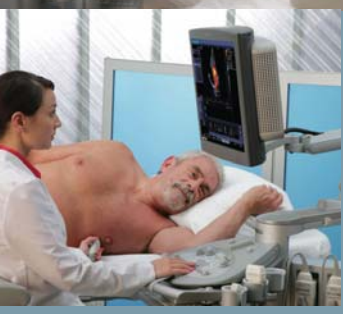

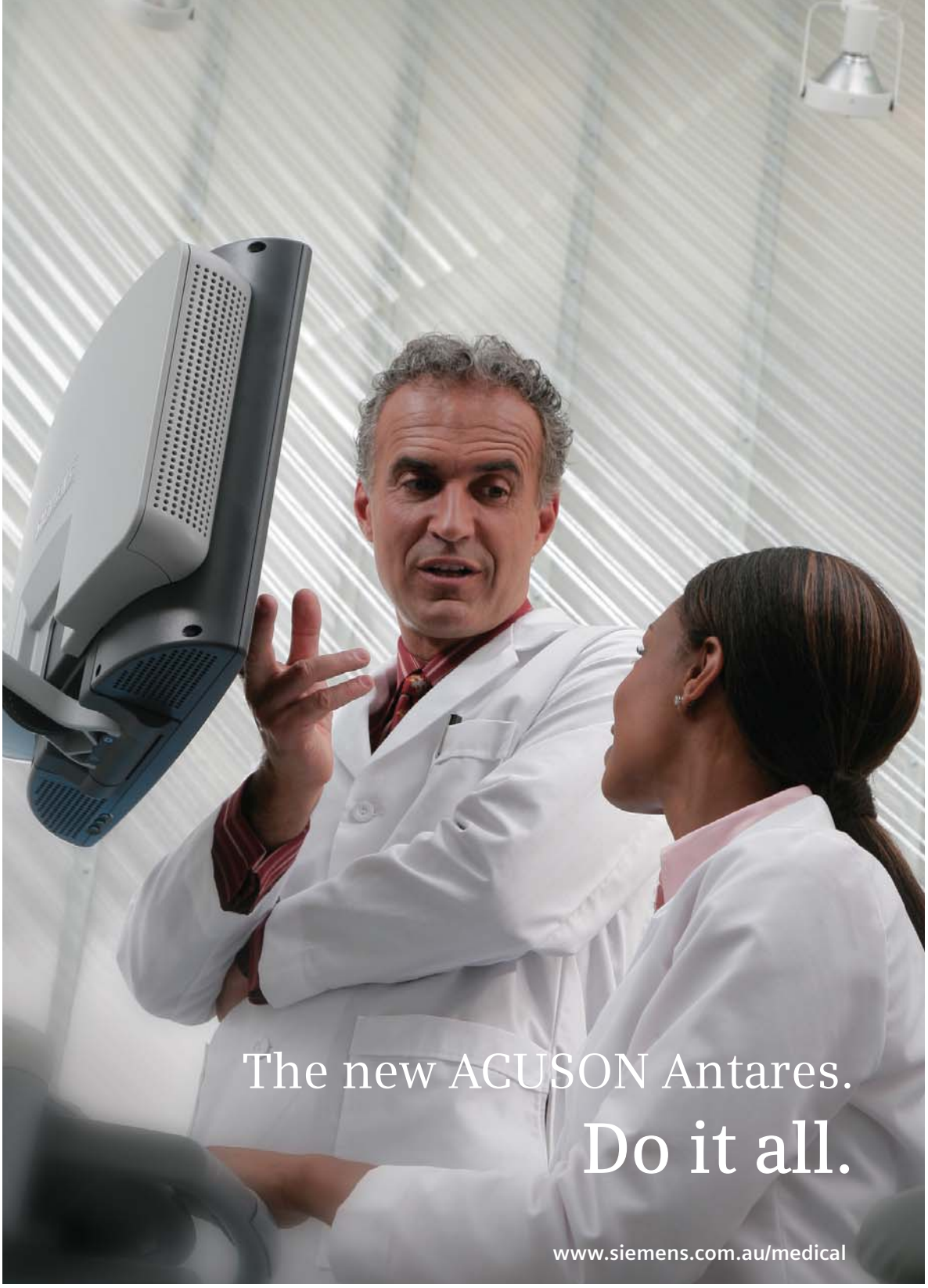

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Ultrasound Bulletin

Journal of the Australasian Society for Ultrasound in Medicine

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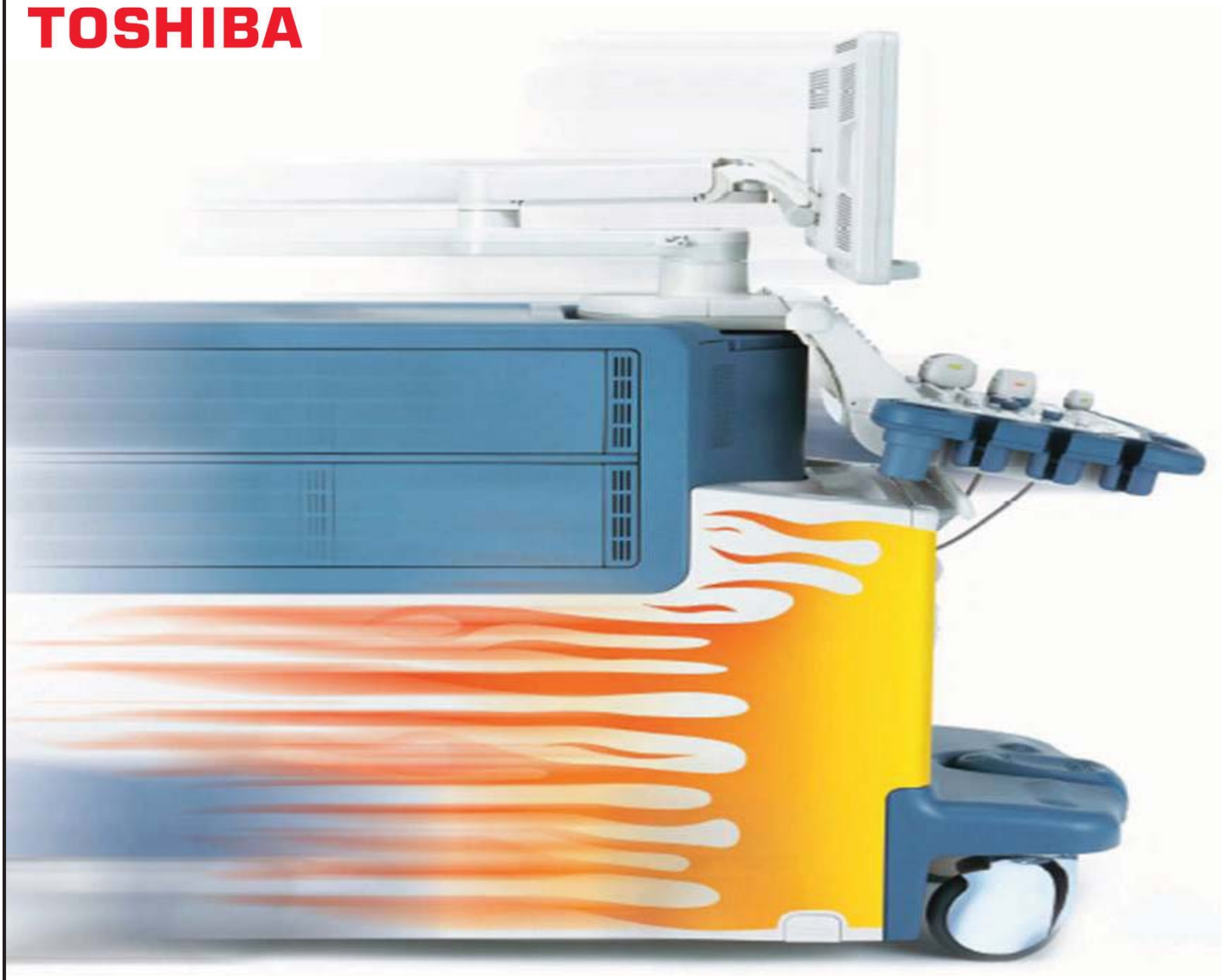

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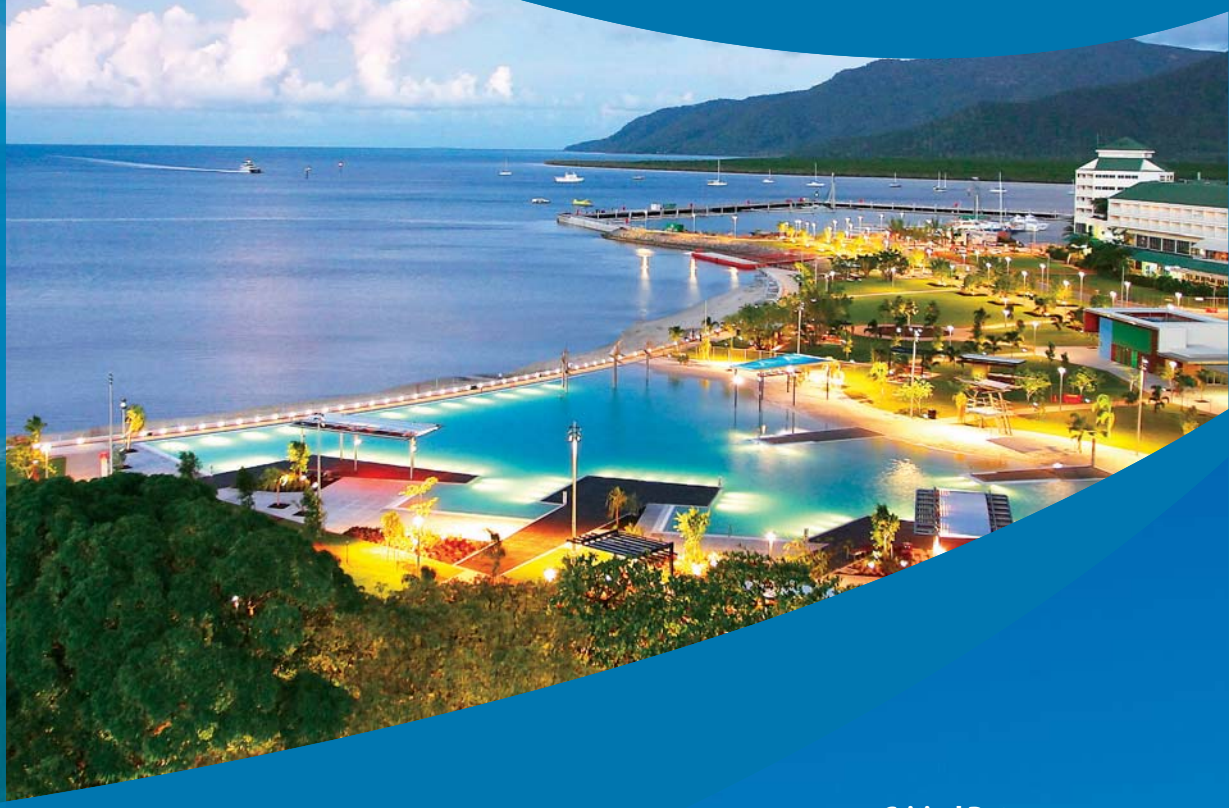

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Promoting Excellence in Ultrasound

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Critical Dates

Proffered Paper & Poster Abstract Submission Deadline
Friday, 11 May 2007

Proffered Paper & Poster Abstract Notification
Friday, 22 June 2007

Early Bird Registration Deadline
Friday, 13 July 2007

Accommodation Deadline
Monday, 6 August 2007

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Australasian Society for Ultrasound in Medicine

Ultrasound Bulletin

ASUM Ultrasound Bulletin May 2007 10 (2)

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

Membership and geneal enquiries
to ASUM at the address below

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BOOK REVIEWS

REPORTS

EDUCATION

NOTICES

Draft Program Cairns

Thursday, 13 September 2007				
Skills Development Workshop				
	GE Healthcare Room	**Toshiba Room**	**Philips Room**	**Siemens Room**
9.00 am–9.50 am	Mrs Lynette Hassall – Breast Ultrasound	Mrs Shirley Comninos – 18 Week Scan	Dr Joseph Polak – Vascular Scanning, The Challenges	
10.00 am–10.40 am	Dr Tom Stavros – Breast Implants	Dr Alison Lee Tannock – Fetal Heart Ultrasound	Ms Deb Coghlan – CVI Scanning	
10.40 am–11.10 am	**Morning break**			
11.10 am–12.00 pm		Dr Susane Fraser – Breast Cytology and Basic Breast Pathology	Mrs Yvonne Butcher – Unusual Carotid Pathology	Dr David Nyberg – Tertiary Scanning
12.00 pm–1.00 pm	**Lunch**			
1.00 pm–1.50 pm	Dr Tom Stavros – Ultrasound of the Groin		Ms Deb Coghlan – Arm Arteries	Dr David Nyberg – 11–12 Week Scan
2.00 pm–2.40 pm		Dr Alison Lee Tannock – Fetal Heart Ultrasound	Ms Deb Coghlan – Arm Veins	Dr Carlo Martinoli – Wrist and Hands
2.40 pm–3.10 pm	**Afternoon break**			
3.10 pm–3.50 pm	Dr Carlo Martinoli – Post Operative Shoulder		Dr David Nyberg – Tertiary Scanning	Mrs Yvonne Butcher – Tips for Difficult DVT Scans
4.00 pm–5.00 pm	Mr Richard Allan – Appendix	Mrs Yvonne Butcher – Renal Artery Doppler Ultrasound, The Challenges		Mrs Shirley Comninos – 18 Week Scan

Friday, 14 September 2007			
Plenary Session			
9.00 am–10.00 am	Dr Julie Campbell – Tissue Engineered Vascular and Urogenital Grafts		
10.00 am–10.30 am	Professor Torben Lorentzen – Liver Abscesses, Imaging and Treatment Guided By Ultrasound		
10.30 am–11.00 am	**Morning Tea – Exhibition**		
Concurrent Sessions	**Vascular**	**Breast and Small Parts**	**Musculoskeletal**
11.00 am–11.30 am	Ms Deb Coghlan – Peripheral Vascular Disease – Lower Extremity Imaging including Stents and Grafts	Dr Tom Stavros – Ultrasound of Aggressive Malignant Breast Nodules	Dr Eugene McNally – Ultrasound Intervention in the Upper Limb
11.30 am–12.00 pm	Professor David Evans – Doppler Ultrasound in the Functional Assessment of the Cerebral Circulation	Dr Susane Fraser – Rural and Remote Breast Diagnosis	Dr Carlo Martinoli – Brachial Plexus Ultrasound
12.00 pm–12.30 pm	Dr Roxanne Wu – Duplex and the Surgeon:Great Expectations	Mr Stephen Bird – Scrotum	Dr Shane Brun – Sports Medicine in Real Life
12.30 pm–1.30 pm	**Lunch – Exhibition**		
1.30 pm–2.00 pm	**Symposia by Sponsors**		
Concurrent Sessions	**Vascular**	**Small Parts**	**Musculoskeletal**
2.00 pm–2.20 pm	Dr Joseph Polak – Carotid Intima/Media Thickness	Dr Tom Stavros – What Thyroid Nodules we Biopsy According to SRU Panel	Dr Eugene McNally – Ultrasound Intervention in the Lower Limb
2.20 pm–2.40 pm	Ms Deb Coghlan – Upper Extremity Vascular Disorders/Imaging	Mr Stephen Bird – Salivary Glands	Dr Carlo Martinoli – Ultrasound of Ankle Tendons
2.40 pm–3.00 pm	Professor David Evans – Ultrasonic Detection of Cerebral Emboli	Dr Tom Stavros – Breast/Mammogram Correlation	Dr Eugene McNally – Ultrasound in Arthritis
3.00 pm–3.30 pm	**Afternoon Tea – Exhibition**		
Plenary Session			
3.30 pm–4.00 pm	Professor David Evans – Cerebral Embolism Research in Leicester		
Concurrent Sessions	**Vascular**	**Urology and Gynaecology**	**Musculoskeletal**
4.00 pm–4.20 pm	Dr Christina Steffen – Salvaging the Diabetic Foot – a Short Talk about Short Bypasses	Associate Professor Hans Peter Dietz – Ultrasound of the Pelvic Floor – The Basics	Dr Eugene McNally – Rotator Cuff Tears: A Dynamic Approach
4.20 pm–4.40 pm	Professor David Evans – Recent Developments in Doppler Ultrasound	Professor Ajay Rane – Ultrasound Vaginal Grafts	Dr Carlo Martinoli – Ultrasound of Entrapment Neuropathies of the Upper Extremity
4.40 pm–5.00 pm	Dr Joseph Polak – AAA Screening	Associate Professor Hans Peter Dietz – Pelvic Floor Trauma – Myth or Reality?	Dr Eugene McNally – Ultrasound of the Hindfoot: Technique and Pathology
5.00 pm–7.00 pm	**Welcome Reception**		

Annual Scientific Meeting 2007

Saturday, 15 September 2007			
Plenary Session			
9.00 am–9.30 am	Dr Jon Hyett – Novel First Trimester Markers for Down Syndrome		
9.30 am–10.00 am	Professor David Ellwood – Labour Ward Ultrasound – What, When and Why?		
10.00 am–10.30 am	Professor Yves Ville – Increased Nuchal Translucency with Normal Karyotype		
10.30 am–11.00 am	**Morning Tea – Exhibition**		
Concurrent Sessions	**Obstetrics**	**Musculoskeletal**	**Vascular / Interventional Ultrasound**
11.00 am–11.20 am	Dr Robert Cincotta – Management of Multiple Pregnancies	Dr Neil Simmons – Sonography of the Sacrotubrous Ligament	Dr Joseph Polak – Diagnostic Test Algorithms
11.20 am–11.40 am	Dr Jon Hyett – Outcomes of Pregnancies Referred with Preterm Prelabour Rupture of Membrane	Dr Carlo Martinoli – Ultrasound of the Wrist and Hand	Professor Torben Lorentzen – Ultrasound Guided RF-Ablation of Liver Tumours
11.40 am–12.00 pm	Dr David Nyberg – Abnormalities of Amniotic Fluid	Dr Neil Simmons – Sonography of Retinacular and other Fascial Structures	Mr Brendan Cramp – Postsurgical Transluminal Stent Ultrasound
12.00 pm–12.30 pm	Dr Jon Hyett – Prenatal Diagnosis of Genetic Syndromes	Dr Shane Brun – Sports Medicine Beyond Real Life	Dr Joseph Polak – Carotid IMT: Protocols and Approaches
12.30 pm–1.30 pm	**Lunch – Exhibition**		
Concurrent Sessions	**Obstetrics**	**Musculoskeletal**	**Gynaecology and Renal**
1.30 pm–2.00 pm	Dr David Nyberg – The Gravid Cervix	Dr Neil Simmons – Sonography of Lower Limb Nerve Entrapments	Dr Kerry McMahon – Mistakes made in Obstetrics and Gynaecology Imaging Reporting
2.00 pm–2.30 pm	Professor Yves Ville – Fetal Infections	Dr Carlo Martinoli – Shoulder Ultrasound Beyond the Rotator Cuff	Associate Professor Hans Peter Dietz – Ultrasound for the Pelvic Floor Surgeon
2.30 pm–3.00 pm	Dr David Nyberg – The 2nd Trimester Sonogram	Dr Neil Simmons – Sonography of Bursae	Professor Torben Lorentzen – Ultrasound in Nephrology
3.00 pm–3.30 pm	**Afternoon Tea – Exhibition**		
Concurrent Sessions	**Gynaecology and Early Pregnancy**	**Obstetrics**	**Proffered Papers**
3.30 pm–3.50 pm	Professor David Ellwood – Early Pregnancy Failure – The Role of Assessment Units	Dr David Nyberg – Use of 3D Ultrasound	Proffered Papers
3.50 pm–4.20 pm	Dr Kerry McMahon – Imaging the Uterus from Congenital Anomalies to Post Menopause	Dr Rob Cincotta – Fetal Therapy: what the Sonographer Needs to Know	Proffered Papers
4.20 pm–5.30 pm	Poster Defence Session		
7.00 pm–12.00 midnight	**ASUM ASM Gala Dinner**		

Sunday, 16 September 2007			
Concurrent Sessions	**Gynaecology**	**General**	**Obstetrics**
9.00 am–9.20 am	Associate Professor Hans Peter Dietz – Ultrasound of Implants in Pelvic Reconstructive Surgery	Professor Torben Lorentzen – Percutaneous Gastrostomy Guided by Ultrasound and Fluroscopy	Dr David Nyberg – Fetal Syndromes
9.20 am–9.40 am	Professor David Ellwood – How Useful is Ultrasound in the Management of Secondary PPH?	Dr Richard Allan – Ultrasound on Chronic Liver Disease	Dr Jon Hyett – Managing Monochorionic Twin Pregnancies
9.40 am–10.00 am	Associate Professor Hans Peter Dietz – The Prediction of Delivery Mode and Intrapartum Maternal Trauma	Mrs MIchelle Pedretti – Peyronies Disease	Dr Robert Cincotta – 3D Ultrasound in the 1st Trimester
10.00 am–10.30 am	Professor David Ellwood – Saline Hysterosonography – a useful adjunct to the Gynaecological Scan	Dr Matthew Andrews – Interventional Ultrasound: Review of the Basics	Professor Yves Ville – Fetal Brain
10.30am–11.00 am	**Morning Tea – Exhibition**		
Plenary Session			
11.00 am–11.30 am	Mr Richard Allan – Liver Doppler		
11.30 am–12.00 noon	Dr Robert MIller – The Pivotal Role of Ultrasound in IVF – Before, During and After		
12.00 noon–12.30 pm	Professor Yves Villes – An Update on Fetal Therapy		
12.30 pm	**Finish**		

*This provisional program is correct at time of printing but the organisers reserve the right to alter the program if and as is deemed necessary

ASUM extends a warm welcome to you at upcoming ASUM meetings

Australasian Society for Ultrasound in Medicine

Upcoming ASUM Meetings

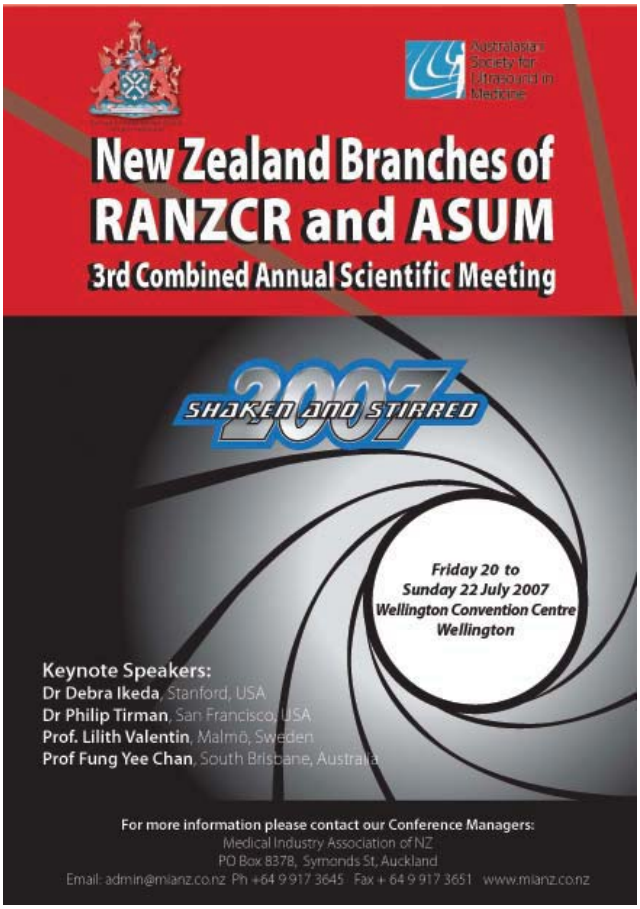
ASUM WA Ultrasound CPD Meeting 2007
Perth, Australia June 30 - 1 July 2007
Go to www.asum.com.au for more details

ASUM and RANZCR 3rd Combined ASM 2007
Wellington, New Zealand July 20 - 22 July 2007
Go to www.asum.com.au for more details

ASUM 37th Annual Scientific Meeting 2007
Cairns, Australia September 13 - 16 September 2007
Go to www.asum.com.au for more details

ASUM Multidisciplinary Workshop 2008
Sydney, Australia TBA
Go to www.asum.com.au for more details

World Federation for Ultrasound in Medicine and Biology 2009
Sydney, Australia 30 August- 3 September 2009
Go to www.asum.com.au for more details



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WFUMB 2009 Sydney Australia

President's message

Dr Matthew Andrews

First Certificate of Clinician Performed Ultrasound

A milestone in ASUM's history occurred recently with the awarding of the first CCPU to Dr Anthony Joseph. Tony was awarded the CCPU (Emergency) in Acute Pelvic Pathology by ASUM Council and I would like to congratulate him on his achievement and also all of the ASUM members who have contributed to the development of the CCPU, culminating in presentation of this certificate. In particular, ASUM is extremely grateful to Dr Glenn McNally, chair of the ASUM CCPU Certification Board and driver of the whole CCPU concept.

