



**Australasian Society
for Ultrasound
in Medicine**

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Dr Stan Barnett

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Mrs Mary Young

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Dr Glenn McNally

Chief Executive Officer

Dr Caroline Hong

ULTRASOUND BULLETIN

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Editor:

Dr Glenn McNally

Royal Hospital for Women, Sydney

Co-Editor:

Keith Henderson

ASUM Education Officer

Assistant Editor:

Margo Harkness

Queensland University of Technology

Contributions

Original research, case reports, quiz
cases, short articles, meeting reports and
calendar information are invited. Please
send to the Editor, ASUM, 2/181 High
Street, Willoughby 2068 Australia
Tel: 61 2 9958 6200 **Fax:** 61 2 9958 8002

Email: editor@asum.com.au

Contributors should read the guidelines
on the last page of this issue.

Advertising

Enquiries and bookings to:

Email: registrar@asum.com.au

Tel: 61 2 9958 7655 **Fax:** 61 2 9958 8002

Mail: ASUM, 2/181 High Street,
Willoughby 2068 Australia

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Membership and General Enquiries

Email: asum@asum.com.au

Tel: 61 2 9958 7655 **Fax:** 61 2 9958 8002

Mail: ASUM, 2/181 High Street,
Willoughby 2068 Australia

Website: http://www.asum.com.au

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Welcome to the first issue of 2002. I have assumed the role of editor, taking over from Rob Gibson, and intend to change as little as possible. The Bulletin has become the most visible, and probably the most valued of ASUM's educational activities. One change that you will notice, however, is the new title. The quarterly *ASUM Bulletin* has become the *ASUM Ultrasound Bulletin*.

This issue contains an important announcement regarding the establishment of two new scholarships sponsored by Toshiba (see page 31). A novel paper comes from Nick Pocock regarding the use of ultrasound in bone assessment. Our president, Stan Barnett, has provided another superb discussion on bioeffects, responding to recent publicity surrounding another study suggesting an association between prenatal scanning and altered cerebral dominance. Jason Abbott provides an excellent overview of the assessment of pelvic pain and Debbie Nisbet provides an interesting discussion of assessment of gestation using different biometric parameter.

Everybody please note the important statement regarding occupational health and safety which has rightly assumed a much greater importance in recent times.

Enjoy the *Ultrasound Bulletin*.

Glenn McNally
Editor

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Special Insert Draft Constitution and Notice of Special General Meeting to be held on 20 April 2002 to vote on the adoption of the new constitution.

President's message



This is the first issue of the *Bulletin* for the year 2002. We are facing an interesting and challenging time, particularly with the recently introduced accreditation requirements for Commonwealth Government medical benefit schedule for reimbursement. The ASUM fully supports this approach which will help in achieving our Society's aim of promoting the highest possible

standards of medical ultrasound practice. The ASUM played an important and influential role in the formation of the Australasian Sonographer Accreditation Registry (ASAR), now an essential element of the accreditation program. Sonographer accreditation will ensure that diagnostic ultrasound examinations in Australia that are not performed by a medical practitioner will be performed by a qualified sonographer or by one undertaking an accredited program of study.

Continued growth of the ASUM as a relevant professional organisation depends on our ability to identify and respond to the needs of all members and the Australasian community. The ASUM undertakes many fine educational activities, however it is difficult to fully cater for the needs of the wide range of professional specialty groups. ASUM relies heavily on the continued goodwill and generous support provided on a voluntary basis by its members. Many of these activities continue quietly behind the scenes. We are indebted to these volunteers for the continuing generous support. Mentoring is an important function in all aspects of ASUM professional activities, whether it relates to teaching sonographic standards of practice or to encouraging unselfish contributions to essential services. Our Society is recognised internationally for its efforts in education. However, it is important to realise that maintaining the DMU and DDU examinations places substantial demands on our resources and on the continued voluntary efforts of lecturers and examiners. It is essential that the processes involved are efficient and effective and that the diplomas achieve maximum professional recognition to ensure the optimal benefit for all concerned. To this end, Council has established committees to independently assess the needs of the sonographer and medical community and to make recommendations on possible future developments. The objective is to openly explore issues beyond the scope of responsibility of the examination boards, e.g., processes of credentialing of individuals and accreditation of practices, co-ordination of training and examinations, professional linkages, and effective marketing.

As we approach the time of the year when ASUM seeks expressions of interest for positions on Council, I remind members of their opportunity to nominate for positions on committees or on Boards of Examiners for the DMU and DDU. It is essential, for the continued professional growth of ASUM, that "new blood" is periodically introduced into Council and committees. I would particularly encourage those who have not yet offered their services to do so. There is a need for greater participation on the DMU Exam Board by medical members.

In keeping with the approach towards improved cost-effectiveness, Council has resolved to reduce the size of ASUM Council from 19 to 12 members. The reduced size is consistent with that of other similar ultrasound societies. Our objective is to create an efficient unit of Councillors that each has responsibility for a portfolio, either as Chair or as an active

participant in a committee. The committees recommended by Council include; Executive, DMU Advisory and Sonographer Affairs, DDU Development and Medical Affairs, Standards of Practice and Safety, Education, Grants and Research, and Branch Liaison. These committees are created by Council to undertake specific functions, and may be changed as required. The Boards of Examiners are prescribed according to the ASUM Constitution. The Board of Examiners for the Diploma of Diagnostic Ultrasound comprises; President and Hon. Secretary together with no more than 10 medical members. The Board of Examiners for the Diploma of Medical Ultrasonography comprises; President and Hon. Secretary together with no more than 12 members, the majority of whom are sonographer members of ASUM. Please think seriously about nominating for membership of Council, Boards or committees. ASUM needs your professional support.

The Annual Scientific Meeting is a major showcase for ASUM professional activities and we are looking to a successful conference on Queensland's Gold Coast in September this year. As usual, there is a list of distinguished overseas speakers. We are also looking forward to participation by visitors from Asia as a result of the successful interactions at the Asia-Linkage Program held during the 2001 Annual Scientific Meeting in Sydney. Plans are under way to develop exchanges of invited speakers between ASUM and the Korean Society of Medical Ultrasound, and with Singapore. We will be looking forward to further opportunities to maintain similar linkages with other medical ultrasound societies and organisations in SE Asia. I would also draw your attention to our faculty of Australasian speakers. Please do not overlook the local talent. There is plenty of it around! We are fortunate to have high standards of sonographic practice within the ASUM. This is a great opportunity to demonstrate that professional aspect of ASUM, and I would encourage submitted abstracts from as many as possible of our sonographer, medical and scientist members. This year will see the introduction of the UI/UL Plenary Lecture grant offered by ASUM to assist in the cost of travel and attendance for an ASUM member invited by the Convenor to present a paper at the Annual Scientific Meeting. This new initiative has been developed through the efforts of Council. We all look forward to further opportunities to support the needs of members and to encourage contributions to our goal of enhancing the standard of medical ultrasound.

The Executive Committee has continued to take a proactive role on behalf of ASUM. Activities are proceeding on schedule for ASUM's bid to host the 10th Congress of the World Federation for Ultrasound in Medicine and Biology. I am pleased to announce that we have been successful in winning a substantial grant from NSW Department of State Regional Development (DSRD) to support business activities associated with hosting the WFUMB 2009 meeting in Sydney. This is a significant opportunity to promote medical applications, biotechnology and health care sectors in the international arena. We have also been offered considerable continuing support from the Sydney Convention and Visitors Bureau (SCVB). Following endorsement by the ASUM Council, I have agreed to take on the responsibility of convenor of the WFUMB 2009 congress.

A late item of news that will inspire all members of ASUM is that Kaye Griffiths was honoured in the Australia Day list 2002 as a Member of the Order of Australia. This prestigious award is in recognition of Kaye's dedicated service to the field of ultrasonography (see the article in this issue). On behalf of ASUM Council, I would like to extend our sincere congratulations to Kaye for a well-deserved award.

Dr Stan Barnett PhD
President

From the desk of the CEO

ASUM AND THE YEAR AHEAD

This year, ASUM is looking to develop a wide range of education and training courses to assist members to be up to date with advances in diagnostic medical ultrasound.

We all know that learning does not end with the attainment of a qualification. In fact I often view my first qualification from the university of Adelaide as a beginners' licence to attain further education and training in my career development.

The ASUM DMU Part 1 and Part 2 Preparation courses and the DDU Technical Seminar held from 20- 24 February 2002 in Sydney received popular interest, as in previous years.

The ASUM Obstetrics and Gynaecology Conference to be held in Sydney from 19 to 21 April 2002, promises to be another attraction offering comprehensive understanding of current gynaecological applications of diagnostic ultrasound. This meeting is convened by Dr Glenn McNally, a Sydney Obstetrician and Gynaecologist specializing in ultrasound. Dr McNally is also the new Editor of the ASUM Ultrasound Bulletin as well as the Honorary Treasurer of the Society. We are also fortunate to have Professor Anna Parsons from the University of South Florida and Professor Andreas Lee from University of Vienna Hospital as the international speakers. If you have not enrolled yet, it is not too late. Call the ASUM office on 02 99587655 or email education@asum.com.au

Not to be missed is the ASUM 2002 Annual Scientific Meeting, which will be held at Conrad Jupiters, Gold Coast in Queensland from 19 to 22 September 2002. Roslyn Savage, Convenor of the ASUM 2002 Annual Scientific Meeting and members of the ASUM 2002 Organising Committee have planned an exciting and interesting education, scientific and social program. More information is outlined in the ASUM 2002 brochure in this issue of the Bulletin. Make sure that you mark these dates in your calendar 19-22 September 2002. We hope to see many local and international delegates at ASUM 2002.

The New Zealand Branch of ASUM is also conducting its Annual Scientific Meeting from 18 to 21 July 2002 at the Le Grand Hotel in Hamilton. If you are thinking of traveling to New Zealand, this is a great opportunity to combine learning in a friendly atmosphere and fun for all. There will be an optional DMU preparation course and vascular workshop.

CONTINUING PROFESSIONAL DEVELOPMENT CREDITS

ASUM members may claim points in the ASUM Maintenance of Standards in Professional Practice (MOSIPP) program for attendance at any of the above ASUM educational meetings. These points can be transferred directly to the Australasian Sonographer Accreditation Registry (ASAR). If you need more information on MOSIPP, please visit our website or email education@asum.com.au.

ASUM COUNCIL MATTERS

Since my last report in the Bulletin on Council decisions, a lot of energy and work have been directed towards building a strong Society. I am certainly impressed by the ability of Council to remain focused on strategic issues in spite of the daily demands of their busy professional and personal lives. Council met on 3 November 2001 and the following decisions were made.



ASUM Restructure

The issue of ASUM restructure has been on the agenda and a subject of healthy debate for some time. Council unanimously resolved for a reduction in Council size from 19 to 12 members for greater effectiveness and efficiency. Other changes were also proposed, resulting in an entirely new constitution to comply with legislative changes relating to Company Law. Included in this issue of the Bulletin, members will find the new constitution together with explanatory notes prepared by ASUM's solicitor. This constitution is put to members for adoption at the Special General Meeting to be held on 20 April 2002 at 10.30am in Sydney. The details of the meeting are outlined in the notice enclosed.

Committees of ASUM - designing the engine that drives ASUM for the future

Council also resolved that the following Committees be established, resulting from the new Council structure and they are:

1. Executive Council Committee, with at least one medical and one sonographer member
2. Finance Committee
3. Education and Educational Meeting Committee,
4. Research and Grants Committee,
5. Standards and Safety Committee,
6. DDU Development and Medical Affairs Committee,
7. DMU Advisory and Sonographer Affairs Committee
8. Branch Liaison Committee

It was agreed that the above outcomes could be achieved with a Council size of 12 people to drive the key objectives for the future. The restructure of Council and the creation of relevant committees, each to be chaired preferably by a Councillor, received a lot of support and is seen as a major step forward in the effective and efficient corporate governance of the Society.

What are the other major objectives for ASUM?

In addition to agreeing on a new Council and Committee structure, in order to move forward, Council also agreed and is committed to three other major objectives. They are:

1. Coordination/liaison of ultrasound training in Australasia, including the Asia-Pacific region.
2. ASUM Asia Link Program
3. WFUMB 2009 conference bid

As CEO, my role is to support and assist the Executive Committee to continue to promote and drive these aims.

WORLD FEDERATION OF ULTRASOUND IN MEDICINE AND BIOLOGY (WFUMB) 2009

Members will be pleased to hear that ASUM has been busy preparing for the bid to host the WFUMB 2009 congress in Sydney. Dr Stan Barnett has been appointed by Council as the Convenor for the WFUMB 2009 bid.

ASUM is committed to host a successful world conference in Sydney. We are pleased to report that ASUM is receiving a lot of support and assistance from the Sydney Convention and Visitors Bureau. We are also grateful that we are successful in achieving funding from the NSW Department of State and Regional Development for WFUMB 2009.

Dr Barnett will be attending the meeting of the WFUMB Administrative Council in Nashville in March 2002 to present Sydney's bid for WFUMB 2009 conference. A decision will be made by the WFUMB Administrative Council at its meeting in Montreal in June 2003.

ASUM members traveling overseas are advised and encouraged to be "ambassadors" and help 'sell' Sydney as the perfect destination for a world congress. Any member intending to attend the WFUMB conference in Montreal in 2003, please also contact me with your names and details.

MEMBERSHIP

Membership in ASUM continues to be strong. ASUM membership provides many privileges including access to quality educational programs, courses and the Annual Scientific Meeting at a discounted rate, ensuring continuing professional development in a rapidly changing specialty of medical ultrasound. For more information on ASUM membership, visit our website www.asum.com.au, email registrar@asum.com.au or ring 02 99587655.

ICMS PTY LTD

ASUM is pleased to announce that we have appointed ICMS Pty Ltd as the Professional Conference Organisers for ASUM. ICMS Pty Ltd will support ASUM with three objectives, namely, the Annual Scientific Meeting, the ASUM Asia Link Program and the WFUMB 2009 bid. ICMS Pty Ltd has a reputation of extensive experience in managing successful conferences in Australia and overseas. Their head office is based in Melbourne, with branch offices located in Sydney and Brisbane. We are confident that this appointment will bring ASUM's meetings and conferences to an even higher level of professionalism.

INFECTION CONTROL

Members are advised to refer to the ASUM website for information on ASUM's submission to the Commonwealth government which proposes an amendment to the "Draft for Public Consultation; Infection Control in the Health Care Setting. Guidelines for the prevention of transmission of infectious diseases".

Dr Bass said "This is the first time that diagnostic ultrasound transducer and transvaginal transducer in particular have been specifically included in the Infection Control Guidelines. The ASUM agrees that their current three pronged approach for reprocessing transducers is more than

adequate and submit that the use of Glutaraldehyde is neither necessary or desirable. It is incorrect to state that sodium hypochlorite is an unsuitable high level disinfectant and the use of sodium hypochlorite for reprocessing ultrasound transducers should not be banned". ASUM is indebted to Cheryl Bass for her hard work in preparing the submission on behalf of ASUM members.

ELECTION FOR COUNCIL AND NOMINATIONS TO COMMITTEES AND EXAMINATION BOARDS

The strength of this Society relies heavily on the expertise and the work of our volunteers.

Whether you have an interest in nominating for Council, Committees and Boards of Examinations, members are advised to contact the President or myself if you need more information. We can direct you to the appropriate person to advise you on the duties and responsibilities. ASUM can only grow from strength to strength with your support and interest. Nomination forms will be distributed with the next issue of the Bulletin.

Councillors form the Board of Company Directors of ASUM. They play an important role in areas of law, policy and corporate strategy, accountability, public relations and risk management.

- Law – eg employment, trade practices, superannuations, insurance, governance.
- Policy and corporate strategy eg mission statement, ongoing policy and major programs for mission statement and strategies.
- Accountability eg for overall performance of the Society, representing best interests of the Society and not factional interests, financial plans and budgets.
- Public relations eg keeping members informed and involved, establishing the image the Society wishes to project, representation at appropriate functions and meetings eg by the President, Councillors and CEO.
- Risk management eg understanding the risks in the Society's activities, insurance, succession planning, internal controls, to conserve and protect the Society's assets.

If you have any questions, please feel free to telephone me on 02 99587655 or email me at carolinehong@asum.com.au. I am keen to hear your views on what ASUM represents to you and how it can continue to remain relevant and strong in this rapidly changing environment.

ASUM-UI/UL PLENARY LECTURE AWARD

ASUM is pleased to announce that Professor Albert Lam of Princess Alexandra children's Hospital, Westmead, Sydney is the inaugural presenter of the Ultrasonics Institute/ Ultrasonics Laboratory Plenary Lecture at ASUM 2002 Annual Scientific Meeting. More about this is on page 6.

KAYE GRIFFITHS AM

It is wonderful news to see Kaye Griffiths being honoured in the Member of the Order of Australia awards on Australia Day 2002. This prestigious award is in recognition for many years of service in the field of Ultrasonography. Our heartiest congratulations to Kaye from ASUM Council, staff and members.

Dr Caroline Hong
Chief Executive Officer

GE Diasonic Adv

Rob Gibson, Retiring Editor, ASUM Bulletin



Rob Gibson assumed editorship of the bimonthly ASUM Newsletter in 1997, when the Education Committee, of which he was chairman, determined that it should be transformed into an educational publication. The Bulletin now stands as the most visible of ASUM's educational activities

Rob has exercised considerable scholarship in his stewardship of the ASUM Bulletin. His stature as a clinician and teacher has been reflected in the stature of the publication, which he and his team have developed. Under his leadership the Bulletin has featured excellent scientific papers, clinical papers and case reports, while maintaining its role in communicating official notices and reports about ASUM's activities.

Rob's editorial team comprised Margo Harkness, Keith Henderson, and Sue Butterworth (until August 2000). Most recently, Rob established an editorial board of 20 sonographers and sonologists to assist the editor in sourcing the wide range of content required by our membership.

He has handed over to me a publication which is well-regarded by its readership. I intend to build on the solid foundation which Rob has established working with the editorial board to provide varied and challenging content. I see this Board as the principal means to ensure the diversity of content to engage our members

Congratulations Rob on a job well done. Our Society owes an enormous debt of gratitude to you and of course your secretary, Merily Denning. I look forward to maintaining the high standards that you have set.

