



**Australasian Society
for Ultrasound
in Medicine**

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Dr Glenn McNally

Chief Executive Officer

Dr Caroline Hong

BULLETIN

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This issue of the *Bulletin* is the last I shall oversee as its Editor. Having been present for its conception, gestation and delivery in February 1998, I feel some of the emotions of a parent, including pride and a minor degree of exhaustion. I would like to sincerely congratulate all staff and members of ASUM who have been part of the production team as well as those who have contributed manuscripts of various types, especially those who have done so on a regular basis. I would like to particularly express my gratitude to Keith Henderson, Margo Harkness, Merilyn Denning and Iris Hui – these people have worked hard to make a success of the *Bulletin*.



ASUM deserves to feel proud of the *Bulletin* as it is a reflection of the quality of the standard of ultrasound practised by its members throughout Australia and New Zealand.

I am sure the new Editor, Glenn McNally, will continue to nurture the development of the *Bulletin* and add new qualities with the active support of the ultrasound community.

Robert N Gibson
Editor

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President's message



This is the final issue of the Bulletin for 2001, the first year of the new millennium. It has been an interesting and challenging year. I am indebted to the members of the Executive Council who provide essential and valuable support to help direct the aims and purposes of ASUM. With the help of Council we are setting new

initiatives to widen the outlook for ASUM's future development and growth as a professional society.

I would like to take this opportunity to thank Council and Committees that support ASUM and the members who voluntarily give their time and expertise to the benefit of the membership. The continued support of our industry representatives is also appreciated. I wish to thank the retiring councillors who have willingly given their time and energy, for the sake of continuing a viable ultrasound society, for their contributions. Dr Andrew Ngu completed a term as Past-President, Dr Fergus Scott (Convenor ASUM 2001) completed a term as Medical Councillor and David Rigby completed his term as corporate representative.

Professional organisations like ASUM need continually to adjust to changes brought about by technological and sociological development. In these days when medico-legal issues become important in the provision of diagnostic services, it is crucial that appropriate standards of practice and safety guidelines are maintained to ensure continued safe and effective application of ultrasound in medicine. Our linkages with other ultrasound organisations, including the World Federation for Ultrasound in Medicine and Biology (WFUMB), help in this process. ASUM provides valuable educational services and also has an opportunity to develop into the pre-eminent centre of excellence for medical ultrasound practice within Australasia. Nowadays, we live in a competitive era and the Executive Committee and Council are working hard to develop strategies to ensure that our Society will flourish and grow.

The ASUM Executive Council has recently assumed a more proactive role in running the society. The current Executive Council incorporates a range of expertise representing



September 2001 Council Meeting

various specialty groups within the Society and includes a scientist (Stan Barnett, President), obstetrician (Dr Glenn McNally, Treasurer), and sonographers (Mary Young, Hon Secretary and Kaye Griffiths, Assistant Secretary). We are also supported by an experienced, professional and highly motivated Chief Executive Officer, Dr Caroline Hong. Caroline's primary role is to ensure that directives of Council are implemented to realise our objectives in an efficient and effective manner. Our primary objective remains the pursuit of the highest standards of use of ultrasound in medicine.

One of the agreed objectives is to develop linkages in the broader geographic context of Australasia, *ie*, with our neighbours in the Asia-Pacific region. The Executive Council of ASUM is committed to exploring opportunities to assist professional ultrasound societies within our region establish high standards of safe and effective use of diagnostic ultrasound in medicine. The Executive Council has accepted the responsibility and has begun the process of creating strategic academic linkages and identifying areas where ASUM can develop a mutually beneficial program of training and accreditation. This will allow an opportunity to use the considerable professional expertise that exists within ASUM.

The inaugural forum was held during the 31st Annual Scientific Meeting of ASUM, Sydney, 7-9th September, 2001. It was designed to bring together key individuals from neighbouring Asian countries to examine the wider perspective, beyond boundaries of individual ultrasound societies or countries, and to determine ways in which we might form effective professional alliances. The Asia Link program was made possible through the generous support and professional services and assistance of the Sydney Convention and Visitors Bureau.

