ISSN 1441-6891

Volume 9 Number 3 August 2006

Australasian Society for Ultrasound in Medicine

ULTRASOUND BULLETIN

Nuchal Translucency Course
Melbourne 14 September 2006

ASUM Scientific Meeting 2006
Melbourne 15–17 September 2006

ASUM-ISUM Asia Link Ultrasound Meeting
8th ISUM Congress
Bandung Indonesia 8–9 December 2006

ASUM Multidisciplinary Workshop
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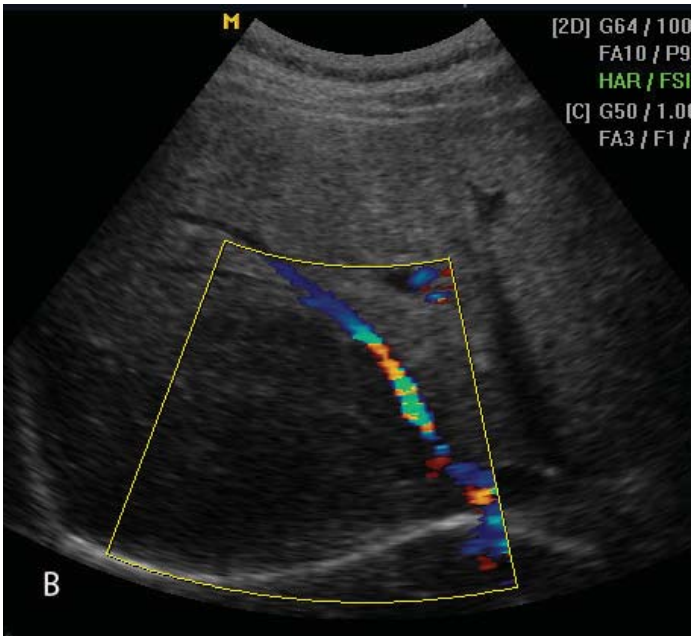
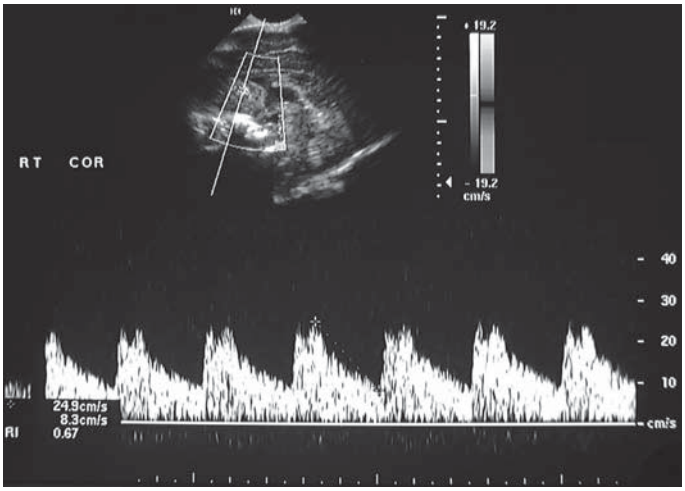
DDU/DMU Preparation Courses
Gold Coast 28 February–4 March 2007

ASUM NZ and RACZR
3rd Combined Scientific Meeting
Wellington New Zealand 19–22 July 2007





- 2nd trimester fetal abnormalities
- Cytomegalovirus infections
- Hepatocellular carcinoma
- Cranio facial abnormalities

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ULTRASOUND BULLETIN
Official publication of the Australasian Society for Ultrasound in Medicine

Published quarterly
ISSN 1441-6891

Indexed by the Sociedad Iberoamericana de Informacion Cientifien (SIIC) Databases

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Membership and general enquiries
to ASUM at the address below

Published on behalf of ASUM by Minnis Communications
Bill Minnis Director
4/16 Maple Grove
Toorak Melbourne Victoria 3142 Australia
tel +61 3 9824 5241 fax +61 3 9824 5247
email minnis@minniscomms.com.au

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AUSTRALASIAN SOCIETY FOR ULTRASOUND IN MEDICINE
ABN 64 001 679 161
2/181 High Street
Willoughby Sydney NSW 2068 Australia

tel +61 2 9958 7655 fax +61 2 9958 8002
email asum@asum.com.au
website:http //www.asum.com.au

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ULTRASOUND BULLETIN

ASUM Ultrasound Bulletin August 9: 3

Notes from the Editor

Welcome to the August issue of the *Ultrasound Bulletin.*

It has been a very busy period for ASUM and this issue reflects that activity. The Society's active role in Australia, New Zealand, Asia and Europe is evident in the President's and the CEO's reports.

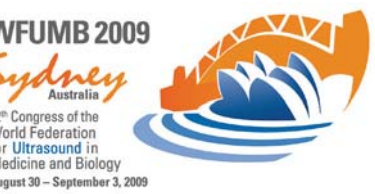
The official launch in Seoul of the Sydney venue for WFUMB 2009 places ASUM in the 'hot seat' and ushers in an exciting era for practitioners of ultrasound in Australia.

WUFMB 2009 in Sydney will be the ultrasound 'meeting of a lifetime' and all members of ASUM as well as other members of the sonographic community in Australia and New Zealand should start planning their contribution to or attendance at this one-off opportunity.

This issue contains a thought-provoking article on 2nd trimester screening in detecting fetal abnormalities by Albalooshi and Benzie, as well as articles by Pedretti on cytomegalovirus infection and Williams on hepatocellular carcinoma. Readers are exhorted to read and respond to Letters to Editor on the implications of nuchal translucency screening.

The Annual Scientific Meeting in Melbourne is detailed on pages 16–17, and promises a varied and exciting program.

Readers are encouraged to register for the ASM 2006 and as always, to submit their own contribution to our journal.



ASUM extends a warm welcome to you at upcoming ASUM meetings

Australasian Society for Ultrasound in Medicine

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15 – 17 September 2006

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ASUM2006 www.icms.com.au/asum2006

ASUM Head Office

Australasian Society for Ultrasound in Medicine (ASUM)
Promoting Excellence in Ultrasound
2/181 High Street
Willoughby NSW 2068
Sydney Australia
Telephone: +61 2 9958 7655
Facsimile: +61 2 9958 8002
Email: asum@asum.com.au
Website: www.asum.com.au

Meeting Secretariat

ICMS Pty Ltd
84 Queensbridge Street
Southbank VIC 3006
Australia
Telephone: +61 3 9682 0244
Facsimile: +61 3 9682 0288
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President's message

Dr David Rogers

Hello to you all. Since my last report in May, the academic season for ASUM has certainly been in full swing, with an ambitious program.

First, a large delegation from ASUM attended the WFUMB 2006 meeting in Seoul, Korea. What a magnificent event this was – the Olympics of ultrasound. The Koreans, under the leadership of Prof Choi and Prof Kim, organised a spectacular event, with a fantastic academic program and a Grade A social program.

This conference is of special significance to ASUM as it is the conference preceding the 2009 WFUMB Congress in Sydney. It begins the three-year countdown for our own organising committee and certainly threw down the gauntlet for us to match and, hopefully, better. There is a great deal of work to do between now and then, and I encourage all ASUM members to take up the challenge and assist the organising committee in any way possible. Already, ASUM has conducted a great deal of promotional work around the globe. To formally launch the 2009 Congress, ASUM hosted an excellent cocktail party in Seoul, which was very well attended by keynote speakers and WFUMB councillors. This helped raise awareness of the Sydney event and, hopefully, many will plan to make the long trip from the northern hemisphere. We extend our gratitude to our event sponsors: GE Healthcare, Terason and Toshiba.

In June Roger Davies, Caroline Hong and I travelled to Denmark to present lectures at the 9th International Congress on Interventional Ultrasound, hosted by the Danish Society of Diagnostic Ultrasound, in Copenhagen. This was the first Australasian exchange to Denmark under the recently formed CADUCEUS liaison whereby there will be continued exchanges of speakers at meetings hosted by ASUM and DSDU. Christian Nolsoe has been the driving force behind this and ASUM is deeply indebted to Christian for his efforts. The congress was of the highest of standard, with many of the originators of interventional ultrasound present, such as Prof Hans Henrik Holm and Skip Van Sonnenberg.

Recently, the New Zealand Branch held its annual meeting in Napier. This meeting was a tribute to the continued enthusiasm of the New Zealand members, and the dedication of the organising committee, under the leadership of Rowena Tyman and Jayne Lloyd. As ASUM now holds a Council Meeting in conjunction with this meeting, it was very pleasing to see the contribution of the ASUM Council members who presented seven talks in total. Of special interest were the veterinary ultrasound talks given by Angela Harkness. Hopefully, Angela will become a regular presenter at ASUM meetings. The inclusion of photos of her patients was a lovely touch. I am not sure pictures of our own human patients would evoke such a response.

It is with relief, but tinged with some sadness, that this is my last President's report. My two-year term has flown by. It has been my honour to meet many people from around the world in this role. It has been a privilege to serve ASUM in this capacity. I am still amazed at the strength of the Society, the enthusiasm of the members and their dedication to education that is the cornerstone of all ASUM activities. During the last two years there have been many highlights. To list the most important ones:

i) The expansion of ASUM activities within Asia. This has seen the status of ASUM grow immensely within the region. ASUM now has links with many Asian societies and collaborates with them in educational events.

ii) The passing of the first candidates from the DMU (Asia) course in Kuala Lumpur. This has been ground breaking work to help establish the field of sonography in an area where sonographers are not recognised. The first students were of the highest calibre and will be a credit to the program.

iii) The establishment of the CADUCEUS liaison with Denmark, as previously outlined.

iv) The sale of the old ASUM offices and the purchase of a new building in recent months. This building will give the ASUM secretariat the space it needs to perform its work and should be a sound investment for the future.

v) The holding of a strategic planning

Dr David Rogers, Dr Caroline Hong and Dr Christian Nolsøe launch CADUCEUS

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Left – Dr David Rogers and Assoc Prof Roger Davies at the Interventional Ultrasound Congress in Copenhagen. Right – CADUCEUS founding members Dr Bjorn Skjoldbye, Dr Caroline Hong, Dr David Rogers, Dr Christian Nolsøe and Dr Hans Henrik Holm

seminar to try to set the course for future ASUM activities.

vi) The establishment of the ASUM College of Ultrasound. This is a major and creative new initiative that should help to maintain ASUM's position as the peak body in ultrasound education. This has been passionately driven forward by Glenn McNally.

vii) The establishment of new, prestigious, travelling fellowships which should bring speakers to many areas.

I must thank my wife and family for their support and patience during the last two years, when my family time has been eroded and my presence scarce. Without their support my efforts would have been greatly diminished. I must also thank my working colleagues who will be relieved to see me more often at their sides.

Lastly, I must thank ASUM CEO Dr Caroline Hong, who has made my job easy over the last two years. Caroline is the driving force behind ASUM and we are very fortunate to have her working for the Society. She is also supported by fantastic staff at the office.

Best wishes to Matthew Andrews who will take over as President in September. I am sure you will do a great job, Matthew.

David Rogers
ASUM President

ASUM seeks applications for funding for research to be presented at WFUMB 2009 in Sydney

Applications for research funding by the ASUM Research and Grants Committee should be received by 1st October. Applications which involve a presentation of results at WFUMB 2009 in Sydney, will be prioritised, but must meet the normal criteria outlined in the ASUM Research and Grants Policy.

Applicants will be notified of the decision with respect to their application two months after the 1st October deadline.

Applications must be in writing and address all of the criteria outlined in the ASUM Research and Grants Policy.

Applications to be addressed to:
The Chairman
ASUM Research and Grants Committee
2/181 High Street
Willoughby
New South Wales 2068
Australia
Enquiries to Mr Keith Henderson
tel +61 2 9958 6200
email khenderson@asum.com.au

Applications invited for ASUM Research Grants

ASUM is seeking to support research which builds on the body of existing research findings and extends our knowledge of the applications, efficacy and safety of clinical ultrasound.

Applications are particularly invited in the areas of:

1 High frequency ultrasound

2 Therapeutic ultrasound applications

3 Tissue elasticity

4 Obstetric growth parameters pertinent to the whole Australian and/or New Zealand population

5 Flow Mediated Dilatation and/or Intima Media Thickness Studies

Projects in other areas will be considered, however, it is unlikely that applications for projects that duplicate existing findings, or studies, will be successful except where it is judged that these are necessary to validate the findings of other studies.

Enquiries to Mr Keith Henderson
tel +61 2 9958 6200
email khenderson@asum.com.au

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CEO's message

Dr Caroline Hong

At the time of writing this message, ASUM has just finished a successful meeting in Napier, Hawkes Bay, New Zealand. Napier is a truly beautiful, seaside, Art Deco town. Rowena Tyman, Jayne Lloyd and the whole organising committee did an excellent job at the local level in presenting a great conference at the Napier War Memorial Convention Centre, with the conference dinner at Mission Estate Winery themed on the movie Naked Gun.

The keynote speakers were Marilyn Siegel, Martin Necas and Sue Davies. Many prominent speakers from the ASUM membership and Council supported the program. The generous support and sponsorship of Siemens, Philips, Toshiba and GE Healthcare also contributed greatly to the success of the meeting.

The ASUM Council met all day on Saturday 15th July and considered many issues, including the WFUMB 2009 World Congress, the ASUM College of Ultrasound, education issues, research and grants, annual scientific meetings, multidisciplinary workshops, membership, DMU, DDU, CCPU, standards of practice, international linkages and the new ASUM office.

WFUMB 2009 World Congress

Many members who have been following the progress of this congress would be aware that work on WFUMB 2009 started as far back as 2001, when the bidding process started. Since that time, considerable effort and expense have been invested towards promoting the congress internationally. The Organising Committee is now tasked with many decisions to ensure the success of this congress, which will be held from 30th August to 3rd September 2009 in Sydney.

A team of members and staff represented ASUM at the WFUMB 2006 Seoul World Congress in May. The Congress attracted 3082 participants from 68 countries. The scientific programs consisted of a congress lecture, 10 plenary lectures, three 'Hot Focus' sessions, 53 refresher courses with 204 presentations, 49 keynote lectures, 63 scientific sessions with 434 oral presentations and 516 scientific exhibitions, including 67 Young Investigator Award presentations.

ASUM hosted a Society booth, which attracted a lot of attention during the Congress. ASUM also hosted a cocktail party to officially launch the next WFUMB 2009 World Congress to be held in Sydney. This cocktail party was generously sponsored by GE Healthcare, Toshiba and Terason.

Stephen Bird from ASUM won the Bronze Award for the Best Scientific Exhibition, which was presented to him at the World Congress Dinner.

The WFUMB Council also decided that the WFUMB Congress, after the Sydney event in 2009, will be held biannually; the next one being in Vienna for WFUMB 2011.

CADUCEUS 2006

The **C**ollaborative **A**ustralasian **D**anish **U**ndertaking of **C**ontinued **E**xcellence in **U**ltra**S**ound – CADUCEUS – was launched officially in Copenhagen at the 9th International Congress for Ultrasound this year.

A small ASUM team, consisting of Dr David Rogers, Dr Roger Davies and myself, represented ASUM at the June launch. For those who are not aware of CADUCEUS, this project has been

Clockwise from top left: Prof Byung Ihn Choi, Mrs Eun Kyung and Caroline Hong, Welcome reception at Seoul, Dr Caroline Hong and Mr Stephen Bird after his win at WFUMB, Prof Marilyn Seigel and Dr Iain Morle at the New Zealand ASM meeting in Napier

running for two years between ASUM and the Danish Society for Diagnostic Ultrasound (DSDU).

The purpose is to work in collaboration to further develop the promotion of excellence in ultrasound to a level comparable to the best in the world. A Memorandum of Agreement was signed between both parties to facilitate DSDU and ASUM to promote a high standard of professional practice in medical ultrasound and also to promote a mutual exchange of information on or relating to education and training in medical ultrasound.

Expressions of interest are invited from the ASUM membership to participate in an exchange program, to be based in Denmark, for a short-term research or education project. Email carolinehong@asum.com.au.

ASUM College of Ultrasound

The development of the ASUM College of Ultrasound has commenced, with an injection of funds. Stan Barnett has commenced duties as Project Director on a fixed term contract. Dr Glenn McNally, Chair of the Advisory Board of the College, is the key driver for this project, with support from Keith Henderson, ASUM Education Manager.

ASUM is well placed, not only as the peak ultrasound imaging body in New Zealand and Australia, but, also as an internationally recognised certification provider, to provide educational mechanisms to support the ultrasound community. The purpose of establishing this college is to ensure standardisation of skills and to provide quality assurance for the benefit of end-users, the medical community and the patient. The programs offered will provide access to a high level of training in a wide range of applications. It is projected that a program of courses will commence in 2007. For more information, please contact the ASUM office at asum@asum.com.au.

ASUM 2006 Melbourne 14–17th September 2006

This meeting is just around the corner and registrations are coming in steadily. We assure you of a high quality event with lots of opportunities to network with luminaries in ultrasound. ASUM meetings are also a lot of fun and it is always pleasing to see so many familiar faces at these meetings. If you have never attended an ASUM meeting, please make this your first, you will be amazed at how much there is to be gained. Dr Andrew Ngu, Dr Matthew Andrews and the local organising committee have all worked hard in putting together a fantastic program. All details are available on www.asum.com.au/asum2006.htm and I urge you to book online, as well as reserve your accommodation, well in advance to avoid disappointment.

The meeting will start on Thursday 14th September 2006 with the Nuchal Translucency Course, followed by three days of the Annual Scientific Meeting from Friday 15th September to Sunday 17th September 2006. The skills day, which is usually held on Thursday, will now be held on Sunday, 17th September 2006. You will have noticed the ASM program in this edition.

New ASUM head office

We are pleased to advise the membership that ASUM Council has approved the purchase of slightly bigger office

premises in St Leonards. The current ASUM office, based in Willoughby, was bought by ASUM in 1989 and sold in 2004 at a reasonably good price, with a three-year lease back option. We hope to complete the purchase settlement and relocate to St Leonards by the end of 2006. The new premises will better serve the Society as the current premises are too small to accommodate all of ASUM's staff and activities. The new office is located in an 'association precinct' close to many other medical and health related associations. The location is very favourable as it is close to public transport, public and private hospitals, office amenities and the central Sydney CBD.

Membership

By now, many of you would have received your renewal notices for membership for the period 1st July 2006 to 30th June 2007. There are at least 18 reasons why you should join ASUM and if you have not acted on your renewal, please do so now so that you do not lose the benefits of ASUM membership. You can now renew or join online.

For information on the benefits of joining ASUM email registrar@asum.com.au. Applications for corresponding membership for those based outside of Australia are also welcome.

ASUM member wins Dr DE Strandness Research Award

I take great pleasure in congratulating Kathryn Busch from Camperdown Vascular Laboratory on winning the 2006 Dr DE Strandness Research Award at the Society for Vascular Ultrasound's (SVU) 29th Annual Conference in Philadelphia, USA, in June.

Kathryn's presentation, High resolution duplex ultrasound imaging proves a high incidence of arterial neovascularisation, was chosen as the best scientific paper presented at the meeting. The Dr DE Strandness Research Award is the most prestigious research award offered by the SVU. Well done Kathryn.