Glenn McNally
Editor

Congratulations Kaye Griffiths AM



Kaye Griffiths was appointed a Member of the Order of Australia (AM) 26 January 2002.

The citation reads:
Mrs Kaye Annette GRIFFITHS
For service to science in the
field of ultrasonography,
particularly as a researcher,

educator and contributor to the advancement of diagnostic ultrasound, and to the promotion of the profession.

Kaye Griffiths, a nurse and research ultrasonographer, has been involved in the development of medical imaging techniques and practices. She has also made a major contribution to raising the level of education for sonographers and in the development of ultrasonic sonography as a profession, both in Australia and internationally.

Contribution to Ultrasonography includes:

- Significant contribution in the early 1970s to first clinical trials of grey-scale ultrasound in obstetrics, gynaecology, abdominal and breast examinations.
- Pioneered two-dimensional techniques for ultrasonic examinations of the brain in children.
- Made specific contributions to examinations of the breast in the development of ultrasonic diagnostic criteria for

identifying early breast cancer.

- Made a significant technical contribution to the operation of the Australian designed and built UI Octoson.
- Pioneered new Doppler ultrasound examination techniques for the measurement of blood flow in the foetus in obstetrics and in the large vessels in the upper abdomen.

Professional contributions/service include:

- Secretary, DMU Board of Examiners 1978-1982.
- Chairman, DMU Board of Examiners 1983-1989.
- Chairman, NSW Branch, ASUM.
- Member of Council, ASUM.
- Chairperson, Australasian Sonographer Accreditation Registry, 1996-1998.
- Convenor, First World Congress of Sonographers, Sydney, 1985; regular speaker at many forums on Ultrasonography.
- Played a dominant role and appointed inaugural President, World Federation of Sonographers, 1994.

Kaye has been a member of ASUM since 1971, chaired the Ultrasonographers Group from 1980-83 and the DMU Board of Examiners from 1983-89. She is currently serving on the Council as Assistant Honorary Secretary. ASUM congratulates Kaye on her well deserved appointment to this honour.

Congratulations Albert Lam

Inaugural Presenter of the UI/UL Plenary Lecture at ASUM 2002

A group of scientists from the former Ultrasonics Institute/ Ultrasonics Laboratory research group of the CSIRO has provided funding for an annual plenary lecture of an educational or leading edge research nature, at the ASUM Annual Scientific Meeting. The ASUM Council agreed to an equal contribution to establish and maintain the lecture fund in perpetuity.

The presenter of the UI/UL Plenary Lecture will be from Australia or New Zealand, invited by the Convenor of the

Scientific Meeting to present a lecture providing education or insight into leading edge research. The UI/UL Plenary Lecture Fund will provide funding to cover the lecturer's costs at the discretion of the convenor.

In 2002 the Convenor of the Annual Scientific Meeting has invited Professor Albert Lam of Princess Alexandra Children's Hospital, Westmead, Sydney to present the UI/UL Plenary Lecture.

ATL AD

Prenatal ultrasound scanning and altered handedness: What safety implications?

Stanley B Barnett PhD, President of ASUM and Chair of Safety Committee
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INTRODUCTION

The popular press recently publicised the findings of a Swedish study that showed an association between prenatal ultrasound scans and increased incidence of non-righthandedness in adult males enrolling for military service (1). The study reported 30% increase in non-righthandedness in a population of approximately 7,000 men compared with a cohort of 172,000 similar aged men who were not exposed to ultrasound *in utero*.

Males born in University Hospital Malmö in 1973-78 were compared with males born during the same time period at other Swedish medical centres that had not yet introduced ultrasound scanning into routine antenatal care. Handedness was assessed as part of eligibility testing for military service when the preferred hand was determined by handling and aiming a replica rifle. There was no difference in incidence of left-handedness for ultrasound exposed and unexposed (odds ratio = 1.03, 95% confidence interval 0.91 to 1.17) males during the introduction phase of routine screening with ultrasound (during the years 1973-75). However, when ultrasound was offered more widely (1976-78), the risk of left-handedness was higher among those exposed to ultrasound compared with those unexposed (odds ratio = 1.32, 95% confidence interval 1.16 to 1.51). The estimated effect corresponds to three additional left-handers per one hundred male births.

SIGNIFICANCE OF FINDING

Any evidence of a biological response to diagnostic ultrasound during fetal development should be taken seriously. Although research on biological effects has advanced in certain areas, gaps remain in the knowledge. There are risks in any medical procedures. However, from a clinical perspective, it is always appropriate to balance benefit against risk. The risk of withholding a vital diagnostic examination can be potentially more damaging to the developing fetus than the potential harm from diagnostic ultrasound. Whilst it is important that the clinical significance of this effect is fully evaluated, the biological plausibility also needs to be established.

From a scientific perspective, this paper by Kieler et al (2001) is significant in that it reproduces findings of previous studies in a much larger study population (1). The paper offers a potential mechanism whereby perturbation of neural development at a critical stage can result in altered cerebral dominance (2). This biological mechanism has been described in neuro-pathological terms, to differentiate from congenital left-handedness.

The effect of becoming left-handed is not, in itself, a serious threat to human health although it is sometimes associated with mental impairment such as dyslexia (Note that these

studies did not show an increase in dyslexia). The significance of this effect is that; if the altered handedness results from altered cerebral dominance that is actually induced by brief exposure to diagnostic ultrasound then this challenges the generally accepted scientific view that diagnostic ultrasound is biologically innocuous. Acoustic output of ultrasonographic equipment used in the 1970s was substantially lower than that available in modern diagnostic devices, and is lower than intensities permitted by the US Food and Drug Administration Centre for Devices and Radiological Health. If such low level ultrasound exposure is causal in the interference with cerebral development this would have serious implications for the practice of demonstrating ultrasound equipment by live scanning, as occurs in some scientific conferences.

The concept of sinistrality presents scientific challenges in the explanation and understanding of such a subtle biological effect. There is no doubt that scientific debate will continue for many years about the potential mechanism of ultrasound interaction and the possibility that ultrasound exposure might affect the central nervous system in ways that are currently unexplored.

The questions of concern to the ultrasound user community and the general public are:

- What is the scientific credibility?
- Was the effect caused by ultrasound?
- What are the implications to human health?

SCIENTIFIC CREDIBILITY

The paper by Kieler et al (2001) is published in a reputable journal, which means that it has passed the normal process of scientific peer-review (1). Occasionally papers of dubious quality become published, but usually in journals of dubious credentials. Whilst it is quite inappropriate to argue against a paper simply because it does not conform to individual beliefs, editors are usually less likely to accept a provocative paper unless they are convinced of its plausibility and credibility. The issue of possible human harm is a sensitive matter that can easily trigger unwarranted media attention and cause unnecessary concern about safety of medical ultrasound.

Whilst the peer-review process is expected to prevent publication of scientifically inadequate papers, it is usual practice to give greater credence to papers that are supported by independent study. The association of ultrasound scanning with increased non-righthandedness was first published in a human study carried out in Norway (3). Subsequently, a similar result was published from a study in Sweden (4). The latest paper (1) is the third peer-reviewed publication describing the same effect. The scientific criterion of reproducibility by independent verification has been validated.

This study confirms the results from two previous studies (3,4) that males who were exposed to ultrasound *in-utero* appear to have a higher probability of becoming non-right handed. Because of its design, the present cohort study may be more susceptible to bias by unknown factors than the two previous randomised controlled trials. However, the results from all the three studies are consistent, showing a 30% increase in the likelihood of left-handedness, or sinistrality, among males. Furthermore, there is no published epidemiological study reporting a contrary finding, i.e., absence of an association between ultrasound and sinistrality in males.

Laboratory studies on biological effects of diagnostic ultrasound do not provide strong evidence to support, or refute, the suggestion of subtle effects on the central nervous system. A paper by members of the WFUMB Safety Committee examined the issue of sensitivity of biological tissue to medical ultrasound (5). It recognised the absence of scientific data and advised that little work has been undertaken to specifically assess the sensitivity of embryonic and fetal tissues to damage by ultrasound. The paper also commented that; even if small volumes of tissue, equivalent to the focal zone of an ultrasound beam, were affected it is possible that the consequences would not be detected unless a critical sensory structure was involved. Reports of fetal responses and transient electrophysiological responses show that ultrasound can be detected by the CNS, however, this does not necessarily imply that the bioeffect is hazardous to the fetus.

WHAT ARE THE IMPLICATIONS?

The use of diagnostic ultrasound has an exemplary record of safety, particularly when compared with other medical imaging techniques. However, there is a continuing trend to produce more powerful, sophisticated ultrasound equipment, to further relax limits on acoustic output, and to encourage users to explore new applications. It is difficult to sustain an argument against the use of diagnostic ultrasound for medically indicated reasons when improved diagnostic value is expected to provide a benefit to the patient. When there is no known benefit the risk:benefit ratio changes. To maintain a safe record it is essential that a good safety margin exists in all ultrasound examinations to take account of the uncertainty.

Based on current knowledge of mechanisms of interaction between ultrasound and biological tissue, it is very difficult to attribute a brief exposure in B-imaging as the cause of the observed effect. However, it should be recognised that scientific knowledge is incomplete. Today's challenges in research on biological effects of ultrasound involve developing greater understanding of interactive mechanisms responsible for alterations to cell structure and function. This is particularly important when non-thermal mechanisms are involved. There is a need to develop more sensitive assays in molecular biology to determine subtleties of potential interaction at the level of gene expression which may lead to significant changes in the development of whole organ systems.

With the increased world-wide use of diagnostic ultrasound in pregnancy there is little or no opportunity to

obtain control, non-exposed, populations in future human studies. It is most unlikely that a mass of evidence will be found to counteract the findings of this and the previous studies showing increased incidence of left-handedness. Therefore, the weight of scientific evidence is likely to remain in favour of such an effect. However, it is important to recognise that none of these studies can confirm that ultrasound exposure was the cause. They simply show an association between sinistrality and the processes associated with prenatal examinations.

SUMMARY

- Prenatal ultrasound examinations and sinistrality in males is a repeated and consistent scientific finding.
- There are no studies that fail to show an increased probability of non-righthandedness in males scanned prenatally.
- There is no information on ultrasound exposure, but acoustic output would be substantially lower than that available in modern diagnostic equipment.
- No established ultrasound mechanism responsible for altered handedness.
- Results show a statistically significant association, but there is no direct evidence that ultrasound is the cause of the observed effect.
- Research is needed into possible ultrasound/biological mechanisms, and to differentiate between pathological left-handedness and that occurring naturally.
- Clinical relevance is uncertain, however there is no evidence of brain damage.
- Pregnant women should not be deterred from attending for clinically-indicated ultrasound scans on the basis of this report.

These studies do not imply that exposure to ultrasound causes brain damage; they simply raise the possibility of a subtle means by which ultrasound may alter neurological development. Whilst this new data should be reviewed seriously, it does not alter the position held by ASUM in its current safety recommendations. ASUM advocates prudent use of diagnostic ultrasound in situations when medical benefit is expected.

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Quantitative ultrasound in the management of osteoporosis

Nicholas A Pocock MB BS MD FRACP, Department of Nuclear Medicine and Bone Densitometry, St Vincent's Hospital, Darlinghurst, New South Wales

Osteoporosis is a common problem in Western societies and is increasing as the population ages. Osteoporosis-related fractures already represent a major problem for the Australian health care budget, and in addition contribute significantly to the demands placed upon the limited resources of the public health system. The cost of management of hip fractures alone, currently exceeds \$400 million annually (1). With the projected Australian population over 65 years of age estimated to increase from the current level of 2.25 million, to between 4.02 and 4.05 million by 2021 (2), the increased demand for hospital beds to treat osteoporotic fractures will pose an even larger burden on the health care system in the first quarter of this century. To avoid this impending crisis a number of workers in the field of osteoporosis have suggested a possible approach, based on various screening techniques, to identify high risk individuals, followed by appropriate therapy to reduce fracture incidence (3-5).

There are no clinical features that reliably identify patients with osteoporosis or osteopenia prior to fracture. There is therefore, a need for tools to identify such individuals who could subsequently be investigated further, or in whom preventative measures could be instituted to maintain bone mass. A suitable screening procedure for osteoporosis in the general population should ideally be readily available, reasonably inexpensive and safe. At present the gold standard for measurement of bone mass, and the prediction of fracture risk, is dual energy X-ray absorptiometry (DXA). In recent years however quantitative ultrasound (QUS) of bone has been introduced as a measure of bone mass and due to its portability and freedom from radiation, has been suggested to be a useful screening modality.

MEASUREMENT PARAMETERS

QUS utilizes ultrasound in a frequency range from 0.2 to 0.6 MHz, to measure the physical properties of bone. The speed of sound transmission (SOS) and the attenuation of the ultrasound beam (broadband ultrasound attenuation - BUA), through peripheral bone sites, commonly the calcaneus, are used to assess bone structure. SOS is measured in m/sec and its basis as an indicator of bone structure relates to its relationship to the elastic modulus. BUA is expressed as the slope of the attenuation Vs frequency (dB/MHz), which is linear in cancellous bone in the range of 0.1 to 1 MHz, and increases with increasing bone mass. In addition to the basic parameters of SOS and BUA, some QUS machines combine these values to obtain a further index of fracture risk; eg., the Stiffness Index used in the Lunar Achilles and the Quantitative Ultrasound Index (QUI/Stiffness) used by the Hologic Sahara.

$$\text{Stiffness} = (0.67 \times \text{BUA}) + (0.28 \times \text{SOS}) - 420$$

$$\text{QUI} = 0.41 \times (\text{BUA} + \text{SOS}) - 571$$

QUS AND BONE STRUCTURE/STRENGTH

The measured ultrasound parameters largely reflect bone mass, but theoretically, could also provide additional information of the integrity of the internal micro-architecture of bone, independently of bone mass. This concept has gained some credibility due to the anisotropic properties on QUS in bone (6). However while some workers in the field suggest that SOS and BUA reflect micro-architectural information, a number of studies (7,8) found that approximately 90% of the variation in clinical QUS measurements is accounted for by bone density and that micro-architecture contributed a maximum of 6 to 8 % to the variation in QUS.

There is good evidence that calcaneal QUS measurements are correlated with the strength of the proximal femur. Bouxsein *et al.* (9) reported high correlations of both SOS and BUA ($r = 0.8$) with the failure load of the proximal femur, which however were not as high as the correlations of proximal femur BMD with femoral failure load (approx 0.92). Interestingly tibial SOS correlated poorly with femoral failure load ($r=0.44$). In a similar study Lochmuller *et al.* (10) reported generally lower correlations of QUS parameters with hip strength and also found that Stiffness was more strongly correlated than SOS or BUA to femoral failure load. Nicholson *et al.* (11) also carried out a similar study and found that QUS parameters were not independent predictors of hip strength.

PRECISION OF QUS

The precision of the QUS parameters is difficult to assess using the conventional co-efficient of variation (CV), particularly in the case of SOS, due to the large absolute values of the 'mean' value of SOS which results in falsely low CV values, often quoted as 0.5% or less. These values are misleading and the precision is best gauged from the 'Standardised CV'. There are a number of ways of calculating a 'Standardised CV' but they all essentially correct for the range of values of the parameter in question, observed in the population. One popular method is to use the difference between the young normal mean and the osteoporotic population mean as a clinical range. Published values of sCV for QUS vary but realistically are at best 2-4%. The derived index of Stiffness has a better precision than BUA or SOS by themselves, possibly due to the different effects of temperature and immersion time on BUA and SOS (12,13).

The QUS machines currently in use generally have a lower precision than DXA machines (14).

This may be in part reflect the variations in transmission of the ultrasound beam through not only bone, but also through:

- the coupling medium

- Soft tissue
- Bone marrow

QUS is also very dependent on temperature. Studies by Pocock *et al.* (12) demonstrated a decrease in SOS with increasing temperature, but an increase in BUA as temperature increased. These results tended to cancel out in the derived index 'Stiffness' but due to the latter's strong dependence on SOS, it also demonstrates a decrease with temperature.

Coupling of QUS with the body part being examined may be done with either a water bath or with ultrasound gel. In both cases there is a minimum amount of time required to obtain adequate acoustic coupling with the skin and performing a measurement before this has occurred will result in errors. Since BUA and SOS are changing in different directions as acoustic coupling occurs (13), at least in the case of a water bath machine, the derived index, Stiffness, stabilizes more quickly and hence may be the preferred measurement index for clinical use.

A further possible source of error in BUA measurements, is variation in calcaneal thickness which results in an increase in BUA as bone width increases (15). The size of this effect is small but may be of more importance in pediatrics due to the large changes in calcaneal width as a child develops. BUA is not usually corrected for bone width since in adults it is not a major determinant of BUA. Paradoxically Johansen (16) demonstrated that ankle edema results in a decrease in BUA and SOS, the mechanism of which is not explained.

The reported effect of increase in heel width on SOS is not as consistent and depends on the particular QUS system. SOS in soft tissue is less than in water and therefore in water systems as soft tissue thickness increases (replacing water in the fixed beam path), SOS will decrease (17). In most dry systems SOS is measured in the heel (i.e Velocity Heel, and not Velocity Bone) so as soft tissue increases, SOS again decreases due to change in the ratio of soft tissue to bone.

SKELETAL SITE FOR QUS MEASUREMENTS

The calcaneus is currently considered the preferred skeletal site for QUS due to a number of factors:

- it is readily accessible,
- there is little soft tissue,
- the bone surfaces are close to parallel aiding in transducer positioning,
- it is a weight bearing bone,
- it is highly trabecular (90%) and metabolically active,
- longitudinal studies demonstrate it is an independent predictor of fracture.

More recently QUS instruments have been developed which measure cortical bone parameters at a number of skeletal sites. The Sunlight Omnisence, is one of these more recent instruments, and measures SOS in a number of cortical bone sites. These include the ultra distal radius, the distal radius, the metacarpal, phalanx (usually third proximal), and tibia. There are cross sectional studies demonstrating that some of these measurements, particularly in the distal third of the radius and in the phalanx can differentiate an osteoporotic population from a normal population (18,19).

