Abstract Submission Deadline
Friday, 23 January 2009

Abstract Notification
February 2009

Early Registration Fee Deadline
March 2009

Registration Deadline
July 2009

Late Registration
From Saturday, 1 August 2009

Important Dates

WFUMB 2009

World Congress in Medical Ultrasound

Sydney Australia

12th World Congress of the World Federation for Ultrasound in Medicine and Biology

30 August to 3 September 2009

Incorporating

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ASUM CEO Contact
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Email: carolinehong@asum.com.au

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Promoting Excellence in Ultrasound

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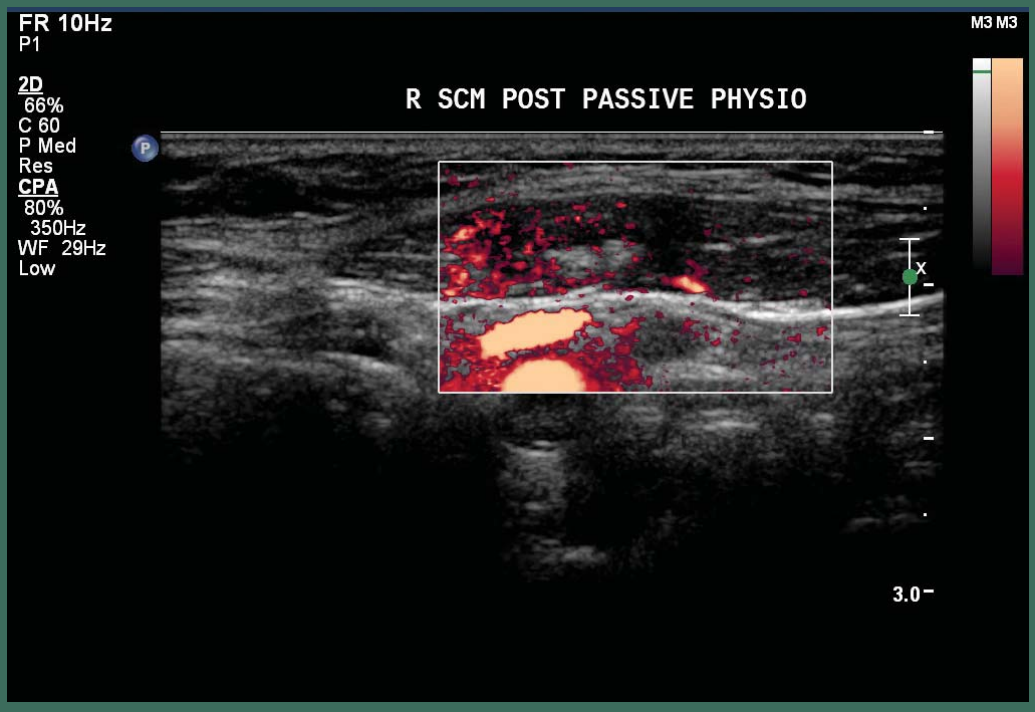

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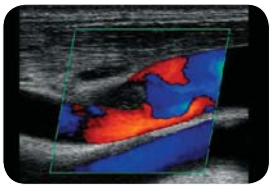

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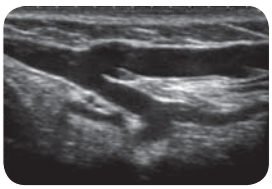

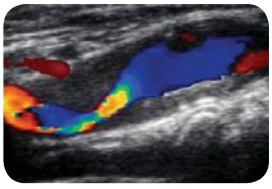

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Australasian Society for Ultrasound in Medicine

Ultrasound Bulletin

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Original research, case reports, quiz cases, short articles, meeting reports and calendar information are invited and should be addressed to The Editor at ASUM's address below

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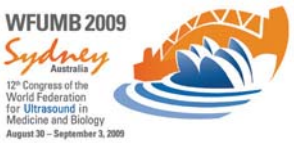

Index to abstracts

Cover image: A pain in the neck – Ultrasound of Sternocleidomastoid syndrome. Page 33

New Editor George Condous


Prof George Condous

Before reviewing this issue, I would like to personally thank Ron Benzie who has been a wonderful editor over the last 12 months. His editorials and choice of content for the ASUM *Ultrasound Bulletin* have set a high standard indeed. We wish him well in his new role as President of ASUM for the next two years. Thank you and we look forward to new and exciting directions for the Society.

It is with great enthusiasm that I take on the role as editor on the eve of WFUMB 2009 in Sydney. As part of the organising committee, I know the program will be very appealing to both local and overseas delegates. We have ensured that all aspects of the sessions are of the highest quality indeed. The Obstetrics and Gynaecology program is no exception to this. The hottest, most well known international and national speakers will be presenting so keep 30th August–3rd September 2009 free!

In this issue, Prof Steve Goldstein, an invited speaker at next year's WFUMB meeting, discusses the role of ultrasound in women with abnormal uterine bleeding. I agree that we need to have a 21st century approach to this century old problem. In modern practice, these women should not be subject to unnecessary surgical intervention in the form of hysteroscopy D&C to make a diagnosis. High resolution transvaginal ultrasound holds the key to the work-up of these women.

Prof Dirk Timmerman, (a good friend and co-author in many of my papers), co-authors an academic update on the IOTA trial with Dr Joan Veldman. The International Ovarian Tumor Analysis group has published more than 25 papers relating to the use of ultrasound and mathematical models to predict the likelihood of malignancy in adnexal masses. This wonderful work has set the benchmark for gynaecological ultrasound academic work worldwide. Timmerman, *et al.* challenge the role of serum CA 125 in the pre-operative work-up of ovarian masses, publishing that ultrasound experience alone can distinguish between benign and malignant masses. I agree with their conclusions that experienced sonologists do not need CA 125 to improve diagnostic capabilities when determining the likelihood of malignancy in an ovarian mass. This new concept goes against the teachings of our gynaecological oncology colleagues who use the Risk of Malignancy Index (RMI). I believe that serum CA 125 is essential for assessing the response to chemo/surgical cytoreduction in women with epithelial ovarian cancer. This is akin to serum hCG being utilised to assess the response to methotrexate in women with ectopic pregnancy. The performance of ultrasound in experienced hands to pick up malignancy or an ectopic pregnancy is not improved by the addition of these serum markers. These findings will take many years, however, to translate into clinical practice.

This issue is also bursting with the best abstracts and posters from the Auckland ASUM ASM. Please enjoy the most up to date ultrasonographic approaches conveyed in these well oiled vignettes.

Finally, visit the WFUMB website http://www.wfumb2009.com to see the provisional program and list of exciting speakers. This event does not come to Australia often so I encourage you all to register and support ASUM's hosting of this prestigious congress.

Letter to the editor **The benefits of membership**

Dear ASUM

I received a letter from you dated 25th September 2008. The letter offered me a complimentary membership of ASUM for this financial year.

I wanted to write and express my gratitude for this membership! I'm not sure why I received it but I am very grateful and will use your internet and DVD resources to do some extra CPD. I recently attended the ASUM conference in Auckland and was very impressed with the standard of the talks and particularly the skill development workshops. I learnt a lot and am grateful for the experience. Congratulations on a fantastic meeting.

I am a sonographer that works in the remote North West of WA in the small town of Exmouth. You may have heard of us with the recent Qantas flight incident (I was involved in x-raying many of the injured passengers before they were transferred to Perth). I have been performing x-ray and ultrasound examinations here on a part time basis for two years and more recently was employed full time to cope with the increasing demand in both x-ray and ultrasound.

I trained in radiography and later in ultrasound at QUT in Brisbane and moved to Exmouth to pursue my interest in scuba diving and whale sharks in 2001. After a five-year break from ultrasound while swimming with whale sharks along the Ningaloo Reef every day, I approached the local health service with my qualifications and managed to get them to send up an old US machine (GE Logiq 500) and multi-format camera for the images. I have been working on this equipment since 2006 and just recently we received Teleradiology equipment which has allowed a faster link to the radiologists in Fremantle.

I really enjoy my job and helping out the locals and visitors, who would otherwise face a 6–12 hour return drive for ultrasound services depending on sonographer fly-in visits in other areas or a flight to Perth with overnight stays, which creates problems for families and those with job commitments. Although we don't have the technology of metropolitan hospitals, we do our best with what we have and I work very closely with the local doctors to help with diagnosis and determining who is evacuated out and who can be treated locally. It can be quite challenging but is very rewarding.

One of my biggest challenges is attending CPD events and keeping up to date with the new stuff that is so far away (We are 1300 km from Perth). I was able to attend the ASUM conference with the help of a scholarship from the Australian Rural and Remote Health Professional scholarship Scheme administered by Services for Australian Rural and Remote Allied Health (SARRAH). I was very grateful for their assistance to attend this fabulous conference and extend my knowledge.

I am also very grateful for the complimentary membership and although I am a financial member of the ASA, I do follow the ASUM news as well and look forward to now receiving the quarterly *Ultrasound Bulletin* and watching some DVDs.

Thanks again

Allison (Ali) Richards
Radiographer/Sonographer
Exmouth District Hospital

(Editor's note – ASUM provides complimentary membership for full fee paying participants at ASUM major meetings and also offers reduced rates for students).

President's message


Prof Ron Benzie

It is both a privilege and an honour to have been elected by Council to be your President for the next two years. Matthew Andrews, your previous President did a sterling job steering the Society through some difficult issues with tact and diplomacy. He was a good role model for future presidents.

Another Past President, Andrew Ngu, our Honorary Treasurer, is also on Council so I will call on both for their advice and experience to help me in the months ahead.

The Society also has four new Council members. Drs Michael Carr, Lucia Pemble, Fergus Scott and Ms Karen Waalwyk were welcomed to their inaugural Council Meeting in Auckland on 20th September 2008. The fact that a radiologist head of a large corporation, an academic sonographer, an obstetrician gynaecologist with fetomaternal medicine expertise and a sonographer, who are all busy in private practice are willing to volunteer their valuable time to the Society bodes well for us all. It demonstrates the range of disciplines of ASUM office bearers. Outgoing Council members Stephen Bird, Kaye Griffiths and John Crozier have been stalwart supporters of ASUM with whom I have enjoyed serving. Our grateful thanks to them. We will doubtless rely on them in the years to come.

Now I don't know about you, but I come back from an ASUM annual conference, like last month's Annual Scientific Meeting in Auckland, full of energy and enthusiasm. So bear with me if I go on a bit in this my first message to you as President. Hospital bureaucracy, fiscal restrictions and administrative drudgery will soon haul me back to reality. As will the struggles to find a suitable nuchal translucency on a 130 kg mother!

But, who could fail to be invigorated by some of the presentations in Auckland? From overseas we had superb speakers from 12 different countries, some of whom will also be presenting at WFUMB 2009 so we will have another opportunity to learn from them. Amongst the local speakers, I managed to hear an excellent first presentation on five cases of the rare Pentalogy of Cantrell by Waikato student sonographer Mel MacRury. I also got to Prof Holden's talk on ultrasound in renal transplantation and learned a great deal in an area of which is beyond my ken. Such was the spectrum of content that there was something for everyone.

This conference was an example par excellence of what ASUM

Letter to the editor

Dear ASUM

Focused ultrasound in the clinical medicine is now well established in a broad range of specialties, no more so than in emergency medicine where ultrasound is developing a wide range of indications and will likely become an expected standard of care central to our practice.

With emergency departments throughout Australasia now increasingly using ultrasound as part of the bedside diagnostic clinical work-up and to guide a number of procedures, it is timely to acknowledge the role played by John Chambers, Director of Emergency Medicine at Dunedin Hospital, NZ, in introducing ultrasound to our specialty.

John has been using ultrasound in clinical practice since the mid-1980s. On speaking with John, he remembers the time when peritoneal lavage was the investigation of choice for abdominal trauma and establishing the usefulness of bedside ultrasound met with great resistance. However, that was about to change. John was an author of two papers published in the 1980s proposing a role for focused ultrasound in the assessment of blunt abdominal trauma before the term 'Focused Assessment with Sonography for Trauma' or FAST had been coined and before the many articles we have now seen published in the medical literature.

"When we published two small articles on the use of ultrasound in trauma it met with great interest and requests by postcards, (remember this was a time before the internet and e-mail), for reprints came from all corners of the globe including Turkey, Japan, Russia, USA, South America, Germany and France. Now patients benefit daily by the use of ultrasound to answer a variety of clinical questions and hasten diagnosis and treatment".

John Chambers: pioneer of emergency ultrasound

John has continued to use ultrasound as part of his daily clinical practice, more recently attending the first UK Advanced Emergency Ultrasound and Echocardiography Courses held in Cambridge, England and has established regular training courses in emergency ultrasound in Dunedin, NZ. John will also be involved as faculty for the one-day Introductory Emergency Ultrasound Course being run in Wellington this November as part of the Australasian College for Emergency Medicine's Annual Scientific Meeting.

Dunedin ED uses a Sonosite M-Turbo ultrasound machine and report particular success in the area of ultrasound-guided procedures including femoral nerve block and central and difficult vascular access.

It is easy for us all to follow a path that has already been developed for us, what is a lot harder is to have an innovative idea and develop that idea into established clinical practice.

The contribution that John Chambers has made to establishing focused bedside ultrasound in emergency medicine should not be under-estimated. Not only did he have an idea, but he published his work for others to read and develop further. It is said that it takes nearly 20 years for a good idea in medicine to become established as mainstream clinical practice and the use of ultrasound in clinical practice is a good example.

Andrew Haig
Senior Staff Specialist in
Emergency Medicine
Royal North Shore Hospital

does so well. Drs David Rogers and David Davies-Payne and their team deserve our thanks for a meeting which excelled expectations.

ASUM was established to promote the highest possible standards of medical ultrasound practice in Australia and New Zealand. But as the Constitution of the Society states, it has many other objectives, which I am going to paraphrase:

a to contribute to the advancement of the science and practice of ultrasonics in medicine and biology;
b to encourage and assist research and publications;
c to encourage and assist training courses, seminars, conferences to improve ultrasound knowledge and skills;
d to provide instruction by ASUM members in university, medical school, hospital and laboratories;
e to provide scholarships pertaining to the science and practice of ultrasonics in medicine and biology;
f to support professional scientific and technical development;
g to promote high standards by the development of practice guidelines, statements and policies;
h to recognise by diplomas or certificates attainment of practitioners in the field of ultrasound;
i to maintain offices, rooms and libraries for ASUM members;
j to publish relevant books, periodicals or papers;
k to promote social intercourse and good fellowship amongst members;
l to advise government and statutory authorities in any aspect of ultrasonics in medicine and biology.

If you go through these carefully you will see that ASUM does meet most of the objectives and in many areas does them extremely well. But your Society is always evolving. We depend on you to help us improve services to members so if you have ideas or concerns please contact your Council members or myself.

I expect that like me, most of you have never read the Constitution. But it is a fine document reconfigured in 2001 by the ASUM Council and our then new CEO, Dr Caroline Hong. It is available online from the ASUM website (www.asum.com.au) and from the ASUM office on request, and is worth reading. Every so often it is not a bad thing to be reminded of the breadth, scope and importance of your Society in the wider ultrasound world. The attendance at the recent ASUM Annual Scientific Meeting in Auckland of presidents from several Asian, Latin American, American, British and European ultrasound bodies confirms our international status.

We have, thanks to the CEO, Educational Manager, previous Presidents, Councillors and members, close relationships with many overseas organisations.

Relationships with WFUMB (World Federation of Ultrasound Medicine & Biology) whose 12th Congress we are hosting in 2009, with the Royal Australian New Zealand College of Obstetritians and Gynaecologists (RANZCOG), the Royal Australian and New Zealand College of Radiologists (RANZCR), the Australian Sonographers Association (ASA), the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) and the World Interactive Network Focused on Critical Ultrasound (WINFOCUS) are all vital and are often synergistic. Which just means that together we can achieve more than any one organisation can alone. Our strength is in our multidisciplinary nature. We are not solely a sonographer's or an obstetrician's or a radiologist's or intensivist's or internist's or vascular surgeon's society. Because we cross these many, often closely guarded, boundaries, we have an unique role in the global development of ultrasound and ultrasound education. Make no mistake, when overseas bodies propose conjoint educational programs it is because they recognise that ASUM has a reputation for providing good ultrasound education in many areas. ASUM therefore needs to guard its predominant position in our region in an increasingly globalised, brand-conscious world.

ASUM is also unique in that it certifies and grants diplomas which have maintained the high standard of ultrasound in our region. Dr Glenn McNally's foresight and energy put us in the forefront of certification of physicians who use ultrasound in daily practice. This does not mean referred ultrasound which should always be in the realm of specialist sonographers and sonologists. The CCPU maintains our lead in the field of specific ultrasound training in diverse areas of clinical practice. I firmly believe this is the way forward. Just as sonographers and clinicians have to maintain competence, so the doctor using ultrasound as a tool in patient management needs to be appropriately trained and have his or her competence tested at intervals. The incentive for life-long learning should not just be the fear of litigation,

We all know the importance of the DMU for sonographers and the DDU for sonologists – not only as a ticket to work in well-paid professions. As professional members of our Society we also have other responsibilities. For example, the importance of keeping our policies and guidelines updated cannot be understated. Simon Meagher and his colleagues on the Standards of Practice Committee have been busy reviewing our policies, statements and we owe them our gratitude.

Other responsibilities we can all partake in may even include sitting through lectures given in halting English by foreign physicians at an annual conference! The mere fact that these doctors have travelled far and are willing to present data in a language which they were not brought up to speak, merits our respect. We should also bear in mind that the relationships so formed can enhance our own lives. I have been very lucky in my career to have had many junior and senior colleagues from overseas who have enriched my professional life – and not only because of their exotic cuisines. Contact with colleagues from various religious, ethnic and geographic groups can surely only be mutually beneficial.

It is only 10 months until WFUMB 2009 and just like the Sydney Olympics we need volunteers. Please contact the office if you would like to be involved.

The convenors of the various organising committees are hard at work to ensure a successful Congress. Prof Rob Gibson has undertaken the difficult task of being WFUMB 2009 Convenor, keeping everything on track.

The WFUMB board members who visited the Auckland ASUM Congress came away with the certain knowledge that in our part of the world, we know how to organise conferences of exceptional merit. We also know how to enjoy ourselves when the work is done.

This brings me finally to the ultrasound manufacturers whose support is so important. Next time the sales representative disturbs your busy schedule, just remember without the financial backing, the research and innovative advances made by our major sponsors, we would be labouring in very arid vineyards.

If you have read this far, I thank you for your forbearance and I promise that in my future messages I will not mention the C word (constitution) again.

Ron Benzie
President

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CEO's message


Dr Caroline Hong

By the time you are reading this issue of the *Ultrasound Bulletin*, we will be well advanced in many of the cyclical activities of the Society, as well as making progress in the newer projects that take up the time and expertise of the volunteer members and Secretariat staff of ASUM.

ASUM welcomes new President Prof Ron Benzie

It gives me great pleasure to advise that ASUM has a new President in Prof Ron Benzie for the next two years from 2008 to 2010. Many of you will know Prof Benzie as the previous Editor of the *Ultrasound Bulletin* and President Elect for the past year, succeeding Dr Matthew Andrews, who served ASUM from 2006 to 2008.

Prof Ron Benzie is an Aberdeen graduate who has worked in obstetrics and gynecology and ultrasound in university hospitals in UK, Canada and Australia. He is widely published internationally and is currently the Director of Perinatal Ultrasound at the Nepean Hospital in Western Sydney. Prof Benzie's main research interest recent years has been in the field of prenatal diagnosis. He founded the international fetal anomaly database PLATYPUS (Program Listing Abnormality and Prenatal Ultrasound) and is involved in the development of electronic aids for diagnosis and the assessment of their role in medical education. His current research is concerned with prenatal fetal diagnosis using 3D and 4D ultrasound technology. Prof Benzie conducts research at the Nepean Clinical School at the Nepean Teaching Hospital of the University of Sydney.

ASUM thanks these people for their kind support of ASUM's educational, professional and research projects

Dr Greg M Briggs
Ms Katherine Karakalpakis
Dr Judith Krones
Dr George Larcos
Dr David Lipp
Dr Harley Roberts
Dr Helen E Scott
Dr John Stewart
Dr Margaret Thomson
Dr Peter S Warren
Dr Hong Soo Wong
Dr Christian H. Wriedt
Dr Caroline Hong and ASUM staff

ASUM 2008 Auckland Annual Scientific Meeting

"The ASUM meetings seem to get better each year", "ASUM 2008 Auckland is definitely the best ASUM meeting I have ever attended!" – these were the exact words of delegates, sponsors and exhibitors at ASUM 2008 Auckland.

It was important to us that participants enjoyed themselves in the City of Sails and that their conference objectives were met. The conference feedback received to date has been very positive. Everyone seemed to exude an overall sense of joy in learning, participating, networking, peer connecting, exchanging information, conducting good ultrasound education and healthcare business.

Once again, on behalf of the ASUM Executive, Council and the ASUM 2008 Conference Organising Committee, I would like to thank everyone involved with the organisation of and support for the 38th Annual Scientific Meeting of the Australasian Society for Ultrasound in Medicine in Auckland, New Zealand. I also thank all who attended this meeting.

In particular, thanks go to Dr David Rogers and Dr David Davies-Payne and their organising committee for working with the local conference agents, Lynda Booth and Karen Williamsen of WORK4U in Auckland. More than 470 people attended this event.

Our sincere thanks go to each and everyone who contributed to the staging of the best ASUM conference held since 1970! My gratitude extends to the speakers, delegates, sponsors and

exhibitors who contributed to this successful meeting.

Our heartfelt gratitude goes to Toshiba, GE Healthcare, Siemens and Philips, our Gold Sponsors and to all the exhibitors who supported the meeting.

We also thank all the local and the international speakers, many of whom travelled long distances and paid their own way to present and share their ultrasound expertise and experiences with you at this meeting. We are grateful to the keynote international speakers, namely Dr Bernard Benoit, Prof Peter Burns, Dr Rhodri Evans, Prof Syed Amir Gilani, Dr Philippe Jeanty, Dr Kevin Martin, Prof Christian Nolsøe, Prof Liane Philpotts, Dr Iryna Tsikhanenka and Prof Masosatoshi Kudo.

We also thank GE Healthcare once again for additionally sponsoring Prof Bernard Benoit. We are also grateful to Dr Philippe Jeanty for his CD ROMs and DVDs on Fetal Echocardiography, which are now available for sale to members from the ASUM website: www.asum.com.au (limited stock available).

The ultrasound practice in medicine in Australia and New Zealand is among the best in the world. With its unique team approach harnessing the important contributions of the sonologist and the sonographer, our ultrasound industry effectively and successfully provides the best health outcome for the patient.

WFUMB 2009 – an event of a lifetime not to be missed! www.wfumb2009.com

Bigger and more exciting than ever, the next 39th Annual Scientific Meeting of ASUM, the ASUM 2009, together with the ASUM 2009 MDW multidisciplinary workshops, will be held here in Sydney at the "Olympics" of ultrasound meetings, the WFUMB 2009 World Medical Ultrasound Congress.

I urge all members to diarise the dates, Sunday 30th August to Thursday 3rd September 2009 now. I also encourage all members to log on to the official congress website www.wfumb2009.com to view updates. Registration is now open online, so book early to qualify for the early bird rates and to secure your accommodation bookings in Sydney. The Call for Abstracts closing date has been extended from 28th November 2008 to 23rd January 2009, to allow more time for you to submit online.

I am pleased also to announce the appointment of the new Congress convenor, Prof Rob Gibson. Robert Gibson is Prof and Deputy Chairman, in the Department of Radiology, at The University of Melbourne, and staff radiologist at The Royal Melbourne Hospital. His main clinical and research interests lie in ultrasound and gastrointestinal and hepatobiliary radiology, both diagnostic and interventional. He led the development of a new radiology curriculum for medical students at The University of Melbourne, which forms the basis of the CD *Medical Imaging*. He has been Secretary of ASUM, Chairman of its Education Board, and was foundation Editor of its journal. He serves on the editorial board of several international journals.

> The registration fee for three days attendance at WFUMB 2009 is equivalent to the registration fee for the 2008 Annual Scientific Meeting (a three day event)

The Organising Program Committee has worked tirelessly to bring you an exciting program of plenary lectures, special topics presentations and workshops. Being an international world congress, expecting to attract 3500 to 5000 people from all around the world, this congress will feature a diverse profile of delegates, speakers, presenters and exhibitors of all nationalities.

This WFUMB 2009 Congress will be different from all previous world congresses, in that it takes all the best from past congresses and the best from ASUM annual meetings and workshops, ensuring that we will cater for the diverse objectives of our international participants.

There will be disciplines covering nearly all aspects of medicine. The workshops will be very popular and will be booked out quickly. We have a very high level of technical expertise amongst the sonographers and sonologists and they will showcase a complete range of workshops at this world event. ASUM has for many years worked with the RANZCOG in running the Nuchal Translucency courses and this course will be conducted during the congress.

Exhibition space is been taken up as the applications come in, so I urge all potential exhibitors to sign up early to secure your space. ICMS Pty Ltd will again work with ASUM to provide

We want your memories

ASUM has been in existence for almost 40 years and is approaching some significant milestones such as our 40th year issue of the *Ultrasound Bulletin* in February 2010.

We are keen to preserve as much of our history as possible.

Apart from having a historical feature in the 40th year issue we intend to have a historical display at WFUMB 2009.

So if you have historically significant material ASUM would like access to it.

What is historically relevant?

- Old photos of interest such as people, equipment, buildings and premises
- Old posters or brochures of events, equipment
- Group photographs of former ASUM Councils, Branches etc
- Movie clips, videos or slides
- Documents of historical significance

If you have memories that you would like to share with us please record it. Up to 5,000 words is acceptable.

Contact ASUM by email asum@asum.com.au.

the congress secretariat services. Many of you who have attended an ASUM meeting in Australia, will be familiar with ICMS and its staff. ICMS has offices in Melbourne, Sydney, Brisbane and Canberra.

Early pregnancy courses Sydney and Melbourne

ASUM was approached to go into a joint venture with the Early Pregnancy and Gynaecology Scanning Foundation, to run early pregnancy and gynaecology courses. The previous courses last year were so successful that this year, another two courses were organised for Sydney and Melbourne. The joint course that ran on 18th and 19th October 2008 at the Nepean Hospital, was chaired by Assoc Prof George Condous and supported by the University of Sydney and attracted about 30 people.

The joint course, which ran from 25th and 26th October 2008 at the Epsworth Hospital in Melbourne, was chaired by Dr Monica Pahuja and attracted 47 people.

ASUM holds this course jointly and promotes common education objectives with the Early Pregnancy and Gynaecology Scanning Foundation whose purpose is "to undertake and promote clinical research in early pregnancy loss i.e. miscarriage and ectopic pregnancy. This ethos is also applicable to the use of ultrasound and, in particular, transvaginal ultrasound as a diagnostic tool in the management of common gynaecological complications, all necessary for the improvement of women's healthcare and optimising medical approaches in these ailments".

Giulia Franco Teaching Fellowship, ASUM Education Day in the ACT proudly sponsored by Toshiba

An ASUM ultrasound education day was conducted on 18th October 2008 in Canberra, ACT, at the ANU Medical School, Canberra Hospital. The teaching fellow, Mr Martin Necas and presenters Dr Wes Cormick, Prof David Ellwood, Dr Meiri Robertson and Ms Debra Paoletti, had a very successful day attended by 50 people.

The Giulia Franco Teaching Fellowship was established to increase the educational opportunities for members outside the major centres. Each teaching fellow is appointed by the education committee to conduct workshops and seminars primarily, but not exclusively, in centres that would not normally host a major scientific meeting. Martin Necas was the Travelling Fellowship recipient for the Giulia Franco Traveling Fellowship for 2008 and we thank Toshiba for the generous support for this event.

All participants receive 6 points in the MOSIPP Category 2. I would also like to thank Sue Caitcheon for her enthusiastic support in helping organise this event.

Toshiba (Australia) Pty Limited celebrates 30 years

Left: Dr Caroline Hong (ASUM CEO) congratulating Mr Atsutoshi Nishida, Global President and CEO of Toshiba, on the 30 years celebration of Toshiba in Australia; Right: Mr Nick Swann, Dr Caroline Hong, Mr Atsutoshi Nishida, Dr Ron Shnier, Mr Mark Masterson, Ms Maryanne McHugh at the Toshiba 30 years celebration of Toshiba Australia in Sydney.

Dr Caroline Hong, ASUM CEO, was pleased to join in the celebration, hosted by Global President and CEO, Mr Atsutoshi Nishida from Japan, to mark the 30 years anniversary of Toshiba Australia at the Shangri-la in Sydney on 11th August 2008. Toshiba Australia has been one of the major supporters of ASUM since its inception in Australia in 1978.

Mr Nishida leads the Toshiba company which has a history dating back over 130 years, and has revenues in excess of US$76.7 billion and over 197,000 employees world wide.

Mr Nick Swaan, General Manager, leads Toshiba Australia's Medical Division which provides products and service support in Computed Tomography, X-Ray and Ultrasound.