Dr Caroline Hong
ASUM CEO
carolinehong@asum.com.au

UPCOMING ASUM MEETINGS

● Update Skills ● Networking ● Professional Development

Email asum@asum.com.au or see www.asum.com.au for regular updates

ASUM 2006 Annual Scientific Meeting Melbourne Australia
14th–17th September 2006

ASUM 2007 Multidisciplinary Workshop Gold Coast Australia
2nd–4th March 2007

ASUM 2007 Joint meeting with RANZCR NZ Wellington New Zealand
19th–22nd July 2007

ASUM 2007 Annual Scientific Meeting Cairns Australia
13th–17th September 2007

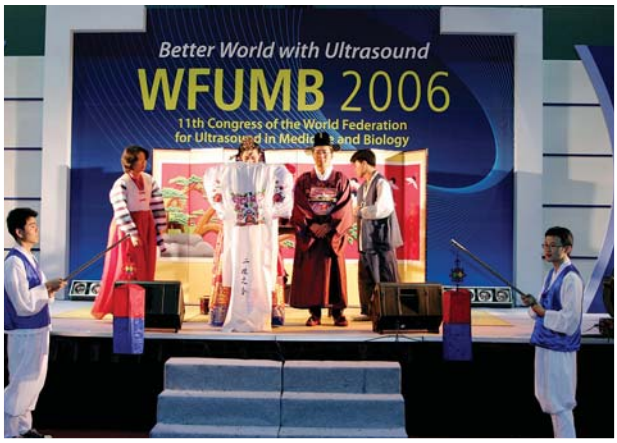
ASUM 2008 Annual Scientific Meeting Auckland New Zealand
September 2008

WFUMB 2009 World Congress Sydney Australia
30th August–3rd September 2009

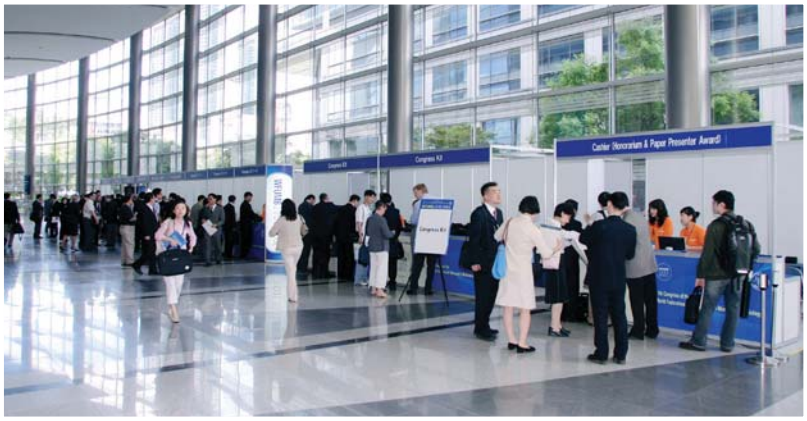
Notice of Annual General Meeting

The 2006 Annual General Meeting of the Australasian Society for Ultrasound in Medicine will be held at The Melbourne Convention Centre on Saturday 16th September 2006 Commencing at 2.30 pm

Images from WFUMB Seoul 2006



Opening ceremony performances

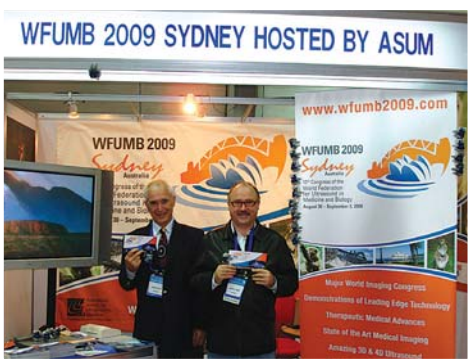


The registration area at WFUMB 2006

Lunch symposium

ASUM booth promoting WFUMB Sydney 2009

Mr David Fauchon and Mr Stephen Bird



Prof Ron Benzie and Dr Glenn McNally

WFUMB 2009 Sydney Cocktail Party

Exhibition at WFUMB Seoul

Prof Marv Ziskin, Ms Kaye Griffiths, Mrs Shirley Barnett and Dr Stan Barnett at WFUMB Seoul

Welcome reception at WFUMB Seoul

The GE Healthcare stand

Prof Barry Goldberg, Dr Caroline Hong, Dr David Rogers, Mr Stephen Bird and Mr Keith Henderson

Prof and Mrs H Watanabe with Prof and Mrs Kim

The WFUMB Sydney cocktail party was a popular Congress social event

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To the Editor

Right of reply – Mark Bryant re article 'Changing frequency effects nuchal translucency measurement'

The article '*Changing Frequency Affects Nuchal Translucency Measurement'* (*Ultrasound Bulletin* 2006 May; 9 (2): 30–32) aimed to demonstrate that it is possible to have data collection errors of up to 100%, when following the current criteria set by the Fetal Medicine Foundation (FMF) for measuring the nuchal translucency thickness. This is possible by variable spatial pulse length (SPL) and its effect on axial resolution.

In response to Dr Andrew McLennan's comments, I have made the following observations.

1 Transducer availability – The variation in SPL of transducers available to operators may vary from 0.3–3 mm (tenfold). Consequently, it is very difficult to have accurate inter-practice and inter-operator reproducibility of this measurement.
2 The majority of patients in our practice are suitable for scanning with a range of higher frequency transducers.
3 Incorrect gain setting and the use of harmonics may have an effect on the 'apparent' skin thickness. These factors can have some effect on axial resolution. However, the primary factor in determining axial resolution is the spatial pulse length.
4 Dr McLennan's postscript statement, *'In Figure 5b, the fetus is not truly mid-sagittal and both callipers are placed in the nuchal fluid, not on the first part of the lines making the measurement inappropriately small'* is incorrect. Figure 5b demonstrates a skin thickness of 0.4 mm. The nuchal translucency has not been measured. The phrase 'not truly mid-sagittal' is difficult to assess because all images have the forehead and face removed and/or are outside the focal zone.

Mark Bryant

To the Editor

Comment on McLennan's reply to Bryant re article 'Changing frequency effects nuchal translucency measurement'

I would like to comment on Dr McLennan's reply to Mr Bryant's article on *'Changing frequency affects nuchal translucency measurement'* (*Ultrasound Bulletin* 2006 May; 9(2): 30–32). Before discussing the merits of this response, my communication with Mr Bryant indicates that he was not advised that Dr McLennan would have right of reply before publication. Is this normal ASUM practice?

Concerning Dr McLennan's response, firstly, as we are all aware, one of the basic tenets of ultrasound is the use of the highest frequency transducer compatible with adequate penetration. While many patients are not compatible with the use of higher frequency transducers, nevertheless a significant number can be scanned with 7 MHz or in some cases 12 MHz transducers. It would be an interesting exercise to see what proportion of the images sent in for nuchal translucency accreditation purposes are of a high frequency.

Second, changing the gain to reduce the 'fuzz' is basic to nuchal measurement techniques and, unfortunately, will not improve axial resolution.

Third, Dr McLennan notes that adjusting the measurement would involve ignoring a large body of literature. Without launching into a grandiose argument with examples of developments that ignored large bodies of literature, it is enough to say that advances in medical knowledge come, in part, through the critical analysis and questioning of the accepted status quo. Finally, in response to Dr McLennan's postscript, it would appear he has misinterpreted image 5a. Mr Bryant's aim here was to show the skin thickness and not to produce a nuchal measurement.

Rod McGregor MHSc

Editor's note*: When controversial matters arise it is the established editorial practice of the ASUM Ultrasound Bulletin to invite comment from relevant experts for co-publication.*

To the Editor

Comment on paper 'Ultrasound in New Zealand Emergency Departments' Sampsa Kiuru, MD

This paper reports on a practical survey within New Zealand on the use and level of skills in emergency departments in which it finds lack of standardisation of training and accreditation. While the findings come from a relatively small population, they probably have universal relevance. The author states in his conclusions that: '*The main factors that seem to hinder the effective and timely use of diagnostic ultrasound in emergency departments seem to be the lack of systematic, coordinated training and the absence of standardised certification for the physicians in use of ultrasound*.'

This study identifies a problem of availability of equipment and trained personnel. There is, in fact, a general and urgent need to standardise the level of diagnostic care.

While the increasing availability of inexpensive ultrasound devices can help with the provision of equipment to a wider community, this can actually exacerbate the problem of inconsistency of standards of practice and quality assurance.

Being the peak ultrasound imaging body in Australia and New Zealand, ASUM is acutely aware of these important issues and understands the essential need for equitable accreditation and standards of practice. Accordingly, ASUM has appointed a project director with the responsibility of establishing a College of Ultrasound. The primary objectives are to provide mechanisms to support the needs of end-users, the ultrasound equipment industry and the community by achieving appropriate standards of skill.

Besides developing support systems for Australia and New Zealand, the ASUM College of Ultrasound is also developing collaborative ventures in the Asia Pacific region. This follows on from the establishment of the Asia Link program.

It is only proper that ASUM should seek to ensure that educational and practical ultrasonographic skills are developed to the levels that are set by ASUM. It is also anticipated that the establishment of the CCPU will contribute towards this end.

ASUM College of Ultrasound
Dr Stan Barnett, Project Director
Dr Glenn McNally, Chair Advisory Committee

To the Editor

Thanks from SA and rural Vic

Recently, I was privileged to attend the Chris Kohlenberg Teaching Fellowship lecture and workshop at the Mt Gambier Hospital, delivered by David Fauchon.

I would like to take this opportunity to thank you for your time and effort in presenting your talk and then spending an entire day scanning with us. It was all greatly appreciated.

Generally, we have to travel long distances to receive the high standard of education you presented to us. The lecture on gynaecological ultrasound was very informative. During the workshops, it was reassuring for us to realise that we are all able to perform the studies to a national standard. The seminars on 3D and 4D ultrasound and third trimester fetal welfare were also of great value. The local obstetrician and general practioners who also attended, were also very impressed by the standard of the material covered, as well as the professional way in which it was delivered.

The highlight of your visit was the scanning workshops. The opportunity to work one-on-one with a sonographer of your calibre was an opportunity not to be missed and was greatly appreciated by all who participated.

I must thank ASUM and GE Healthcare for facilitating this visit and recommend that ASUM members take advantage of any similar events. They are well worth the effort.

I trust that some of our good food, wine and *bon temps* went some way to offset the long hours spent in small aircraft and waiting in airports. I hope that you enjoyed the WFUMB 2006 in Korea.

Lyn Muir

To the Editor

Thanks from Wagga Wagga

I would like to extend a thank you on behalf of Regional Imaging Riverina – Wagga Wagga ultrasound team to Dr Meiri Robertson for her recent visit.

We started on Friday in the Department, with Dr Robertson scanning. Protocols, routines and reviews were discussed. This informal day allowed all of us to talk and ask many questions on all aspects of obstetric scanning.

On Saturday, we spent a more formal day with structured lectures and dedicated question and answer sessions. The ultrasound staff, radiologists, local obstetricians and general practitioners attended this forum with topics covering a broad spectrum of subjects.

Some areas of review included: nuchal screening, twins, Doppler studies and third trimester assessments. As many of our patients are referred for tertiary assessment and many to the Fetal Medicine Centre where Dr Robertson works, it was great to get positive feedback.

The event, overall, allowed a fantastic review of our work with many points of discussion identifying protocols that we, as a department, could confidently include immediately. It was nice to have reinforcement that what we present as a regional centre is of a high quality and received well from tertiary centres.

Thank you to Dr Robertson for a very positive and interesting two-day forum.

Karen Dorsett

ASUM EXAMINATIONS ADVICE AND INFORMATION

Contact Marie Cawood for information about the DMU

Contact Matthew Byron for information about the DMU

tel +61 2 9958 7655 email asum@asum.com.au

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ASUM ASM
15–17th September 2006
14th September Nuchal

Friday 15th September 2006		
O&G 8.30 am – 10.00 am	**Vascular 8.30 am – 10.00 am**	**MSK: Shoulder 8.30 am – 10.00 am**
Ultrasound of the Ovaries • How to Assess Ovarian Tumour with Ultrasound Prof Kittipong Vairojanavong • Morphologic Ultrasound Appearance of Complex Ovarian Tumour Prof Kittipong Vairojanavong	• Exploring the Popliteal Fossa Prof John Harris • Potential Ultrasound Facilitated Overuse of Carotid Interventions Prof Gregory Moneta • Transcranial Doppler and Duplex Scanning Prof Brian Chambers	• Ultrasound of the Shoulder: The Washington University Experience Prof Sharlene Teefey • Dynamic Assessment of Shoulder Pain Ms Mary Langdale • Clinical Examination of the Shoulder Dr Peter Larkins
Morning Tea 10.00 am – 10.30 am		
Plenary 1 10.30 am – 12.30 pm		
Opening Address • Utility of Duplex Scanning for Peripheral Arterial Disease in 2006 Prof Gregory Moneta • Safety of Ultrasound Prof Marvin Ziskin • Mathematical Models to Distinguish Benign / Malignant Tumour Prof Dirk Timmerman • ASUM Meets China / ASUM Asia Link: Contrast Enhanced Ultrasound Prof Yuxin Jiang • ASUM Meets China / ASUM Asia Link: Contrast Enhanced Ultrasound Features of Liver Abscess Dr Yu Xia		
Lunch 12.30 pm – 1.30 pm		
O&G 1.30 pm – 3.00 pm		**General 1.30 pm – 3.00 pm**
Improving Fetal Cardiac Diagnosis • Introduction / Overview Dr James Grimwade • The Dilemma of Poor Antenatal Diagnosis of Congenital Heart Disease. The Dilemma of Poor Antenatal Diagnosis Prof Dan Penny • Normal Physiology of the Fetal Heart Prof Adrian Walker • Normal / Abnormal Anatomy Prof Jim Wilkinson • Live Scanning of Normal Heart + 3D / 4D Display Dr Mark Teoh		• Emergency Room FAST Scanning Prof John McGahan • Ultrasound – Contrast Agents in Diagnosis of Focal Liver Lesions Dr Christian Nolsøe • Ultrasound of the Paediatric Eye Mr Cain Brockley
O&G 3.30 pm – 5.30 pm		**General 3.30 pm – 5.30 pm**
Improving Fetal Cardiac Diagnosis • Diagnosis of Fetal Cardiac Malformation in the First Trimester Dr Simon Meagher • Problem Solving of Abnormal Fetal Heart Presentations Dr Simon Meagher, Prof Charles Kleinman, Prof Sam Menahem, Dr James Grimwade • Fetal Arrhythmias Prof Charles Kleinman • Management Issues Following the Diagnosis of a Fetal Heart Abnormality Prof Sam Menahem • The Future of Fetal Cardiology Prof Charles Kleinman • Concluding Remarks Dr James Grimwade		• The Difficult Gallbladder Prof Sharlene Teefey • Interventional US Abdominal Dr Christian Nolsøe • Right Lower Quadrant Ultrasound Prof John McGahan
Saturday 16th September		
7.30 am – 8.30 am Meet the Expert Breakfast		
O&G 8.30 am – 10.00 am	**Vascular 8.30 am – 10.00 am**	**General / breast 8.30 am – 10.00 am**
The Fetal Head – MRI / Ultrasound • Understanding Ultrasound of the Fetal Head Prof John McGahan • Comparative Development Anatomy of the Fetal Brain – Ultrasound and MRI Dr Michelle Fink, Dr Amanda Sampson • Malformation of Cortical Development Dr Richard Leventer • Examples of Fetal Brain Abnormalities Using Ultrasound / MRI Dr Michelle Fink / Dr Amanda Sampson	• Ultrasound for Assessment and Interventions for Chronic Liver Disease Dr Anthony Schelleman • Mesenteric Duplex Scanning: From Development to Current Status Prof Gregory Moneta • Ankle / Brachial Pressure Indices – Essential in Clinical Practice Professor John Harris • Ankle / Brachial Pressure Indices – Now of Limited Value Prof Ken Myers • Ultrasound and Endovenous Treatment for Varicose Veins Ms Christine Bolton	• Breast Surgery / Perspective Integration Dr Darren Lockie / Dr Jennifer Senior • Somthing Old and Somthing New Ms Allison Rose • Pitfalls and Tricks for Breast Ultrasound Ms Paula King

PROGRAM 2006
Melbourne Convention Centre
Translucency Course

Morning Tea 10.00 am – 10.30 pm

O&G 10.30 am–12.00 pm O&G

Premature Labour and Placenta	Vascular	MSK
• Ultrasound of Placental Praevia Accreta Prof David Ellwood • Transvaginal Scans of Pregnant Cervix Prof Kittipong Vairojanovong • Doppler Assessment of a Sick Fetus Dr Amamda Sampson • Predicting Placental Pathology with Ultrasound Prof David Ellwood	• Surveillance During and After Arterial Surgery Professor Philip Walker • Non-Invasive Tests of Venous Hemodynamics: What We Know and Don't Know in the Era of CEAP Prof Gregory Moneta • Ultrasound and Non-Atherosclerotic Arterial Diseases Prof Harry Gibbs	• Hip Pain Ms Mary Langdale • Functional Anatomy and Pathology of the Lateral Hip with Ultrasound Correlation Dr Ross McKellar • Tears of the Gluteal Tendons –a Surgeon's Perspective Mr Elton Edwards • Ultrasound of the Paediatric Hip Mr Cain Brockley

Lunch 12.00 pm – 1.00 pm

O&G 1.00 pm – 2.30 pm

3D / 4D Ultrasound		General
• The Role of the 3D in Gynaecology Dr Michael Bethune • Debate – The Place of Entertainment Ultrasound in Obstetrics For – Prof Lachlan de Crespigny Against – Dr Glenn McNally • New Technologies in 3D Ultrasound Dr Michael Bethune		• Testicular Microlithiasis: a Marker of Malignancy? Prof Sharlene Teefey • Prostate Imaging and Treatment Dr Grant Baxter • The Use of Ultrasound in Male Infertility Mr Gordon Baker • Non Gynaecological Pelvic Pathology Dr Simon Meagher

Afternoon Tea 2.30 pm – 3.00 pm

O&G 3.00 pm – 5.00 pm

Early Pregnancy	Vascular	MSK
• Diagnosis / Management of Pregnancies of Unknown Location (PULS) Dr George Condus • Ethics and Legal Aspects of Later Term Termination of Pregnancy Assoc Professor Lachlan de Crespigny / Prof David Ellwood • The Role of the 11–14 Week Scan Dr Amanda Sampson • Where Are We At With Soft Markers? Dr Michael Bethune	• Ultrasound and Haemodialysis Access Surgery – Establishing Criteria Professor Harry Gibbs • Evaluation of Upper Extremity Ischaemia Professor Gregory Moneta • Ultrasound and Renal Transplantation Ms Paula King	• The Accuracy of Ultrasound for Diagnosing Focal Lesions of the Hand and Wrist Prof Sharlene Teefey • Blood vessels: Their Role in Tendon Pain and Pathology Assoc Prof Jill Cook • Trigger Finger Dr Lois Basham • Morton's of Not Ms Mary Langdale

Defence of Poster and Electronic Presentations 5.00 pm – 6.00 pm

ASUM ASM Gala Dinner 7.00 pm – 11.00 pm

Sunday, 17th September 2006

PLENARY 2 8.30 am – 10.30 am

Ultrasound Guided Tumour Ablation Prof John McGahan
Establishing an Ultrasound Unit in 2006 Prof Philip Walker
Venous Thrombosis – The Current Status Prof Ken Myers
Managing Expectations in Pregnancy Ultrasound Dr Mark O'Brien

Morning Tea – Brunch 10.30 am – 11.00 am

O&G 11.00 am – 1.00 pm	General 11.00 am – 1.00 pm
Ultrasound of the Endometrium • Differential Diagnosis of Endometrial Abnormality Prof Dirk Timmerman • Ultrasound Diagnosis of Trophoblastic Tissue Prof Kittipong Vairojanavong • Prediction of Depth of Infiltration in Endometrial Carcinoma Prof Dirk Timmerman	• Uterine Vascular Malformation Prof Dirk Timmerman • Dealing with Challenging Patients and Difficult Situations Dr Mark O'Brien

2007 Introduction and Closing Address

Skills Development Workshops 11.00 am – 4.20 pm

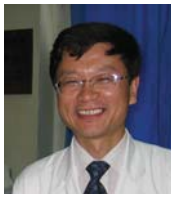
Workshop 1	Workshop 2	Workshop 3	Workshop 4
• Counselling Customer Service Breast Ultrasound Ms Tania Griffiths • The Gynaecological Pelvic Exam Dr Amanda Sampson	• What's New With Testes Mr Bob McDonald • The Fetal Heart Scan The 11–14 Week Scan Ms Louise Worley • Preventative Maintenance for Sonographers Ms Roslyn Savage	• The Advanced Shoulder Mr Chris Sykes • The Wrist and Elbow Mr Stephen Bird • Ovarian Veins Mr Martin Necas • The Ankle Ms Mary Langdaie	• Ultrasound Examination of Varicose Veins Mr Robert Ziegenbein • Ultrasound of Abdominal Aortic Aneurysms Mr Robert Ziegenbein • The Hip – Beyond the Hernia Mrs Oriana Tolo • Salivary Gland Ultrasound Workshop Mr Mark Smyth

ASUM ASM 2006 international and local keynote speaker profiles

International keynote speakers

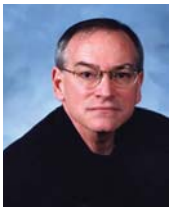
Dr Grant Baxter
ASUM BMUS Presidential Exchange
Consultant Radiologist, Honorary Senior Lecturer, University of Glasgow, United Kingdom

Dr Grant Baxter is a general radiologist with subspecialty interest in oncology, GU, including renal transplantation, and ultrasound. The Western Infirmary incorporates the Beatson Oncology Unit, which is the second largest cancer centre in the United Kingdom. Dr Grant is involved with the West of Scotland Prostate Brachytherapy Team and is Head of the Ultrasound Department. Other interests centre upon ultrasound contrast agents and needle techniques, under either ultrasound or CT guidance.



Prof Yuxin Jiang MD
ASUM Meets China
Director of the Department of Diagnostic Ultrasound, Peking Union Medical College Hospital, Beijing, China

Prof Jiang is Professor of the Chinese Academy of Medical Sciences and Peking Union Medical College in Beijing, China and President of the Society for Ultrasound in Medicine Chinese Medical Association (SUM/CMA). Prof Jiang will lead a team from China to present at ASUM ASM 2006 on topics relating to ultrasound guided therapy, e.g. HIFU and radio frequency and microwave ablation, use of contrast in ultrasound, and various interventional techniques.