Multidisciplinary Workshop

Yet another successful ASUM Multidisciplinary Workshop (MDW) was held in March at Jupiters on the Gold Coast. This year the meeting was held in conjunction with the International Society of Ultrasound in Obstetrics and Gynaecology (ISUOG), ensuring a high standard of lectures, instruction and a well attended meeting. On behalf of ASUM, I would like to thank and congratulate the organisers, speakers, instructors and the trade, who provided equipment for the workshop components of the meeting. The MDW and the Annual Scientific Meeting are now attracting similar numbers of registrants and are clearly the two major scientific events organised by ASUM. The MDW format of holding a larger meeting with concurrent sessions, rather than a series of smaller specific topic meeting as ASUM organised previously, seems to be popular with our members. ASUM is continually monitoring its scientific and instructional program and welcomes any comments, suggestions or feedback from members.

Combined New Zealand ASUM and RANZCR Branch Scientific Meetings

The policy of holding a combined scientific meeting of the NZ branches of the two organisations on a biannual basis was decided several years ago. This year's meeting will be held in Wellington on 19th–22nd July and promises to deliver a first class program. While there are some organisational challenges in holding a combined meeting, I believe the principle, from an ASUM perspective, is sound and should be encouraged and continued. Ultrasound is rarely practised in isolation from other imaging modalities. The opportunity for ultrasound practitioners to view ultrasound in the context of other diagnostic imaging techniques is not available at ultrasound-only meetings. The radiology component of the meeting provides an overall perspective of patient imaging, allowing sonographers and sonologists to see where their work fits in overall patient management. It also provides an opportunity to interact with the providers of imaging other than ultrasound in a non-workplace environment. I particularly encourage NZ members to attend the meeting, and suggest Australian members also give it consideration.

WFUMB World Congress Sydney 2009

Organisation of this meeting is well underway under the leadership of the congress convenor, Dr Stan Barnett. The scientific program is coming together and there will be many innovative features at this World Congress, building on the success of previous meetings. Many members have responded to the call for involvement in the congress and as the program develops, their contributions will materialise. I reiterate that this meeting will provide a once in a professional lifetime opportunity for ASUM and individual members, thus I urge members to participate in any manner they feel they can contribute. Apart from the personal satisfaction, participation will be impressive on the CV.

ASUM

I would like to acknowledge the many people who contribute to the success of ASUM as a society. As with

The first CCPU recipient Dr Andrew Joseph (Centre) is awarded his certificate by Dr Caroline Hong and Dr Glenn McNally.

Australasian Society for Ultrasound in Medicine

New Zealand Branches of RANZCR and ASUM

3rd Combined Annual Scientific Meeting

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any professional organisation, its strength is dependent upon the membership, the members' honorary contributions and the support provided by the secretariat. ASUM is fortunate to have a very active and highly motivated membership, many of whom volunteer their services all with the objective of providing 'Excellence in Ultrasound' to the community. The highly skilled secretariat is an invaluable resource to the profession. ASUM provides a unique cross-section of membership from a range of medical craft groups, sonographers, scientists and the ultrasound trade, brought together in a spirit of professional camaraderie and cooperation. While I encourage members to participate beyond their membership – ASUM has plentiful resources to assist – I believe it is important to acknowledge that the membership itself contributes significantly to the Society's success.

Dr Matthew Andrews
President
president@asum.com.au

ASUM Beresford Buttery Teaching Fellowship

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The Beresford Buttery Teaching Fellowship replaces the Beresford Buttery Overseas Traineeship, which was established in 1996, in conjunction with GE Healthcare in memory of Beresford Buttery FRACOG, DDU, COGUS who passed away in China in 1995 while serving as ASUM's representative on WFUMB.

Beresford enthusiastically promoted ultrasound education and worked tirelessly for ASUM throughout most of his professional career. The Beresford Buttery Teaching Fellowship focuses on major city centres in Australia and New Zealand.

We are very excited about these new arrangements as more of our members will be able to benefit by attending these workshops and meetings.

On the shoulders of giants

Prof Ron Benzie

Our front cover this month has an ultrasound image of a likely pentalogy of Cantrell sent by email attachment from Vietnam. Thanks to Drs Ha and Roberts for sharing this interesting case with us. In the past, cover pictures have been taken from articles inside the journal, but now the precedent has been set, let's see if we can rise to the challenge. Perhaps it will encourage others both here and overseas to get on the cover.

The lead article in this issue is an invited one from Peter Dietz, an internationally recognised expert in the new subspecialty of pelvic floor ultrasound. He illustrates for us how much important information can be derived from imaging, including 3D and 4D ultrasound. With increasing concerns being raised about the safety of VBAC and the search for methods of predicting who might safely deliver vaginally after C-Section, we will hear more about ultrasound of the pelvic floor.

Our invited Opinion, which will be a regular feature, is contributed by another gynaecologic sonologist with a reputation beyond our shores. George Condous, whose work in pregnancies of unknown location will be familiar to many of you, raises important questions about the diagnosis and management of ectopic pregnancy and argues the need for early pregnancy units led by appropriately trained specialists. His new book Early Pregnancy is reviewed in this issue.

In his article, Stephen Bird describes a new method for ultrasound evaluation of the distal biceps tendon. This work won a Bronze Award at WFUMB in Seoul in 2006 and we are grateful to be able to publish it here.

Micallef, whose contribution won Best Poster Award in Melbourne at the 2006 ASUM Annual Scientific Meeting, demonstrates how 3D ultrasound can help in the management of Cornelia de Lange syndrome.

Webb reviews holoprosencephaly and also emphasises the place of 3D ultrasound in its prenatal diagnosis.

For those of you who are interested in eponymic syndromes and their origins, Cantrell first described his pentalogy in 1958. In 1933 Cornelia de Lange published the splendidly titled article 'Sur un type nouveau de degeneration (Typus Amstelodamensis)' in *Arch Med Enf* 1933; 36: 713.

Truly we stand on the shoulders of giants. And if you want to know more about the great ones who gave their names to syndromes, www.whonamedit.com is a fascinating resource. Although at this time Cantrell is not yet listed.

I will end with a second plea (the first one in the last issue having spectacularly failed to elicit even negative responses). Please consider this journal as a vehicle for publishing work in progress, case histories, opinions, critiques – anything you feel will appeal to our varied readership.

Your Bulletin needs you!

Ron Benzie
Editor
Email benzier@wahs.nsw.gov.au

Front cover image: Pentalogy of Cantrell

The patient, aged 30 years, had a normal pregnancy three years earlier. She attended the Tu Du Hospital Saigon, for Down syndrome screening and a CRL length of 62 cm was consistent with a gestation of 12 weeks and 5 days. The nuchal fold was prominent and measured 5.2 mm. There was a large ventral hernia and colour flow Doppler confirmed that the heart was within the ventral hernia. A heart rate of 170/min was recorded.

The association of a ventral hernia with defects of the sternum and diaphragm is consistent with a diagnosis of Pentalogy of Cantrell. It is not possible to comment on possible structural abnormalities of the heart but it is unusual to make this diagnosis at such an early gestational age. The pregnancy was terminated. Cantrell *et al.*[1] described a syndrome with omphalocele in association with a ventral diaphragmatic hernia. The Pentalogy of Cantrell consists of (1) A deficiency of the anterior diaphragm; (2) A midline supra umbilical abdominal wall defect; (3) A defect in the diaphragmatic pericardium; (4) Congenital cardiac abnormailities and; (5) A defect of the lower sternum.

Ectopia cordis is a rare malformation at the severe end of the spectrum of anterior body wall defects.

Reference: 1 Cantrell JR, Holler JA, Ravitch MM. A syndrome of congenital defects involving the abdominal wall, sternum, diaphragm, pericardium and heart. *Surg Gynaecol Obstet* 1958; 107: 602–14.

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CEO's message

Dr Caroline Hong

ASUM Head Office

The staff has settled nicely into the new office at Crows Nest/St Leonards. Many members have been to the office and most have remarked favourably on the positive change and in the improved professional layout. The design and open plan fit out is modern, bright and vibrant. The lease with the old office at Willoughby expires in May 2007 and the timing of the purchase of these new premises and ASUM's relocation could not have been better. The office is staffed by eight core employees and we work with volunteer members in serving the society. If any of you are in Sydney, please feel welcome to visit us.

First CCPU

Congratulations go to Dr Anthony Joseph for being the first to be awarded the Certificate in Clinician Performed Ultrasound (CCPU). This is indeed a major achievement and a historical milestone for ASUM. We certainly anticipate that many more will be pursuing the CCPU as a natural progression of their education and training as ultrasound continues to grow in its applications in all aspects of medicine.

The world market for medical ultrasound systems, in accordance to the research reports, is expected to undergo rapid growth to $4.5 billion by 2010, which means there will be growth in sales of ultrasound equipment as well as a demand for ongoing education and training worldwide.

The CCPU was developed in response to the demand for credentialling, certification and established standards of practice for clinicians who use ultrasound at the point of care.

The ASUM Council feels it is important that education and training be provided for this particular form of ultrasound examination. Limited diagnostic point of care imaging has undergone marked proliferation in recent years and is different in depth and scope when compared to referral diagnostic ultrasound examinations. ASUM, together with a number of colleges and professional associations, has introduced the CCPU to provide credentials by which medical practitioners can demonstrate that they are appropriately trained in the protocols and standards of practice relevant to this particular form of ultrasound examination.

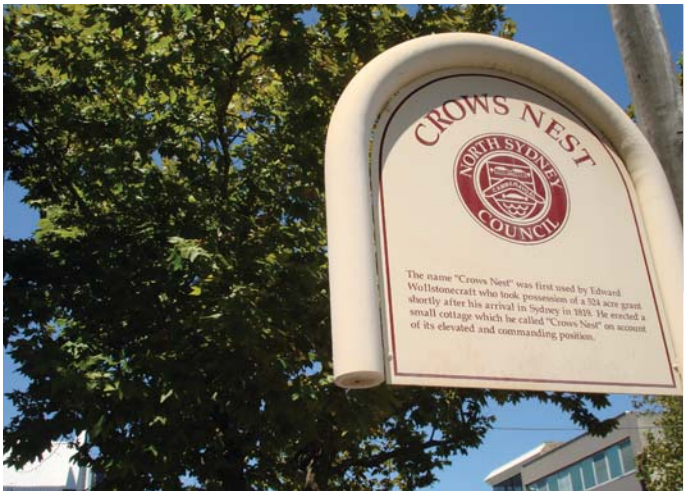
A special class of ASUM membership has been created, the Clinical Affiliate. CCPU candidates may join ASUM as a full Medical Member or as a Clinical Affiliate.

The program is currently open to fellows or registrars in the second or subsequent year of their training program of the:

- Australasian College for Emergency Medicine (ACEM);
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG);
- Royal Australasian College of Surgeons (RACS); and
- All clinicians who have completed the FAST/AAA Module.

A number of colleges, societies and associations are currently in discussion with the ASUM Council regarding proposals to extend the CCPU to other specialty areas. It is planned to extend the CCPU to include rheumatology, rural and remote general practice, anaesthesia and intensive care medicine, military medicine and several of the surgical subspecialties, including breast and endocrine surgery,

Parker material to come



Left: ASUM has settled into its new home at Crows Nest. **Right:** Caroline Hong and David Rogers meet ECR President Christian Herold at the European Congress of Radiology's Vienna meeting.

colorectal surgery and trauma surgery. Fellows and Registrars in other specialist disciplines may be admitted at the discretion of the ASUM CCPU Certification Board.

Education is currently offered through on-line modules and interactive courses. Accredited courses are also available from other providers. Full details of the requirements of the CCPU are available at: www.asum.com.au/ccpu.htm.

A brochure is being sent to Fellows and Registrars of the ACEM and RANZCOG that outlines all the ASUM CCPU courses on offer between July 2007 and June 2008.

CCPU basic courses

In 2007, it is planned to run six basic courses in Sydney or Melbourne. Course numbers are strictly limited due to the practical nature and places are subject to spaces available and sufficient registrations being received. In the first half of 2008, eight basic courses are planned.

CCPU advanced courses

Four advanced courses are planned for 2007 and eight for 2008. In addition, the three George Condous courses in Melbourne (20th and 21st July), Brisbane (22nd and 23rd July) and Sydney (28th and 29th July) on Early Pregnancy and Gynaecological Scanning have been approved by the CCPU Certification Board as satisfying all the requirements of the CCPU (O&G) and CCPU (Emergency) Advanced Acute Pelvic Modules.

For further information refer to the ASUM Website http://www.asum.com.au or contact ccpu@asum.com.au.

Diploma of Diagnostic Ultrasound

Access to the on-line **DDU Tutorial** is available to current, registered candidates only. Your application must be approved and processed before admission to this site is gained. Please remember to complete each section in its entirety before moving onto the next.

The number of DDU candidates continues to rise with the DDU Part I attracting a total of 44 candidates and the DDU Part II a record number of 25 candidates to sit this year. The written portions for both the Part I and the Part II will be held on Monday 14th May 2007 in Auckland, Melbourne, Perth and Sydney. The Part II Viva for all specialties, excluding cardiology, will be held in Melbourne on Saturday 16th June 2007. Part II cardiology candidates will sit their Viva examination in Melbourne on Thursday 14th June 2007.

Remember, to apply to sit the DDU examination, you must be a current ASUM Medical Member in a specialist practice or currently enrolled in a specialist training program, and an Australian or New Zealand resident.

The 2008 DDU examination dates will be published in the DDU Handbook in August this year, a copy of which may be downloaded from our website. With the exception of cardiology candidates, we will be alternating the sitting of the viva examination between Melbourne and Sydney.

Diploma of Medical Ultrsonography

The new look DMU website design has been well received. One of the major benefits is the easy access and user-friendliness of different sections of the handbooks and forms.

In previous years, DMU candidates had to sit all of the Part II Examination together but from this year, candidates have the choice of sitting only the Part II Written Examination and sitting the other two examinations, namely the Oral and the Practical Examination, the following year. This greater flexibility allows candidates longer preparation time and opportunity for better professional development.

A DMU information brochure is currently being prepared and this will be placed on the website when it is completed.

This year, a total of 156 candidates have applied to sit the DMU examinations. Ninety-five candidates are sitting Part I and 61 candidates have applied for the Part II Examinations. These numbers are comparable to those of previous years. The written examinations for all Part I and Part II candidates will be offered in eight major locations throughout Australia and New Zealand on Saturday 28th July 2007. The Part II Practical Examinations will be held at individual practices throughout New Zealand and Australia during August. The oral examinations will be conducted on 1st and 2nd September 2007 in Sydney, Brisbane, Auckland, Melbourne and Perth.

Eligibility to sit for the DMU includes, being a current member of ASUM, being an Australian or New Zealand resident and satisfying the entry criteria as outlined in the DMU Handbook. Candidates who wish to sit for the DMU Part II Practical Examination must have at least two

Musculoskeletal Ultrasound 2007

18-19 August 2007
Crowne Plaza Hunter Valley Resort
Hunter Valley, New South Wales

You are invited to participate in 'MSK Ultrasound 2007' being held at the Crowne Plaza Hunter Valley Resort, from 18-19 August 2007. The intensive program will be workshop-focused and delivered by specialist radiologists and sonographers who are recognised for their extensive knowledge and teaching skills. **Interactive workshops and open teaching forums are included in the registration fee.**

Workshop Facilitators: Bill Breidahl, Stephen Bird, Frank Burke, Greg Cowderoy, Phil Lucas, Jenny Noakes, Paul O'Connell, John Read, Neil Simmons, Amanda Woodward

Program themes: Hip, Groin, Foot, Ankle, Shoulder, Elbow, Wrist & Hand

Social program: Join us for a night of fine wine and entertainment at the Gala Dinner. Award winning wines from local winery Meerea Park have been matched to a sumptuous 5 course dinner. Tempt your taste buds with the menu on the Phoenix Conferencing website

For program updates and registration information visit the Phoenix Conferencing website

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PHOENIX CONFERENCING

Left: The WFUMB booth at ECR in Vienna, **Right:** Julia and Boris Tuscheck, Dr Caroline Hong, Prof Paladini, Dr Matthew Andrews and Dr Andrew Ngu on the Gold Coast.

years sonography experience to be eligible.

This year, the ASUM DMU Board of Examiners is implementing a grading system for every candidate sitting the two MCQ Part I Examinations and the Part II Written Examination (Distinction, Credit, Pass and Fail). This is intended to give candidates feedback on their knowledge content and encourages the enhancement of their future study. For the oral and the practical examinations, pass and fail grades will continue to be awarded.

ASUM always welcomes any feedback from candidates in relation to the DMU website, the Handbook, examination information and the examination process, itself, as well as our customer service.

Membership – Early bird renewals are due on 30 June 2007

Membership renewals for the year 1st July 2007 to 30th June 2008 are being processed now and will be mailed out to current members in May. The early bird specials apply until 30th June 2007 and we urge you to renew early so that you will continue to enjoy your membership benefits. Once you receive your subscription renewal, payments may be made on-line, via post or by fax to +61 (02) 9438 3686.

Please remember that access to your Members Only area of our website at www.asum.com.au is linked to the email address you originally provided. If you have had a change of email, let us know by sending an email to registrar@asum.com.au requesting we reset your password.

No society other than ASUM can provide you with so many benefits and special privileges, in a truly unique professional multidisciplinary environment. The strength of ASUM comes from the quality and diversity of the expert contribution of its medical specialists, medical professionals, scientists, sonographers and corporate members, all of whom are interested in the common goal of promoting excellence in ultrasound.

ECR 2007 and WFUMB 2009 Sydney Congress

I was privileged to be part of the ASUM team at the European Congress of Radiology (ECR) 2007 Congress that was held in Vienna in March this year, to promote the WFUMB 2009 Sydney Congress. The ECR represents the medical specialty of radiology throughout Europe and the Mediterranean and its annual event is attended by more than 16 000 delegates. Dr David Rogers, Mrs Sue Rogers, Dr Glenn McNally and I were charged with hosting the ASUM society booth that was generously offered by ECR at no cost to ASUM. There were more than 60 society booths at this congress, from all over the world; they were all of similar sizes, with displays in the society booth section, as part of the large exhibition and meeting.

At this meeting, we were privileged also to meet with the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) President Elect, Dr Norbert Gritzmann and Dr Gerhard Mosbeck, the President of the Austria Society for Ultrasound, in exploring ways to work together collaboratively and also in promoting World Federation of Societies for Ultrasound in Medicine and Biology (WFUMB) 2009 Sydney and WFUMB 2010 Austria congresses. The ASUM team was also warmly received by the ECR 2007 President, Dr Christian Herold, at the President's international welcome reception.

ASUM has already made progress in the planning for the WFUMB 2009 Congress that will be held from 30th August to 3rd September 2009, at the Sydney Convention and Exhibition Centre (SCEC).

The SCEC has demonstrated its commitment to considering the environment in all business activities and the important role it plays in its position on the Sydney Harbour foreshore. Recently, the SCEC achieved Green Globe Benchmarked Convention Centre status. The only other convention centre to have this rating is Kuala Lumpur. This Green Globe is the global benchmarking, certification and improvement system for sustainable travel and tourism. This benchmark accreditation reflects the Centre's commitment to the environment and the achievements of its environmental program. ASUM is proud to be hosting the WFUMB 2009 Sydney World Congress at the SCEC in Darling Harbour Sydney from 30th August to 3rd September 2007.