Toshiba Australia was founded in 1975 as a joint venture with EMI and became Toshiba Australia in 1978. This is comprised of the following business divisions: Information Systems Division, Electronic Imaging Division, Medical Division, Research and Development and Corporate Services.

ASUM congratulates Toshiba on the 30 years celebration and appreciates their cooperation in achieving common goals in promoting excellence in ultrasound, through educational activities and offering the latest in imaging technology to ASUM members to help them in their jobs in saving lives and improving the health of people in Australia and New Zealand.

Toshiba was the first company in September 2007, to announce its major sponsorship of the WFUMB 2009 World Medical Ultrasound Congress to be held in Sydney from 30th August to 3rd September 2009. The Congress will attract global attention to medical imaging ultrasound technology and its increasing applications in saving lives and improving health world wide.

DMU Board of Examiners meets in Sydney 18th–19th October 2008

Members of the DMU BoE held a workshop at the ASUM office in Sydney over two days on DMU examinations and the DMU curriculum. Margaret Condon, Chair of the DMU BoE and members of the board also attended a presentation conducted by Margo Gill on an ASUM project relating to the Part II curriculum development of the DMU. I was able to witness part of what and how the DMU BoE worked together as a group. It is inspiring to see the dedication and devotion that these volunteer members give so willingly to the society. We owe it to people such as those on the board and many others out there in the membership, who continue to uphold the high standards of the DMU in the ultrasound community and profession, locally and internationally.

ASUM DMU (Asia) Vision College

I am pleased to announce that since the commencement of the DMU (Asia), 22 diplomas have been awarded, with another batch to be awarded in November 2008. In 2008 the ASUM members who were selected to represent ASUM in either presenting as lecturers or examiners at Vision College in Kuala Lumpur include Barry Lennon, Naomi Rasmussen, Elvie Haluszkieweicz, Brian Starkoff, Michelle Pedretti and Roger Gent.

CCPU

The Certificate in Clinician Performed Ultrasound (CCPU) is offered by ASUM as a credential for medical practitioners who are not imaging specialists but who use ultrasound as a diagnostic tool at the point of care. Details of the regulations and specifications are outlined on the ASUM website www.asum.com.au in the CCPU section.

The Certificate in Clinical Ultrasound is awarded by the Council of ASUM on the recommendation of the CCPU Certification Board.

Currently there are CCPU panels in five disciplines, namely Emergency, Neonatal, Obstetrics & Gynaecology, Critical Care, and Surgical, with a Sports Medicine panel soon to be confirmed. The CCPU Panels meet several times a year to focus on curriculum and syllabus development and to assess award applications. The CCPU Certification Board also meets several times a year and is chaired by Dr Glenn McNally.

To date we have awarded the CCPU to 14 members, four in the Emergency CCPU, six in Neonatal CCPU and four in O&G CCPU. There has been a lot of interest in the ASUM CCPU and education providers are encouraged to submit their courses for accreditation and recognition towards the CCPU. There are at least 15 programs that are recognised by ASUM for the CCPU provided by various ultrasound education providers in Australia.

ASUM congratulates the following award winners

Congratulations are due to many people who have been recognised for various awards during the AGM and the Gala Dinner at the ASUM 2008 Auckland Annual Scientific Meeting:

- Dr Peter Duffy – Life Member, admitted at the AGM on 20th September 2008
- Dr Glenn McNally – Honorary Fellow
- Mr Stephen Bird – Honorary Fellow
- Giulia Franco Teaching Fellowship – Martin Necas. Sponsored by Toshiba
- Chris Kohlenberg Teaching Fellowship – Yisha Tong. Sponsored by GE
- Beresford Buttery Teaching Fellowship – Assoc Prof Hans Peter Dietz. Sponsored by GE Healthcare
- Anthony Tynan Award for Best Clinical Presentation (sponsor – Siemens-Medical Solutions) – Dr Rachael McEwing
- Best Research Presentation (sponsor – Siemens-Medical Solutions) – Ms Susan Campbell-Westerway
- Best Sonographer Research Award (sponsor – Philips Healthcare) – Mr Nevile Phillips
- Best Poster Award (sponsored by ASUM) – Mr Hitoshi Inuzuka
- Best Student Presentation Award (sponsored by Australian School of Medical Imaging) – Ms Mel MacRury
- UI UL Plenary Award to Assoc Prof Anthony Doyle.

I wish to conclude my message by taking this opportunity to extend my thanks to the outgoing councillors, Stephen Bird, Dr John Crozier and Kaye Griffiths for their support and hard work over the years in their capacities as councillors.

Dr Caroline Hong
Chief Executive Officer
carolinehong@asum.com.au

HONOURS LIST

The following members were recognised at the AGM held on 20th September 2008 in Auckland New Zealand

Dr Peter Duffy – Life Member
Dr Glenn McNally – Honorary Fellow
Mr Stephen Bird – Honorary Fellow

Call for Volunteers for WFUMB 2009

WFUMB 2009 needs you!

If you wish to volunteer your services and help WFUMB 2009 to be a truly successful event, please contact the ASUM Office on (02) 9438 2078

Immediate Past President's message

Dr Matthew Andrews

This is my final President's message for the ASUM Bulletin[1]. I would like to take the opportunity to reflect on the highlights of the last two years and to give my perspective on the future of ASUM and its ongoing role in ultrasound in Australia and New Zealand.

ASUM: the past two years

The past two years have seen the Society build on its already very firm base.

The Annual Scientific Meeting and the Multidisciplinary Workshop remain well entrenched as the Society's two annual showcase ultrasound meetings. Specific short courses are also provided throughout the year, with local ASUM branches providing education lectures to local members. The 2007 Annual Scientific Meeting held in Cairns in northern Queensland marked a departure from having capital cities as venues. This risky decision was vindicated with a highly successful meeting in the quality of presentations and attendance. Credit is due to both the local organisers and the ASUM Secretariat.

The long-standing traditional and prestigious ASUM ultrasound qualifications; the Diploma of Diagnostic Ultrasound (DDU) and the Diploma of Medical Ultrasonography (DMU) have been joined by the introduction of the Certificate in Clinician-Performed Ultrasound (CCPU), the first of which was awarded just over a year ago. The innovative CCPU heralds a whole new dimension to ASUM's purpose, reflecting its ability to adapt the ever changing nature of ultrasound practice.

The purchase of new ASUM premises, which were officially opened by the Federal Health Minister, the Hon Tony Abbott in June 2007 reflects the progress of the Society. ASUM can truly be proud of its state-of-the art facility, providing appropriate housing for the secretariat and a venue for on-site teaching. This new home base will be an apt hub for the Society for many years to come.

Mandatory accreditation for access to Medicare rebates has been introduced for all diagnostic imaging services, including ultrasound. ASUM has played a key role in the establishment of initial ultrasound standards, using its unique position of representing multiple diverse ultrasound provider groups. As ultrasound progresses, ASUM as the peak ultrasound body will be a major authority on the development of ongoing standards of practice.

We are now in the countdown period for the World Federation of Ultrasound in Medicine and Biology (WFUMB) 2009 World Congress being held in Sydney. This has been an ongoing project since ASUM won the bid to host the Congress in 2003. A large number of ASUM members and staff have contributed considerable efforts over the past five years in ensuring a most successful meeting. ASUM can be proud of this groundwork and of those who will continue their input, culminating in the event in late August 2009

ASUM: future role

Medical ultrasound within Australasia is of an excellent standard, in no small part due to the contribution our Society has made to the education, research and standards of practice within ultrasound. The future of ultrasound practice is very positive however rapid advances and changes in practice must be continually reviewed and embraced sensibly by the profession if ultrasound is to retain its current credibility as an imaging modality.

As with any professional organisation, ASUM must continue to review its role and services so that its members needs are met and it attracts the maximum number of potential members, ensuring that it reflects current ultrasound practice. ASUM will gain maximum credibility and authority through its membership strength.

Ultrasound practice is heading in two distinct directions: referred type ultrasound performed by imaging specialists such as radiologists, obstetrician or vascular sonologists and ultrasound performed by clinicians as a part of their clinical examination of the patient. ASUM and similar societies around the world have traditionally catered to the first group, however with the advent of more portable and affordable high quality ultrasound machines with expanding applications; it is logical and appropriate that ultrasound should also be used as a clinical tool. ASUM therefore has an obligation to ensure that patients receive an appropriate standard of ultrasound service, no matter by whom it is performed. It is for this reason that ASUM has pioneered the Certificate in Clinician Performed Ultrasound (CCPU), catering to the targeted requirements of clinicians, utilising the expertise and experience of its traditional ultrasound professional members, who are dedicated to ultrasound either as sonologists or sonographers.

This exciting new dimension to ultrasound provides significant logistical challenges to ASUM, especially in catering to the wide and ever-expanding number of clinician groups using ultrasound. In addition to a common ultrasound physics module, each group requires specific training and credentialing dedicated to the particular profiles of the clinicians' work. I am confident ASUM will meet this and other future challenges that new applications of ultrasound will doubtless provide.

Referred ultrasound is performed by specialist sonologists who either perform the scans themselves or work in conjunction with sonographers. In my time of ultrasound practice, there has been a maturation of the working relationship between sonologists and sonographers. There is no question that the best ultrasound result for the patients occurs where there is a functional relationship of mutual respect of sonographers' and sonologists' skills

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and expertise in contributing to the examination. The sonologist brings medical expertise and experience and the sonographer contributes scanning skill and expertise, optimising images to facilitate the appropriate diagnosis and management of the patient. When there is frequent, open and appropriate communication between sonographer and sonologist, the patient is the beneficiary. ASUM will continue to build on this team approach, which was initiated some years ago by ASUM making sonographers full members of the Society. More recently, ASUM and the Australian Sonographers Association (ASA) have made preliminary moves to cooperate in areas of mutual interest. As with the ultrasound examination, success of these initiatives will be largely dependent on the two organisations mutually recognising and respecting each other's perspectives. It has become clear that both organisations have distinct functions and roles, which should be maintained, but where there is overlap, the sensible and logical course is to pool precious resources to the overall benefit of all involved in the ultrasound profession. I look forward to the enormous enthusiasm displayed by ultrasound personnel for their profession being channeled and utilised in the most efficient manner towards our common goal, without unnecessary duplication.

One of ASUM's ongoing fundamental and crucial roles will be to ensure that standards of ultrasound practice are appropriate and safe. With the increased availability and access to simpler and ever-improving machines, there is a temptation to believe that ultrasound can be easily performed. ASUM must ensure that it remains the appropriately qualified and credentialed operator who takes responsibility for ultrasound service. More than ever, it is imperative ASUM strengthens its advisory role to legislative authorities, insisting that ultrasound services provided to patients are of an adequate and safe standard and that ultrasound is appropriately placed as part of the spectrum of available diagnostic imaging services.

Finally, I would like to thank ASUM for the honour and privilege of serving as its President for the last two years. The task would not have been possible without the outstanding support, counsel and contribution of my fellow Councillors, Executive members, and the ASUM Secretariat. I wish Prof Ron Benzie every success as the new ASUM President. The Society will be in excellent hands under his leadership. ASUM's immediate task is the success of the WFUMB 2009 World Congress, but it is important we now also look and plan beyond. I look forward to a continued long relationship with ASUM.

Matthew Andrews

1 The report in the August issue was my final contribution to the ASUM Annual Report

DMU PREPARATION COURSES AND DDU TECHNICAL SEMINAR 2009

Cardiac DMU Preparation Course
Sydney 25th–29th March 2009

General, Vascular & Obstetric DMU Preparation Course
Sydney 18th–21st April 2009

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For further details contact ASUM by email on dmu@asum.com.au.

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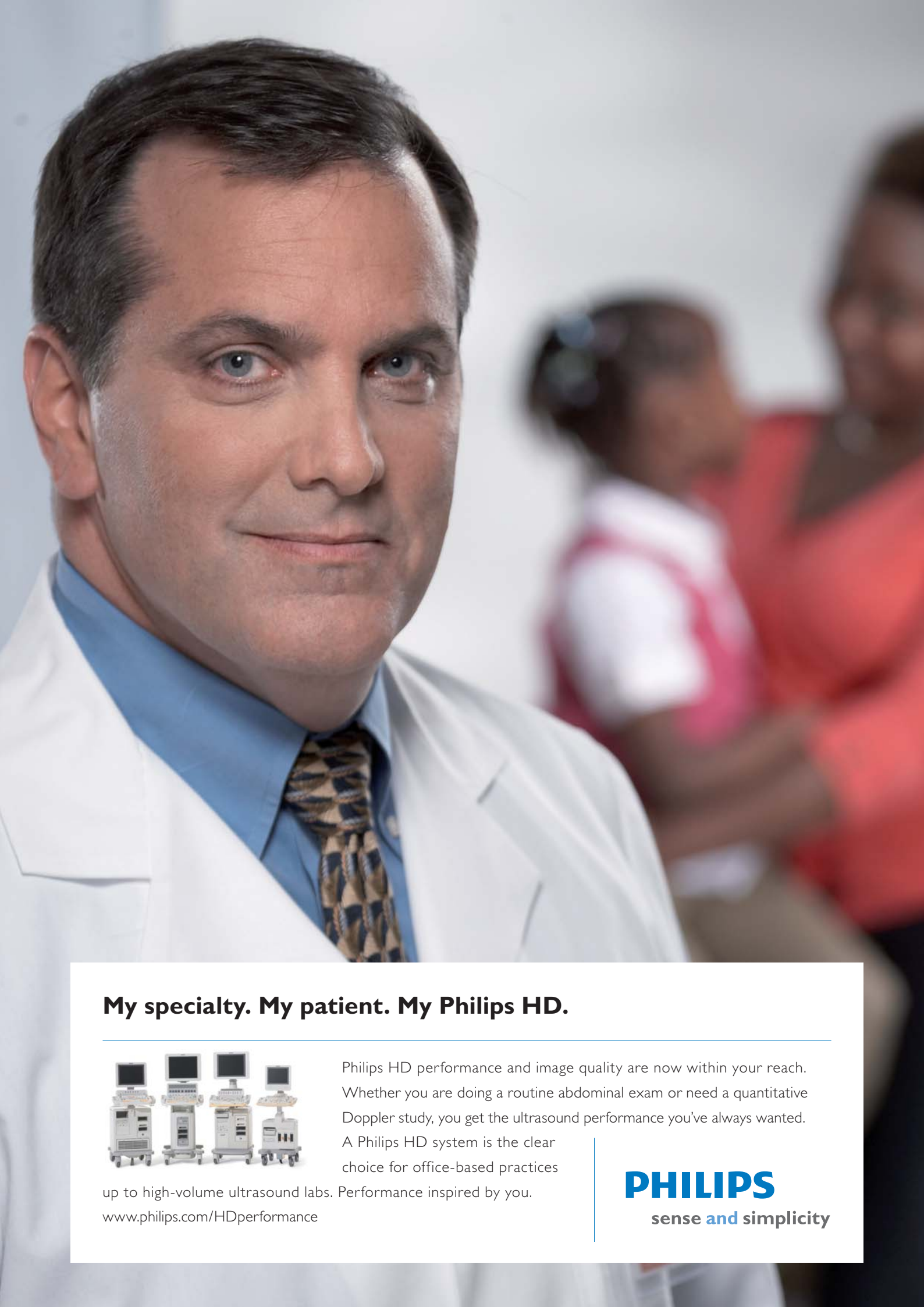

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Abnormal uterine bleeding: transvaginal ultrasound or endometrial biopsy?

Steven R Goldstein

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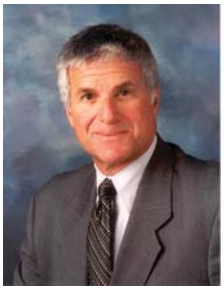

Introduction

Abnormal uterine bleeding (AUB) should be classified in to three different categories based upon the woman's age and menopausal state.

1 Pre-menopausal women under 40 years who are at low risk of endometrial pathology, i.e. most likely dysfunctional uterine bleeding
2 Pre-menopausal women over 40 years with AUB
3 Post-menopausal women with bleeding.

The first group can be further divided into those women under 40 years who are at high risk (obesity, diabetes mellitus, polycystic ovary syndrome (PCOS)) of global endometrial pathology.

Dilatation and curettage

The traditional gold standard for endometrial evaluation was dilation and curettage (D&C). First described in 1843[1], it became the most common operation performed on women in the world. However as early as the 1950s, a review of almost 7000 curettage procedures found that the technique missed endometrial lesions in 10% of cases[2]. Of these, 80% were focal endometrial lesions, i.e. endometrial polyps. In addition, curettage before hysterectomy found that in almost 20% of specimens less than one-quarter of the cavity was curetted. In 60% of specimens less than one-half of the cavity was curetted. In the 1970s, vacuum suction curettage devices allowed sampling without anaesthesia in an outpatient office setting. The most popular was the VABRA (Berkley Medevices, Berkley California) aspirator. Subsequently, cheaper, smaller, less painful plastic catheters with their own internal pistons to generate suction became popular. One of these, the Pipelle (Unimar, Cooper Surgical, Trumbull, Connecticut) device was found to have similar efficacy with much better patient acceptance when compared to the VABRA.

In my opinion, rarely has a device like the endometrial Pipelle biopsy gained such widespread acceptance with so little prospective validation. It was first described by Cornier in 1984 in an article entitled *The Pipelle: a disposable device for endometrial biopsy*[3]. If you put 'Pipelle' into PubMed you see that from 1988–1991 there were eight papers, seven of which evaluated Pipelle (often compared to other methods) for timed endometrial biopsy in the luteal phase as part of an infertility evaluation; something no longer employed. Then in 1991 Stovall, *et al*. performed endometrial Pipelle biopsies on 40 women with known endometrial carcinoma in the outpatient clinic before their scheduled hysterectomy[4]. They identified endometrial carcinoma in 39 of 40 patients, yielding a sensitivity of 97.5%. These findings were widely advertised throughout the early 1990s. It is easy to understand why clinicians rapidly adopted this as the method of choice for endometrial evaluation. Coming from D&C and then VABRA aspirator, suction piston biopsy instruments were safe, easy, and inexpensive, and resulted in less patient discomfort or need for anaesthesia or analgesia. The device became so popular that, although many clinicians use other brands, the word 'Pipelle' has become synonymous with suction piston biopsy instruments just as we often ask for a 'Kleenex' even though our tissue comes from another manufacturer or we will say we are going to the 'Xerox' machine even though our copier may be some other brand.

The sensitivity of such suction piston biopsy devices is quite variable. In other studies of women with known endometrial malignancies who underwent Pipelle biopsy prior to hysterectomy, the diagnosis of cancer was missed in two of 26 patients (7.6%)[5] and in 12 of 37 patients (23.4%)[6]; not nearly as reliable as indicated in the original work by Stovall. The significance of the limitation of such sampling was further underscored in the study by Guido *et al*.[7] They also studied the Pipelle biopsy in women with known endometrial carcinoma undergoing hysterectomy. Among 65 women with known cancer of the endometrium, Pipelle biopsy detected malignancy in only 54 (83%). Thus, there was a 17% false negative rate in these women with known carcinoma. However, when the uterine specimens were analysed, of the 11 cases that were missed, the tumour occupied less than 5% of the surface area in three, occupied 6%–25% surface in another four, and in the remaining four the tumour occupied between 26%–50% of the uterine cavity. Further, when the tumour was confined to a focal lesion (polyp) Pipelle missed 5 of 11. When the tumour involved more than 50% of the cavity, Pipelle missed none. Thus, based on the fact that tumours localised in an endometrial polyp or small area of the endometrium went undetected, the authors in that study concluded that "Pipelle was excellent for detecting global processes in the endometrium".

Perhaps much of the limitation of suction piston biopsy devices comes from the fact that such devices sample a small surface of the endometrial cavity. Rodriguez, *et al.* did a pathological study of 25 hysterectomy specimens[8]. The percentage of the endometrial surface sampled by the Pipelle device was 4% (range 0%–12%). From these data, it seems that undirected sampling whether through curettage or various types of suction aspiration will often be fraught with error, especially in cases in which the abnormality is not global but focal (polyps, focal hyperplasias, or carcinomas involving small areas of the uterine cavity).

Transvaginal ultrasound

Transvaginal ultrasound scan (TVS) was introduced in the mid 1980s. It utilises higher frequency transducers in closer proximity to the structure being studied. This yields a degree of image magnification that is a form of 'sonomicroscopy' in which structures that cannot be appreciated with the naked eye can actually be discerned. It has been studied significantly in post-menopausal women with bleeding. Five large studies, mostly out of Scandinavia and Italy[9, 10, 11, 12, 13], of post-menopausal women with bleeding who had an endometrial echo ≤4 mm on TVS revealed only three cancers in 2752 women. Stated another way, a woman, with post-menopausal bleeding (PMB) and a thin distinct endometrial echo ≤4 mm, has a risk of having endometrial cancer as low as 1 in 917. Contrast that with the false negative rates of blind endometrial sampling in women with known endometrial carcinoma cited above. TVS can also be used in the evaluation of non-menopausal women similar to that in menopausal women. The biggest difference (and this is fundamentally crucial) is that if you employ TVS or saline infusion sonohysterography (SIS) in women who still have endogenous ovarian function (i.e. they are making estrogen) then any ultrasound evaluation must be timed to the end of the bleeding episode and be done as soon as possible after the bleeding ends, when the endometrial thickness will be as thin as possible. In post-menopausal women with no oestrogen stimulation and thus no 'cycling', ultrasound evaluation is not time sensitive and can be performed at any time. In the event a woman is on hormone replacement therapy (HRT), timing will depend on the type of hormone therapy employed. In continuous combined HRT, there is no cycling and evaluation of the endometrium can be done at any time. With sequential HRT, there is development of the functionalis of the endometrium by estrogen and then sloughing after the administration of a progestogen. These women should have the endometrium evaluated like other cycling women i.e. as soon as possible after the bleeding ceases.

Limitations of transvaginal ultrasound

Not all uteri lend themselves to a meaningful examination and will not always display a reliable endometrial echo. Since TVS will not yield a tissue diagnosis, it is important that it be appropriately performed and the outcome appropriately documented. I am convinced that if one angles the transducer long enough eventually one could always find something linear and white and freeze the frame, place calipers and call this the 'endometrial echo". A well-defined endometrial echo should be seen taking off from the endocervical canal. It should be distinct. Often fibroids, previous surgery, marked obesity or an axial uterus may make visualisation suboptimal. If so it is perfectly acceptable and in fact appropriate to conclude "endometrial echo not well visualised". In these cases, the ultrasound cannot be relied upon to exclude pathology. SIS with endometrial biopsy or hysteroscopy with D&C are both appropriate steps in endometrial evaluation of such women if there is a history of PMB. In women who present with PMB who undergo SIS as part of their work-up, difficulty in distending the endometrial cavity is associated with a 7x increased risk of underlying malignancy[14].

Transvaginal ultrasound in non-bleeding post-menopausal women

The increasing use of imaging in a variety of clinical situations has led to the identification of thick endometrial findings in asymptomatic (i.e. non-bleeding) post-menopausal women. The significance of a thick endometrial echo in non-bleeding post-menopausal women has not been validated. Of postmenopausal, 10%–17% women will have asymptomatic polyps. The incidence of malignancy in such polyps approaches 0%[15,16] while complication rates associated with operative hysteroscopy approach 3.6%[17]. Quiescent anatomic structures may be common, never before detected, and easily seen with the improved resolution of all imaging modalities. Additional testing and evaluation has not been shown to be necessary or clinically relevant, and in some cases may result in more harm than good. Obviously decisions about what to do with incidental unexpected findings should be made on a case-by-case basis depending on a multitude of factors. A thin, distinct endometrial echo on a woman with PMB has a very high negative predictive value but a thick endometrial echo in a woman without bleeding is unvalidated and does not require automatic sampling.

Conclusions

Women with AUB under the age of 40 years should have a TVS to exclude focal pathology and as a rule do not require an outpatient endometrial Pipelle biopsy to exclude global pathology. In women with high risk of endometrial global pathology such as obesity, PCOS needs to be evaluated on an individual basis. Women with AUB over the age of 40 years should have a TVS to exclude focal pathology and as a rule do require an outpatient endometrial Pipelle biopsy to exclude global pathology. Women with PMB and an endometrial echo ≤4 mm on TVS as a rule do not require an outpatient endometrial Pipelle biopsy, whilst those women with an endometrial echo >4 mm should have SIS to exclude focal pathology followed by an outpatient endometrial Pipelle biopsy. Inpatient hysteroscopy D&C as a diagnostic tool should be replaced by high resolution TVS ± outpatient endometrial Pipelle biopsy.

References

1 Ricci JV. Gynaecologic surgery and instruments of the nineteenth century prior to the antiseptic age. In: The development of gynaecological surgery and instruments. Philadelphia: Blakiston; 1949. p. 326–8.

2 Word B, Gravlee LC, Widemon GL. The fallacy of simple uterine curettage. *Obstet Gynecol* 1958; 12: 642–5.

3 Cornier E. The Pipelle: a disposable device for endometrial biopsy. *Am J Obstet Gynecol* 1984; 48: 109–10.

4 Stovall TG, Photopulos GJ, Poston WM, Ling FW, Sandlers LG. Pipelle endometrial sampling in patients with known endometrial carcinoma. *Obstet Gynecol* 1991; 77: 954–6.

5 Zorlu CG, Cobanoglu O, Isik AZ, Kutluay L, Kuscu E. Accuracy of Pipelle endometrial sampling in endometrial carcinoma. *Gynecol Obstet Invest* 1994; 38: 272–5.

6 Ferry J, Farnsworth A, Webster M, Wren B. The efficacy of the Pipelle endometrial biopsy in detecting endometrial carcinoma. *Aust N Z J Obstet Gynaecol* 1993; 33: 76–8.

7 Stovall TG, Photopulos GJ, Poston WM, Ling FW, Sandles LG. Pipelle endometrial sampling in patients with known endometrial cancer. *Obstet Gynecol* 1991; 77: 954–6.

8 Rodriguez MJ, Platt LD, Medearis AL, Lacarra M, Lobo RA. The use of transvaginal sonography for evaluation of postmenopausal size and morphology. *Am J Obstet Gynecol* 1988; 159: 810–4.

9 Karlsson B, Granberg S, Wikland M, *et al*. Transvaginal ultrasonography of the endometrium in women with postmenopausal bleeding – Nordic multicenter study. *Am J Obstet Gynecol* 1995; 172: 1488–94.

10 Ferrazzi E, Torri V, Trio D, Zannoni E, Filiberto S, Dordoni D. Sonographic endometrial thickness: a useful test to predict atrophy in patients with postmenopausal bleeding. An Italian multicenter study. *Ultrasound Obstet Gynecol* 1996; 7: 315–21.

11 Gull B, Carlsson S, Karlsson B, Ylostalo P, Milsom I, Granberg S. Transvaginal ultrasonography of the endometrium in women with postmenopausal bleeding: is it always necessary to perform an endometrial biopsy? *Am J Obstet Gynecol* 2000; 182: 509–15.

12 Epstein E, Valentin L. Rebleeding and endometrial growth in women with postmenopausal bleeding and endometrial thickness <5 mm managed by dilatation and curettage or ultrasound follow-up: a randomized controlled study. *Ultrasound Obstet Gynecol* 2001; l8: 499–504.

13 Gull B, Karlsson B, Milsom I, Granberg S. Can ultrasound replace dilatation and curettage? A longitudinal evaluation of postmenopausal bleeding and transvaginal sonographic measurement of the endometrium as predictors of endometrial cancer. *Am J Obstet Gynecol* 2003: 188; 401–8.

14 Epstein E, Ramirez A, Skoog L, Valentin L Transvaginal sonography, saline contrast sonohysterography and hysteroscopy for the investigation of women with postmenopausal bleeding and endometrium > 5 mm. *Ultrasound Obstet Gynecol* 2001 Aug; 18: 157–62.

15 Fernandez-Parra J, Rodriguez Oliver A, Lopez Criado S, Parrilla Fernandez F, Montoya Ventoso F. Hysteroscopic evaluation of endometrial polyps. *Int J Gynaecol Obstet* 2006; 95: 144–8.

16 Shushan A, Revel A, Rojansky N. How often are endometrial polyps malignant? *Gynecol Obstet Invest* 2004; 58: 212–15.

17 Lev-Sagie A, Hamani Y, Imbar T, Hurwitz A, Lavy Y. The significance of intrauterine lesions detected by ultrasound in asymptomatic postmenopausal patients. *Br J Obstet Gynaecol* 2005; 112: 379–81.

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IOTA: an international prospective study on the pre-operative characterisation of ovarian tumours based on predictive computer models

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Correspondence to Professor Dirk Timmerman. Email dirk.timmerman@uzleuven.be

Dirk Timmerman

Joan Veldman

The pre-operative differentiation between benign and malignant ovarian tumours remains a major challenge for clinicians. A reliable diagnosis is essential for an appropriate treatment, which will influence the outcome for the patient and the medical costs.