There are however no large longitudinal studies demonstrating the utility of these measurements to predict fracture.

Recently Hans *et al.* (20) reported that a combination of SOS measurements from different skeletal sites (calcaneus plus distal radius) may improve the 'diagnostic' utility of QUS by better discriminating an osteoporotic population (hip fractures) from controls. The study however was limited due to the age difference between the fracture cases and the controls. In addition the improvement of the area under the curve for calcaneus plus distal radius was small (3% NS). The utility of combining QUS data from different sites is yet to be proven.

INSTRUMENT STANDARDIZATION

One of the major limitations in the field of QUS is the lack of standardization of the instruments currently in use. Differences in methodology include:

- dry (ultrasound gel coupling) vs wet (water bath coupling),
- varying regions of interest even within the one bone,
- different algorithms for calculation of BUA,
- different age ranges for calculation of the young normal range,
- variation in transducer placement (fixed Vs variable).

The region of interest (ROI) of QUS instruments is usually designed for adult feet and may be too large for children. Smaller transducers or a focused beam are required for children. Some later generation QUS instruments use BUA to obtain an image of the bone which allows the region of interest to be placed in a standardized region of interest (ROI).

PREDICTION OF FRACTURE

There have been two large prospective studies demonstrating that QUS is predictive of hip fractures in elderly females:

- The first by Hans *et al.* (21) studied women 75 years and older using the Lunar Achilles. This study reported that QUS was an independent predictor of hip fracture risk comparable to femoral neck BMD. Relative risk for a 1 standard deviation decrease in femoral neck BMD, BUA and SOS were 2.1, 2.1 and 1.9 respectively. Later revised data decreased the relative risk for BUA and SOS to 1.7 and 1.5 respectively. Stiffness was also shown to be a predictor with a relative risk of 1.7. The best predictors of hip fracture were trochanteric and total proximal femur BMD with relative risks of 2.6 and 2.5 respectively.
- The second study by Bauer *et al.* (22), was from the Study of Osteoporotic Fractures; which investigate women 65 years and older. This study used the Walker Sonix QUS instrument and reported that calcaneal BUA was an independent predictor of hip fracture (relative risk 2.0) but also found that femoral neck BMD and even calcaneal BMD were better predictors of hip fracture with relative risks of 2.6 and 2.2 respectively. The predictive ability of BUA remained after correcting for femoral neck BMD but was no longer significant after correcting for calcaneal BMD.

A number of smaller longitudinal studies have also been reported by Stewart *et al.* (23) and by Porter *et al.* (24) also

demonstrating that BUA was a predictor of future fracture. Huang et al from Wasnich's group in Hawaii also demonstrated that BUA was predictive of vertebral and 'any' fractures (25).

QUS IN CLINICAL PRACTICE

There are a number of suggested possible models for the use of QUS in the management of osteoporosis (26):

1. Estimation of BMD:
 - a) at axial sites. This approach however is not recommended due to the only modest correlations of peripheral QUS with axial BMD (27).
 - b) at local sites. This can be achieved with greater confidence since QUS correlates more strongly with local BMD than with axial BMD. Peripheral sites however are not as predictive of fracture as central sites and there is no consensus on the significance of peripheral T scores. In addition BMD at peripheral sites have not been used to identify patients who may respond to specific therapy for osteoporosis.
2. The stand alone approach where QUS is used on its own for management decisions.
 - This approach is also premature since none of the studies demonstrating the efficacy of therapy have yet chosen patients on the basis of QUS results.
 - In addition there is no consensus regarding a diagnostic T score for QUS and this will also vary depending on the technique and site used.
 - The ability of QUS to monitor therapy is still unproven.
3. Prescreening. This model suggests the use of QUS to identify a high risk group who would subsequently be further investigated by other modalities e.g. DXA. This model has been shown to be potentially useful (27) but concerns remain regarding the cost-effectiveness and it may be more economical to proceed directly to DXA.
4. A composite approach. This model suggests the use of QUS with other parameters (e.g. BMD or biochemical markers) to identify subjects who warrant therapy. Prospective data demonstrating that a combination of measurements is a better predictor of fracture are not available.

CONCLUSION

QUS has been shown to be useful in the prediction of fracture in elderly females. It has not yet gained wide acceptance in the management of osteoporosis, principally due to the difficulty defining an appropriate model for its application in the community. Further work will concentrate on obtaining data to demonstrate its utility by itself, or with other predictors of fracture risk, in therapeutic decision making.

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Role of ultrasound in the management of pelvic pain and endometriosis

Jason Abbott MRANZCOG MRCOG, Associate Lecturer Endo-Gynaecology, University of New South Wales and Royal Hospital for Women

Thierry Vancaillie FRANZCOG, Associate Professor Endo-Gynaecology, University of New South Wales and Royal Hospital for Women

INTRODUCTION

Ultrasound is an important tool in the assessment of pelvic pain in the female. Trans-abdominal and trans-vaginal scanning has many advantages, including its availability, lack of radiation, relatively low cost (compared to computerised tomography (CT) or magnetic resonance imaging (MRI)), ability to assess the female genital tract with greater precision than CT, and ability to add tactile information to diagnosis using probe compression and correlating this with localised tenderness. We will first briefly examine the role of ultrasound in the management of common causes of pelvic pain and then review in detail the role of ultrasound in endometriosis.

COMMON CAUSES OF PELVIC PAIN

Appendicitis

Acute appendicitis is the most common cause of right lower quadrant pain, though in a young female population reproductive tract pathology is responsible for the majority of differential diagnoses. Imaging both the reproductive tract and the appendix by sonography is helpful in the differentiation of the underlying cause of pathology. Ultrasound is comparable to CT in the diagnosis of acute appendicitis (1), with one study showing no difference between the two modalities and sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of 100%, 96%, 89% and 100% for ultrasound and 92%, 75%, 92% and 87% for CT (2).

Renal Calculi

Of this pathology, with a sensitivity of 94% and a specificity of 97%. Ultrasound is reported to have poor sensitivity of 19%, but a specificity of 97% (3).

Diverticulitis

Diverticulitis may also be diagnosed by ultrasound with a sensitivity of 85%, specificity of 84%, PPV of 85% and NPV of 84% (4). These figures are not statistically significantly different from CT scanning.

Pregnancy Related

Pregnancy related causes are a common presentation of pelvic pain in the female. The main contributors are ectopic pregnancy and miscarriage variants. The most important diagnosis is that of ectopic pregnancy. The utilisation of transvaginal ultrasound in conjunction with a quantitative beta human chorionic gonadotrophin has improved the accuracy of diagnosing ectopic pregnancy (5), and is accepted as the optimal non-invasive mode of diagnosis. The complete range of ultrasound findings is beyond the scope of this review. At ultrasound examination, the only

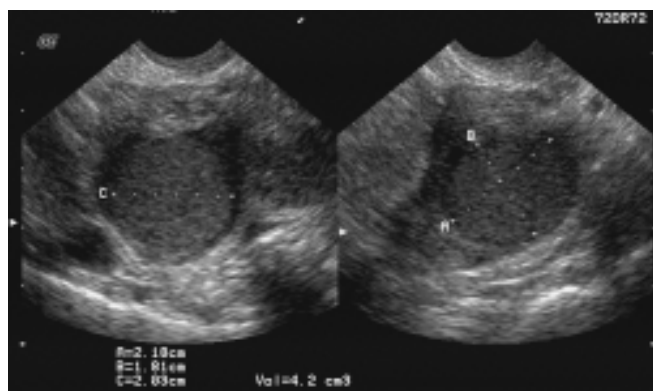
pathognomonic sign of ectopic pregnancy is the finding of a live embryo outside the uterine cavity. This is seen in up to 25% of cases only (6,7).

Pelvic Inflammatory Disease

Pelvic inflammatory disease and its sequelae such as tubo-ovarian abscess, are best visualised using ultrasound. The combination of pelvic pain, vaginal discharge, fever, leucocytosis and negative pregnancy test in a sexually active woman should raise the suspicion of this as the diagnosis. Ultrasound findings may include thickening of the adnexal structures which may or may not be fluid filled and may be associated with free fluid within the pelvic cavity (8). This often represents tubal pathology and a pyosalpinx may be diagnosed by the finding of low level echoes within the tubal lumen (8). The loss of the ovarian outline demonstrating oedema of the ovarian parenchyma, the tethering of this structure due to adhesions (noted by limited mobility on transvaginal sonography) and an increase in the volume of the ovary are suggestive of involvement of this organ. The progression of infection to a tubo-ovarian abscess is seen sonographically as an adnexal mass with thick walled, dilated and irregular fluid filled structures. Sonography is reported to have a sensitivity of 85% and a specificity of 100% for the diagnosis of Pelvic Inflammatory Disease (8).

Ovarian Cysts

Functional ovarian cysts and their sequelae are frequent cause of acute pelvic pain (9). They may occur following the failure of ovulation from a primary follicle, haemorrhage from a corpus luteum or the failed involution of a corpus luteum. Ultrasound allows diagnosis of the pathology initially and is also used to follow up the patient at 6-8 weeks to ensure involution of the cyst.



Right Ovarian Endometrioma



Endometrioma occupying Pouch of Douglas



Endometrioma of Recto-sigmoid colon



Right Ovarian Endometrioma demonstrating thickened cyst wall and typical appearance of cyst content



Tubo-Ovarian Torsion

Tubo-ovarian torsion may be suggested by the sudden onset of often unilateral lower abdominal pain, the experience of nausea or vomiting. Ultrasound is an important part of the diagnostic workup since torsion with complete occlusion of vascular supply will lead to ischaemia and necrosis of part or all of the adnexae. Even partial torsion may be diagnosed sonographically with increased volume of the ovary and tube noted secondary to venous and lymphatic blockage. The resulting unilateral ovarian oedema is suggestive of a torsion (10). There is often underlying pathology such as an ovarian cyst or dermoid, except in the adolescent and paediatric population, in which no cause may be found (11). The addition of Doppler ultrasound is helpful when blood flow to the ovary is absent, though does not exclude torsion if present, since the ovary has dual blood supply emanating from both the ovarian artery and the uterine artery delivered by the mesosalpinx and ovarian ligament (12).

Pelvic Venous Congestion

For women with chronic pelvic pain who have prominent pelvic veins and where no other pathology is evident, pelvic venous congestion may be diagnosed. This diagnosis may account for up to 80% of these residual cases (13). The diagnosis of pelvic venous congestion as a cause of chronic pelvic pain has been reported for over 50 years (14) and the gold standard for diagnosing this condition is venography with a sensitivity of 91% and a specificity of 89% (13). Following diagnosis, the primary treatments include ovarian vein ligation, and ovarian vein embolisation (15, 16). Oophorectomy with or without hysterectomy has been used to treat patients with this diagnosis as has medical treatment with high dose medroxyprogesterone acetate (17). There is no evidence that ultrasound is able to distinguish the syndrome compared to control groups, when the diagnosis has been previously made by venography (18).

ENDOMETRIOSIS

"In its worst stages, this disease affects the wellbeing of the female patient totally and adversely, her whole spirit is broken, and yet she lives her life in fear of still more symptoms such as further pain, the loss of consciousness and convulsions" (19).

This description of endometriosis from 1776 encapsulates the symptomatology of this most unusual and pervasive of diseases. The author, a Scottish physician, continues to comment: "Bodily illness is an inevitability when it comes to this disease". Two hundred and thirty years on, and endometriosis continues to be a disease that plagues both women and their physicians with its diversity of clinical presentations and management difficulties.

Laparoscopy is seen as the gold standard for the diagnosis of endometriosis, based on visual findings at the time of surgery. The addition of biopsy to demonstrate glands and stroma is not mandatory, though the diagnosis may be erroneous without this histological confirmation of disease. It has also been suggested that all women may have histological evidence of endometriosis and that it is only brought to the attention of physicians when the woman presents with either pain or infertility (20, 21). There is a

significant delay in the diagnosis of endometriosis from the initiation of symptoms. This has been reported as up to 3.5 years and 11.7 years in women with infertility and pelvic pain respectively (22). This delay may result in disease progression, cause greater patient anxiety and depression, and possibly increase the persistence of disease following treatment.

Sonographic findings in endometriosis

For women with endometriosis, the two presenting features are infertility and pelvic pain. The four cardinal pain symptoms are dysmenorrhea, pelvic pain, dyspareunia and rectal pain (dyschesia). Ultrasound is helpful in the management of endometriosis in the following ways:

1. Diagnosis of ovarian endometriomas and differentiation of the adnexal mass.
2. The use of transrectal sonography to diagnose deeply invasive uterosacral disease and invasion of the rectum.
3. As a research tool to observe uterine contractility as a possible contributing factor to initiation and progression of disease.

Ultrasound is not helpful in the diagnosis of small volume peritoneal disease.

Endometriotic cysts

The finding of the ground glass appearance within an endometriotic cyst has been demonstrated to be highly suggestive of, though not pathognomonic of, an endometrioma (23). The sensitivity of B-mode transvaginal ultrasound to diagnose endometriomas ranges from 75-92% and specificity from 90-97% (24-29). The addition of colour flow Doppler imaging to demonstrate arterial flow within an endometriotic cyst has produced conflicting evidence. The reported range for arterial flow within endometriotic cysts is 44-98% with a mean of 71%. This wide range may limit reproducibility and interfere with the pre-operative diagnosis of these cysts (30). This discrepancy is reflected in the literature with reports of both increased sensitivity and specificity (31) and of no additional value to the B-mode diagnostic capability (32).

The finding of scattered vascularity within a cyst has been reported to help differentiate an endometrioma from other more vascular ovarian cysts including corpora lutea and neoplasms (25, 31). This may be helpful in the planning of surgical intervention and the mode of surgery or specialist referral, especially when combined with clinical and biochemical findings. Other measures such as pulsatility index and resistance index are not helpful in differentiating endometriomas from other benign adnexal masses (25, 31-33). It is reported that the addition of CA-125 in combination with grey scale transvaginal ultrasound does not improve the diagnosis of endometriomas (29). Furthermore, there is decreased accuracy in the diagnosis if these combinations of tests are utilised. The same authors have since reported that the combination of positive Doppler imaging and CA-125 level of >25 u/ml to be predictive of endometriomas in 95.6% of cases. The absence of these features reduces the probability of an endometrioma to 1.4% (31).

Rectosigmoid endometriosis

The involvement of the gastro-intestinal system in women

with endometriosis ranges from 3-37% of patients (34). The symptom of rectal pain is variable and is not dependent on the stage of the disease (35). Many gynaecologists recommend that colorectal involvement be dealt with surgically as medical treatment offers temporary effects only (36-39). The pre-operative assessment of colorectal involvement is therefore important and may alter the surgical approach (laparoscopy versus laparotomy), and several imaging techniques are currently available. The utilisation of modalities such as barium enema and colonoscopy suffer from low sensitivity and techniques such as MRI and CT are limited by cost, availability and accuracy (40-42).

Rectal ultrasound was first reported in the diagnosis of endometriosis in 1989 (43). Since this time it has been described more widely as a tool for diagnosing rectal involvement by endometriosis (44-46). The diagnosis of invasion into the rectal serosa or muscularis and the extent of disease has been reported to impact on the modality of surgical approach (44).

There is minimal literature regarding the impact that ultrasound diagnosis has on either the histological correlation with the ultrasonographic findings and the clinical outcome. Only one study is published in the area (44), which reports on 46 women with deeply invasive endometriosis, and the ultrasound finding of rectal involvement in 24 of these women. All of these patients had a laparotomy and a histological diagnosis of rectal endometriosis made (within any layer of the rectal wall). In the remaining patients, laparoscopy was performed, where endometriosis was again confirmed in lesions removed, though there is no histology available on the bowel in these women. Follow-up from this cohort reports a marked reduction in pain with 90% of women having reduced pain and 80% of women being pain free (the methods of recording pain symptoms are not recorded, nor is there a comparison of pre-operative versus post-operative pain symptoms). The surgery is not without complication and recto-vaginal fistulae are reported in 12.5% (3/24) of women, transient neurogenic bladder in 25% (6/24), and vaginal vault necrosis in 4% (1/24).

Endometriotic lesions could be removed without opening the bowel lumen in all women identified with no rectal wall involvement. Rectal ultrasound appeared to be more accurate than other modalities of imaging in this group. Bowel infiltration had been suspected in 10/16 (62%) of women by rectal examination, 12/24 (50%) on sigmoidoscopy, 8/24 (33%) by barium enema, 14/21 (67%) on CT scan and 8/12 (66%) on MRI. The positive predictive value from this study for rectal involvement by endometriosis diagnosed by trans-rectal ultrasound is 100%. The negative predictive value cannot be assessed directly. The clinical outcome in women treated by laparoscopy with no rectal involvement noted is reported to be equally good and an indirect measure of the accuracy of trans-rectal ultrasound.

The preliminary results of these non-invasive imaging techniques using radial probes are most encouraging. Further evaluation with larger patient numbers and comparison to other imaging techniques such as MRI are

warranted. Clinical correlation to pain outcome is also necessary, as intervention by laparotomy with bowel resection has been reported to have significant morbidity.

Ultrasound as a research tool in the pathogenesis of endometriosis

In the woman without disease, uterine contractility increases significantly at midcycle and is decreased during the luteal phase of the cycle suggesting that oestrogen and progesterone respectively have positive and negative influences on contractility. Retrograde uterine contractility is reported to be greatest at the time of midcycle, ensuring adequate sperm transport, whilst convergent contractility is greatest in the luteal phase, perhaps for implantation of the embryo (47). An abnormality in this contractility system may be responsible for a variety of conditions including dysmenorrhea, abortion, and preterm labour (47, 48).

There is a growing body of evidence that endometriosis may represent a primary disease of the uterus, with endometrial tissue implanting in the peritoneal cavity as a secondary phenomena (49-52). In women with endometriosis, uterine contractility is reported to be increased at varying times in the cycle, with significant dysperistalsis at midcycle (53). It has been shown by sonography that uterine peristalsis is confined to the endometrium and the subendometrial myometrium, which has a circular muscular arrangement.