During the two sessions allocated to the program, issues that were examined included membership composition of each ultrasound society; affiliations with other Asian societies or links with other international organisations, such as WFUMB; ways in which diagnostic ultrasound is practised (mainly private, public hospital, or both); accreditation of individuals and facilities; the role of sonographers; methods of education and training, particularly in remote areas. Many other issues of mutual interest were openly discussed during the program. The proceedings of the Asia Link program will be documented in a separate issue of the ASUM *Bulletin*.

We have already received positive recommendations toward future co-operative development from our Asian colleagues. Prof Hiroko Watanabe, President of the Asian Federation of Societies for Ultrasound in Medicine (AFSUMB) has placed on the agenda for the annual meeting the matter of developing a mutually beneficial Asia Link program. Meanwhile, we have received strong interest from Prof Choi, Convenor of WFUMB 2006 in Korea, indicating an intention to bring colleagues to the meeting of ASUM 2002. I believe

Cont'd on page 4

From the desk of the Chief Executive Officer



By the time this goes to print, it will be nearly 5 months that I have been in the position of Chief Executive Officer of ASUM.

It was a pleasure and an exciting time for me to attend the recent ASUM 2001 Annual Scientific Meeting. In addition to organising and overseeing four ASUM business meetings, I was able

to meet many members, visit the trade displays, attend scientific sessions, oversee the Asia Link program and join in hosting the activities for the Asian leaders, together with the members of the Executive Council and the Sydney Convention and Visitors Bureau to show off Sydney as a great venue for a future world conference. A preliminary report is included on page 28 in this *Bulletin*.

In attending the ASUM 2001 meeting, I can understand why many members and staff feel a sense of pride in belonging to ASUM. It is because of its unique membership structure which brings together all the expertise from a range of medical specialists, scientists, sonographers and corporate companies into one society, working together to promote the highest possible standards of practice for ultrasound in medicine.

My role in ASUM bears some resemblance to my previous role as CEO of a professional association. The main similarities relate to working with the Executive Council and supporting the Board of Directors in the overall performance and future direction of the Society. The exciting feature in ASUM is its international status and therefore its role as a major leader in ultrasound practice and research in medicine and biology at a global level.

It is my priority to support the President and the Executive Council in driving change to improve everything that we do in terms of member services, strategic alliances - locally and overseas, risk management, financial accountability and strengthening our corporate governance. We can only do this through the support and expertise of committees, advisory boards, liaison persons, volunteers and staff. We are fortunate to have such continuing strong support.

As CEO, I also have a responsibility in providing leadership to all my staff so that their efforts are focussed on meeting the objectives of the Society, responding to our members' needs and are aligned to our future growth as a strong and relevant Society. There are already excellent capabilities within the Secretariat staff and I am optimistic of their valuable contribution to the future growth of the Society.

During the week of the ASUM 2001 Annual Scientific Meeting held in Sydney, ASUM also held two Council meetings, an Annual General Meeting and an Executive Council meeting.

At the Annual General meeting held on 6 September 2001, it was resolved to increase the membership fees for 2002-2003 by 5%. The membership fees have remained the same for many years and this modest increase is consistent with the increase in overall costs in providing member services and conducting educational activities and meetings.

The following were elected as Directors for 2001-2002:

President	Dr Stan Barnett
Honorary Secretary	Mrs Mary Young
Treasurer	Dr Glenn McNally
Assistant Honorary Secretary	Mrs Kaye Griffiths
Medical	Dr Neil Orr
	Dr Roger Davies
	Dr David Rogers
	Dr Matthew Andrews
	Dr George Larcos
Sonographer	Mr Stephen Bird
	Ms Janine Horton
	Mrs Alison Lee-Tannock
	Ms Vicki Truelove
Scientist	Mr Peter Muffet
Corporate	Dr Dave Carpenter
Associate	Ms Maryanne McHugh
	Mr Justin O' Leary

Previously co-opted members to Council are no longer appointed to Council this year. In accordance to the Society's Memorandum and Articles, there is no provision to co-opt members to Council and therefore they could not be returned to the Australian Securities & Investment Commission (ASIC) as Directors. However, their valuable expertise, which should not go unrecognised, will be retained in an advisory capacity, as requested by Council.