Professor Charles Kleinman MD
Director, Fetal Cardiology, Children's Hospital of New York, United States

Prof Charles S Kleinman MD is Chief of Paediatric Cardiac Imaging at the Children's Hospital of New York and Professor of Clinical Paediatrics and Obstetrics and Gynaecology at Columbia University College of Physicians and Surgeons, and Weill Medical College at Cornell University, New York. He also runs the Fetal Cardiology Service at the New York Children's Hospital and affiliated hospitals in New York.

Prof John McGahan MD
Director of Abdominal Imaging and Ultrasound, University of California, United States

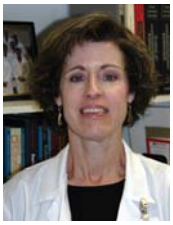
Prof John McGahan, MD is the Professor for Radiology and Director of Abdominal Imaging and Ultrasound at the University of California, Davis, located in Sacramento, California. He is the author of over 200 scientific articles and has been editor of over five published text books in the field of ultrasonography.

Prof Gregory Moneta
Professor of Surgery, Oregon Health Services University, Portland, United States

Prof Gregory Moneta is Professor of Surgery at the Oregon Health Services University in Portland, Oregon, USA. He is Past President of several national bodies, including the American Venous Forum. He has been actively involved with vascular ultrasound since its inception and has performed seminal studies on criteria for diagnosing carotid, mesenteric and renal arterial disease. He is actively involved in establishing criteria for performance in vascular laboratories.

Dr Christian Nolsøe
ASUM Denmark CADUCEUS
President of the Danish Society of Diagnostic Ultrasound (DSDU), Denmark, Associate Professor, Department of Circulation and Medical Imaging, Norwegian University of Science and Technology, Trondheim, Norway

Dr Christian Nolsøe is the President of the Danish Society of Diagnostic Ultrasound (DSDU). He is a radiologist with subspeciality in ultrasound and a PhD in image guided tissue ablation. His fields of interest include interventional ultrasound, Doppler, tissue ablation, ultrasound contrast and new techniques.



Prof Sharlene Teefey MD
Director of Ultrasound, Mallinckrodt Institute of Radiology, Washington University School of Medicine, United States

Prof Sharlene Teefey is Professor of Radiology and the Director of Ultrasound at the Mallinckrodt Institute of Radiology. Her residency and fellowship were at the Mayo Graduate School of Medicine. She has a special interest in musculoskeletal ultrasound, which has also been the focus of her research.

Prof Dirk Timmerman
Professor Faculty of Medicine, UZ Gasthuisberg, Belgium

Prof Dirk Timmerman is head of the unit of Prenatal Medicine and Gynaecological Ultrasound at the University Hospitals of Leuven. He is Coordinator of the International Ovarian Tumour Analysis (IOTA) collaborative group and Belgian representative to the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB). He is a member of the International Society of Ultrasound in Obstetrics and Gynaecology (ISUOG) Board and a member of the editorial board of *Ultrasound in Obstetrics and Gynecology*. His main interest is gynaecological ultrasonography.

Prof Kittipong Vairojanavong
WFUMB Invited Lecturer
Sponsored by ASUM
Past President, Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB), Rajavithi Hospital, Thailand

Prof Kittipong Vairojanavong is the Past President of the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB). He is involved with the advisory editorial boards of the journals *Fetal Diagnosis and Therapy*, as well as *Ultrasound Review of Obstetrics and Gynaecology*.

Prof Marvin C Ziskin
WFUMB Invited Lecturer
Sponsored by ASUM
President of the World Federation for Ultrasound in Medicine and Biology (WFUMB), Professor of Radiology and Medical Physics, Temple University Medical School, USA

Prof Marvin C Ziskin, MD, MS (Biomedical Engineering) commenced his career in ultrasound in 1965 at Hahnemann Medical College, where he pioneered in B-scan techniques in clinical medicine. In 1968 he joined the faculty at Temple University Medical School, where he has been Professor of Radiology and Medical Physics for the past 38 years. He has written more than 200 scientific articles and is the co-author of seven textbooks. From 1982 to 1984, he was the President of the American Institute of Ultrasound, and from 2003 to 2006 has been the President of the World Federation for Ultrasound in Medicine and Biology (WFUMB).

Local keynote speakers

Dr Michael Bethune
Consultant Sonologist, Melbourne Ultrasound for Women, Mercy Hospital for Women, The Royal Women's Hospital, Melbourne

Dr Michael Bethune is a specialist obstetrician and gynaecologist with the subspecialty Certificate in Obstetric and Gynaecological Ultrasound (COGU). He is a visiting imaging specialist at the Royal Women's Hospital, Melbourne and at the Mercy Hospital for Women. He also works in private practice at Melbourne Ultrasound for Women. Dr Bethune is the Treasurer of the Australasian Association of Obstetric and Gynaecological Ultrasonologists (AAOGU). He is actively involved in ultrasound education and has spoken at several national and international meetings. He is a RANZCOG accredited nuchal translucency assessor. His fields of interest include 3D/4D ultrasound and prenatal diagnosis.

Mr Cain Brockley
Chief Sonographer, Medical Imaging Department, Royal Children's Hospital Melbourne

Mr Cain Brockley has been the Chief Sonographer at the Royal Children's Hospital in Melbourne for the last five years. He obtained his postgraduate qualification at RMIT University and, since that time, has been involved in all aspects of paediatric ultrasound. Mr Brockley has been involved in a number of research and academic projects including co-writing paediatric subject matter for the Monash University ultrasound course. Mr Brockley regularly presents at a range of educational events, as well as local and national conferences. His areas of interest include paediatric liver transplant evaluation, ultrasound of the paediatric eye and specialised paediatric musculoskeletal examination.

Assoc Prof Lachlan de Crespigny
Honorary Fellow, Murdoch Children's Research Institute Principal Fellow, Department of Obstetrics and Gynaecology, University of Melbourne Melbourne

Assoc Prof Lachlan de Crespigny is an obstetrician and gynaecologist who practices exclusively in ultrasound and related diagnostic procedures. He is a Principal Fellow in the Department of Obstetrics and Gynaecology at the University of Melbourne and is an Honorary Fellow of the Murdoch Children's Research Institute. He is in private ultrasound practice. He has long had an interest in research in his specialty and has published widely in Australian and international journals. His recent topics include ethics and abortion. He is co-author of *Prenatal Tests: The Facts* (OUP 2005). Assoc Prof Lachlan de Crespigny was President of ASUM from 1992 to 1994.

Prof David A Ellwood
UI/UL Plenary Award Lecturer, Canberra Clinical School, UTS and ANU Canberra Associate Dean and Professor of Obstetrics and Gynaecology, The Canberra Clinical School of the University of Sydney and ANU, Director of the Fetal Medicine Unit at The Canberra Hospital, Canberra

Prof David Ellwood is a practicing obstetrician and certified subspecialist in maternal-fetal medicine who is interested in teaching and research in high risk obstetrics. Currently he is the President of the Perinatal Society of Australia and New Zealand (PSANZ). He is an Executive Member of Women's Health Australia (WHA). He is also a member of the Advisory Faculty of Advanced Life Support in Obstetrics (ALSO). He is the Past Chair of the Maternal-Fetal Medicine Committee of the RANZCOG and the current Chair of the Research Assessment Sub-Committee which oversees research training for trainees. He is a Past Chair of the High Risk Obstetric Advisory Group of NSW Perinatal Services Network (HROAG). He is widely published and sits on the Advisory Board of the publication *Australian Doctor*. Prof Ellwood's expert opinion is sought in a wide range of pregnancy and birth related legal issues.

Ms Mary Langdale
Senior Sonographer, Victoria House Imaging, Melbourne

Ms Mary Langdale, a DMU qualified general sonographer, is currently employed as the senior sonographer at Victoria House Imaging in Melbourne. She has an extensive knowledge of musculoskeletal ultrasound and her full time job in the busy private practice involves a workload of at least 80% MSK. The variety of injuries seen is immense and includes many elite athletes from varying sports. She has a keen interest in sharing her knowledge with fellow

sonographers, sonologists and medical staff both within the department and around Australia through various presentations, workshops and tutorials with Monash University, ASUM and ASA.

Dr Simon Meagher
Director Monash Ultrasound For Women, Monash IVF, Melbourne
Consultant Obstetrician Gynaecologist/Sonologist at the Mercy Hospital and Box Hill Hospital.

Dr Simon Meagher is actively involved in research and has published over 50 articles in peer review and local journals. He has a dedicated interest in education and has produced a world-first DVD library in obstetric and gynaecological ultrasound, with the first five chapters now distributed through ASUM (see www.asum.com.au). Over recent years, his Melbourne-based annual workshops have attracted large numbers nationally and internationally. He is an examiner for the ASUM Diploma in Diagnostic Ultrasound (DDU) and has an established private practice.

Dr Amanda Sampson
Clinical Director of Ultrasound, Royal Women's Hospital, Melbourne, Australia
Director, Women's Imaging Centre, Melbourne

Dr Amanda Sampson has taken an active interest in the teaching of ultrasound through the RANZCOG, having collaboratively developed three CD-ROM *Practice Improvements Projects for Fellows and Subspecialists* (Threatened Miscarriage, Gynaecology, Fetal Brains). Her main areas of interest include training, multiple pregnancy, fetal brain development and abnormality, intrauterine transfusions and adolescent gynaecology. She has served on numerous committees within RANZCOG and is the RANZCOG representative with the Department of Health and Aging.

Visit our major sponsors at ASUM ASM 2006

Adjudication of ASM prizes and awards

Due to the generosity of ASUM corporate members a range of prizes and awards are offered for proffered presentations at the 2006 Annual Scientific Meeting. Prizes and awards are for specifically designated purposes as described on the published list of prizes and awards. Adjudication of the prizes and awards is undertaken by an Adjudication Panel under the auspices of the ASUM Education Committee.

In order to conduct the adjudication of prizes and awards in the most objective and equitable way, guidelines for adjudication and scoring sheets are used by the panel. The stated purpose of the prize or award is a major factor in determining the eligibility of contributions for a particular prize or award.

For the purpose of prizes and awards, contributions to the scientific program are broadly categorised into four groups:

1 **Oral presentation of a descriptive clinical or literature review type**
These may include a case study description, the description of a new technique or a literature based review of a particular topic.
2 **Oral presentation of original research**
This type of presentation will typically describe the methodology, results and conclusions of scientifically conducted, original research.
3 **Poster presentation of a descriptive clinical or literature review type**
These may include a case study description, the description of a new technique or a literature based review of a particular topic.
4 **Poster presentation of original research**
This type of presentation will typically describe the methodology, results and conclusions of scientifically conducted, original research.

Eligibility for particular prizes and awards is based on the nature of the presentation, professional category of the presenter and other criteria as described in the relevant prize or award description. In submitting a presentation for consideration for prizes and awards, contributors are advised to read carefully the following list of prizes and awards, and their descriptors, so as to determine the eligibility of contributions for a particular award.

Best Sonographer Research Presentation Award. Value $A2000. Sponsored by Philips Medical Systems Australasia Pty Ltd
To be awarded for the best proffered research paper by a sonographer.

Best Research Presentation Award. Value $A1500 Sponsored by Siemens Ltd – Medical Solutions
To be awarded for the best proffered research paper.

Anthony Tynan Best Clinical Presentation Award (Formerly Best Clinical Presentation Award). Value $A1000 Sponsored by Siemens Ltd – Medical Solutions
To be awarded for the best clinical presentation proffered as a paper or poster.

Best Poster Award. Value $A500 and a free registration for the presenting author to the next ASUM ASM. Sponsored by ASUM
To be awarded for the best poster.

Adjudication Guidelines for Oral Presentations

Presenter: **Title of Presentation:**

Category of presentation:

☐ **Descriptive clinical** ☐ **Literature review** ☐ **Original research**

		POOR		CREDITABLE		OUTSTANDING
ABSTRACT	Correctly portrays the presentation,demonstrates the relevance of the topic and creates interest	1	2	3	4	5
INTRODUCTION	Acknowledges Chair and audience. Describes the contextual relevance of the topic. Aims/hypothesis/purpose clearly stated.	1	2	3	4	5
CONTENT	Well developed description of topic/case.	1	2	3	4	5
	Relates topic/issues to local context and conditions.	1	2	3	4	5
	Integrates own thought and refers to other work on the topic.	2	4	6	8	10
	Describes the problem/issue/technique in detail.	2	4	6	8	10
	Discussion relates to, and is supported by relevant literature.	2	4	6	8	10
	Literature is appropriate and current.	1	2	3	4	5
	Comprehensive coverage.	1	2	3	4	5
CONCLUSION	Summarises major points/findings. Outlines recommendations for future work.	1	2	3	4	5
PRESENTATION	Audiovisual well sequenced and relevant to the presentation with appropriate image quality.	1	2	3	4	5
	Presentation well sequenced. Clear and audible presentation Holds audience interest.	1	2	3	4	5
ORIGINALITY	Original thought is evident in the selection of the topic.	1	2	3	4	5
	The methodology is appropriate and shows evidence of originality in its design.	2	4	6	8	10
VALUE	The topic is relevant and beneficial to the profession.	2	4	6	8	10
IF MORE THAN 2 MINUTES OVERTIME DEDUCT 50 POINTS					SCORE	/100

Adjudication Guidelines for Poster Presentations

Presenter: **Title of Presentation:**

Category of presentation:

☐ **Descriptive clinical** ☐ **Literature review** ☐ **Original research**

		POOR		CREDITABLE		OUTSTANDING
ABSTRACT	Correctly portrays the presentation, demonstrates the relevance of the topic and creates interest.	1	2	3	4	5
INTRODUCTION	Describes the contextual relevance of the topic. Aims/hypothesis/ purpose clearly stated.	1	2	3	4	5
CONTENT	Well developed description of topic/case.	1	2	3	4	5
	Relates topic/issues to local context and conditions.	1	2	3	4	5
	Integrates own thought and refers to other work on the topic.	2	4	6	8	10
	Describes the problem/issue/technique in detail.	2	4	6	8	10
	Discussion relates to, and is supported by relevant literature.	2	4	6	8	10
	Literature is appropriate and current.	1	2	3	4	5
	Comprehensive coverage.	1	2	3	4	5
CONCLUSION	Summarises major points/findings. Outlines recommendations for future work.	1	2	3	4	5
DESIGN	Logical and easy to follow. Information presented concisely.	1	2	3	4	5
	Text is eye catching and easily viewed. Important points are well illustrated.	1	2	3	4	5
ORIGINALITY	Original thought is evident in the selection of the topic.	1	2	3	4	5
	The methodology is appropriate and shows evidence of originality in its design.	2	4	6	8	10
VALUE	The topic is relevant and beneficial to the profession.	2	4	6	8	10
					SCORE	/100

ASUM Ultrasound Bulletin 2006 August; 9 (3): 22–33

Effectiveness of second trimester ultrasound screening in detecting fetal abnormalities

Saeeda Albalooshi and Ronald J. Benzie

Abstract

Objective To determine the detection rate of fetal anomalies in different organ systems by second trimester anatomy scan between 18–22 weeks.

Methods A retrospective chart review of all women who had anomaly scanning from 1st January 2002 to 31st December 2003. A total of 4371 women with singleton fetuses had second trimester sonography between 18 and 22 weeks gestation.

Main outcome measures Information obtained from hospital records regarding different systems which included: central nervous system, cardiac, genitourinary, chest, gastrointestinal, neck and face, and musculoskeletal.

Results A total of 4371 women had second trimester anomaly scanning from 1st January 2002 to 31st December 2003. One-hundred-and-two fetuses and newborns with anomalies were diagnosed, which gives a prevalence of 2.3%. Sixty-five (63.7%) of the 102 anomalous fetuses were diagnosed at 18–22 weeks, 16 (15.7%) were diagnosed after 22 weeks and 21 (20.6%) were diagnosed after birth. The sensitivity for detecting anomalies ranged from 91% to 66% according to the organ system of the fetus.

Conclusion This study has demonstrated the potential of screening in the second trimester and the clinical value of second trimester fetal anomaly scanning. It has also demonstrated that the detection rate at the18–22 weeks scan of the central nervous, the genitourinary and the musculoskeletal systems is good. However, cardiac abnormalities can be missed at the 18–22 weeks scan, though what is missed is usually a small heart defect.

One-stage ultrasound examination at the midtrimester gives acceptable results concerning congenital anomalies with few false positives.

Introduction

The advent of routine antenatal ultrasonography in Australia and other countries has altered the mode of presentation and natural history of a number of congenital anomalies. The most commonly cited benefits of routine ultrasound screening in the mid trimester include: better gestational age assessment, detection of multiple gestations and the detection of unsuspected fetal anomalies.

In spite of the fact that routine ultrasound has these and other apparent benefits, the RADIUS and other trials have not shown a reduction in perinatal mortality or morbidity.[1] Critics of this study have pointed out that it may be unreasonable to expect a screening test, in this case ultrasound, to alter morbidity in a study for which no interventions were specified. Until there are studies showing that routine ultrasound enhances the ability of obstetricians to recognise and improve the outcome of pregnancy complications, the most substantial argument in favour of routine ultrasound screening will centre on its ability to diagnose birth defects and reassure the parents. This knowledge allows the parents a better choice and a decrease in the prevalence of children born with major abnormalities. Routine rather than indicated ultrasound screening is necessary to diagnose most birth defects prenatally, since 75% of fetal anomalies occur in women considered being low risk.[2,3]

Worldwide, there have been several large trials, which sought to determine the accuracy of routine ultrasound for diagnosis of birth defects[1,4,5] and some studies have demonstrated decreased perinatal morbidity and mortality rates following the use of ultrasound in pregnancy.[4,5]

This has led to the introduction of ultrasonographic screening programs as part of the antenatal care offered to every pregnant woman in several developed countries.

The use of routine ultrasound screening for fetal anomalies in the second trimester of pregnancy, including a four-chamber view of the heart, had led to diagnosis of approximately 50% of all fetal structural anomalies that could not be detected by other screening tests, such as prenatal chromosomal analysis or maternal serum alpha-fetoprotein screening.[6–9]

Saeeda Albalooshi MBBS

Ronald J Benzie MBChB, FRCSC, FRANZCOG, ARDMS
Christopher Kohlenberg Department of Perinatal Ultrasound
Nepean Hospital, University of Sydney
Penrith
New South Wales 2750
Australia

Correpondence to Ron Benzie
email BenzieR@wahs.nsw.gov.au

The timing of an anomaly scan must, therefore, balance the gestation at which technical ability and organ development allow for a reliable diagnosis or reassurance to be given, against unnecessary delay. To our knowledge, as yet, no study has identified the optimum gestation at which the anomaly scan should be performed. However, most screening programs recommend ultrasound examination to be performed at 18, 20 or 22 weeks of gestation.

Gestational age may well have influence on the feasibility of the examination, the diagnosis of fetal anomalies and timing when termination of pregnancy is available.

We present the results of a retrospective study in unselected pregnant women with scans done between 18–22 weeks gestation to determine the detection rate of abnormalities or need for further ultrasound assessment.

Materials and methods

Current obstetric practice in Australia follows Australasian Society of Ultrasound Medicine guidelines (ASUM),[10] which suggests that every pregnant woman should have a fetal ultrasound examination at 18 to 20 weeks gestation, principally to detect congenital fetal anomalies.

The Christopher Kohlenberg Department of Perinatal Ultrasound of Nepean Hospital, University of Sydney, is a large tertiary referral unit specialising in the diagnosis and management of a wide range of congenital malformations. Computerised records of all fetuses scanned from 1st January 2002 to 31st December 2003, with a diagnosis of congenital malformation, were retrieved and analysed.

The Institutional Ethics Committee approved the study; informed consent was waived.

There were four scanning rooms in the Ultrasound Department during that time. Room 1 contained a Siemens Sonoline, which had 3.5 MHz and 5 MHz sector probes, a multiformat imaging system and a video recorder. Room 2 contained an Ultramark 9 with 3.5 MHz sector probe and a thermo printer and video recorder. Room 3 had ATL 3000 HDI with C9-5MHz transvaginal transducer and C4-2MHz transabdominal transducer. Room 4 had Voluson 730 with RIC5-9 transvaginal probe and RAB4-8P three-dimensional transabdominal probe as well as AC2-5 and AB2-7 transabdominal transducers. Room 3 and 4 had thermo printers.

Three full-time sonographers and three half-time sonographers performed the obstetrics scans. The women were scheduled at 30 min intervals.

The 18–22 weeks scan determines fetal growth parameters, head and abdominal circumference, biparietal diameter, femoral and humerus length and, sometimes, general limb length. It consists of a full anatomy scan, including four-chamber view of the heart. Table 1 gives details of the anatomical checks that are made routinely.

Results were recorded in close cooperation with obstetricians. Cases with fetal cardiac anomalies and some other complex anomalies were referred to specialist centres. Amniocentesis was performed at the Perinatal Ultrasound Department of Nepean Hospital.

Comments were made in the notes on the effect of anomalies on the parents. A note was also made if the scan was particularly difficult because of maternal obesity, scarring of the uterus due to previous surgeries, or fetal position. Table 2 shows some of the difficulties during routine ultrasound screening for detecting fetal abnormalities.