It is only this subendometrial layer termed the archimyometrium or the stratum subvasculare that is responsive to the changes in the menstrual cycle (54, 55). It can be demonstrated by ultrasound that the archimyometrium has an increased diameter in women with endometriosis and may account for the abnormality in contractility during the menstrual cycle (49). Similar to the clinical findings of endometriosis, there is no correlation between the width of the sonographic halo and the stage of endometriosis as classified by the American Fertility Society system (49). There does appear to be widening of this halo with age and there is a statistically significant difference in the width of the halo seen sonographically in women over the age of 31 compared to younger women with disease (49). Women who have this halo sign and have undergone hysterectomy have been found to have histological features diagnostic of adenomyosis, where there is infiltration of the myometrium by endometrial glands.

These sonographic findings are the same as those documented for women with endometriosis as the primary problem, compared to women with adenomyosis as the primary problem (56-58). The next logical step is that endometriosis and adenomyosis are merely clinical variants of the same pathological process and represent differing clinical, morphological and histopathological presentations (51).

Summary

Ultrasound has a significant role in the current management of pelvic pain and endometriosis. It has the potential to be an important tool in the management of and possible screening for women at risk of developing endometriosis. Currently, ultrasound can be used in the diagnosis of

appendicitis, diverticulitis, pregnancy related problems such as miscarriage and ectopic pregnancy, adnexal problems such as ovarian cysts, tubo-ovarian torsion and pelvic inflammatory disease. Ultrasound is useful to diagnose endometriomas, though it has no role in the diagnosis of small volume peritoneal disease. There is an ongoing role for ultrasound in the assessment of the ovaries, a likely site of disease recurrence

In the future there is likely to be an increased need for ultrasound in the pre-operative diagnosis of rectal involvement with infiltrating endometriosis which may alter the approach to the treatment and the counseling of the patient. The potential for ultrasound to screen women who are at risk for development of endometriosis and contribute to the understanding of its pathogenesis has yet to be realised, though there is evidence that this will be possible in the not too distant future.

We believe that a team approach is important in the assessment, diagnosis and long-term management of the woman who presents with pelvic pain. This will involve both primary clinician, who should have experience in sonography, and specialist sonographers and sonologists to discuss the difficult or complex case.

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How should the ultrasound estimated due date be calculated?

Debbie Nisbet, Specialist Ultrasound, Royal Women's Hospital, Melbourne

Lachlan de Crespigny, Associate Professor, Department of Obstetrics and Gynaecology, University of Melbourne;
Honorary Fellow, Murdoch Children's Research Institute, Royal Children's Hospital, Melbourne

Abstract

Arguably the most important contribution ultrasound has made to modern obstetric care is to enable an accurate estimate of the due date. When performed by appropriately trained personnel, ultrasound dating of pregnancies at less than 22 weeks' gestation gives a more accurate estimated due date (EDD) than the last menstrual period (LMP) even for women with "certain" dates. When calculating the EDD by ultrasound, the earliest ultrasound should provide the most accurate estimate. Multiple parameters should be used to assess the gestational age.

When the EDD is calculated from the LMP there are many sources of error. There may be an inability to remember the exact date of the LMP, menstrual irregularity or amenorrhea, prior use of the oral contraceptive pill, or bleeding during early pregnancy. Thus the LMP is unreliable in up to 45% of women (1). In addition, even in regularly cycling women the time of ovulation is unpredictable, with late ovulation (after day 14) being more common (2). Therefore ultrasound dating more often postpones, rather than brings forward, the EDD.

There are potential sources of error in calculating the EDD from the LMP even if the LMP can be accurately recalled. The most commonly used methods of calculating the EDD are the obstetric calculator ('wheel') and Naegle's rule ('9 months plus 7 days from the first day of the LMP'). Individual wheels vary by up to 7 days, making them unreliable (3). Naegle's rule is affected by the number of days in the month, therefore the duration of pregnancy varies with the month of conception and pregnancies are allocated a length of between 280 and 283 days. The ultrasound method of calculating the EDD generally assumes a length of pregnancy of 280 days, although 282 has been used by some groups (4).

The main advantage of ultrasound dating of pregnancy that has been demonstrated is a decrease in the number of pregnancies considered to be overdue (5). Such pregnancies are more likely to be subject to induction of labour; they also require increased surveillance. In 2 large studies assessing the rate of post term pregnancies, 9.5% were over 294 days and 10% of pregnancies were over 296 days long respectively using the menstrual EDD; using the ultrasound EDD, the respective figures were 1.5% and 4% (6,7). The protocol in many units is to redetermine by ultrasound only when the menstrual dates are out by 7, and in some units 14 days (1). To maximize the improvement in the number of pregnancies incorrectly classified as "post term", the ultrasound EDD should be used even for smaller differences in dates. This then becomes the critical issue: should ultrasound dates be used even when these differ from menstrual dates by only a few days?

Dating by ultrasound also has limitations. Operator error in measuring the fetal biometry and estimating the due date may occur, and the ultrasound EDD may be regarded as 'yet another' due date. Operators use differing measuring

techniques, measure different structures, and use differing charts (some of which may be inappropriate for the population being scanned).

Although LMP data are used to derive ultrasound dating formulae, protocols are used in chart development to ensure maximal accuracy of data. Regression of data to derive an average formula enhances their accuracy. Pregnancies included in good charts have carefully checked dates and a regular 28 day cycle. In some cases urinary luteinizing hormone (LH) kits or ultrasound have been used to monitor ovulation, resulting in increased accuracy (8). Measurement of the CRL (by a small number of 'reliable' operators) to establish gestational age has been used to develop a BPD chart (9). Other steps in chart development to ensure increased accuracy include ensuring that all gestations are uniformly represented, prospectively stating exclusion criteria (such as fetal abnormality or multiple gestation), and the exclusion of poor measurements. In addition, a minimum number of dedicated individuals should take the measurements using high quality, accurately calibrated equipment. The technique used should be described in detail and interobserver and intraobserver variability of measurements assessed.

Gestational age charts should be created using cross sectional data (i.e. scan fetuses once each) and growth charts are more accurate if they are developed using longitudinal data (i.e. scan the same fetuses on more than 1 occasion). In the second trimester measurements do not appear to be influenced significantly by fetal gender, ethnicity and multiple pregnancy (10). It is advisable to use charts suggested by a central organization such as ASUM to ensure uniformity, however it is important for operators to familiarize themselves with the charts used, in particular with the measurement technique used.

CALCULATING THE EDD USING ULTRASOUND

The first scan by a reliable operator should be used to calculate the EDD. Individual variation in fetal size is smaller in early pregnancy, and growth rate is rapid which minimizes the effect of measurement error. The ultrasound EDD should be stated in the scan report. At subsequent scans of the same pregnancy a new EDD should not be given. This causes confusion and is wrong in principle the earlier scan should be more accurate. At second and subsequent scans growth should be assessed; if fetal measurements are not consistent with the expected fetal size, the reason for this should be sought.

Standard measurements should be taken. Measurements should be considered individually before including them in an assessment of gestational age. When measurements are not in agreement they should be repeated. Poor quality sonographic fetal measurements should not be included for gestational age assessment. If measurements appear to be affected by a fetal anomaly they should be excluded. For

example when a skeletal dysplasia is suspected the femur length should be excluded. Equipment calibration should be regularly checked.

If the head shape is dolicocephalic or brachycephalic either the head circumference or a 'corrected BPD' should be used instead. Head shape can be assessed using the cephalic index (CI) which is calculated using the BPD and OFD (occipitofrontal diameter) in the formula $(\text{BPD}/\text{OFD}) \times 100$. A CI of less than 73 is indicative of dolicocephaly; greater than 84 indicates brachycephaly (11). The corrected BPD is calculated using the formula $(\text{BPD} \times \text{OFD})/1.265$ (12).

The head circumference is today usually measured using an ellipse. If the head circumference is to be calculated using the formula $(\text{BPD} + \text{OFD}) \times 1.57$, both the BPD and OFD need to be remeasured "outer to outer" for the calculation.

Gestational age should be assessed using multiple parameters, as this has been shown to be more accurate than using a single measurement (13,14). Biological variability and subtle technical factors limit any measurement used alone. There are also measurement variations between fetuses and these variations are not always in the same direction.

We recommend that the crown rump length (CRL) be used to assess gestation up to 14 weeks. Gestation sac diameter should not be used as this has been demonstrated to correlate poorly with gestational age (15). With increasing gestational age there is an increasing variation in the CRL associated with fetal flexion and extension, therefore it is helpful to include other parameters when assessing gestation. BPD can be measured from early in the first trimester (16), but certainly should be included from 12 weeks' gestation. After 13 weeks a combination of BPD, HC and femur length (FL) is recommended (along with CRL up to 14 weeks). The abdominal circumference (AC) should also be measured to evaluate growth and fetal proportions however not included in an assessment of gestational age. The AC becomes more important in the assessment of fetal growth in the second half of pregnancy (13).

Appropriate charts should be carefully selected; the best charts may not be those used by the manufacturer in the ultrasound machine's software. ASUM has recently adopted a new set of charts (17). In our Practices we continue to advocate the use of the charts recommended by ASUM until recently: Robinson (CRL > 8/40) (18), Silva (CRL < 8/40) (8), de Crespigny (BPD) (9) and Hadlock (HC, FL) (19,20).

In conclusion, when an ultrasound examination is performed by an appropriately trained individual using high resolution equipment, a multiparameter assessment of gestational age at the time of the earliest scan enables the most accurate estimate of the due date. The time has come for ultrasound to replace the menstrual due date.

Ultrasound Assessment of Gestational Age

- Fix gestation at, and only at, the first accurate scan
- Use multiparameter assessment using only good quality measurements
- Recheck outlying measurements
- Exclude poor measurements or those affected by a fetal anomaly
- Use CRL from 6-14 weeks
- Use BPD from 12 weeks; use HC, FL from 13 weeks

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Statement on guidelines for reducing injuries to sonographers/sonologists

Occupation induced musculoskeletal injuries affect a large number of sonographers/sonologists, particularly those with high workloads and those who have been in the profession for a long time. Sonologists who scan on a regular basis as do many O&G, musculoskeletal and vascular sonologists are not immune from work-induced injury.

THE ROOM

- Room configuration and design needs to be flexible and versatile.
- The room needs to be large enough to allow the ultrasound unit to be easily manoeuvred into position for different examinations and provide an adequate working space.
- Suitable flooring is required to allow easy movement of the ultrasound unit.
- Ventilation needs to be adequate for the unit, patient and staff.
- Lighting should be dimmable with accessible controls.
- Accessories such as support pads for the patient and the sonographer/sonologist, gel bottle holders, additional transducers and linen need to be nearby and easily accessible.
- Fittings - the room needs hand washing and transducer-cleaning facilities (2) with contaminated waste and sharps disposal containers provided in the room if required.
- A room set up for opposite (usually left handed scanning) is helpful so that the sonographer/sonologist can alternate scanning sides.

THE ENVIRONMENT

- The scanning room needs to be close to the waiting areas, patient facilities and processing areas.
- The sonographer/sonologist reporting area and the data entry systems need to be set up ergonomically to allow the sonographers/sonologists to vary their posture.
- If transducers are cleaned with glutaraldehyde, an approved fume cupboard or similar ventilated container needs to be provided outside of the scanning room. If an enclosed self-filtering system is used it may be located within the scanning room.
- If glutaraldehyde is used as a cleaning agent then a documented emergency management policy needs to be in place to manage spills.

THE ULTRASOUND UNIT

- State of the art equipment allows for better visualisation, which increases diagnostic accuracy and reduces sonographer/sonologist fatigue. Good ergonomic design needs to be a major part of the buying decision.
- Fully adjustable units, to suit the procedures undertaken and all sonographers/sonologists using the unit, are recommended.
- The unit needs to be manoeuvrable with accessible, lockable wheels.
- Recording devices need to be easily accessible.
- A footrest needs to be available.

- Depending on the equipment size and sonographer/sonologist build, when moving the ultrasound unit a distance, two people should be used to move the unit particularly in and out of lifts.
- Height adjustable handles are recommended, to enable sonographers/sonologists to push the unit at the correct height for their body habitus.

KEYBOARD

- Height adjustable keyboards which are capable of being rotated are recommended.
- The set up of the keyboard needs to be user friendly with the most frequently used functions most accessible (2). Preset programs allow the keys to have multi functions depending on the examination.
- The keys need to be easy to use, to minimise abduction and flexion of the arm. LED screens are easy to use but may create problems due to the prolonged static position of the operating arm.
- Space underneath the keyboard needs to be available to allow room for the sonographers/sonologists' knees.

MONITORS

- Need to be high definition (7).
- Monitors which are height and tilt adjustable are recommended. Lateral movement of the monitor across the unit reduces the need for the sonographers/sonologists to twist their neck and trunk.
- Controls and locks need to be accessible.
- For examinations that the patient observes, a remote monitor should be fitted for patient viewing to ensure that the sonographer's/sonologist's monitor can remain ideally positioned for the sonographer/sonologist to view it.
- In a difficult procedure, such as some vascular procedures, a remote high definition monitor installed for the sonographer's/sonologist's use can further reduce the need for the sonographer/sonologist to reach and twist.

TRANSDUCERS

- Transducers should be easy to change with lightweight cables and easy-to-access cable supports (2).
- Cables need to be long enough to permit unrestricted use.
- It is preferable that the transducers are large enough to allow a power (palmer) grip (most only allow a pinch grip).
- The transducers should be 'slip resistant' to assist grip. Handles can be fitted to some transducers to improve the grip.
- Cables that come out the end (not the centre of) the transducer allow an improved grip.

THE COUCH

The following considerations should all be addressed and points 1-6 are considered mandatory when new or

replacement couches are being purchased. It is recommended that points 1-6 inclusive be implemented within 6 months of this standard being promulgated.

1. Needs to be height adjustable and tiltable (for vascular work) and be capable of going low enough to allow patients to get on and off easily and unassisted.
2. Needs to be movable, with wheels that are lockable and easy to release.
3. Needs to have 'uncluttered' sides and ends to allow the sonographers/sonologists to place their knees and feet underneath if needed.
4. The covering should be made of a material that allows easy cleaning.
5. Needs to be narrow enough so that the sonographer/sonologist does not have to reach any further than necessary.
6. Needs to have an adjustable headrest and if appropriate patient restraints (2).
7. For transvaginal scanning an adjustable footplate may facilitate comfortable positioning for both the patient and sonographer/sonologist.
8. Ideally the couch will have electronic foot pedal controls which are accessible and easy to use.
9. For cardiac work a cut out is needed to allow the transducer to be positioned for some views.

THE CHAIR

- Needs to be height and tilt adjustable with sufficient adjustability to suit all staff and procedures (2).
- Needs to have back and thigh support and a footrest. A flat, gas lift stool is an acceptable alternative.
- Needs to rotate so that the sonographer/sonologist can rotate from the patient to the ultrasound unit whilst keeping posture aligned.
- The chair needs to be mobile.

ACCESSORIES

- Gel bottles should have large openings to reduce the strength needed to squeeze the bottle.
- Support cushion should be available to support the arm in abduction.
- The patient chair used for sitting procedures (eg shoulder ultrasound) needs to be fully adjustable, easy to rotate, lockable and armless.
- For other sitting procedures, such as hand ultrasound, a height adjustable table for supporting the limb will assist in improving the sonographer's/sonologist's posture. For these a fixed chair for the patient is preferred.
- A transducer wrist strap will allow sonographers/sonologists to easily release their grip to rest and stretch during the examination.
- In difficult procedures a sling installed to support the sonographer's/sonologist's scanning arm can be helpful.
- Push wheelchairs and beds correctly, using steering wheels and brakes, and adjusting to a comfortable height for pushing if possible.
- Push rather than pull equipment.
- All equipment needs to be regularly maintained and kept in good working order.

THE SONOGRAPHER/SONOLOGIST

- Need to think posture all the time. They need to avoid

bending, twisting, reaching, lifting, sustained pressure, arm abduction and awkward postures. This is difficult but alternating sitting and standing may assist with this as well as varying scanning techniques and transducer grip.

- Need to take time to adjust all equipment to suit and have accessories on hand before beginning to scan (2).
- Get the patient to move as close to them as possible.
- Lower the couch to reduce arm abduction. This also allows gravity to assist when applying pressure with the transducer and allows for a more comfortable transducer grip.
- If the arm is abducted, support it either by a cushion or rest on the patient.
- Sonographers/sonologists should rest then stretch their hand and wrist during procedures to relax stressed muscles.
- Refocus eyes onto distant objects every few minutes to reduce eye fatigue.
- Do not perform successive similar ergonomically difficult examinations.
- Take regular breaks from scanning.
- Stretch before commencing work, during, in between examinations and at the end of the day.
- Ensure that meal breaks are taken, to completely relax.
- Sonographers/sonologists who suffer any pain or discomfort should seek competent medical advice. Musculoskeletal injuries caused by the repetitive task of scanning are often not apparent until the end of the day, or at night. These injuries often take a long time to manifest and a long time to resolve, if ever. The severity of an acute injury may be exacerbated by an existing chronic musculoskeletal injury.
- Report and document any pain and discomfort to employers.
- Appropriate exercise may lessen the chance of getting injured and may reduce the severity of any injury.
- A good level of fitness is necessary for the demanding work tasks a sonographer/sonologist performs.
- Undertake a stretching, strengthening and aerobic exercise program.
- Discuss with colleagues various techniques, exchange and 'brainstorm' ideas to develop scanning techniques to reduce stress on the body and thus musculoskeletal injuries.
- Become multiskilled, to vary work tasks.
- Adjust hours of work to give your body time to rest.
- Follow infection control protocols at all time to prevent cross infection (8).
- Read literature available on work place injuries, back care and specifically musculoskeletal injuries in sonography as they contain information of use. There are several web sites with relevant information.

There are always cases requiring sonographers/sonologists to work around a patient which may result in them adopting awkward postures. This is sometimes unavoidable especially with seriously ill patients. When doing such procedures take frequent breaks to reduce the incidence of fatigue and injury. Do not perform successive difficult examinations without a break.

Statement on guidelines for reducing injuries to sonographers/sonologists

THE PATIENT

- Explain the procedure fully to the patients and ask them to move by themselves as much as possible.
- Get the patient to move as close as possible to reduce arm abduction.
- Seek permission to lean on the patient for arm support if required.