ASUM Education and Meetings

There has been a flurry of activity at ASUM.

The Giulia Franco Teaching Fellowship, sponsored by Toshiba, was awarded to Stephen Bird who

presented in Western Australia. He travelled to Perth, Bunbury, Albany and Kalgoorlie in March this year.

ASUM in the Hunter 2007 was also presented on 25th May 2007 by Assoc Prof Jon Hyett.

We also hope to see as many members attend our ASUM upcoming meetings listed below:

30th June and 1st July 2007 – ASUM WA Ultrasound CPD Meeting 2007, Royal Perth Hospital.

19th–22nd July 2007 – ASUM NZ Branch and RANZCR NZ Branch Joint Annual Scientific Meeting 2007. Wellington New Zealand.

20th–21st July 2007 – Melbourne – ASUM presents: The Early Pregnancy and Gynaecological Scanning Foundation Theoretical Courses (two-day course).

22nd–23rd July 2007 – Brisbane – ASUM presents: The Early Pregnancy and Gynaecological Scanning Foundation Theoretical Courses (two-day course).

28th–29th July 2007 – Sydney – ASUM presents: The Early Pregnancy and Gynaecological Scanning Foundation Theoretical Courses (two-day course)**.**

13th–16th September 2007 – ASUM Annual Scientific Meeting 2007. Cairns Australia.

Feb/March 2008 (Dates TBA) – ASUM MDW Sydney Australia.

19th–22nd September 2008 – ASUM Annual Scientific Meeting 2008 Auckland New Zealand.

30th August to 3rd September 2009 – WFUMB 2009 Sydney World Congress to be hosted by ASUM. Sydney Australia

For a full listing of ASUM meetings and to register please see the ASUM Website Calendar at http://www.asum.com.au

Tanzania – call for help

John Morshead is a radiographer who has worked in Melbourne for the past 10 years. Prior to that he spent six years working in Tanzania, where he was involved in radiographer training. While in Tanzania, with some Australian Government funding, John established an ultrasound facility and training program, before returning to Australia.

John plans to return to Tanzania in January 2008. The Society of Radiography in Tanzania plans to upgrade its course to degree level and John has been invited to assist with their training. He will be based at Uhumbiib Medical Centre, the university training hospital in Dar Es Salaam.

MDW 2007 DMU and DDU lectures.

The training school is in need of basic medical imaging textbooks and John is seeking donations of any used ultrasound, radiography or radiology texts. Old and non-current editions would be more than welcome.

Mr John Morshead can be contacted at:

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Congratulations

ASUM also congratulates John Buhler and Ultrasonix Medical Corporation for being named the 2007 Medical Device Company as part of the 9th annual BC Biotechnology Awards held by Life Sciences British Columbia. The award was presented at a gala ceremony April 18th at the Hyatt Regency Hotel in Vancouver, Canada.

The BC Biotechnology Awards are presented annually by Life Sciences British Columbia to recognise individuals and organisations that have made outstanding contributions to the development of British Columbia's biotechnology industry, and to increase public awareness and understanding of life sciences in the province.

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OPINION

Ectopic pregnancy: to see or not to see?

George Condous

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Should we see all ectopic pregnancies using ultrasound pre-operatively? I think this is an unrealistic goal and, more importantly, this question is not particularly relevant in the modern management of ectopic pregnancy.

More and more ectopic pregnancies are managed non-surgically, using either medical management in the form of methotrexate or a 'wait and see' expectant approach. Such conservative approaches do not require histological confirmation of chorionic villi at the time of surgery and it is this confirmation that allows a unit to accurately assess its ectopic pregnancy pick-up rates. Therefore, will we ever truly know the real rates of ectopic pregnancy diagnosis using ultrasound? I don't think so. If an early pregnancy unit can boast the ability to determine its true positive pick up rate of ectopic pregnancy using ultrasound, then I believe such a unit is doing its early pregnancy population a disservice by not offering more conservative treatment modalities.

I am still amazed that women who present with lower abdominal pain with or without bleeding in the first trimester undergo both a transabdominal scan followed by a transvaginal scan (TVS). This requires the woman to initially have a full bladder, then she leaves the scan room to empty her bladder before returning for her TVS – the investigation that should have been performed in the first place. This is completely unnecessary, inappropriate and an archaic approach. Transabdominal ultrasonography is not diagnostic for ectopic pregnancy. The transvaginal and not transabdominal ultrasound should be the first and only approach used in women who present with early pregnancy complications. In a recent study, TVS was not painful and was found to be acceptable by women and 99% said that they would agree to have a similar procedure in the future[1]. Women with clinical signs of a ruptured ectopic pregnancy who are haemodynamically compromised should not have surgery delayed to have an ultrasound examination performed.

There is no doubt that the management of early pregnancy complications, and in particular ectopic pregnancy, has been revolutionised by the introduction of rapid immunoassay of human chorionic gonadotrophin (hCG) and high-resolution transvaginal ultrasonography. Currently, over 90% of ectopic pregnancies can be visualised on TVS pre-operatively[2,3], and TVS performed by a trained ultrasonographer not only confirms the viability and gestation of a pregnancy but, most importantly, its location. The diagnosis of ectopic pregnancy is not usually based on ultrasound signs alone, however, in a recent large prospective study, the capability of TVS when used as a single test to positively identify an ectopic pregnancy was clearly demonstrated[3]. The diagnosis of ectopic pregnancy should be based upon the positive visualisation of an adnexal mass using TVS rather than on the absence of an intrauterine gestational sac.

It is still possible to see ultrasound reports that read 'empty uterus, ectopic pregnancy cannot be excluded'. This is not helpful and may result in unnecessary intervention. In well-trained hands, this situation is not akin to a 'query ectopic pregnancy'. When the pregnancy cannot be visualised on TVS either inside or outside the uterus, then this is a pregnancy of unknown location (PUL)[4–12] and not a 'query ectopic pregnancy'. If the woman is clinically stable, laparoscopy is not appropriate even if the initial serum hCG is above a particular discriminatory zone[8]. If an ectopic pregnancy cannot be seen on TVS by an experienced ultrasonographer, then there is every chance that it will not be seen at laparoscopy[13].

In conclusion, 'to see or not to see' is not the question. It is more important to ask: why are women still undergoing laparotomy instead of laparoscopy if surgery is indicated? Why do we not explore more conservative outpatient approaches to the management of ectopic pregnancy? Why do we persist in performing transabdominal scans instead of a primary transvaginal scan? Why do we still see ultrasound reports that read 'empty uterus, ectopic pregnancy cannot be excluded'? Why is early pregnancy management still viewed as 'scraps' for unsupported junior O&G residents? These questions are much more relevant to modern early pregnancy practice. It is time to focus our efforts on developing a consensus for management of all first trimester complications. This begins with dedicated early pregnancy units led by appropriately trained specialists.

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Pelvic floor ultrasound

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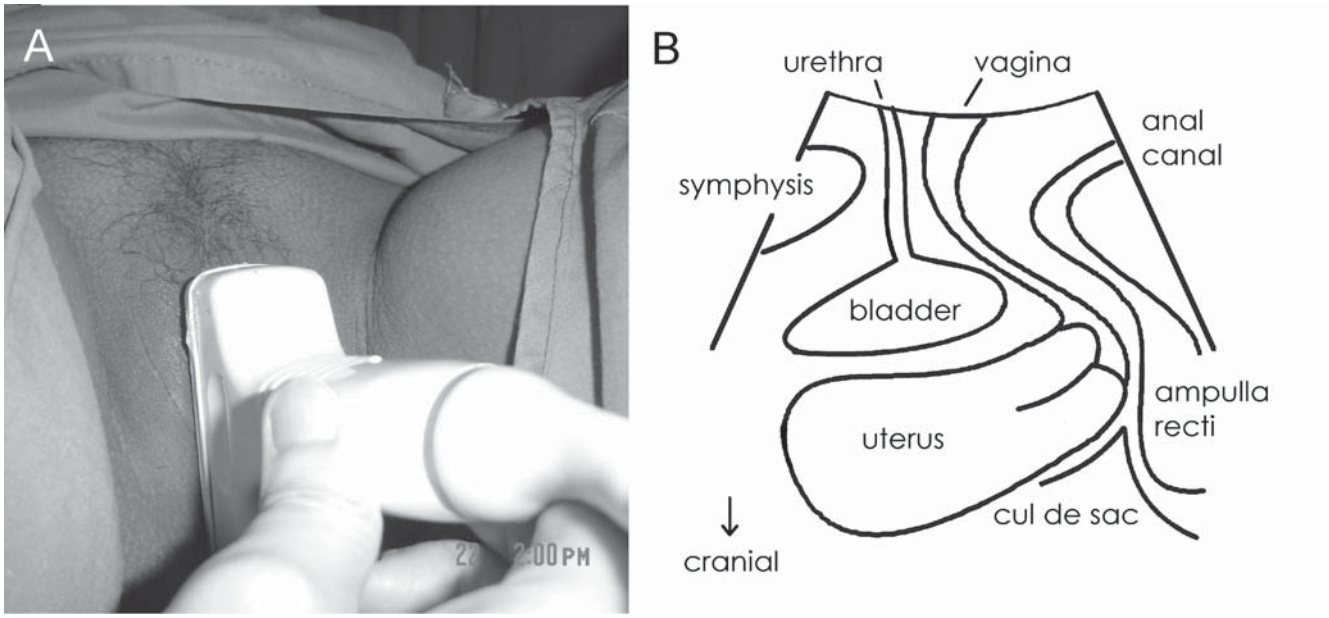

Fig. 1: Transducer placement on the perineum (left) and schematic representation of imaging in the midsagittal plane. Left image courtesy of N. Pangilinan, Manila, right image adapted from *Ultrasound Obstet Gynaecol* 2004; 23: 80–92 with permission.

Introduction

The uptake of a new diagnostic method depends on many factors, some of them having absolutely nothing to do with medicine. And even if acceptance is rapid, it takes decades for new developments to be reflected in general clinical practice. Clearly, this is true for pelvic floor ultrasound, the modality under review in this article.

In 2007, many colleagues working in general obstetrics and gynaecology in the developed world would consider an assessment incomplete without diagnostic imaging, whether the patient be gynaecological or obstetric. The situation is still very different in urogynaecology where a cursory clinical examination is generally regarded as sufficient.

Paradoxically, imaging methods played a more prominent role in what is now urogynaecology in the 1960s than in the 1980s. It was plain and contrast radiological imaging then, which were first used to describe bladder descent[1–3] and later central and posterior compartment prolapse[4].

Ultrasound was introduced from the mid-1980s onwards, via the transvaginal[5] and introital/transperineal/translabial[6] routes. Magnetic resonance imaging has been used in a research context[7] but, as yet, none of these methods has become a generally accepted part of clinical practice. This is at least partly due to the fact that urogynaecology and female urology are defined by another diagnostic method, urodynamics, which investigates lower urinary tract function and encourages the practitioner to ignore pelvic floor anatomy. It is high time that clinicians realised what modern imaging has to offer to the gynaecologist, urogynaecolgist and urologist working in the field of urinary incontinence and female pelvic organ prolapse. There also is a case to be made for pelvic floor ultrasound in women with anorectal dysfunction, not just for imaging of the anal sphincter, but also for symptoms of obstructed defecation.

The author holds that clinical examination alone, particularly when the examiner is unaware of its shortcomings, is a woefully inadequate tool to assess pelvic floor function and anatomy. In 1943, Howard Gainey, an obstetrician from Kansas City, first described levator trauma in parous women[8]. In editorial comments two reviewers stated 'I am convinced that there is more to the examination of the postnatal patient than I have been practising' and that 'None of us has learned to examine the pelvis completely'. This is just as true today as it was in 1943. Our examination skills are poor, focusing on surface anatomy, rather than true structural abnormalities. The results are predictable, and imaging can go a long way towards explaining why so many women have surgery for prolapse, only to come back with recurrence[9].

The introduction of prolapse quantification systems such as the POP-Q[10] has done little to change the situation. While quantification of prolapse beyond Stages 1–4 of the Baden-Walker classification has to be regarded as progress, it still is only surface anatomy, and surface anatomy without appreciation of function. Clinical examination often results in false negative findings due to levator co-activation: we ask the patient to bear down, and she reflexively contracts the pelvic floor, trying to stop loss of urine, flatus or stool, or contracts simply because of the stressfulness and embarrassment of the situation, or in anticipation of a cold metal instrument. Levator activation is particularly common in nulliparous women[11], is very likely part of a generalised defensive reflex[12], and has to be overcome by visual or

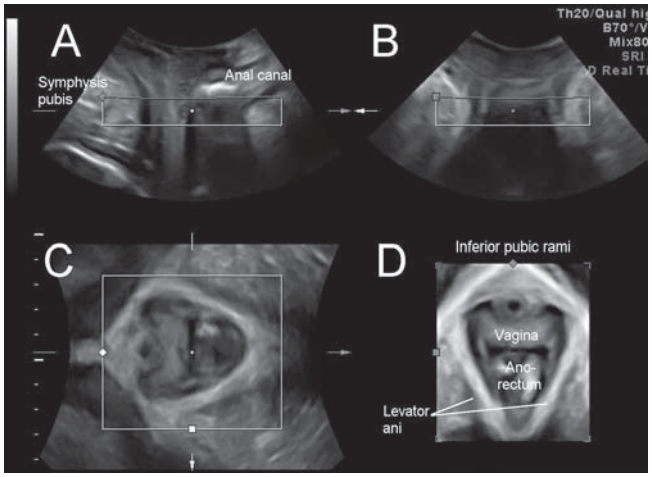

Fig. 2: Standard acquisition screen of 3D pelvic floor ultrasound. The midsagittal plane is shown in (A), the coronal plane in (B), the axial plane in (C) and a rendered axial plane (i.e., a semitransparent representation of all pixels in the box seen in A–C) in (D).

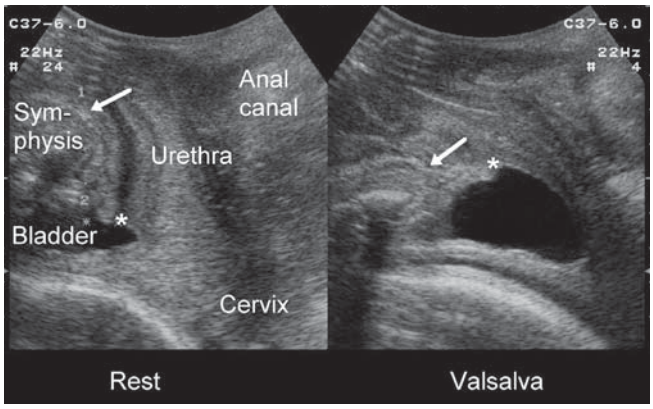

Fig. 3: Pelvic floor Ultrasound, midsagittal plane. The image on the left is taken at rest, the one on the right is on maximal Valsalva.

tactile biofeedback. Ultrasound helps you see levator co-activation and impending loss of urine or stool, alerting you to the need for bladder or bowel emptying and/or biofeedback teaching.

While there have been attempts at quantifying levator function[13], they have largely been ignored by pelvic floor surgeons, and do not contain any reference to either muscle elasticity or distensibility or morphological integrity, two of the main predictors of pelvic organ descent[14,15]. While it may well be possible to improve our clinical assessment skills, this won't happen unless we allow imaging techniques to show us what the actual problems are. Avulsion of the anteromedial aspects of the pubovisceral muscle off the pelvic sidewall[16,17] – the missing link between vaginal childbirth and prolapse or major levator trauma – is palpable, but palpation of levator trauma requires considerable skill and teaching[18,19], preferably with imaging confirmation. Certainly, diagnosis by imaging is a lot more reproducible than diagnosis by palpation (kappa 0.83 *v.* 0.495 in own unpublished data), and much easier to teach. Suspected levator trauma, however, is by no means the only reason to perform pelvic floor imaging (Table 1).

Table 1: Proposed indications for pelvic floor ultrasound:

- Recurrent urinary tract infections
- Urgency, frequency, nocturia and/ or urge urinary incontinence
- Stress urinary incontinence
- Insensible urine loss
- Bladder-related pain
- Persistent dysuria
- Symptoms of voiding dysfunction
- Symptoms of prolapse, i.e., the sensation of a lump or a dragging sensation
- Symptoms of obstructed defecation such as straining at stool, chronic constipation, vaginal or perineal digitation and the sensation of incomplete bowel emptying
- Faecal incontinence
- Pelvic or vaginal pain after anti- incontinence or prolapse surgery
- Vaginal discharge or bleeding after anti- incontinence or prolapse surgery

Equipment and examination technique

Basic requirements for translabial pelvic floor imaging would include a B-mode capable 2D ultrasound system with cine loop function and a 3.5–6 Mhz curved array transducer. A videoprinter is usually the most convenient method of documentation. A midsagittal view is obtained by placing a transducer (usually a curved array with frequencies between 3.5 and 8 MHz) on the perineum (Fig. 1a), after covering the transducer with a glove, condom or thin plastic wrap for hygiene reasons. Due to reverberations, powdered gloves can markedly impair imaging quality and should be avoided. Imaging can be performed in dorsal lithotomy, with the hips flexed and slightly abducted, or in the standing position. Requiring the supine patient to place her heels close to the buttocks will result in an improved pelvic tilt. Bladder filling should be specified and for some applications prior voiding is preferable. The presence of a full rectum may impair diagnostic accuracy and sometimes necessitates a repeat assessment after bowel emptying. Parting of the labia can improve image quality. Best results are realised in pregnancy and poorest in menopausal women with marked atrophy, most likely due to varying hydration of tissues.

The transducer can usually be placed firmly against the symphysis pubis without causing significant discomfort unless there is marked atrophy. The resulting image includes the symphysis anteriorly, the urethra and bladder neck, the vagina, cervix, rectum and anal canal (Fig. 1b). Posterior to the anorectal junction, a hyperechogenic area indicates the central portion of the levator plate, i.e., the puborectalis/ pubococcygeus or pubovisceral muscle. The cul de sac may also be seen, filled with a small amount of fluid, echogenic fat or peristalsing small bowel. Parasagittal or transverse views may yield additional information, e.g. enabling assessment of the pubovisceral muscle and its insertion on the arcus tendineus of the levator ani, and for imaging of transobturator implants.

There has been disagreement regarding image orientation in the midsagittal plane. Some prefer orientation as in the standing patient facing right[20] which requires image inversion on the ultrasound system, a facility that was not universally available in the past. Others (including the author) prefer an orientation as on conventional transvaginal ultrasound (cranioventral aspects to the left, dorsocaudal to the right). The latter also seems to be more convenient when using 3D/4D systems – see Fig. 2 for the standard representation of a 3D volume of the pelvic floor. The top left (A) represents the midsagittal plane, with the bottom left

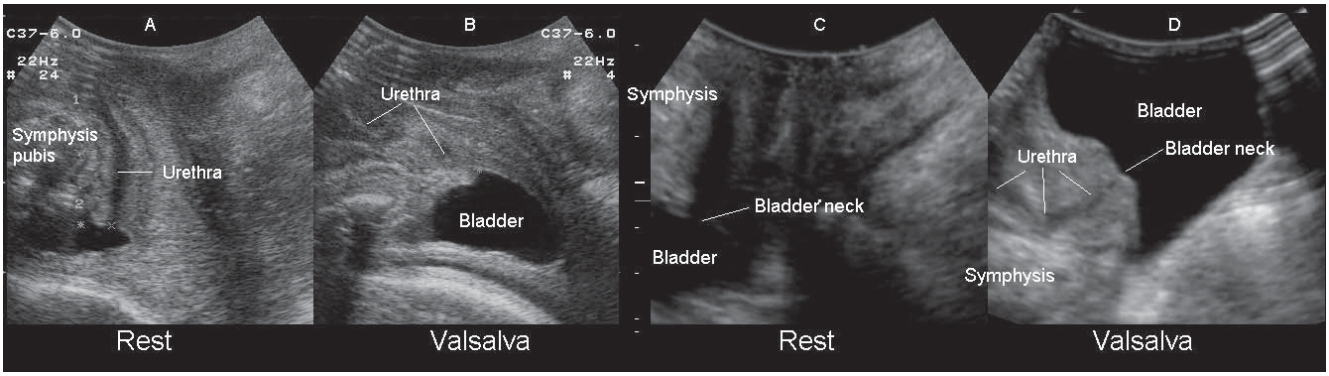

Fig. 4: The two main types of cystocele as imaged on maximal Valsalva in the midsagittal plane: Cystourethrocele (Green Type 2) on the left, associated with urinary stress incontinence and good voiding function, and an 'isolated cystocele' (Green Type 3) on the right, associated with prolapse and voiding dysfunction rather than stress incontinence.

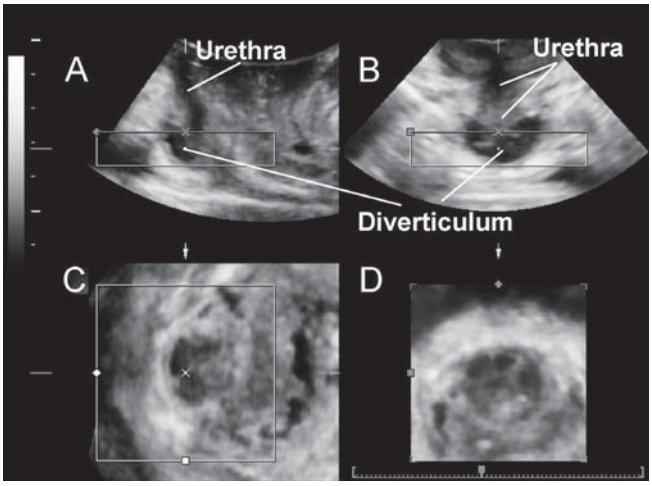

Fig. 5: Urethral diverticulum on 3D pelvic floor ultrasound. The orthogonal planes A-C clearly illustrate the location and extent of the diverticulum.