Table 1: Standard fetal anatomical checklist used in routine ultrasound scanning by ASUM Guidelines.[10]

Measurement
- Biparietal diameter
- Head circumference
- Femur length
- Humerus length

Head
- Skull shape
- Intracranial anatomy (ventricles and cerebellum)

Face
- Lips
- Binocular distance
- Profile

Spine
- Sagittal
- Coronal
- Transverse

Heart
- Position
- Axis
- Four-chamber view of the heart and extended heart views to show Intraventricular septum

Great vessels
- Left ventricular outflow tract
- Right ventricular outflow tract
- Aortic arch
- Ductal arch

Thorax

Diaphragm

Abdomen
- Stomach bubble
- Anterior abdominal wall
- Kidneys (left and right)
- Bladder

Umbilical cord
- Cord insertion
- Presence of three vessels

Extremities
- Hands/fingers
- Feet/toes

Checklists for high risk (aneuploidy) scan
- Brachycephaly
- Humerus length
- Nuchal fold
- Heart-ASD/VSD-Aortic arch
- Missing middle phalanx on 5th digit
- Clinodactyl
- Hydronephrosis
- Choroid plexus cysts
- Echogenic bowel
- Widened space between hallux and 2nd toe

The women were rescheduled for a scan at 18 weeks, if the gestational age determined by ultrasound at first scan was less than 18 weeks.

Definition of cases

We defined congenital abnormalities as the various structural defects noted at birth, which include malformations, deformation, or dysplasias. We excluded the abnormalities without serious medical consequence (minor deformities of the nose, ears and face, clicking hip, umbilical or inguinal hernia, undescended testes, hydrocele, phimosis, hypospadias, isolated skin lesions, functional cardiac murmurs, and

Table 2: Reasons for failure to detect an abnormality in routine ultrasound screening programs.

Reason	Example
Patient non-compliance	Declines scan / Late booking
Technical difficulties	Maternal obesity/ Fetal position Multiple pregnancy
Absence of sonographic sign	Tracheo-esophageal fistula/ Down syndrome with no structural abnormality
Late appearance of sonographic sign	Duodenal atresia/ Small bowel obstruction/ Hydrocephalus/ Microcephaly/ Obstructive uropathies/ Pleural effusions

isolated single umbilical artery). Isolated growth restriction, amniotic fluid abnormalities, hydrops due to RH incompatibility, mild pelvicalyceal dilatation, and choroid plexus cysts were also excluded.

Chromosomal abnormalities in the absence of structural deformities were also recorded but are not presented.

Data analysis

The data during pregnancy from each patient were compared with the data obtained at birth or obtained on autopsy (at elective terminations and perinatal deaths). An ultrasonographic diagnosis was classified as:

(1) **True positive** when it was confirmed by examination at term (clinical, paraclinical or autopsy findings).

(2) **False negative** if it was observed at term but not detected on ultrasonographic examination during pregnancy.

(3) **False positive** if it was recorded before birth but was not confirmed by examinations at birth.

(4) **True negative** if an abnormality was suspected initially but was not confirmed on subsequent ultrasonographic examinations or at birth.

Results

There were 6696 registerable births in this two-year period. Information was available on all abnormalities identified at delivery. Using this information, it was possible to assess the efficacy of sonographic antenatal screening for significant congenital fetal abnormalities. Additional data on perinatal death and all pregnancies terminated because of proved fetal abnormality in this two-year period were collected and analysed.

Abnormalities recorded

The number of midtrimester ultrasound examinations performed during the study period was 4371. One-hundred-and-fifty-three malformations were recorded in 102 fetuses, representing 1.5 abnormalities per malformed fetus. Altogether, there were 102 fetuses and newborns with anomalies, which gave a prevalence of 2.3%.

Of the 102 malformed fetuses, 63 (61.8%) had a single malformation, 28 (27.5%) had two malformations, and 11 (10.8%) had three or more malformations.

The most common fetal malformations were those of central nervous system (25.5% of total anomalies) and the second common system for fetal anomalies was of urinary tract (19.6%) followed by cardiovascular system (19%),

Table 3: Incidence, sensitivity, specificity, positive, and negative predictive value for anomalies in fetuses during ultrasound examination.

	Malformations in the fetuses		
Ultrasound examination	Present	Absent	Total
Positive	126	15	141
Negative	27	4203	4230
Total	153	4218	4371
Incidence	3.5%		
Sensitivity	82.4%		
Specificity	99.6%		
Positive predictive value	89.4%		
Negative predictive value	99.4%		

neck and face (13.7%), musculoskeletal system (13.7%), chest (4.6%) and gastrointestinal (3.9%).

Sensitivity of screening

Of the 153 malformations recorded in our study, 126 were diagnosed during pregnancy. The overall sensitivity for detection of malformations by ultrasonography in this unselected population was 82.4%. There were 15 false positives and 27 remained undiagnosed (false negatives), which gives a specificity of 99.6% and positive predictive value of 89.4% (Table 3). The 15 false positive findings were of fetuses with mild ventriculomegaly and renal pelvic dilatation mainly that were not confirmed after birth.

It can be seen from the results shown in Table 4 that there were marked differences in the detection rate for different malformation. The best detected abnormalities were those of the urinary system (90.9%), central nervous system (88%) and major musculoskeletal abnormalities (88%). The lowest detection rate was for cardiac abnormalities (68.8%) and face and neck (66.7%).

Gestational age at diagnosis

For the majority of cases, a diagnosis was made between 18 to 22 weeks gestation. The diagnosis was made earlier for the abnormalities of the central nervous system, major musculoskeletal abnormalities and for major urinary abnormalities. The cardiac abnormalities (major or minor) were detected later in pregnancy, as were the cleft palates. The anencephalies were the earliest detected.

Overall, 63.7% of fetal abnormalities were detected before 22 weeks and 15.7% of abnormalities were detected after 22 weeks. Only 20.6% of fetal abnormalities were detected postnatally (Series 1) (Fig. 1).

Outcome of malformed fetuses

Among the cases detected during pregnancy, 24.5% elected termination. Three fetuses with severe malformations, where parents elected to continue with the pregnancy, died in the neonatal period. There was one stillbirth, this infant had

Table 4: Detection rate of congenital anomalies in different organ systems.

Anomaly	No. of confirmed diagnosis	False positive (*n*)	True positive (*n*)	False negative (*n*)	Detection rate (%)
	Central nervous system				
Hydrocephalus	7	8	7	–	–
Microcephalus	1	–	1	–	–
Arachnoid cyst	1	–	1	–	–
Dandy-Walker Variant	1	–	1	–	–
Neural tube defects					
Anencephaly	4	–	4	–	–
Spina bifida and hydrocephalus	5	–	5		
Spina bifida without hydrocephalus	2	–	1	1	–
Encephalocele	1	–	1	–	–
Spinal sac	1	–	–	1	–
Reduction deformities of brain					
Cerebellar hypoplasia	2	–	1	1	–
Total	25	8	22	3	88
	Cardiovascular system				
Hypoplastic left heart syndrome	2	–	2	–	–
Tetralogy of Fallot	1	–	1	–	–
VSD + stenosis of aortic valve	2	–	2	–	–
VSD + coarctation of aorta + mitral valve atresia	1	–	1	–	–
VSD + pulmonary stenosis	1	–	1	–	–
VSD + double-outlet right ventricle + coarctation of aorta	1	–	1	–	–
VSD + double-inlet left ventricle + coarctation of aorta	1	–	1	–	–
Total anomalous pulmonary venous return + ASD + PDA	1	–	–	1	–
Ventricular septal defect	3	–	1	2	–
Aortic stenosis	1	–	–	1	–
VSD + coarctation of aorta	1	–	–	1	–
Pulmonary stenosis	1	–	1	–	–
Total	16		11	5	68.8
	Genitourinary system				
Infantile polycystic kidneys	2	–	1	1	–
Bilateral multicystic dysplastic kidneys	2	–	2	–	–
Unilateral multicystic dysplastic kidneys	2	–	2	–	–
Renal agenesis	1	–	1	–	–
Single kidney (unilateral renal agenesis)	4	–	3	1	–
Pelvicalyceal system dilatation	6	4	6	–	–
Renal cyst	–	1	–	–	–
Duplex kidneys and ureteric dilatation	2	–	2	–	–
Megacystic bladder + rethral stenosis	1	–	1	–	–
Total	20	5	18	2	90
	Pulmonary system				
Congenital cystic adenomatoid malformation of the lungs	1	–	1	–	–
Congenital diaphragmatic hernia	2	–	2	–	–
Bell shaped chest	1	–	1	–	–
Total	4	–	4	–	100

Table 4: Detection rate of congenital anomalies in different organ systems (cont.).

Anomaly	No. of confirmed diagnosis	False positive (*n*)	True positive (*n*)	False negative (*n*)	Detection rate (%)
	Gastrointestinal system				
Multiple GI atresia	1	–	1	–	–
Gastroschisis	2	–	2	–	–
Omphalocele	1	–	1	–	–
Anal atresia	1	–	–	1	–
Total	5	–	4	1	80
	Face and neck				
Cleft palate	6	–	–	6	–
Cleft lip	5	–	5	–	–
Cleft lip and palate	5	–	5	–	–
Lymphangioma of neck	1	–	1	–	–
Branchial remnant	1	–	1	–	–
Total	18		12	6	66.7
	Musculoskeletal system				
Arthrogryposis	1	–	1	–	–
Thanatophoric dysplasia	1	–	1	–	–
Diastematomyelia	1	–	1	–	–
Skeletal dysplasia (short rib polydactyl syndrome	1	–	1	–	–
Sacrococcygeal teratoma	2	–	2	–	–
Hemivertebra	2	–	–	2	–
Deformities of lower limbs					
Bilateral talipes of feet	4	–	4	–	–
Unilateral talipes of foot	8	–	5	3	–
Benign femoral hypoplasia	–	2	–	–	–
Fixed lower limbs	1	–	1	–	–
Rocker bottom	1	–	–	1	–
	Deformities of the upper limb				
Absent forearm, three digits in each hand, no thumb present	1	–	1	–	88 excluding minor abnormalities
Short limbs and absent hands	1	–	1	–	–
Absence of digits in hands	2	–	1	1	–
Deformity of the hands	3	–	2	1	–
Extra digits	1	–	–	1	–
Clinodactyly	2	–	1	1	–
Total	32	2	22	10	68.8

multiple gastrointestinal atresia and limbs deformities. The total number of live births in this study was 71.6% (73 out of 102 malformed fetuses). Of the live-born infants, 76.7% had abnormalities that were detected before birth and in 23.3%, the diagnosis was made after birth.

False positives

Some diagnoses were made in fetuses that were in fact found to be normal at birth. In some, the diagnostic error was rectified on subsequent ultrasonographic examination at a later stage of the pregnancy.

Of the 168 diagnoses of malformations made during pregnancy, 15 (8.9 %) were false positive, 27 (16.1 %) were false negative. No patient, in whom a misdiagnosis was made, had a termination of pregnancy, indicating that the false positive cases were of minor anomalies only (Table 4).

Detection of abnormalities in different systems

Abnormality detection was analysed by organ systems (Tables 5 to 11). Each table is divided into abnormalities

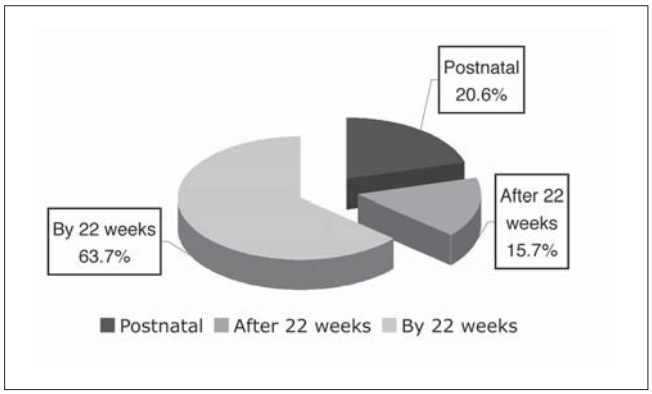


Fig. 1: Series 1: Gestational age at diagnosis.

detected, those undetected, gestational age when detected and the effect on outcome.

Discussion

There is still much controversy over the value of routine ultrasound screening for fetal abnormalities. The policy, which is practiced at Nepean Hospital, has not been adequately evaluated in Australia. There are several large trials, which studied the benefit of routine ultrasonographic screening. Helsinki, RADIUS study and Eurofetus study are the largest of such studies.[1,3,4]

The RADIUS study was performed in USA on low risk pregnancies. They were randomised to receive ultrasound at 16-20 weeks and 31–33 weeks or when clinically indicated. This study had disappointing results in term of diagnosing major anomalies. Only 17% of cases were detected before 24 weeks in the screened group, however, this detection rate is three times higher than the 5% detection rate in the control group.[1]

The Helsinki trial was a population-based randomised trial, randomly assigned to have screening ultrasound between 16–20 weeks or scans when clinically indicated.[4]

The detection rate for fetal anomalies was 45%, over two-and-a-half times higher than detection rate in the RADIUS trial.[1]

In the Eurofetus study, over 200,000 women were scanned in 14 European countries in 60 hospital ultrasound units.[3]

The sensitivity of ultrasound in the detection of abnormalities in the three studies was 40.9% in the Helsinki trial, 16.6% (before 24 weeks) in the RADIUS study and 64% in the Eurofetus study.

In our study, the overall sensitivity of prenatal ultrasound for correctly identifying fetuses with structural defects was 82.4 %. Other reports in the literature for screening for malformation in the general population showed a range from 8.7% to 78.3%. A Swedish study[11] had a sensitivity of 21%; Levi *et al*. reported 21% and 41%.[9,12] Luck showed a sensitivity of 85% excluding facial anomalies[7] and Chitty *et al*. reported a sensitivity of 74%.[8]

There are several potential reasons for the discrepancies, which include, the gestational age at which screening is performed, the definition of abnormalities and the degree of ascertainment of abnormalities postnatally.

The skill and experience of the sonographers who are involved in routine screening is clearly a critical factor in the detection of fetal abnormalities.

Some authors recommend a single ultrasonographic examination performed in the second trimester. However, this may prevent detection of certain abnormalities that become apparent later in the pregnancy and thus reduce the overall reliability of ultrasonographic screening. In our series, 15.7% of the malformations were detected after 22 weeks. This late detection involved mostly major abnormalities of the central nervous system and the cardiac system. This is well illustrated in the study from Belgium where only four out of 20 cases of hydrocephalus were identified by scanning before 22 weeks gestation, with the remainder being identified later in pregnancy.[9] Similarly, only half of the cases of microcephaly (two of four) were identified in the second trimester.

It is important to consider the age at which terminations are carried out, because there are considerable differences between countries. In New South Wales and Australia in general, terminations after 22 weeks are only carried where a lethal anomaly exists. In our study, the majority of diagnoses of malformations were made before 22 weeks; in only 15.7% of cases the diagnosis was made after 22 weeks. The malformations detected after 22 weeks were either those with late expression such as those of the central nervous system or those overlooked on the first examination and picked up on subsequent examinations.

In our study population, 84% of elective terminations were carried out before 22 weeks gestation.

Any effect on perinatal mortality rates will depend on the early detection of abnormalities, parents deciding to terminate affected pregnancies and the availability of effective treatment, either pre- or postnatally.

The gestational age at which routine screening is performed is an important factor in the detection of fetal abnormalities. Visualisation of much of the fetal anatomy is more difficult at 15–17 weeks than at 18 weeks or later. The ASUM recommendation suggests screening at 18–20 weeks for that reason. The same policy is followed at Nepean Hospital.

The earlier gestational age at scanning may account for lower detection rates in the Belgium and RADIUS studies where screening was performed at any time between 15 and 22 weeks.

In our study, 57.8% of fetuses with major structural anomalies were found at 18–22 weeks scanning. The rate is lower than those of an Italian report in which 69% were detected at 21 weeks scan when added.[13] Similarly, in the UK, 59% of major abnormalities were identified at 11–15 weeks and 81% when a mid-pregnancy scan was included.[1] In the study of V Hiilesmaa *et al*. of Finland, 30% of fetuses with major structural anomalies were identified at the mid-pregnancy scan, which is lower than our detection rate.[15]

The definition of anomalies included in the studies reported is variable. Some do not include examination of the face,[7] or examine the profile only,[16] only include major degrees of talipes, or do not give adequate details regarding postnatal confirmation of abnormalities. These discrepancies would contribute towards the differences in reported detection rates.

Central nervous system abnormalities

All recent studies, where routine screening is performed in the mid second trimester, report 100% detection of anencephaly and many achieve rates approaching 100% for open neural defects. The main reason for the

Table 5: Central nervous system abnormalities.

Anomaly	No. of cases (gestational age weeks)	No. detected	No. not detected	Outcome
Anencephaly	18	4	–	4 TOP[A]
Hydrocephalus	5 (18–20) 1 (26) 1 (30)	7	–	1 NND[B] 2 TOP 4 live-birth
Spina bifida with hydrocephalus	3 (18–20) 2 (22–25)	5	–	4 TOP 1 live-birth
Spina bifida without hydrocephalus	1 (18) 1 (postnatal)	1	1	1 TOP (had other abnormalities)
Encephalocele	1 (30)	1	–	1 live-birth
Congenital cerebellar hypoplasia	1 (21) 1 (postnatal)	1	1	1 TOP 1 live-birth
Dandy-Walker variant	1 (21)	1	–	1 live-birth
Microcephaly ventriculomegaly + absent cerebellum	1 (30)	1	–	1 NND
Arachnoid cyst	1 (31)	1	–	1 live-birth
Spinal sac	1 (postnatal)	–	1	1 live-birth

[A]TOP (termination of pregnancy) [B]NND (neonatal death)

Table 6: Cardiovascular system anomalies.

Anomaly	No. of cases (gestational age weeks)	No. detected	No. not detected	Outcome
Hypoplastic left heart syndrome	2 (19)	2	–	1 TOP[A] 1 live-birth (operated)
VSD[B] + Double inlet left ventricle + coarctation of aorta*	1 (22)	1	–	1 live-birth
VSD+ Double outlet right ventricle + Coarctation of aorta*	1 (19)	1	–	1 live-birth
VSD + Coarctation of aorta*	1 (postnatal)	–	1	1 live-birth
Total anomalous pulmonary venous return + ASD[C]	1 (postnatal)	–	1	1 live-birth
VSD + aortic stenosis	2 (19)	2	–	2 live-birth
VSD + Pulmonary stenosis	1 (20)	1	–	1 TOP
Pulmonary stenosis + dilated right ventricle & atrium	1 (19)	1	–	1 TOP
Aortic stenosis	1 (postnatal)	–	1	1 live-birth
VSD + mitral valve atresia + coarctation of aorta*	1 (23)	1	–	1 live-birth
Tetralogy of Fallot	1 (19)	1		Live birth
VSD	1 (30) 2 (postnatal)	1	2	2 live-birth 1 live-birth (VSD + pulmonary stenosis)

[A]TOP (termination of pregnancy) [B]VSD (ventricular septal defect) [C]ASD (atrial septal defect) *Diagnosed at the specialist centre

improvement is the recognition of the cranial signs associated with spina bifida and Arnold-Chiari malformation. These are the lemon sign, resulting from scalloping of the frontal bones, and the banana sign, which refers to the abnormal shape of the cerebellum. The lemon sign is the result of the decrease in the intraspinal pressure in neonates, which causes the brain to shift downward. This shift decreases the intracranial pressure, which is reflected onto the fetal cranium. The banana shaped appearance of the cerebellum is thought to be a result of traction on the brain stem. Using these cranial signs in the high-risk population, nearly all fetuses with open spina bifida can be identified before 20 weeks.

Table 7: Gastrointestinal abnormalities.

Anomaly	No. of cases (gestational age weeks)	No.detected	No. not detected	Outcome
Gastroschisis	2 (18–19)	2	–	2 live-birth (operated)
Omphalocele	1 (18)	1	–	1 live-birth
Multiple gastrointestinal atresia	1 (23)	1	–	1 stillborn
Anal agenesis	1 (postnatal)	–	1	1 TOP[A] (had other anomalies)

[A]TOP (termination of pregnancy)

In our study, the detection rate for anencephaly was 100% and all were detected before 20 weeks gestation. Most open neural tube defects were detected by screening sonography before 22 weeks gestation except two cases, which were detected after 22 weeks (Table 5).

In this review, there were six cases of spina bifida. All had an abnormal cerebellum (absent or banana shaped) and two were reported to have a lemon shaped skull. The disappearance of the lemon sign as the pregnancy progresses has been reported by others.[17,18]

The sonographic signs associated with some intracranial abnormalities, in particular microcephaly and hydrocephaly, may develop later in pregnancy and would, therefore, only be detected if a scan was initiated because of a clinical indication or if a third trimester scan were routinely offered. We found two cases of hydrocephalus developed late in pregnancy and one case of microcephaly was diagnosed at 30 weeks gestation.