WORKLOAD AND SCHEDULING

- Needs to be organised to avoid the sonographer/sonologist performing repetitive examinations.
- Adequate staffing levels are needed to allow the sonographer/sonologist to take scheduled breaks from scanning.
- Introduce task rotation into the work place to reduce the repetitiveness of the work the sonographer/sonologist performs.

THE EMPLOYER

The employer has absolute responsibility to prevent health and safety problems that cause injury or illness at work (10). The following points will improve the work conditions for sonographers/sonologists:

- Provision of ergonomically safe equipment and a work environment with adequate room, lighting and ventilation is required.
- Employers need to ensure that staffing levels and scheduling allow for sonographers/sonologists to have adequate work breaks and so they do have a rest from scanning and do not perform repetitive tasks.
- A system for staff to report and document any injuries, whether acute or chronic, needs to be in place. These reports must be investigated.
- Consultation with sonographers/sonologists is recommended to discuss and resolve any problems. Involve consultants with expertise in work place design and ergonomics if required.
- Read literature available on musculoskeletal injuries among sonographers/sonologists. This will help to ascertain the enormity of the problem among sonographers/sonologists.

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Web sites

ASUM: www.asum.com.au

Society Of Diagnostic Sonographers : www.sdms.org and go workzones

Auntminnie chat line: www.auntminnie.com and go to discussions – technologists

Australian Sonographer Association: www.a-s-a.com.au

Acknowledgement

ASUM acknowledges the efforts and contributions of Dr Cheryl Bass and Ms Valerie Gregory in consulting with members and OHS experts in preparing this statement.

Musculoskeletal case study

Iain Duncan, Rheumatology Unit, Woden Valley Hospital, Garran, ACT

CASE 1

HISTORY

Middle aged man with several weeks of Achilles pain. No history of trauma. Past history of intermittent pain and swelling in various locations. A linear transducer was used to scan the lower Achilles tendon and calcaneum. What is the likely diagnosis?

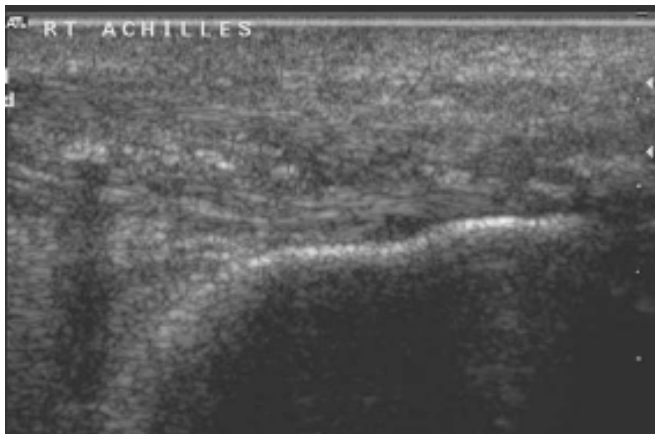


Figure 1 Linear transducer of lower Achilles ad calcaneum. Contralateral Achilles normal.

ANSWER

Compare with Case 2

Central Achilles tendon fibres replaced with intermittent to high echogenicity material. Some shadowing. Overall tendon width increased and abnormal tendon extends right to the calcaneal insertion. Some thickening of the superficial calcaneal bursa is present. Calcific tendonitis (perhaps with pre-existing myxoid degeneration) or gout are the likely diagnoses. Later aspiration of some of the material confirmed gout.

CASE 2

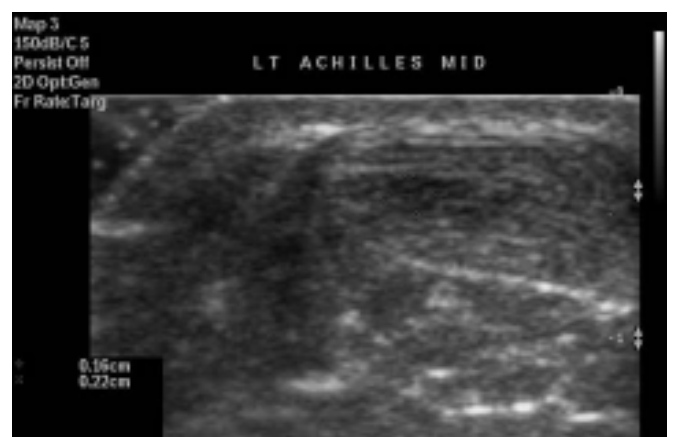
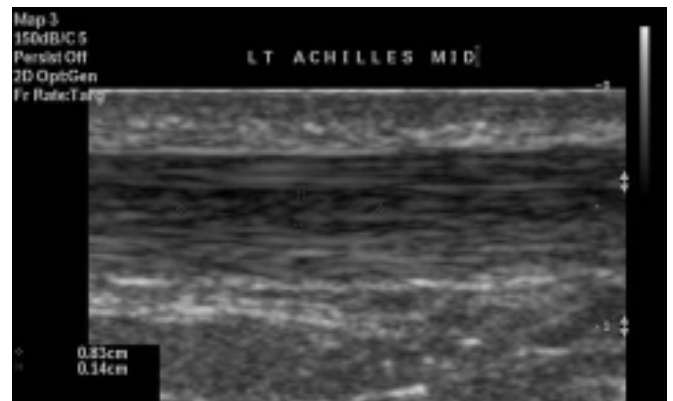
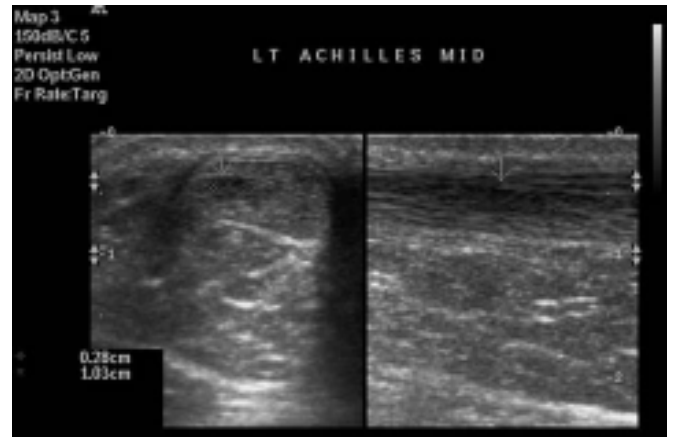
HISTORY

Middle aged man with several months of Achilles pain. No history of trauma. Occupation of tennis coach. A 12 MHz linear transducer was used to scan the tender area of the Achilles Tendon. What is the likely diagnosis?

ANSWER

Compare with Case 1

Loss of normal fibrillary pattern in mid Achilles (typically more towards lateral margin). Remainder of tendon is normal. This is a chronic injury and not an acute partial thickness tear. It may represent an area of myxoid degeneration.



Figures 2, 3 and 4 Linear 12MHz transducer images of mid Achilles at tender area.

Book reviews

Title: Atlas of Renal Ultrasonography
Editor: W Charles O'Neill
Publisher: WB Saunders Company
Published: 2000 ISBN 0 721 689 132
Approximate cost: \$A208

This Atlas is a hardback book of 248 pages, with 29 chapters. Typically there are many images with the limited text well set out under headings of "sonography", "interpretation" and "differential diagnosis".

The table of contents appears comprehensive covering anatomy, parenchymal disease, cystic diseases, collecting system disorders, neoplastic diseases, vascular disorders, trauma and sonography of allografts.

So why did I find this book disappointing?

Firstly, the images are of markedly variable quality. Far too many images are poor, either as a function of the age of machine used, poor reproduction or, on occasions, simply poor technique. Many images have been sourced from journals (all appropriately referenced).

Sometimes it is difficult to visualise the abnormalities described or be convinced of the points being made. Although some conditions are rare, and hence images are difficult to obtain, many of the poor images depict common conditions.

Secondly, apart from the very last chapter (dealing with vascular complications of renal allografts) there is no Doppler ultrasound. This is surprising, particularly as there is an entire section dedicated to vascular disorders.

There are some minor criticisms too. No correlation is made with other imaging modalities, which would be of benefit in the chapters dealing with neoplasms, stone disease and cysts. Ultrasound contrast agents are not mentioned once, and not one transrectal ultrasound is shown in the section dealing with prostate. The chapters dealing with trauma and renal allografts (which appear towards the end of the book) are better, but by that stage, the book had lost my attention.

The text (being an atlas) is necessarily brief, but as a result does not make up for the shortcomings of the images. In any event, an atlas is always going to be judged on the quality of its images rather than its text. Unfortunately, I have trouble recommending this book.

Dr Rick Dowling

Title: Fetal Therapy
Editors: MI Evans, LD Platt, F De La Cruz
Publisher: Parthenon
Published: 2001
Approximate cost: \$A95.00

This book appears to be a collection of papers produced after a conference. It is unclear when the conference was held but it seems to have been some time ago.

Chapter 1 is an excellent summary on the use of ultrasound in the detection of fetal abnormality.

The chapter on embryo-fetoscopy provides good general material but the same type of presentation was being produced 10 years ago – small numbers, few data.

Treatment of fetal obstructive uropathy is potentially one of the most important areas. There was again good general discussion although there were few figures, little follow-up and no discussion on complications. Similarly with the chapters on operative fetoscopy and sacro-coccygeal teratoma.

Harrison's chapter on surgically correctable fetal disease provides an excellent historical description of fetal surgery in his honest and readable style. There are many lessons from his carefully planned approach to diaphragmatic hernia and the ultimately insurmountable problems.

There are several chapters which are likely to be outside the area of interest of many ultrasonologists such as drug treatments for fetal disease, and prenatal therapy for inborn areas of metabolism.

There are two chapters on ethics, the first being by Fletcher. This is a very USA centric paper. He highlights the importance of sentience but frustratingly for those in the field suggests that this occurs "sometime mid to late second trimester" without discussing why he chooses this time.

The final chapter by Chervenak and McCullough discuss directive counselling regarding fetal therapy, raising many issues which warrant further discussion.

This book is recommended as an excellent overview on current fetal therapy by experts although it is disappointing that there is little follow-up.

Lachlan de Crespigny

Videotape Lending Scheme Collection Release

ASUM is delighted to release 4 new videotapes which are now available through the Video Tape Lending Scheme.

The first three tapes are lectures presented by international speaker Dr Joseph F. Polak at last years Vascular Ultrasound Workshop held in Melbourne.

The fourth videotape is of Dr Ted Lyons presentation on adenomyosis at the 2001 Annual Scientific Meeting.

The abstract for tape 25/136 is featured below. Abstracts of other presentations can be viewed on ASUM's website at www.asum.com.au and may be featured in later issues of the *ASUM Ultrasound Bulletin*.

25/136: The management of carotid disease in the new millenium-an update. (Joseph Polak, 2001)

25/137: Carotid Stents: Imaging pre and post placement. (Joseph Polak, 2001)

25/138: Evaluation of Lower Limb arterial Disease - What is the role of duplex ultrasound? (Joseph Polak, 2001)

25/139: Adenomyosis. (Ted Lyons, 2001)

An order form is on page 30 of this *Ultrasound Bulletin*. A full catalogue may be viewed on ASUM's website at www.asum.com.au

The management of carotid disease in the new millenium-an update

(Joseph Polak, 2001)

Despite the advent of anti-hypertensive and anti-platelet therapies as well as modification of risk factors, stroke continues to be the third-leading cause of death in North America with nearly 160,000 deaths in the US each year (1).

Carotid endarterectomy (CEA), first performed acutely to prevent an apparently imminent stroke in 1954, is now standard elective therapy for patients at high risk of stroke with significant stenosis in one or both carotid arteries. By 1985 over 100,000 such procedures were being performed annually (Pokras and Dyken, 1988). However, this surgical procedure is not without risk. Rates of stroke or death within 30 days of the surgery have ranged from 2.3% to 6.7% in well-controlled randomized trials (Table 1). In 1995, the American Heart Association Council on Stroke established surgical guidelines identifying upper limits of acceptable peri-operative (30-day) stroke and death rates for CEA, with updated recommendations in 1998 (2, 3, 4, 5). Major randomized trials that have compared CEA to optimal medical care used similar guidelines for the selection of contributing clinical centers (NASCET and the two VA trials).

Table 1 AHA Council on Stroke Surgical Guidelines (2, 3, 4, 6)

Patient	Stenosis	Upper Limits of Acceptable Perioperative Death and Stroke Rates
Symptomatic	≥70%	5.8% (based on NASCET)
Asymptomatic	≥60%	2.3% (based on ACAS)
HISTORY OF:		
• TIA		5.0%
• Prior CVA		7.0%
• Restenosis after CEA		10.0%
• Contralateral Occlusion with Ipsilateral Stenosis		14.0%

The following aspects of the CEA trials are of considerable importance:

- The endpoints used to assess performance varied widely – even within a single trial – and emphasize combinations of transient ischemic attacks (TIA), transient monocular

blindness (TMB), and stroke (fatal or non-fatal). None include deaths from other causes in their primary assessments, and not all used independent, central adjudication of non-fatal events.

- All except ACAS used angiography to verify stenosis, with non-invasive studies only as screening tools. The risk of angiography was documented in ACAS, in particular.

Perhaps the most remarkable finding from this summary is that only two trials (NASCET and ECST) demonstrated clear benefit from CEA and only in subgroups with severe stenosis (70-99%). In both trials, these subgroups were terminated early, NASCET with an average of 18 months follow-up and ECST with presumably less than 3 years of follow-up.

The information available from randomized trials of CEA is fragmented and difficult to compare, with biased rates over limited follow-up of widely varying patient populations.

CEA as the Standard of Care Comparison

Given that CEA is now well-established and widely used to prevent subsequent disability from stroke in patients at high risk to stroke with significant carotid stenosis, it would be considered impracticable to compare the performance of carotid stenting to best medical care. At the same time, CEA is, in the majority of trials, equivalent to medical care in preventing subsequent stroke or death. Thus any documented improvement of stenting over CEA is also, by implication, an improvement over medical care at least in terms of preventing strokes or death. Conversely, if carotid stenting is inferior to CEA, it is also, by implication, likely to be inferior to medical care. (Table 2)

Primary Endpoints

A major concern with the CEA trials is their consistent omission of all-cause mortality from primary endpoints and the variable inclusion of such minor, non-disabling events as TIA and TMB.

Whether carotid carotid stenting or CEA, these procedures are costly, both economically and in terms of personal risk.

Education

The potential benefit should include quality-of-life, free of major disability (here caused by stroke). This means including stroke and all cause mortality in the definition of the primary endpoint.

Carotid Ultrasound

Carotid or cerebral angiography is no longer required for CEA, although it is required to ensure adequate access for a carotid stenting. Given the non-negligible risk of neurological complications (Hankey *et al.*, 1990), it is not reasonable to use this invasive procedure for determining the extent of stenosis and thus eligibility for carotid stent trials. Carotid ultrasound as developed and used in the ACAS (Howard *et al.*, 1991) study can be used under the condition

that accuracy is verified center-by-center, using approximately 50 correlative examinations (carotid ultrasound versus arteriography) to minimize the considerable inter-laboratory variability.

Medical therapy and anti-platelet medications

All patients should receive an optimal medication regimen:

1. Pre-Procedure
 - ASA 325 mg p.o. q.d. up to procedure
 OR
 - Clopidogrel (Plavix) 300 mg loading dose and 75 mg daily up to procedure
2. Intra Procedure
 - Intravenous heparin boluses are to be administered,

Table 2 Carotid Endarterectomy Trials (CEA)

	Treatment Arms	Endpoints	Patient Population	Rates for Any Stroke/Death
CASANOVA 1982-1988 (8)	A. CEA one or both arteries (n=206) B. No CEA or only on worse artery. Late CEA if certain events (n=204) Both groups Antiplatelet therapy High rate of crossover (B to A)	Ischemic Stroke or Death due to Angio, CEA, or Stroke	<ul style="list-style-type: none"> Asymptomatic 50-90% Stenosis 	At 3 years: A. 10.7%* B. 11.3%* 30-day stroke/death rate: A: 4.2% *Only stroke deaths included
MACE 1988-1990 (9)	A. CEA (one or both) (n=36) B. 80 mg Aspirin (n=35) 5.7% Medical Crossover (B to A)	TIA, Stroke or Death (indep. adj.)	<ul style="list-style-type: none"> Asymptomatic ≥75% Stenosis 	At 2 years: A. 11.1%* B. 11.4%* 30-day stroke/death rate: A: 4% * Not clear if deaths included
NASCET 1988-1991; SEVERE STENOSIS >70% (4)	A. CEA and antiplatelet (one or both) B. Antiplatelet (Aspirin) 6.3% Medical Crossover (B to A)	Stroke ipsilateral to lesion (indep. adj.)	<ul style="list-style-type: none"> Symptomatic in prior 6 months 70-99% stenosis 18-79 years 	Severe Stenosis group at 18 months: A. 15.8% B. 32.3% A. 30-day = 5.8% B. 30-day = 3.3%
NASCET 1988-1997; stenosis. MODERATE STENOSIS STRATUM (10)	As above A. (n=1108) B. (n=1118) 7.9% Medical Crossovers (B to A)	As above	<ul style="list-style-type: none"> Symptomatic 30-69% stenosis ≥18 years (after Feb, 1991) 	Difference not quite significant for ≥50% Average Follow-Up = 60 months.
ECST 1981-1991; MILD or SEVERE STENOSIS (7)	All patients Angiogram. A. CEA in (n=455, severe) (n=219, mild) B. Meds. (n=323, severe) (n=155, mild)	30-day stroke/death and disabling or fatal stroke OR Disability-free survival	<ul style="list-style-type: none"> Symptomatic in 6 months Stenosis classified into 3 groups: MILD: 0-29% MODERATE: 30-69% SEVERE: 70-99% 	Early termination at 3 years for these 2 groups. Most of events were not counted in primary endpoints. SEVERE: in favour of CEA MILD: CEA somewhat worse
ESCT 1981-1995; FULL RESULTS (ref: ECST Collaborative Group, 1998)	A. CEA (n=1811) B. Meds. (n=1213) 3.5% Crossover (B to A)	As above Multiple endpoint combinations	As above	Average Follow-Up not available. Benefit only observed in those with ≥80% stenosis. Note: This was a reanalysis of 1152 patients.

as needed, to maintain the patient's ACT between 200-250 seconds.*

* Dose titration will be determined by investigator based on individual tolerance.