Dr Jim Syme was elected as Life Member for his outstanding contribution to his profession and to the Society. Many members would remember Dr Syme in his role as Chair of the Diploma in Diagnostic Ultrasound (DDU) Board of Examiners, and how he worked tirelessly to advance the DDU and the Society.

Dr Kittipong Vairojanavong, currently Vice President of the World Federation of Ultrasound in Medicine and Biology (WFUMB), President-Elect of the Asian Federation of Ultrasound in Medicine and Biology (AFSUMB), and past president of the Thailand Society of Ultrasound in Medicine, was awarded Honorary Membership for his worthy contribution to ultrasound. Dr Vairojanavong is well known internationally and last visited Australia on an exchange program in 1994, during the Presidency of Dr Lachlan de Crespigny.

Both Dr Jim Syme and Dr Kittipong Vairojanavong were presented with their special award plaques at the ASUM 2001 Gala Dinner in front of more than 300 guests in Sydney.

Two Council meetings were also held on 6 September 2001 - the outgoing Council in the morning followed by the AGM and the Incoming Council during the latter part of the afternoon.

Executive column

Council discussed ASUM Council restructure and indicated overall support for a reduction in Council size, from 19 to 12 members, to make it more effective and efficient as a governing body. It was agreed that further discussion and decision had to be made in relation to the various portfolios/committees required to achieve the Society's objectives. It was intended that each portfolio/committee would be chaired by a member of Council, who can report directly to Council on the committee activities.

In fulfilling its responsibilities in the legal, policy, strategy and accountability areas, Council approved the following:

- Guidelines and responsibilities for ASUM Committees
- Financial end of year accounts
- Branch finances
- Protocol for request for Secretariat resources and expenditure – by Branches, Committees, Examination Boards.
- Responsibilities of ASUM staff to the CEO
- Appointment of the CEO as the Company Secretary (as distinct from the Honorary Secretary). As ASUM is registered as a public company limited by guarantee, it is a requirement to appoint a staff member as company secretary, and who is not a Councillor.

Council at its previous meetings had agreed to support the development of the Asia Link Program, WFUMB 2009 conference bid, coordinated approach to training and educational activities and the Research Foundation. As CEO, I will assist and support the Executive Council in driving these initiatives forward.

Council also paid tribute to Dr Andrew Ngu and Dr Fergus Scott, both of whom have worked tirelessly for the Society and have decided to retire this year from Council. David Rigby who also retired this year from Council, was acknowledged as a valuable corporate representative on Council. It was specially noted that Dr Rob Gibson had retired from the DDU Examination Board and his contribution was much appreciated.

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



ASUM Office will close over Christmas from Monday 24 December 2001 and reopen on Monday 7 January 2002. We would like to take this opportunity to wish all our members a safe and happy Christmas and a joyful New Year.

President's message cont'd from page 2

that this is a unique opportunity for all involved to develop mutually beneficial clinical, scientific and educational activities in our geographic region.

I wish to thank the organising committee of the annual scientific meeting held in Sydney, September. It was, by all accounts, an enjoyable and scientifically rewarding experience. In particular, Dr George Larcos, as scientific convenor, created an interesting and varied program and also provided the opportunity to incorporate the Asia-Link Program into the meeting. Fergus Scott dealt with the responsibility of convenor of the meeting in an amazingly calm manner. Thank you also to all other members of the organising committee: Alison Reilly, Jim Raleigh, Sarah Colley, Tony Grattan-Smith and Keith Henderson. I look forward with anticipation to next year's meeting in Queensland.