Cardiovascular abnormalities

Of the 13 cases where congenital heart defect was diagnosed before birth, nine were referred to a specialist centre for a second opinion. The initial diagnosis was confirmed in four and modified in five. There were no false positive results.

One congenital heart defect, a ventricular septal defect, was detected later in the pregnancy at 30 weeks and was not referred. In three other cases, the pregnancy was terminated because of a cardiac defect. These three cases were not confirmed by a paediatric cardiologist (Table 6).

One case that was modified by the specialist centre was found to have only VSD at birth, which corrected itself. The specialist's diagnosis before birth was double outlet right ventricle and VSD.

Four cases were detected after birth. In one, the fetus had persistent tachycardia and was diagnosed postnatally to have a large ventricular septal defect and coarctation of the aorta. The other three had normal four-chamber heart views at 18 weeks. At birth, one had aortic stenosis, the second had total anomalous pulmonary venous return, atrial septal defect, and patent ductus arteriosis diagnosed when the neonate developed cyanosis. The third had a VSD with multiple anomalies of other systems.

In our study, 75% of fetuses with major cardiac structural abnormalities that were considered detectable by ultrasonography were found at 18–22 weeks. Few studies have investigated the detection of congenital heart defect in non-selected populations. Achiron *et al.* detected 48% of the congenital heart defects prenatally by obtaining the four-chamber view between 18–24 weeks.[1] When views of great vessels were obtained, 78% of cardiac defects were detected.

Our overall sensitivity of congenital heart defect detection was 72.7%. Sensitivities reported by studies looking only at detection of cardiac abnormalities using the 4-chamber view ranged from 7% to 81%.[12, 19–21]

A detection rate of 81% of the congenital heart defects based on the four-chamber view was reported by Vergani *et al.*[20] which included mainly critical congenital heart defects. Copel *et al.* reported a 92% sensitivity of detecting heart defects by obtaining the four-chamber view in a selected population.[22] Studies performed on selected population with a high incidence of congenital heart disease and selecting only critical heart defects cannot, however, be compared to our study, since their results are influenced by the high incidence of the disease rather than the accuracy of four-chamber heart view in defining heart defects. However, the sensitivity of routine ultrasound in the detection of cardiac abnormalities in most studies reported is low.

The outcome of the congenital heart defects detected prenatally is as follows: ten of the 13 cases detected during routine ultrasound examination are alive. Of the three terminated pregnancies, one had hypoplastic left heart syndrome, the second had ventricular septal defect and stenosis of right outflow tract. The third fetus had pulmonary stenosis with dilated right atrium and ventricle (Table 6).

Routine ultrasound examination can improve the detection of cardiac anomalies. In the RADIUS study 43% of complex cardiac lesions were detected in the ultrasound-screened group compared with 21% in controls.[1] Furthermore, the referral pattern to tertiary centres for fetal echocardiography has changed significantly, with an increased proportion being referred because of a suspicion on routine ultrasound rather on the basis of a relevant family history.[23]

Gastrointestinal abnormalities

Anterior abdominal wall defects are regularly detected by routine ultrasound and most studies report 100% detection rate for omphalocele and gastroschisis. Similarly, the detection rate for omphalocele and gastroschisis in this review was 100% (Table 8). There were two cases of gastroschisis and one case of omphalocele. All were live-born and were transferred to a specialist centre for surgery. The incidence of gastroschisis was 1 in 2000 and 1 in 4000 for omphalocele in this study, which is similar to the reported incidence in the literature.[24–26] However, the diagnosis of intestinal obstruction or atresia is less amenable to diagnosis in the second

Table 8: Chest abnormalities.

Anomaly	No. of cases (gestational age weeks)	No. detected	No. not detected	Outcome
Congenital cystic adenomatoid malformation of the lungs	1 (18 + 4)	1	–	1 live-birth
Left sided diaphragmatic hernia	2 (18–19)	2	–	1 TOP[A] 1 live-birth
Bell shaped chest	1 (18 + 4)	1	–	1 live-birth (hypopara-thyroidism)

[A]TOP (termination of pregnancy)

Table 9: Abnormalities of renal system.

Anomaly	No. of cases (gestational age weeks)	No. detected	No. not detected	Outcome
Renal agenesis	1 (18)	1	–	1 TOP[A]
Bilateral multicystic dysplastic kidneys	2 (18–19)	2	–	2 TOP
Unilateral multicystic dysplastic kidneys	2 (19)	2	–	2 live-birth
Polycystic kidneys	1 (20) 1 (postnatal)	1	1	1 NND[B] 1 live-birth
Megacystic bladder + urethral agenesis	1 (18)	1	–	1 TOP
Single kidney	2 (19–20) 1 (32) 1 (postnatal)	3	1	4 live-birth
Renal hydronephrosis; pelvic diameter > 10 mm	2 (21–24)	2	–	2 live-birth
Renal hydronephrosis; pelvic diameter 6–10 mm	4 (18–19	4	–	4 live-birth
Duplex kidney with renal pelvic dilatation	2 (19–21)	2	–	2 live-birth

[A]TOP (termination of pregnancy) [B]NND (neonatal death)

trimester, because the classical signs of the dilated stomach or proximal loops of intestine appears late in pregnancy. One case of intestinal atresia was diagnosed after 22 weeks gestation and the fetus was later stillborn at 28 weeks gestation. Postmortem examination confirmed the initial diagnosis.

In three studies,[7,8,27] all anterior wall defects were identified but only two of the four small bowel obstructions were diagnosed.

Pulmonary abnormalities

Probably the most common abnormality seen in the thorax is a congenital diaphragmatic hernia, which occurs in about 1 in 2000 to 1 in 5000 births. It is an abnormality which can be diagnosed at a routine second trimester scan. Luck reported five cases of diaphragmatic hernia and one case of congenital cystic adenomatoid malformation of the lung.[7] Only two cases of diaphragmatic hernia were diagnosed at 19 weeks.

In our study, both cases of diaphragmatic hernia were diagnosed before 22 weeks, as was our single case of congenital cystic adenomatoid malformation of the lung (Table 8).

Urinary tract abnormalities

Table 9 shows the number of antenatal and postnatal diagnosis of renal anomalies, number of neonatal deaths and pregnancy terminations.

Abnormalities of the renal tract are commonly diagnosed prenatally. A prospective screening program in Staffordshire reported that a total of 92 fetuses examined at around 28 weeks gestation were thought to have renal abnormality, but postnatal examination could only confirm the abnormality in 46% of these cases.[28]

In our study, 25 fetuses were diagnosed prenatally with renal abnormality, but only 20 were confirmed postnatally, yielding a sensitivity of 80% (Table 4) This compares the result reported by Grandjean *et al.* of 88.5%.[3] Ascertainment of urinary tract abnormalities is impossible unless all neonates are scanned at birth and then subsequently followed up into infancy. In the RADIUS study, the incidence of hydronephrosis at birth in the ultrasound screened group (27/7658) was four times greater than the control group.[1] Ten fetuses with dilatation of the renal pelvis (pyelectasis) were identified during routine ultrasound screening and six were confirmed postnatally (Table 9). However, renal tract anomalies are amongst those most frequently diagnosed prenatally, where the incidence of false positive diagnosis can be high,[28] particularly if mild pyelectasis is considered.[2] The thresholds of fetal renal pyelectasis, which warrants prenatal and postnatal follow-up, are conflicting.[40,41] This

Table 10: Musculoskeletal abnormalities.

Anomaly	No. of cases (gestational age weeks)	No. detected	No. not detected	Outcome
Skeletal dysplasia (short rib polydactyly syndrome)	1 (19 + 3)	1	–	TOP[A]
Thanatophoric dysplasia	1 (18)	1	–	TOP
Severe arthrogryposis	1 (19 + 1)	1	–	1 live-birth
Sacrococcygeal teratoma	1 (19) 1 (20)	2	–	2 live-birth
Bilateral talipes	2 (19) 1 (22) 1 (30) 3 (postnatal)	4	3	2 TOP (had other anomalies) 1 stillborn (had other anomalies) 4 live-birth
Unilateral talipes	4 (18) 1 (30)	5	–	5 live-birth
Absence of right hand metacarpal bones and no digits	1 (19 + 4)	1	–	1 live-birth
Fixed lower limbs and severe talipes	1 (18 + 4)	1	–	1 live-birth
Holt-Oram syndrome (absent forearm, three digits in each hand, no thumb present)	1 (18)	1	–	1 live-birth
Short forearm and absent hands	1 (19 + 3)	1	–	1 TOP
Diastematomyelia	1 (18 + 2)	1	–	1 live-birth
Hemivertebra	2 (postnatal)	–	2	1 live-birth
Polydactyly/deformity of hands	1 (23) 1 (postnatal)	1	1	1 live-birth 1 stillborn (had other anomalies)
Clinodactyly	1 (30) 1 (postnatal)	1	1	1 live-birth 1 TOP (had other anomalies)
Webbed fingers/fused fingers and toes	1 (18) 1 (postnatal)	1	1	2 live-birth
Short limbs + small upper limbs	1 (postnatal)	–	1	1 live-birth
Rocker bottom heel	Postnatal	–	1	1 live-birth

[A]TOP (termination of pregnancy)

study uses 5 mm limit to define renal pyelectasis. Up to 50% of fetuses with prenatal pyelectasis may have a normal neonatal ultrasound scan and the majority of those with a postnatal abnormality will be asymptomatic with only mild to moderate degrees of upper tract dilatation. The clinical significance of the postnatal findings in the majority of cases is unclear. This difference reflects the impact of ultrasound screening, and indicates the clinically silent nature of most renal problems. Other studies in the literature describe improved detection rates of urinary tract abnormalities by scanning later in pregnancy.[30,31]

The early diagnosis of hereditary neonatal polycystic kidney disease can be difficult because renal enlargement and distortion may become obvious only late in the pregnancy.[32] In our study, one case of polycystic kidney disease was diagnosed after birth because both the kidneys appeared echogenic during routine ultrasound screening and there was no distortion of renal parenchyma. One fetus with polycystic kidneys diagnosed antenatally died in the neonatal period as a result of pulmonary hypoplasia.

Skeletal abnormalities

Visualisation of the fetal long bones at the time of a routine scan is usually achieved and measurement of the femur is often incorporated as a routine part of examination. Several of the lethal skeletal dysplasias have severe limb shortening which is evident by 18 weeks, making many amenable to detection with routine ultrasound. However, examination of the hands and feet may be more difficult and often there are time constraints, which prevent detailed examination of the extremities. This results in poor detection rates for abnormalities such as talipes and limb reduction defects. The sensitivity for clubfoot deformity and limb reduction defects is low.[7,27] In the EUROCAT (European Surveillance of Congenital Anomalies) study 56 of 101(55%) of severe limb reduction defects were diagnosed prenatally and 43

Table 11: Face and neck abnormalities.

Anomaly	No. of cases (gestational age weeks)	No. detected	No. not detected	Outcome
Cleft lip	5 (19–25)	5	–	5 live-birth
Cleft palate	6 (postnatal)	–	6	3 live-birth (isolated cases) 3 live-birth (had other anomalies)
Cleft lip and palate	5 (19–22)	5	–	3 TOP[A] (had other anomaly 2 live-birth
Neck mass: Branchial remnant/lymphangioma	2 (20–25)	2	–	2 live-birth (operated)

[A]TOP (termination of pregnancy)

(43%) cases had terminations of pregnancy.[33]

In our study, terminations of pregnancy were done for lethal skeletal malformations and for skeletal anomalies associated with other system anomalies (Table 10). Our detection rate was 66.7% including minor skeletal abnormalities. This is higher than the previous mentioned studies.

The sensitivity was 90.9% in this review (Table 4), whereas in the Eurofetus study,[3] it was 36.6% and 34% in Levi *et al.* study.[12]

Face and neck abnormalities

Prenatal recognition of facial anomalies during pregnancy has many benefits. It can lead to the diagnosis of various genotypic syndromes and chromosomal anomalies. More comprehensive diagnostic imaging planes can be achieved to assist therapeutic options after birth. Also, it allows more adequate counselling.

The detection rate of fetal facial anomalies in utero increased when ultrasound examination of the face was included. For example, the generally reported rates of prenatal recognition of cleft lip ranged between 21% and 30%.[3,9,27, 34–37] This low detection rate is not a surprising finding because ultrasonographic evaluation of the fetal face was not a component of the scanning protocol.

The detection rate of cleft lip and palate was 66.7% in our review. This figure is close to the rates reported in tertiary centres of 65%,[38] where facial examination is part of the work-up. Babcook *et al.*[39] reported a detection rate of 88%. These results illustrate the importance of imaging the fetal face.

Conclusion

There is considerable variation in the sensitivity of routine ultrasound programmes in the detection of abnormalities in different systems. There are many reasons why an abnormality may not be detected. These include technical difficulties, absence of a sonographic sign associated with an abnormality, the late appearance of the ultrasound abnormality as well as failure (for whatever reason) to scan the fetus adequately. It is therefore unlikely that routine screening programmes will ever achieve 100% detection of fetal abnormalities, at least not as currently practised.

Tertiary referral has been found to be of particular benefit in cases of cardiac defects or disabling conditions. It also gives the parents the benefit of expert knowledge, allows further counselling and helps the parents to realise that they are not alone in producing a fetus with an abnormality. They may be able to access support groups.

This survey allowed our unit to compare the antenatal pick-up rate with that of other comparable units. It also provides a mechanism to ensure that those involved in antenatal assessment are made aware of the final outcome of those cases they scanned. Detailed analysis of outcomes also should help to improve the quality of antenatal assessment.

Given the multidisciplinary nature of much of modern medicine, it is never going to be easy to conduct a detailed survey and ascertainment of outcomes, especially where a baby is diagnosed in one hospital and delivered in another hospital.

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ASUM Ultrasound Bulletin 2006 August; 9 (3): 34–36

The effects of Cytomegalovirus infection *in utero* diagnosed by ultrasound

Michelle Pedretti

Introduction

Cytomegalovirus (CMV) is a large, enveloped DNA herpes virus.[1] It is a member of the TORCH group of viral infections and is one of the most commonly acquired *in utero* infections.[2]

CMV kills infected cells and can be transmitted via sexual contact, secretions, or transplacentally.[1,3]

Biological effects

Infections that are acquired *in utero* can result in mental retardation and abnormal brain architecture including:

- Increased echogenicity in the ependyma of the ventricular system;[4]
- Microcephaly and ventriculomegaly (which may occur individually or together) and;
- Intracranial calcifications, including calcification of the lateral borders of the lateral ventricles and linear calcifications in the basal ganglia.[5]

Other effects of CMV infection are:

- Non-immune hydrops (resulting from anaemia;
- IUGR may have an early onset;
- Dental enamel defects;
- Cerebral palsy;
- Sensorineural hearing loss; and
- Chorioretinitis or optic atrophy.[1]

Imaging modalities

CT may better appreciate calcifications in the brain parenchyma than ultrasound. MRI may be useful in demonstrating migrational alteration and brain development. It is important to remember that the fetus may be infected yet appear normal in antenatal ultrasound scans.

Other diagnostic tests

Primary maternal infection can be documented by seroconversion for immunoglobulin G (IgG) antibodies in women known to have a negative titer prior to pregnancy. For women with a positive IgG during pregnancy, a presumptive diagnosis of primary infection can be made on the basis of a positive immunoglobulin M (IgM) titer that may persist up to four months after infection. There is a high false positive rate for IgM when certain immunofluorescent assays are used.[1,5]

Michelle Pedretti , GradD AppSc (MedImag), DMU, Masters AppSc (Ultrasound), AMS
Sonographer
King Edward Memorial Hospital for Women
Subiaco 6008
Western Australia
& Kalgoorlie Regional Hospital

Correspondence to Michelle Pedretti
email Pedrets@westnet.com.au

Prevalence of CMV

Approximately 1% of pregnant women are infected with CMV, of which 1–3% of newborns excrete CMV, with only 5% demonstrating clinical symptoms in the newborn period. Primary maternal infection during pregnancy poses the greatest risk to the fetus.[4,6]

Case study

Antenatal history

This 17-year-old gravida 2 para 0 had an antenatal history that included unexplained fever (40.5°C) with abdominal pain, nausea and vomiting at 29 weeks gestation. A laparotomy and appendicectomy demonstrated an uninflamed appendix. No cause was identified as the cause of the fever. The patient was treated with antibiotics.

Antenatal ultrasound

Ultrasound at nine weeks confirmed estimated delivery dates for the pregnancy. The pregnancy had been uneventful until the episode at 29 weeks. The patient was not referred back for a follow-up ultrasound examination until 34 weeks gestation. This examination demonstrated reduced fetal growth of the head circumference (HC), which was well below the 50th centile for gestational age, and elevated systolic-diastolic (SD) ratios. Further antenatal ultrasounds performed to review growth and fetal wellbeing demonstrated microcephaly and raised umbilical artery SD ratios.

Delivery

There was threatened preterm labour at 32 weeks gestation, which settled with medication and a brief hospital stay.

Delivery was induced at 39 weeks 4 days due to microcephaly, intrauterine growth retardation (IUGR) and persistently raised umbilical artery SD ratios on sequential antenatal ultrasounds. A 2600 g baby boy was delivered by SVD, this placed his birthweight on the 10th centile. Althought his Apgars were 7: 9, the baby was unresponsive initially and then developed a high pitched cry, especially on handling; jerky limb movements were also noted.

Neonatal ultrasound

At delivery, the fetal head was observed to be small (HC 42 cm); micrognathia was also noted. A cranial ultrasound was requested. This scan was performed when the neonate was almost four hours old. The ultrasound demonstrated several notable findings:

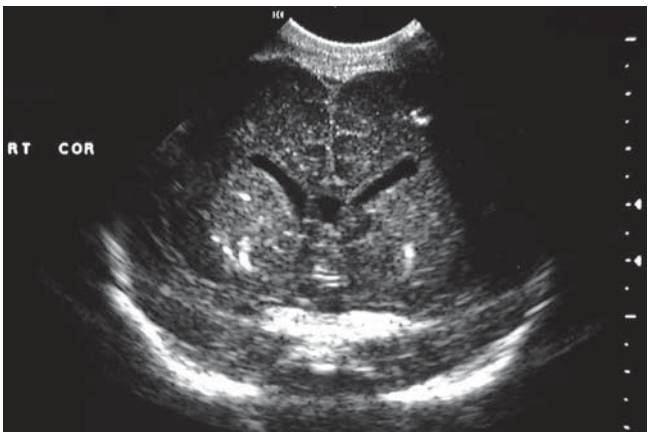

Fig. 1: Coronal view demonstrating diffuse calcification.

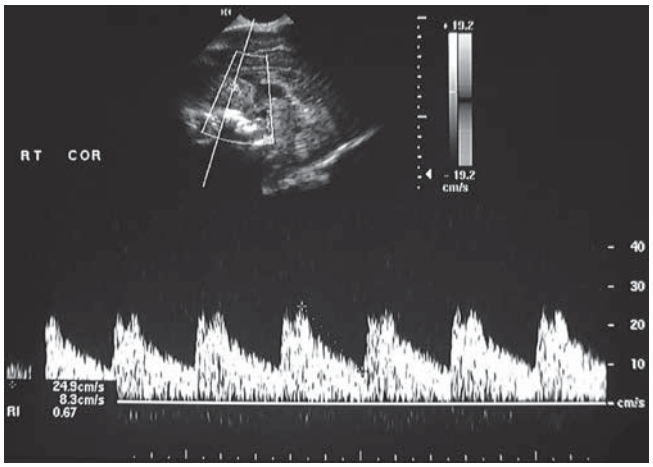

Fig. 2: Doppler trace showing RI of ACA.

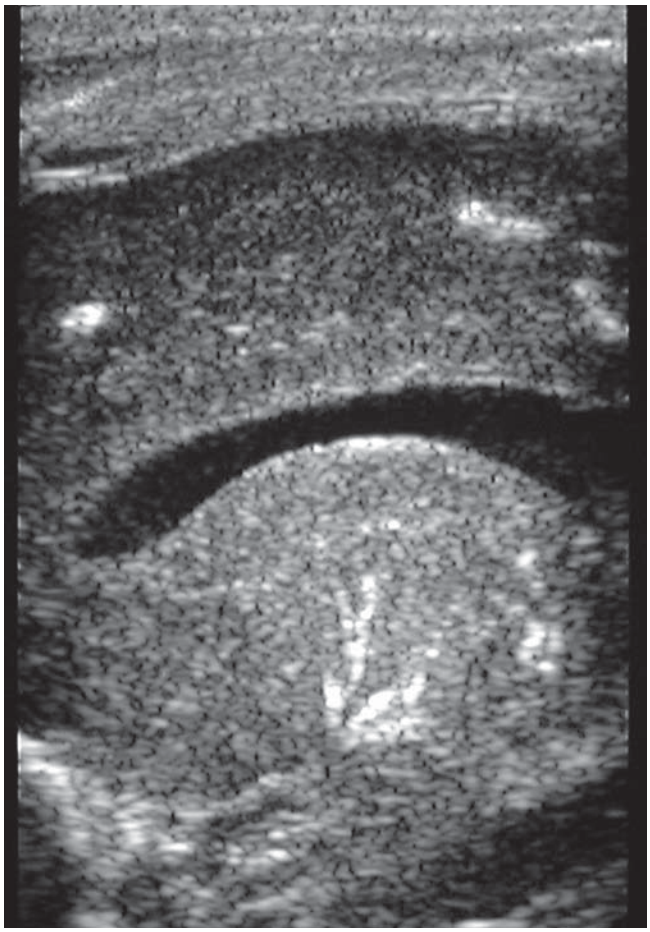

Fig. 3: Diffuse calcifications.