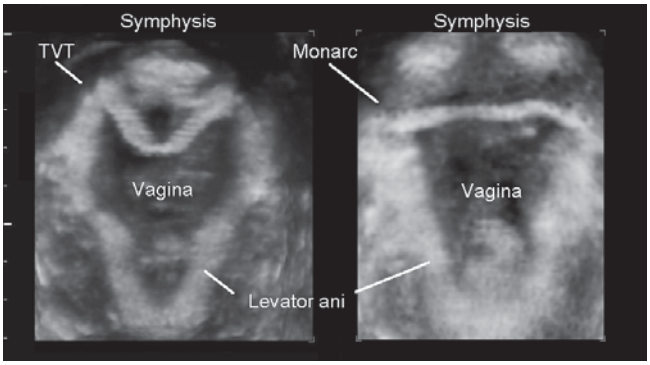

Fig. 6: Suburethral slings as seen on translabial ultrasound, axial plane. The TVT (left) is curving ventrally, while the Monarc tracks laterally towards the insertion of the levator ani muscle.

(C) being an axial plane slice, and the bottom right representing a rendered volume showing the levator hiatus (D).

Translabial ultrasound of the lower urinary tract, even if limited to B-mode imaging in the midsagittal plane, yields information equivalent or superior to the lateral urethrocystogram. Comparative studies have mostly shown good correlation between radiological and ultrasound data for the assessment of bladder neck mobility and funnelling of the bladder neck. Fig. 3 shows the standard imaging used to describe bladder neck mobility with a Valsalva manoeuvre. The position of the bladder neck is determined relative to the inferoposterior margin of the symphysis pubis. The one remaining advantage of x-ray fluoroscopy may be the ease with which the voiding phase can be observed although some investigators have used specially constructed equipment to document voiding with ultrasound[21].

I will try and describe the main uses of the method in the following paragraphs

Anterior compartment

Clinical examination is limited to grading anterior compartment prolapse, which we call 'cystocele'. In fact, imaging will identify a number of anatomical situations that are difficult, if not impossible, to tell apart clinically. There are at least two types of cystoceles with very different functional implications (Fig. 4).

A cystocele with intact retrovesical angle is generally associated with voiding dysfunction and a low likelihood of stress incontinence, while a cystourethrocele is associated with above average flow rates and urodynamic stress incontinence. In addition, occasionally a cystocele will turn out to be due to a urethral diverticulum (see Fig. 5 for a 3D representation of an unusual anterior urethral diverticulum), a Gartner duct cyst or an anterior enterocele, all likely to be missed on clinical examination.

Urethral structure and spatial relationships are much better appreciated in the axial plane (Fig. 5) which is particularly useful in the differential diagnosis of Gartner cyst versus urethral diverticulum. Recently, synthetic suburethral slings have become very popular. Ultrasound can confirm the presence of such a sling, distinguish between transobturator and transretzius slings, especially when examining the axial plane (see Fig. 6), and even allow an educated guess regarding the exact type and material of the sling[22]. A tight 'C'-shaped appearance at rest and a gap of less than 1 cm between tape and symphysis pubis makes functional obstruction very likely and suggests that tape division would be beneficial in a patient with worsened symptoms of bladder irritability or clinically significant voiding dysfunction.

Translabial ultrasound may detect foreign bodies or bladder tumours[23,24] and can be used to determine residual urine, using a formula originally developed for transvaginal ultrasound[25]. While detrusor wall thickness (DWT) has probably been overrated as a diagnostic tool in the context of detrusor overactivity[26,27], increased DWT is associated with symptoms of the overactive bladder[27,28], and may be a predictor of postoperative de novo urge incontinence and/or

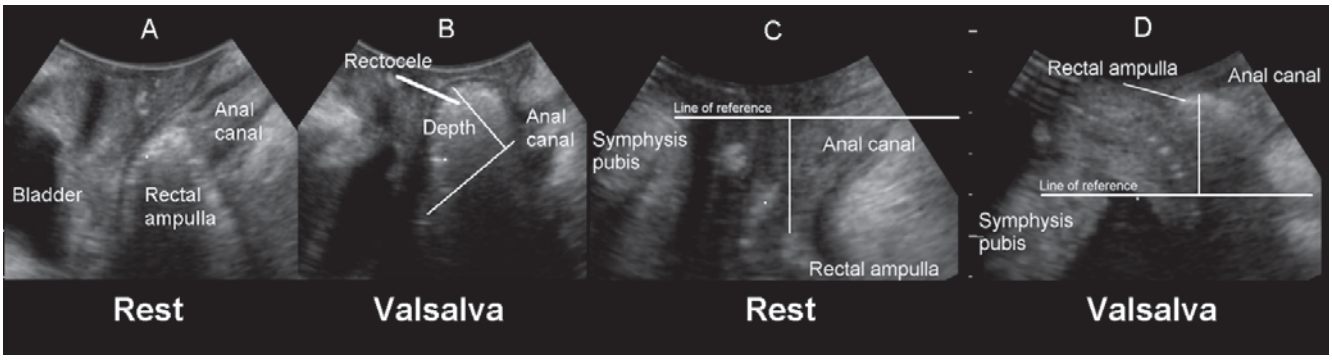

Fig. 7: The distinction between a 'true rectocele', i.e., a defect of the rectovaginal septum (shown by the left pair of images) and perineal hypermobility, i.e., descent of the rectal ampulla without fascial defect (right pair of images). Adapted from *Ultrasound Obstet Gynaecol* 2005; 26: 73–77 with permission.

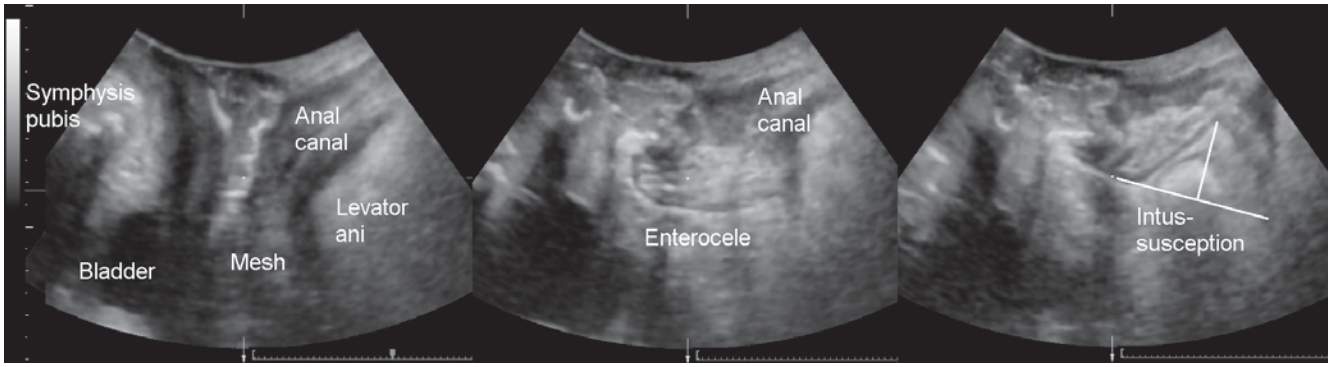

Fig. 8: Rectal intussusception as evident in the midsagittal plane. Images are at rest (left), on mild Valsalva (middle) and maximal Valsalva (right). From Pelvic Floor Ultrasound. Springer Verlag, London 2007 with permission.

detrusor overactivity after anti-incontinence procedures[29]. As opposed to the situation in the male, DWT in women is not predictive of voiding dysfunction[30].

Central compartment

Tranbslabial ultrasound is less useful in the assessment of central compartment prolapse. Generally, uterine prolapse is obvious clinically, as is vault descent. Having said that, translabial ultrasound may graphically show the effect of an anteriorised cervix in women with an enlarged, retroverted uterus, explaining symptoms of voiding dysfunction, and supporting surgical intervention in order to improve voiding in a woman with an incarcerated retroverted fibroid uterus. On the other hand, mild descent of an anteverted uterus may result in compression of the anorectum, explaining symptoms of obstructed defecation, a situation that is termed a 'colpocele' on defecation proctography.

Posterior compartment

As regards the posterior compartment, clinically we diagnose 'rectocele' without being able to distinguish the several different conditions leading to downwards displacement of the posterior vaginal wall. A second degree rectocele may be due to a true rectocele, i.e., a defect of the rectovaginal septum – the most common condition, associated with symptoms of prolapse and obstructed defecation[31] – or due to an abnormally distensible, intact rectovaginal septum (common and associated mainly with prolapse symptoms), a combined recto-enterocele (less common), an isolated enterocele (uncommon) or just a deficient perineum giving the impression of a 'bulge'[32]. See Fig. 7 for a comparison of the first two conditions.

In addition, there is scope for functional imaging of the anorectum, with rectal intussusception and prolapse being visible on Valsalva (Fig. 8). When an asymptomatic or even mildly symptomatic rectal intussusception is picked up on translabial imaging, one may want to provide the patient with visual biofeedback. If we can show that straining at stool is obviously counterproductive (whether due to rectocele, colpocele or rectal intussusception) the patient will hopefully be more likely to modify her behaviour. In some, this is all that is needed to cure symptoms of obstructed defecation and dyschezia.

Finally, there is sphincter assessment. The anal sphincter is generally imaged by endo-anal ultrasound, using high resolution probes with a field of vision of 360°. This method is firmly established as one of the cornerstones of a colorectal diagnostic workup for anal incontinence and is beyond the scope of this review. Due to the limited availability of such probes in gynaecology, obstetricians and gynaecologists have taken to using high-frequency curved array or endovaginal probes placed exo-anally, i.e., transperineally, in the coronal rather than the midsagittal plane[33–35]. There are advantages to this approach- not just from the point of view of the patient. Exo-anal imaging (Fig. 9) reduces distortion of the anal canal and allows dynamic evaluation of the anal sphincter and mucosa at rest and on sphincter contraction, which seems to enhance the definition of muscular defects. However, resolutions may be inferior[36] to those obtained by endoanal ultrasound, and we still lack good comparative studies.

The axial plane

At the moment, axial plane imaging is limited to the assessment of the levator ani muscle, although technological improvements may soon allow us to evaluate paravaginal and paraurethral tissues as well. Translabial ultrasound has confirmed 60-year-old clinical data[8] and magnetic reso-

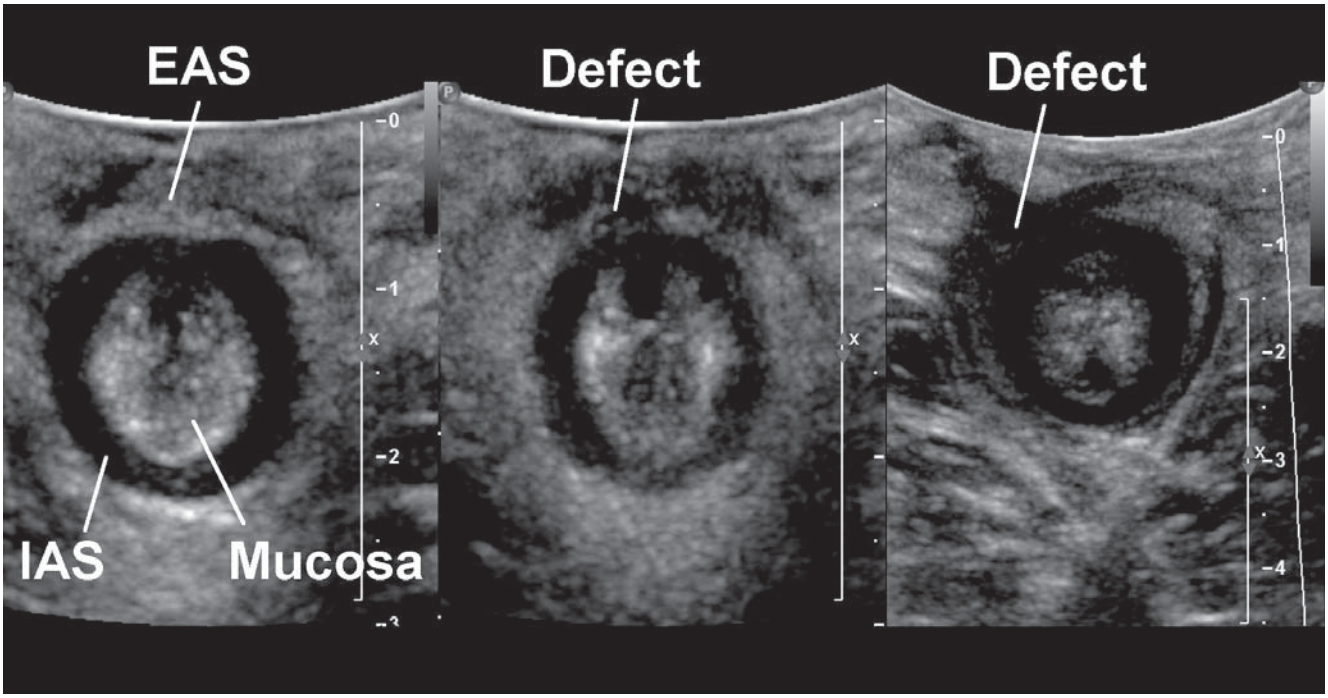

Fig. 9: Findings after repair of 3rd degree tears. The image on the left shows an excellent repair with no discernible scarring of the external anal sphincter (EAS). The central image shows mild scarring in an asymptomatic patient. The right image illustrates a major residual defect which was palpable and associated with flatus incontinence. From Pelvic Floor Ultrasound. Springer Verlag, London 2007 with permission.

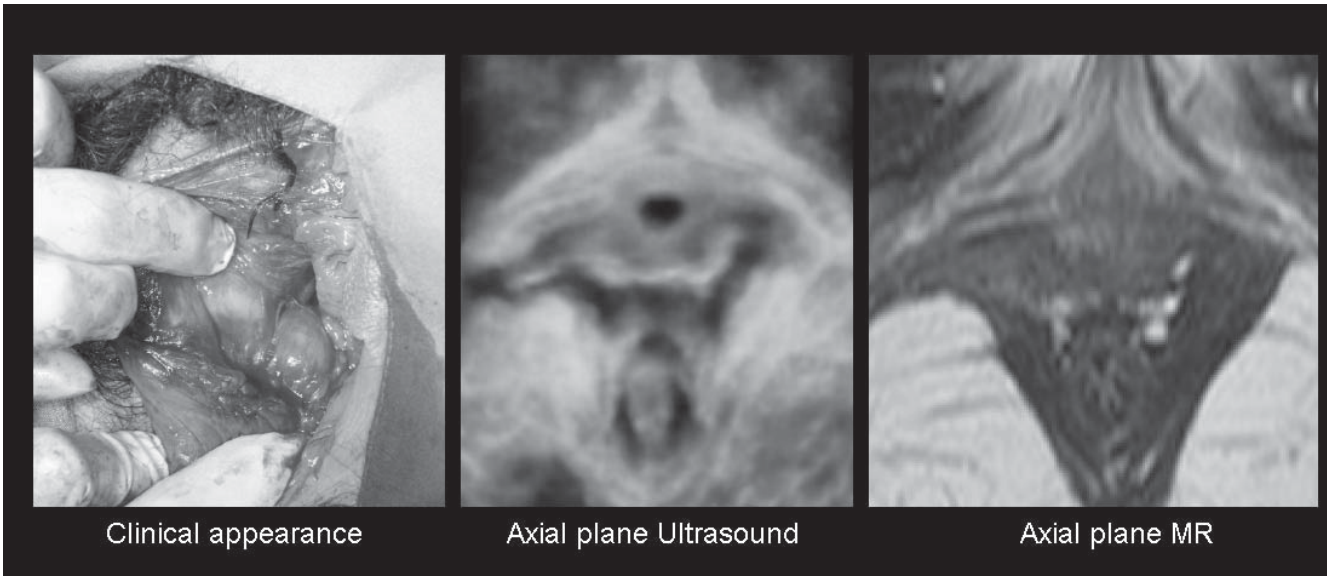

Fig. 10: Delivery-related levator trauma as seen on exploration of a large vaginal tear after vaginal delivery (left), as imaged on translabial 4D ultrasound (middle) and on MR (right).

nance imaging studies[37–39] showing that major morphological abnormalities of levator structure and function are common in vaginally parous women[15]. Very recently, it has been proven that such morphological abnormalities are due to vaginal delivery[16], see Fig. 10 for a comparison of magnetic resonance, ultrasound and clinical findings in a patient with unilateral levator avulsion.

Such major delivery-related levator trauma, affecting the inferomedial aspects of the pubovisceral muscle, seems to be part of the missing link between prolapse and childbirth. While clearly there are other factors, which probably include microtrauma or altered biomechanics of otherwise intact muscle, levator trauma seems to enlarge the hiatus[40] and results in anterior and central compartment prolapse[15]. The larger the defect, the higher is the likelihood of prolapse[40], as quantified on multi-slice or tomographic ultrasound (see Fig. 11). Levator defects seem to be associated with cystocele recurrence after anterior repair[41], probably increase the likelihood of symptomatic prolapse by about 70% (own unpublished data), and are even more strongly associated with symptoms of prolapse than with objective prolapse, especially of the anterior and central compartment (own unpublished data). This last observation implies that levator defects are markers for 'traumatic prolapse', and it makes perfect sense that congenital prolapse (i.e., prolapse in the absence of overt pelvic floor trauma) is less likely to cause symptoms.

These levator defects are palpable, but palpation requires significant teaching[19,42] and is clearly less repeatable (kappa = 0.41) than identification by ultrasound (kappa = 0.83 on analysis of whole volumes and kappa = 0.61 for single

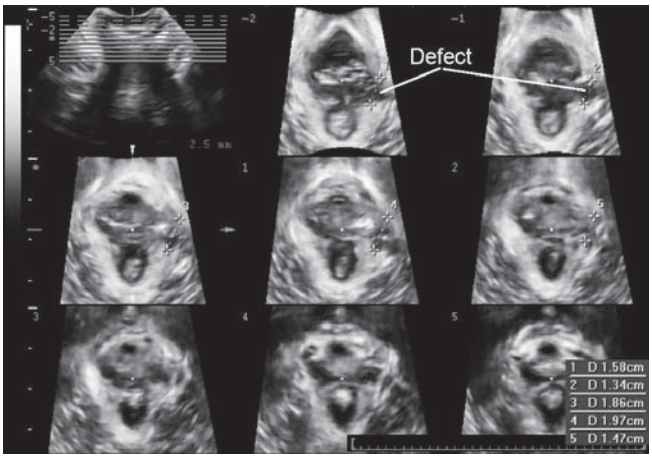

Fig. 11: Quantification of trauma on multislice/tomographic ultrasound imaging. There is a typical left-sided levator defect measuring about 2 cm in (dorsoventral) width and at least 1.25 cm in (craniocaudal) depth as it is apparent in at least five slices.

slices) as shown by the author (own unpublished data).

Another factor only apparent on axial plane imaging is the degree of hiatal distension on Valsalva. If the hiatus enlarges to over 25 cm^2 on Valsalva, we speak of 'ballooning', and the degree of distension is strongly associated with prolapse[43] and symptoms of prolapse (unpublished own data). It seems that ballooning is associated with prolapse recurrence after rectocele repair[44], and the same probably holds for other forms of prolapse surgery.

If delivery-related trauma and excessive distensibility of the levator are indeed risk factors for female pelvic organ prolapse and recurrence after reconstructive surgery, then of course we should be aware of it preoperatively and adjust our surgical approach accordingly. In fact, we may even want to develop surgical methods that reduce the size and distensibility of the hiatus or reconnect the detached muscle in an attempt to prevent prolapse recurrence.

New surgical techniques such as anterior vaginal wall mesh repair with transobturator anchoring[45], clearly reduce the effective size of the hiatus by providing a hammock-like bar across the anterior aspect of the hiatus (Fig. 12). The same may, to some extent, be true for posterior mesh techniques. First attempts at repairing levator trauma have failed (unpublished own data), and the unusual nature of this trauma will likely require innovative techniques.

Conclusion

Even in the late 1980s it was quite apparent that translabial ultrasound was particularly useful for clinical audit. When I worked on my my MD thesis in Heidelberg, we found that vaginal hysterectomy and anterior repair did little to correct cystocele and frequently made women incontinent who had been continent preoperatively. This study was never published – my supervisor made it clear that he didn't want such embarrassing data in the public domain. Not much later, ultrasound was pivotal in showing that colposuspension resulted in a more durable elevation of the bladder neck than anterior repair, and, later, that laparoscopic colposuspension did just the same, although with slightly more 'give' over time. When bone anchor slings were introduced in the mid 1990s, ultrasound rapidly showed that those procedures were very poor surrogates for colposuspension, although it took several years for this conclusion to be accepted on clinical grounds.

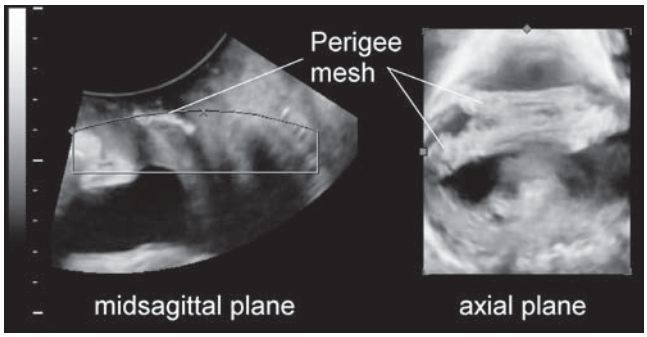

Fig. 12: 'Perigee' anterior vaginal wall mesh repair as imaged in the midsagittal plane (left) and a rendered volume in the axial plane (right).

And then there was the tension-free vaginal tape (TVT) technique. Imaging helped elucidate the mode of action: plain, simple mechanical compression of the urethra, nothing fancy like 'activation of muscular forces' as claimed by some. By 1998 or 1999 it was clear that results regarding stress continence should be durable, very likely better than for colposuspension procedures. Other implants such as the Sparc and the Monarc were assessed in the same way, showing a virtually identical mode of action, but less compressive effect. Procedural modifications were studied, demonstrating that the original TVT technique (using an intraoperative cough test for sling adjustment) was unnecessarily obstructive. Again and again, imaging helped us to adjust practice several years before clinical data in the literature told us what we already knew. While most clinicians ignored ultrasound data, those who didn't were several years ahead of their colleagues.