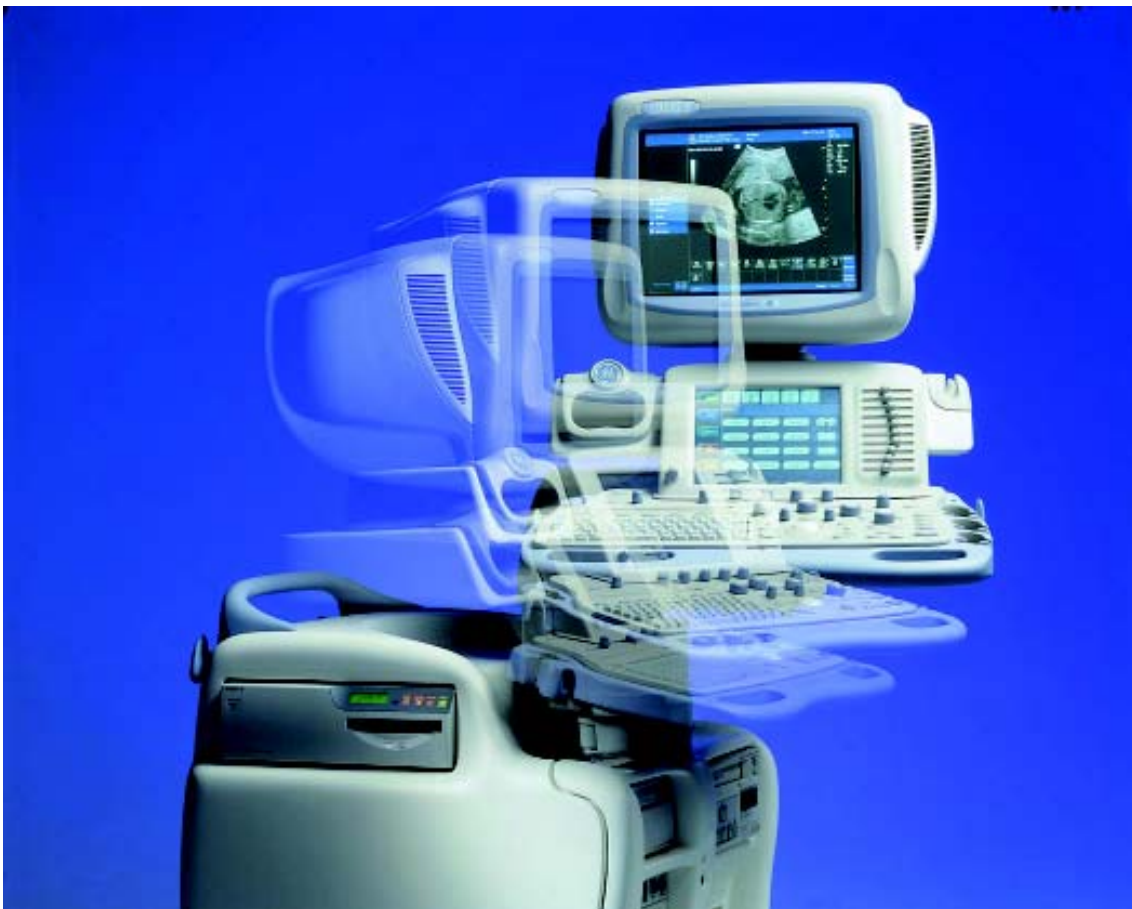
I am pleased to advise that ASUM Council awarded honours in the form of Life Membership and Honorary Membership to two individuals in recognition of their outstanding contribution to the development of high standards of practice of ultrasound. Life Membership of ASUM was awarded to Dr James Syme in recognition of continued dedicated service as Chair of the Board of Examiners of the Diploma of Diagnostic Ultrasound. This is an important and challenging role; one that Dr Syme has fulfilled in an exemplary manner. Congratulations to Jim and thank you for your contribution to ASUM over the years. The award of Honorary Member was presented to Dr Kittipong Vairojanavong, President-Elect of AFSUMB and Vice-President of WFUMB, in recognition for his continuing efforts to advance the standard of diagnostic ultrasound. He has been instrumental in establishing educational workshops to advance the standard of knowledge and skills in remote regions of Thailand. Dr Vairojanavong was an invited guest of the Asia Link program, held during the ASUM 2001 Scientific Meeting.

We are facing an era of change in policy, structure and philosophy. ASUM has grown in size and diversified in interests and activities. We need to ensure that we capture the opportunities and develop for the benefit of the wider community. This is where the leaders of ASUM have particular responsibility. I am sure that there is a positive and productive future for ASUM, given the continued generous support of hard-working and enthusiastic individuals. The pursuit of excellence is a fine objective that can only be achieved with the support of a dedicated team.