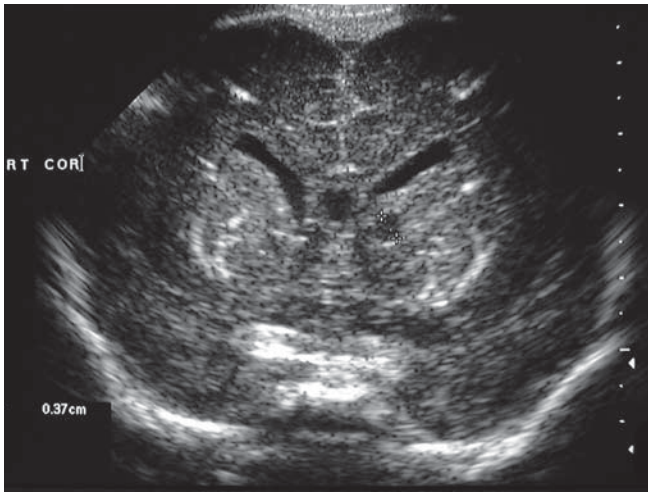

Fig. 4: Hypoechoic area in thalamus.

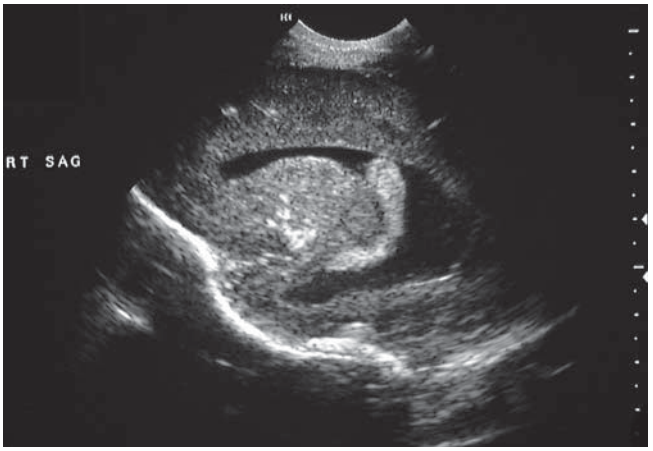

Fig. 5: Right sagittal view through the lateral ventricle.

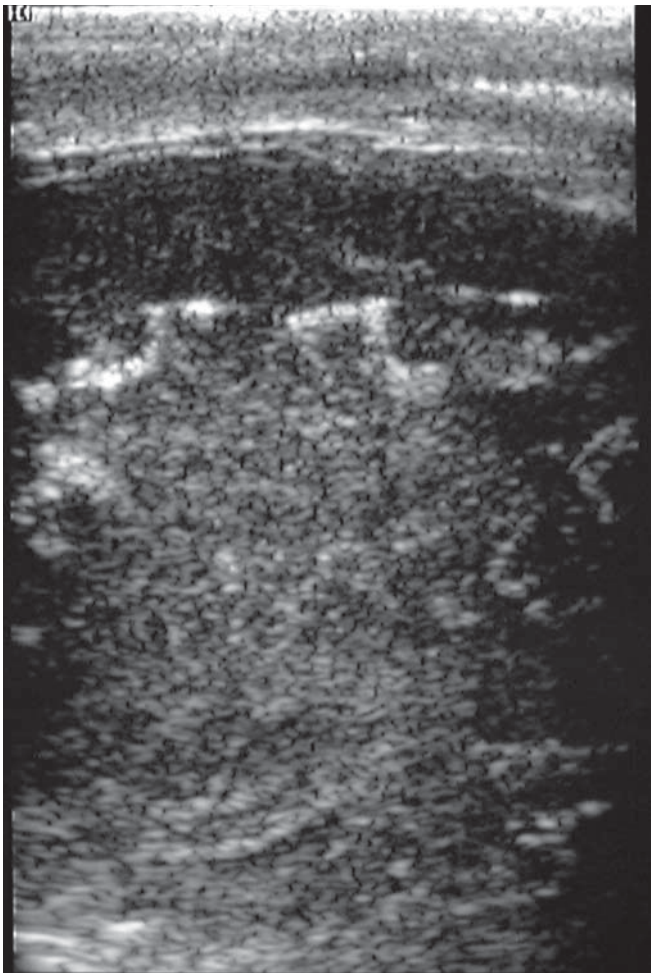

Fig. 6: Periventricular calcifications.

- The most apparent observation was that the sulcal pattern was abnormal (Fig. 1). The central sulcal pattern was in keeping with a gestational age of 28–30 weeks. The more peripheral sulci were absent (Fig. 6), in keeping with a migrational disorder or arrest.
- Multiple echogenic (punctate) foci were seen throughout the deep white matter peripherally (Fig. 1, 3, 6). These are most likely to be consistent with calcifications, even though they do not demonstrate posterior shadowing.
- The vascular structures of the thalami were also prominent and echogenic in their ultrasound appearance (Fig. 4).
- The third and lateral ventricles were prominent (Fig. 5).
- The posterior fossa appeared normal in size, however, the cortex appeared to be generally reduced in volume (Fig. 2). Resistive index values taken in the right ICA, left ICA and ACA were within normal range.
- A small (4 mm) hypoechoic focus was seen in the left medial aspect of the thalamus. This had most likely resulted from a local area of infarction (Fig. 4).

Supplemental tests

Blood, urine and chromosomal testing were performed. Chromosomal testing was of a normal male karyotype; urine specimens returned CMV positive.

Postnatal follow-up at one year

This baby has had a number of problems, including cerebral palsy, epilepsy (controlled by medication) and feeding problems, resulting in a PEG insertion.

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ASUM Ultrasound Bulletin 2006 August; 9 (3): 37

Cranio facial abnormalities in Vietnam

Nguyen Ha

Figs 1, 2, 3: Ultrsound images revealed micrognathia, abnormal low- set ears and absent toes.

Fig 4: Facial features.

In Vietnam we see many cases of fetal abnormality, including those with craniofacial abnormalities (holoprosencephaly) and acrofacial dysplasia.

The present case is of a 34-year-old patient, para 1 + 0, whose first baby was born normally six years ago.

Ultrasound findings for this pregnancy were: BPD 57 mm, FL 39 mm, AC 156 mm. FISH test was normal.

Ultrasound revealed micrognathia, abnormal low-set ears and absent toes. (Figures 1, 2 and 3),

It was thought that this might have been Fraser syndrome and the pregnancy was terminated at the patient's request. A photo of the facial features is shown (Figure 4).

Discussion

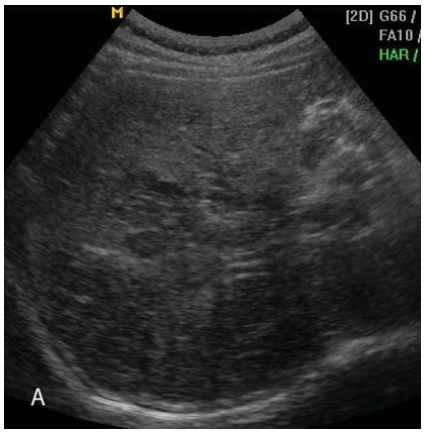
Fraser syndrome is also associated with epidermal blistering, cryptophthalmos and urogenital abnormalities which were not seen in this baby. The alternative and more likely diagnosis would be Nager syndrome, (external ear abnormalities, micrognathia and limb defects with absent digits).

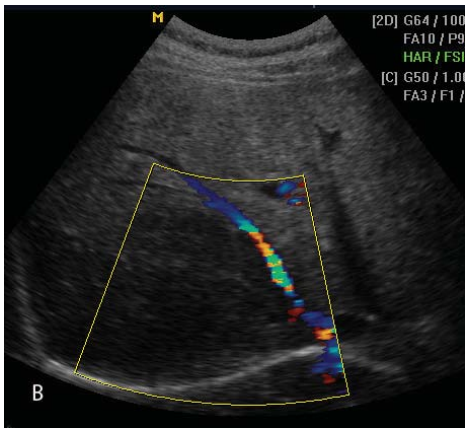
Dr Nguyen Ha
Director of Imaging
Tu Du Maternity Hospital
Ho Chi Minh City
Vietnam
www.bvtudu.org.vn
Correspondence to email nguyenha72@hcm.fpt.vn

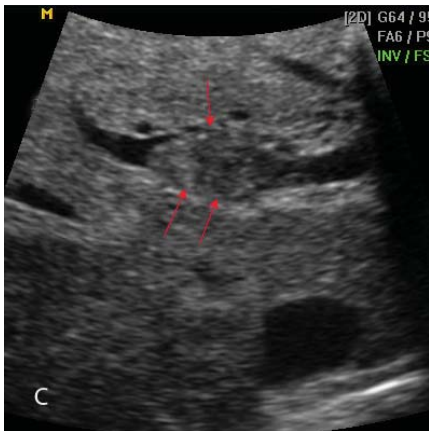
ASUM Ultrasound Bulletin 2006 August; 9 (3): 38–40

Hepatocellular Carcinoma: a common finding in hepatitis B patients in SE Asia

Alan Williams







Flg. 1: Features of hepatocellular carcinoma. Figure 1a: Diffuse HCC of the right hepatic lobe.

Fig. 1b: The mass effect of the tumour demonstrates a shift of the right hepatic vein.

Fig. 1c: Echogenic solid material within the lumen of the right portal vein demonstrates tumour invasion (arrows).

Introduction

The hepatitis B virus (HBV) can be implicated in a vast majority of cases of hepatocellular carcinoma (HCC) and its endemicity in Asia explains the high risk of HCC in the region. In Malaysia, HCC is the eighth most common malignant tumour in males and is responsible for an alarming number of deaths in hospital in Kuala Lumpur.[1] The clinical presentation of HCC is often delayed and has normally reached an advanced stage when diagnosed on ultrasound. While guidelines and criteria exist for identifying a targeted population in Malaysia, a number of chronic HBV patients still escape early detection.

Case 1: HBV positive Chinese male with HCC

A 29-year-old Chinese male patient known to be a HBV carrier, presented for a routine upper abdominal ultrasound. He had acquired the disease through perinatal infection and both mother and a sister have current HBV carrier status. This case exemplifies an all too common scenario in a region of high HBV endemicity, where siblings become infected at an early stage of their lives, which places them in a high risk category of progressing to HCC.

At presentation for the ultrasound scan, the patient's only complaint was a feeling of vague unwellness over recent times. As he was less than 40 years of age, was non-cirrhotic and had no family history of HCC, he was not included in any screening program and this was to be his first ultrasound scan.

The ultrasound revealed a large, diffuse solid mass of the liver. A correlation of ultrasound findings with the patient's history of chronic HBV (infected at birth) created a high level of suspicion for HCC. The patient was subsequently referred to a medical specialist in Kuala Lumpur for further assessment. Further scanning and biopsy revealed primary liver cancer for which he was referred for surgical resection of the tumour. He, unfortunately, did not survive more than two months post surgery. Both his mother and sister have subsequently had upper abdominal ultrasound scans which showed negative results for cirrhosis or HCC.

Sonographic findings

The ultrasound appearance of HCC can be varied. In this case, a large, coarse, inhomogeneous solid tumour with diffuse involvement of the right lobe was demonstrated. Demonstration of an irregular liver surface and a mass effect involving compression and displacement of the right hepatic vein were positive features favouring the presence of a tumour. Focal echogenic material of the right portal vein representing tumour invasion was another identifying feature of this scan. These findings are presented in Figure 1.

There is, apparently, a propensity for venous invasion in 30% to 60% of cases of patients with HCC.[4] Invasion of the portal venous system is more common than the hepatic venous system,[5] a finding supported in Figure 1c. The tumour material was not occlusive and some flow through the obstruction was demonstrated using colour Doppler. Doppler was used to evaluate portal venous flow and the existence of portal hypertension. Spectral Doppler revealed a smooth, continuous, non-phasic, low velocity (mean of about 10 cm/s) hepatopetal flow (Figure 2b). These features are usually demonstrated in patients with mild,

Alan Williams BAppSc, DMU, Dip Ed
Chief Sonographer / lecturer
Vision College
Kuala Lumpur
Malaysia

Correspondence to Alan Williams
email alanmarkwil@hotmail.com

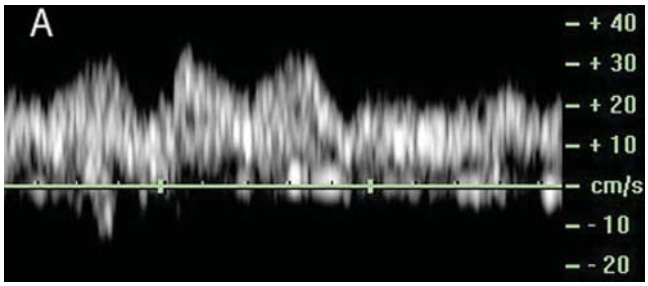


Fig. 2: Portal vein spectral Doppler analysis of a normal and HCC patient. Fig. 2a: represents normal portal vein spectral Doppler. Note the undulating waveform.

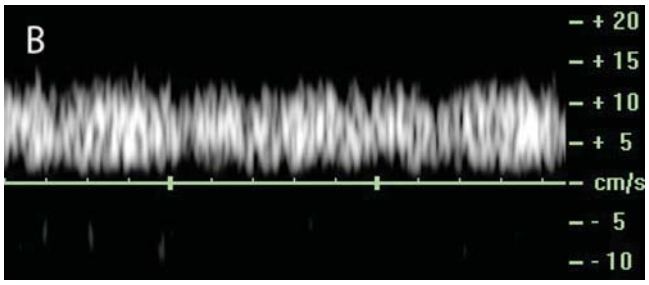


Fig. 2b: Features of mild portal hypertension. Note the more continuous, non-phasic flow with reduced velocity.

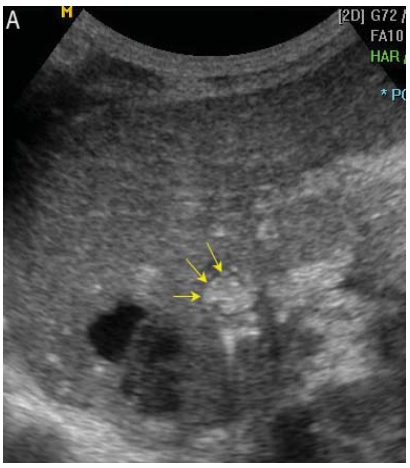


Fig. 3: A spectrum of findings associated with HCC in a middle aged Chinese male. Fig. 3a: A Right lobe echogenic tumour post chemo-embolisation (arrows).

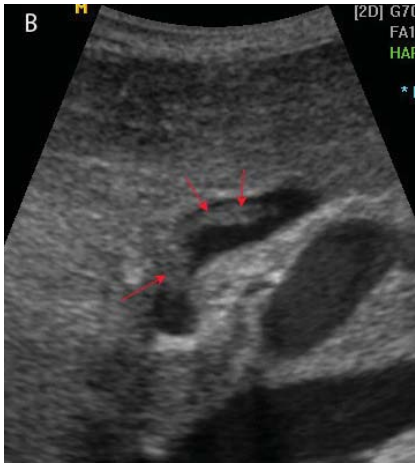


Fig. 3b: Tumour invasion of the left portal vein (arrows).

Figs. 3c and 3d: Findings consistent with portal hypertension. Fig. 3c: Splenomegaly with varices.

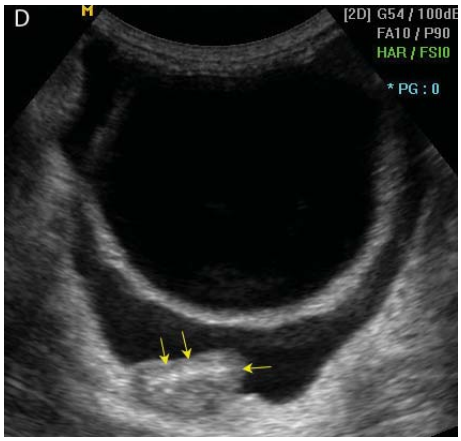


Fig. 3D: Ascites surrounding the urinary bladder and rectum (arrows).

developing portal hypertension.[5] It should be noted that, in normal healthy individuals, spectral Doppler waveform of portal blood flow velocity is more undulating, hepatopetal, and has a mean value of 15 cm/s to 18 cm/s (the velocity range can be wide and depends on cardiac activity and respiration however)[5] (Figure 2a).

Case 2: Advanced HCC with portal hypertension

Splenomegaly, venous collaterals and ascites are common secondary findings in patients with portal hypertension. While these features were absent in Case 1, they can be seen in another HCC patient we scanned here at Selayang Hospital, Kuala Lumpur. This middle aged Chinese male had a history of chronic HBV and was diagnosed with advanced stage HCC. His treatment involved chemo-embolisation with adjunctive radiation therapy. Chemo-embolisation is a treatment normally reserved for patients with large tumours not suitable for surgical resection. For unresectable primary liver cancer, transcatheter arterial chemo-embolisation is claimed by certain specialists in Asia to be an effective method in reducing the size of the tumour. This technique is not curative and additional radiation therapy is needed to kill the residual tumour cells. Chemo-embolisation has become a popular technique in Asia. The solid echogenicity seen in Figure 3a represents the site of chemo-embolisation in the right hepatic lobe.

Conclusion

The notion that early detection carries the hope of successful treatment supports the call for state-of-the-art ultrasound equipment and a well-organised screening program. Interestingly, however, sensitivity and specificity of ultrasound as a screening test compares poorly with that of screening tools in other established screening practices.[1] In addition, several studies conducted in the West have reported no real benefit gained in terms of prolonged survival. While this may be the case, we cannot ignore the capabilities of ultrasound to detect small lesions of the liver in a cost effective and time efficient manner. The excellent contrast and spatial resolution offered by state-of-the-art equipment

establishes a platform for the development of guidelines for the initial management of patients once a lesion is detected. Assessment of disease progress and complications can be performed in a quick and easy manner, a feature that is demonstrated in the two case studies.

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BOOK REVIEWS

General Ultrasound in the Critically Ill

Author Daniel Lichtenstein MD
Publisher Springer 2004
ISBN 3-540-20822-4
Approx cost $A210

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

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

There are three separate sections:

Part I: Generalities

This section consists of four brief chapters: *Basic Notions*, which is a very limited description of the basics of ultrasound imaging; *The Ultrasound Equipment*, which is a brief, somewhat quirky in places, description of basic equipment; *Specific Notions of Ultrasound in the Critically Ill*, which presents five interesting pages on the advantages and disadvantages of scanning the critically ill patient, and some insights into specific features of this area of imaging such as indications for the ultrasound examination; and lastly a very brief, scantily illustrated chapter on *General Ultrasound: Normal Patterns*. In this last chapter of the Part 1 section section the author indicates that the term 'general ultrasound' is usually understood to mean 'abdominal ultrasound' and, indeed, this chapter is an overview of the basic, normal ultrasound appearance of the main organs of the abdomen. The rest of the book, however, uses the term 'general ultrasound' to have a much broader scope than this and includes an almost 'whole of body' approach.

Part II: Organ-by-organ analysis

This 18-chapter, 127-page section is the main part of the text and includes some very interesting information on the applications, advantages and disadvantages, and limitations of ultrasound in a diverse range of situations. The chapters cover all areas of the abdomen, including the peritoneum and retroperitoneal space; the venous system including upper extremity central veins, IVC, lower limb veins, the mediastinum, general ultrasound of the heart, head and neck and soft tissues in various areas of the body.

There are four chapters devoted to ultrasound techniques in the lung: pleural effusion, pneumothorax, diseases of the lung tissue and disorders of the diaphragm and 'lung ultrasound applications' which presents some of the clinical potentials of applying what the author calls 'the seven principles of lung ultrasound'.

Part III: Clinical applications of ultrasound

This section discusses the application of ultrasound in specific settings or situations. Included are chapters such as: *Ultrasound in the surgical intensive care unit (ICU)*, *Ultrasound in trauma, Emergency ultrasound outside the ICU*, *Interventional ultrasound; Emergency ultrasound and antibiotic therapy*, *Learning and logistics of emergency ultrasound* and *Ultrasound – a tool for clinical examination*. This section makes for interesting reading and offers a different perspective on the use of ultrasound in many situations to that found in standard ultrasound texts written for sonologists and sonographers.