3. Post Procedural and Discharge

- Clopidogrel (Plavix) 75 mg q.d. x 1 month
- ASA 325 mg p.o. q.d. indefinitely

Routine pre-treatment

All patients must receive 325 mg enteric-coated water-soluble aspirin orally within the 72 hours prior to the carotid intervention. If the patient has been on chronic enteric-coated aspirin therapy, enteric-coated aspirin may be continued. Clopidogrel should also be administered (300 mg bid) beginning three days before the procedure if possible, and continued as a daily dose of 75 mg.

Peri-procedural medications

It is recommended that all patients receive adequate intravenous heparin to maintain an activated clotting time (ACT) of 200-250 seconds. ACT measurements should be repeated and documented every 30 minutes throughout the procedure.

Endpoints

Primary Endpoint

All cause mortality or non-fatal, documented stroke at follow-up (clinical)

Secondary Endpoints

- Confirmed stroke or death from any cause at discharge, 30 days post-procedure and 12 months post-procedure (clinical).
- Confirmed stroke, acute myocardial infarction, or death from any cause at 30 days post-procedure plus subsequent ipsilateral strokes (clinical).
- Residual stenosis at 30 days, measured by carotid ultrasound.
- Re-stenosis in 12 months (ultrasound/arteriography).
- Need for secondary procedures within 12 months (e.g., conversion from stent to surgery).
- Quality of life (QOL) change over 12 months, compared to pre-procedure QOL (including functional) status.
- Cost of carotid stenting and carotid surgery at 12 months post-procedure.

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The award will cover attendance at an appropriate educational program at the Thomas Jefferson Research and Education Institute in Philadelphia and will include tuition fees, economy airfare and accommodation for the duration of the course (usually 4 days).

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1. who seek to further develop their skills and experience in obstetric and gynaecological ultrasound
2. have as a minimum qualification Part 1 of the DDU or DMU (or equivalent) or have been awarded the DDU or DMU (or equivalent) within the last 5 years (since 31 December 1997)
3. have been a financial member of ASUM for a minimum of 2 years prior to the closing date

Applications should include:

- ❖ a *curriculum vitae*
- ❖ details of current and post employment, particularly in the field of obstetrics and gynaecology;
- ❖ testimonials from two referees in support of the application including contact address and telephone number;
- ❖ an outline of professional goals and objectives;
- ❖ an indication of benefit from award of the Traineeship.

The successful applicant is asked to provide a written report on return from the course at Thomas Jefferson Research and Education Institute.

Applications addressing the criteria should be forwarded by **Friday 28 June 2002** to:

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c/- ASUM
2/181 High Street
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In Touch with Tomorrow

TOSHIBA**Giulia Franco Scholarship
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This scholarship commemorates Giulia Franco who, throughout her career, contributed enthusiastically to education in ultrasound.

The scholarship will fund the Registration Fee as well as necessary accommodation and travel costs associated with attending the ASUM Annual Scientific Meeting up to a maximum value of \$1600. The recipient will also be offered entrance to Toshiba Further Education Programs for Graduate Level Study.

This Scholarship is available to scientific, sonographer or medical members of ASUM who have completed their DMU or DDU or equivalent qualification in the past 10 years, have been a member for at least 2 years prior to the closing date for papers for the Annual Scientific Meeting and have not previously had a paper or poster accepted for presentation at an ASUM or College meeting. In 2002 one Scholarship may be awarded.

The award of this scholarship is conditional upon the recipient:

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- attending the Annual Scientific Meeting as a full registrant and meeting his/her obligations as a presenter, and
- providing the paper in a form suitable for publication in the *ASUM Ultrasound Bulletin*.

In awarding the scholarship, the judges will take into consideration the quality of the paper which is submitted, and the applicant's explanation of the benefit to their clinical practice that they expect to derive from attendance at the Scientific Meeting.

Letters of application together with an abstract of the paper should be posted to: ASUM Toshiba Scholarships, 2/181 High St, Willoughby, NSW 2068, Australia. Applications must be received by the ASUM office no later than Friday 7 June 2002.

Toshiba ASUM ASM Scholarships

Each scholarship will fund the Registration Fee to attend the ASUM Annual Scientific Meeting up to a maximum value of \$800. Recipients will also be offered entrance to Toshiba Further Education Programs for Graduate Level Study.

These Scholarships are available to scientific, sonographer or medical members of ASUM who have completed their DMU or DDU or equivalent qualification in the past 10 years and been a member for at least 2 years prior to the Scientific Meeting. In 2002 up to 3 Scholarships may be awarded.

Applicants will be required to submit a case study in a format suitable for publication in the *ASUM Ultrasound Bulletin*. These cases will be judged on the following criteria: interesting nature of the case, demonstration of sound scanning technique and adherence to accepted protocols, image quality, and the quality of the evaluation of the case.

**ASUM
O&G Conference**

19-21 April 2002

Sheraton On the Park, Sydney

Convenor: Dr Glenn McNally

Featuring plenary sessions and workshops with prominent international and Australian Faculty including:

Dr Anna Parsons,

Dept of Obstetrics and Gynaecology,
University of South Florida

Professor Parsons is well known in the Australian Gynaecological community. Her particular expertise is in the areas of Ultrasound in Infertility and Assessment of the Endometrium.

Professor Andreas Lee

University of Vienna Hospital

Professor Lee's participation in the program is sponsored by GE. Professor Lee is expert in the clinical applications of 3-D Ultrasound and, in addition to involvement in the weekend program, will be conducting the 3-D Ultrasound workshop.

Workshops 19 April**First Trimester Screening Theoretical Course**

Dr Andrew McLennan

Sponsored by Philips Ultrasound

This theoretical course can count towards FMF Accreditation

3-D Ultrasound

Professor Andreas Lee

Sponsored by GE Ultrasound

Office Scanning for Obstetricians and Gynaecologists

Dr Glenn McNally

Paediatric Ultrasound

Dr Chee Hiew

Sponsored by Toshiba

Additional information and a registration brochure are included with this issue of the Bulletin and on ASUM's website at www.asum.com.au

Presentations should be about 500 words with 2 or 3 images.

The award of these scholarships is conditional upon the recipients agreeing to provide a written report on those sessions of the Scientific Meeting that they attend and find most useful. This report should be approximately 500 words and be suitable for publication in the *ASUM Ultrasound Bulletin*.

Letters of application together with case studies should be posted to ASUM Toshiba Scholarships, 2/181 High St, Willoughby, NSW 2068, Australia. Applications must be received by the ASUM office no later than Friday 7 June 2002.

Applications will be judged, and scholarships awarded by a panel appointed by the ASUM Council.

No member can receive one of these scholarships more than once in any 5-year period.

ASUM Victorian Branch

Ultrasound Lecture Series for 2002

The 2002 Ultrasound lecture series takes place on Wednesday evenings from February 6 to July 31.

Sections covered include: Physics, Obstetrics, Gynaecology, Paediatrics, Abdomen, Small parts, Musculoskeletal and Vascular. Registration can be for one section or the whole series.

TIME: Wednesday evenings 6:30pm to 8:00pm

VENUE: Royal Melbourne Hospital

COST: *Whole Series*-ASUM Members: \$150, Non-members: \$200. A late fee of \$20 will apply for registration for the whole series after January 31.
1 Section-ASUM Members: \$50, Non-members: \$60 (no late fee).

Cheques payable to ASUM Victorian Branch.

Registration and Enquiries, contact: Merilyn, Department of Radiology, Royal Melbourne Hospital, C/- RMH Post Office, Victoria 3050; Ph: 03 9342 8786; Fax: 03 9342 8369

ASUM Queensland Branch

A day of tutorials and workshops with guest presenter Roger Gent will be run in June specifically designed to assist Part 2 DMU candidates prepare for the 2002 examinations.

DATE: June

VENUE: Australian Institute of Ultrasound

CONTACT: Roslyn Savage, Ph: 0417 720 875; Fax: 07 3881 2464.

Watch for more details in the May Edition of the ASUM Bulletin.

NZ ASUM

Annual Scientific Meeting 2002

July 18-21, 2002

Le Grand Hotel, Victoria Street, Hamilton

Keynote Speaker: Philippe Jeanty MD PhD

Optional Programme: DMU Preparation Course
Vascular Workshop

Social Programme: Dinner Evening
Nature Walk

Sponsored by: Acuson and Siemens Med Solutions
GE Medical Systems Ultrasound
Kodak
Philips Ultrasound
Toshiba

Contact: Martin Necas exiled@clear.net.nz

Invitation:

It's our pleasure to extend our warmest invitation to ultrasound professionals to join us in Hamilton for NZ ASUM Annual Scientific Meeting 2002. Exciting academic programme, optional vascular workshop, plentiful social happenings and relaxed friendly Hamiltonian atmosphere will make this meeting a captivating and fun event for all. We're looking forward to seeing you in Hamilton!

ASUM Workshop Interventional Ultrasound

25-27 October 2002

Melbourne

Convenor: Matthew Andrews

This exciting program of lectures by leading Australian practitioners is supported by hands-on workshop sessions and includes:

Biopsy

Abcess Drainage

Breast Intervention

Prostate

Foreign Body Removal

A registration brochure will be included with the May issue of the *Ultrasound Bulletin* and on ASUM's internet site: <http://www.medeserv.com.au/asum>

Chris Kohlenberg Teaching Fellowships 2002

(Sponsored by GE Medical Systems Ultrasound)

In 2002 the Education Committee plans programs in the Victoria and New South Wales branches for the 2002 Teaching Fellows. Details of these programs will be published in the May Bulletin

The Chris Kohlenberg Teaching Fellowship was established by ASUM in association with **GE Medical Systems Ultrasound** to increase the opportunity for members outside the main centres to have access to quality educational opportunities. It has been awarded annually since 1998 to provide educational opportunities for members in New Zealand, Queensland and New South Wales Northern Territory, Western Australia, South Australia and Tasmania. It is named to commemorate Dr Chris Kohlenberg, who died while travelling to educate sonographers.

Branches wishing to propose programs for the 2003 Teaching Fellows should, in the first instance, contact Keith Henderson ph (02) 99586200 fax (02) 99588002 email khenderson@asum.com.au

Nominations and proposals should be addressed to: The Education Officer ASUM 2/181 High St Willoughby 2068 Australia, and should be received before 22 November 2002.

MOSIPP

MOSIPP is ASUM's Continuing Professional Development Program

All MOSIPP participant's should ensure that their records are up to date to 31 January 2002 by entering the data on the website or sending their diaries to the ASUM office.

There have been some problems with the profiles on the MOSIPP website. If you are encountering problems please contact Keith or Tim at the ASUM office or email mosipp@asum.com.au

Chris Kohlenberg Teaching Fellowship, NZ

NZ Branch ASUM was privileged to have one of the Chris Kohlenberg Travelling Fellowships this year. This is one of two Fellowships awarded annually to ASUM Branches and is generously sponsored by GE Medical Systems Ultrasound. The purpose of the Fellowship is to advance education in ultrasound particularly in some of the smaller centres.

We are grateful to Dr Quentin Reeves, radiologist, who eagerly took up the challenge when asked if he would be the Travelling Fellow for NZ. Quentin has a keen interest in musculoskeletal imaging having spent 7 years in Sydney and is passionate about US and MR imaging in sports medicine. Originally from NZ, he moved back to Palmerston North 2 years ago, based at Broadway Radiology. More recently he has relocated to Auckland with the Mercy Radiology Group. Quentin also was part of the radiology team for the 2000 Olympic games in Sydney.

In accordance with the aims of the Fellowship Quentin kindly travelled extensively though NZ, enthusiastically delivering a series of lectures which included 'Ultrasound of the Foot and Ankle', 'Ultrasound Guided Musculoskeletal Intervention' and 'Musculoskeletal Ultrasound: Tips and Pitfalls'. Evening meetings were conducted in Dunedin, Christchurch, Hastings, Tauranga and a Saturday morning series was delivered in Wellington. Many positive comments have followed these meetings. A Saturday workshop was

also conducted in Auckland. The workshop was limited to 50 people to maximise interaction with hands on scanning and question and answers with our invited guests. Mr Stewart Walsh, orthopaedic surgeon from the Adidas Sports Medicine Clinic addressed the foot and ankle and Mr Mark Wright, orthopaedic surgeon, targeted the shoulder. Both were stimulating and informative sessions. Quentin followed on with live scanning of known pathology cases and Q & A. Further live scanning, Q & A and didactic sessions followed. The day was an excellent, enjoyable and interactive learning experience.

The Chris Kohlenberg Travelling Fellowship has been a valuable educational initiative in NZ for those with an interest in MS ultrasound. Thank you GE Medical Systems Ultrasound. Also a huge thank you goes to Dr Quentin Reeves who spent many hours in preparation and travelled widely so as many as possible could benefit. Thank you also to Sandra Fleming, GE Sales manager for NZ, Jill Edgar, Dunedin; Julie Mitchell, Christchurch; Stephanie Sharp, Wellington; Dr Jee Fan Hastings and Dr Deborah Andrews, Tauranga for organising the local meetings.

Mike Heath
Workshop Convenor
Chairman, NZ Branch ASUM

Want to know more about the ASUM Asia Link Program?

Look out for a full supplement which will be published and distributed to members as a separate publication soon. See the Bulletin Vol 4 November 2001 issue for the preliminary report on page 28 or visit our website www.asum.com.au

I am pleased to report that the ASUM Council has resolved to support continuing activities for the ASUM Asia Link Program. The first ASUM Asia Link Program was held during the ASUM 2001 Annual Scientific meeting at Darling Harbour from 7-8 September 2001, when world leaders of ultrasound societies in the Asia Pacific Region attended and presented in Sydney. Amongst them were Dr Hiroke Watanabe, President of the World Federation of Ultrasound in Medicine and Biology (WFUMB), Dr Kittipong Vairojanavong, Vice President of WFUMB and Professor Byung Ihn Choi, Convenor of WFUMB 2006.

Dr Stan Barnett, President of ASUM said "Exchange of knowledge is an essential step in the enhancement of skills and awareness. In the short time since the meeting of the Asia-Link program, invitations have been issued amongst participant societies to attend annual conferences."

Reciprocal invitations have been issued between the Korean Society of Medical Ultrasound (KSMU) and ASUM to have experts in particular fields of common interest address each annual conference.

ASUM Council nominated Dr Matthew Andrews to address the KSMU 2002 Conference. Prof Byung Ihn Choi of Korea has also kindly accepted ASUM's invitation to be our keynote speaker at the ASUM 2002 Annual Scientific Meeting to be held at Gold Coast. Prof Choi is currently the President-Elect of the Asian Federation of Societies of Ultrasound in Medicine and Biology (AFSUMB) and has authored more than 150 publications in medical ultrasound.

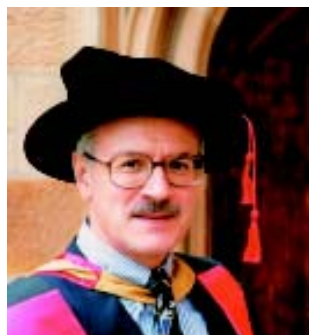
The AFSUMB Administrative Council has agreed to strongly promote a joint activity on ultrasound education between each affiliated society and ASUM. This was a preferred option to establishing a joint convention with AFSUMB which only meets once every three years.

Linkages are being developed with Singapore and work is in progress with Thailand and Malaysia with regard to training issues.

Discussions were also held with various ultrasound companies in Australia. It is pleasing to report that they support the concept of linkages and coordinated training, educational workshops and scientific conferences in the Asia-Pacific region and clearly see the sharing of information and reduction of duplication of effort as an advantage.

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

Meet the President, Dr Stanley B Barnett



What is your involvement with ASUM?

I have been a member since the formation of ASUM in 1970. I have been a member of the Safety Committee for much of that time and have been Chair for 10 years. The international recognition of the ASUM Safety Committee

was highlighted in 1985 when we hosted the 1st WFUMB Symposium on Safety and Standardisation of Ultrasound in Medicine in Sydney.

How long is your term as President?

The entire period is four years beginning with one year as President-Elect. My current two-year term as President will be completed in September 2002, after which I will serve on Council a further year as immediate past-President.

Role of President

There are the prescribed roles that are really the expected duty of a President. These include chairing meetings of Officers and Council and overseeing the activities of committees. However, to be an effective leader the President must also be able to take a broader perspective and deal with the "Big-Picture" issues that affect the development and well-being of the ASUM. We live in a highly competitive world today, and it could almost be considered a dereliction of duty if a President did not tackle difficult situations and determine a future plan to ensure continued growth and viability. I believe that ASUM has a strong future, given the continued dedicated voluntary support of its Council and committees. However, it is essential to take on a proactive role and to assume a leading position as a recognised professional organisation. We have great opportunities to build on our international reputation and to formalise linkages and play a pivotal role in the attainment of high standards of medical practice.

Major Priorities

The development of international professional liaisons are essential for the proper understanding and development of best standards of practice of ultrasound in medicine. Similarly, the advancement of science depends on open dissemination of knowledge. These are vital elements in the achievement of high professional standards within ASUM and throughout the global ultrasound community. This is particularly important for the development of appropriate and relevant practical guidelines for the safe and effective use of ultrasound in medicine. Through my positions as Chair of Safety Committee and as President of ASUM, I have been able to establish professional linkages with other ultrasound organisations including WFUMB, AIUM, BMUS and International Electro-technical Commission (IEC Standards). I have been a contributor,

member, and Vice-Chair of the Safety Committee of the World Federation for Ultrasound in Medicine and Biology.

To establish and maintain an effective Asia-Linkage program providing opportunities for improved education by collaboration and skill-sharing with neighbouring countries in the Asia-Pacific region. Establish credible and reputable centres of excellence for hands-on training. Create partnership scientific conferences in our region. Help co-ordinate training and education outside major cities. Utilise ASUM's strong reputation in education.

To host future WFUMB Congress in Australia.