All this was prior to the widespread introduction of 3D/4D ultrasound. Even in 2001, it was obvious that imaging could make a real difference to the way we investigated and treated women with pelvic floor disorders. Now it is difficult to see how anybody could avoid coming to that conclusion. Current trends, i.e., the near universal introduction of 4D ultrasound, new software options and increasing availability of training, will likely lead to more general acceptance of ultrasound as a standard diagnostic option in pelvic floor medicine.

The issue of levator trauma, one of the most significant developments in clinical obstetrics in the last decade, will take pelvic floor ultrasound from a niche application into the mainstream. The crucial issue, as always, is teaching and the provision of up-to-date resources. It may still be another decade or two before this new imaging method truly becomes part of the gynaecological mainstream.

For further information see http://www.medfac.usyd.edu.au/people/academics/profiles/pdietz.php and the recently published textbook 'Pelvic Floor Ultrasound', Eds. HP Dietz, AB Steensma and L Hoyte, Springer Verlag London 2007.

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A new method for ultrasound evaluation of the distal biceps brachii tendon

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Fig. 1: Conventional sonographic technique.

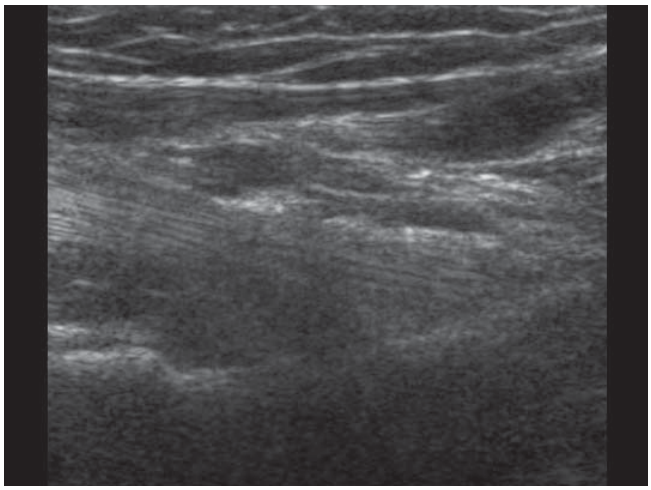

Fig. 2: Conventional image of biceps brachii insertion.

Introduction

Tear of the distal biceps brachii tendon is an unusual and dramatic event that most commonly occurs as a result of forced extension of the flexed load bearing elbow[1]. Typically, the patient is a male manual worker with a clinical history of having lifted a heavy object and his elbow giving way and reporting a sensation of something snapping within the joint.

Sonography is often the modality of choice for assessment of tendons as it provides high resolution, cost effective, dynamic imaging, free of ionising radiation and enjoys high patient acceptance.

Requests for assessment of most tendons are generally greeted with optimism by sonographers and sonologists, however when 'distal biceps brachii tendon' appears written on the referral the smiles disappear, followed by a phone call to the MRI department. Until now, this scenario has been common, however the use of a new acoustic window makes sonographic imaging of the distal insertion of the biceps brachii as simple and rewarding as imaging the Achilles tendon.

The conventional approach

Traditionally, the same logic has been applied to the biceps brachii tendon as tendons elsewhere in the body:

1) Scan straight along the length of the tendon;
2) Use the shortest possible tissue path; and
3) Attempt to scan perpendicular to the tendon fibres.

The patient is positioned with the elbow fully extended and wrist supinated allowing access to the antecubital fossa. An anterior approach and sagittal scan plane is used with the transducer placed upright in the antecubital fossa. The distal end of the transducer is pressed into the soft tissues using a 'heel and toe' manoeuvre to image as perpendicular to the direction of the tendon fibres as is possible (Figs. 1, 2).

The difficulties

The conventional approach only occasionally provides satisfactory results, in particular the most distal portion of the tendon, as it inserts onto the radial tuberosity and the adjacent bicipito-radial bursa is often poorly visualised.

The image quality when using this conventional approach is hampered by a variety of physical limitations:

1) Anisotropy is impossible to overcome due to the deep diving course of the tendon toward the radial tuberosity. Even real time compound imaging or beam steering technology combined with 'heel and toe' pressure cannot, in most cases, produce insonation perpendicular to the direction of the inserting tendon fibres.
2) The tendon insertion is located on the medial aspect of the radial tuberosity making direct sagittal visualisation difficult. Forced supination of the forearm will improve, but not completely overcome the problem (Figs. 3, 4).
3) The tendon insertion is in a deep location, often several centimeters from the skin surface, requiring a lower frequency transducer of poorer spatial resolution capability to achieve adequate penetration. This problem is exacerbated in the acute post-traumatic phase when the antecubital fossa is swollen.
4) When scanning through the mid antecubital fossa, the overlying brachioradialis and pronator teres muscle belly edges lie immediately anterior to the biceps brachii tendon and result in refraction of the sound beam which significantly degrades image quality. This is akin to scanning an ovary or prostate through the midline of the abdominal wall with refraction artifact generated by the rectus abdominus musculature (Figs. 5, 6).

The combination of a difficult-to-access tendon insertion, in a deep location, angled steeply away from the transducer

Fig. 3: Biceps brachii insertion.

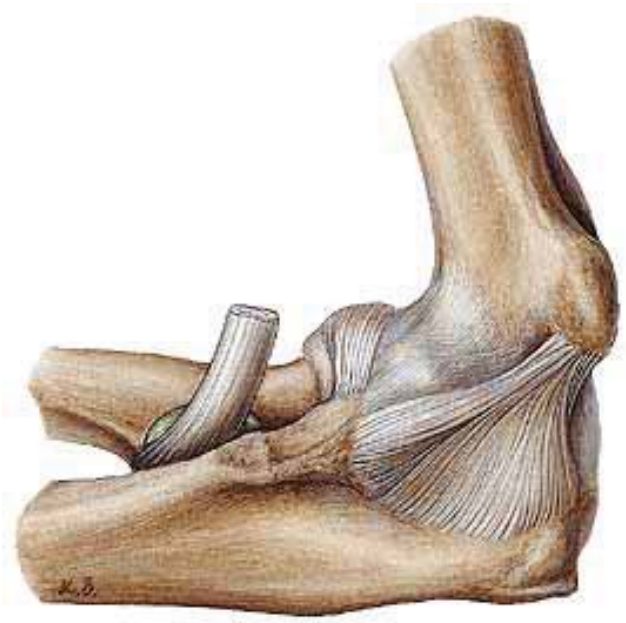

Fig. 4: Biceps brachii insertion.

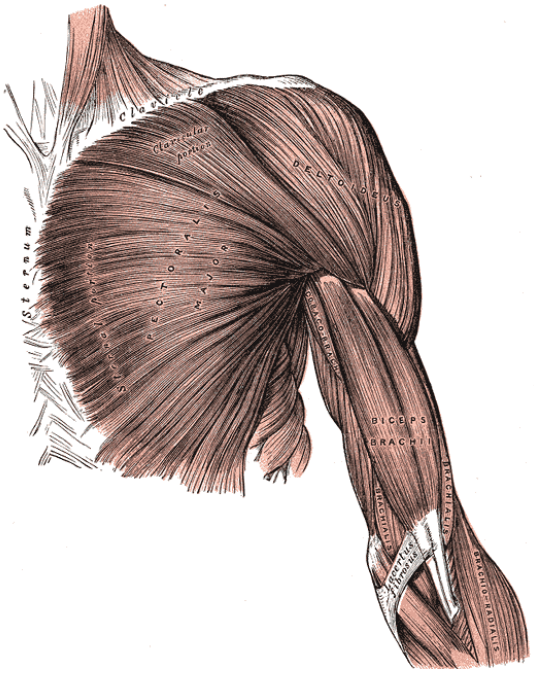

Fig. 5: Musculature overlying biceps brachii insertion.

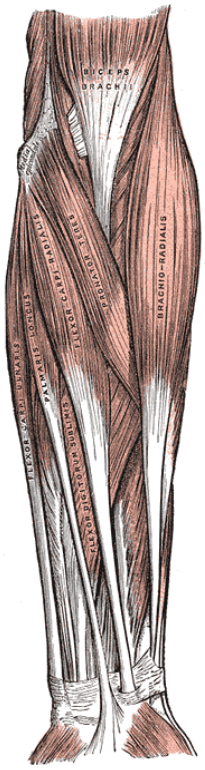

Fig. 6: Musculature overlying biceps brachii insertion.

and overlaid with refraction causing muscle belly edges and fat provides an imaging challenge that requires a new solution.

In 2005 Giuffre BM and Lisle DA described a posterior approach with a pronated forearm which allows visualisation of the biceps brachii insertion onto the radial tuberosity[2]. This approach works well, but has the limitation of visualising only the most distal 5–10 mm of the insertion and does not allow visualisation of the bicipito-radial bursa, more proximal tendon or musculotendinous junction (Figs. 7, 8).

The solution

1) Use a high quality acoustic window that does not degrade image quality at depth;
2) Directly access the medial aspect of the radial tuberosity; and
3) Scan exactly perpendicular to the long length of the tendon fibres to eliminate anisotropy and reveal the tendon fibrillar echotexture from musculotendinous junction to insertion.

The key to achieving all of these objectives and producing high quality images of the biceps brachii insertion is to utilise the pronator teres muscle belly as an acoustic window. The pronator teres muscle runs obliquely across the proximal aspect of the anterior compartment of the forearm.

Pronator teres arises from dual heads on the humerus and ulna that merge to form a single muscle belly which inserts onto the shaft of the radius. It courses directly anterior and medial to the biceps brachii tendon insertion providing an ideal acoustic window free of refraction artifact.

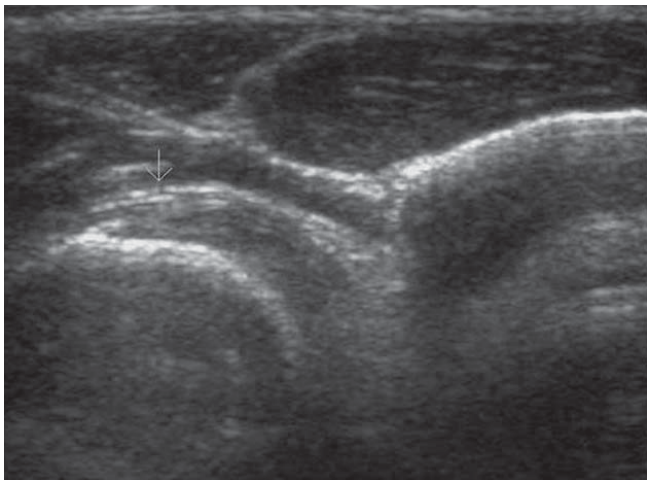

Fig. 7: Giuffre and Lisle posterior approach.

Fig. 8: Giuffre and Lisle technique.

Fig. 9: Pronator teres acoustic window technique.

Fig. 10: Pronator teres acoustic window technique.

Fig. 11: Normal biceps brachii insertion using pronator teres acoustic window: Arrow periosteal fibrocartilage.

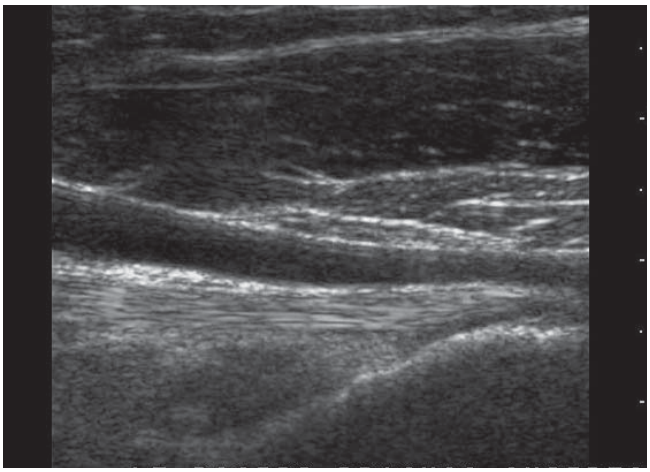

Fig. 12: Brachial artery provides an excellent acoustic window.

The patient is positioned in the traditional manner with elbow extended and wrist supinated. Steeply angling the transducer from medial to lateral across the proximal forearm provides an acoustic window directly through the mid belly of the pronator teres muscle. This line of sight leads directly to the biceps brachii insertion on the radial tuberosity (Figs. 9, 10). Subtle supination and pronation of the wrist adjusts the position of the radial tuberosity and tension of the tendon insertion, both of which are used to fine-tune the image quality. The full length of the biceps brachii tendon from insertion to musculotendinous junction may be visualised using this technique (Fig. 11). The periosteum of

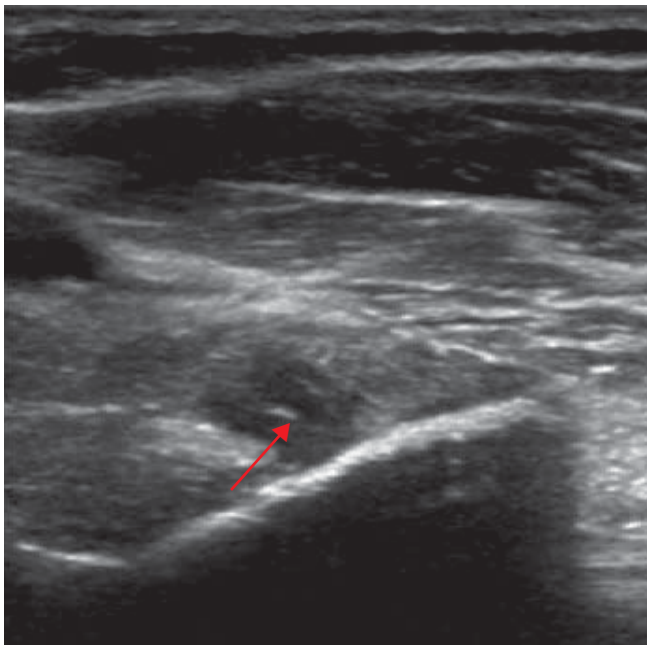

Fig. 13: Bicipito-radial bursa fluid filling a partial tear defect in the biceps brachii tendon.

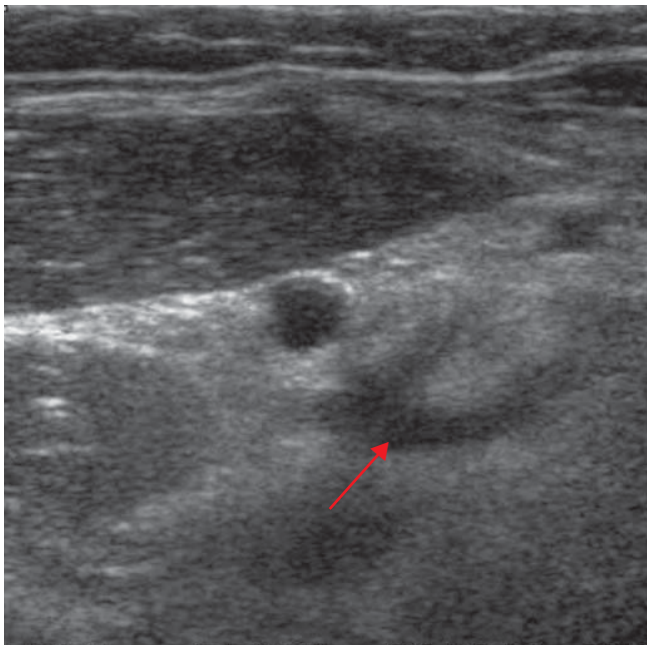

Fig. 14: Transverse image of the bicipito-radial bursa.

Fig. 15: Biceps brachii tendonosis.

Fig. 16: Partial tear of the biceps brachii insertion.

the radial tuberosity including the periosteal fibrocartilage (Fig. 11 arrow) and the bicipito-radial bursa are imaged with excellent clarity. Occasionally, the brachial artery will be located immediately superficial to the biceps brachii tendon, further improving the acoustic window properties and enhancing image quality (Fig. 12).

In cases where a partial tear is suspected, more strenuous pronation and supination of the wrist provides a useful provocative manoeuvre.

Supination and pronation adjusts the tendon tension and displaces fluid from the bicipito-radial bursa into partial tears or avulsions (Fig. 13).

Transverse images of the tendon may be obtained by rotating the transducer through 90 degrees while maintaining the pronator teres acoustic window. Transverse images are particularly useful for assessing the bicipito-radial bursa which appears as a 'U' shaped fluid collection immediately deep to the tendon (Fig. 14).

This technique provides excellent and easily reproducible visualisation of the biceps brachii insertion with a minimum of patient discomfort, even in the acute post traumatic phase. Image quality is only slightly affected by the size of the patient and degree of antecubital fossa swelling due to the nature of the acoustic window that is employed.

Pathology

Using the conventional technique, attention was focused on differentiating ruptured biceps brachii tendons from intact tendons. This new technique provides greater diagnostic confidence and allows more subtle pathology to be diagnosed.

Biceps brachii tendonosis is seen as a loss of fibrillar echotexture and swelling of the tendon (Fig. 15).

Partial tears are seen as anechoic fluid clefts running part way through the tendon (Fig. 16).

Fig. 17: Partial avulsion of biceps brachii insertion.

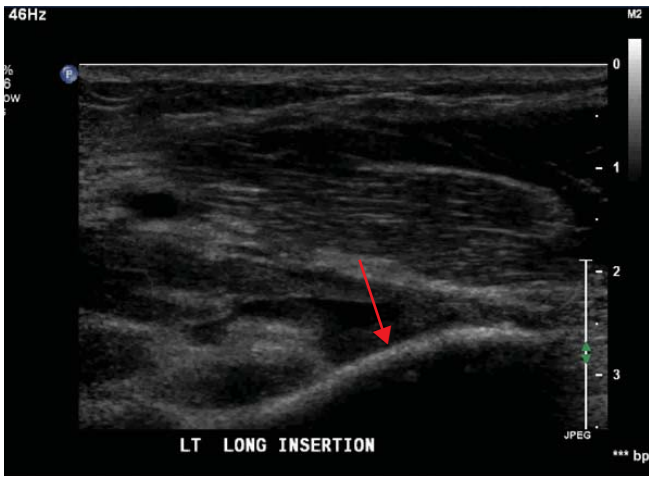

Fig. 18: Bare radial tuberosity following acute biceps brachii rupture.

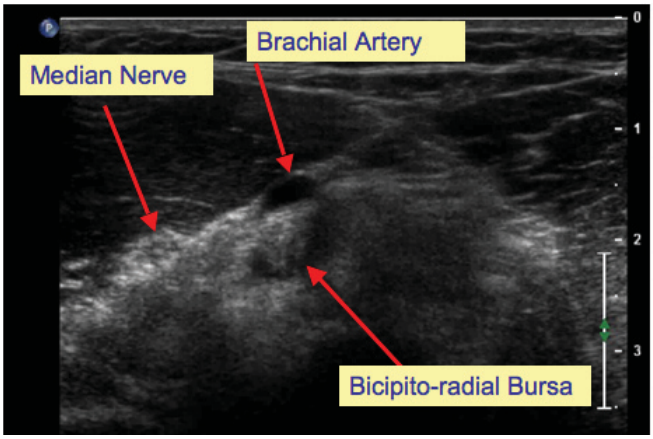

Fig. 19: Median nerve and brachial artery 'guarding' the bicipito-radial bursa.

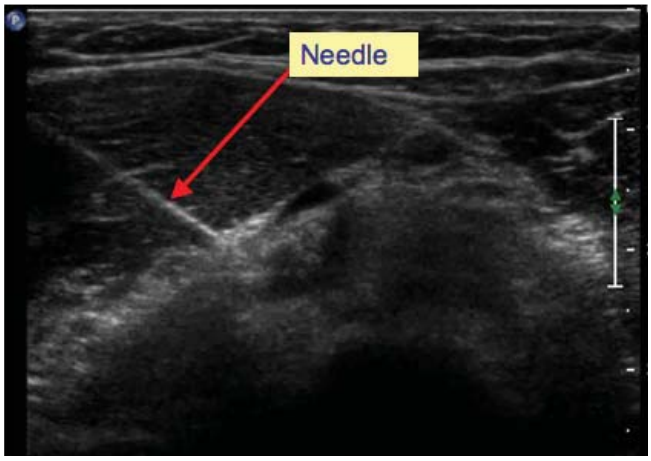

Fig. 20: Needle placement into the bicipito-radial bursa.

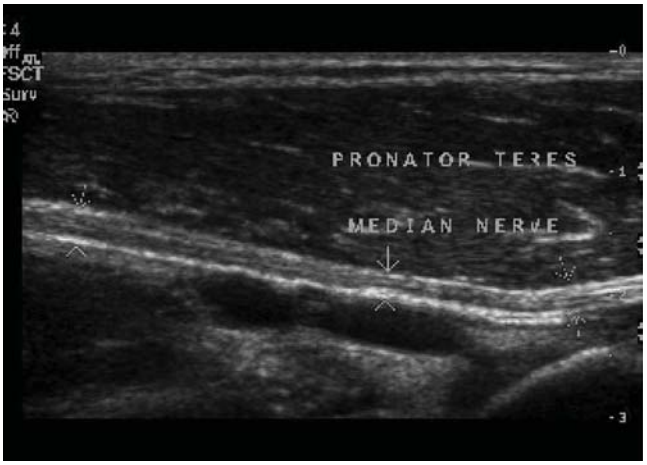

Fig. 21: Median nerve.

Partial avulsions of the tendon insertion from the radial tuberosity may be seen as fluid tracking beneath the proximal avulsed tendon, while distal fibres remain inserted and intact. Care must be taken not to misdiagnose the normal periosteal fibrocartilage appearance as fluid tracking between the tendon and the radial tuberosity enthesis. In cases of avulsion, fluid is invariably seen in the bicipito-radial bursa deep to the tendon which communicates freely between the avulsed tendon end and the enthesis. Real time assessment during supination and pronation of the forearm is most helpful to observe the fluid communication, as is provocative testing with resisted elbow flexion and supination (Fig. 17).