The final chapter called *Concluding remarks* offers a discussion of the role, value and applicability of ultrasound in the critically ill patient.

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

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

Margo Gill
Honorary Fellow ASUM

2006 DDU Report

This year, a substantially increased number of candidates, compared to previous years, sat both the Part 1 and Part 2 Diploma of Diagnostic Ultrasound (DDU) Examinations.

Thirty-six candidates sat the Part 1 and 20 candidates sat the Part 2. This reflects favourably on the DDU qualification and supports the DDU Board of Examiners' (BoE) pursuit to make the DDU a sought-after diploma with good standing to all specialties.

The Part 1 Examination was conducted entirely by multi-choice questionnaire. The Part 2 Examination format remained the same but the BoE has decided the candidates may carry one part of the examination (either written or viva) for one year. This brings the diploma more into line with other post-graduate qualification examinations.

The BoE has undergone some change. Dr Barry Chatterton, after many years of service as DDU secretariat, has stepped down from this position and Dr Monica Pahuja has replaced him. On behalf of the DDU Board of Examiners, I would like to offer our sincere thanks to Dr Chatterton for all his efforts over the years and to congratulate Dr Pahuja on her new position. Dr Pahuja is a radiologist with a special interest and expertise in obstetrics and gynaecology and has worked for some years at the Mercy Hospital.

Two new vascular DDU examiners have been appointed and the viva examination now consists of two parts, each with a different pair of examiners.

In 2007, the DDU viva examination will be held in Melbourne and will return to Sydney in 2008.

The BoE again offers thanks to Dr Glenn McNally for allowing his department to be used for the viva examination and we look forward to renewing our connection in 2008.

I wish to thank Marie Cawood and her team for their efforts and time in supporting the DDU BoE.

Dr Chris Wriedt
DDU Chairperson

DDU 2006 Pass candidates

DDU Part 1

Manju Ambekar
Nadia Blest
Andrew Burns
Rebecca Concannon
Andrew Cronk
Lisa Fox
Maha George-Haddad
Victar Hsieh
Jane Kitchen
Ali Kyatt
Chern Lo
Julian Nguyen
Andrew Nguyen
Suhas Nerlekar
Mary Norris
Manoj Obeyesekere
Helena Peake
Mark Perrin
Scott Petersen
Sanohir Prasad
Joanne Said
Antonia Shand
Kate Stone
Raymond Sy
Matthew Vukasovic
Hong Soo Wong
Warren Yan

DDU Part 2

Con Arronis
Rebecca Chalmers
Jacqueline Chua
Thomas Daly
Steven Grant
Andrew Haig
Subodh Joshi
Vasundhara Kaushik
Dilip Naik
Bernice Ng
Arnold Ng
Abdullah Omari
Ka Kit Wong

DMU (Asia) Diplomates

ASUM congratulates the following Diplomates, who were conferred at the ASUM Council Meeting on 18th July 2006.

Jeng Wui Tan
Pay Chiam Chew
Hui Xien Chan
Pui Zhi Lo

Andrew Ngu
Chair ASUM DMU (Asia)
Board of Examiners

ASUM Teaching Fellowships 2006

Giulia Franco Teaching Fellowship 2006

Sponsored by Toshiba
Teaching Fellow Mr Stephen Bird

Stephen Bird has been appointed Teaching Fellow for Sydney and Perth. He will be visiting Sydney on Saturday 4th November for an educational meeting hosted by Robyn Tantau at St Vincent's Hospital in Darlinghurst.

He will be visiting Perth in February 2007 for a teaching clinic and educational meeting.

Stephen Bird works with a diverse case mix, but enjoys a special interest in musculoskeletal ultrasound. He has been a speaker at many national conferences and recently received a Bronze Award at the 2006 Seoul WFUMB Congress for his work on ultrasound imaging of the biceps brachii insertion.

He is currently employed as the Charge Sonographer at Benson Radiology in Adelaide. He began sonography in 1990, and holds a General and a Vascular DMU and a Master of Medical Sonography from the University of South Australia.

He is currently a member of the ASUM Federal Council and Chairman of the ASUM DMU Board of Examiners. Previously, he has been Chairman of the ASAR, an ASA Federal Council member and recipient of the 2002 ASA Sonographer Achievement Award.

MSK Ultrasound Meeting
St Vincent's Hospital, Darlinghurst, Sydney
Saturday 4th November 2006

Please direct enquiries to Helen Cuneo at the ASUM office on tel (02) 9958 6200 or email education@asum.com.au to book your place. Enquiries must be directed to the ASUM office; St Vincent's Hospital is unable to take enquiries concerning this meeting.

Beresford Buttery Teaching Fellowship 2006

Sponsored by GE Healthcare
Teaching Fellow Assoc Prof Albert Lam

Assoc Prof Albert Lam has been appointed Teaching Fellow for 2006 for New Zealand. He will be visiting Auckland and Dunedin for Teaching Clinics and Educational Meetings in November 2006.

After qualifying as a radiologist, Prof Lam sub-specialised in paediatric radiology and trained in ultrasound with Drs Gary Gates, Fred Sample and George Leopold in California in the mid 1970s.

He returned to Australia to establish the first paediatric ultrasound unit in NSW in 1979. He has remained as the head of this pioneering ultrasound unit at the Royal Alexandra Hospital for Children ever since.

He was appointed Clinical Associate Professor in both the Departments of Paediatrics and Radiology at the University of Sydney in 1994 and is also concurrently the Deputy Head of Radiology at the University.

He joined ASUM as a member in 1979 and was elected Honorary Fellow in 2004. He continues to work closely with ASUM and served as ASUM's NSW Branch Chairman from 1991 to 1994, as well as being the DDU Examiner for paediatric.

He convenes and lectures at numerous education seminars and scientific meetings organised by ASUM and was the inaugural presenter of the UI/UL Plenary Lecture at the ASUM Gold Coast Meeting in 2002.

Assoc Prof Lam has been an invited lecturer at no less than 32 international meetings and 29 Australasian meetings.

Please contact education@asum.com.au for more information. Details of the educational meetings and teaching clinics will be in the next ASUM email newsletter.

Attendees at all ASUM Teaching Clinics and Educational Meetings are eligible for continuing education credits. Certificates of Attendance will be issued

2006 Chris Kohlenberg Teaching Fellowships Reports

Meiri Robinson and seminar attendees

South Australia and rural Victoria

The Chris Kohlenberg Teaching Fellowship is a week-long educational opportunity for people in regional areas who don't have easy access to educational and scientific meetings as readily as those who live in capital cities. The program consists of hands-on training in workshops during normal business hours. The sonographers rotate through the workshop and, where possible, feedback is given on variations in approach towards scanning techniques and any new extensions to the examination that are coming into use. In the evening, presentations are given on a variety of topics.

In the first week of May 2006, the Fellowship took me to regional South Australia and Victoria. The focus of my work is obstetric and gynaecological ultrasound and it was within this area that the Fellowship concentrated. The centres participating were Port Augusta Hospital, Mount Gambier Hospital, the Bendigo Radiology Group and Bendigo Hospital.

In between centres, I was invited to speak at the ASUM South Australian Branch Meeting in Adelaide. While there, I had the privilege of hearing two excellent presentations from Peter Muller, who is Co-Chair of the Adelaide Women and Children's Hospital's Ultrasound Department.

All centres were well equipped. The staff welcomed me kindly and had organised additional sonographers from Port Pirie, Portland and other radiology groups to join in the workshops, the seminars, or both. We had the opportunity not only to scan together, but also to share experiences of particular cases and speculate what clinical follow-up was likely.

One of the most reassuring aspects of a venture like this is discovering that our scanning techniques are similar between centres in the two states and our practices are current. The main focus in the workshops on this occasion was to explain, demonstrate and teach the principles and techniques for performing Doppler flow studies of the middle cerebral arteries and the ductus venosus.

All centres were keen and willing to learn about the approach to these studies and to attempt them in the workshops. With the exception of a few patients that were technically difficult, participants in the workshops were able to successfully perform the study and were satisfied that they would be able to further develop their ability to assess the flow in these vessels.

The seminars included: gynaecological ultrasound, how 3D and 4D ultrasound can be useful in the diagnosis of limb anomalies and third trimester fetal welfare. The second half of the fetal welfare presentation dealt with the theory and application of Doppler studies of the umbilical arteries, middle cerebral arteries and the ductus venosus. Some very useful questions and discussion came out of the presentations that enhanced the value of the seminars. In keeping with the nature of group dynamics, the smaller groups provided for greater interaction.

I learned a great deal myself through the fellowship, not only about ultrasound in the preparation of the course and from the input of the staff at all the centres, but in a wider sense as well. In Port Augusta I learned that there are a couple of 'must see' places in the Flinders Ranges that I will visit when I return, namely Wilpena Pound and Mt Remarkable.

Also, due to the culinary skills of one staff member at Port Augusta, I have discovered that there is much more to guacamole than I had appreciated in NSW.

Mt Gambier showed me that country South Australia has fantastic variety in cuisine and access to rich culture through visiting art and stage productions. During a lunchtime meander around the hospital vicinity in the typically crisp and drizzly Mt Gambier weather, I discovered the wonderful local knack for blending of the old and the new; the local Mt Gambier Presbyterian church building that had its roots back in 1858. It featured an original Scots stained glass window at the entry to the main chapel that was otherwise modern, warm and welcoming to a northern visitor.

North Adelaide has a myriad of excellent places to eat and, while sharing lunch with the local organisers, I was recommended another 'must visit' spot – Kangaroo Island.

A Saturday afternoon stroll took me to a footy match where a local spectator at the university grounds was kind enough to educate me in some of the finer points of that southern football game that I know very little about.

Bendigo is an incredible town that warrants a visit on its own, not just for its rich history but also for its architecture. Full of churches, restaurants and history, there would be no shortage of things to see and do in this large regional city centre – if one set aside some leisure time there.

During the evening seminar, Wayne Downey of Bendigo Radiology gave some wonderful examples of typical

and atypical musculoskeletal injuries that he had scanned as a volunteer sonographer in the recently held Commonwealth Games in Melbourne.

All in all, I consider myself privileged to have worked closely with colleagues at all the centres, meeting new people and visiting new places. ASUM, together with GE Healthcare, the sponsors of the fellowship, are to be congratulated for providing this opportunity for education and skills development. I have enjoyed the challenge of this teaching format as the 2006 Chris Kohlenberg Teaching Fellow and I hope the staff at the centres I visited gleaned worthwhile information from the Chris Kohlenberg Teaching Fellowship.

David Fauchon
Nepean Hospital

Southern NSW

'When you set out for Ithake (Wagga Wagga, Nowra and Wollongong), you should hope that the trip is long, full of adventure, full of knowledge.'

This quotation by a Greek poet sums up my experience quite neatly. It was a great pleasure to accept this teaching fellowship to honour the life and work of Chris Kohlenberg, whom I understand was very passionate about teaching.

One of the major reasons why I involve myself with any teaching program is that I continue to learn something new wherever I go – this trip was no exception.

The program aimed to update attendees on new developments in the area of fetal medicine and obstetric sonography.

I spent a day with sonographers in Wagga Wagga and a day in Nowra fine-tuning techniques and acting as a sounding board to confirm the excellent work that is already being done there. We spent time on the essential elements of the routine anomaly scan, the detailed cardiac assessment and correct Doppler techniques and their applications.

It was requested that I address the following topics in lectures: the 11–14 week scan, the fetal cardiac scan, the routine anomaly scan, multiple pregnancies scanning and the third trimester ultrasound examination.

I also shared two of my other hobbies: the use of the internet to optimise medical practice and case presentations – ultrasound images with matching findings on post-mortem/genetic testing/other imaging modalities – from our monthly women's medical imaging meeting at the Canberra Hospital.

The other important aspects of any medical meeting, namely good food and good company, were a given. I would like to thank the organisers in each centre, especially Nick Stephenson in Wagga Wagga, Helen Taylor in Nowra and Tim Alchin in Wollongong for their time and effort. These meetings certainly would not be possible without the involvement of ASUM and our sponsor GE Healthcare – we acknowledge their great contributions as well.

Dr Meiri Robertson
The Canberra Hospital

Vital stats of the NSW Fellowship

- 5 days
- 3 places: Wagga Wagga, Nowra and Wollongong
- Distance travelled: 1500 km
- 12 hours of lectures
- 16 hours of hands-on scanning
- 45 participants

Diploma of Diagnostic Ultrasound 2007 Examination Dates

2007 DDU Part II

- Part II Casebook submissions close on Monday 15th January 2007 and must be accompanied by the prescribed fee of A$330.00 for all participants.
- Part II Applications close on Monday 19th March 2007.
- Part II Written Examination will be held on Monday 14th May 2007.
- Part II Oral Examination for Cardiology candidates only will be in Melbourne on Thursday 14th June 2007.
- Part II Oral Examination (excluding Cardiology candidates) will be held in Melbourne on Saturday 16th June 2007.

2007 RESULTS

All examination results for both Part 1 and Part 2 candidates will be mailed to candidates at the same time, two weeks after the final exams (i.e. two weeks after Saturday 16th June 2007).

The ASUM *Ultrasound Bulletin* publishes information relating to changes in fees, examination dates, Regulations, etc. Members are kept up to date with this and other related information by automatically receiving the *Ultrasound Bulletin.*

Introducing the Certificate in Clinician Performed Ultrasound

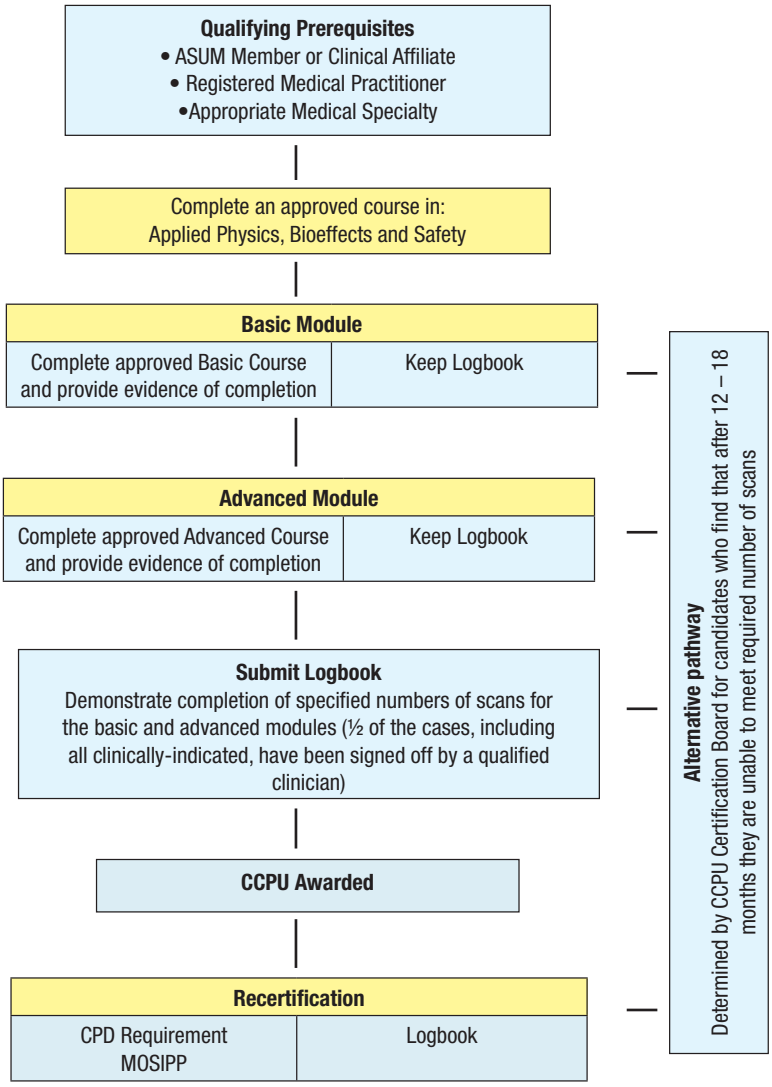
The Certificate in Clinician Performed Ultrasound (CCPU) was introduced following a decision made by the ASUM Council in 2003. The certificate is awarded by the ASUM Council, as is the case with the ASUM diplomas (DDU and DMU).

Why the CCPU?

The CCPU was introduced as a means of offering education to clinicians utilising diagnostic ultrasound technology at the point of care. This form of imaging has undergone marked proliferation in recent years and is different in depth and scope when compared to referred diagnostic ultrasound examinations. Consequently, ASUM Council felt it important that education, training and standards of practice be developed for this particular form of ultrasound examination.

A decision was made to offer education in a modular format, suitable to the needs of clinicians and trainees in a number of clinical disciplines. The program emphasises the development of proficiencies in answering a limited number of clinical questions in order to optimise patient management at the point of care.

The program is currently most developed in the disciplines of obstetrics and gynaecology, emergency medicine and surgery.



Certificate in Clinician Performed Ultrasound (CCPU)

What are the CCPU enrolment prerequisites?

To enrol for the CCPU a candidate must be a:

- ASUM clinical affiliate; or
- ASUM medical member.

The program is currently open to fellows or registrars in the second or subsequent year of their training program of the: Australasian College for Emergency Medicine (ACEM), Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) and Royal Australasian College of Surgeons (RACS).

Fellows and registrars in other specialist disciplines may be admitted at the discretion of the ASUM CCPU Certification Board.

What are the CCPU Program Requirements?

Completion of all of the following requirements leads to the award of the CCPU to a candidate:

- An approved course in Basic Physics, Instrumentation, Bio-effects and Safety Module;
- An approved Basic Course (with evidence of completion) module;
- An approved Advanced Course (with evidence of completion) workshop module; and
- A maintained logbook, demonstrating the performance of a requisite number of examinations specific to the clinical discipline.

ASUM will offer a full range of modules required in each clinical discipline, however, education programs offered by other providers may be accredited to fulfil the certificate requirements. The certification is for a duration of five years. Recertification criteria have been developed.

The Basic Physics, Instrumentation, Bio-effects and Safety Module is common to all the clinical disciplines. This module may be completed on-line through ASUM, at a modest cost. It involves self-assessment for each of the 14 components where progress to each new component requires successful assessment of the preceding component. This component was developed by Mr Mike Dadd, based on a very successful CD ROM program that he developed while at the CSIRO.

What does the future hold?

The CCPU program is likely to undergo substantial expansion with other clinical disciplines including nephrology, rheumatology, neonatology, rural and remote general practice, anaesthesia and intensive care medicine, military medicine and several of the surgical subspecialties including breast and endocrine surgery, colorectal surgery, and trauma surgery.

The CCPU is overseen by the ASUM CCPU Certification Board. It is envisaged that the education modules will be delivered to a degree through on-line programs, along with most of the scanning workshops being conducted through the developing ASUM College of Ultrasound and some local workshops usually conducted in association with scientific meetings of the respective clinical disciplines.

The ASUM CCPU Certification Board wishes to create a register of diagnostic medical sonographers, with appropriate skills, to train medical practitioners in practical scanning skills at the practitioner's place of work, using the practitioner's own equipment.

For further information contact ASUM +61 2 9958 6200, email education@asum.com.au or visit ASUM website www.asum.com.au/ccpu.htm.

Expressions of interest are sought from experienced, qualified sonographers who wish to be involved in the training of medical practitioners in practical skills.
Contact Helen Cuneo tel +61 2 9958 6200

2006–2007 DMU Examination Dates and Fees

2006 DMU

DMU Part II Practical Examination Period	1st May–30th October 2006
DMU Part II Oral Examination Period	9th September–29th October 2006
DMU Part I Supplementary Written Examination	4th November 2006

(All candidates have received individual examination timetables detailing their examination dates)

2007 DMU Application Dates

Applications will be accepted from Friday 1st December 2006. 2007 DMU Applications close on Wednesday 31st January 2007 but late applications will be accepted up until Friday 30th March 2007.

Applications for 2007 Part I & Part II Examinations open	Friday 1st December 2006
Applications for 2007 Part I & Part II Examinations close	Wednesday 31st January 2007

2007 DMU Written Examination Dates

DMU Part I & Part II Written Examinations	Saturday 28th July 2007

2007 DMU Examination Fees

DMU Enrolment (once only fee)*	$A310.00 + GST = $A341.00
Part I	
DMU Part I APP	$A310.00 + GST = $A341.00
DMU Part I PHY	$A310.00 + GST = $A341.00
Part II	
DMU Part II Written	$A515.00 + GST = $A566.50
DMU Part II Oral	$A515.00 + GST = $A566.50
DMU Part II Practical	$A715.00 + GST = $A786.50

Supplementary Examinations

DMU Part I Supplementary APP	$A310.00 + GST = $A341.00
DMU Part I Supplementary PHY	$A310.00 + GST = $A341.00

* Please note: The DMU Enrolment fee is a once only payment and covers all the administration charges for the Part I and Part II examinations. Candidates who have already sat a DMU Part I or DMU Part II examination and are yet to complete their Diploma will have already paid the Enrolment Fee.