In the case of benign functional cysts we could suffice with conservative treatment to avoid unnecessary morbidity and impaired fertility. Most benign non-functional cysts can be treated with minimally invasive surgery[1,2]. In this way, the duration of hospitalisation and revalidation will be limited and morbidity will be minimal in comparison with surgery after midline laparotomy. On the other hand, patients with a suspicious adnexal mass require a series of expensive and unpleasant staging examinations and laparoscopy should be avoided in early stage ovarian cancer, because the rupture during surgery of a Stage 1 ovarian cancer may worsen the prognosis[3]. Whenever a mass is considered to be malignant, the patient should be referred to a gynaecologic oncologist for proper staging and debulking of the tumour, since the amount of residual malignant tissue after primary surgery is one of the most important factors in ovarian cancer[4].

In 1990, Jacobs, *et al*. combined measurements of serum CA-125 with women´s menopausal status and ultrasound features of ovarian tumours to estimate the risk of an ovarian tumour being malignant (the risk of malignancy index (RMI[5]). This test is widely used in oncology units. In prospective studies the RMI reaches an AUC of around 0.89.

The International Ovarian Tumour Analysis (IOTA) study is a multicentre collaborative project which aims to improve the pre-operative diagnosis of ovarian tumours by using predictive computer models. A consensus statement on terms and definitions was published in 2000[6].

The first phase of IOTA was conducted between 1999 and 2002. Several new mathematical models were developed based on the prospectively collected data of 1066 patients with a persisting adnexal tumour in nine European centres. The IOTA logistic regression model 1 performed very well when tested prospectively (AUC 0.93) and was significantly better than the RMI. A measurement of serum CA-125 is not improving the performance of mathematical models[8]. Furthermore, ultrasound performed by experienced examiners was proven to be superior to assessing the level of serum CA-125 for discrimination between benign and malignant adnexal masses[9].

Between 2002 and 2005, three centres continued the prospective collection in order to be able to perform an internal validation of mathematical models developed in IOTA Phase 1. In this so-called IOTA Phase 1b study a new dataset of 507 new patients was prospectively collected in three out of the original nine centres. All models proved to perform excellently with AUCs of more than 0.94.

The second phase of IOTA consisted of an external validation of the models and this was conducted between 2005 and 2007. The diagnostic algorithms were prospectively validated on 1938 patients in 19 centres in Belgium, Italy, UK, Sweden, Poland, Czech Republic, Canada and China. A first analysis showed that the overall performance of the logistic regression models was excellent (AUC 0.93).

However, these results were obtained by specialised gynaecologic ultrasound units in tertiary centres and cannot be extrapolated to peripheral centres where the quality is almost certainly more variable. Moreover, even for the expert sonologist using subjective impression as for the mathematical models, approximately 8% of the adnexal masses were difficult to classify as benign or malignant and lay close to the decision boundary. Unfortunately, models that were built especially for the classification of these difficult masses showed disappointing results[10]. Therefore, a subgroup of 'uncertain' tumours needs a reliable second stage test to help even experienced ultrasound examiners. Promising techniques are intravenous ultrasound contrast agents, proteomic analysis, new sets of tumour markers and 3D power Doppler ultrasonography. Until now none of these techniques has prospectively been tested in a multicentre study.

In the third phase of the IOTA study, we plan to validate the use of second stage tests in order to provide reliable classifications in cases where the presently developed mathematical models result in uncertain diagnoses. Finally, an improvement in pre-operative diagnosis and subsequent management of patients with adnexal tumours should decrease morbidity, costs and duration of hospitalisation and improve survival of patients with ovarian cancer.

References

1 Medeiros LR, Stein AT, Fachel J, Garry R, Furness S. Laparoscopy versus laparotomy for benign ovarian tumours. Cochrane Database Syst Rev 2005; 20: CD004751.

2 Carley ME, Klingele CJ, Gebhart JB, Webb MJ, Wilson TO. Laparoscopy versus laparotomy in the management of benign

unilateral adnexal masses. *J Am Assoc Gynecol Laparosc* 2002; 9: 321–6.

3 Vergote I, De Brabanter J, Fyles A, Bertelsen K, Einhorn N, Sevelda P, Gore ME, Kaern J, Verrelst H, Sjövall K, Timmerman D, Vandewalle J, Van Gramberen M, Tropé CG. Prognostic importance of degree of differentiation and cyst rupture in stage I invasive epithelial ovarian carcinoma. *Lancet* 2001; 357: 176–82.

4 Hacker NF, Berek JS, Lagasse LD, Nieberg RK, Elashoff RM. Primary cytoreductive surgery for epithelial ovarian cancer. *Obstet Gynecol* 1983; 61: 413–20.

5 Jacobs I, Oram D, Fairbanks J, Turner J, Frost C, Grudzinskas JG. A risk of malignancy index incorporating CA 125, ultrasound and menopausal status for the accurate preoperative diagnosis of ovarian cancer. *Br J Obstet Gynaecol* 1990; 97: 922–9.

6 Timmerman D, Valentin L, Bourne TH, Collins WP, Verrelst H, Vergote I. Terms, definitions and measurements to describe the ultrasonographic features of adnexal tumors: a consensus opinion from the international ovarian tumor analysis (IOTA) group. *Ultrasound Obstet Gynecol* 2000; 16: 500–5

7 Timmerman D, Testa AC, Bourne T, Ferrazzi E, Ameye L, Konstantinovic ML, Van Calster B, Collins WP, Vergote I, Van Huffel S, Valentin L; International Ovarian Tumor Analysis Group. Logistic regression model to distinguish between the benign and malignant adnexal mass before surgery: a multicenter study by the International Ovarian Tumor Analysis Group. *J Clin Oncol* 2005; 23: 8794–801.

8 Timmerman D, Van Calster B, Jurkovic D, Valentin L, Testa AC, Bernard JP, Van Holsbeke C, Van Huffel S, Vergote I, Bourne T. Inclusion of CA-125 does not improve mathematical models developed to distinguish between benign and malignant adnexal tumors. *J Clin Oncol* 2007; 25: 4194–200.

9 Van Calster B, Timmerman D, Bourne T, Testa AC, Van Holsbeke C, Domali E, Jurkovic D, Neven P, Van Huffel S, Valentin L. Discrimination between benign and malignant adnexal masses by specialist ultrasound examination versus serum CA-125. *J Nat Cancer Inst* 2007; 99: 1706–14.

10 Valentin L, Ameye L, Jurkovic D, Metzger U, Lécuru F, Van Huffel S, Timmerman D. Which extrauterine pelvic masses are difficult to correctly classify as benign or malignant on the basis of ultrasound findings and is there a way of making a correct diagnosis? *Ultrasound Obstet Gynecol* 2006; 27: 438–44.

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Finger brachial indices: can they predict steal post fistulae formation?

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Abstract

Background: Symptomatic steal phenomenon is a rare complication following insertion of upper limb arteriovenous fistula formation (AVF)[1]. This phenomenon involves a reduction in distal limb perfusion resulting in numbness, paraesthesia, pallor, decreased sensation and, in severe cases, ischemic ulcers[2]. ***Aims:*** The aim of the study is to demonstrate that finger brachial indices (FBI) can be used to prevent the potential of steal syndrome after fistula formation and therefore improve the patient's outcome and to implement these results in the laboratory criteria. ***Methods:*** Thirty-three patients requiring haemodialysis AV access were initially evaluated. Nineteen males and 14 females with mean age of 57 ± 27 years old took part in the study. Duplex scans and digital pressures were performed pre-operatively, a day post-operatively and at a six week follow-up. Due to illness and other personal circumstances, only 15 patients could be followed up to six weeks and six patients one day post-operatively. ***Results:*** Pre-operative FBI can prevent the potential of significant clinical steal syndrome. The results show that patients who developed symptomatic steal had FBI <0.9 pre fistula formation and FBI of <0.6 post-AVF formation. These patients had lower absolute finger pressures pre and post AVF formation compared to patients with no complications. Of symptomatic patients, 86% were diabetic and had calcified upper limb arteries. ***Conclusion:*** FBI should be included as a pre-operative test prior to fistula formation in patients that have pre-existing vascular disease and are diabetic. The results indicate that pre-op FBI can prevent the potential of the development of a steal phenomenon.

Keywords: Fistulae, finger brachial index (FBI), arteriovenous fistula (AVF), steal phenomenon, ischaemic monomelic neuropathy (IMN).

Introduction

Two clinical variants of hand ischaemia are recognised: vascular steal syndrome and ischaemic monomelic neuropathy (IMN).

The pathogenesis of vascular steal occurring with an end-to-side radiocephalic fistula or brachiocephalic fistula is that the fistula provides a low pressure run off system with the distal radial or brachial artery acting as a conduit for reversed blood flow from the digital and palmar arch arteries through to the arteriovenous fistula (AVF).

Reverse flow detected in an arteriovenous (AV) access does not indicate clinical vascular steal syndrome. Reverse flow is common within AV access with previous studies showing that steal phenomenon occurs in most patients but only in a small number of these patients do symptoms of arterial insufficiency develop[3].

Related vascular steal syndrome symptoms include numbness, paraesthesia, pain, pallor, ulcers or absent pulses. Diagnosis is usually clinical and finger brachial indices (FBI) tests have been used to document the severity of vascular steal and also when the diagnosis is uncertain.

Steal syndrome after AVF formation may be an acute or chronic presentation. Hand ischaemia caused by steal syndrome after the creation of AVF is a rare complication with incident rates ranging between 3% and 7%[4]. The rates vary due to increased risk factors in certain patients and also the type of fistula that is formed. Steal is more likely to develop in patients with arteriovenous fistula than in patients with prosthetic grafts[5]. However, prosthetic grafts fail more frequently than AVF due to an increased rate of infections and pseudoaneurysm[6]. Diabetics have an increased risk for ischemic complications because of calcified atherosclerotic disease[1]. Patients with brachio-cephalic AVF also have an increased risk factor for ischaemic complications because the brachial artery provides the only blood supply to the hand and the diversion of blood flow through an AVF may produce distal ischaemia. Other factors that can produce steal are inflow/outflow vessel stenosis and anastomotic or segmental stenosis[2].

The blood flow and flow rates through the fistula are required to be sufficient for haemodialysis and maintaining patency. High volume flows may decrease the perfusion to the limb and cause distal limb ischaemia.

Ischaemic monomelic neuropathy is a complication of AV access seen mainly in diabetic patients[6]. IMN is an alteration in blood flow to the vasa nervosum and can occur acutely and often causes irreversible dysfunction of radial and ulnar nerves. IMN can be differentiated from true vascular steal by the presence or absence of tissue ischaemia. IMN produces tingling of the hand and numbness without arterial circulation compromise. These patients experience acute pain, weakness and muscle paralysis of the forearm and hand. IMN shows no obvious decrease in FBI or reduced finger pressures.

Finger pressure indices are a simple non-invasive test that can be performed prior to an AVF insertion. FBI have

been previously analysed and they have been used to provide information to prevent the development of steal[7]. Previous studies utilised FBI <0.6 to prevent steal and showed sensitivity of 100%, specificity 76%, the positive value 46% and negative predictive value 100%[7]. The same study showed that absolute finger pressures of <50 mm Hg on the day of surgery can predict which patients are at risk for the development of steal[8].

FBI post surgery can be used to differentiate between true ischaemia from IMN and to quantify the severity of steal.

Methods

Patient selection

There were 33 patients, 19 males and 14 females with mean age of 57 ± 27 years, that required arteriovenous fistula creation and presented to the vascular laboratory for a vein mapping scan, underwent finger pressure measurements and duplex ultrasound examination of the upper limb vessels to obtain baseline values. All patients were informed of the study objective and agreed to participate.

The finger pressures were compared to the contralateral brachial pressure to obtain FBI post operatively.

Of the patients, 48% were diabetic, 36% had peripheral vascular disease, 63% had hypertension and 27% had hypercholesteremia.

Patients with previous AVF access were excluded from the study.

Ultrasound assessment

A high resolution 7–12 MHz transducer was used for the duplex ultrasound examination. Duplex was used to evaluate the morphology, diameter, maximum/minimum peak systolic velocities and flow rates.

Lesions detected in the cephalic vein or at the anastomosis were described by location and the degree of narrowing was assessed by the increase in peak systolic velocities.

Finger pressure measurements

Index pressure measurements were taken bilaterally using the DASH 2000 (GE software version 2, patient monitor 227 499 06US/E, Fairfield, Connecticut, USA) non-invasive blood pressure monitor. A suitable arm and finger pressure cuff was used. The Nellcor pulse oximeter was attached to the index finger. Both the brachial and finger pressures were taken and repeated three times. The average value was then used to obtain the FBI.

Steal related symptoms categorised for this study were classified according to Fontaine's classification[9].

Stage 1: Reduced finger pressure index with coldness of hand or discolouration.
Stage 2: Intermittent pain during dialysis.
Stage 3: Ischemic rest pain.
Stage 4: Ulceration and necrosis.

Results

Fifteen patients were followed up to 6 weeks and six patients were only followed up one-day post-operatively. The remaining 12 patients were unavailable post-operatively and at six weeks due to personal circumstances. In total 12 patients had brachio-cephalic AVF, seven had radio-cephalic AVF and two patients had a PTFE loop performed.

Eight patients showed FBI of <0.6 post-operatively. Five of these eight patients complained of steal related symptoms and came under Stage 1 category. One patient had severe steal and ulceration of the fingertips with no perfusion signals obtained from the index finger. Two-thirds of patients with steal related symptoms had FBI of <0.9 pre-operatively and FBI <0.6 post-operatively. These results are consistent with previous findings[2].

Patients that developed steal symptoms had predisposing factors and co-morbidities including diabetes, high blood pressure, pre-existing vascular disease and calcified arteries. Four of the five symptomatic patients were diabetic and had hypercholesteremia. Interestingly enough, these patients had brachio-cephalic AVF and flow rates exceeding 2 L/min post-operatively. These patients also showed reduced antegrade flow in the brachial artery distal to the AVF anastomosis and AVF stenosis of >50%.

Two thirds of the patients with FBI <0.6 post-operatively and had no symptoms at all, showed AVF flow rates of <2 L/min, retrograde flow in the distal native artery and no stenosis in the AVF.

Discussion

There are multiple factors that can cause symptomatic steal including high flow through the AVF, insufficient collateral circulation, inflow artery stenosis, outflow or anastomotic stenosis[2]. Differential diagnosis should be taken into consideration such as IMN, carpel tunnel and venous hypertension. IMN is an alteration in blood flow to the vasa nervosum, it occurs acutely and often causes irreversible dysfunction of radial and ulnar nerves. Ischaemic monomelic neuropathy can be differentiated from true vascular steal by the presence or absence of tissue ischaemia. IMN produces tingling of the hand and numbness without arterial circulation compromise. To confirm significant steal, AVF compression should have been performed while taking finger pressures. Partially compressing/occluding the fistula should increase perfusion to the hand and elevate the FBI by at least 50% to confirm significant steal.

The patients with related steal symptoms experienced temporary reduction in blood flow and FBI days after the operation. Most of these patients had FBI >0.6 at their six-week follow up with complete resolution of their symptoms. This suggests that sufficient collateral flow is established within days or weeks post operatively. However, limb ischaemia can occur at any time after AVF access and therefore it's important for these patients to continue a surveillance program including FBI.

Conclusion

Steal syndrome is the condition of arterial insufficiency distal to an AVF. From these results it can be concluded that patients with pre-existing vascular disease and are diabetics have a greater risk in developing steal complications post AVF formation. Patients that developed steal syndrome had brachio-cephalic AVF, flow rates of >2 L/min, FBI <0.9 pre-operatively and FBI <0.6 post-operatively. Furthermore, these patients showed reduced antegrade flow in the native artery distal to the AVF anastomosis and displayed AVF stenosis/stenoses of >50%. However, the value of pre-operative evaluation to prevent steal has been analysed but steal

syndrome is still unpredictable due to multiple factors[16].

FBI should be performed on patients pre-operatively if they have clinical evidence of pre-existing vascular disease and are diabetic. Reports show the possibility of preventing the development of steal related symptoms using FBI studies as a diagnostic test pre-operatively.

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References

1 AE. Henriksson, D. Bergqvist. Steal syndrome of the haemodialysis vascular access: Diagnosis and treatment. *J Vasc Access* 2004; 5: 62–8.

2 Goff, *et al*. *Ann Vasc Surg* 2000; 14: 138–44.

3 Duncan H, Ferguson L, Farin I. Incidence of the radial steal syndrome in patients with Brescia fistula for haemodialysis: It's clinical significance. *J Vasc Surg* 1986; 4(2): 144–7.

4 AG Martin, M Grasty, PA Lear. Haemodynamics of brachial arteriovenous fistula development. *J Vasc Access* 2000; 1: 54–6.

5 Valentine RJ, Bouch CW, Scott DJ. Do preoperative finger pressures predict early arterial steal in haemodialysis access patients? A prospective analysis. *J Vasc Surg* 2002; 2: 351–6.

6 Anne Marie Miles. Upper limb ischemia after vascular access surgery: Differential diagnosis and management.

7 Papasavas PK, Reifsnyder T. Prediction of arteriovenous access steal syndrome utilising digital pressure measurements. *Vasc Endovascular Surg* 2003; 37(3): 179–84.

8 Odland MD, Kelly PH. Management of dialysis-associated steal syndrome complicating upper extremity arteriovenous fistulas: Use of intraoperative digital photoplethysmography. *Surgery* 1991; 110(4): 664–9; discussion 669–70.

9 Vascular Society Guidelines. Vascular Society. Available online at: www.vascularsociety.com/guidelines [verified October 2008].

Did you measure it?

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Introduction

The measurement of organs and structures is an integral part of the majority of ultrasound examinations.

A discussion between four senior sonographers revealed that there were three separate opinions on correct caliper placements for calculation of something as supposedly simple as a bladder volume. This variation prompted the thought 'Why are we not all measuring the same way?'

A review of a selection of reference books was interesting. Most of the references provided a 'normal range' of measurements, with either limited or no instruction on performing the measurement and few, if any, criteria given for patient positioning, or what constituted the correct plane to perform the measurement.

In the first section, the author reviews the literature. In the second section, the author suggests criteria for making consistent measurements.

Bladder

The method of calculation of bladder volume is inherently inaccurate – our calculations use the volume of an ovoid sphere, but the bladder is very rarely spherical.

Tempkin[1] makes no mention of criteria for measurement of the bladder, but provides a volume of '16 to 18 ounces of urine' with a wall measurement of '1 cm or less' (p 184).

Goldberg[2] makes no mention of how to measure the bladder, but provides a normal volume (p 338) of 300 to 1000 mL. and a wall measurement of 'not exceeding 5 mm'.

Gill[3] has a sparse section on ureters and bladder (p 172) and states that the bladder has an 'average storage capacity of 400 to 500 mL in the adult'. No wall measurement or instruction is given as to methods of calculating this volume.

Sanders[4] (p 332) informs us that 'bladder volume can be calculated by multiplying width, height, and length and halving the result', and that both pre- and post-void views should be obtained. A normal adult bladder volume is given (p 331) as 'about 150 to 400 cc' and we are told the normal bladder empties completely. We are also told that the thickness of the bladder wall should be '3 mm thick when distended, and 5 mm thick when empty' (p 330).

Kawamura[5] states that the normal bladder has a potential capacity of 600 to 800 mL (p 418), with a bladder wall thickness 'from 3 to 6 mm, depending on the degree of bladder distension' (p 423). Kawamura continues on to explain that the bladder volume is calculated using the 'formula V = width x height x depth.', but continues 'the formula is sometimes presented as V = transverse x anteroposterior (AP) x length' (p 426) and that bladder capacity should be noted. However, no instructions or criteria on where or how to measure the bladder volume or wall thickness are provided.

Rumack, *et al.*[6] tells us that the bladder wall should be 'smooth and of uniform thickness' (p 327) but give no indication of volume or size, just an instruction that the 'bladder is best evaluated when it is moderately filled.'

Prostate

Tempkin[1] gives instruction on prostate examination only via the transrectal approach but does not discuss measurement of the prostate, or normal size for the gland.

Gill[3] states that prostate size increases with age (p 356), and that 'glandular volumes can be calculated during imaging of the prostate in the transverse plane'. Gill further states that the weight of the gland is equal to the volume in cubic centimeters, with the weight of the gland for a younger patient given as 20 g. He goes on to state that, after 50 years, the 'gland weight doubles every 10 years', giving a prostate gland weight of more than 40 g as enlarged in the older man. No instruction of how to perform the measurement or how to calculate the volume is given.

Goldberg[2] (p 420) states the prostate measurements are 'approximately 3.5 cm in transverse dimension (width), 3.5 to 4 cm in cephalocaudal dimension (length) and 2.5 to 3 cm in anterior-posterior dimension (depth), but does not state whether the measurement is performed using the transabdominal, transperineal or transrectal approach.

Curry and Tempkin[7] describe both a transrectal and transabdominal approach to imaging the prostate, however, a normal prostate measurement of '4 cm transverse, 3 cm anteroposterior, 3.8 cm in length' (p 210) is provided.

Kawamura[5] discusses the measurement of the prostate gland from a transrectal approach and states that the gland should be measured at the level of the verumontanum in 'both a transverse (35 mm to 45 mm) and an anteroposterior (15 mm to 25 mm) dimension (p 454).

Rumack, *et al.*[6] also describe a transrectal approach, with measurements given as 'maximal transverse width (right to left), anteroposterior (anterior midline to rectal surface), length (maximal head to foot)' (p 402). Rumack, *et al.* continue on to state that 'prostate volume is calculated with the oblate spheroid formula: volume = 1.57 (W x AP x L)' and tell us that the prostate volume can be converted to weight using '1 mL of prostate tissue is equivalent to 1 g', although no further instruction on where to measure the prostate is given.

Kidney

Tempkin[1] (p 114) gives the instruction to measure the 'long axis of the left kidney with superior to inferior measurement' with no other guidance as to correct placement of the calipers. However, Tempkin[1] (p 112) describes a transverse image of the 'kidney midportion' with 'anterior to posterior measurement' instructing us to include the hilum, with calipers placed anterior and posterior (AP) on the image. Confusingly, on p 118, exactly the same instruction is given with the calipers placed transversely, rather than AP. The normal adult kidney

measurement is given as '9 cm to 12 cm long, 2.5 cm to 3.5 cm thick, and 4 cm to 5 cm wide' (p 101).

Goldberg[2] states that 'each kidney usually lies off-axis to the longitudinal plane' (p 331) and states that 'to measure accurate renal lengths, scans must be obtained along this longest renal axis'. He states (p 335) that 'the right kidney is 10.74 cm (± 1.35 cm SD) in length, and the left measures 11.10 cm (± 1.15 cm SD). The kidneys measure approximately 5 cm to 5.5 cm in width and approximately 3.5 cm to 4 cm in depth'.

Gill[3] (p 170) states that the adult kidneys 'average 11 to 13 centimeters in length, 5 to 7 centimeters in width, and 2 to 3 centimeters in anteroposterior thickness, with the left kidney being slightly larger', but no instruction is given as to the method for obtaining the measurements.

Curry and Tempkin[7] provide 'normal measurements' (p 116) for the adult kidney as 'approximately 9 to 12 cm in length, 2.5 to 4 cm in depth, and 4 to 6 cm in diameter'. These measurements are similar but not exactly the same as given in Tempkin[1]. The text continues with description of the size of paediatric kidneys, however, no description of the correct caliper placement or patient position for obtaining these measurements is given.

Sanders[4] (p 309) states that a normal adult kidney ultrasound measurement is 'between 8 and 13 cm in length.' The paragraph continues with a parenchyma measurement of 2.5 cm thick, and a width measurement of 5 cm. Fig. 31.8 gives us a line drawing of liver, kidneys and spleen superimposed on a dotted lumbar spine, and the caption states that 'the longest renal length should be obtained' and continues that a length measurement 'taken along a standard longitudinal view of the kidney is too short'.

Hagen-Ansert[8] tells us that the normal adult kidney varies 'from 9 to 12 cm in length, 2.5 to 3 cm in thickness, and some 4 to 5 cm in width' and continues on to state that both kidneys 'attain approximately the same dimensions' and that a 'difference of more than 1.5 to 2 cm is significant', although no instruction as to where to obtain the measurements is given.

Kawamura[5] tells us that the kidney size is 'approximately 10 to 12 cm long, 5 to 7.5 cm wide, and 2 to 3 cm thick and weighs approximately 130 to 150 g' (p 322). No criteria for measurement are given.

Rumack, *et al.*[6] tells us that in the adult the kidney is 'about 11 cm long, 2.5 cm thick, 5 cm wide, and weighs between 120 and 170 g' (p 323), with a discussion on correlation of kidney size with right or left side, body height, gender, and age all being relevant to changing size and volume of the kidney.

Liver

Tempkin[1] gives no instruction on liver measurements, and tells us 'size and shape are variable' (p 53).

Goldberg[2] instructs us to measure the liver (p 81) 'in the right midclavicular line on a full view image of the liver from the dome to its inferior tip' and continues 'if the entire liver cannot be pictured on one image, then two images are pieced together, using an internal landmark such as the right portal vein'. He quotes Gosink and Leymaster and states that 'normal livers measure 13 cm or less' but further states 'hepatomegaly is present when the liver measures 15.5 cm or greater.'

Gill[3] states that 'the craniocaudal length of the right lobe of a normal adult liver is 13 to 15.5 cm' (p 97), although the method for obtaining this measurement is not explained.

Curry and Tempkin[7] (p 88) state that normal measurements are 'not applicable', however, on p 78, they state that 'Along the midclavicular line, the normal longitudinal measurement of the right lobe is less than or equal to 13 cm', but go on to state that the 'measurement has also been stated to be 15 to 17 cm'. The midclavicular line in this description is important, however no description of patient position is given, and a description of criteria or how the measurement is performed is also lacking.

Sanders[4] (p 234) gives us a line diagram of an upper torso (Fig. 23.2) with an instruction to measure the length in the midclavicular line. The diagram further shows us the liver measurement is 15 cm. The text instructs us to find a landmark in the midclavicular line, and on serial scans, to always measure at the same level. On page 236 there is a discussion on hepatomegaly which tells us that the liver is 'considered enlarged if it measures more than 15 cm in length at a point midway between the spine and the right side of the body' and refers us to Fig. 23.2.

Hagen-Ansert[8] informs us (p 198) that the liver is 'the largest organ in the body', and that the right lobe 'exceeds the left lobe by a ratio of 6:1', although no measurements or other criteria are provided.

Kawamura[5] provides us with clear and well-defined measurement criteria with Fig. 5.1 on p 117 illustrating the measurements. The author states that there is a 'range of normal measurements. The greatest transverse portion ranges from 20 to 22.5 cm; the greatest anteroposterior measurement, from 10 to 12.5 cm and the greatest length on the right surface, from 15 to 17 cm.' The text continues to explain that 'Liver length and anteroposterior dimensions are obtained from sagittal and parasagittal sections obtained at the midline and the midclavicular line, which runs parallel to the spine midway between it and the right side of the body', but does not state whether the measurements are obtained with the patient in a supine, right anterior oblique or decubitus position.

Rumack, *et al.*[6] discuss two methods of measuring the liver length (p 82): Gosink who measured liver length in the midhepatic line and stated that in '75% of patients with a liver length greater than 15.5 cm hepatomegaly was present'; Niederau, who measured both liver length and AP diameter in 'both the midclavicular line and midline and correlated these findings with gender, age, height, weight and body surface area' concluded that the mean midclavicular, longitudinal, liver length was 10.5 cm with 1.5 cm standard deviation, and an anteroposterior diameter of 8.1 cm with a standard deviation of 1.9 cm.

Pancreas

Tempkin[1] gives no instruction on pancreas measurements, except to say that the normal pancreas does not need to be measured (p 97).

Goldberg[2] gives two sets of numbers for the measurement of the pancreas, and on p 178 (Fig. 9.10) gives us a line diagram of the pancreas with three arrows to indicate the position of the measurements (unfortunately placed two pages after the written description given on p 176). We are told the measurements are to be performed at the level of

the head, at the corporocaudal region and at the level of the isthmus, and the dimensions Goldberg has 'settled on' are given as '35 mm for the head and body, and 25 mm for the isthmus'.

Gill[3] states that 'normal measurements for the adult pancreas are 3 cm for the head, 2 cm for the body and 1 to 2 cm for the tail' and in Fig. 7.6, two of these measurements are illustrated on a sonographic image. However, it is left to the observer to decide which actual measurements are being illustrated; in my opinion the head and the body measurement. In this author's opinion, as the measurements are not labeled and the diagram is too small to adequately demonstrate measurements, this is not a particularly useful illustration.

Curry and Tempkin[7] (p 105) give an illustration (Fig. 7.3) and description of how to perform the measurements, and also give the instruction that 'Readers are advised to consult the scanning protocols at their institutions to determine the acceptable range'. The measurements that are given are for the head 'ranges between 2 and 3 cm in its anterior posterior dimension, though a size as high as 4 cm has been noted'; for the neck 'between 1.5 and 2.5 cm'; the body 'between 2 and 3 cm'; and the tail 'between 1 and 2 cm'. This is possibly the most complete set of instructions and diagram for pancreas measurement this author has seen to date.

Sanders[4] Chapter 22 (p 219–229), gives a detailed and constructive discussion on pancreas anatomy and pathology, but gives no measurements for the pancreas.