In the acute phase, complete rupture of the biceps brachii tendon results in a 'bare' radial tuberosity and adjacent fluid collection (Fig. 18). Chronic tears are often accompanied by clinical symptoms including pain during physical activity, weakness in flexion of the elbow, supination of the forearm and grip strength[3]. Sonographically a 'bare' radial tuberosity and wasting of the biceps muscle belly is evident.

Bicipito-radial bursa injection

The bicipito-radial bursa lies deep to the biceps brachii tendon and is in close proximity to the brachial artery and medial nerve. The anatomical position as well as the previously discussed imaging challenges make placement of steroid and local anaesthetic under ultrasound guidance difficult. The pronator teres acoustic window approach may be used to obtain high resolution images of the bicipito-radial bursa and biceps brachii tendon insertion. Rotating the transducer 90 degrees into the axial plane allows the bursa and tendon to be imaged in cross section. In this plane the location of the median nerve and brachial artery in relation to the bicipito-radial bursa are easily appreciated (Fig. 19). A needle path through the forearm musculature in this plane provides excellent needle visualisation and safe access to the bursa (Fig. 20).

Median nerve

Slight modification to the described biceps brachii insertion technique, produces excellent images of the median nerve as it passes between the heads of the pronator teres. This is the

most difficult portion of the median nerve to visualise due to the deep course taken through the antecubital fossa. It is also an important structure to examine as irritation of the median nerve may complicate bicipito-radial bursitis or biceps brachii partial tear[4]. To locate the median nerve, simply scan the biceps brachii tendon in the longitudinal plane and angle the transducer 5–10 degrees posterior. The pronator teres acoustic window will demonstrate the median nerve coursing deep through the proximal forearm in excellent detail.

Longitudinal and transverse images of the median nerve may be obtained through this acoustic window (Fig. 21).

Summary

The described angled approach through the pronator teres muscle belly provides high quality images of the biceps brachii tendon from the musculotendinous junction to the insertion. The bicipito-radial bursa and radial tuberosity periosteum are well visualised and with a slightly modified technique, the median nerve may be examined coursing through the antecubital fossa. Use of this technique greatly enhances the diagnostic confidence of sonography for assessment of the biceps brachii insertion and related structures.

Acknowledgement

Musculoskeletal Images are from the University of *Washington Musculoskeletal Atlas: A Musculoskeletal Atlas of the Human Body* by Carol Teitz, M.D. and Dan Graney, Ph.D.

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A prenatal diagnosis of holoprosencephaly using 2D and 3D ultrasound

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Introduction

Holoprosencephaly results from failure of the normal separation of the embryonic forebrain (prosencephalon) during the fourth to sixth week of gestation. At its most severe this results in the formation of a single ventricle and absent falx, and a spectrum of midline facial defects. The incidence is approximately 1: 10 000 births[1].

Causative factors include aneuploidy (most commonly trisomies 13 and 18), as in the case reported here; also teratogens, congenital infection such as toxoplasmosis and maternal diabetes. Chromosomal abnormalities represent one-third of cases[2].

Three types of the condition are recognised; alobar, semilobar and lobar holoprosencephaly with alobar being the most severe. Severely affected fetuses commonly die at birth or in the first few months.

Holoprosencephaly – definitions

The three types of holoprosencephaly are characterised by the degree of division of the prosencephalon.

Fig. 1 demonstrates the normal fetal brain.

Fig. 2 Alobar type. There is a single crescent shaped ventricle.

Fig. 3 Semilobar type. There is separation of the cerebral hemispheres in the occipital area. The occipital and temporal horns of the lateral ventricles are partly formed.

Fig. 4 Lobar type. The cerebral hemispheres are connected in the frontal area. There is mild ventricular dilatation.

Typical sonographic features of holoprosencephaly:

Alobar and semilobar features

1 Single crescent-shaped ventricle;
2 Fused thalami;
3 Absent midline brain structures (falx cerebri, cavum septum pellucidum, corpus callosum);
4 Mid-line facial abnormalities – most severe in alobar type (such as cyclopia); and
5 Absent third ventricle.

Lobar features

1 Fusion of lateral ventricles anteriorly;
2 Absent cavum septum pellucidum, corpus callosum;
3 Incomplete falx;
4 Incomplete interhemispheric fissure; and
5 Normal face or less severe anomaly (such as cleft lip)[2–4].

Other possible sonographic findings of holoprosencephaly include polyhydramnios, macrocephaly, microcephaly, intrauterine growth restriction, and reduced intraorbital distance.

Case review

A 36-year-old gravida 2, para 1 woman attended for her routine fetal anatomy scan at a country centre. When a complex cranio-facial fetal anomaly was diagnosed at this scan, she was referred to the Nepean Hospital's Perinatal Ultrasound Department where she presented at 19 weeks and 2 days gestation.

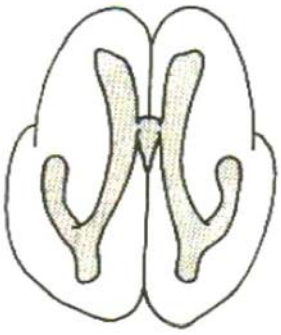

Fig. 1: Normal fetal brain

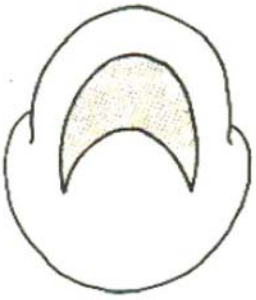

Fig. 2: Alobar type

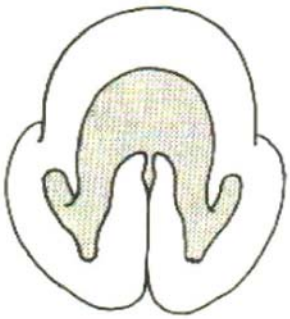

Fig. 3: Semilobar type

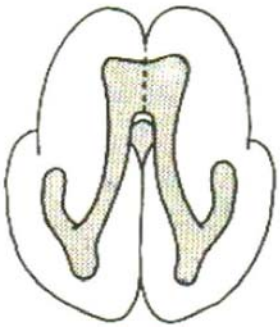

Fig. 4: Lobar type

Adapted from Romero *et al*[5]

Our ultrasound examination (2D and 3D) demonstrated several cranio-facial abnormalities including a single large cerebral ventricle/alobar holoprosencephaly, hypotelorism, prominent forehead and a flattened facial profile with a forehead proboscis. Other fetal structures appeared normal.

The patient was counselled and underwent an immediate uncomplicated amniocentesis. The fetus died spontaneously in utero five days later at 20 weeks gestation. Karyotyping after amniocentesis revealed trisomy 13.

Figs. 5–9 are scan images demonstrating the main findings.

Discussion – sonographic downfalls and tips

There are reports of diagnosis of holoprosencephaly in the first trimester from nine weeks gestation using transabdominal and transvaginal ultrasound[1].

Diagnosis depends on distinguishing this pathology from other conditions causing profound ventriculomegaly. The most significant sonographic finding in severe

Fig. 5: Single dilated crescent-shaped ventricle and fused thalami.

Fig. 6: Normal cerebellum and fused thalami.

Fig. 7: Measurement of proboscis in 2D.

Fig. 8: 2D facial profile. The proboscis is seen protruding from the flattened forehead. The nose appears to be absent.

holoprosencephaly is the single crescent-shaped ventricle with the crescent-shaped cortex seen anteriorly, and fused thalami posteriorly without the third ventricle between them. In ventriculomegaly there are always two separate lateral ventricles and the midline cranial structures are usually present.

Hydranencephaly may mimic holoprosencephaly. However, the finding of a crescent-shaped rim of cortex and mid-line facial anomalies are indicative of holoprosencephaly as opposed to hydranencephaly[2].

Antenatal diagnosis of lobar holoprosencephaly is difficult and unreliable as the absent cavum septum pellucidum (CSP) is subtle and is the only real feature[1,2].

The incomplete falx may be overlooked and isolated ventriculomegaly may be wrongly diagnosed. However, the absent CSP and flattened frontal horns are the hallmarks for lobar holoprosencephaly.

A large Dandy-Walker cyst can be confused with holoprosencephaly. However, there will be a normal supratentorial system seen with a true Dandy-Walker cyst[4].

If prenatal sonographic findings include a large crescent-shaped single ventricle and severe midline facial abnormalities, look for characteristics of trisomy 13 such as abnormal hands/feet, omphalocele and heart defects[4].

Holoprosencephaly may also occur with other syndromes such as Di George syndrome or campomelic dysplasia prompting a thorough search for multi-system anomalies.

Fig. 9: Surface rendered 3D facial profile.

Conclusions

Prenatal diagnosis of alobar and semilobar holoprosencephaly is possible with 2D and 3D ultrasound; it is more difficult to diagnose lobar holoprosencephaly confidently.

Holoprosencephaly may be diagnosed with ultrasound in the first trimester.

In this particular case study, the additional use of 3D ultrasound, specifically when imaging the fetal face, assisted in the explanation of the severity of the baby's condition.

Acknowledgement

An acknowledgement to David Fauchon, Mani Viswasm and Lesa Posa for their technical assistance.

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A twin pregnancy with a normal fetus and complete hydatidiform mole: an evolving diagnosis

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Introduction

Hydatidiform mole is the benign form of gestational trophoblastic disease characterised by marked trophoblastic proliferation and hydropic degeneration of the chorionic villi. Although rare, complete and partial moles can be found in association with a normal fetus in twin gestations occurring in 1 in 20 000 to 1 in 100 000 pregnancies.

A woman with a coexistent mole and fetus has a one-in-four chance of a live birth[1]. These pregnancies are at high risk of both maternal and fetal complications including preeclampsia, persistent trophoblastic disease, hyperthyroidism, theca lutein cysts, spontaneous miscarriage, intrauterine death and preterm labour.

The presenting symptoms of a complete mole and a coexisting fetus (CMCF) are similar to those of a singleton hydatidiform mole.

Patients typically present in the first and second trimester with intermittent vaginal bleeding, hyperemesis gravidarum, rapid uterine enlargement and markedly elevated b-hCG levels.

Sonographically, a complete hydatidiform mole in a twin pregnancy will appear as a normal fetus and placenta next to a complex echogenic intrauterine mass containing multiple cystic areas.

Fluid collections with irregular contours and thin walls may also be seen in addition to the small cystic spaces. Bilateral ovarian enlargement with theca lutein cysts has also been described[2].

The sonographic appearance of a molar pregnancy in the early first trimester may, however, be non-specific as demonstrated by this case. The majority of molar pregnancies in the first trimester may simply appear as either a missed abortion or anembryonic pregnancy. While, conversely, a non-molar abortion (miscarriage) may undergo hydropic change which may sonographically mimic the features of a hydatidiform mole[3]. The progressive sonographic changes in a case of CMCF occurring between initial presentation at 5 weeks 5 days gestation and diagnosis at 12 weeks are presented here for review.

Case history

Over the course of a six-week period a primigravida 21-year-old woman presented with ongoing vaginal bleeding, lower abdominal pain and increasing hyperemesis.

At each subsequent examination the embryo was seen to have normal growth and the ovaries to have a normal sonographic appearance. Figs. 1–7 illustrate the evolution of the diagnosis.

Fig. 1: 1st Presentation 5 weeks, 5 days.
Ultrasound findings: Transabdominal and transvaginal scanning identified a single embryo with a CRL of 2.2 mm consistent with a gestation of 5 weeks 5 days. No cause for p.v. bleeding was identified.
b-hCG = 28 085 (normal range 500–200 000).

Fig. 2: 2nd Presentation 6 weeks 1 day.
Ultrasound findings: A dichorionic-diamniotic twin pregnancy was identified on transvaginal scanning. The second gestational sac contained a lobulated avascular mass of uniformly echogenic material measuring 1.2 x 1.0 x 0.8.cm related to the developing placenta. Fetal elements could not be seen.
Diagnosis: An ongoing viable pregnancy with a coexistent degenerating failed gestation was considered the most likely diagnosis. A complete hydatidiform mole was not considered as a possible differential diagnosis.
b-hCG = 46 325 (normal range 500–200 000).

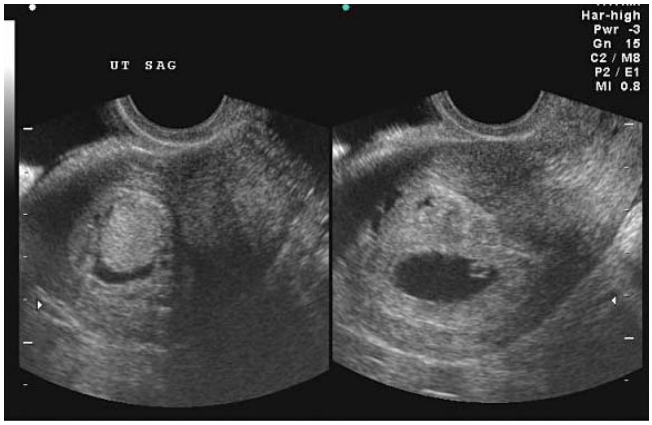

Fig. 3: 3rd Presentation 6 weeks 6 days.
Ultrasound Findings: The second gestational sac appears irregular in outline. The rounded hyperechoic material had doubled in size and almost occupied the entire sac.
Diagnosis: Unchanged from the previous examination.
b-hCG 92 844 IU/L (normal range 500–200 000).

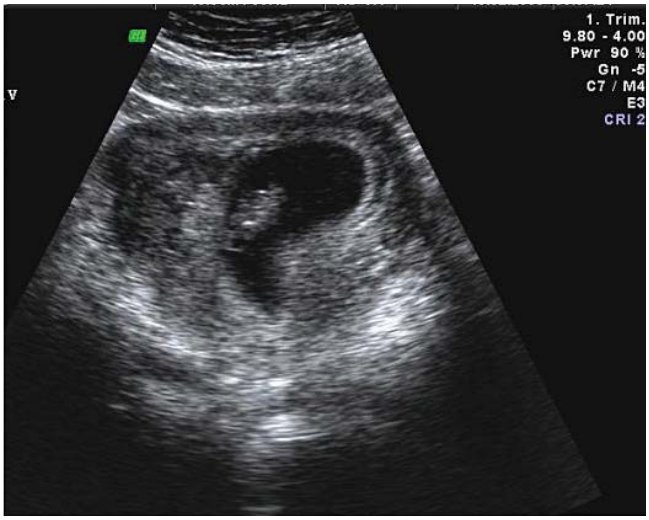

Fig. 4: 4th Presentation 8 weeks 4 days.
Ultrasound findings: The 2nd gestational sac was poorly visualised. The sac borders were ill defined and it appeared to be filled with material of mixed echogenecity (arrow). b-hCG not recorded.

Fig. 5: 5th Presentation 9 weeks 4 days.
Ultrasound findings: The area of mixed echogenicity could be seen adjacent to the gestational sac containing the viable fetus.
Diagnosis: A resolving haematoma with areas of recent haemorrhage.
b-hCG recorded at 9 weeks 2 days 193 894 IU/L
Not available at time of the scan (normal range 10 000–100 000).

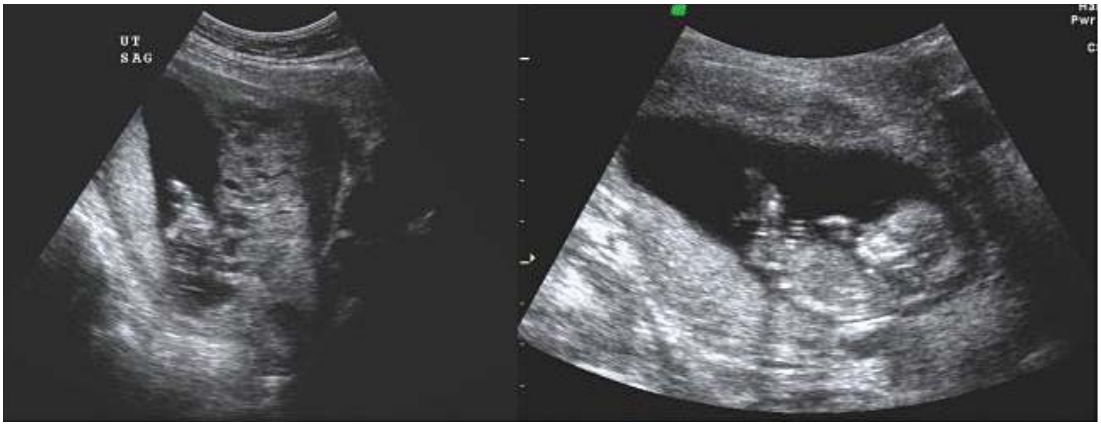

Fig. 6: 6th Presentation 12 weeks 1 day.
Ultrasound Findings: Anteriorly and to the right of the normal fetus and placenta is a mass of hyperechoic tissue interspersed with anechoic spaces of varying sizes. The mass measured 6.9 x 5.2 x 4.6 cm.

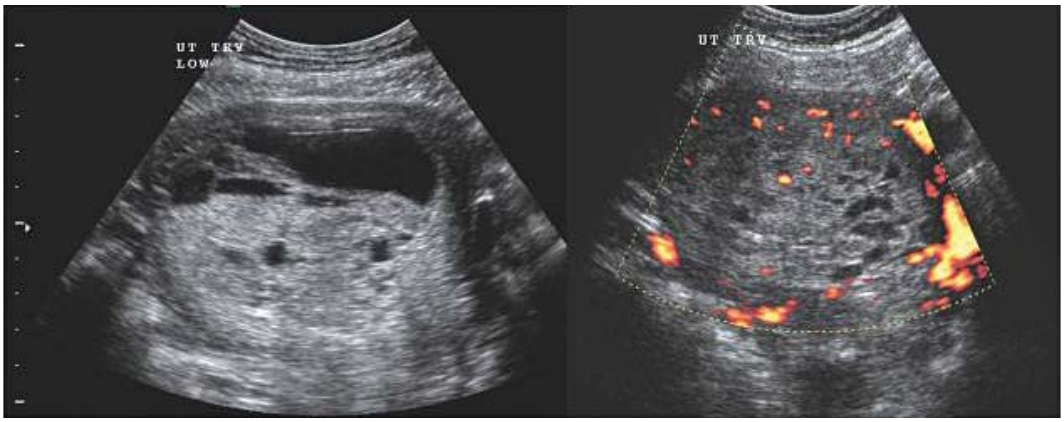

Fig. 7: Transverse scans though the complete mole with colour Doppler demonstrating vascularity.
Diagnosis: Complete hydatidiform mole with a coexistent fetus. b-hCG 537 668 IU/L (Normal Range 10 000–100 000) The serum bHCG reached a peak of 561 044 units recorded at 12 weeks 3 days gestation. Over the course of 3 weeks the serum bHCG declined to normal. After counselling the patient elected to terminate the pregnancy.

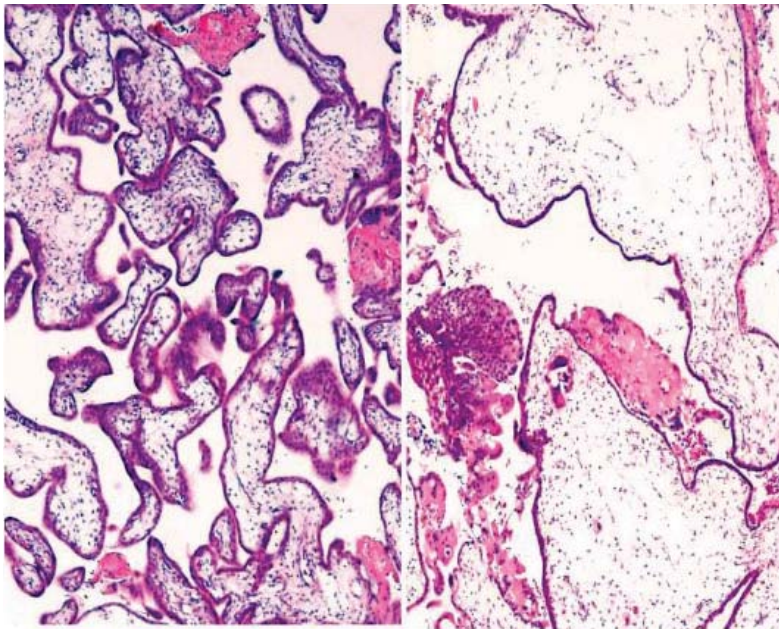

Fig. 8: Histopathology confirmed the ultrasound diagnosis of a complete mole with a coexistent first trimester placenta and fetus.

Discussion

A complete hydatidiform mole with a coexistent live fetus is a rare entity. The majority of these pregnancies result from dizygotic dichorionic twinning and can be differentiated from a partial mole by identifying a normal fetus and normal placenta. The clinical management is complex, and prognosis poor. The fetal loss rate is estimated at approximately 60%, while severe maternal complications occur in 10% of cases. The risk of persistent trophoblastic disease is markedly increased with CMCF ranging from 20–50% of cases[1]. In this setting the diagnosis should be both accurate and timely.

The symptoms of hydatidiform mole are however essentially non-specific in the first trimester. Ultrasonography in conjunction with b-hCG levels which exceed those of normal pregnancy are crucial to facilitating an accurate diagnosis. While markedly elevated b-hCG levels may suggest complete hydatidiform mole it is not reliable enough in twin pregnancies where b-hCG levels can be significantly but normally elevated[4].As demonstrated by this case the typical sonographic features of hydatidiform mole may not be apparent in the early first trimester. Transabdominal ultrasound was unable to demonstrate the hydropic villi as cystic spaces until the 12th week of gestation, when the b-hCG was also abnormally elevated.

The initial transvaginal examination at 5 weeks only identified the viable embryo.

The examinations at 6 weeks 1 day demonstrating a uniformly hyperechoic mass projecting into the gestational sac from the placental surface and the subsequent scan at 6 weeks 6 days showing increase in mass size, have features consistent with a failed gestation and associated hemorrhage/clot.

When correlated with the b-hCG levels the initial diagnosis of a viable pregnancy with a coexistent degenerating failed gestation would seem to account for the patient's symptoms. In retrospect the hyperechoic mass is thickened hydropic trophoblast[5]. The subsequent transabdominal scans at 8–9.5 weeks appeared to confirm the initial diagnosis. It is arguable whether transvaginal scanning at the examinations at 8–9.5 weeks may have revealed the characteristic sonographic features of a hydatidiform mole.