Dr Stan Barnett MSc PhD FAIUM
President



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Controversies in third trimester fetal welfare scanning

H Murray MBChB (Hons) MRCOG FRANZCOG DDU CMFM DM, Department of Perinatal Ultrasound, Nepean Hospital, Penrith

One of the major dilemmas in modern obstetric practice is to determine if and when to intervene to deliver a fetus perceived to be at risk of intrauterine hypoxia and acidemia. The assessment of fetal health in the third trimester has advanced markedly with the advent of an improved understanding of fetal physiology and improved Doppler technology in real-time ultrasound. The challenge is therefore to provide the obstetrician with information about the fetus from the third trimester scan that will accurately determine the status of an at risk fetus, and allow for it to be delivered before hypoxic damage can occur.

The ASUM guidelines for the third trimester scan include the determination of

- Fetal number, presentation and size
- Fetal cardiac activity
- Measurements of fetal size
- Placental localisation
- Amniotic fluid volume
- Detection of maternal masses
- Fetal wellbeing.

Clearly there needs to be added to this list a recheck of fetal anatomy in order to detect those fetal anomalies that may not have been present at the 18-20 week assessment. Such anomalies are included in Table 1.

<p>Cerebral ventriculomegaly due to X linked hydrocephalus Congenital infection Lissencephaly</p> <p>Microcephaly</p> <p>Cardiac disorders Hypoplastic left ventricle Ventricular outflow obstruction Pulmonary outflow obstruction Coarctation of the Aorta</p> <p>Late onset diaphragmatic hernia Duodenal atresia (double bubble) Skeletal dysplasias Neuromuscular disorders. Renal disorders including infantile polycystic kidney</p>

Table 1 Fetal anomalies diagnosable in the third trimester that may not have presented at the 18-20 weeks scan. (List not exhaustive)

The first three components of the ASUM guidelines should pose little problem in the busy obstetric practice, with the proviso that some care needs to be taken with measurement of the fetal head especially if the fetus is presenting by the breech, or if the fetal head is deeply descended into the maternal pelvis.

The breech-presenting fetus will often have a dolichocephalic head, which makes the BPD an unhelpful measurement.

Similarly, when the fetal head is deeply descended into the pelvis, the measurement of the head circumference can be difficult, especially if membranes are ruptured. An inaccurate measurement will lead to inaccurate estimation of fetal weight, which may lead to an inappropriate decision if the fetus is at the extremes of size. An indication of the reliability of the fetal measurement must therefore accompany a report in such circumstances.

PLACENTAL LOCALISATION

Although the lower edge of an anteriorly placed placenta is easy to detect transabdominally, the lower edge of the laterally or posteriorly placed placenta is often difficult to define. Unsuspected placenta praevia following at least one ultrasound examination in pregnancy has been reported in up to 7% of cases (1), and a number of these will be the cause of significant bleeding in the peripartum period. Where the lower edge of the placenta cannot be defined due to the fetal presenting part, and there is a suspicion of placenta encroaching on the cervical os, transvaginal ultrasound has been shown to be a safe and accurate means of detecting the placental site (2). In our practice, a distance between the fetal head and the sacrum of more than 1.5 cms after 36 weeks of pregnancy has been found to be associated with the lower edge of a posterior placenta encroaching on the cervical os in over 50% of cases, and therefore such a finding warrants consideration of a transvaginal scan. The relationship between the lower edge of the placenta and the internal os of the cervix can then be ascertained.

AMNIOTIC FLUID VOLUME

From the obstetricians point of view, one of the most enigmatic components of the third trimester scan is the assessment of the amniotic fluid volume. There are two measures of the amniotic fluid that are used, the amniotic fluid index (AFI), and the amniotic fluid evaluation associated with the biophysical profile (BPP) scoring system. Normal values for the AFI are commonly obtained from the data of Moore et al (3), which show the 2.5 percentile for any gestation up to 42 weeks is 6.3 cms or more. A normal amniotic fluid estimation for the BPP is a single pocket of fluid of greater than 3 cms without umbilical cord loops or more than one pocket of > 2 cms without cord loops (4). For the pregnancy with a single pool of fluid at 37 weeks of 4 cms diameter therefore, the AFI can be reported as abnormal even though the amniotic fluid is reported as normal as part of the BPP. This causes major problems of interpretation to obstetricians in clinical practice, as witnessed by the number of referrals to our fetomaternal unit.