Hagen-Ansert[8] tells us that the pancreas is 10 to 15 cm long, and agrees with Arger, *et al*. on a 'head = 2.5 cm; body = 2 cm; and tail = 2 cm' (p 247). A table (Table 14.1) is provided comparing four differing measurements from four authors. There is a description of the anatomical relationships of the pancreas but no criteria or illustration of where the measurements are to be performed.

Kawamura[5] does provide us with criteria for assessing the dimensions of the pancreas by telling us (p 244) the dimensions are best assessed using a true transverse section, and to align the transducer so the 'beam intersects the pancreas perpendicular to its transverse axis', and gives us an anteroposterior dimension of 'no more than 2.5 cm', body 'no more than 1.2 cm' and tail 'not exceeding 2 cm'.

Rumack, *et al.*[6] provide us with a detailed description of the anatomy of the pancreas, the measurements are stated as the 'anteroposterior dimensions of the normal head measured 2.2 to 0.3 cm, with the body measuring 1.8 to 0.3 cm. The cephalocaudal dimension of the head has been reported as 2.01 to 0.39 cm and that of the body as 1.18 to 0.36 cm.' (I have to admit that I was somewhat confused by this explanation.)

Spleen

Tempkin[1] gives no instruction on spleen measurements, but tells us that 'size is variable but is considered normal when it appears about the same size as the adjacent left kidney' (p 123).

Gill[3] states that 'several methods can be used to assess splenic size', (p 224) and goes on to give a measurement of '12 cm to 13 cm long, 6 to 8 cm in the AP dimension, and 4 to 6 cm in the transverse dimension' as normal for an adult spleen but gives no indication of how or where to perform the measurements. Additionally, he gives a volume calculation and splenic index method, but warns that 'all normal organ measurements are relative to patient size'.

Goldberg[2] gives a measurement for the spleen of '11 x 7 x 3 cm with an average weight of 150 g', but no discussion of how or where these measurements are obtained.

Curry and Tempkin[7] (p139) state that the size of the spleen may vary, however 'generally the longest dimension superior to inferior should be no greater than 12 or 13 cm. The largest transverse dimension (anterior to posterior) should be no larger than 7 or 8 cm'. This appears somewhat unclear as the term 'superior to inferior' could be interpreted to mean 'diaphragm to lower pole in a straight line', or bipolar distance – upper pole to lower pole. A further text box entitled 'Normal Measurements' (p 142) states the spleen is 'normally 12 or 13 cm in the superior to inferior axis; 6 or 7 cm in the medial to lateral axis; and 5 or 6 cm in the anterior to posterior plane', but there are no diagrams to explain this description.

Sanders[4] (p 278) gives a definition of splenomegaly as 'enlargement of the spleen', and later (p 279) tells us that with experience 'it becomes obvious when the spleen is enlarged on real-time, but criteria for documenting enlargement are still unsatisfactory'. His recommendation is that if the 'transducer has a 90° angle and the superior/inferior border of the spleen cannot fit on an image, the spleen is enlarged'.

Hagen-Ansert[8] informs us that the spleen is of variable size and shape (p 300), and that one can compare the size of the spleen with the size of the liver (p 307), and that in patients with splenomegaly the spleen 'may be seen as low as the umbilicus.' A formula for calculating splenic volume is given (p 308). It states that 'Koga's method utilises the decubitus long axis of the spleen' and correlates the splenic volume in cubic centimeters to the 'sectional area in square centimetres', although no comment is made on what the normal values should be.

Kawamura[5] tells us that the spleen has a 'variable and rather asymmetric shape' and that variations in the body's blood supply can affect its size (p 263) and makes the surprising claim that the 'volume can decrease from 350 to 200 mL in less than one minute'. The author continues on to tell us that, using autopsy specimens, the average measurements are '4 cm thick, 8 cm wide, and 12 cm long'. This is not particularly helpful as I am generally trying to assess a living patient, not an autopsy specimen.

Rumack, *et al.*[6] tell us that the 'average adult spleen measures 12 cm in length, 7 cm in breadth, and 3 to 4 cm in thickness and has an average weight of 150 g' (p 149), the text continues on to discuss the examination technique and state that the patient is imaged in a supine position, and that the long axis of the spleen lies obliquely from the coronal plane, although no instruction or criteria on how to perform the measurements is provided.

Aorta

Tempkin[1] (p 34) instructs us to measure the aorta in transverse with 'anterior to posterior measurement (calipers outside wall to outside wall)' and gives criteria for positioning of the calipers in both proximal, middle and distal aorta.

Gill[3] (p 72) states that the 'normal aorta measures between 2 and 3 ½ cm in diameter' but gives no indication as to method of measurement.

Goldberg[2] (p 283) states that the 'average diameter of the aorta is taken to be 2 cm at the aortic hiatus and 1.5 cm at the aortic bifurcation'. He continues on and explains that 'measurements are usually taken in the AP plane', it is not clear whether this AP plane is performed on a transverse or longitudinal image.

Sanders[4] gives us no value for normal measurement for the aorta.

Hagen-Ansert[8] states that 'the aorta is usually 2 to 4 cm in diameter' (p 184) and that 'it is important to identify the vessel in two dimensions.'

Kawamura[5] tells us that 'as the aorta courses inferiorly, it tapers, becoming smaller in caliber' (p 56) and that 'normal aortic diameters have been cited at ~ 2.5 cm' (p 66) and continues on to explain that the aorta tapers, 'reaching a diameter of about 1.5–2 cm at the level of the iliac arteries', but continues with a discussion of ectasia.

Rumack, *et al.*[6] state that 'the abdominal aorta tapers from its cranial to its caudal extent in 95% of people, and usually measures less than 2.3 cm in diameter for men and 1.9 cm for women.' They continue to tell us that the normal aorta diameter will increase with age and by up to 25% in the seventh and eighth decade (p 464) and giving us figures of '2.4 cm for a 60-year-old and 3.7 cm for a 75-year-old'.

Aneurysm

Gill[3] (p 83) tells us that when measuring an aneurysm 'the sonographer should include all three planes, the lumen, the areas proximal and distal to the aneurysm, and the entire aneurismal dilatation to assess whether the vessel is stenosed'.

Goldberg[2] (p 285) states that 'dilation of the aorta is occasionally difficult to assess' due to difference in size of the aorta due to stature or gender of the patient, but states that 'a maximum AP diameter of 3 cm or a focal dilation of the aorta is usually taken as evidence of aortic aneurysm'.

Sanders[4] tells us (p 291) that if an aneurysm 'is over 5 cm in width or anteroposterior diameter, operation is usually required' and that looking at aneurysms on ultrasound is useful as we can reveal the 'true internal and external dimensions' of the aneurysm.

Hagen-Ansert[8] (p 193) discusses the statistics of possibility of rupture when the aneurysm reaches 5 cm, 6 cm and 7 cm in size and tells us the maximum diameter in 'transverse, antero-posterior, width and longitudinal measurement' could be stated.

Kawamura[5] states that a 'true aneurysm is identified sonographically as a dilatation of the aorta ≥3 cm near its bifurcation, a focal dilatation along the course of the aorta, or lack of normal tapering of the aorta'.

Rumack, *et al.*[6] discuss types of aneurysm at length and provide us with a large number of statistics (p 466) but do not give us more than an indication that there is a rupture rate of '25% for aneurysms greater than 5 cm in anteroposterior diameter' (p 467).

We are told that an aneurysm is 'any focal dilatation of the aorta or a generalised dilatation greater than 3 cm' (p 470). We are told that 'it is important to get an accurate outer-layer-to-outer-layer measurement in a plane perpendicular to the long axis of the vessel' and Figs. 12–37 (p 471) provide us with longitudinal and anteroposterior sonographic images of an aneurysm with dotted lines indicating where the measurements are to be obtained.

Conclusion and discussion

This article is intended as a basis for discussion, and to provide the impetus for each practice to state clearly and precisely, where and how to measure various organs. This is vital if we are to provide a clear and logical approach to measurements during an ultrasound examination, and precise instruction for our student sonographers.

The main conclusions are:

1 Measurements should be consistent – they should be done the same way every time, by everyone in the practice.
2 Measurements should have criteria – you should be able to explain what you are measuring and exactly where and how to place the calipers.
3 Measurements should be reproducible – not just by an individual sonographer, but throughout the practice in which you work.
4 'Practice protocols' would be a big help for reproducibility and consistency.
5 A length measurement should be performed along the long axis of the organ or to the long axis of the body, with criteria to specify which is to be performed.
6 A transverse measurement should be done in transverse view only, length and anteroposterior in longitudinal view.

Whether you agree with the practice protocol or not, every sonographer employed should perform the measurement using the same method.

This would mean we are all getting consistent, reproducible results so our patients are getting a comparable measurement every time they attend, and follow-up is a true comparison of a measurement, not at the discretion of the sonographer performing the scan.

References

1 Tempkin BB. Ultrasound Scanning Principles and Protocols (2nd ed). Amsterdam: WB Saunders; 1999.
2 Goldberg BB. Textbook of Abdominal Ultrasound. Baltimore: Williams and Williams; 1993.
3 Gill K. Abdominal Ultrasound A Practitioners Guide. UK: Saunders; 2001.
4 Sanders RC. Clinical Sonography A Practical Guide (3rd Ed). Philadelphia: Lippincott; 1998.
5 Kawamura DM. Diagnostic Medical Sonography A Guide to Clinical Practice; Abdomen and Superficial Structures (2nd ed). Philadelphia: Lippincott; 1997.
6 Rumack CM. Wilson SR, Charbonneau JW, Johnson JM (eds). Diagnostic Ultrasound (3rd Ed). Amsterdam: Elsevier Mosby; 2005.
7 Curry RA, Tempkin BB. Ultrasonography An introduction to normal structure and Functional Anatomy: WB Saunders; 1995.
8 Hagen-Ansert SL. Textbook of Diagnostic Ultrasonography (3rd) Ed. Amsterdam: Mosby; 1989.
9 Deb Coghlan, Personal conversation, January 2008.
10 Australian Institute of Ultrasound 2008. Ultrasound in Emergency Medicine Fast Track Training Course Notes.

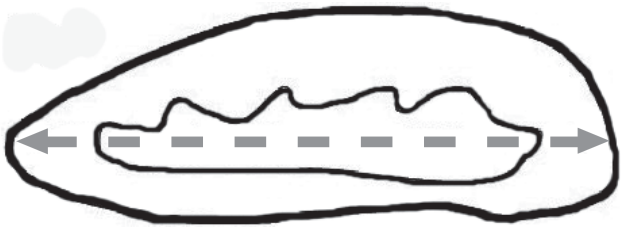

Fig. 1

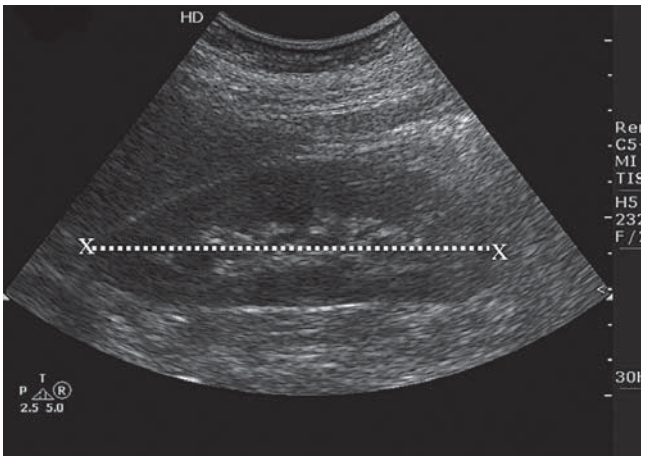

Fig. 2

Suggestion for criteria: Kidney length – the kidney is measured with the long axis at 90º to the ultrasound beam, with the cortex symmetrical at the upper and lower poles equal, to ensure maximum length measurement.

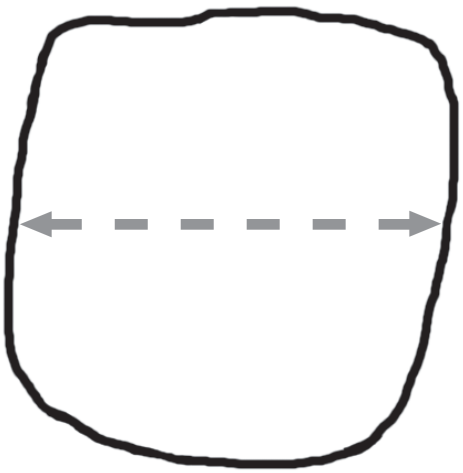

Fig. 3

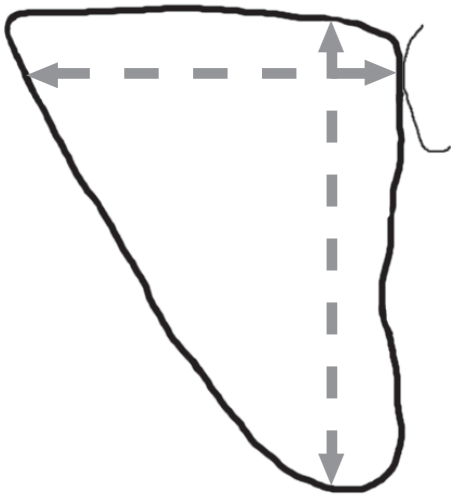

Fig. 4

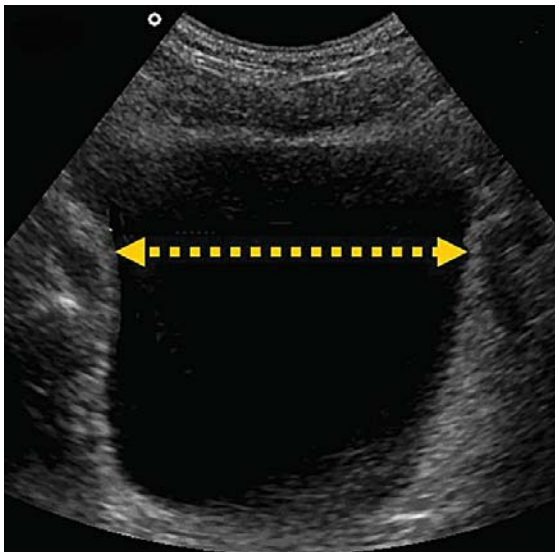

Fig. 5

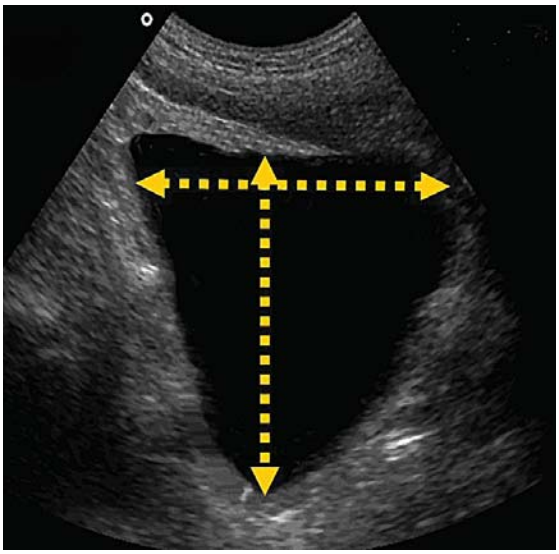

Fig. 6

Suggestion for criteria: Bladder – maximum depth is measured, from anterior to posterior, with the length measured at 90° to this, along the maximum length from superior to inferior. Maximum transverse diameter is always measured in transverse, across the widest part of the bladder, at 90º to the other measurements. The measurements are taken from inside the bladder wall. Using these criteria will overestimate bladder volume, but this overestimation will be consistent, and can be used on all bladder shapes.

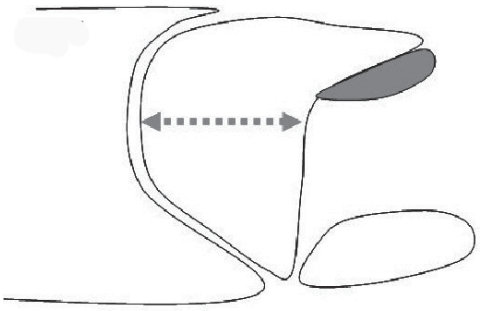

Fig. 7

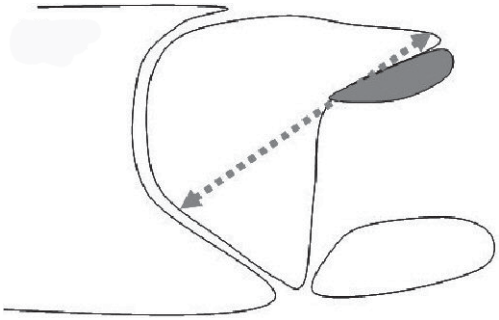

Fig. 8

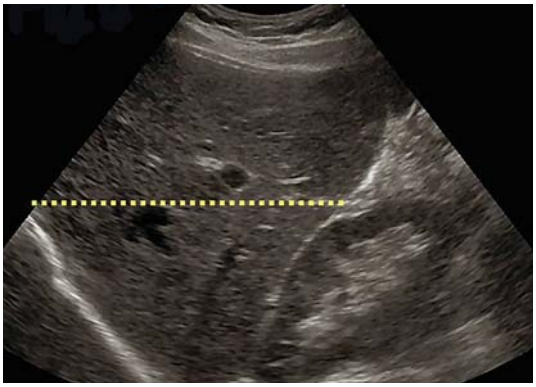

Fig. 9

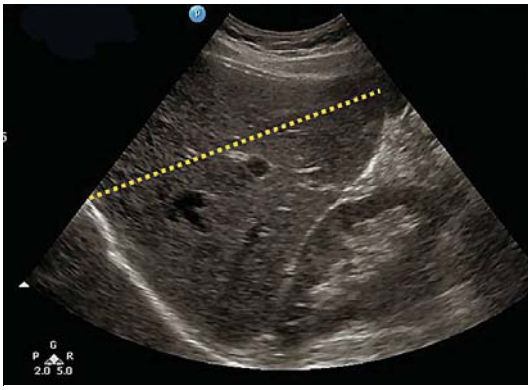

Fig. 10

Suggestion for criteria: Liver – the liver measurement is performed with the patient supine, in the midclavicular line, from the diaphragm to the lower edge of the liver; the image should contain the gall bladder and right kidney. If you choose to measure the true length of the liver from superior to inferior (Fig. 7 and 9) the measurement will be consistently shorter than the diaphragm to lower anterior edge of the liver (Fig. 8 and 10), but either of these may be used.

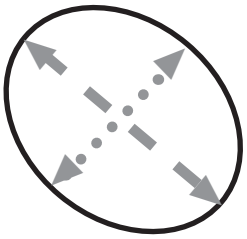

Fig. 11

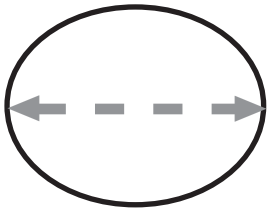

Fig. 12

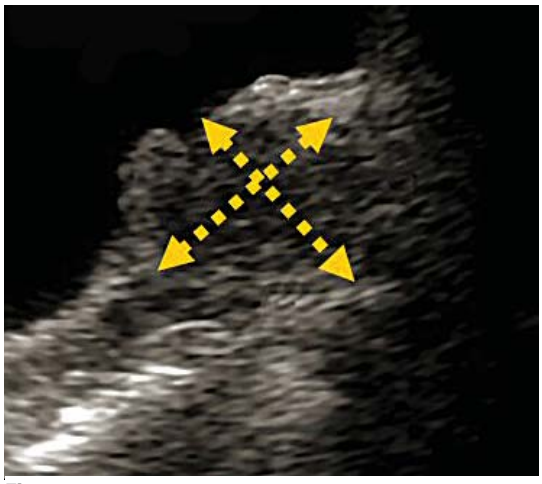

Fig. 13

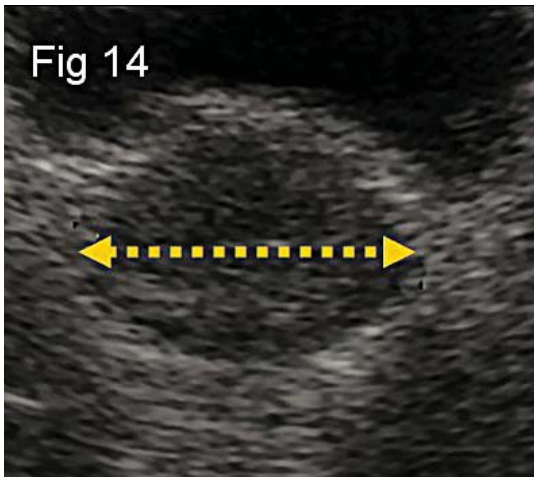

Fig. 14

Suggestion for criteria: Prostate – The length of the prostate is obtained on a longitudinal image, along the line of the urethra (craniocaudal), the AP diameter is at 90° to this plane (Figs. 11 and 13). The transverse dimension is obtained in the transverse plane at the widest point (Figs. 12 and 14).

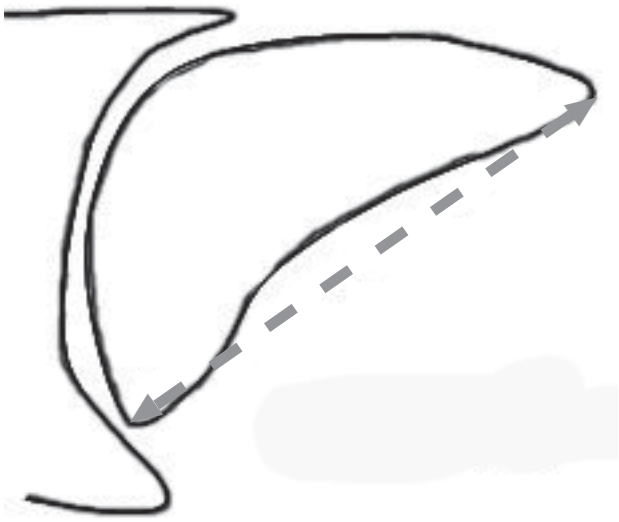

Fig. 15

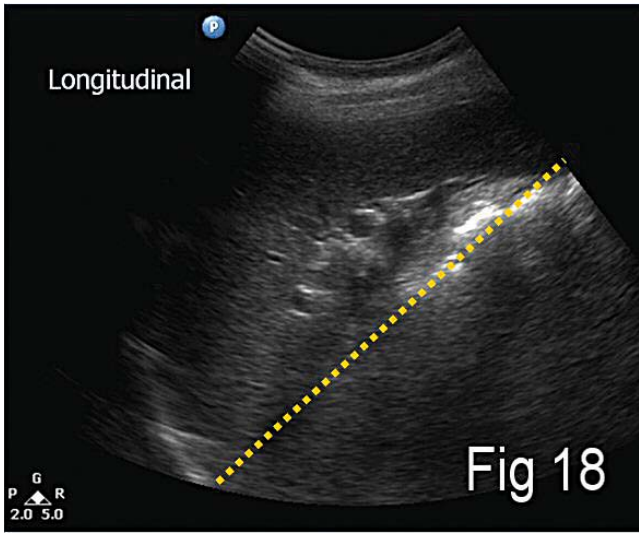

Fig. 18

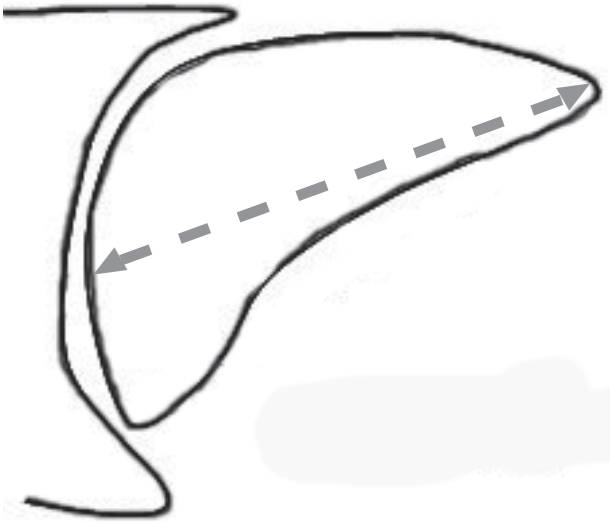

Fig. 16

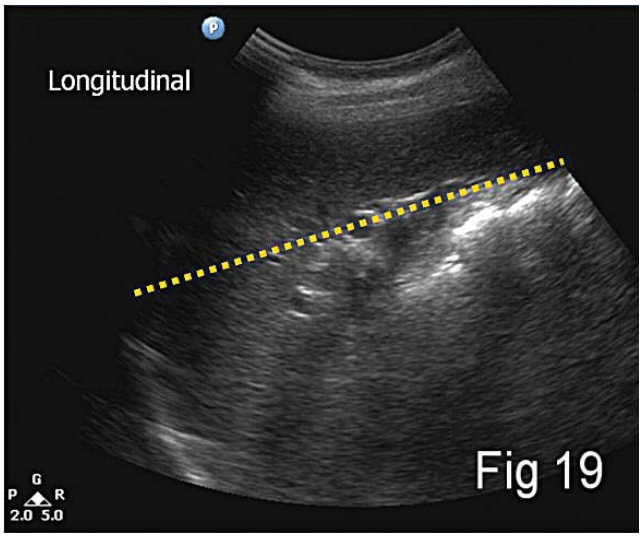

Fig. 19

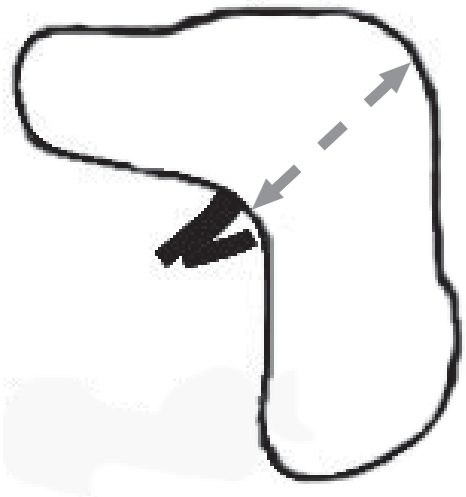

Fig. 17

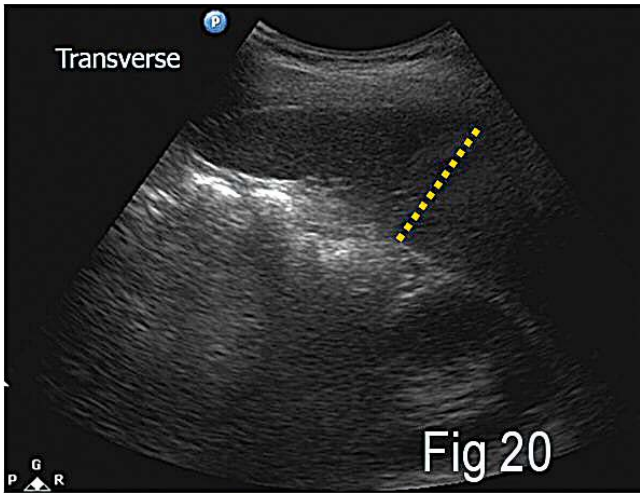

Fig. 20

Suggestion for criteria: Spleen – The spleen is measured with the patient supine, the probe placed along the intercostal spaces, so both the upper and lower poles are visible. The measurement is 'bipolar' from upper pole to lower pole (Figs. 15 and 18) or diaphragm to lower pole (Figs. 16 and 19). The transverse measurement is across the width of the spleen from hilum to lateral margin (Figs. 17 and 20).

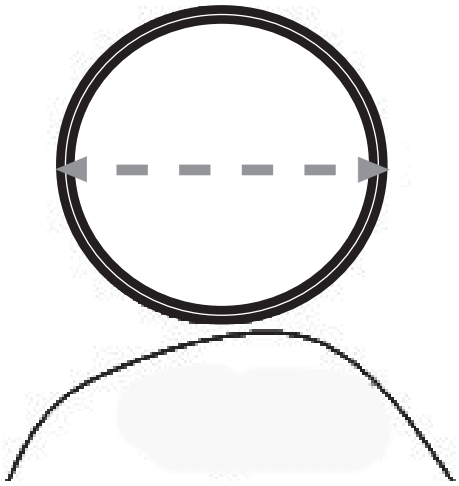

Fig. 21

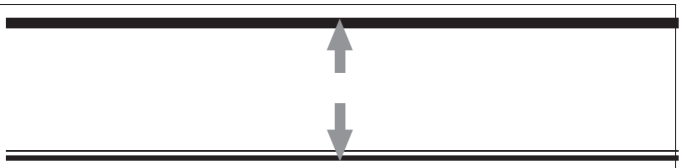

Figure 22

Suggestion for criteria: Aorta – The normal aorta tapers from proximal to distal, an initial transverse measurement should be obtained at the level of the renal arteries, and a second transverse measurement 3 cm above the level of the bifurcation to document tapering. The measurement is from outer wall to outer wall (Fig. 21). An AP measurement is obtained at approximately 3 cm above the level of the bifurcation, with the probe manipulated so the aorta is perpendicular to the plane of the beam (Fig. 22).