The incidence of theca lutein cysts identified in conjunction with complete moles ranges between 20 and 60%[6]. Theca lutein cysts are seen infrequently in the first trimester with complete hydatidiform moles. They are more readily seen in the second trimester as the ovaries respond to the markedly elevated levels of b-hCG. Theca lutein cysts were not identified at any time throughout the entire series of scans in this case.

Conclusion

Ultrasound can identify complete hydatidiform moles existing with a normal pregnancy. The hydatidiform changes are often less marked in the first trimester, exhibiting features which are indistinguishable from a missed abortion. Studies performed by Lazarus[6] and subsequently confirmed by Benson[2] reviewed the ability of ultrasound to detect histologically confirmed hydatidiform moles. Both concluded that the majority (72–82%) of complete hydatidiform moles demonstrated a typical appearance but that diagnostic accuracy declined in very early gestations. An empty sac, or one containing complex material should be viewed with a degree of suspicion even when found coexisting with normal fetus and placenta.

As demonstrated in this instance clinical review of the patient symptoms, correlation with b-hCG and serial ultrasound eventually led to an accurate diagnosis.

Acknowledgements

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CASE REVIEW

Cornelia de Lange syndrome: the value of 3D and 4D ultrasound

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Introduction

Cornelia de Lange Syndrome (De Lange Syndrome, Brachmann de Lange Syndrome) is a genetic disorder in which most cases occur sporadically. It is characterised by pre- and post-natal symmetrical growth retardation, craniofacial abnormalities, limb abnormalities, diaphragmatic hernias, genitourinary features, cardiac anomalies, severe mental retardation and hirsutism. The main craniofacial features include microbrachycephaly, micrognathia, anteverted nostrils and long philtrum. Flexion contractures of the elbow are present in approximately 80% of cases and 20% of cases demonstrate severe upper limb anomalies (Fig. 1)[1–3].

Clinical background

A 28-year-old gravida 1 para 0 had a fetal anatomy scan performed at a rural centre that identified limb abnormalities at 18 weeks 4 days of gestation by the last normal menstrual period. She was referred for a tertiary review at Nepean Hospital and was re-scanned at 19 weeks 1 day with a GE Voluson 730 Expert using 2D, 3D and 4D imaging. This scan identified the following:

- Fetal size equivalent to 17 weeks 4 day gestation suggestive of intra-uterine growth restriction;
- Bilateral shortening and absence of a radius or ulna in the forearms (Figs. 2 and 3);
- Absence of hands bilaterally;
- Micrognathia (Fig. 4);
- Long philtrum (Fig. 4); and
- Flexion contractures of the elbows.

Later that day, she was counselled in the Genetics Department where the diagnosis of Cornelia de Lange syndrome was suggested and a decision was made to terminate the pregnancy. An autopsy was agreed to after the procedure in the hope of a more definitive diagnosis for the risk of future recurrence.

The autopsy findings supported the sonographic findings. It also revealed a small membranous ventricular septal defect, bicuspid aorta, minor gastrointestinal anomalies, brachycephaly and a left foot containing four metatarsals and hypoplastic phalanges. The left arm was found to have a single shortened forearm bone with the presence of a single metacarpal and digit with a fingernail.

The patient returned seven months later with a subsequent pregnancy for nuchal translucency screening and later for a fetal anatomy scan. These revealed low risk for trisomy 21 and trisomies 18/13 and a structurally normal fetus. Fig. 5 demonstrates 3D images comparing this fetus with the previous Cornelia de Lange fetus.

Discussion

Cornelia de Lange syndrome has proved in the past to be a difficult diagnosis to make by prenatal ultrasound[4]. However, the frequency in prenatal diagnosis of facial anomalies and skeletal malformations is likely to increase with the rapid

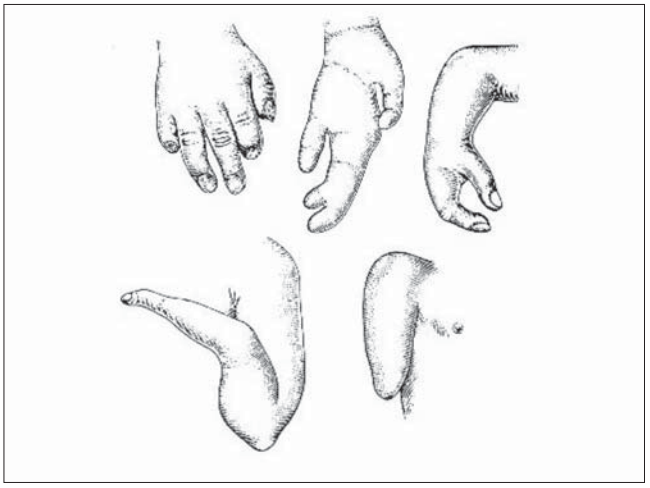
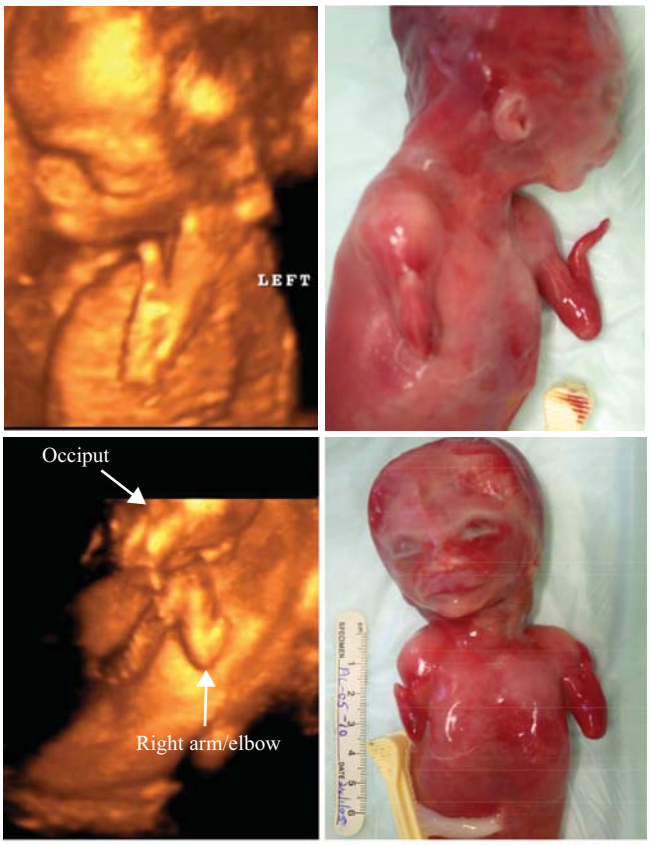


Fig. 1: Examples of various types of malformed upper limbs found **in** de Lange syndrome. (From JM Berg *et al.* The de Lange syndrome. Oxford: Pergamon; 1970**)**.



Figs. 2 and 3: Shortening and absence of a radius or ulna in the forearms.

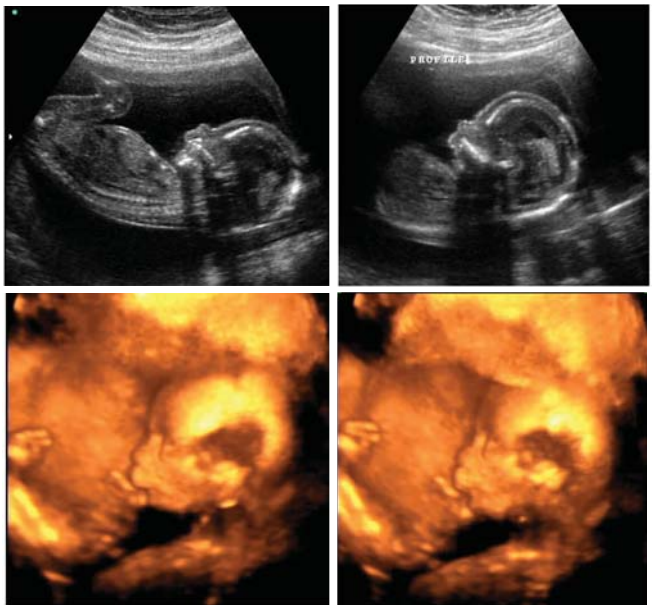


Fig. 4: Micrognathia.

improvement of 2D ultrasound and the development and increased use of 3D and 4D ultrasound[5].

The current literature comparing the diagnostic performance of 2D versus 3D ultrasound for the diagnosis of congenital anomalies has not provided conclusive results[5]. When used with 2D ultrasound, 3D ultrasound improves the detection rate of a wide range of anomalies[6]. This case is an example of the benefits 3D and 4D ultrasound add, in the sonographic detection of limb and facial abnormalities and the counselling of the expectant parents.

The fetal face is the most frequently documented structure using 3D ultrasound[6]. When an adequate 3D volume of the face is obtained, the reconstructed image can be rotated and manipulated using the multiplanar function in conjunction with the rendered display to better demonstrate the area of interest[5]. This application is most commonly used to improve visualisation of clefts of the lip and palate[6]. In this case, the use of 3D imaging, primarily the rendered display, assisted in the diagnosis of micrognathia and a long philtrum when demonstrated in conjunction with the 2D profile images as demonstrated in Fig. 4.

The examination of the fetal limbs was also made easier with the use of 3D and 4D ultrasound. As demonstrated in Fig. 6, the 2D images of the limb anomalies are very difficult to appreciate compared to the 3D images. Furthermore, the use of 4D ultrasound in the patient's following pregnancy, improved the visualisation of the normal free moving elbows and ruled out elbow flexion contractures.

When counselling the parents, the 3D and 4D ultrasound played a valuable part in describing the anomalies encountered. It also provided a reduced level of anxiety in the patient's subsequent pregnancy when she was shown a 3D image of her normal baby (Fig. 5). Most patients and people with non-sonographic background have great difficulty in comprehending 2D ultrasound images. A better understanding of both normal and abnormal surface anatomy is gained when it is illustrated by 3D ultrasound images. This enables more objective and focused counselling, and allows specialists to explain management more effectively.[6]

3D ultrasound has been reported as offering a significant diagnostic advantage in detecting fetal anomalies when used

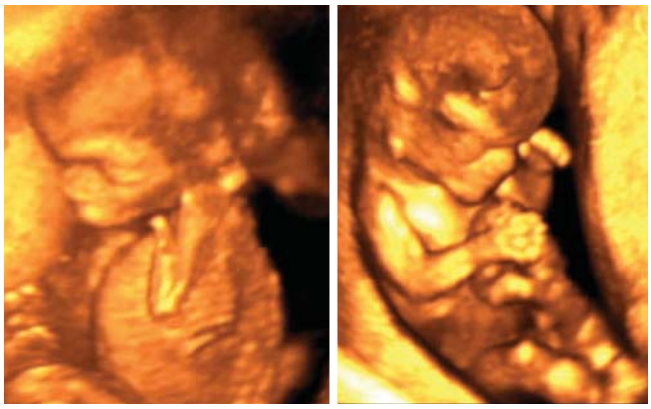


Fig. 5: 3D images comparing structurally normal fetus with the previous Cornelia de Lange syndrome fetus.

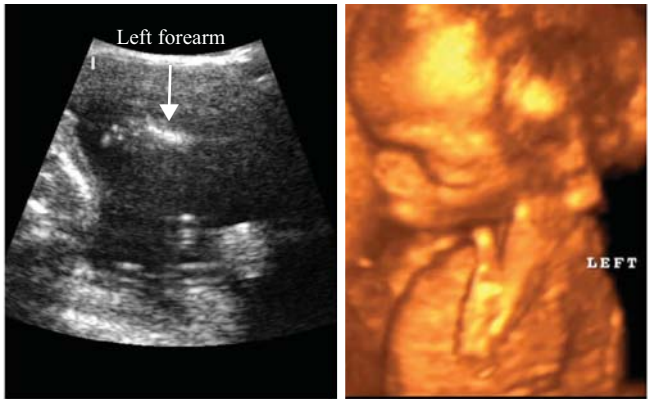


Fig. 6: 2D ultrasound (left) and 3D demonstrate superior images of anomalies.

with traditional 2D ultrasound imaging[6]. Our department has also found 3D and 4D ultrasound to be a beneficial addition to 2D ultrasound imaging. This case in particular has highlighted the benefits in both diagnosis and counselling.

Acknowledgement

This was the prize winning poster at the 2006 ASUM Annual Scientific Meeting in Melbourne.We would like to thank Mani Viswasam for assistance in gathering the information.

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General Ultrasound in the Critically ill

Authors Daniel Lichtenstein, M.R. Pinsky and F. Jardin
Publisher Springer
Year 2004
ISBN 3540208224
Price $A210.00

This 189-page hard cover text makes for interesting and, at times, thought-provoking reading. Daniel Lichtenstein MD, from France, is described in the two forewords to the book, as 'an intensivist and physician-sonographer' and 'one of the leaders in the field'.

Lichtenstein describes the book as having the dual purposes of describing 'the fullest exploitation possible of general ultrasound in the intensive care unit' and helping to 'popularise a method that remains obscure to those who have never used it'. The text is therefore aimed at radiologists who may be involved in the emergency medicine setting, intensivists and emergency medicine physicians. In countries such as Australia and New Zealand, the book is also applicable to sonographers working in acute care hospitals. Both the clinical applications of ultrasound techniques in the critically ill and the rationale/philosophy of ultrasound performed by critical care physicians are well discussed and appear to be supported by the author's extensive experience and own research.

Three separate sections are included. *Part I Generalities* consists of four brief chapters; *Basic Notions*, which is a very limited description of the basics of ultrasound imaging; *The Ultrasound Equipment*, which is a brief, somewhat quirky in places, description of basic equipment; *Specific Notions of Ultrasound in the Critically Ill*, is an interesting five pages on the advantages and disadvantages of scanning the critically ill patient and provides some insights into specific features of this area of imaging, such as indications for the ultrasound examination; and last a very brief, scantily illustrated chapter *General Ultrasound: Normal Patterns*. In this last chapter of the section, Lichtenstein indicates that the term 'general ultrasound' is usually understood to mean 'abdominal ultrasound' and indeed this chapter is an overview of the basic, normal ultrasound appearance of the main organs of the abdomen. The rest of the book, however, uses the term 'general ultrasound' to have a much broader scope than this and includes an almost 'whole of body' approach.

At 18 chapters and 127 pages the *Part II: Organ by Organ Analysis* section forms the major part of the text and includes some very interesting information on the applications, advantages, disadvantages and limitations of ultrasound in a diverse range of situations. The chapters cover all areas of the abdomen, including the peritoneum and retroperitoneal space; the venous system including upper extremity central veins, IVC, lower limb veins; the mediastinum; general ultrasound of the heart; head and neck; and soft tissues in various areas of the body. Four chapters are devoted to ultrasound techniques in the lung: pleural effusion, pneumothorax, diseases of the lung tissue and disorders of the diaphragm. The chapter *Lung Ultrasound Applications* presents some of the clinical potentials of applying what the author calls 'the seven principles of lung ultrasound'.

Part III: Clinical Applications of Ultrasound discusses the application of ultrasound in specific settings or situations. Included are chapters such as: *Ultrasound in the Surgical Intensive Care Unit (ICU); Ultrasound in Trauma; Emergency Ultrasound Outside the ICU; Interventional Ultrasound*; *Emergency Ultrasound and Antibiotic Therapy*; *Learning and Logistics of Emergency Ultrasound*; and *Ultrasound, a Tool for Clinical Examination*. This section makes for interesting reading and offers a different perspective on the use of ultrasound in many situations to that found in standard ultrasound texts written for sonologists and sonographers. The final chapter *Concluding Remarks* offers a discussion of the role, value and applicability of ultrasound in the critically ill patient.

Overall, this is a very interesting text, however, a major criticism is the quality of some of the images which have all been obtained using quite old equipment. Lichtenstein justifies this by indicating that he would prefer to 'keep characteristic figures, as a clinically contributive image is definitely better, in the emergency, than the sophisticated image dear to the imaging specialist'. Indeed there may well be other aspects of the text and its philosophy that the imaging specialist may object to, but I thought there were many interesting aspects and much to be learned from this book.

I would recommend the book to anyone working in an acute care setting with a busy emergency department and all those involved in teaching general sonologists and sonographers, and emergency medicine physicians.

Margo Gill

Textbook of Diagnostic Ultrasonography 6th Edition, Vols 1 & 2

Editor/Author Sandra L Hagen-Ansert
Publisher Mosby Elsevier
ISBN 13 9780323028035, ISBN 10 3323028039
Approximate cost $A425.00 inc GST

This text was first published in 1978 and has since been widely used by those training in ultrasonography. The sixth edition is an extensive text and includes new chapters on physics, contrast agents in abdominal applications, ultrasound-guided interventional techniques, emergency abdominal scanning, musculoskeletal system, neonatal hip/spine, female infertility and 3D/4D evaluation of fetal anomalies.

Sandra Hagen-Ansert and 18 contributors have covered all aspects of sonography in a thoroughly comprehensive manner, explaining that 'the primary goal of the text is to serve as an in-depth resource for students studying sonography as well as a reference for experienced practitioners'. The chapters cover sonographer technique including practical instructions on patient history taking, patient positioning, protocols and probe manipulation and orientation.

Each chapter is laid out with learning objectives, chapter outlines, key terms and definitions. This makes it very easy for the reader to find the information they are looking for. The sonographic examination details follow on from the sections on anatomy, physiology, laboratory data, pathology and numerous tables and charts with a distinctive sonographic findings icon. Over 3000 illustrations are included and there are many new full color illustrations, high quality ultrasound images and gross pathology photos.

The chapter on musculo-

skeletal (MSK) ultrasound is limited, reflecting the use of ultrasound for MSK in the USA. Shoulder, wrist and Achilles regions have been covered with general MSK technique and artefacts outlined. Although not covering other regions, it has practical instructions for examining the musculoskeletal system and provides the trainee with a good start in MSK.

This is an excellent text for trainee sonographers and a very good practical addition to any department. The chapters are clearly laid out and a workbook to accompany the text is also available.

Glenda McLean
Tutor Sonographer
Monash Medical Centre

Handbook of Early Pregnancy Care

Editors Thomas H. Bourne and George Condous
Publisher Taylor & Francis
ISBN 1842143239
Approx cost $A120

While this book is succinct and informative, editor Condous' chapter on what to do when you cannot see a pregnancy, which you suspect is there, is worth the book's price alone.

The concept of pregnancies of unknown location (PUL) is one we should accept and bear in mind before we assume an empty uterus is due to a complete miscarriage.

The point is made that complete miscarriage is not diagnosable by ultrasound. A serum hCG must be done to exclude an ectopic pregnancy. The rare case of the patient with an earlier scan in the pregnancy, confirming an intrauterine gestation, who a week later has an empty uterus, might be the exception to that rule.

Ectopic pregnancy is important enough to claim six out of the 16 chapters. There is an excellent chapter by Kirk on expectant management of ectopic pregnancy, with emphasis on the strict criteria to be fulfilled before embarking on that route. Surgical management is also well reviewed by Istre.

Bottomley's chapter on caesarean scar pregnancy reminds us that with increased caesarean section incidence, we will see more of these and if suspected, referral to a specialist centre may save a life.

I strongly recommend that every ultrasound clinic where pregnant women are seen should have a copy of this book and it should also be required reading for radiologists and obstetricians in training.

Ron Benzie
Professor
Nepean Hospital

ASUM 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, Toshiba's 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.

The Giulia Franco Teaching Fellowship will focus on major city centres.

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SONOGRAPHER REGISTRATION WORKING PARTY

Sonographer registration will happen –
Help us to make it happen on our terms

What the current accreditation system means

Since 2001, the Australasian Sonographer Accreditation Registry (ASAR) has been the body for accreditation of sonographers in Australia. This involves:

- Assessing and evaluating education and training courses and institutions to uphold standards and consistency of sonographer education and training; and
- Ensuring sonographers meet the required level of expertise and maintain that level via mandatory continuing professional development (CPD).

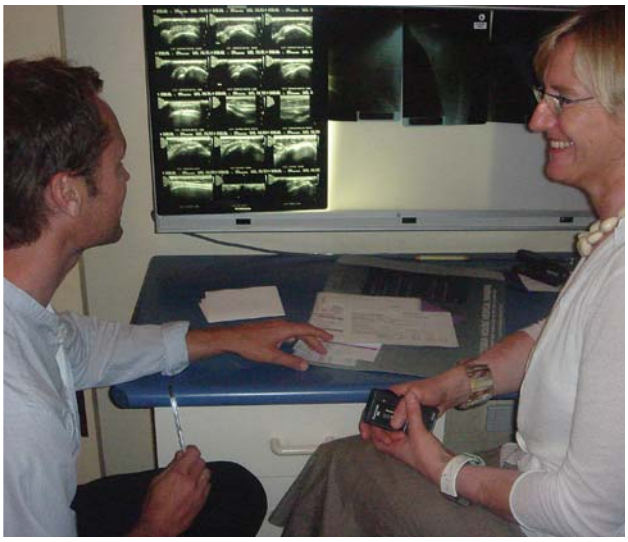
The Sonographer Registration Working Party, comprising representatives of all professional associations and stakeholders – ASAR, ASUM, ASA, AIR, and CSANZ – has been formed to work towards developing a national sonographer registration board.

What future national Sonographer Registration would mean for you and the ultrasound profession

- Offers protection to patients and the community by assuring the quality and safety of ultrasound service provision by registered sonographers;
- Enhanced accountability of practitioners in ultrasound;
- Avoids the multiplicity of state based registration boards and their associated fees, thus facilitating interstate work opportunities;
- Uniform national standards – assessment of character and fitness to practice;
- Recognition of sonography as an allied health profession; and
- Protection of the title 'sonographer'.

All enquiries may be addressed to the ASUM representative, Ros Savage, via email srwp@asum.com.au

2006/2007 CADUCEUS Scholarship Australian Visit



Left: Morten Boesen, Cheryl Bass and Gary Zimmerman, scanning at the Tennis Open, **Right:** Morten Boesen and Cheryl Bass hard at work.