The Magee Family Project: development of perinatal services for Bhutan

Emma Parry FRANZCOG

Bhutan is a small Buddhist Kingdom in the Himalayas with a population of around 600,000, which has high maternal and perinatal mortality. I am an obstetrician from Auckland and I feel lucky to be involved in a project to improve perinatal outcomes in Bhutan. From April to July this year I was in Bhutan, accompanied my husband and two children, to work in a number of areas of the project, the main one being ultrasound training.

Six Bhutanese O&Gs

There are no formally trained sonographers in Bhutan. Dr Phurb Dorji is the only obstetrician with training in high-risk obstetrics and ultrasound. Phurb spent 18 months at the National Women's hospital in Auckland, New Zealand and is the main resource for obstetric ultrasound in Bhutan. There are five other obstetricians and gynaecologists in the country, though none has an interest in ultrasound.

Bhutan has a free health system, with three referral hospitals, around 12 district hospitals and a large number of basic health units.

The country's geography is a major challenge; it takes three to four days to travel from one end of the country to another, although the distance is around 600 km. About 40% of the population lives more than an hour's walk from a road.

Some ultrasound scanning is available in the district hospitals and is performed by 12 x-ray technicians. These technicians have formal x-ray training and are then selected for further ultrasound training. This entails observing scanning for three months in India, with no formal teaching or hands-on experience. They then return home and start scanning and, in most cases, there is no support or supervision.

Within the project, provision has been made for formal training and two former x-ray technicians are in India, part of the way through a two-year formal sonographer training program.

Trainining courses

While I was in Bhutan, I ran two, four-week training courses for all the x-ray technicians. Half came to the capital, Thimphu, for four weeks and the other half went out to the busiest units outside of the capital to cover for their colleagues while they were on the course. This way, all 12 technicians were able to attend.

The number of years spent scanning ranged from one month to eight years. This meant there were some hard habits to break. All the technicians were keen and enjoyed having their first ever formal teaching session in ultrasound.

LESSONS LEARNED

- Linking theory and practice is important
- Relatively short interventions appear to be successful.
- Both parties learn a lot from these activities

At the start of the course they were pre-tested, using a MCQ, which they all failed. This test was given to them again at the end of the course.

The course comprised of daily lectures from 9.00 am until 10.30 am. Topics included physics of ultrasound and Doppler, which were kindly given by my husband, Dr Dave Parry, who is a medical physicist. I gave lectures on early pregnancy, dating, biometry, assessment of fetal wellbeing, Doppler and gynaecological scanning.

I also gave a brief lecture on anomaly scanning and Dr Phurb Dorji gave lectures on fetal anomalies. We didn't expect the students to be able to conduct anomaly screening, but hoped that they would be able to identify major anomalies so that cases could be referred to Dr Dorji for a second opinion and a decision on transfer and delivery made. One needs to bear in mind that some of the units are a two-day drive away.

After the lecture, the students were split into two groups of mixed ability. Some went to the main hospital scan department where there were two machines; general, gynae and early pregnancy scans were done there. The other half went to the maternity outpatients where obstetric scanning was performed.

As part of the project, a portable ultrasound machine had been purchased – a Terason – and taken to Bhutan in our hand luggage. This machine proved to be excellent and we were able to split the use of this and the small Aloka between the maternity outpatients ward and the main hospital scanning department so two students could scan at once in both sites.

I rotated between the two sites and provided hands-on supervision, which the students quickly got used to. Students were encouraged to critique each other when not being directly supervised by Phurb Dorji or myself.

Students kept a logbook and we reviewed their progress and range of cases at the end of each week. In the last week, a series of tests were held, including a practical examination.

The MCQ was run again on the penultimate day; all the students had improved, each one passing the final post-test examination.

Student feedback

Student feedback was very good and, despite having to come to Thimphu for a month, they all really enjoyed the course.

Part of the concern is the ongoing lack of supervision and collegiality. We provided a number of support materials and are trying to maintain contact with the students via email.

Thanks to ASUM, we were able to provide an excellent physics CD-Rom to them free of charge. We very much appreciate this generous contribution.

If anyone is keen to learn more about the project, please contact me by email at: daveemmaalicerosie@gmail.com.

ASUM New Zealand Branch, National Conference, Napier 13–16th July 2006

The ultrasound team at Hawke's Bay Hospital ran a successful conference for over 120 delegates at the Napier War Memorial Conference Centre on 13–16th July. The keynote speakers were Marilyn Siegel, Professor of Radiology and Paediatrics, Washington University, St Louis, USA and Sue Davies, Program Director / Sonographer from The Australian Institute of Ultrasound, Australia. Other invited speakers included Martin Necas (who also ran a student workshop sponsored by Toshiba on 13th July) and Angela Hartman, veterinary radiologist from Massey University and radiologists and sonographers from Australia and New Zealand.

Top: The Organising Committee. Above: Dr David Rogers thanks keynote speaker Prof Marilyn Seigel

Convenor Rowena Tyman reports

Feedback from everyone so far (delegates, sponsors, manufacturers, ASUM Council and speakers) has been very positive. The whole conference, beginning with the extraordinary greeting performances from John Trewick, SMO of ED Dept Hawke's Bay Hospital (alias Manuel) and Iain Morel, Clinical Radiology Director, Hawke's Bay Hospital (alias Mr Fawlty – you just had to be there to appreciate that one), was a huge success.

The speakers were excellent and kept the delegates captivated throughout and, of course, the social events – which included Philips' Hawke's Bay wine tasting and Siemens' Dinner at the Mission Winery – were received with enthusiasm by all.

As Convenor, I would like to extend great thanks to the whole ultrasound team, especially my manager, Mandy Robinson, and her secretary, Silke Toepfer, at Hawke's Bay Hospital.

There was a terrific amount of preparation and Jayne Lloyd, Co-convenor and ultrasound team leader, supported me throughout the whole process. Special thanks also go to the support of Rex de Ryke and his committee from ASUM NZ and, of course, Caroline Hong and the ASUM Council who all provided support and a variety of interesting talks, while also attending to ASUM Council duties.

Finally, without sponsors, the manufacturers and their support and dedication to the profession, we would not be able to hold such events. We had a great display in the Exhibition Hall, and I would like to thank the following for all their support:

Siemens (Platinum)
Philips (Gold)
GE Healthcare (Silver)
Toshiba (Student Workshop)

Prizes were awarded to delegates as follows:

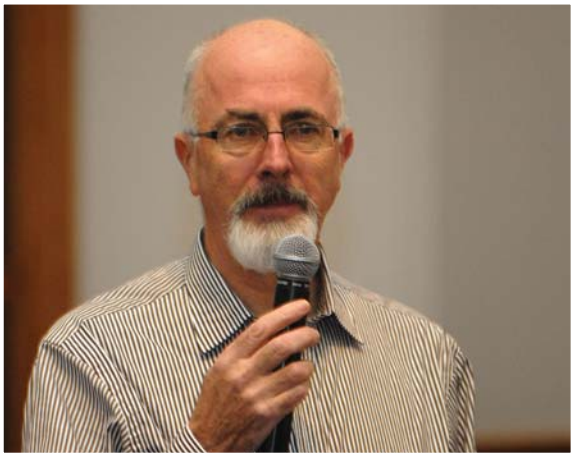
Best Proffered Paper
Kids Playing Pretend: Things that weren't quite what we thought. David Davies-Payne.

Best Student Paper: Awarded jointly
Retained Products of Conception – Thinking Outside the Square. Rochelle Luke.
Vascular Anastomoses in Monochorionic Twins – A Case of TRAP Sequence. Gemma Penn.

Best Poster
A New Method for Ultrasound Evaluation of the Iliopsoas Tendon Insertion. Stephen J Bird.

Rowena Tyman
Convenor

Delegates listening attentively



Dr Iain Morle

Keynote speakers Marilyn Seigel, Martin Necas and Sue Davies

Silke Toepfer

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General Manager: Rosina Davies

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New Members May–July 2006

May 2006

Full members
Alan Adno NSW
Christine Allman NSW
Darren Barling NSW
Sueanne Burford WA
Jessie Childs SA
Sarah Davies Qld
Samantha Downing NZ
Gary McCulloch SA
Meiri Robertson ACT
Patricia Wakefield Vic
Kathryn White Qld
Sarah Wild NZ
Penelope Wilkinson NZ

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Bernard Brenner NZ
Kimberlee Deery NSW
Donna Dixon NZ
Simonne Doornbos NSW
Jacqui Drake Vic
Megan Halliday NT
Robert Harris Qld
Thomas Hitchcock WA
Christopher Hunter NSW
Sean Kelly NZ
Katharine Louey Vic
Alexandra Marceglia Vic
Carla Marcelli WA
Ahmed Maruid NSW
Benjamin Micallef NSW
Arif Mirza NSW
Lisa Mitchell Vic
Diane Palmer Vic
Girija Prabhala NSW
Miranda Robinson Vic

Corresponding members
Jamal Alshalaan Saudi Arabia
Borsha Sarker United Kingdom
Alan Williams Malaysia

June 2006

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Bassima Al-Haouli Vic
Sandy Archard Vic
Leanne Day NSW
Arumugam Ganeshalingham NSW
Carolyn Garlick Vic
Andrea Gibb NZ
Andrew Gill WA
Christopher Howitt NSW
Vladimir Humeniuk SA
Christine Manley Tas
Thobekile Mketwa NZ
Khaled Nachabe NSW
Bernice Ng WA
Jennifer Parkes Vic
Matthew Pounsett NSW
John Shirley NSW
Jessamine Soderstrom WA
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David Walsh SA

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Sarah Kurth Qld
Benjamin Roberts WA

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Rose Ly-Schmitz NSW
Patricia Moore Vic
Polly Peres NSW
Sigit Pramono SA

Corresponding member
Ayman Shallal United Arab Emirates

July 2006

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Cyrus Edibam WA
Peter Esselbach SA
Hala Iasiello SA
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Jayne Lloyd NZ
Charmaine Maier ACT
Triet Nguyen Qld
Elizabeth Paterson NSW
Rocco Pozzolungo NSW
Gayathri Ramani ACT
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Sarah Moan NZ

Corresponding member
Shahid Qadir Saudi Arabia

Moving? New job? New workplace? Don't forget to tell ASUM: tel +61 2 9958 7655 email asum@asum.com.au

May–October 2006 ASUM DMU Practical Examination Period
Candidates receive individual notification
Contact DMU Coordinator
Tel: +61 2 9958 7655
Email: dmu@asum.com.au

Wednesday 16 Aug 2006
ASUM – WA Branch
Education Meeting
The Role of Trasperineal Ultrasound in Placental Localisation
Venue: RMH Radiology Seminar Room
Level 5 Roberts Road Subiaco
Tel: + 61 8 9400 9860

Sunday 3 Sep 2006 5 Days
16th World Congress on Ultrsound in Obstetrics and Gynaecology
Venue: Hilton London Metropole, London UK
Contact: ISUOG, Unit 4 Blythe Mews Blythe Road, London W14 OHW
Tel: +44 (0) 20 7471 9955
Email: congress@isuog.org
www.isuog2006.com

Saturday 9 Sep–29 Oct 2006
ASUM DMU
Part II Oral Examination Period
Contact DMU Coordinator
Tel: +61 2 9958 7655
Email: dmu@asum.com.au

Thursday 14 Sep 2006
Nuchal Translucency Course
Venue: Melbourne Convention Centre Melbourne
Contact: ASUM 2/181 High Street Willoughby NSW 2068
Tel: +61 2 9958 7655
Email: education@asum.com.au

Friday 15 Sep 2006 3 Days
ASUM 2006 36th Annual Scientific Meeting of the Australasian Society for Ultrasound in Medicine
Venue: Melbourne Convention Centre Melbourne
Contact: ASUM 2/181 High Street Willoughby NSW 2068
Tel: +61 2 9958 7655
Email: education@asum.com.au

Sunday 17 Sep 2006
ASUM 2006 Skills Day
Venue: Melbourne Convention Centre Melbourne
Contact: ASUM 2/181 High Street Willoughby NSW 2068
Tel: +61 2 9958 7655
Email: asum@asum.com.au

Thursday 19 Oct 2006 3 Days
ECHO Australia 2006
Venue: The Westin Sydney 1 Martin Place Sydney NSW
Clinical Applications of Echocardiography in Clinical Cardiology and How to Intergrate the Latest Innovations in Cardiovascular Ultrasound
Contact: Linda Rattray GE Heathcare
Tel: +61 2 9846 4735
Email: Echo.Australia2006@ge.com

Thursday 19 Oct 2006
To be confirmed
ASUM Victorian Branch Meeting
Combined Meeting with RANZCR
Venue: Royal Childrens Hospital Flemington Road Parkville Melbourne
Speaker Dr Andrew Baldey
Ultrasound and Nuclear Medicine Correlation – A Pot Pouri of Cases
6.30 pm for 7 pm start
Contact: Monica Pahuja
Email: MPahuja@mercy.com.au

Saturday 21 Oct 2006
2006 CCPU Program
Advanced Module (O&G)
Acute Pelvic Pathology (Melbourne)
Venue: Royal Womens Hospital
Email: education@asum.com.au

Sunday 29 Oct 2006
2006 CCPU Program
Advanced Module (O&G)
Principals of Screening for Chromosomal Abnormality (Sydney)
Venue: Royal Hospital for Women
Email: education@asum.com.au

Saturday 4 Nov 2006
ASUM DMU Part 1 Supplementary Written Examination
Venue: As allocated. Candidates receive individual notification.
Contact DMU Coordinator
Tel: +61 2 9958 7655
Email: dmu@asum.com.au

Friday 8–9 December 2006
ASUM-ISUM Asia Link Ultrasound Meeting 8th ISUM Congress
Bandung Indonesia
Contact Dr Daniel Makes
Email: d_m@cbn.net.id

2007

Wednesday 28 February 2007 5 Days
DMU Prep Course
Venue: Conrad Jupiters Gold Coast Australia
Contact ASUM 2/181 High Street Willoughby NSW 2068
Tel: +61 2 9958 7655
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Friday 2 March 2007 3 Days
ASUM Multidisciplinary Workshop
Venue: Conrad Jupiters Gold Coast Australia
Contact: ASUM 2/181 High Street Willoughby NSW 2068
Tel: +61 2 9958 7655
www.asum.com.au

Friday 2 March 2007 2 Days
Obstetric & Gynaecological Ultrasound Symposium
Venue: Conrad Jupiters Gold Coast Australia
Contact ASUM 2/181 High Street Willoughby NSW 2068
Tel: +61 2 9958 7655
www.asum.com.au

May–October 2007 ASUM DMU Practical Examination Period
Candidates receive individual notification
Contact DMU Coordinator
Tel: +61 2 9958 7655
Email: dmu@asum.com.au

Thursday 19 July 2007 4 Days
ASUM NZ and RANZCR NZ Third Combined Scientific Meeting 2007 New Zealand
Venue: Wellington Convention Centre Wellington New Zealand
Email: education@asum.com.au

Saturday 28 July 2007
ASUM DMU Part I & Part II Written Examinations – Provisional
Venue: As allocated. Candidates receive individual notification.
Contact: DMU Coordinator
Tel: +61 2 9958 7655
Email: dmu@asum.com.au

Saturday 1 Sep–31 Oct 2007
ASUM DMU
Part II Oral Examination Period
Contact DMU Coordinator
Tel: +61 2 9958 7655
Email: dmu@asum.com.au

Thursday 13 Sept 2007
ASUM 2007 37th Annual Scientific Meeting of the Australasian Society for Ultrasound in Medicine
Venue: Cairns Convention Centre, Cairns North Queensland Australia
Contact: ASUM 2/181 High Street Willoughby NSW 2068
Tel: +61 2 9958 7655
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2008

Saturday 26 July 2008
ASUM DMU Part I & Part II Written Examination – Provisional
Venue: As allocated. Candidates receive individual notification.
Contact: DMU Coordinator
Tel: +61 2 9958 7655
Email: dmu@asum.com.au

Sept 2008 ASUM Annual Scientific Meeting
New Zealand

2009

Sunday 30 Aug 2009 – Thursday 3 Sept 2009 5 Days
ASUM hosts WFUMB 2009
World Congress in Sydney Australia
Venue: Sydney Convention and Exhibition Centre
Contact: Dr Caroline Hong ASUM CEO 2/181 High Street Willoughby NSW 2068 Sydney Australia
Email: carolinehong@asum.com.au

REMINDER confirm dates of non-ASUM events with the organisers before making plans to attend.

Guidelines for authors

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

Original research

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

Quiz cases

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

Case reports

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

Review articles

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

Forum articles

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

Calendar items

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

Corporate news

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

Format

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

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

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

- Title page should include the:

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

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

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

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

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

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

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

Abstract

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

Images

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

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

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

Copyright

Authors are required to provide assurance that they own all property rights to submitted manuscripts, and to transfer to ASUM the right to freely reproduce and distribute the manuscript.

ULTRASOUND BULLETIN PUBLICATION DATES

	November 2006	February 2007	May 2007	August 2007	November 2007
Submission Deadline	9 October	15 January	3 April	10 July	10 October
Post Date	17 November	23 February	12 May	15 August	15 November

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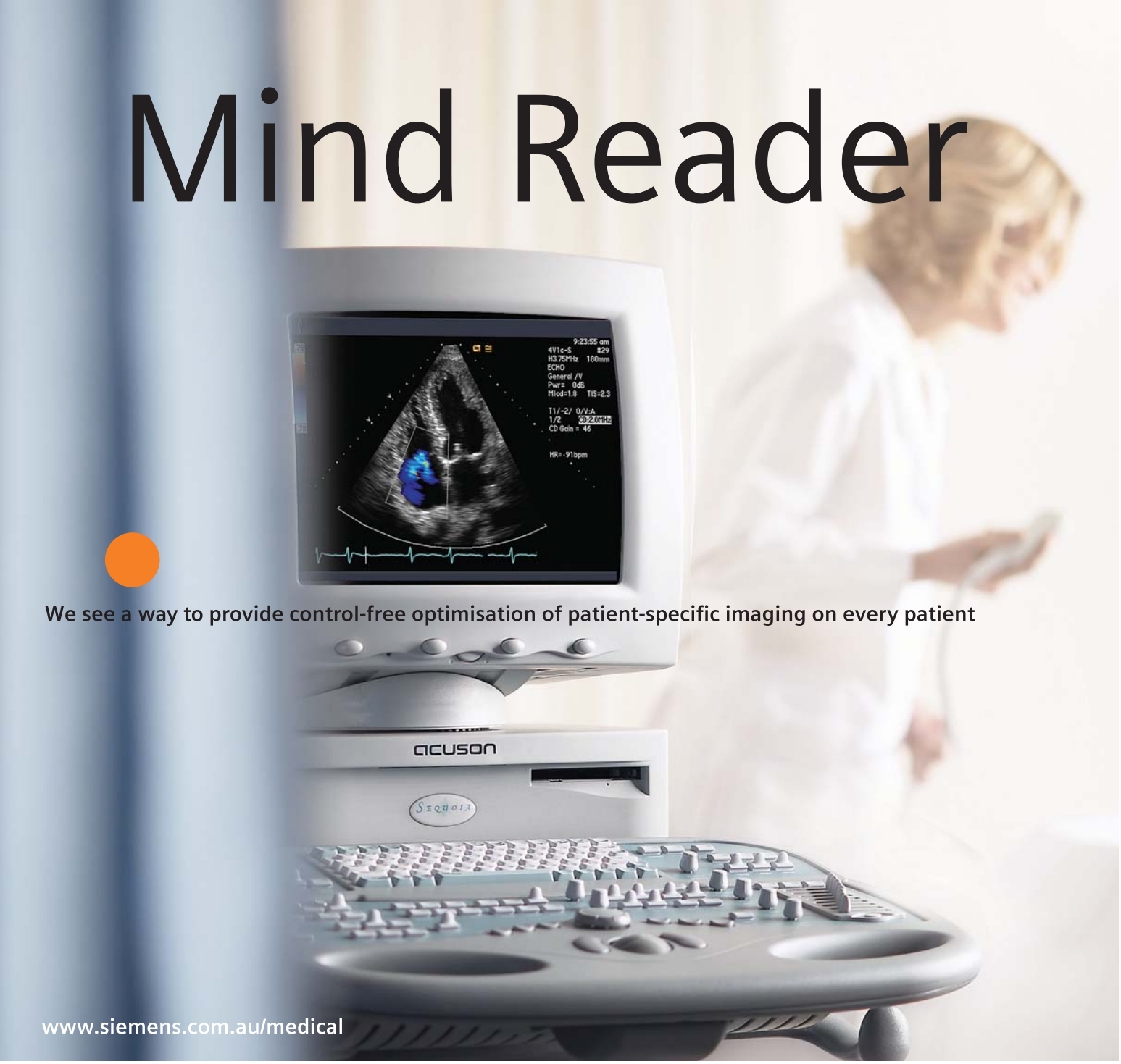

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