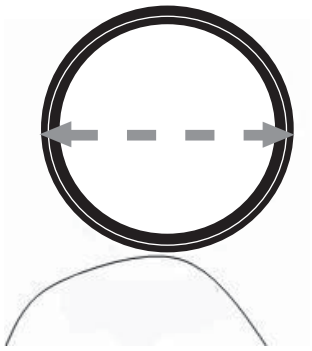

Fig. 23

Fig. 24

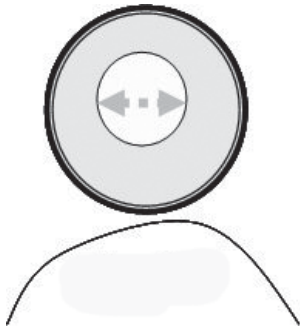

Fig. 25

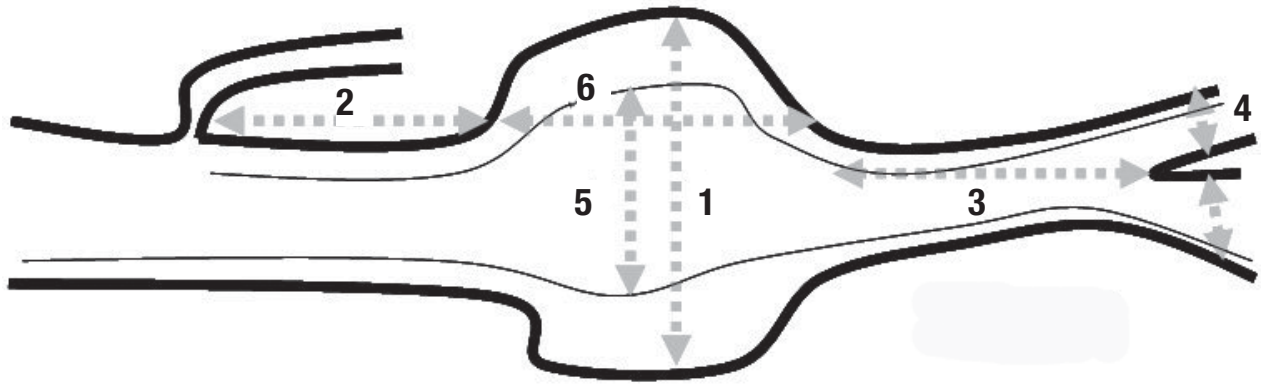

Fig. 26

Suggestion for criteria: Aneurysm – An aneurysm is defined as a focal dilitation of greater than 1.5 times the proximal diameter. The measurements are taken in maximum transverse dimension (Fig. 23), however, if the maximum transverse diameter is not at 90° to the beam then the maximum transverse diameter should be measured across the widest diameter, Coghlan[9] (Fig. 24) and across the widest residual lumen (Fig. 25).
If an aneurysm is seen, the measurements in longitudinal become complicated (Fig. 26[10]):
Measurement 1 – maximum AP diameter
Measurement 2 – distance from SMA to proximal aneurysm
Measurement 3 – distance from distal aneurysm to bifurcation
Measurement 4 – diameter of both Common Iliac Arteries
Measurement 5 – residual lumen AP
Measurement 6 – length of aneurysm.

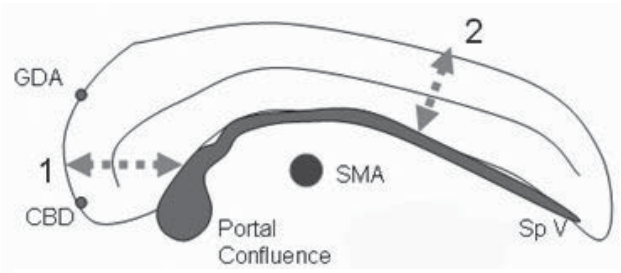

Fig. 27

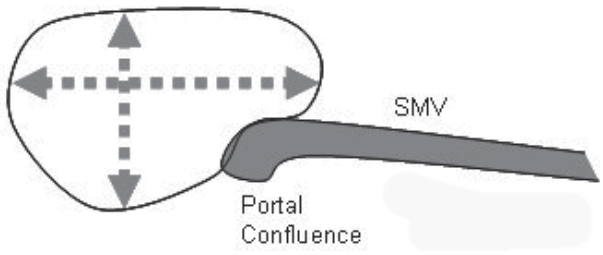

Fig. 28

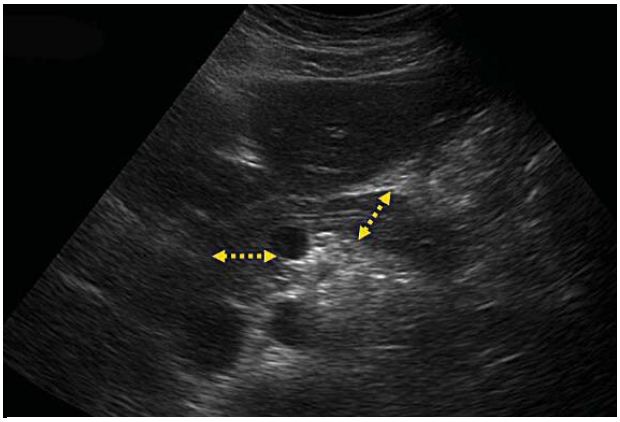

Fig. 29

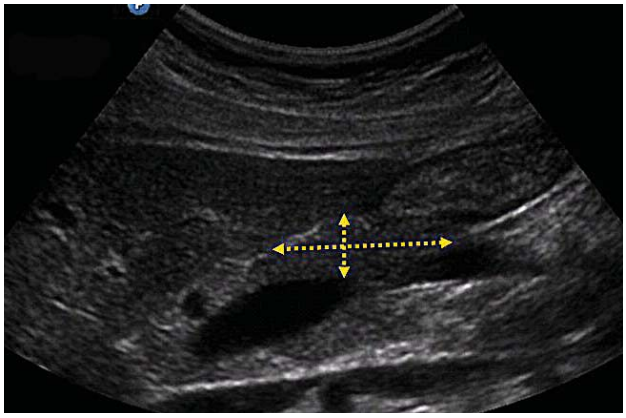

Fig. 30

Suggestion for criteria: Pancreas The pancreas is measured across the head, perpendicular to the beam (Fig. 27 – [1]), at the level of the SMA. If a measurement of the body is required the measurement is taken lateral to the SMA, at 90° to the axis of the body of pancreas (Fig. 27 – [2]). In longitudinal the landmark is the portal confluence and Superior Mesenteric Vein (SMV) and the measurements are performed – maximum length from superior to inferior, and maximum AP diameter at 90° to the length measurement (Fig. 28).

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Dealing with a pain in the neck Sternocleidomastoid syndrome – sonographic evaluation of treatment

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Abstract
We investigate the use of ultrasound imaging in the identification of Sternocleidomastoid syndrome (SCM), treatment planning and assessment of progressive active and passive physiotherapy.

Case report
The patient presented with unilateral neck tightness, with radiating head and face pain. Ipsilateral eye pain with excessive lacrimation and heat were also reported.

Underlying pathological and systemic problems had been ruled out.

Objective
The authors sought to investigate if serial sonographic evaluation of Sternocleidomastoid syndrome (SCM) is a useful bio-feedback tool for physiotherapy treatment.

Methods
A physiotherapist assessed the condition. There was sonographic confirmation of extent of condition. Treatment planning took place and sono-evaluation of treatment progress was ongoing.

Results
There was a confirmation of diagnosis of SCM. Feedback to physiotherapist of treatment progress or need to re-assess was ongoing as was visual feedback to the patient of treatment progress.

Conclusions
Ultrasound imaging provided a visual confirmation of the clinical impression. There was a measurable improvement of the condition with treatment progression both subjectively with symptom reduction and objectively with sonographic evaluation.

A positive motivational and educational tool for the patient which increases awareness and aids compliance of self-management exercise techniques was provided.

Pre treatment

Physiotherapy assessment
Active and passive length of SCM muscle
Pain scale (VAS 11 Point 0–10)
Palpation and symptom provocation = critical sign
Postural alignment
Functional movement (patient specific functional scale).

Clinical impression
Tight and weakened SCM muscle

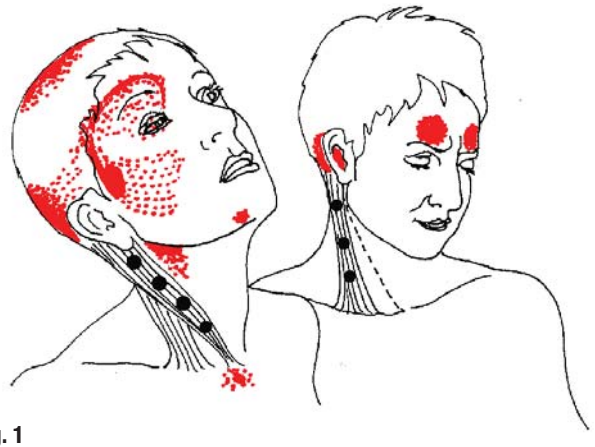


Fig. 1

Dense ‘ropey’ area along muscle with multiple trigger points
Reduced flexion and range of cervical rotation
Postural asymmetry.

Sonographic assessment
The identification of a taut fibrous band running through the symptomatic SCM muscle was made and relevant dimensions and appearance were recorded.

Muscle texture and vascularity of the normal contra-lateral SCM were demonstrated.

Objective
We sought to confirm clinical findings and to assess the treatment SCM using ultrasound imaging as a bio-feedback tool.

Treatment methods and monitoring

Passive therapy

Soft tissue techniques
Massage, trigger point direct pressure and stretches (Fig. 1).

Active therapy

Home program for patient self-management
Stretches specific to SCM muscle, postural re-education, deep cervical flexor strengthening and ergonomic advice.

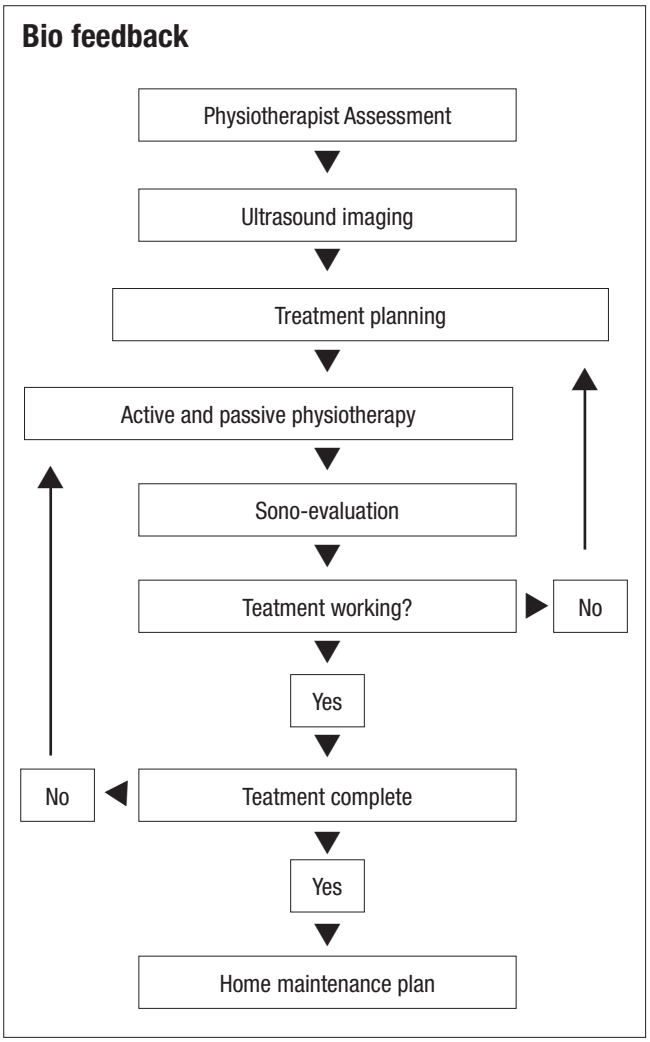


Fig. 3

Fig. 4

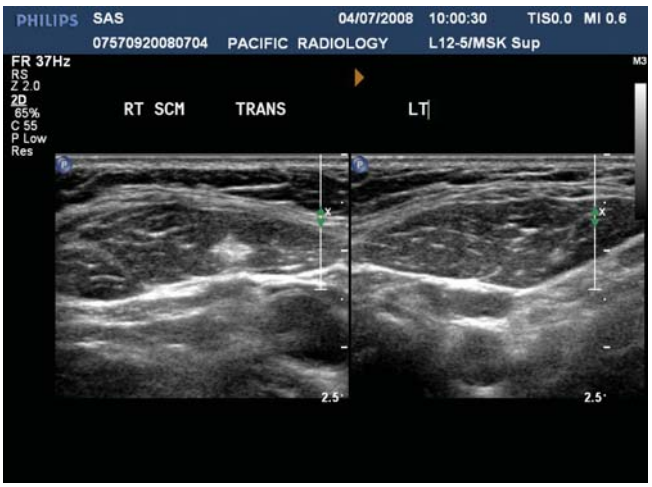


Fig. 2

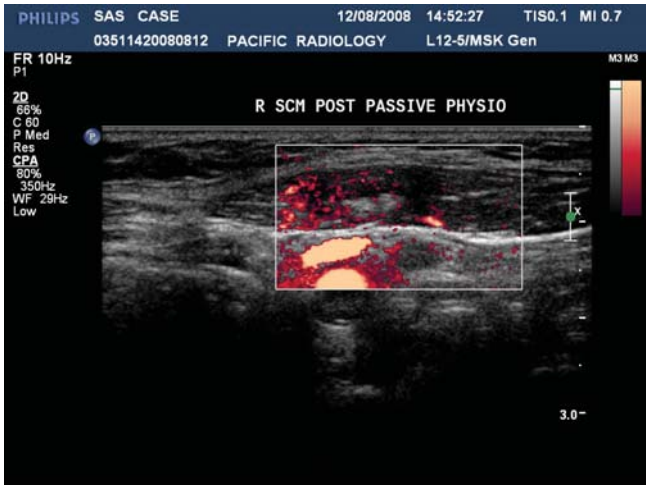


Fig. 5

Results

Sonographic and physiotherapy evaluation

Day 1 of treatment

Unilateral muscle tightness, postural asymmetry and impaired functional ability (Fig. 2).

After 10 days of treatment

After 10 days the SCM muscle had become more flexible and demonstrated separation of fibrous tissue (Fig. 3).

After 3 weeks

Sonographically there is fraying and decreased density within the fibrous band (Figs. 4–6).

- Passive manipulation and trigger point therapy is administered during treatment sessions
- There is a marked increase in vascularity within the muscle
- Clinically, there is increased functional ability and a decreased pain level score
- The patient feels this as a heating effect in the muscle
- Active stretch by patient produces a small increase in vascularity within the muscle confirming effective and accurate exercise technique.

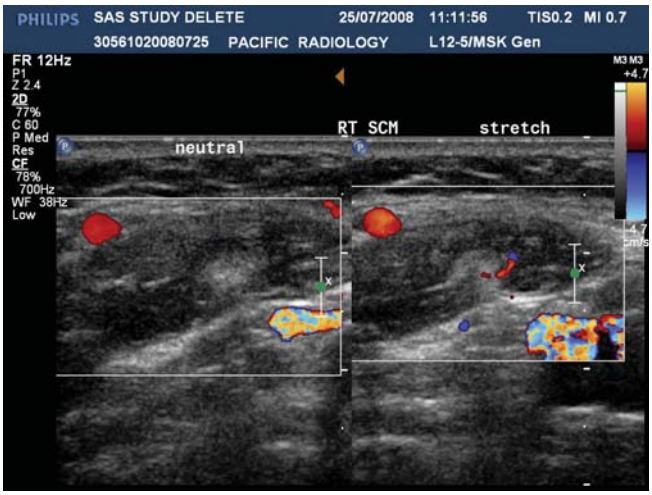


Fig. 6

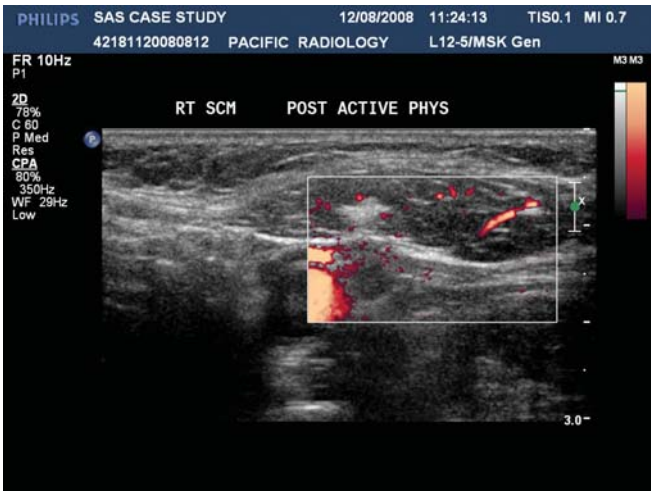


Fig. 7

Conclusions

- Implementation of a targeted treatment plan based on sonographic confirmation of clinical findings (Fig. 7)
- Visible and measurable changes in the extent and appearance of the muscle fibrous band
- Verification of increased muscle vascular perfusion with active and passive physiotherapy techniques
- Feedback on home management, postural re-education and ergonomic adjustment (Fig. 8).

Discussion

How does this multidisciplinary approach enhance the treatment of sternocleidomastoid syndrome?

- Improves the diagnostic accuracy of clinical impression and excludes other pathology
- More targeted treatment regime resulting in a shorter patient rehabilitation time
- Dynamic interval feedback to physiotherapist and patient
- Improved patient compliance – "seeing is believing"
- Evidence-based practice by incorporating a multi-disciplinary bio-feedback treatment plan.

Fig. 8

References

1 Cibulka MT. Sternocleidomastoid muscle imbalance in patient with recurrent headache. *Manual Therapy* 2006; 11: 78–82.

2 Babak Missaghi. Sternocleidomastoid syndrome: a case study. *J Can Chiropract Assoc* 2004; 48: 201–5.

3 Travell JG, Simons DG. Myofascial pain and dysfunction: The Trigger Point Manual. Baltimore: Williams and Wilkins; 1983.

4 Kendall H, Kendall F, Boynton D. Posture and pain. Huntingdon, NY: Robert E Kieger Publishing Company; 1952.

5 Kendall F, McCreary E. Provance P. Muscles: Testing and Function. Baltimore, MD: Williams & Wilkins 1993.

6 Falla D, Jull G, Rainoldi A, Merletti R. neck flexor muscle fatigue is side specific in patients with unilateral neck pain. *Eur J Pain* 2004; 8: 71–7.

7 Stratford P, Gill C, Westerway M, Binkley J. The Patient-Specific Function Scale. *Physiother Can* 1995; 47: 258–63.

ASUM 38th Annual Scientific Meeting Auckland 2008 – Abstracts

101 The future of ultrasound

Professor Peter N Burns
Professor and Chairman of Medical Biophysics and Professor of Radiology at the University of Toronto, Senior Scientist at Sunnybrook Health Sciences Centre, Toronto

Since its inception, ultrasound imaging has been evolving steadily from a purely anatomic to a functional means of noninvasive assessment, with the incorporation of Doppler methods into the routine of many examinations offering one of the best-established examples. This trend will continue as ultrasound technology leverages technical developments in digital signal processing, as well as the invention of new targets in the body which will reveal information at the cellular or even molecular and genetic levels. In this talk, two illustrations will be provided.

In the first, a new (well, almost new) method of making an ultrasound image by forming virtual rather than actual ultrasound beams will be described. This method breaks the conventional requirement of one pulse, producing one echo, producing each line in the ultrasound image. In fact, in its extreme implementation, one entire image can be made from a single pulse, allowing frame rates of 3–5000 images per second.

Although the idea has been around for some time, new signal processing methods allow such instruments to be made. So, what can we do with a frame rate of 3000 per second? The answer is, quite a lot. At these frame rates, phenomena missed in conventional scanning can be captured. One example is the propagation of a shear wave, or 'wobble', through tissue after the application of a little prod, perhaps from the ultrasound beam itself. By comparing successive images, the movement of tissue can be detected and the propagation of this very rapid wave can be tracked. Now, as shear waves pass more quickly through stiffer tissue, plotting the speed of this disturbance gives a new kind of elastography image. Because the whole process is complete within about 50 milliseconds, 20 of these images can be made per second, offering real time imaging.

Another thing that can be done at these very high frame rates is Doppler, over a range of many angles, in less than the time taken to make a conventional colour image. The result is vector resolved (that is, 2D, angle independent) Doppler images of exquisite resolution, also in fast real time. The only obstacle is that these methods require the computational processing of several DVDs worth of ultrasound data every second, but soon the only problem we will have to deal with is the electricity bill.

In the second, we see that microbubbles are simple precursors of a new class of imaging 'probes' that can be injected into the vascular system. These probes can be targeted to molecular ligands associated with disease such as the cell surface signals indicating angiogenesis associated with a cancer, or of endothelial cell inflammation in atherosclerosis, or angiogenic plaque microvessels, or thrombus. The limitation of bubbles is that they cannot reach targets beyond endothelial cell lining blood vessels, so nanodroplets of liquid, coated with specific targeting molecules, will be designed to leave the vascular space and enter interstitial tissue. Imaging then reveals their distribution in the body and, quite possibly, offers a new way to concentrate ultrasound energy in their treatment, as has recently been demonstrated in the treatment of acute stroke by ultrasound, known as 'sonothrombolysis'. Such enhancement of permeability by ultrasound can open the blood brain barrier and deliver agents into the brain and can even modulate the effects of other treatments such as radiotherapy. The pipedream of an image guided method to locally enhance drug delivery – by a method as simple as moving an image cursor – may well be realised by ultrasound, which similarly and most intriguingly, appears to be able to locally sensitise tissue to radiotherapy, potentially revolutionising its use in soft tissue cancers.

102 Ultrasound in developing countries

Professor Syed Amir Gilani
Director, Afro-Asian Institute of Medical Sciences Lahore, Pakistan

This presentation will cover the background of ultrasound and teaching standards in the world – developed versus developing countries. My personal experience is discussed after visiting 74 countries of the world during the last 10 years. I have selected 20 countries from the developing world including all regions of the world, regardless of their regional or religious origins. The main objective of this experience-based presentation is to share my familiarity with the participants and the authorities in ultrasound. I hope the deficiencies pointed out shall be taken positively to upgrade the knowledge of ultrasound in these countries.

The presentation is based on critical analysis of different aspects like:

- Standards of clinical ultrasound in different hospitals of a country
- Educational setups in universities and hospitals of that country
- Role of health ministries in upgrading of standards of ultrasound
- CME programs
- National society/association
- Radiologist versus non-radiologist controversies
- Private sector
- Ultrasound education setups
- Are they using any protocols?

103 Novel sonographic technique in the diagnosis and treatment of liver tumours

Dr Matatoshi Kudo
Department of Gastroenterology and Hepatology, Kinki University School of Medicine, Japan

Ultrasound (US) contrast agents such as Levovist and Sonazoid are now commercially available in Japan. Innovative contrast agents and ultrasound technologies have dramatically changed both diagnostic and treatment strategies for hepatocellular carcinoma (HCC). Contrast-enhanced US is extremely useful in the differential diagnosis

of hepatic tumours as well as in evaluation of post-treatment response of HCC after lipiodol transarterial chemoembolisation and radio frequency ablation.

Contrast-enhanced US sensitively detects residual cancer cells in HCC patients after treatment, to facilitate accurate guidance for needle insertion for US monitoring especially with use of 'Defect Re-perfusion Imaging'; no other imaging modalities, including computed tomography (CT) or magnetic resonance imaging (MRI), have such capability.

Recently, the breakthrough technology of pure arterial phase (PAP) imaging, which depicts only intranodular arterial accumulated maximum intensity projection images, was developed from advanced raw data storing and accumulation technologies. This technique can clearly identify whether blood supply in the tumour is of arterial or portal origin, to facilitate the non-invasive characterisation of nodular lesions associated with liver cirrhosis. Again, dynamic CT or dynamic MRI do not have such capabilities. This innovative technique can help differentiate premalignant lesions from overt HCC.

Concurrent real-time imaging of multi-detector CT and US, known as real-time virtual sonography (RVS), has recently become available. This imaging technique displays a real-time synchronised multiplanar CT image in precisely the same slice of US plane. Thus, RVS can be used for real-time needle insertion guidance, especially for nodules demonstrated on CT, but not on B-mode US. Needle insertion guidance using RVS is also useful for locally recurring nodules next to previously ablated lesions, which are not usually detected by B-mode US. Furthermore, this technique is useful for ablation of the area, to establish a safety margin surrounding the originally ablated area.

In conclusion, the newly innovated harmonic US with use of 'Defect Re-perfusion Imaging', PAP-US and RVS are dramatically changing the diagnostic and therapeutic strategies for HCC, with the goal of improving the prognosis of HCC patients.

104 US-guided ablations techniques – historical review and future aspects

Professor Christian Nolsøe
Koge Hospital, University of Copenhagen, Lykkebaekvej, Koge, Denmark

Tissue ablation of localised cancer in a variety of organs by means of radioactive seeds, alcohol, heat or frost guided by percutaneous, endoluminal or endoscopic ultrasound has gained widespread use during the last two decades. These techniques are often referred to as minimally invasive therapies but actually differ a lot in their degree of invasiveness as well as with respect to complexity of the equipment, time spent with and personnel needed for each procedure and cost related to the treatment. They range from a simple set up with a needle and a syringe containing a few cc of ethanol used for ablation of hyperparathyroid adenomas to a highly sophisticated scenario where liquid nitrogen under high pressure at a temperature around -200°C is circulated from big tanks into several dedicated needle shaped probes meticulously positioned transperineally in a prostate cancer.

As it can be understood, each method has its advantages and disadvantages and comparison of the results achieved with the different methods can only be done to a limited degree because the diseases they are used as treatment for are very different.

Anyone with a specific interest in either of these techniques therefore, is encouraged to search the literature for details. In general, ethanol has been used for ablation of hepatocellular carcinoma and parathyroid adenoma, brachytherapy mainly for prostate cancer by means of Iodine-125 seeds, cryotherapy for liver metastases, prostate cancer and renal carcinoma and finally, thermal ablation by heat with the use of laser, radiofrequency (RF), microwave or high-intensity focused ultrasound (HIFU) has been used in a range of organs on a variety of indications but, by far mostly in the treatment of colo-rectal liver metastases. The results of these widespread treatments, naturally, vary considerably but they all have been reported to have some degree of success on selected groups of patients. One technique, however, seems to be unsurpassed with respect to "spreading the news" and that is RF ablation. Probably no other ablation technique has experienced even close to this increase in popularity measured by the number of articles published and the number of reported new applications.

Any new treatment has to stand the test of time but with respect to RF ablation of colo-rectal liver metastases the evidence so far accumulated in the literature beyond reasonable doubt confirms that a five-year survival rate of between 30% and 40% can be achieved. This is comparable to the results from reports on surgical treatment and ought to imply that any patient diagnosed with colo-rectal liver metastases be referred to a competent centre for evaluation of possible treatment with either of these methods. RF equipment dedicated for ablation and with built-in biofeedback systems are available and despite their high-tech refinements are impressively easy to use. The RF probe is designed like a needle and the procedure resembles any other US-guided intervention in the fact that the needle is directed to its target under real time scanning. Once in position, however, the RF needle has to stay in place for a longer period of time – ranging from a few minutes to more than an hour. If more metastases are to be ablated the time spent increases correspondingly and thus the entire procedure may take hours, which is one reason why the patient should be under full anesthesia. In case follow-up indicates the presence of residual viable metastatic tissue a repeated RF ablation can be done within a short time, which is often not possible with surgery.

106 Ultrasound in renal transplantation

Professor Andrew Holden
Auckland City Hospital, Auckland, New Zealand

Renal transplantation is the treatment of choice in patients with end stage renal failure. Graft survival rates have improved in recent years due to improvements in immunosuppression, improved case selection and the availability of grafts in better condition. With increasing numbers of renal transplant recipients returning to the community, sonographers and sonologists are expected to be able to diagnose renal transplant complications.

A Doppler ultrasound surveillance programme after renal transplantation has been shown to improve renal graft survival.

This is primarily due to early recognition and treatment of:

(i) acute graft dysfunction
(ii) mechanical complications including collections and vascular and collecting system complications.

Sonographic evaluation of the renal graft includes

assessment of renal size and echotexture, intra- or peri-nephric fluid collections, collecting system anatomy, renal arteries and veins and assessment of peripheral vascular resistance.

The Doppler diagnosis of renal artery stenosis in a renal graft is challenging because native kidney criteria cannot be reliably applied. In 70 consecutive renal grafts evaluated at Auckland City Hospital with no clinical evidence of renal artery stenosis, the median peak systolic velocity (PSV) in the main renal artery was 232 cm/s (range 140–312)! Although absolute peak systolic velocity measurements in the transplant renal artery are important, evaluation of additional or secondary signs of renal artery stenosis can improve diagnosis specificity. Secondary signs include direct colour or power Doppler angiographic findings, iliac-renal artery ratios, downstream tardus parvus findings in segmental arteries and low vascular resistance in peripheral small arteries. Despite the use of direct and indirect ultrasound signs, a number of equivocal cases still occur. In these patients, a secondary test to evaluate transplant renal artery anatomy is necessary, especially in cases where clinical concern is raised by unexplained graft dysfunction or hypertension.