From December 2006 to January 2007, Victoria House Medical Imaging was lucky enough to host the CADUCEUS Exchange Program Scholarship winner, Dr Morten Boesen. The CADUCEUS scholarship is a joint creation of the ASUM and the Danish Society for Diagnostic Ultrasound (DSDU) to share knowledge and promote the worldwide excellence of ultrasound practice.

Morten Boesen is the third person to be awarded this honour. He follows in the footsteps of his Danish colleague, Christoffer Brushoj, who visited us last year and the Australian sonographer, Mary Langdale, who travelled to Denmark in late 2006 to share her ultrasound knowledge with the Danes.

Morten is medically qualified and on his way to becoming an orthopaedic sports surgeon. He is currently writing his PhD under the guidance of Dr Soren Torp-Pedersen on the diagnosis and treatment of Achilles tendinopathies. He is also the team doctor of the largest soccer club in Demark (F.C. Copenhagen).

Morten came to us with considerable experience in musculoskeletal ultrasound, but found the practice of ultrasound in Australia very different to what he was accustomed to in Denmark. In Australia, highly qualified and experienced sonographers perform the initial scan on most patients and produce a series of images that form the basis of review and discussion with the radiologists. In Denmark, there are no sonographers, nor are films taken in his practice. There, the doctor does all the scans and there are no pictures to review. Morten immediately appreciated the advantages of using sonographers and has taken home the thought of instigating a Danish sonographer training program.

Cheryl Bass, Frank Burke, Mary Langdale and Stephanie Pritchard on the latest Danish visitor under the CADUCEUS program

Ultrasound at Victoria House Medical Imaging is a bit of a cornucopia and Morten loved the variety. He was impressed by the many different pathologies, the detailed scanning techniques, and how much information was obtained from each scan. He was a quick learner and his cheerful attitude meant our patients were very willing to assist him and wanted to know all about him. And before you ask, no, he has not met Princess Mary.

Because of Morten's interest in sports medicine, physicians Dr Gary Zimmerman and Dr Peter Larkins made him welcome in the sports medicine clinic. Morten really appreciated sitting in on their consulting sessions and the opportunity to go with Gary, who is the Western Bulldogs team doctor, to one of their training sessions.

Morton was also able to spend a day and naturally some part of the night with David Young, one of the orthopaedic surgery legends in Melbourne.

During the Australian Tennis Open, Morten, having represented Denmark in Badminton, with his brothers, was very keen to be involved in our ultrasound service for the players in the medical centre underneath the Rod Laver Stadium. Tim Wood, Tennis Australia's doctor, sponsored Morten to receive a visitor's pass. Morten was very excited and spent a very happy day seeing players with Gary Zimmerman and Dr Peter Larkins. Unfortunately, on that day the Ultrasound machine was not needed, so he only got to scan the ball.

Morten also spent a week in Sydney. Robyn Tantau, sonographer, was very helpful in assisting him in placements for his stay. He visited Dr John Read, musculoskeletal radiologist, Prof George Murrel, orthopaedic surgeon and Nathan Gibbs, physician.

Nathan befriended Morten, organising among other things, a special guided tour inside the Opera House with his brother in law. And just to ensure that Morten didn't think that Victoria was the only state that played Aussie Rules, he took Morten to a Sydney Swans' training session.

As well as being the acronym for Australia's and Denmark's ultrasound exchange program, CADUCEUS is an ancient astrological symbol, a symbol with complex interpretations; the simplest expresses that life is about maintaining a healthy balance.

Morten was certainly able to

Left: Two CADUCEUS fellows, Mary Langdale and Morten Boesen, chat together at Victoria House Medical Imaging, **Right:** Morten Boesen(CADUCEUS Fellow) with the team from Victoria House Medical Imaging; Stephanie Pritchard, Cheryl Bass, Frank Burke, Mary Langdale, Morten and Ross McKellar (Musculoskeletal Imaging Fellow).

achieve this. On his visit, Morten's wife, Camilla and gorgeous three-year-old daughter, Ulrikka, accompanied him. In addition to Morten's heavy work schedule, he and his family made the most of every opportunity to explore Melbourne and Sydney. Melbourne turned on a hot few days for their six-week visit and I think Ulrikka's favourite place was the Prahran Swimming Pool. Morten is a delightful person and we thoroughly enjoyed having him at Victoria House Medical Imaging and wish him well for the future.

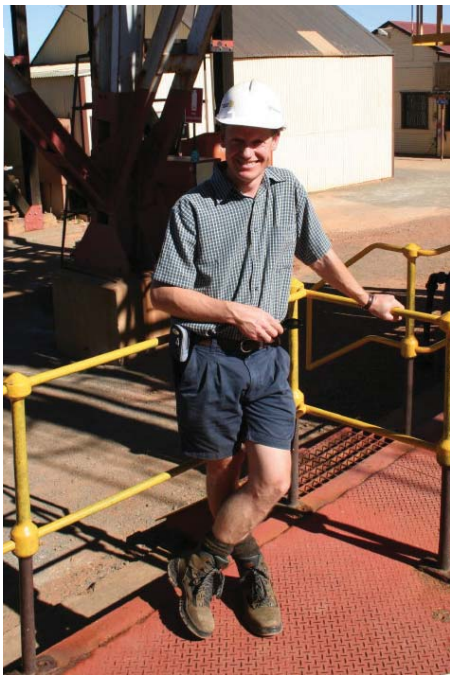
CADUCEUS: Collaborative Australasian Danish Undertaking for Continued Excellence in Ultrasound

Expressions of interest in the CADUCEUS Scholarship should to be directed to the ASUM CEO, Dr Caroline Hong, by email to carolinehong@asum.com.au

The CADUCEUS scholarship and exchange program has been possible as a result of a Memorandum of Agreement which was signed on 8th April 2005.

The signatories were Dr David Rogers and Dr Caroline Hong on behalf of the Australasian Society For Ultrasound In Medicine (ASUM) and Dr Christian Nolsøe and Dr Michael Bachmann Nielsen on behalf of the Danish Society For Diagnostic Ultrasound (DSDU).

2006 Giulia Franco Teaching Fellow strikes Gold in outback WA



Forging ahead; Stephen Bird takes time out from his whirlwind WA tour with the Giulia Franco Teaching Fellowship.

Mr Stephen Bird was the recipient of the 2006 Giulia Franco Teaching Fellowship, kindly supported by Toshiba. Stephen toured Western Australia with his top notch presentations, starting his week of teaching lectures in Perth on 24th March 2007. The flavour of the trip was definitely musculo-skeletal (MSK) ultrasound and Stephen was able to demonstrate his technique for imaging the biceps brachii insertion, among other topics.

The Perth session was well received by all who attended. The workshop was kept small, with the 25 attendees representing all the major practices and teaching hospitals in Perth. The program was didactic in nature, combining lectures with two hands-on live scanning sessions. The topics covered included the *Elbow*, *Upper Limb Neuro* and *Difficult Areas in MSK Ultrasound Demystified*.

A Toshiba Aplio, kindly loaned by Royal Perth Hospital, performed beautifully and was used in the two scanning sessions of the day. Participants were reluctant for the day to end and Stephen was still lecturing an hour after the expected finish.

Following the session, Stephen commenced his 2000 km journey around the lower half of the state.

Stephen Bird tours outback WA for the Giulia Franco Teaching Fellowship

Bunbury was his second stop and he was worked hard there, providing 12 sonographers with a day of lectures, covering another didactic program of live scanning and lectures that included *Shoulder*, *Elbow and Basic Arm Neurology*, *Groin and Hip*, *Ankle*, *Calf* and *Difficult areas in MSK*.

The next stop in the tour was further south in Albany. The venue for the evening lecture was the Albany Regional Hospital where Stephen met twelve sonographers and medical imaging technologists, some of whom had made the trip to Albany from surrounding towns. Then it was on to Esperance. Stephen made his final stop of his trip in Kalgoorlie, 600 km North East of where he had started in Perth six days previously.

Stephen presented some wonderful lectures in Kalgoorlie Hospital's Medical Imaging Department on Thursday evening, covering the elbow, wrist and shoulder. We also welcomed him into the department on Friday, where he demonstrated his skill with the ultrasound transducer, providing hands on workshops for sonographers, among the bustle of the department.

Stephen was given a day's reprieve to do a bit of sight seeing in and around Kalgoorlie prior to catching the train back to Adelaide.

During this time, he was caught panning for gold and striking it lucky – it is doubtful that he will be able to retire on the basis of his gold find, but we would welcome him back to try his luck in the Goldfields again.

Stephen may not have had a huge amount of success with the gold panning but for all those who attended his lecture series certainly did strike gold. He has demonstrated an unwavering passion for ultrasound and a great wealth of knowledge in musculo-skeletal ultrasound, which he has shared among the WA attendees with an infectious enthusiasm.

Important notice
DMU Pass 2007
ASUM Council awarded Merrin Jackson (NSW) a DMU (Vascular) on 3rd March 2007.

CCPU Report

The Certificate in Clinician Performed Ultrasound (CCPU) was developed in response to the demand for credentialling, certification and established standards of practice for clinicians who use ultrasound at the point of care.

The ASUM Council feels it is important that education and training be provided for this particular form of ultrasound examination. Limited diagnostic point of care imaging has undergone marked proliferation in recent years and is different in depth and scope when compared to referred diagnostic ultrasound examinations. ASUM, together with a number of colleges and professional associations, has introduced the CCPU to provide credentials by which medical practitioners can demonstrate that they are appropriately trained in the protocols and standards of practice relevant to this particular form of ultrasound examination.

A special class of ASUM membership has been created, the Clinical Affiliate.

Candidates may join ASUM as a full Medical Member or as a Clinical Affiliate.

The program is currently open to fellows or registrars in the second or subsequent year of their training program of the:

- Australasian College for Emergency Medicine (ACEM);
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG); and
- Royal Australasian College of Surgeons (RACS) and all clinicians who have completed the FAST/AAA Module.

A number of colleges, societies and associations are currently in discussion with the ASUM Council regarding proposals to extend the CCPU to other specialty areas. It is planned to extend the CCPU to include rheumatology, rural and remote general practice, anaesthesia and intensive care medicine, military medicine and several of the surgical subspecialties, including breast and endocrine surgery, colorectal surgery, and trauma surgery. Fellows and Registrars in other specialist disciplines may be admitted at the discretion of the ASUM CCPU Certification Board.

Education is currently offered through on-line modules and interactive courses. Accredited courses are also available from other providers. Full details of the requirements of the CCPU are available at: www.asum.com.au/ccpu.htm.

A brochure is being sent to Fellows and Registrars of the ACEM and RANZCOG that outlines all the ASUM CCPU courses on offer between July 2007 and June 2008.

Basic courses

In 2007, it is planned to run six basic courses in Sydney or Melbourne. (Course numbers are strictly limited due to the practical nature and places are subject to spaces available and sufficient registrations being received.) In the first half of 2008, eight basic courses are planned.

Advanced Courses

Four advanced courses are planned for 2007 and eight for 2008. In addition the three George Condous courses in Melbourne (20th and 21st July), Brisbane (22nd and 23rd July) and Sydney (28th and 29th July) on *Early Pregnancy & Gynaecological Scanning* have been approved as satisfying all the requirements of the CCPU (O&G) and CCPU (Emergency) Advanced Acute Pelvic Modules.

For further information refer to the ASUM Website http://www.asum.com.au or contact ccpu@asum.com.au.

ASUM Chris Kohlenberg Teaching Fellowships

Proudly sponsored by GE Healthcare

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

The Chris Kohlenberg Teaching Fellowships were 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.

MEMBERSHIP RENEWALS

Just a reminder to all our valued members, as at the end of this financial year (30th June 2007) all current membership with ASUM will lapse. We have endeavoured to mail out the subscription renewal notices late May. In the meantime, should you have any questions or concerns regarding your membership, please feel free to contact Marie Cawood at our office via email to srwp@asum.com.au

EARLYBIRD RENEWALS

Medical / Scientific / Sonographer members	$313.50* if paid by 30th June 2007
Associate members	$242.00* if paid by 30th June 2007
Trainee members	$242.00* if paid by 30th June 2007
Retired members	$104.50* if paid by 30th June 2007
Corporate members	$1155.00* if paid by 30th June 2007
Corresponding ordinary members	$203.50* if paid by 30th June 2007
Corresponding associate members	$154.00* if paid by 30th June 2007

*Inclusive of GST

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James Abbott 07 3343 9466
James.abbott@qldxray.com.au
www.qldxray.com.au

Siemens Ltd - Medical Solutions (Acuson)
Nick Kapsimallis 02 9491 5863
nick.kapsimallis@siemens.com
Marketing General Manager: Cameron Marcuccio
www.medical.siemens.com

Sonosite Australasia Pty Ltd (Portable Ultrasound)
Matthew Tucker 1300 663 516
matt.tucker@sonosite.com
www.sonosite.com

Symbion Imaging (Diagnostic Imaging)
Mark Mooney 02 9005 7702
mark.mooney@symbionhealth.com
www.symbionhealth.com

Toshiba (Aust) P/L Medical Division
(Toshiba)
Louise Archer 02 9887 8041
larcher@toshiba-tap.com
General Manager: Nick Swaan
www.toshiba.com.au

ASUM new members

NEW MEMBERS – JANUARY 2007

FULL (8)
Santina Ampt Vic
Samantha Brinsmead NSW
Angela Chua NSW
Richard Lennon NSW
Mohamed Patel NSW
Yasmin Tan NSW
Alec Welsh NSW
Grant Withey Qld

ASSOCIATE (36)
Ouzi Amouyal NSW
Jodie Boyd NSW
Belinda Buckley NZ
Mark Buczek WA
Mark Burrows NZ
Matthew Chapman SA
Suzi Chen Vic
Xue Chen NSW
Angela Currie WA
Lynda Duncan NZ
Amy Eaton WA
Suzanne Foley NSW
James Harley Vic
Glenn Hastings Vic
Sharron Inglis NSW
Samantha Jagiello WA
Phillip Jones NSW
Andrea Mays Vic
Shane McIntosh Qld
Natalie Pearton WA
Luke Pingel Qld
Carla Robertson NSW
Edwina Shakespeare Vic
Kristian Smith Qld
Melissa Smith NSW
Tenille St.Ledger Qld
Robert Starcevich WA
Helena Stewart SA
Pamela Thornton NSW
Radmila Tomanovic WA
Michelle Truong Vic
Ee Wee SA
Tamara Welsh WA
Jasmin Whinnett Qld
Toni Whiting NZ
Bridget Yule NZ

TRAINEE (3)
Anna Lee Vic
Roshini Nayyar NSW
Gregory Robinson NSW

CORRESPONDING (1)
Sarah Cutts UK

NEW MEMBERS – FEBRUARY 2007

FULL (10)
Jason Abbott NSW
Karmin Al-Khafaji Vic
Anthony Cross Vic
Susan Hastings Vic
Tanya McCahon NZ
Quyen Huu Nguyen NSW
Paul Shekleton Vic
Hardus Swartz NZ
Hasan Titiz Qld
David Walters NSW

ASSOCIATE (38)
Marcelline Arul Vic
Alicia Bartlett Qld
Kirsten Black Vic
Ruth Bollard Vic
Leanne Boulton Vic
Anita Boyd NSW
Lindsay Bridgford Vic
Naomi Buckland Vic
Bianca Crane WA
Brendan Cullinane Qld
Bowbona Czyszek Vic
Mark Davis NSW
Debbie Edwards Qld
Rhonda Fagg NZ
Priscilla Gaffur NZ
Maria Gonzalez NSW
Megan Grantham Vic
Susan Harberts Vic
Collen Harrison NSW
Natasha Harrop-McGurk WA
Janine Kearsley Vic
Theresa Lee WA
Melanie MacRury NZ
Katie Maslin WA
Karren Morrison NZ
Nicola Morrison NZ
Jeremy Ngoh Vic
Linh Nguyen Vic
Jacqueline O'Connor NZ
Amanda Orange Qld
Sarah Paige Vic
Randhir Sewgolam NZ
Toni Shanahan Vic
Sherren Sinnadurai NSW
Shae Small WA
Alicia Smith NSW
Simon Undrill Vic
Jessica Ziolkowski Vic

TRAINEE (3)
Tau Boga NZ
Ljiljana Ilic-Jeftic Vic
Christine Lai NSW

CORRESPONDING (2)
Christopher Eagle USA
Rosemary Reid UK

NEW MEMBERS – MARCH 2007
FULL (16)
Olurotimi Adeyemi SA

Colleen Bergin NZ
Craig Cairns Qld
Theo Christodoulou Vic
Lindsay Cochrane Qld
Brendan Cramp Qld
Elizabeth Dally NSW
Arvind Deshpande NSW
Helen Gofton Qld
Rajika Karunadasa Vic
Jennifer La Trobe NZ
Marion Lane NZ
Regent Lee NSW
Caron Lyon NZ
Seshu Mandapati Tas
Simon Palomares Vic

ASSOCIATE (16)
Grant Abbott NZ
Ross Cardwell WA
Peter Eggler NSW
Timothy Fogarty NZ
Lisa Gibki SA
Christine Hammond Vic
Yufen Hewitt Vic
Victoria Hope WA
Kellie Landa Qld
Jenny Ocone Vic
Martin Rochford NSW
Kaye Rubis NSW
Sarah RussellNSW
Kerusha Singh NSW
Dianne Stanley NZ
Louise Van Onselen Qld

TRAINEE (8)
Shin Cheng NSW
Andrew Cheung NSW
Kim Mae Chia NSW
Rosalie Grivell SA
Geoffrey Lee Vic
Ritu Mogra Vic
Dennis Wang NSW
Kes Wickremesekera NZ

CORRESPONDING (1)
Marion Cairnduff Canada

CONTINUING ASUM MEMBERSHIP

A reminder that your membership subscription renewals are now due. If you have not received a copy of your subscription renewal notice, please contact our office by telephone (02) 9438 2078 or email registrar@asum.com.au

For those who have paid previously and taken advantage of the early bird rate, we thank you.

For full listing see www.asum.com.au

2007
25th May
ASUM in the Hunter
Radiology Conference Centre
John Hunter Hospital
Contact Christian Abel 0414 495 620
christian.abel@hnehealth.nsw.gov.au

14th June – Melbourne
ASUM DDU Cardiology Oral Examination
Contact Marie Cawood.
Ph:+612 9438 2078
Fx:+612 9438 3686
email: ddu@asum.com.au
website: www.asum.com.au

16th June ASUM DDU Oral Examination All except Cardiology – Melbourne
Contact Marie Cawood
Ph:+612 9438 2078
Fx:+612 9438 3686
email: ddu@asum.com.au
website: www.asum.com.au

30th June and 1st July
ASUM WA Ultrasound CPD Meeting 2007
(2 days) Royal Perth Hospital
Contact Michelle Pedretti
email: pedrets@westnet.com.au

19th July
Nuchal Translucency Accreditation One Day Theoretical Course
FMF Certification of Competence in 11–14 Week Scan 2007
The Ellott Theatre, Wellington Convention Centre, Wakefield Street, Wellington
Registration will be available online
Medical Industry Association of New Zealand
Ph: (09) 917 3645
Fx: (09) 917 3651
email: admin@mianz.co.nz
website: www.mianz.co.nz

20th–21st July – Melbourne
22nd–23rd July – Brisbane
28th–29th July – Sydney
ASUM Presents: (2 days) The Early Pregnancy and Gynaecological Scanning Foundation Theoretical Courses 2007
Convenor
Assoc Prof George Condous
ASUM Head Office
PO Box 943, Crows Nest NSW 1585
Sydney, Australia
Ph: 02 9438 2078
Fx: 02 9438 3686
email: asum@asum.com.au

19th–22nd July
ASUM NZ and RANZCR NZ Third Combined Scientific Meeting 2007 New Zealand
(4 days) Venue: Wellington Convention Centre Wellington New Zealand
Contact Jodie Preston-Thomas
Ph: 0011 649 917 3645
Fx: 0011 649 917 3651
email: jodi@mianz.co.nz

27th July
2nd ABDA Educational Programme (1st Annual Indonesian Society of Oncologic Imaging (ISOI) and 12th Annual ISUM Meeting
(2 days) Venue: Balihai Resort & SPA, Kuta, Bali
Contact: Secretariat ISUM/ISOI, Jl. Raya Radio Dalam IB, Kebayoran Baru, Jakarta Selatan 12140, Indonesia
Ph: +62-21-7230060, 7258135
Fx: +62-21-7230061
email: isum@centrin.net.id / intium@cbn.net.id

28th July
ASUM DMU Part I & Part II Written Examinations-Provisional
Venue as allocated.
Candidates receive individual notification.
Contact DMU Coordinator
Ph: +61 2 9438 2078 Fx: +61 2 9438 3686
email: dmu@asum.com.au

13th–17th September ASUM 2007
37th Annual Scientific Meeting of the Australasian Society for Ultrasound in Medicine
(4 days) Venue Cairns Convention Centre, Cairns North Queensland Australia
Contact ASUM PO Box 943, Crows Nest NSW 1585
Ph: +61 2 9438 2078
Fx: +61 2 9438 3686
website: http//:www.asum.com.au or online registration

2008
TBA ASUM Multi-Disciplinary Workshop
(5days) Sydney, Australia

26th July ASUM DMU Part I & Part II Written Examination-Provisional
Venue: As allocated. Candidates receive individual notification.
Contact: DMU Coordinator
Ph: +61 2 9438 2078
Fx: +61 2 9438 3686
email: dmu@asum.com.au

18th–21st September
38th Annual Scientific Meeting of the Australasian Society for Ultrasound in medicine 2008
(4 days) Venue: Skycity Auckland Convention Centre Auckland, New Zealand
Contact: Karen Williamson
Ph: 0011 649 917 3645
website: www.mianz.co.nz

2009
30th August–3rd September
ASUM hosts WFUMB 2009 World Congress in Sydney Australia
(5 days) Venue: Sydney Convention and Exhibition Centre
Contact: Dr Caroline Hong ASUM CEO
Ph: + 61 2 9438 2078
Fx: + 61 2 9438 3686
email: carolinehong@asum.com.au or asum@asum.com.au

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.

Digitised graphics should be supplied as JPG or TIFF files on PC formatted 3.5" diskette or CD, which must be clearly labelled with the author's name and the names of the image files.

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