Main interests

My professional interest is in the development of practical safety guidelines for the safe and effective application of diagnostic ultrasound. This is based on my experience as a research scientist, however, a large component of political understanding is essential. That element is not normally found in the laboratory! I have been fortunate to be invited as guest speaker at many international conferences. The opportunity to share knowledge and appreciate different cultures is fascinating, but it can also be a quite humbling experience!

I particularly enjoy the opportunity to work on collaborative projects with colleagues in other countries or with other ultrasound organisations. Again, the sharing of information is a powerful stimulus. These opportunities tend to present periods of intensive work as there never seems to be enough time to complete tasks that seem straightforward, in theory at least! Nevertheless, I have enjoyed working in laboratories overseas and have greatly appreciated having international visitors in my lab.

Where do you work?

I work in the Health Services sector in the CSIRO. My academic background is in biological sciences and pathology. My first degree was obtained from University of London Kings College and higher degrees from University of New South Wales Medical Faculty. My responsibility is to undertake research into biological effects of non-ionizing radiation emitted from such commonly available devices as medical ultrasound equipment and mobile telephones. I am one of a few remaining original members of the Ultrasonics Laboratory that is still working on ultrasound.

What do you do in your spare time?

On those rare occasions when I have spare time on a weekend I enjoy sailing my catamaran in the waters of Pittwater, Broken Bay and beyond. When the wind velocity is insufficient to bother to raise the mast, I simply enjoy living in the tranquil and natural beauty of "the Pittwater peninsula" in Sydney's northern beaches. The rugged terrain around our house still harbours families of peculiar marsupial including the bandicoot, supposedly an endangered species elsewhere!

ASUM 2002

Conrad Jupiters, Gold Coast, Queensland

**Skills Development Day
19 September 2002**

**32nd Annual Scientific Meeting
20 – 22 September 2002**

On behalf of the organising committee I invite you to attend the 32nd Annual Scientific Meeting at Conrad Jupiters on the beautiful Gold Coast. We encourage you to bring your family and take the opportunity to indulge in some of the recreational opportunities for which the Gold Coast is famous.

The organising committee has planned an interesting educational and scientific program augmented by an invigorating social program. The scientific convenor, Dr Neil Orr has developed an exciting program involving leading speakers from Australia, New Zealand Europe, North America and Asia. The traditional Conference Dinner has been replaced by a less formal event at Sea World and time has been allowed to enable delegates to enjoy the delights of the Gold Coast with their families.

A registration brochure and full details of the scientific and social programs will be included with the February 2002 Bulletin. Full information and on-line registration can be accessed from ASUM's website at <http://www.asum.com.au> from February 2002.

**Ros Savage
Convenor**



Diploma of Medical Ultrasonography examination 2001 - Board of Examiners report

The 2001 Diploma of Medical Ultrasonography examinations commenced on 25 August 2001 with the written papers for both Part I and Part II. Written papers were held at 31 venues across Australia and New Zealand in 7 capital cities, 5 major towns and 19 remote venues.

Part I

187 candidates presented for the Part I examination. The overall pass rate was 72.7%. The pass rate for each region was:

NSW	73%	VIC	73%
SA	89%	QLD	66%
TAS	100% (2 candidates)	WA	82%
ACT	100% (1 candidate)	NZ	71%

The pass rate by Speciality was:

Speciality	No Candidates	Pass Rate
General	98	78%
Cardiac	67	66%
Vascular	13	77%
Obstetric	9	67%

The Mean Score (%) for the Physical Principles of Ultrasound and Instrumentation Paper was 60% (range 24% to 96%).

The Mean Score (%) for the Anatomy, Physiology and Pathology Paper was:

General	61% (30% - 85%)	Cardiac	55% (38% - 78%)
Vascular	63% (49% - 78%)	Obstetric	58% (45% - 67%)

Part II – Written Paper

106 candidates presented for the Part II written examination. The overall pass rate was 88%. Successful candidates were admitted to the Practical and OSCE examinations.

The pass rate for each region was:

NSW	88%	VIC	88%
SA	100% (4 candidates)	QLD	92%
TAS	100% (3 candidates)	WA	77%
ACT	100% (3 candidates)	NZ	93%
NT	100% (1 candidate)		

The pass rate by Speciality was:

Speciality	No Candidates	Pass Rate
General	62	92%
Cardiac	29	83%
Vascular	13	92%
Obstetric	2	100%

Part II – OSCE

102 candidates presented for the OSCE examination. The overall pass rate was 95%. The overall pass rate for each region was:

NSW	97%	VIC	84%
SA	100% (4 candidates)	QLD	92%
TAS	100% (3 candidates)	WA	90%
ACT	100% (3 candidates)	NZ	94%
NT	100% (1 candidate)		

The pass rate by Speciality was:

Speciality	No Candidates	Pass Rate
General	64	95%
Cardiac	25	92%
Vascular	14	79%
Obstetric	2	100%

Part II – Practical

108 candidates presented for the Practical examination. The overall pass rate was 82%. The overall pass rate for each region was:

NSW	92%	VIC	63%
SA	100% (4 candidates)	QLD	67%
TAS	100% (6 candidates)	WA	90%
NT	100% (1 candidate)	NZ	93%
ACT	75% (4 candidates)		

The pass rate by Speciality was:

Speciality	No Candidates	Pass Rate
General	65	82%
Cardiac	23	78%
Vascular	17	88%
Obstetric	3	100%

Part II – Overall Results

130 candidates presented for the Part II examination. The overall pass rate was 71%. The pass rate by Speciality was:

Speciality	No Candidates	Pass Rate
General	75	75%
Cardiac	33	58%
Vascular	19	74%
Obstetric	3	100%

Part II Examinations - Overall performance

General

The overall standard of candidate preparation was good. Areas in which the majority of candidates were well prepared included:

- knowledge and understanding of ultrasound bioeffects
- knowledge and recognition of pancreatic pathology

Areas in which the overall standard of candidate preparation was below expected included:

- knowledge and understanding of uterine pathology;
- recognition and the ability to identify normal abdominal anatomical structures;
- cystic malformations of the lung in the fetus;
- understanding of Doppler principles and their application to spectral and colour Doppler samples.

Cardiac

Areas in which the majority of candidates were well prepared included:

- limitations of the Bernoulli equation in pressure determination in the written paper;

- image optimisation, prosthetic valves, high PRF, regurgitation assessment and diastolic function as demonstrated in the OSCE examination.

Areas in which the overall standard of candidate preparation was below expected included:

- understanding of quantitative assessment of LV systolic function;
- nomenclature and identification of the structures which make up the cardiac crux;
- use of phantoms in the assessment of system and transducer performance including calibration and resolution (also very poorly answered in the 2000 exams);
- use of angle correction in Doppler spectrum in particular relating to assessment of the abdominal aorta.

Vascular

The standard of candidate preparation was generally good with the majority well prepared in the following areas:

- physics OSCE questions including bioeffects, Doppler parameters such as resistive index and peak systolic velocities, and understanding of TGC;
- renal artery stenosis and colour Doppler aliasing;
- appearance and treatments of pseudo aneurysms;
- colour Doppler appearance of SFA occlusion with collateral outflow and inflow;
- abdominal aortic aneurysm endoluminal grafts;

- carotid artery dissection, symptoms and Doppler findings.

Topics in which the overall knowledge was below the necessary standard were:

- knowledge of coeliac artery compression and Doppler findings;
- colour Doppler map orientation with iliac artery occlusion and collateral pathways;
- causes of high resistant vertebral artery flow;
- symptoms of carotid artery arteritis and B mode appearance;
- long/greater saphenous vein tributaries located immediately below the SFJ and reflux patterns.

The Board of Examiners would like to thank the extensive team of volunteer sonographer and sonologist examiners and supervisors, and the participating hospitals and practices, without whose contributions the examinations could not be held.

The Board of Examiners extends congratulations and best wishes to the successful candidates for their future careers as sonographers.

Jill Clarke
Chairman, Board of Examiners
Diploma of Medical Ultrasonography

DMU Examination Results 2001

DMU Part I Examination

The following Candidates passed the Part I Examination:

Abbott, Marsha	QLD	Cardiac	Clark, Alesha	NSW	General	Hoy, Michelle	NSW	Cardiac
Aldridge, Kam	QLD	Cardiac	Cluff, Jacqueline	NZ	General	Huang, Pei	NSW	Vascular
Alexander, Mark	QLD	Cardiac	Cole, Andrew	VIC	General	Hughes, Linda	VIC	Cardiac
Archer, Jacqueline	NSW	General	Cunliffe, Simon	NZ	General	Hussaini, Shaista	NSW	General
Bailey, Lee Anne	NSW	General	Daley, Jocasta	NSW	Cardiac	Irving, Christine	QLD	Cardiac
Baker, Glenn	VIC	General	Devadas, Michael	NSW	General	Kaddatz, Sharon	QLD	General
Barker, Glen	VIC	Cardiac	Donald, Carl	QLD	General	Kinder, Kelly	WA	General
Barrand, Jean	VIC	Vascular	Dumitrescu, Loredana	WA	Vascular	King, Sally	NSW	General
Batchelar, Gillian	NZ	General	Dunncliff, Rachael	VIC	Cardiac	Kolotas, Thomas	NSW	General
Bates, Rebecca	NSW	Obstetric	Fardsavar, Danoush	VIC	General	Kovatch, Catherine	NSW	Vascular
Batty, Fiona	NSW	General	Fursland, Anita	NSW	General	Le, Tam	SA	Cardiac
Bauch, Sally	NSW	Cardiac	Gale, Nicola	VIC	General	Lewis, Michael	VIC	Cardiac
Beadle, Sarah	NSW	General	Gibson, Jason	QLD	Cardiac	Lewis, Philip	NSW	Vascular
Begum, Jahanara	NZ	General	Glass, Anna	NZ	General	Lupuleasa, Chiharu	TAS	General
Beh, Raymond	NSW	General	Goddard, Mark	NSW	General	Lyons, John	NSW	Vascular
Benjamin, Anthony	QLD	Cardiac	Goh, Yuli	VIC	Cardiac	Macfarlane, Josie	NZ	Vascular
Black, Kelly	NSW	General	Gumkowski, Patricia	NSW	General	Magee, Helen	VIC	Obstetric
Bolton, Benjamin	QLD	Cardiac	Hammond, Christine	VIC	Cardiac	Malone, Jacqueline	SA	Cardiac
Bowden, Shaun	SA	Cardiac	Hanna, Mark	NSW	General	Massurit, Cologne	QLD	General
Brasher, Amy	NSW	General	Harris, Andrew	VIC	General	McEnroy, Lorraine	WA	General
Bricknell, Kristen	QLD	Cardiac	Hawke, Nathan	QLD	Cardiac	McQuillan, Craig	NZ	General
Brown, Hayley	SA	Cardiac	Hayes, Teresa	NSW	Vascular	Merchant, Adrian	NSW	General
Bui, Catherine	NSW	Obstetric	Hazlett, Brooke	VIC	General	Mitchell, Lisa	VIC	General
Burnett, Helen	QLD	Cardiac	Henderson, Pauline	NSW	General	Mitic, Mirjana	VIC	General
Cadogan, Tracey	NZ	General	Hines, Yvette	NSW	Cardiac	Mojsilovic, Milomir	NZ	General
Cahill, Michelle	VIC	General	Honeysett, Erin	NSW	Cardiac	Muir, Sean	TAS	General
Cater, Donna	NSW	General	Hort, Donald	WA	General	Mulcahy, Karl	QLD	Cardiac
Cho, In-Suk	WA	General	House, James	VIC	General	Mullen, Joanna	NZ	General

Cont'd on page 32

Reports

Cont'd from page 32

Murchie, Karen	VIC	Cardiac	Price, Peter	WA	General	Sweetman, Nicola	SA	General
Murrell, Janice	Vic	Cardiac	Qin, Ying	QLD	Cardiac	Tawton, Kathryn	QLD	Cardiac
Nugent, Tracey	QLD	Cardiac	Radford, Azin	NSW	General	Taylor, Amy	NSW	General
O'Connor, Kerri	NZ	General	Read, Margaret	QLD	General	Taylor, Danielle	WA	General
O'Malley, Sharon	NSW	Obstetric	Reiken, Joseph	QLD	Cardiac	Thompson, Kathyanne	NSW	General
Oppawsky, Diane	VIC	General	Rutland, Jennifer	VIC	Cardiac	Timmins, Katrina	VIC	Cardiac
O'Sullivan, Joseph	QLD	Cardiac	Samayoa, Adriana	VIC	Vascular	Treath, Tirith	NSW	Obstetric
Pancewicz, Elena	SA	Cardiac	Sandeep, Vishwant	NZ	General	Waghorn, Wendy	NZ	General
Panuccio, Catrina	SA	General	Scott, Richard	VIC	Vascular	White, Jessica	VIC	General
Patrick, Colin	WA	General	Siles, Ingrid	VIC	General	Wickes, Jodie	NZ	General
Pendergast, Haley	QLD	General	Spencer, Catherine	NSW	Cardiac	Worth, Sophy	NZ	General
Perram, Lori	NSW	General	Stapley, Rebecca	SA	Cardiac	Wright, Amanda	NZ	General
Pettersson, Sarah	NSW	General	Sternbeck, Kristin	NSW	General	Zhang, Hai Dong	NSW	General
Pittman, Luke	NSW	Cardiac	Strapps, Kirsten	ACT	Cardiac	Zirein, Omayya	NSW	General
Popovic, Jelena	QLD	General	Su, David	NSW	Cardiac			

DMU Part II Examination

The following Candidates passed the Part II Examination:

Allan, Charmayne	TAS	General	Eades, Jill	VIC	General	Peterson, Rebecca	NSW	Obstetric
Amiet, Toni	NT	General	Eagleton, Michael	NSW	General	Quinn, Katrine	QLD	Cardiac
Anderson, Kylie	QLD	Cardiac	Eller, Timothy	QLD	Cardiac	Range, David	NSW	General
Anderson, Rohan	QLD	General	Forbes, Martin	VIC	Vascular	Riches, Catherine	WA	General
Anderson, Troy	NSW	General	Franklin, Rosemary	SA	Vascular	Riordon, Amy	VIC	General
Ashby, Georgina	VIC	General	Girdler, Rona	NSW	General	Ryan, Leanne	WA	General
Baglin, Terri	QLD	Cardiac	Graves, Jayne	QLD	Cardiac	Seidel, Carolyn	NSW	Vascular
Barker, Sharon	WA	General	Grono, David	NSW	General	Setlhake, Sarah	Safrica	General
Begg, Kaylene	SA	Cardiac	Hansen, Erica	NZ	General	Shaw, Claire	NZ	General
Brown, Pauline	NZ	General	Hare, Andrea	QLD	General	Short, Nicole	NSW	General
Browne, Angela	NZ	Vascular	Horton, Laura	NZ	General	Sketcher, Terry	VIC	General
Cain, Penelope	VIC	General	Hume, Craig	WA	Vascular	Sonne, Jill	NSW	Vascular
Cairnduff, Marion	NZ	General	Jensen, Juliet	NZ	Cardiac	Spargo, Amanda	QLD	Vascular
Campbell, Christen	QLD	Cardiac	Kaushal, Fiona	NSW	General	Spinner, Narelle	VIC	Obstetric
Carter, Karen	NZ	General	Kemble, Jane	ACT	General	Thompson, Fiona	TAS	Vascular
Catchpole, Ian	QLD	Vascular	Kortesidis, Steliani	SA	Cardiac	Thorpe, Kim	NZ	General
Chambers, Jayne	NSW	Vascular	Kyatt, Peter	VIC	Cardiac	Trembath, Deborah	NZ	General
Child, Kerrie	NZ	General	Le, Hoang	NSW	General	Waalwyk, Karen	VIC	Obstetric
Chui, Maria	NSW	Cardiac	Lennie, Chandra	VIC	Cardiac	Wademan, Carmen	VIC	General
Clancy, Caroline	NSW	General	Marlin, Sarah	NSW	Cardiac	Walter-Bruns, Zinta	VIC	Cardiac
Clennett, Susan	WA	General	McCann, Joan	NZ	General	Wei, Yue Li	NSW	Cardiac
Clough, Amy	VIC	Vascular	McIntosh, Louise	NSW	Vascular	Wells, Sally	TAS	General
Coleman, Donna	WA	Vascular	Miu, Florence	NSW	General	White, Christina	WA	General
Compton, Julie	NSW	General	Morgan, Jodie	NSW	General	Williamson, Michelle	NSW	General
Connor, Carmen	NSW	General	Norman, Miriam	TAS	Cardiac	Winter, Susan	NZ	Cardiac
Couch, Julie	NSW	General	Pacey Ann	NSW	Vascular	Zegarac, Katarina	ACT	General
Cox, Allison	ACT	General	Page-Smith, Jodi	NSW	General	Zhu, Judith	NSW	Cardiac
Delimitros, Kon	VIC	General	Pavan, Dennis	NSW	General			
Dodos, Stavros	VIC	General	Pedersen, Jodie	TAS	General			

New Members October – December 2001

FULL MEMBERS

Andrea Barkehall-Thomas	VIC
Keith Burton	NSW
Jeanette Hiew	VIC
Ljiljana Miljkovic-Petkovic	NSW
Allison Richards	QLD
Travis Scott	QLD
David Walters	SA
Lauren Wilson	SA

ASSOCIATE MEMBERS

Georgina Amaral	NSW
Kylie Hamilton	QLD
Andrew Korobov	NSW
Helena Lassemillante	NT
Michelle Murphy	VIC
Melanie Norman	NSW
Nicholas Palmieri	VIC
Maria Peck	NSW
Anil Verma	WA

TRAINEE MEMEBERS

Ley-Ping Eu	VIC
Marilyn Fooks	VIC
Jaspal Hunjan	NSW
Michael Taylor	VIC

Chris Kohlenberg Teaching Fellowship - SA

The South Australian Branch of ASUM has been host to one of the 2001 Chris Kohlenberg Teaching Fellows. This unique teaching fellowship is an educational initiative of ASUM supported by GE, honoring of Chris Kohlenberg who lived a vision of providing ultrasound education not only in major cities but also in rural locations and developing countries. The aim of the fellowship is to invite one of Australasia's most outstanding exponents of diagnostic ultrasound to travel to rural and city locations providing ultrasound education of the highest quality.