Options include CT angiography, MR angiography or digital subtraction angiography. We use contrast enhanced MRA to clarify equivocal cases of transplant renal artery stenosis. This technique is non-invasive and avoids nephrotoxic contrast. The vascular anastomoses may be difficult to profile on conventional angiography but can be easily depicted by rotating a 3D MRA data set.

Transplant renal vein pathologies include thrombosis or stenosis. Acute renal vein thrombosis is usually easily detected clinically (with major graft dysfunction) and sonographically. Conversely, renal vein stenosis may be asymptomatic or patients present with nonspecific mild graft dysfunction. The diagnosis should be suspected sonographically when there is very high peripheral vascular resistance (RI >0.9) with no biopsy cause of acute graft dysfunction.

Direct visualisation of the transplant renal vein may be difficult because of its short length. High velocities may be seen in a normal transplant renal vein, especially in the immediate post-transplant setting due to anastomotic oedema or compression by adjacent structures such as the transplant renal artery. In these cases, the finding of normal peripheral vascular resistance in the graft can be reassuring and excludes significant renal vein stenosis. MR or digital subtraction venography can be used in equivocal cases.

Iatrogenic transplant vascular lesions include arterio-venous fistula, false aneurysm and arterio-calyceal fistula. These most commonly occur as a result of graft biopsy but may also complicate nephrostomy or open surgery. These lesions are readily recognised on Doppler. It is important to measure the size of these lesions as small AV fistulae (<10 mm) usually spontaneously thrombose while large lesions require catheter directed embolisation.

Peri-nephric collections occur in 50% of transplants. Aetiologies include urinoma, serome, haematoma or lymphocele. In the immediate post-transplant period, the size of peri-graft collections should be documented. While the ultrasound appearances of peri-nephric collections are nonspecific, growing collections suggest urinoma, lymphocele or abscess. Small cresenteric haematomas are common at the renal poles, are usually echogenic and resolve spontaneously.

Lymphoceles usually appear at the 4–8 week post-transplant period and are typically anechoic. Urinomas are relatively rare and should be suspected in collections associated with significant collecting system dilatation.

Dilatation of the renal pelvis is common, especially in the early post-transplant period. Significant calyceal dilatation is abnormal, except early on when some anastomotic oedema may occur at the vesico-ureteric junction. Severe hydronephrosis in the presence of graft dysfunction is usually managed with antegrade (nephrostomy) or retrograde (ureteric stenting) decompression.

However, the clinical significance of less severe degrees of urinary tract dilatation is often unclear. The findings of caliectasis or an absent ureteric jet are important but serial ultrasound surveillance for progressive dilatation is usually performed.

The assessment of peripheral vascular resistance within a renal graft is a non-specific indicator of graft dysfunction. The common causes (acute tubular necrosis, acute rejection and drug toxicity) cannot be reliably differentiated on Doppler findings alone and a biopsy is required. However, sonography is an excellent method to monitor response to treatment in these situations.

107 Imaging of soft tissue haemangioma

Dr Daniel Makes
Senior Consultant Radiologist and Chief of Superficial Organ Imaging, Department of Radiology, Faculty of Medicine, University of Indonesia, Jakarta

Haemangiomas are among the most frequent tumours to involve the soft tissue. Soft tissue haemangiomas may be superficial or deep, with the latter lesions most frequently intramuscular.

The vast majority of soft tissue haemangiomas evaluated radiologically are intramuscular haemangiomas. The radiologic evaluation of soft tissue haemangiomas should always begin with radiographs.While helpful in only a small percentage of cases; certain features may be diagnostic and more difficult to appreciate on advanced imaging like CT or MRI. Other imaging modalities can be employed after the radiographic evaluation, with MRI often considered the ultimate imaging test for diagnosis.

Ultrasound, however, is an alternative imaging modality that has the advantage of being quick and cost-effective compared to MRI.

We will discuss cases of soft tissue haemangiomas which we are dealing with, the differential diagnosis and we feel that the role of imaging in evaluation of these kinds of masses has markedly improved because of the advent of CT, ultrasound and more recently MRI.

108 Correlation between antenatal and postnatal ultrasound

Dr David Perry
Starship Children's Hospital, Auckland, New Zealand

The abnormal fetus benefits from a multi-disciplinary approach to manage a safe and reliable transition from obstetric to paediatric care. Antenatal assessment of structural abnormalities is always dependent on imaging technology and careful sonography remains the primary tool, with occasional help from fetal MRI.

Postnatal assessment is predominantly through a combination of clinical examination and imaging – again

sonography is the primary modality for most abnormalities. Imaging also has an increasing role in perinatal post mortem investigation if pathological examination is not accepted.

A series of cases will be presented to demonstrate the benefits of good pre- and post-natal investigation, with the emphasis on sonography but including a range of modalities.

109 The use of ultrasound in chest imaging and intervention

Dr David Davies-Payne
Ascot Radiology and Auckland City Hospital, Auckland, New Zealand

The paediatric chest provides an opportunity for ultrasonography due to its smaller size and the potential for a thymic sonographic window. Vascular abnormalities can be demonstrated and pathologies such as malignant mass and collection can be large enough to gain useful information about their origin and nature.

Some examples and techniques will be discussed along with the potential clinical utility for surgeon, intensivist and oncologist.

110 Pre-operative use of ultrasound to localise ingested foreign bodies in children

Mr Lino Piotto
Women's and Children's Hospital, Adelaide, Australia

Ultrasound is increasingly being used in gastrointestinal applications in paediatric patients. At our institution ultrasound has almost completely replaced radiography in the diagnosis of pyloric stenosis, malrotation, intussusception and appendicitis. A further development in the use of ultrasound is its value in the localisation of ingested foreign bodies.

The use of radiography and fluoroscopy to locate and track ingested foreign bodies in children is well documented and dates back many decades. Although plain abdominal radiography is very sensitive in detecting radio-opaque ingested foreign bodies, it may not be very specific. The exact location of the foreign body can often not be determined because of variations in gut anatomy and the usual superposition of small and large bowel.

Furthermore, with a sharp foreign body, plain radiography will not reliably demonstrate whether the object is within the gut lumen or has passed through the gut wall to lie in the peritoneal cavity. Also, problems arise when the foreign body is radiolucent or when serial radiographs do not seem to demonstrate progressive movement through the alimentary tract. Ultrasound can be very successful in overcoming the above mentioned problems.

Ultrasound has been successfully used for the localisation of superficial foreign bodies such as palm thorns, splinters and glass for some time. However, the use of pre-operative ultrasound to localise the position of ingested foreign bodies to assist in their surgical removal is, to the best of our knowledge, unreported and may be a new concept.

111 Ultrasound strain imaging of the stomach enables differentiation of Rome III subgroups in Functional Dyspepsia

Professor Odd Helge Gilja
National Centre for Ultrasound in Gastroenterology and Institute of Medicine, Norway

The Rome III defines two distinct entities of Functional Dyspepsia (FD), namely epigastric pain syndrome (EPS) and postprandial distress syndrome (PDS). We aimed at studying these subgroups of FD using ultrasonography by simultaneously assessing antral strain, gastric accommodation and emptying and visceral hypersensitivity. Antral strain during antral contractions was assessed by ultrasound strain rate imaging in 15 controls and 16 FD patients (5 EPS patients and 11 PDS patients). Antral strain in EPS patients was 43.8% (23.1–98.1) and it was significantly higher than in controls during fasting 34.4% (19.2–59.4), $P < 0.05$ and in PDS patients 24.9% (14.9–37.5), $P < 0.001$. PDS patients had lower strain than controls ($P < 0.001$). Postprandially, EPS patients had higher radial strain (36.3 %) than controls (23.6%, $P < 0.05$) and PDS patients (24.2%, $P < 0.05$). The area of the proximal stomach during fasting was significantly larger in FD than in controls (mean ± SEM) (14.0 ± 1.4 cm^2 vs. 7.9 ± 0.2 cm^2, $P<0.01$). The accommodation response ratio (postprandial proximal area/fasting proximal area) was significantly higher in controls than in FD (mean ± SEM) (2.1 (0.1) vs. 3.7 (0.2), $P<0.001$). The symptom score in the fasting state and the area under the curve in the postprandial state were significantly higher in FD patients than in HC for all the symptoms. We conclude that anterior radial strain measured by SRI can discriminate between HC and subgroups of FD. This study supports the Rome III division of FD into EPS and PDS groups.

112 Sonographically detected caesarean scar defects and abnormal bleeding

Dr Talat Uppal
Nepean Hospital, University of Sydney, Australia

Caesarean section scar defects, or sonolucent pocketing, have been postulated to be associated with abnormal or irregular bleeding.

We performed a prospective audit of women attending our practice for pelvic ultrasounds, aged between 20 and 45 years, during the period October 2007 to May 2008. Women completed a questionnaire about menstrual patterns and caesarean section history. During the pelvic examination if a measurable defect was seen at the level of the cervicouterine isthmus images were recorded for later analysis.

The data were analysed for a history of caesarean section, irregular bleeding and coexisting uterine or endometrial pathologies. A total of 300 pelvic scans were assessed. 80 women reported having a caesarean section and 27 of these had a visible sonolucent pocket at the level of the scar. A significant number of these women reported prolonged menstrual bleeding or intermenstrual spotting in the absence of other uterine or endometrial pathology.

Caesarean section scar defects may be the cause of menstrual abnormalities, particularly intermenstrual or postmenstrual spotting.

113 Pentalogy of Waikato

Mr Mel MacRury
Waikato Hospital, Hamilton, New Zealand

We have had several cases of this rare pathology at Waikato Hospital over the last few years so I have decided to present a selection of these cases at this conference as part of my DMU training. I will initially go over the background of the condition, covering the incidence, features, appearances, prognosis and detection. I will then present the individual cases, of which there are five (hence Pentalogy of Waikato). My presentation will include a variety of images, photographs

and video clips of various cases we have had through our hospital to show what pentalogy of Cantrell entails – postmortem results and images will also be included.

114 Increased NT – early indicator of large fetus?

Ms Andrea Gibb
Waikato District Health Board, Hamilton, New Zealand

This presentation is a retrospective study of women who have presented to Waikato Hospital's Fetal Medicine Clinic with raised nuchal translucency. The subset that this study considers is those who have normal karyotype following CVS or amniocentesis.

After normal cardiac detail scans, these women undergo growth scans at 28 and 32 weeks to exclude IUGR. The opposite appears to be true in this population with a significant percentage being large for dates. Another subjective observation suggests that these fetuses are male. A literature search was conducted to ascertain if this condition had been noted previously (virtually no previous studies were identified).

Details included in this research include:

1 Maternal age and parity
2 Background risk and adjusted risk from NT measurement
3 Gender of the fetus
4 Biometry
5 Birth weight
6 The presence of GDM.

It is hoped to stimulate discussion on this topic and hopefully attract other centres to participate in a long-term study. This study is ongoing and is now prospective.

115 AFI as a triage tool for postdate pregnancies

Dr Talat Uppal
Nepean Hospital, University of Sydney, Australia

The management of postdates pregnancy varies from institution to institution. At Nepean Hospital we use AFI as a triage tool to organise induction of labour in the low risk patient at a gestation of 40 weeks plus 10 days. Women are reviewed in postdates clinic at 41 weeks and have a cervical assessment done.

With dedicated staff, the AFI is a simple test to perform, is less time consuming than a CTG and works efficiently as part of a well structured program. This test has been shown to increase spontaneous labour rates and decrease admission numbers. We have reviewed the details from the postdates service, that involved 3000 women from 2001–2007 inclusive.

We will present the data regarding the parity, gestation, Bishop's score and mode of induction.

116 Fetal weight formulas – a weighty dilemma

Ms Susan Campbell Westerway
North Shore O and G Ultrasound, St Leonards NSW, Australia

The debate over the accuracy of fetal weight formulas has been ongoing for decades. ASUM's own obstetric policy has, until now, not recommended any one formula due to lack of clinical evidence as to their accuracy.

The objectives of this study were:

1 To look at the issues in relation to the most common fetal weight formula available
2 Show clinical examples of weight variations for the pull down charts available on current ultrasound systems
3 Discuss the error factors that must be taken into account when selecting a formula.

Methodology

Fetal weight was assessed in 84 subjects within seven days of birth with birth weights being grouped to <3000 g, 3000–3500 g, 3500–4000 g and > 4000 g. Using a variation of parameters and fetal weight regression formula, the resultant estimated fetal weight was compared with the birth weight.

Results

1 Comparisons were made between the different regression models and variations from actual birth weights analysed for each weight grouping.
2 Random error across the weight ranges was 8.9% using a formula incorporating AC, HC, BPD and FL and 10.1% for a formula with AC and BPD.

117 Using the HC:AC ratio to predict intra-uterine growth restriction: a new look at an old measurement

Ms Ann Quinton
Nepean Hospital, University of Sydney, Australia

Introduction

The fetus with intra-uterine growth restriction (IUGR) is at higher risk of adverse events in-utero, at birth and throughout life. Ultrasound measurements performed in the early third trimester have not been shown to predict IUGR neonates.

Aim

To determine if any ultrasound biometric growth parameters at 28–32 weeks gestation could predict a birth weight below the 10th percentile, that is, IUGR.

Method

This study examined the relationship between all fetal measurements at the routine third trimester ultrasound and IUGR at birth using various statistical analyses. The study group of 41 women (smokers $n = 21$; non-smokers $n = 20$) had a 20% incidence (8/41) of IUGR.

Results

The head circumference to abdominal circumference (HC:AC) ratio was the best predictor. The HC:AC ratio was significantly higher at 1.105 ± 0.037 (mean ± SD) for the IUGR neonates compared to 1.067 ± 0.039 for the appropriate for gestational age (AGA) neonates (P 0.02). A cut-off value of 1.068 derived from the co-ordinates of the receiver operating characteristic (ROC) curve gave a sensitivity of 88% and specificity of 52%.

Discussion

The HC:AC ratio identified 88% (7/8) of the IUGR neonates. Of the AGA neonates, 52% (17/33) were identified.

Using a higher cut-off value would improve the specificity but would lower the sensitivity resulting in fewer of the IUGR babies being detected.

Conclusion

In this small study, the HC:AC ratio at 28–32 weeks was found to be a sensitive predictor of IUGR at delivery. Larger studies are necessary to confirm these findings.

118 3D Ultrasound in gynaecology

Dr Bernard Benoit
Princess Grace Hospital, Maternity, Monaco

Volume acquisition can be achieved, with a

transvaginal probe, as a single 3D static volume or as live 3D with realtime acquisition of a series of consequent volumes. The main advantage of volume ultrasound is the possibility of displaying the digitally stored information in different ways according to the question of interest. Volume data information can in addition be manipulated with different tools (Magi-Cut, B-Mode colour maps, contrast and brightness changes, zoom, etc) to provide the best image, which is the basis of diagnosis and clinical decision making.

The main advantages of using 3D ultrasound in gynecology are:

- display of the C plane (coronal view) of the uterus assessment of congenital uterine anomalies, acquired uterine structural changes (polyps, fibroids, synechia, etc), position of intra uterine and intra tubal devices
- simplify and shorten hysterosonography
- 3D rendering of ovarian mass
- accurate volume measurement (fibroids, ovarian masses, etc)
- automatic count and measurement of follicles
- study of the pelvic floor.

119 Current concepts in fetal growth

Dr Katie Groom
The University of Auckland, New Zealand

Only 20–50% of small for gestational age (SGA) babies are currently diagnosed before birth and about half of stillborn babies have a birth weight <10th customised centile and therefore likely suffer from fetal growth restriction. While it is uncertain whether suboptimal growth is the cause of death it is certainly an important association. Strategies to increase antenatal detection of suboptimal fetal growth have the potential to reduce perinatal morbidity and also mortality. Randomised trials of routine growth scans early in the third trimester have not been found to be helpful in increasing detection of SGA babies.

Use of customised antenatal growth charts which record serial measurements of fundal height and estimated fetal weight (if a growth scan is performed) have been shown to double antenatal detection of small babies and are recommended by the RCOG for routine use in antenatal care.

A range of clinical risk factors are associated with SGA babies including demographic factors such as smoking, birth of a previous SGA baby and medical conditions such as chronic hypertension, renal disease and antiphospholipid syndrome.

Currently there are no screening tests that enable reliable prediction of SGA pregnancies. Uterine artery Doppler studies in mid pregnancy appear to have limited utility for prediction of SGA. Low levels of PAPP-A in first trimester serum are associated with a two to three fold increase in later SGA but neither perform well enough in isolation to be recommended as a screening test.

A recent large Auckland study of nulliparous pregnancies reported that 85% of customised SGA babies were born at >37 weeks. The implications of these findings for practice are that growth scans in women at risk of SGA should be performed (or continued) late in the third trimester.

The SCOPE study, which is being conducted in Auckland and Adelaide, as well as centres in the UK, aims to develop reliable early pregnancy screening tests in both SGA and preeclampsia using a combination of clinical, biochemical and Doppler variables. If successful this will result in accurate risk prediction for future nulliparous women.

120 New methods of fibroid treatment

Dr David Rogers
Ascot Radiology and Auckland City Hospital, Auckland, New Zealand

In the 21st century, there are many diverse forms of treatment for uterine fibroids. Previously hysterectomy was the mainstay.

Laparoscopic surgery has advanced greatly and laparoscopic myomectomy has become a successful means of treatment.

However, this has limitations as fibroids need to be discrete and few in numbers.

Fibroid embolisation has become the most popular alternative form of treatment. This technique is widely practised in many parts of the world with considerable success. The technique has improved in the last five years and peri-procedural pain has diminished. However, side effects are frequent.

RF ablation of fibroids has become popular in Korea, with transvaginal insertion of the probe.

Recently, high intensity focused ultrasound with MR guidance has come into vogue. Equipment costs are high but treatment outcomes are said to be excellent.

With all these options available, ultrasound assessment of fibroids has become very important. No longer is it possible to state that fibroids are present and that the uterus is a certain size. Fibroids must be described, counted, measured and mapped to enable appropriate treatment decisions.

This talk shall cover specific aspects of fibroid treatment and shall relate the role of ultrasound and other imaging techniques in their assessment.

121 Ultrasound of the wrist joint

Professor Syed Amir Gilani
Director, Afro-Asian Institute of Medical Sciences Lahore, Pakistan

1 Ultrasound artifacts
2 New technologies
3 Indications for wrist ultrasound
4 Anatomy of wrist – cross-sectional anatomy of the wrist
5 Patient positioning and examination technique.
Ultrasound examination of the hand and wrist requires the patient to sit comfortably with their arm supported on an adjustable stand. The wrist is placed comfortably in a neutral position with a small rolled towel placed beneath it. This allows for gentle support of the wrist especially during the dynamic portion of the examination. The examiner performs the study facing the patient. It is important to remember that ultrasound permits the performance of a dynamic examination as well as the ability to compare anatomy on the other side. If the structure being examined is extremely superficial it may be necessary to use a standoff pad in order to project the structure into the focal zone of the transducer.
6 Normal ultrasound appearances
It is essential to have the correct transducer position for imaging the flexor (upper image) and extensor (lower image) tendons of the wrist.

7 Hand and wrist pathology
a) soft tissue tumors of the hand and wrist
b) tendon pathology – tenosynovitis, De Quervain's disease and trigger digit.
c) trauma to the tendons and/or ligaments of the hand
d) Carpel tunnel syndrome.

122 Sonographic assessment of forefoot pain

Stephen Bird
Benson Radiology, Adelaide, South Australia

Forefoot pain is a common clinical presentation that is often debilitating for the patient. Chronic forefoot pain often impacts upon the patient's ability to participate in paid employment.

Enjoyment of simple life pleasures is also compromised as forefoot pain makes walking a dog or playing with children/ grandchildren unpleasant. This paper will demonstrate a systematic approach to sonographic assessment of forefoot pain considering a wide range of differential pathologies.

123 Ultrasound of the knee joint

Professor Syed Amir Gilani
Director, Afro-Asian Institute of Medical Sciences Lahore, Pakistan

1 Anatomy of knee
- muscles and tendons the knee, ligaments of the knee
- bursae of the knee, bones of the knee.

2 Ultrasound of the knee
- every examination should begin by taking the patient's history.

Patient history	Potential findings
Pain when rising from a sitting position or during stair climbing	Patellofemoral disease
MVA trauma (dashboard injury)	PCL tear or dislocation
Pain or locking of knee after squatting	Meniscal tear
Popping sound after a pivoting during a non-contact injury	ACL tear
Popping sound during contact	Collateral ligament, meniscus or patellar dislocation
Acute swelling	ACL, peripheral meniscal tear, osteochondral fracture with or without capsule tear
Knee "gives out"	Ligamentous laxity, patellar subluxation and/or dislocation, meniscal tear

Patient positioning and examination technique
We need a high frequency, linear transducer in the 7–12 MHz range. The patient lies comfortably in either a supine, sitting or semireclining position. The knee should be flexed about 15–20 degrees with a small pillow placed behind the knee in order to stabilise and immobilise the leg. The knee should be imaged from four different approaches, including:

Anterior approach
- patellar and quadriceps tendons
- supra-patellar recess, bursa and fat pad
- patellar retinacula
- cortical surface of the femur and tibia
- anterior cruciate ligament.

Medial approach
- medial collateral ligament (MCL)
- adductor magnus insertion
- pes anserinus tendons and bursa
- medial meniscus

Lateral approach
- biceps femoris tendon
- lateral collateral ligament (LCL)
- lateral meniscus
- iliotibial band.

Posterior approach
- semimembranosus gastrocnemius bursa
- posterior horns of the medial and lateral menisci
- posterior cruciate ligament
- cartilage of the medial and lateral femoral condyles
- popliteal vessels
- Pathology of the knee.

(we will discuss few a cases of knee pathologies).

124 Required levator distension in vaginal childbirth

Professor Hans Peter Dietz
University of Sydney, Nepean Clinical School, Australia

Objectives
Biometry and function of the puborectalis muscle in the human female is likely to be of importance for successful vaginal childbirth. This study was designed to define the degree of stretch/strain required of the puborectalis muscle during a vaginal delivery.

Methods
We examined 227 nulliparous women at 36–38 weeks gestation with 4D ultrasound imaging at rest, on maximal Valsalva and during pelvic floor muscle contraction (PFMC). Minimal hiatal diameters, circumference, area and the bony part of the hiatus were measured. The latter was subtracted from the hiatal circumference to obtain the muscular component of the levator hiatus. In order to estimate necessary hiatal distension at vaginal birth we calculated a mean required circumference of 29.3 cm based on Caucasian neonatal biometric data. Required muscle 'strain' was calculated both from dimensions at rest and on Valsalva.

Results
The volume datasets of 224 women were available for analysis. Mean gestational age was 37.1 weeks. The mean strain required for vaginal delivery was calculated as 1.46 (0.61–2.74; SD 0.39) from rest and 1.06 (range 0.24–2.43; SD 0.43) from dimensions at maximal Valsalva.

Conclusions
There are enormous inter-individual variations in the distension required of the puborectalis muscle in childbirth.

The strain necessary for vaginal delivery of an average sized Caucasian baby, on top of the distension obtained by maximal Valsalva, varied from 24% to 243%, that is, by a factor of 10. This finding may explain some of the variation in obstetric outcomes observed in nulliparous women.

125 Genito urinary ultrasound of the male in the infertile couple – is it a valid exercise?

Mr Nevile Phillips
Obstetric And Gynecological Ultrasound Wembley, Perth, Australia

Between 1st January 2004 and 31st May 2006 a total of 749 men, whose only symptomatology related to the inability of their partner to achieve a pregnancy, underwent an ultrasound of the genito-urinary tract as part of their initial assessment at the Pivet Medical Centre, a Perth infertility clinic. The number of lesions identified totalled 643 with many patients having more than one lesion.

The most common lesion was the varicocele, which was present in 363 (49%) of patients.

Asymptomatic seminomata were present in five men (0.7%), testicular microlithiasis in 42 men (5.6%), cystic ectasia of the rete testis in nine (1.2%), renal lesions in 30 men (4.0%), prostatic disease in four men (0.5%), hydrocele in 23 men (3.1%) and epididymal cysts in 156 men (21%).

The diagnostic value of the procedure was of significant importance, predominantly among the men with testicular cancer, microlithiasis, cystic ectasia, renal disease and also men with a hydrocele as this has excluded underlying serious disease.

126 Sonovaginography: establishing normative data for the rectovaginal septum

Dr George Condous
Nepean Centre for Perinatal Care and Research, Nepean Clinical School, University of Sydney, Australia

Objectives

Establish normative data for the thickness of rectovaginal septum (RVS) at sonovaginography.

Methods

Prospective observational study. Women undergoing laparoscopy for clinical suspicion of rectovaginal endometriosis (RVE) were enrolled. We performed sonovaginography during anesthesia before laparoscopy. The sonographer predicted whether or not a nodule was present in retrocervical area or RVS.

Thickness of posterior vaginal wall ± RVS was taken at three points in midsagittal plane – at posterior fornix (retrocervical area), middle third of the vagina (upper RVS) and just above perineal body (lower RVS). Surgical confirmation of RVE was considered the gold standard.

Results

Twenty-three women have been enrolled. Median age was 38 years (IQR 33–44). 73% (8/11) had a history of endometriosis. RVE was confirmed in 17% (4/23). Visualisation of hypoechoic nodules at sonovaginography demonstrated sensitivity and specificity of 75% and 95% for detection of RVE. Mean diameter (SD) of RVE nodules was 27.3 (± 9.4) mm. Mean thickness of vaginal wall ± RVS at posterior fornix, at middle third of vagina and just above perineal body was 5.1, 1.4 and 4.0 mm, respectively. These measurements were not significantly different in the presence of endometriotic nodules.

Conclusions

We have established normative RVS thicknesses based on sonovaginography. Although numbers are small, there was no correlation between thickness and presence of RVE. The visualisation of hypoechoic lesions at sonovaginography seems to be the best predictor for RVE.

127 Is haemoperitoneum an absolute contraindication for the conservative management of ectopic pregnancy?

Dr Tommaso Bignardi
Nepean Centre for Perinatal Care and Research, Nepean Clinical School, University of Sydney, Australia

Objective

The presence of haemoperitoneum is accepted to be an indication for surgery in women with tubal ectopic pregnancy (EP). The aim of this ongoing study is to evaluate the feasibility of managing such women non-surgically.

Methods

Selected women with diagnosis of tubal EP and haemoperitoneum on transvaginal ultrasound (TVS) were offered conservative treatment (MTX or expectant) as inpatients.

Inclusion criteria for non-surgery included clinical stability, stable haemoglobin level on two measurements (0 and 12–24 hours apart), absence of significant haemoperitoneum and absence of an acute abdomen.

Significant haemoperitoneum was defined as the presence of blood above the level of uterine fundus and/or blood in Morrison's Pouch (hepato-renal space). Subsequent management was based upon the hCG ratio (serum hCG at 48hour/hCG at 0 hour). If the hCG ratio >1, women received MTX 50mg/m^2 (single-dose protocol); if hCG ratio <1, they were offered expectant management. All women were managed as an inpatient until the abdominal pain settled and the serum hCG levels were falling.

Results

Six women have been recruited to date. Median age was 23.5 years (IQ 22.2–26.2). Median gestational age at diagnosis was 53 days (IQ 49–61). Haemoglobin ranged from 11.2 to 14.2 mg/dL at presentation and from 12.0 to 14.8 mg/dL after 12–24 hours. Five women were managed expectantly, one woman received MTX. All women had resolution of the EP within three weeks from admission with no complications.

Conclusions

The presence of haemoperitoneum is not an absolute contraindication to conservative management of tubal ectopic pregnancies. We believe that the clinical state of the woman is more important in deciding whether to perform surgery or not when there is blood in the pelvis on scan.

128 The effect of levator avulsion on hiatal dimensions and function

Dr Varisara Chantarasorn
Nepean Centre for Perinatal Care and Research, Nepean Clinical School, University Of Sydney, Australia

Objective

Vaginal delivery is a risk factor for pelvic organ prolapse. This may be mediated by trauma to the insertion of the puborectalis muscle or via traumatic over-distension. Our aim was to determine changes in levator hiatal dimensions after childbirth.

Methods

296 nulliparous women carrying an uncomplicated singleton pregnancy were seen at 36–38 weeks gestation and again 3–6 months postpartum. They underwent an interview and 4D translabial ultrasound after voiding, in the supine position.

Hiatal diameters, circumference and area were measured

at rest, on maximal Valsalva and pelvic floor muscle contraction (PFMC). Muscle strain on Valsalva and PFMC were calculated as previously described.

Results

Of 296 women, 208 (70%) returned for postnatal assessment after normal vaginal delivery (n = 99, 48%), vacuum/forceps (n = 31, 15%) and Caesarean section (n = 78, 38%). After Caesarean section hiatal area was reduced from 20.9 to 18.9 cm^2 (P = 0.003). After vaginal delivery there was a 7% increase in hiatal area on Valsalva from 21.1 to 22.6 cm^2 (P = 0.019). After vaginal delivery with avulsion injury (which occurred in 20% of women delivered vaginally), there was a 25% increase in hiatal area on Valsalva from 20.5 to 25.6 cm^2 (P= 0.003). After avulsion injury, hiatal area on PFMC also increased significantly (P = 0.001) and strain on PFMC was reduced by about half (P = 0.008).