This year the honor was bestowed upon Dr Victor Hurley who is well known for his outstanding O&G ultrasound skills and his natural ability to share knowledge and practical scanning techniques with others.

Victor is an obstetrician and gynaecologist, certified as a sub specialist in ultrasound by the Royal Australian and New Zealand College of Obstetrics and Gynaecology (RANZCOG). He is a partner in Melbourne Ultrasound for Women and is a staff specialist at Mercy Hospital for Women. Previously a medical councilor with ASUM, he is currently the chairman of the Australasian Association of Obstetrics and Gynaecological Ultrasonologists (AAOGU) and a member of the ultrasound sub-specialty committee for RANZCOG.

Victor spent a week as the teaching fellow travelling around South Australia. The first leg of the fellowship was Mount Gambier in the south east of the state where the perils of small aircraft and bad weather became evident. Thick fog at the airport forced the flight from Melbourne to Mount Gambier to circle over the city for 40 minutes and then return to Melbourne without setting foot in South Australia. A second attempt later in the day was more successful and Victor spent a day working side by side with local sonographers and sonologists. The department opened its

doors to interested individuals from local clinics as well as staff from Millicent, Naracoorte and southwestern Victoria. Following the full day live scanning workshop Victor gave a series of lectures in a well attended after work meeting.

The second leg of the fellowship was two plane flights away in Whyalla where Victor again spent a day scanning in the local hospital ultrasound department followed by evening lectures. The Whyalla component of the fellowship attracted interested staff from the iron triangle of South Australia including Port Pirie and Port Augusta.

The third leg of the fellowship was a Saturday morning seminar at the Women's and Children's Hospital in Adelaide. Victor was ably assisted by Dr Karen Shand and Lino Piotto who also gave excellent presentations.

In the true tradition of Chris Kohlenberg, Victor has proven himself to be not only a very skilled and knowledgeable sonologist but also a great teacher of his craft.

While the Adelaide leg of the fellowship was very important, I think the greatest value was in visiting Mount Gambier and Whyalla. Rural South Australia has some very fine, dedicated and hard working sonographers and sonologists who crave quality education and have significant geographic difficulties in accessing it. The feedback from the rural locations has been exceptional and the opportunity to work in a live scanning capacity with Victor has been a rare treat they will not forget.

I would like to thank Victor for making his time so generously available and also I would like to thank GE Ultrasound for sponsoring such a great initiative.

Stephen Bird
ASUM South Australian Branch
Honorary Secretary

Australian Vascular Ultrasound Accreditation Board – Update

The Australian Vascular Ultrasound Accreditation Board (AVUAB) was established as an initiative of the Australasian Society for Ultrasound in Medicine (ASUM) in 1997 as a forum for all those involved in the provision of vascular ultrasound with the aim of developing an agreed and reasonable accreditation programme. The accreditation documents currently accessible on ASUM's website address at www.asum.com.au (and by clicking on 'AVUAB' which appears on the front page) are the result of that process.

Since the establishment of AVUAB, the RANZCR has developed and implemented its own comprehensive accreditation programme which may include elements of the AVUAB accreditation guidelines. The other Medical Colleges may develop similar accreditation procedures.

With the development of these various accreditation programmes, it should be noted that the accreditation guidelines suggested by AVUAB are intended as an educational resource only. AVUAB will not be administering an accreditation process nor will it accept any legal liability arising from the use of any of the material contained in the guidelines.

AVUAB will continue to meet as a multidisciplinary forum for the discussion of issues related to vascular ultrasound accreditation and any comments or queries regarding vascular ultrasound accreditation may be referred to AVUAB for consideration.

Dr Gareth Phillips
Chair, AVUAB

DDU 2002

Examination Dates and Fees

Part I Examination Fee

A\$385.00 (includes GST) for ASUM Members

A\$660.00 (includes GST) for Non members

Part II Examination Fee

A\$660.00 (includes GST) for ASUM Members

A\$935.00 (includes GST) for Non members

Part II Casebook Fee

A\$275.00 (includes GST)

Fees quoted above are from 1 July 2000 and may be subject to change.

PLEASE NOTE THE FOLLOWING INFORMATION PERTAINING TO THE NEXT DDU EXAMINATIONS

2002 Part I

Part I written examination will be held on Monday 20 May 2002. Closing date for applications Monday 25 March 2002

2002 Part II

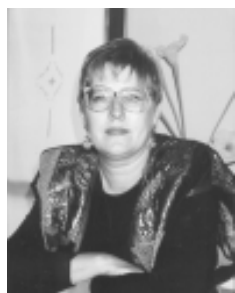
Casebooks for 2001 Part II DDU Examination must be submitted by Monday 21 January 2002 and accompanied by the prescribed fee of A\$275.00 for all participants.

Part II written examination will be held on Monday 20 May 2002. Closing date for applications Monday 25 March 2002.

Part II oral examination will be held on Saturday 15 June 2002 in Sydney, (except Cardiac candidates, who will be examined in Melbourne on a date yet to be determined).

NB Applications received after the closing dates will not be accepted. All applications must be submitted on the original form as photocopies are not acceptable. All applicants are advised to read through the DDU handbook. For the latest copy, please contact ASUM on 61 2 9958 7655.

Obituary for Jan Marshall



When Jan Marshall died, aged 48, on January 8 of cancer in San Jose, California after a short six-week illness, I lost my best friend, my son lost his God Mother, a family lost a daughter and a sister; and the ultrasound industry lost a tireless visionary.

Jan's consuming relationship with the ultrasound profession included working in different aspects of

ultrasound; the clinical, the professional body and then ultimately working for a manufacturer to provide the technology and applications required for tomorrow's medicine.

Originally born in Brisbane, Jan started her career at the Royal Brisbane and Holy Spirit Hospitals prior to moving to Melbourne to become Senior Sonographer at the Royal Children's and St Vincent's Hospitals. While at the Royal Children's she extended her qualifications studying a Degree in Epidemiology and Masters of Ultrasound. Jan was President of the ASUM Ultrasonographers' Group from 1989 to 1990.

Fulfilling a desire to train, teach and influence the way ultrasound was delivered; Jan joined Acuson where she worked for a short time in Melbourne before relocating to Milan as Applications Manager. She arrived in Italy; not

DMU 2002

Examination Dates and Fees

DMU Calendar 2002

26 April 2002	Closing date for applications for an exemption
31 May 2002	Closing date for Part I and Part II applications
24 August 2002	Part I and Part II Written examination
October 2002	Part II Practical and OSCE examinations
December 2002	Part I Statement of Attainment mailed Part II results mailed

DMU Fees 2002

	ASUM Members	Non Members
Part I	A\$450.00 + GST*	A\$800.00 + GST*
Part II	A\$800.00 + GST*	A\$1200.00 + GST*

* GST applies to Australian Residents only

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knowing Italian but determined to embrace the language, people, culture and career completely and with passion. An indication of her success was delivering a technical presentation in Italian and receiving a standing ovation. She later said that was the hardest thing she ever did.

In 1995 she moved to Acuson's office in Silicon Valley, USA where she held a number of senior positions in the marketing and engineering departments until her recent appointment as Director of Product Development, a position that truly delighted her intellect. Jan always had the ability to understand the technology along with the application and held a number of patents directly related to her ideas.

Jan lived a big life, achieving goals that for most of us would have remained as dreams. While the profession has lost a luminary, her professional colleagues have also lost a friend. One always gained a different and fresh perspective on life after time with Jan. Her big smile, her cooking and hospitality, her lack of bigotry, her love of music and her wicked sense of humour also defined her.

She is missed now and will always be remembered.

A memorial lunch will be held in Melbourne, to attend or send your reflections please call Debbie Myers on 0412 384056 or e-mail dmyers@acuson.com

Debbie Myers

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Unfortunately the program scheduled for Melbourne in May 2002 has been cancelled due to unforeseen and unavoidable circumstances. We apologize for any inconvenience caused.

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Fax +61 7 3864 9079
Email: e.stein@qut.edu.au

Course Enquiries Margo Harkness
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| ○ Apr 20th-21st | Breast Ultrasound Techniques |
| ○ May 7th-9th | Train The Trainer |
| ○ June 15th-16th | Advanced Vascular Techniques |
| ○ July 15th-19th | Ultrasound in Emergency Medicine |
| ○ July 27th-28th | Ultrasound in Paediatrics |
| ○ Aug 5th-7th | Advanced Ultrasound in Emergency Medicine |
| ○ Aug 14th-16th | Train The Trainer |
| ○ Oct 12th-13 | Ultrasound Techniques in O&G |
| ○ Oct 14th-18th | O&G Fast Track Training |
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Sat 9 Mar 2002 - 5 days Joint meeting of the Perinatal Society of Australia and New Zealand with the Federation of Oceania and Asia Perinatal Societies *Venue:* Christchurch, New Zealand *Contact:* Susan Day at Wyeth Clinical Services Email: days@labs.wyeth.com

Sun 10 Mar 2002 - 3 days 46th AIUM Annual Convention *Venue:* Opryland Hotel, Nashville, TN USA *Contact:* The American Institute of Ultrasound in Medicine Ph: 301 498 4100; Fax: 301 498 4450; Email: conv_edu@aium.org; Website: www.aium.org

Mon 25 Mar 2002 Closing date for DDU Part 1 and Part 2 written examination applications *Contact:* DDU Coordinator, 2/181 High Street, Willoughby NSW 2068 Ph: 02 9958 7655; Email: ddu@asum.com.au

Fri 19 Apr 2002 - 3 days ASUM Obstetrics and Gynaecology Conference *Venue:* Sheraton on the Park, Sydney *Contact:* ASUM, 2/181 High Street, Willoughby NSW 2068 Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email: asum@asum.com.au

Fri 26 Apr 2002 Closing date for DMU exemption applications *Contact:* DMU Coordinator, 2/181 High Street, Willoughby NSW 2068 Ph: 02 9958 0317; Email: dmu@asum.com.au

Sun 5 May 2002 - 5 days XIVth World Congress of Cardiology *Venue:* Sydney Convention & Exhibition Centre, Australia *Contact:* ICMS Ph: 612 9475 0751; Email: wcc@icms.com.au; Website: <http://www.wcc2002.com.au>

Fri 17 May 2002 - 3 days Australian Sonographers Associations 9th Annual Conference *Venue:* Go Loco, Australian Technology Park, Sydney *Contact:* Elaine Trevaskis Ph: 03 9585 2996

Mon 20 May 2002 DDU Part 1 and Part 2 written examination *Contact:* DDU Coordinator, 2/181 High Street, Willoughby NSW 2068 Ph: 02 9958 7655; Email: ddu@asum.com.au

Thu 23 May 2002 - 4 days Fifth International Congress of the Asian Vascular Society *Venue:* Singapore International Convention & Exhibition Centre *Contact:* Congress Secretariat Ph: 65 299 8992; Fax: 65 299 8983; Email: ctmapl@singnet.com.sg; Website: <http://www.vascular-singapore.org>

Wed 29 May 2002 - 6 days QUT. Cardiac Ultrasound Continuing Education Series. *Venue:* Melbourne *Contact:* Margo Harkness Ph: 07 3864 2490; Email: m.harkness@qut.edu.au

Fri 31 May 2002 Closing date for DMU Part 1 and Part 2 written examination applications *Contact:* DMU Coordinator, 2/181 High Street, Willoughby NSW 2068 Ph: 02 9958 0317; Email: dmu@asum.com.au

Fri 7 Jun 2002 Deadline for applications for Giulia Franco Scholarship for New Presenters and Toshiba ASUM ASM

Scholarships. Application to ASUM Toshiba Scholarships, 2/181 High St, Willoughby NSW 2069, Australia.

Sat 15 Jun 2002 DDU Part 2 oral examination, Sydney, Australia (except Cardiology candidates) *Contact:* DDU Coordinator, 2/181 High Street, Willoughby NSW 2068 Ph: 02 9958 7655; Email: ddu@asum.com.au

Fri 28 Jun 2002 Deadline for applications for Beresford Buttery Overseas Traineeship. Applications to GE Beresford Buttery Overseas Traineeship, c/o ASUM, 2/181 High Street, Willoughby NSW 2068, Australia

Wed 3 Jul 2002 - 5 days Euroson 2002: 14th Congress of the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) *Venue:* Palace of Culture, Warsaw, Poland *Contact:* Imaging Diagnostics Department, Brodno Country Hospital, ul Kondratowicza 8, 03-242 Warszawa, Poland Ph: 48 22 811 9677; Fax: 48 22 811 9591; Email: usgptuwj@euroson.edu.pl

Mon 8 Jul 2002 - 6 days QUT. Cardiac Ultrasound Continuing Education Series. *Venue:* Brisbane *Contact:* Margo Harkness Ph: 07 3864 2490; Email: m.harkness@qut.edu.au

Thu 18 Jul 2001 - 4 days NZASUM. Annual Scientific Meeting 2002. *Venue:* Le Grand Hotel, Victoria Street, Hamilton *Contact:* Martin Necas Email: exiled@clear.net.au

Sat 24 Aug 2002 DMU Part 1 and Part 2 written examination *Contact:* DMU Coordinator, 2/181 High Street, Willoughby NSW 2068 Ph: 02 9958 0317; Email: dmu@asum.com.au

Wed 11 Sep 2002 - 4 days 15th Congress of International Perinatal Doppler Society *Venue:* Hilton Hotel, Prague, Czech Republic *Contact:* <http://www.guarant.cz/IPDS2002>

Thu 19 Sep 2002 - 4 days ASUM 2002. 32nd Annual Scientific Meeting of the Australasian Society for Ultrasound in Medicine. *Venue:* Jupiters Casino, Gold Coast, Queensland, Australia *Contact:* ASUM, 2/181 High Street, Willoughby NSW 2068 Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email: asum@asum.com.au

Sun 22 Sep 2002 - 8 days Radiology in Southern France. Faculty includes Dr Faye Laing. *Venue:* Hotel du Palais, Biarritz, France *Contact:* D Beatty Crawford Ph: 001 440 256 1803; Fax: 001 440 256 4607; Email: radint@ameritech.net

Thu 3 Oct 2002 - 4 days Annual Convention Society of Diagnostic Medical Sonographers (SDMS) *Venue:* Atlanta, Georgia, USA *Contact:* 12770 Coit Road, Ste 708, Dallas, TX 75251, USA Ph: 1 972 239 7367; Email: bplater@sdms.org

Thu 3 Oct 2002 - 4 days 53rd Annual Scientific Meeting of the The Royal Australian and New Zealand College of Radiologists *Venue:* Adelaide Convention Centre *Contact:* Conference Organisers: Aldron Smith Management Ph: 03 9645 6311; Fax: 03 9645 6322

Wed 16 Oct 2002 - 5 days Congress of the Mediterranean African Society of Ultrasound (MASU) *Venue:* Int Conference

Cont'd on page 43

Branch Officers

Branch Chairmen

ACT	Iain Duncan	fax: 02 6286 7552
NSW	to be appointed	
NZ	Mike Heath	fax: 649 529 1545
QLD	to be appointed	
SA	Jane Copley	fax: 08 8344 3194
TAS	Rob Jones	fax: 03 6224 1740
VIC	Vicki Truelove	fax: 03 9558 5731
WA	Martin Marshall	fax: 08 9224 2912

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Centre, Kampala, Uganda *Contact:* Prof Henry Kasozi, Mulago Hospital, PO Box 7051, Kampala, Uganda Ph: 256 41 53 0137; Fax: 256 41 53 0412

Fri 25 Oct 2002 - 3 days Annual Convention Society of Radiologists in Ultrasound *Venue:* Fairmont Hotel, San Francisco, CA, USA *Contact:* Susan Robers, Admin Director, 44211 Slatestone Court, Leesburg, VA 20176-5109, USA Ph: 1 703 729 4839; Fax: 1 703 729 4839; Email: info@sru.org

Fri 1 Nov 2002 - 5 days 12th World Congress on Ultrasound in Obstetrics and Gynecology *Venue:* Hilton, New York,

NY, USA *Contact:* Ms S Johnson, Ex Dir, ISUOG, 3rd fl, Lanesborough Wing, St George's Hospital Medical School, Cranmer Terrace, London SW17 0RE, UK Ph: 44 20 8725 2505; Fax: 44 20 8725 0212; Email: johnson@sghms.ac.uk

Wed 11 December 2002 - 3 days BMUS 34th Annual Scientific Meeting *Venue:* Manchester International Conference Centre *Contact:* 36 Portland Place, London W1B 1LS Ph: 44 20 7636 3714; Fax: 44 20 7323 2175; Email: secretariat@bmus.org; Website: www.bmus.org

Guidelines for authors

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

FEATURE ARTICLES

Feature articles are original papers, or articles reviewing significant areas in ultrasound and will normally be illustrated with relevant images and line drawings. Feature articles are commissioned by the Editor who will indicate the size and scope of the article.

FORUM ARTICLES

Members are invited to contribute short articles expressing their observations, opinions and ideas. Forum articles should not normally exceed 1000 words in length. 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 in the *Bulletin*. Each listing must contain: activity title, dates, venue, organising body and contact details including name, address, phone number, facsimile number (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

Manuscripts should be submitted in triplicate in print and on PC formatted diskette as MS Word documents.

- Font size: maximum 12, minimum 10
- Double spacing for all pages
- Each manuscript should have the following components: Title page, abstract, text, references, tables, legends for illustrations.

- Title Page should include the following:
 - ❖ 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.
- Relevant 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. **Vancouver style format should be used.**

Examples of Vancouver style:

1. In-text citation:as documented in previous studies (1-3). Note: Not superscript
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

All 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. All images sent must have all personal and hospital or practice identifiers removed. Please do not embed images in text. Separate images are required for publication purposes. Figure legends must be provided for the images. 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 (eg Letraset). (Please send one copy of illustrations without labelling as this can be added electronically prior to publication.) On the back of the print include the authors name, figure number and a directional arrow indicating the top of the print. Digitised graphics should be supplied on PC formatted 3.5" diskette, ZIP disk or CD, which must be clearly labelled with the author's name and the names of the image files. JPG or TIFF files are preferred. ZIP disk and CD will be returned after publication if requested. Please do not submit images direct from CPD cameras as these may present problems.

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