Conclusions

Vaginal childbirth results in enlargement of the levator hiatus. Hiatal area on Valsalva is significantly increased 3–6 months postpartum, especially if the puborectalis muscle is avulsed. Traumatic over-distension is probably of lesser importance compared to avulsion injury

129 A new ultrasound-based model of care for the management of acute gynaecological complications

Dr Tommaso Bignardi

Nepean Centre for Perinatal Care and Research, Nepean Clinical School, University Of Sydney, Australia

Objective

To compare two models of care for women with acute gynaecological complications, i.e. a traditional approach to acutegynaecological women compared to new ultrasound (USS)-based approach.

Methods

The Acute Gynaecology Unit (AGU) was set up in November 2006 at Nepean Hospital. This is an USS-based model of care which evaluates all women with acute gynaecological problems (pregnant and non-pregnant) using ultrasound at the primary interface. Prior to setting this model of care, we prospectively collected data on all acute gynaecological women who presented to Nepean Hospital between July and September 2006. We then collected data on all acute gynaecological women who presented to the AGU between March and May 2007, i.e. after the unit had been established for four months. Outcome measures included time to see doctor, time to ultrasound, admission rates, number of women admitted for an ultrasound scan, length of stay (LOS) as an outpatient, LOS as an inpatient, occupied bed stays, surgery rates and expectant and medical management rates. P-values were obtained using t-test, chi-square or Fisher's exact test for equality of two proportions.

Results

133 consecutive women were reviewed before the introduction of the AGU (old model) and 157 consecutive women after the introduction of the AGU (new model). The new USS-based model of care resulted in a significant decrease in admission rates, time to see doctor for an USS and LOS as an outpatient. There was also an overall reduction in occupied bed stays as well as a decrease in surgery intervention rates and an increase in the number of women managed expectantly.

Conclusion

The new USS-based model of care for women with acute gynaecological complications significantly improves patient care. This new model of care streamlines the management of women with acute gynaecological problems, maximising outpatient management and minimising unnecessary inpatient theatre allocation.

130 Comprehensive use of ultrasound in breast imaging

Assoc Professor Liane Philpotts

Associate Professor of Diagnostic Imaging, Chief of Breast Imaging, Co-Director of the Yale Breast Center, Yale University School of Medicine, New Haven, Connecticut, USA

Ultrasonography of the breast is an invaluable tool in daily practice for evaluation of mammographic findings, palpable areas and as guidance for many interventional procedures. In addition, US is being used for other indications, some of which are still under investigation. Correlation with MR findings is more and more commonly necessary. Evaluation of axillary nodes in patients with newly diagnosed breast cancer is being investigated, along with percutaneous sampling of the nodes. US use as a screening tool has also received recent attention.

Second Look US

Correlation with Breast MRI: Ultrasound is frequently being performed to further assess suspicious enhancing lesions found on MRI of the breast. This is important for several reasons. Identification of such lesions can facilitate biopsy with sonographic guidance in many cases, thus avoiding the more difficult MR guided biopsy. Studies have shown that second look ultrasound can identify a certain percentage of such lesions seen on MR. LaTrenta et al found that of those cases with an ultrasound correlate, carcinoma was found in a significantly higher percentage to those cases in which no ultrasound correlate was found.

The difficulty of absolute correlation of ultrasound and MR findings, however, is an important issue. Any biopsy performed with ultrasound guidance should be carefully reviewed to assess for concordance with the MR imaging findings. Depending on the concordance and clinical situation, repeat MR guided biopsy or follow up MR should be performed to document appropriate lesion sampling. A study at our institution comparing US biopsies deriving from either findings from routine mammo/US studies versus those from MR studies showed a higher cancer miss rate on MR derived studies. This suggests that either sampling was inadequate or, more likely, that the correct lesion was not actually sampled. Over time, we have leaned towards recommending MR guided biopsies rather than US unless there is a definite correlative finding. For patients awaiting treatment of cancer, delay in diagnosis of additional ipsi- or contralateral lesions are a problem and expediting this process is desirable.

Axillary Ultrasound

Ultrasound of the axillary region has gained interest lately as it can play an important role in the management of newly diagnosed breast cancers. Diagnosis of malignant spread to axillary lymph nodes prior to surgery can preclude sentinel biopsy and lead directly to a full axillary node dissection.

While it is known that differentiating benign and malignant lymph nodes can be very difficult in many imaging

modalities, there are features that are suggestive of malignancy including cortical thickening, asymmetric bulging and loss of fatty hilum.

Fine needle aspiration of axillary lymph nodes has been proposed by many as an alternative to core biopsy. If positive, no further intervention is necessary. A full nodal dissection will be performed. The limitation of FNA is that a negative result does not preclude nodal disease. False negative sampling may result from obtaining cells from normal portions of an involved node or inadequate cellularity. In some cases where there is ample nodal tissue to accommodate the throw of the needle or the trough of the vacuum device, for example when the node is suspiciously enlarged, core biopsy is favoured. While core biopsy may provide a more definitive diagnosis, the risks of using large gauge automated or vacuum probes in the axillary region can be problematic. Neurovascular bundles and chest wall often preclude "firing" an automated needle. The use of axillary nodal sampling will vary from institution to institution depending on such things as the experience of the cytopathologists, the skills of the radiologists and the skills of the surgeon in performing sentinel node biopsy.

Screening US

The use of US for screening has been a more recent development. While several individual studies have shown success in detecting cancers at a stage and size similar to mammography, larger scale studies are needed to fully define the role and assess the reproducibility of such outcomes. Large, randomised controlled trials, such as for mammography, are the true indicators of the value of a screening test but are impractical in most cases. A screening tool should be carefully proven to cause more benefit than harm given that it will be used in asymptomatic women.

The results of the ACRIN 6666 trial, a multi-institutional study, were recently released. This study, performed at 21 sites, assessed annual mammography and US in high risk women over three years. Out of more than 2800 women, 41 cancers were detected: eight by both mammo and US, 12 by mammo alone, 12 by US alone and eight by neither. Thus the combination found 78% cancers. The PPV of mammography was 22.6%, but that of US was only 8.9%, indicating many false positives were generated from US. Thus US, in addition to mammography, will detect additional cancers but will also increase the number of false positive biopsies. Given that this study was performed in high risk women, a population for which breast MRI is often indicated, it is important to note that the combination of mammography and MRI has a sensitivity of 93%. Therefore, the absolute role of US as an additional screening tool in high risk women is still questionable. For women who cannot or do not have access to MRI, it is a reasonable tool. The role of US screening in intermediate risk women is still a possibility.Tools to improve the specificity of US, such as elastography,c will be beneficial to improve the results if US is incorporated into breast screening practice.

131 Breast ultrasound in the assessment of calcifications

Dr Jeremy Whitlock
Greenlane Clinical Centre, Auckland, New Zealand

In its infancy, breast ultrasound was limited to detection of mass lesions and even differentiation between cystic and solid proved challenging using the early ultrasound equipment. However over the past decade, the development of high-frequency transducers, combined with ever-improving computer technology, has led to a significant increase in resolution and contrast of ultrasound systems. This has expanded the scope of ultrasound in the assessment of mammographically detected abnormalities. While mammography has been and remains to date, the modality of choice in the detection and characterisation of microcalcifications, breast ultrasound is now being used more frequently in the evaluation of mammographically detected calcifications.

Ultrasound can not only provide further information about the nature of the tissue surrounding the calcifications but also is becoming more commonly used as a means of biopsy to target areas of calcification. The advantages of ultrasound guided biopsy over stereotactic biopsy include improved patient comfort due to supine positioning and lack of breast compression/immobilisation, no requirement for use of ionizing radiation, reduced cost of the procedure and in general a reduction in procedure time compared with stereotactic biopsy. Various needles can now be used for ultrasound guided biopsy. While core biopsy remains the most widely utilised method, the newer large-bore, vacuum assisted devices are now available for hand-held use in both ultrasound and stereotactic biopsy.

Breast MRI is now starting to be considered more frequently in the work up of malignant calcifications to assess extent of disease preoperatively. However careful breast ultrasound assessment will continue to be extremely valuable in the initial evaluation and needle biopsy of most mammographically detected lesions including microcalcifications. With the ongoing refinement of ultrasound equipment and release of new technologies, both in hardware as well as software development, the role of ultrasound will only continue to increase in the assessment of calcifications.

Scanning the journals

Does three dimensional power Doppler ultrasound improve the diagnostic accuracy for the prediction of adnexal malignancy?

Dai SY *et al. Journal of Obstetrics and Gynecology Res* 2008; 34: 364–70.

The Japanese authors of this study compared results of 3D power Doppler with 2D transvaginal gray-scale sonography, MRI and PET in 36 patients with suspicious adnexal masses.

They concluded that 3D power Doppler did not improve the prediction of malignancy and 2D transvaginal sonography still remains important in the differential diagnosis of adnexal masses. While it was a small study, it does lend hope to those centres with less advanced technology particularly given that ultrasound is cheaper and more convenient than MRI in these cases.

Sonographic birth-weight prediction in obese patients using the Gestation Adjusted prediction method

Thornburg, *et al. Ultrasound Obstet Gynaecol* 2008; 32: 66–70.

This American study is worth perusing given the increasing number of obese pregnant patients we see.

Briefly the GAP (gestation adjusted prediction) method uses the formula: birth weight at delivery = median fetal weight by ultrasound/median fetal weight at gestational age of ultrasound.

In 1025 controls and 357 obese women, the method was able to predict correctly birth weight within 20% of the actual birth weight in over 90% of cases and within 10% of over 59%. For the macrosomic fetuses, the method was able to correctly exclude macrosomia in about 90% although in those with a BMI >40 kg it was less accurate. More work continues to be needed!

Ultrasound examination of the knee: an illustrated guide

Descamps M, *et al. Ultrasound* 2008; 16: 43–7.

The knee is frequently injured, especially by rugby and football players, but is also affected by degenerative disease.

This article points out that ultrasound has a place in the investigation of the knee particularly with regard to ligaments and tendons. It is useful for observing the extra-articular soft tissues as opposed to the extra-articular structures where MRI performs better.

The authors demonstrate how to scan the knee and provide a check list of structures to examine and record.

For musculoskeletal assessment we need to know the strengths and limitations of ultrasound and this article helps in this regard.

Benign and malignant epididymal masses evaluated with scrotal sonography

Alleman WG, *et al. J Ultrasound Med* 2008; 27: 1195–1202.

This paper from the Mayo Clinic reviews 85 cases of solid epididymal masses over an eight-year period. Only 6% had malignant disease. The size of the mass (greater than 1.5 cm) and the presence of colour Doppler flow were statistically significant markers for malignancy.

It is useful to remember that most solid scrotal masses are benign but careful ultrasound assessment can help identify possible malignancy.

Laparoscopic ultrasonography – assisted retroperitoneal lymph node sampling in patients evaluated for stomach cancer recurrence

Kim H, *et al. J Ultrasound Med* 2008; 27: 1229–33.

This paper caught my attention as I was not aware of laparoscopic sonography. They only describe two patients but they were able to localise small lymph nodes (1.5 cm or less) with intraoperative ultrasound. This is particularly important in gastric cancer where the nodes can be deep and difficult to access. Using this laparoscopic technique might also reduce trauma to surrounding tissues and operating time. We may see more applications of this procedure.

Spinal sonography in newborns and infants
Part II: spinal dysraphism and tethered cord

Deeg KH, *et al. Ultrascholl in Med* 2008; 29: 71–88.

This splendidly illustrated review is required reading for those who like myself get confused about the nomenclature. Myelocystocele, intradural lipoma, fibrolipoma, diastematomyelia, dorsal dermal sinus and caudal regression syndrome are all covered.

As long as the spine arches are not completely ossified, all different types of spinal dysraphism can be diagnosed sonographically in the neonate.

The Gleaner

Book reviews

Interventional Ultrasound of the Breast
Editors Philip Drew, Simon Cawthorn, Michael Michell
Published by CRC Press, 2007
Cost $130
ISBN 1 84184 416 0

This easily read 124-page book consists of chapters written by multiple contributors, covering history of breast diagnosis, breast anatomy, technology for surgeons, training and accreditiation, ultrasound appearances of benign and malignant breast lesions, preoperative diagnosis and biopsy guns, techniques of ultrasound biopsy, techniques of ultrasound-guided vacuum-assisted biopsy, future developments and future developments: focused ultrasound ablation.

Most chapters are well illustrated, however the standard of ultrasound images and their presentation in the text is patchy.

Contributors come from a wide variety of backgrounds, reflecting the multidisciplinary approach to the diagnosis and management of breast disease. They include physicists, surgeons, an anatomist, a radiologist and a breast clinician.

The initial chapters covering the history of breast diagnosis and anatomy set the context of the book. The anatomy is well presented and illustrated. The training and accreditation section is aimed at clinicians performing ultrasound and ultrasound-guided procedures rather than diagnostic imaging specialists such as radiologists.

While the content of the chapters is generally sound, some topics are repeated in different chapters, possibly a deliberate intention of the editors. A comment in the training and accreditation chapter "Ultrasound allows almost all impalpable cancers to be biopsied…." is a very optimistic assessment of ultrasound's detection capabilities.

The emphasis of the book, understandably, reflects a very ultrasound-centric approach with little discussion of where ultrasound (US guided biopsies) complement and fit in with other imaging modalities such as mammography and MRI and biopsy techniques such as stereotaxis.

Granted, the title indicates the book is dedicated to interventional breast ultrasound, however, a rational discussion of where it fits with respect to all breast imaging would be appropriate. Similarly, correlative mammographic images and discussion of how to localise mammographically detected lesions with ultrasound would be highly relevant, as this will often lead to ultrasound-guided biopsy if the lesion is seen with ultrasound. All too often with imaging, we see approaches focussed on the modality, whereas the clinical presentation and problem should dictate which imaging should be used and its context in the range of options available.

The *Ultrasound Appearances of Benign and Malignant Breast Lesions* chapter provides comprehensive descriptions and ultrasound images of various pathologies, however, there is not a lot of discussion on the difficulties of breast ultrasound specificity, particularly in differentiating benign from malignant lesions and hence those which should proceed to biopsy.

Overall, this book is very readable and imparts multiple useful tips on breast ultrasound and its role in breast intervention. Its compact size reflects its specific and directed charter, which it covers adequately. It would probably be more useful to clinicians performing interventional ultrasound rather than diagnostic imaging specialists.

Dr Matthew Andrews

Obstetric Ultrasound – Artistry in Practice
John C. Hobbins
Published by Blackwell Publishing
Cost $80
ISBN 978 1 4051 5815 2

Reviewing some medical books can be a chore. Wading through multi-author texts is often debilitating and sleep inducing. However this single author text is a delight to read.

John Hobbins is one of the fathers of ultrasound and prenatal diagnosis. His experience, pragmatism and wisdom shines through in this publication. The style is almost conversational, peppered with occasional humorous asides, but the content is evidence-based, up to date and relevant. He does not shy from controversy and his Chapter 22 with his own opinions on "hot topics" is worth the price of the book. Whether he is discussing fetal anomaly, biometry or maternal disease, the collated information is succinctly presented. The references are recent and the reader is not overwhelmed by unnecessary papers. Like all good teaching texts, clinical cases are used to demonstrate sonographic points.

This book should be in the library of all of us who perform obstetric ultrasound. Its subtitle *Artistry in Practice* is fitting and is a tribute to the author.

Prof Ron Benzie

MRI-Guided Focussed Ultrasound Surgery
Editors Ferenc A. Jolesz and Kullervo H. Hynynen
Published by Informa
Cost $US 199.95 (Amazon.com)
ISBN 978 0 8493 7370 1

This 200-page hard cover text is described by the editors as a literary first – the first book dedicated entirely to MRI-guided focussed ultrasound surgery (MRgFUS). It is a comprehensive, well structured, informative and at times, awe inspiring text. In the preface, the editors describe the technology, explained in great detail in this book, as a "disruptive technology" which may "radically change" current medical practices, replace some invasive surgical procedures and potentially, in some cases, "eliminate need for ionising radiation".

There are 29 contributors to this expansive text, drawn from eminent institutions across the globe including the Harvard Medical School, the Mayo Clinic in the USA and Imperial College, London. Underlining the broad contribution from sites around the world, there are numerous contributors from France, especially from Universite Victor Segalen, Bordeaux and contributors from the University of Toronto, Canada and the University of Texas, USA.

Jolesz and Hynynen have divided the book into 15 well-constructed chapters. The first introductory chapter concisely summarises the historical background and subsequent development of this novel technology, outlining briefly current applications and introducing their vision of future applications and impact on current medical practice.

The next two chapters are technical in nature, detailing fundamental scientific and physics principles underlying ultrasound, with emphasis on its use as a

therapeutic tool; and MRI as a thermally sensitive imaging modality. Both chapters include detailed diagrams, formulae and images, invaluable for reference.

Chapters 4, 5 and 6 are more practical in nature, first explaining principles and strategies of thermal tissue ablation then, over two chapters, detailing equipment and practical methods used in treatment planning, execution and verification of treatment effect. The information in the first of these two chapters is a valuable practical guide for the radiologist and technologist planning to perform MRgFUS and is also a helpful resource for clinicians involved in referring patients for this procedure. The second chapter is again more theoretical, explaining concepts and formulae underpinning the methods to develop a 'sensible' approach to treatment planning.

The next three chapters deal at length with clinical applications for MRgFUS. Initially, an overview of current and future applications is presented. Subsequently, two entire chapters are dedicated to 'already proven applications' – treatment of breast tumours and uterine fibroids. The section on uterine fibroids is particularly well structured and informative, comparing MRgFUS with other forms of treatment, explaining the procedure in detail and reviewing results of clinical trials.

The final sections explore in detail experimental and potential applications for this innovative technology. An entire chapter is devoted to ablation of brain tumours; a further chapter examines potential treatment of liver, renal and bone tumours. A fascinating insight into the future of medicine is offered in the final four chapters. Non-thermal applications are proposed including targeted drug delivery – either through accumulation in tumour tissue using sonosensitisers or into the brain by transiently opening the blood-brain barrier; activation of gene therapy in desired tissues and induction of tumour cell apoptosis. Truly amazing.

I would recommend this book to any radiologist, medical imaging technologist or clinician interested in this new exciting field of non-invasive MRI guided focussed ultrasound surgery.

Dr Andrew Dobrotwir

DMU KEY DATES FOR 2009

Part I and Part II Application Open 1st December 2008
Part I and Part II Application Close 31st March 2009
Application for Exemption Close 31st March 2009

Cardiac DMU Preparation Courses
Sydney 25th–29th March 2009

General, Vascular and Obstetric Preparation Course
Sydney 18th–21st April 2009

DMU Part I Written Examination 25th July 2009
DMU Part II Written Examination 25th July 2009
DMU Part II Oral Examination Period September 2009
DMU Part II Practical Examination Period August 2009
DMU Part I Supplementary Written Examination 7th November 2009

DMU TABLE OF FEES & CHARGES 2009

DMU Enrolment (once only fee) $A342.00 + GST = $A376.20
DMU Part I APP $A342.00 + GST = $A376.20
DMU Part I PHY $A342.00 + GST = $A376.20
DMU Part II Written $A567.00 + GST = $A623.70
DMU Part II Oral $A567.00 + GST = $A623.70
DMU Part II Practical $A840.00 + GST = $A924.00

Supplementary Examinations
DMU Part I Supplementary APP $A342.00 + GST = $A376.20
DMU Part I Supplementary PHY $A342.00 + GST = $A376.20

DDU FEES AND DATES

Applicants must be a member of ASUM to sit the DDU examination. Application forms for both the DDU exam and ASUM membership may be downloaded from our website at www.asum.com.au. Registration may be eligible for discounted trainee membership rates including complementary membership in the first year.

DDU Fees 2009

Part I A$1039.50 (includes GST) Examination fee for ASUM Members sitting in Australia;
Part I A$945 (ex GST) Examination fee for ASUM members sitting in NZ;
Part II A$1848.00 (includes GST) Examination Fee;
Part II A$1680.00 (ex GST) Examination Fee;
Part II A$330.00 (includes GST) Casebook fee.
Part II Part II Candidates sitting exam for second time, who have been offered the opportunity to do the oral portion only, A$924.00 (includes GST) and A$840 (ex GST) This is available to approved candidates only.

DDU Dates 2009
2009 Part I

- The Part I Applications close on Monday 16th March 2009.
  The Part I Examination will be held on Monday 18th May 2009.
  DDU Technical Seminar (Physics) will be held Wednesday 25th to Thurday 26th March 2009

2009 Part II

- Casebooks for 2009 Part II DDU Examination must be submitted by Monday 19 January 2009 and accompanied by the prescribed fee of A$330.00 for all participants.
  The Part II Applications close on Monday 16th March 2009.
  The Written Examination for Part II will be held on Monday 18th May 2009.
  The Oral Exam for Cardiology candidates only will be in MELBOURNE on Thursday 18th June 2009.
  The Oral Examination for Part II candidates (excluding Cardiology) will be held in Melbourne on Saturday 20th June 2009.

Results
ALL examination results for both Part 1 and Part 2 candidates will be mailed to candidates at the same time, two weeks after the final Part 2 exams (4th July 2009).

DMU PREPARATION COURSES AND DDU TECHNICAL SEMINAR 2009

Cardiac DMU Preparation Course
Sydney 25th–29th March 2009

General, Vascular & Obstetric DMU Preparation Course
Sydney 18th–21st April 2009

DDU Technical Seminar (Physics)
Sydney 25th–26th March 2009

The DMU Preparation Courses are intended for candidates preparing for DMU examinations in 2009. Students from other courses may also find the preparation courses useful.

Please bring this notice to the attention of anyone you are aware of who is intending to do an ultrasound qualification

For further details email dmu@asum.com.au or ddu@asum.com.au

Clinician Performed Ultrasound update

The Certificate in Clinician Performed Ultrasound (CCPU) is gathering momentum with applications being received from medical practitioners in Australia and New Zealand.

CCPU is recognised as a relevant credential by point of care medical practitioners from a broadening range of practice areas.

If you are interested in finding out more about the CCPU and how it might assist you in your medical specialty, the ASUM website, www.asum.com.au, is a good start.

In the 'Policies' area of ASUM website, ASUM Policy B8; 'Statement on the Use of Ultrasound by Medical Practitioners' sets out the theoretical and practical training requirements for medical practitioners who use ultrasound. It outlines the credentials available through ASUM for medical practitioners and the eligibility criteria and training requirements. It also outlines the distinction between ASUM's educational offerings such as Diploma in Diagnostic Ultrasound (DDU) and CCPU.

The 'CCPU' area of the ASUM site contains relevant documents such as regulations, application forms and general information.

The 'Regulations' area informs panel members and candidates of the eligibility, theoretical and practical requirements to obtain a CCPU qualification. More detailed information about the theoretical elements of the CCPU can be found in the course syllabi developed by medical practitioners from the various CCPU panels.

Key considerations and requirements in gaining a CCPU include:

- Check eligible for your specialty e.g. Are you required to be a member or a fellow of the appropriate College or a registrar in second year of training?
- Complete an ASUM's accredited Physics course
- Complete the theoretical requirements such as a Level 1 and Level 2 course
- Complete log book practice requirements
- Maintain annual requirements, (continuing professional development points)

The CCPU panels are responsible for developing course syllabi and curricula, overseeing the logbook requirements and setting standards of practice protocols and appropriate use statements.

Additionally panels will run Level 1 and/or Level 2 courses. The Obstetrics and Gynaecology panel and the Neonatal panel have delivered courses with ASUM's assistance. Running courses tests the validity of the syllabus and helps develop common curriculum. As ASUM cannot deliver all CCPU related training, we invite the ultrasound industry's training providers to apply for course accreditation. For a course to be accredited for CCPU requirements, it must address the syllabus for the specialty in question. Information about course accreditation is available through the CCPU area of the ASUM website.

As a competency oriented qualification, the CCPU attracts applications for advanced standing for part or all of the CCPU requirements. A downloadable form is available from the ASUM website.

CCPU: the strengths

The major strength of the CCPU is its reliance on the medical practitioners who use ultrasound within a specialty for the development of the syllabus, curriculum and standards of practice.

By having a 'bottom-up' approach to the development of some of the CCPU's requirements, it ensures the content remains relevant to the profession.

CCPU: the outcomes so far

Since January 2008 ASUM has received 60 applications for enrolment in the CCPU.

There have been a total of 14 CCPU qualifications awarded to date.

There are five active CCPU panels consisting of 32 CCPU panel members.

CCPU Certification Board

The CCPU is governed by the CCPU Certification Board which consists of seven members and meets quarterly. To date the Board has met three times and is due to meet again prior to the close of 2008.

The CCPU Board considers recommendations from CCPU panels on matters such as advanced standing, CCPU awards and course accreditation.

CCPU panels

There are five active CCPU panels: Emergency, Critical Care, Obstetrics and Gynaecology, Neonatal, Surgical (Breast & Endocrine) with Sports Medicine and Rheumatology being established. Also considering establishing panels are Rural and Remote GPs and Phlebology.

The future

The CCPU will grow significantly as its value as a standard in the area of point of care ultrasound is recognised.

CCPU Neonatology holds first workshop

On the 8th and 9th August 2008, the first CCPU Neonatology Level 1 (basic) Workshop was held jointly at ASUM's training rooms and Royal North Shore Hospital in Sydney.

The workshop was conducted by members of the CCPU Neonatology panel, Martin Kluckow, Nick Evans, Sheryle Rogerson, Andy Gill and David Knight.

In total, 20 participants attended the workshop, which included the following sessions; neonatal heart and echocardiogram scanning, introduction to Doppler and neonatal brain scanning. Practical scanning took up part of day one and most of day two. These sessions were highly valued by workshop participants as evidenced by the positive comments in the post workshop survey.

Workshop participants will now need to complete their logbooks to meet the CCPU Level 1 requirements.

A Level 2 (advanced) workshop will be held at the Royal Prince Alfred Hospital on the 28th and 29th November 2008 by faculty members. Candidates will be introduced to more advanced functional echocardiographic measurements, recognition of structural heart disease and structural and Doppler abnormalities of the brain.

The CCPU Neonatal panel is to be congratulated for the contribution and effort in achieving such a successful outcome for point of care ultrasound.

ASUM Teaching Fellowships

An important part of ASUM's education program is the facilitation of teaching days by way of teaching fellowships in association with our valued sponsors.

The Giulia Franco Teaching Fellowship

Proudly sponsored by Toshiba Medical

Since the introduction of Ultrasound, Toshiba has been at the technological forefront of this diagnostic imaging technology. Throughout the years, Toshibas innovations have set new standards and created new applications that have significantly extended ultrasound capabilities.

The Giulia Franco Teaching Fellowship was established by ASUM in association with Toshiba Medical to provide educational opportunities for sonographers in all parts of Australia and New Zealand. It is named to commemorate Giulia Franco whose passion for ultrasound took her to all parts of Australia and New Zealand, and continued as she moved into a business career with Toshiba. It was first awarded in 2004.

This year the Giulia Franco Teaching Fellowship was awarded to Mr Martin Necas who participated in a successful teaching day in Canberra.

Chris Kohlenberg Teaching Fellowship

Proudly sponsored by GE Healthcare

Since its foundation, GE Healthcare has constantly been at the forefront of research and technical innovation, with GE Healthcare today being recognised as a world leader in the supply of diagnostic imaging systems.

The Chris Kohlenberg Teaching Fellowship was established by ASUM in association with GE Healthcare to increase the opportunity for members outside the main centres to have access to quality education opportunities. It has been awarded annually since 1998 to commemorate Dr Chris Kohlenberg, who died while travelling to educate sonographers.

This year, the Chris Kohlenberg teaching fellowship was awarded to Dr Yisha Tong for regional Queensland.

ASUM Beresford Buttery Teaching Fellowship

Proudly sponsored by GE Healthcare

The Beresford Buttery Overseas Traineeship was established in 1996 in conjunction with GE Healthcare in memory of Beresford Buttery FRANZCOG, DDU, COGUS who passed away in China in 1995 while serving as ASUM's representative on WFUMB. Beresford worked tirelessly for ASUM throughout most of his professional career.

Since 2006, the Beresford Buttery Overseas Traineeship has been replaced with a teaching fellowship, which focuses on major city centres in either Australia or New Zealand.

This year Assoc Prof Hans Peter Dietz was awarded the Beresford Buttery teaching Fellowship for the WA Translabial Workshop on 29th November 2008.

Thanks to our sponsors

ASUM wishes to express its gratitude to Toshiba for the generous support of the Giulia Franco Teaching Fellowship which was such a success in the ACT in October.

ASUM also wishes to thank GE Healthcare for its generous support of the Beresford Buttery Teaching Fellowship to be held in Perth during November 2008 as well as the Chris Kohlenberg Teaching Fellowship for Queensland (postponed to 2009).

ACT Education Day

Fifty registrants were treated to a great day of ultrasound education with presentations from ASUM's Giulia Franco Teaching Fellow from New Zealand, Martin Necas along with our local talent, Dr Wes Cormick, Prof David Ellwood, Dr Meiri Robertson and Ms Debra Paoletti. Topics varied from obstetrics, gynaecology, vascular ultrasound to hand MSK work.

This meeting was a wonderful educational opportunity for sonographers from the regional community around the ACT. Participants came from as far afield as Orange, Wagga, Wollongong, Young and Boorowa. As such, the meeting provided a forum for education as well as a excellent networking opportunity for sonographers from the surrounding area.

On behalf of the Canberra sonographers I would like you to pass on our gratitude to Toshiba for their sponsorship of the Giulia Franco teaching fellowship. Toshiba has always been a true supporter of sonographers education and we thank them for this support.

Sue Caitcheon

ASUM 38th Annual Scientific Meeting Auckland 2008 – Convenors' Report

David Rogers Scientific Convenor and David Davies-Payne Co-Convenor

The NZ ASM had a great social and academic program.

The ASUM 2008 Annual Scientific Meeting was held at the Sky City Convention Centre in Auckland from September 18th to September 21st. The theme was "Into the Next Dimension", with many of the sessions showcasing future ultrasound technologies and their clinical applications. The meeting was well attended, with 470 delegates.

The major corporate sponsors for this year's meeting were Toshiba, Philips, GE Healthcare and Siemens. Their financial support and direct participation with the exhibition hall and sponsors' symposia were key to producing a quality educational event.

This year's conference was notable for its luminary international speakers. The international faculty consisted of Dr Bernard Benoit (3D/4D imaging in obstetrics and gynaecology), Prof Peter Burns (ultrasound physics and future applications), Prof Giovanni Cerri (history and future of WFUMB), Dr Rhodri Evans (head and neck diagnostic imaging and intervention), Prof Syed Gilani (ultrasound education in the developing world and musculoskeletal imaging), Dr Philippe Jeanty (advanced fetal imaging), Dr Masatoshi Kudo (contrast enhanced liver imaging), Dr Daniel Makes (soft tissue vascular lesions), Dr Kevin Martin (safety of new ultrasound technologies), Prof Gebhard Mathis (chest and abdominal imaging), Dr Christian Nolsøe (contrast enhanced interventional techniques), Assoc Prof Lianne Philpotts (breast imaging) and Dr Iryna Tsikhanenka (obstetric imaging and antenatal diagnosis). All sessions were very informative and often immensely enjoyable. Some highlights of this year's meeting were the numerous presantations on the use of 3D and 4D imaging Special thanks is given to the generosity of other ultrasound societies who sponsored many speakers for the conference, in particular, The Danish Ultrasound Society, The British Medical Ultrasound Society, The Austrian Ultrasound Society, The Asian Federation of Ultrasound in Medicine and Biology, and the Indonesian Society of Ultrasound in Medicine.

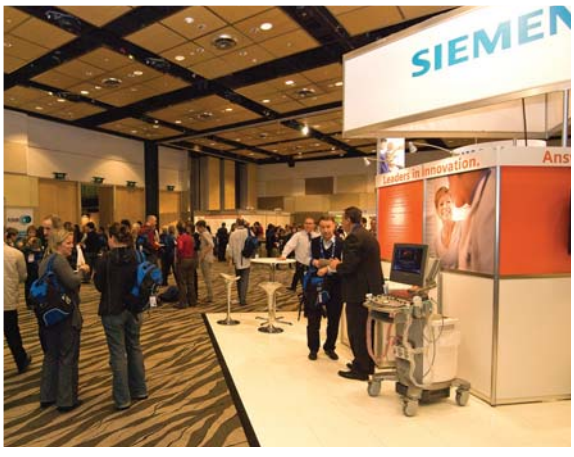
The local contingent of the faculty consisted of Mr Stephen Bird (assessment of forefoot pain), Dr Brendan Buckley (renal ablation), Dr David Davies-Payne (paediatric chest and abdominal imaging, OsiriX), Dr Richard Davis (nasal bone assessment), Assoc Prof Anthony Doyle (breast, soft tissue masses), Ms Vanessa Galloway (carotid, paediatric liver transplant, scrotum), Dr Katie Groom (individualised fetal growth), Prof Andrew Holden (renal transplant assessment), Dr Russell Metcalfe (paediatric musculoskeletal imaging), Dr Emma Parry (chorionicity), Dr David Perry (antenatal-postnatal correlation), Dr David Rogers (fibroid treatment, OsiriX integration), Prof Peter Stone (fetal medicine in NZ), Dr Philip Weeks (shoulder ultrasound and MRI), Dr Jeremy Whitlock (breast calcifications), Mr Alan Williams (liver transplant assessment). These sessions rounded out what was felt to be a very full academic program, which covered nearly all aspects of clinical ultrasound.

The nuchal course (Dr Dereck Souter, Dr Jon Hyett and colleagues) and skills day (Ms Philippa Maurer, Ms Vanessa Galloway and colleagues) were both run on 18th September, providing insights into the practical skills and theory behind many of the common ultrasound examinations.

As is typical of ASUM conferences, the social events were much anticipated and well attended – from the faculty dinner and the welcome reception, with its traditional opening of the sake barrel, to the headline conference dinner and dance at the Auckland Museum. All credit to the conference organisers who put together a fantastic evening of fine food and great entertainment.

ASUM 08 was a great success. The focus will now be on Sydney as we all prepare for the Olympic Games of ultrasound conferences: WFUMB 09. We are very grateful to the local organising committee: Philippa Maurer, Vanessa Galloway, Sophy Worth, Alan Williams, Dereck Souter, Philip Weeks, Jeremy Whitlock and Andrew Holden, with professional assistance from Workz4U: Karen Williamson and Lynda Booth. Everybody worked tirelessly to achieve a great conference.

Images ASUM 38th Annual Scientific Meeting Auckland 2008

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ASUM Asia Link Scholarship 2008, Sydney Australia

Sakshi Tomar

ASUM Asia Link Scholarship is a great concept, promoting excellence in ultrasound and imparting knowledge to young doctors. It was an honour to accept this scholarship in 2006 through the Indian Federation of Ultrasound in Medicine and Biology (IFUMB).

I was very keen and enthusiastic about undertaking the scholarship, but it took a while to reach Sydney as I was held up by an important project.

I finally arrived in Sydney on 1st August 2008, looking forward to a great academic program over two weeks. My placement was at the Royal Hospital for Women (RHW) at Randwick, Sydney. After I checked in with Dr Glenn McNally, Head of the Department of Medical Imaging at RHW, I flew to Adelaide to be with my sister for the weekend.

As a referral hospital and training centre, RHW does fetal scanning and serology testing where necessary. There are six ultrasound rooms equipped with Wipro GE and Toshiba scanners.

On the evening of Monday 4th August, I visited the ASUM office at Crows Nest, NSW with Dr McNally where I met Dr Caroline Hong. She is a very warm and affectionate person. I was presented with gifts and had photos taken with Drs Hong and McNally and I presented them with tokens of appreciation and affection from India. The day ended with a great Indian dinner at one of the local restaurants.

During my two-week stay at RHW, I performed hands-on scanning on few patients and observed APX 600 scan results. The obstetric cases included nuchal translucency scan and risk assessment, fetal morphological scanning for congenital abnormalities, dating scans, third trimester growth parameters and placental localisation.

I observed lots of interesting cases like fetal hydrocephalus, diaphragmatic hernia, PUJ obstruction, cardiac and limb anomalies, placenta praevia, placenta accreta, multiple pregnancy after IVF, incompetent cervix, patients with bleeding P/V (nonprogressive intrauterine pregnancy, retained products of conception, ectopic pregnancy in first trimester and placenta previa in third trimester).

Dr Sakshi Tomar enjoyed two weeks ultrasound training at RWH with ASUM Asia Link.

Pelvic sonographic scans included multiple uterine fibroids, endometrial polyps, adenomyosis, ovarian dermoid, pelvic inflammatory diseases, pelvic collections following hysterectomy, enlarged stimulated ovaries following IVF and many other pathologies.

I was instructed in interventional ultrasound procedures including amniocentesis, chorionic villus sampling and hysterocontrast salpingography (HyCoSy) under the supervision of Dr Glenn. I also observed neonatal transcranial, neonatal hip and abdominal scans.

I had the opportunity to discuss cases with Dr McNally and fellow residents. My sincere thanks must go to Dr McNally, Dr Sarah, Dr Yasmin, Dr Jennett and Dr Stanley along with the department staff for their hospitality and guidance.

Dr McNally also arranged for me to visit the Department of Imaging at Prince of Wales Hospital where I saw a number of abdominal ultrasounds, color Doppler scanning, x-ray reporting, barium procedures and the CT and MRI sections.

I also attended a pediatric clinico-radiologic meeting, which was very interesting. My special thanks go to Dr Jennett Taylor for organising this for me.

On the last day, a courier from the ASUM office arrived with a parcel containing a beautiful ASUM plaque, which was a pleasant surprise, the ASUM *Ultrasound Bulletin* and WFUMB 2009 brochures. I ended my visit to Sydney with a refreshing tour of the city.

My thanks go to Dr Caroline Hong for organising a great program for me and to the ASUM Council for giving me this opportunity. My thanks also go to Iris Hui for very promptly replying to all my emails and to Louise Allsopp for organising my stay. I would like to thank IFUMB for choosing me as the recipient of this scholarship.

My thanks to my family, my husband Dr Sanjay and lovely daughter Aaina for their support and patience.

I hope this program continues to impart sonographic skills to budding doctors and I wish ASUM a great WFUMB 2009 at Sydney.

While on my Cathay Pacific flight back to India, I was filled with enthusiasm for ultrasound and continuing to improve my ultrasound skills. I feel privileged to be a recipient of this scholarship.

Thanks everyone once again.

Good bye Sydney and I hope to see you soon.

Ultrasound Bulletin
Publication Dates 2009

	Feb 2009	May 2009	Aug 2009	Nov 2009
Submission deadline	10th Dec 08	31st Mar	30th Jun	30th Sep
Post date	15th Feb	20th May	15th Aug	19th Nov

CADUCEUS comes to Dr Jones and Partners Adelaide

Akram Dakhil

My name is Akram Dakhil, I am a radiologist, having completed my training in general radiology and passing the Danish Board last year [2007]. I am now working at Køge Hospital, University of Copenhagen.

One of my great wishes has aways been to specialise in ultrasound, especially the musculoskeletal (MSK) aspect and that's why I applied for the CADUCEUS scholarship.

I knew from colleagues that MSK ultrasound was very advanced in Australia and this scholarship presented a great chance for me to learn.

With the assistance of ASUM Chief Executive Officer Dr Caroline Hong I was able to stay for a few weeks at The Musculoskeletal Centre of Excellence, Dr Jones and Partners, Adelaide, where I had the opportunity to follow Dr Neil Simmons.

Shortly before my trip to Australia, I had read four abstracts in the ASUM *Ultrasound Bulletin* presented by Dr Simmons to the ASUM meeting in Cairns last year. I was very excited to meet him and I knew a little bit about the centre from our correspondence and I was very enthusiastic to learn more about musculoskeletal ultrasonography.

After a 30-hour plus trip from Copenhagen to Adelaide, I landed with my pregnant wife and 7-month-old daughter. Guess what happened? Delayed luggage! We only had our winter clothes on from freezing Denmark which were quite unsuitable for a hot 35°C Adelaide.

However, despite the missing luggage, I felt very welcome from the day one at the centre and luckily we got the luggage after four days.

The Musculoskeletal Centre is equipped with four ultrasound machines, three of them perform MSKUS and the other one is for general US. An average of 30 MSKUS patients a day were seen and about 45% of patients have ultrasound guided injections. The sonogaphers are extremely skilled at MSKUS and usually have one trainee with them who requires more supervision. The centre also has one digital x-ray machine. Nuclear medicine is situated in the same rooms but this is performed by physicians from elsewhere.

Dr Akram Dakhil made a lot of new friends during his Adelaide stay with CADUCEUS.

Sonographers do the scanning, take standard scanning pictures and extra pictures if there is pathology. Afterward, they present the patients' images to the radiologist, who reviews the pictures again.

In cases where ultrasound guided injection is needed, the radiologist is called in. At the end of an ultrasound examination, the ultrasound report is written by the radiologist not the sonographer, which is quite different from what we do in Denmark.

As far as I know, there are few places in Denmark with sonographers, who are either registered nurses or radiographers. At home, sonographers scan patients and write the report as well.

To be a sonographer in Australia requires two years of post-graduate education after finishing basic radiographic training. In contrast, in Denmark we don't have a school that qualifies sonographers and I believe that we have to consider the Australian way of educating sonographers. A better-educated sonographer workforce in Denmark will give us the possibility to scan more patients and leave us better able to respond to the growing numbers of examination requests.

In the period of January–February, 2008 I followed a training program devised by Dr Neil Simmons. Initially, I started sitting in with experienced sonographers, learning scanning techniques and protocols. Gradually, I was able to scan patients and present the scans to Dr Simmons.

Afterwards, I followed Dr Simmons and Dr Steve Zadow and saw a huge variety of pathologies, many interesting cases and injection techniques. Part of the training program consisted of me being taken through Dr Simmons' many power point presentations on MSKUS.

My short stay at The Musculoskeletal Centre gave me not only knowledge but also many ideas. The pleasant working atmosphere and good relationships between the staff made my stay an experience of a lifetime.

During our lunch breaks we took time to learn a little bit about each other and at the end I felt that I have left a lot of friends in Adelaide.

I'm sure that I would like to come back again to see my friends and to visit my stillborn baby who died and was buried in Adelaide. I would like to thank all the staff at the centre and especially Dr Neil Simmon, Dr Steve Zadow, Rosemary, Josie, Pat, Lucy, Voula, Sue, Jenny, Peter, Andrew and Frank. I would like to send thanks also to Dr Caroline Hong, DUDS and EFSUMB President Christian Nolsøe and BK-Medical for the great help and support to my CADUCEUS scholarship.

One of the things I learned from Dr Simmons that I am sure will colour my future professional life is that "MUSKUS is stimulating, constantly challenging, clinically relevant and above all, fun!"

ASUM Awards and Fellowships 2008

Chris Kohlenberg Teaching Fellowship
Dr Yisha Tong (Queensland)
Sponsored by GE Healthcare.

Beresford Buttery Teaching Fellowship
A/Prof Hans Peter Dietz (Western Australia)
Sponsored by GE Healthcare.

Giulia Franco Teaching Fellowship
Mr Martin Necas (Canberra)
Sponsored by Toshiba.

Anthony Tynan Award for Best Clinical Presentation Award
Dr Rachael McEwing
Sponsored by Siemens Value $1000

Best Research Presentation Award
Dr Susan Campbell-Westerway
Sponsored by Siemens Value $1500

Best Sonographer Research Award
Mr Nevile Phillips
Sponsor by Philips Value $2000

Best Poster Award
Mr Hitoshi Inuzuka
Sponsored by ASUM Value about $1820 made up of free registration to WFUMB 2009 in Sydney (5 day registration @ $1320) and $500 spending money

Best Student Presentation Award
Ms Mel MacRury
Supported by Australian School of Medical Imaging

UI UL Plenary Award
A/Prof Anthony Doyle

WFUMB 2009 Sydney Australia

ASUM New Members 2008

New members July 2008

FULL (9)
Adam Bystrzycki Vic
Nesko Dulovic NZ
Anthony Forshaw Qld
Wai Ling Kong NSW
Peter Malycha SA
Tanya Nippita NSW
Suresh Raju NSW
Fatima Taka Vic
George Turner Qld

Affiliate (5)
Kathleen Braniff Qld
Daphne D'Cruz NSW
Toby Fogg NSW
Hugo Poncia NSW
Stephen Wood NSW

Associate (8)
Yuangen Fu NSW
Darren House NSW
Theresa Magrane NZ
Lisa Micarone SA
Yaojun Qu NSW
Anthea Scholz SA
Sharon Skinner NSW
Donelle Wilton-Smith NSW

Student (45)
Kate Archibald NSW
Nicole Armfield Vic
Aarti Bajaj ACT
Ivana Bogdanovska WA
John Bruce NSW
Fung Hong Cheng Qld
Nancy Chouinard Canada
Amy Chui NSW
Siobhan Clery NSW
Ben Craythorn WA
Robyn Cross WA
Kelly Eberhard SA
Kathryn Edwards Qld
Kathryn Fulton NSW
Erika Gosney Vic
Dion Harrison WA
Melissa Hendry Vic
Lindsay Henry Qld
Danielle Hokin Qld
Lesa Hornsey Qld
Erica Jovcevski NSW
Reem Leman Vic
Anna Liu NSW
Sandhya Maranna SA
Fady Masiha NSW
Gillian May SA
Olivia McNamee SA
Prudence Mdaya SA
Natalia Michelli Vic
Dalyn Nunn Vic
Sandra Pennino SA
Gurmeet Rajpal Qld
Angela Rogers Qld
Oskar Sheppard Qld
Owen Sheppard Qld
Kate Smart Qld
Tegan Sullivan ACT
Melanie Tilburgs SA
Felicity Tolmurst Qld
Thuy Vi Vi Ly WA
Shirley Villamar-Encinas NZ
Shirin Willis Qld
Jennifer Wishart NSW
Geraldine Wright Qld
Nicola Young Vic

Trainee (2)
Amy Mellor WA
Angela Williams NZ

New Members August 2008

Full (2)
Bridget Jeffery WA
Fredrick Joshua NSW

Affiliate (3)
Robyn Carey NZ
Harshad Patez NZ
Dianne Poad Qld

Student (60)
Jessica Ahola SA
Anthanasia Alenciou Vic
Laura Andrighetto NSW
Fari Asari Vic
Yvette Baker Qld
George Balalis SA
Hayley Beutel Qld
Stefanie Blackburn Qld
Rebecca Breen NSW
Alison Christy NSW
Sean Coveney SA
Nicola Cowper Qld
David De Gruyter NSW
Keren Eagle NSW
Catherine Ford NSW
Bronwyn Grant Vic
Abigail Harress-Blaas NZ
Sarah Hely NZ
Paul Hennock NSW
Beth Hinksman Vic
Heejin Hong Vic
Charlie Hsu Qld
Kelly James NSW
Thomas Kelaart WA
Gigi Nga Chi Kwan Qld
Hoi Kwok Vic
Paul Lumley Vic
Teri Maher ACT
Benjamin Manning NSW
Karen Marshall SA
Kimberleigh Metcalf Qld
Jane Moloney Vic
Eveshen Naidoo WA
Trang Nguyen SA
Truc Nguyen NSW
Monique Ogrodnik Vic
Katherine Ortiz Vic
Melissa Puopolo SA
Nerrida Robinson Vic
Laura Russell Qld
Emma Savill Qld
Michelle Scott NSW
Juhee Seo NSW
Nicole Singh SA
Nicola Smith NZ
Bharat Sojitra SA
Julia Somogyi NSW
Sarah Stewart WA
Kay Stimson NSW
Sheryll Stuart NZ
Tran Uyen Vic
Trang Linda NSW
Angelina Travers WA
Elissa Ulett Qld
Nikki Watkins NSW
Lucy Weir NSW
Tessa Wright WA
Susy Yin SA
Chan Pei Pei Singapore
Li-Meng Seah Singapore

Trainee (3)
Joanne Jeffers WA
Jaynaya Marlow NZ
Sharyn Rayner NSW

New Members September 2008

Full (22)
Lalzad Assema Vic
Elena Bratu NZ
Kate Brown NZ
Jane Busby NZ
Wendy Collins NZ
Rommel Cruzado NSW
Deepthi Dissanayake WA
Bronwyn Dixon NZ
Simone Francis NSW
Susan Gilchrist NZ
Natalie Grant NSW
Robin Harle Tas
Julie Heaney NZ
Thomas Hewitt Qld General, O&G,Vasc
Bill Lang NSW
Jeannette Lefrandt Vic
Virginia Saxton Vic
Ian Schmaman NSW
Kristof Urbaniak NSW
Tricia Wakefield WA
Susan Wearne Qld
Kristy Wolff NZ

Affiliate (2)
David Hou NZ
Vincent Muhlethaler NSW

Corresponding (4)
Kam Ping Fung Hong Kong
Fin Hodge Canada
Chiou Li Ong Singapore
Shah Zaman Pakistan

Student (4)
Shahnaz Basit NSW
Katherine Leary NSW
Qiu Zhou NZ
Kimberley Naylor NZ

2009 Conference Calendar

MSK Ultrasound 2009

14th March 2009

Marriott Surfers Paradise Resort & Spa

Faculty

Stephen Bird

Mark Bryant

Greg Cowderoy

Peter Murphy

Jenny Noakes

John Read

Bonus evening hip & groin lectures with live scanning Friday 13th March included in registration.

Provisional Program Friday 13th March	
19:00	Live scanning demonstration of the hip- Stephen Bird
19:30	Live scanning demonstration of the groin- John Read

Saturday 14th March	
8:30	Shoulder talk- Greg Cowderoy
9:00	Shoulder workshop
10:00	Morning tea
10:30	Hand, wrist, elbow talk- Stephen Bird
11:00	Hand, wrist & elbow workshop
12:00	Lunch
13:00	Foot, ankle, talk- Jenny Noakes
13:30	Foot, ankle, soft tissue workshop
14:30	Afternoon tea
15:00	Hip, thigh workshop Group A/ Revision Group B
15:45	Hip, thigh workshop Group B/ Revision Group A

Vascular Imaging & Intervention Vietnam

4-6 May 2009

Golden Sand Resort, Hoi An, Vietnam

Join us in Vietnam in 2009 for an educational and cultural experience. The conference program will incorporate a broad spectrum of vascular imaging techniques, including ultrasound, CT, MRI, angiography and intervention. Lectures will be delivered by well known experts. Radiologists, radiographers, and sonographers, will all benefit from attending.

The conference will be held at Golden Sand Resort, Hoi An. This exclusive beachfront resort features a 115m pool, private beach, 5 restaurants and bars, fitness centre, kids' club, spa and an extensive range of activities. Partners and families will be catered for with a concurrent sightseeing and activities program.

Overall Conference Program / Partners' Program			
Sun		Transfer service to Hotel	
		Welcome Reception	
Mon	AM	Lectures	Hoi An Ancient Town tour
	PM	Lunch	
		Afternoon at leisure in Hoi An Town	
		Traditional Vietnamese dinner in Town	
Tue	AM	Lectures	Cooking class at Hotel
	PM	Lunch	
		Eco farm tour	
		Buffet dinner at Hotel	
Wed	AM	Lectures	Lantern making class
	PM	Lunch	
		Eco fishing and water tour	
		Gala beach dinner	
Thur		Transfer service to airport	

For registration information & program updates, visit the Phoenix Conferencing website or contact the Secretariat:

Event Solutions
E: shan@eventsolutions.com.au
P: (07) 3550 3111

www.phoenixconf.com

Calendar of ultrasound events
www.asum.com.au

2008

28th–29th November 2008
ASUM CCPU Advanced Neonatal Workshop
Royal Prince Alfred Hospital
Camperdown NSW 2050
Contact ASUM
tel +61 2 9438 2078
fax +61 2 9438 3686

29th November 2008
ASUM WA Branch Translabial Ultrasound Workshop
Venue Health Department
Royal Street, East Perth, WA
Contact ASUM
PO Box 943, Crows Nest
NSW 1585 Australia
tel +61 2 9438 2078
fax +61 2 9438 3686
Email asum@asum.com.au

2009

31st January–1st February 2009 Obstetric/Gynaecological Ultrasound Workshop
Venue Michael Chamberlin Lecture Theatre, St Vincent's Hospital, Fitzroy Vic 3065
Contact tel +61 3 9790 1766
Email ultrasound@ultrasound.com.au
Website www.ultrasound.com.au

25th–26th March 2009
DDU Technical Seminar (Physics)
Venue Sydney
Contact ASUM
ddu.asum.com.au

25th–29th March 2009
Cardiac DMU Preparation Course
Venue Sydney
Contact ASUM
dmu@asum.com.au

3rd–4th April 2009 NZ Branch of ASUM Annual Scientific Meeting 2009
Venue Palmerston North
Contact ASUM
PO Box 943 Crows Nest
NSW 1585 Australia
tel +61 2 9438 2078
fax +61 2 9438 3686
Email asum@asum.com.au

18th–21st April 2009
General Vascular & Obstetric DMU Preparation Course
Venue Sydney
Contact ASUM
dmu@asum.com.au

30th August–3rd September 2009
ASUM hosts WFUMB 2009 World Congress in Sydney Australia
Venue Sydney Convention and Exhibition Centre
Contact Dr Caroline Hong
ASUM CEO
ASUM Head Office
PO Box 943, Crows Nest
NSW 1585, Sydney Australia
www.asum.com.au and
www.wfumb2009.com

New CD ROMs and DVDs available on the ASUM website

ASUM now has limited stock of four CDROMs/DVDs by Dr. Philippe Jeanty concerned with fetal echocardiography. These are:

- Fetal Echocardiography Part 1
- Fetall Echocardiography Part II: The Anomalies
- Pitfalls & Artifacts
- The Umbilical Cord

You may purchase a set of all four or an individual disc by going to the Education area of the ASUM website www.asum.com.au

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tel (03) 9879 6200

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Ms Janine Horton
www.nanosonics.com.au
tel (02) 8063 1600

Peninsula Vascular Diagnostic
Mrs Claire Johnston
pvd@vascularsurgeon.biz
tel (03) 9781 5001

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Mr Ian Schroen
1800 251 400
ian.schroen@philips.com
www.medical.philips.com

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larcher@toshiba-tap.com
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Guidelines for authors

Authors are invited to submit papers for publication in the categories described below. Final responsibility for accepting material lies with the Editor, and the right is reserved to introduce changes necessary to ensure conformity with the editorial standards of the *Ultrasound Bulletin.*

Original research

Manuscripts will be subject to expert referee prior to acceptance for publication. Manuscripts will be accepted on the understanding that they are contributed solely to the *Ultrasound Bulletin.*

Quiz cases

A case study presented as a quiz, involving no more than three or four images and a paragraph briefly summarising the clinical history as it was known at the time. It will pose two or three questions, and a short explanation.

Case reports

Case reports are more substantial presentations resembling short scientific papers which illustrate new information, or a new or important aspect of established knowledge.

Review articles

Review articles are original papers, or articles reviewing significant areas in ultrasound and will normally be illustrated with relevant images and line drawings. Unless specifically commissioned by the Editor, articles will be subject to expert referee prior to acceptance for publication.

Forum articles

Members are invited to contribute short articles expressing their observations, opinions and ideas. Forum articles should not normally exceed 1000 words. They will not be refereed but will be subject to editorial approval.

Calendar items

Organisers of meetings and educational events relevant to medical ultrasound are invited to submit details for publication. Each listing must contain: activity title, dates, venue, organising body and contact details including name, address, telephone and facsimile numbers (where available) and email address (where available). Notices will not usually be accepted for courses run by commercial organisations.

Corporate news

Corporate members are invited to publish news about the company, including structural changes, staff movements and product developments. Each corporate member may submit one article of about 200 words annually. Logos, illustrations and tables cannot be published in this section.

Format

Manuscripts should be submitted in triplicate in print and on PC formatted diskette as MS Word documents.
Images must be supplied separately and not embedded. PowerPoint presentations are not accepted.

- Font size: maximum 12 pt, minimum 10 pt
- Double spacing for all pages
- Each manuscript should have the following:

Title page, abstract, text, references, tables, legends for illustrations.

- Title page should include the:

Title of manuscript, the full names of the authors listed in order of their contribution to the work, the department or practice from which the work originated, and their position.

Corresponding author's name, contact address, contact telephone number and facsimile number (where available) for correspondence.

- Abbreviations may be used after being first written in full with abbreviation in parentheses.
- References should be cited using the Vancouver style, numbered according to the sequence of citation in the text, and listed in numerical order in the bibliography. Examples of Vancouver style:

1 In-text citation Superscript. If at the end of a sentence the number(s) should be placed before the full stop or comma.

2 Journal article Britten J, Golding RH, Cooperberg PL. Sludge balls to gall stones. *J Ultrasound Med* 1984; 3: 81–84.

3 Book: Strunk W Jr, White EB. The elements of style (3rd ed.). New York: Macmillan, 1979.

4. Book section Kriegshauser JS, Carroll BA. The urinary tract. In: Rumack CM, Wilson SR, Charboneau JW, eds. *Diagnostic Ultrasound*. St Louis, 1991: 209–260.

Abstract

Manuscripts for feature articles and original research must include an abstract not exceeding 200 words, which describes the scope, major findings and principal conclusions. The abstract should be meaningful without reference to the main text.

Images

Images may be submitted as hard copy (in triplicate) or in digital format. Images sent must have all personal and hospital or practice identifiers removed. Do not embed images in text. Separate images are required for publication purposes.

A figure legend must be provided for each image. Hard copy images should be presented as glossy print or original film. Any labelling should be entered on the front of the glossy print using removable labels. Send one copy of illustrations without labelling as this can be added electronically prior to publication. On the back of the print include the author's name, figure number and a directional arrow indicating the top of the print.

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