The determination of whether the amniotic fluid is normal for any given pregnancy is not done through the isolated

estimation of the size of liquor pockets without reference to fetal status or condition. A report of an AFI that falls below the 2.5 percentile must be accompanied by further fetal assessment, namely:

Is there evidence of fetal urine production?

Is there a possibility of membrane rupture (ask the mother)?

Is there evidence of poor fetal growth?

Is there evidence of fetal compromise with abnormalities in the BPP or Doppler flow assessment? (see below)

A normally grown fetus with a normal BPP at 36 or more weeks where there is a single pool of liquor of 4.5 cms can be expected, in the absence of other maternal or fetal disease, to deliver a healthy child at or around term. Implications of abnormality of liquor volume would be inaccurate in such a case. A report should therefore contain an assessment of the combined size of the vertical pockets of liquor and an indication of whether this amount of liquor is normal given fetal size and biophysical status.

In cases of increased liquor, pregnancy assessment and reporting can be equally as hazardous. The term polyhydramnios is that attributed to a pregnancy where abdominal palpation of the mother fails to appreciate fetal parts due to excessive amounts of liquor. The term hydramnios is that used when the amniotic fluid is measured using ultrasound, and where the deepest pool (DP) of liquor is greater than 8 cms, or the AFI is more than the 95 percentile for the gestational age (5). Further, hydramnios can be divided into mild (DP 8-12 cms), moderate (DP 12-15cms) and severe (DP > 15 cms). For a fetus that is on the 90 percentile for growth at 36 weeks with an AFI of 28 cms, and where fetal parts are easily felt abdominally, the pregnancy can have an ultrasound classification of hydramnios without clinically having polyhydramnios.

Only 17-29% of pregnancies with a DP of 8-12 cms will have an identifiable pathology as opposed to 75-91% of pregnancies with DP 12-15 cms (5). An ultrasound assessment of hydramnios must therefore look for impediment to fluid ingestion in the fetus including gastrointestinal tract atresias, oesophageal compression from thoracic masses, CNS lesions, and fetal anaemia using middle cerebral artery (MCA) peak flow velocities (6). Assessment should also include cervical length, using a transvaginal probe if necessary, given the association of preterm labour and moderate/severe hydramnios. A referring practitioner should be urgently notified of the finding of severe hydramnios especially in the presence of cervical shortening or dilatation, particularly at gestations before 34 weeks, due to the strong association with maternal and fetal morbidity.

FETAL WELFARE ASSESSMENT

Despite the fact that less than 1% of any pregnant population will carry a fetus destined to develop acidemia before delivery, up to 25% of pregnant women will be sent for some sort of ultrasound assessment of fetal welfare. The tests usually requested are a biophysical profile, or Doppler assessment of the fetal circulation. It is clear that these two tests are not mutually exclusive but do complement each other in being able to determine fetal wellbeing and the risk of fetal hypoxia and acidemia.

A fetus affected by acute chorioamnionitis may have a low resistance to flow in the placental circulation even though it may be suffering the effects of systemic infection which may be detected by poor biophysical status, and the small fetus suffering chronic hypoxemia may show normal biophysical status and liquor volume at 29 weeks despite suffering significant hypoxemia and lactic acidemia which may be detected by fetal Doppler interrogation of arterial and venous blood flow.

Clearly a full understanding of the role of the two tests is important before they can be employed to give clinically useful information.

DOPPLER VELOCIMETRY IN THE FETUS

Doppler interrogation of the fetal vasculature is a valuable tool for the detection of impaired fetoplacental blood flow, fetal hypoxemia and fetal acidemia. Although many vessels can have their flow characteristics measured, the three that are commonly sampled are an umbilical artery, a middle cerebral artery, and the ductus venosus.

The umbilical artery waveform must be measured (a) at least 2 cms from the cord insertion into either the fetus or the placenta, (b) with a wide range gate to ensure that the whole vessel is interrogated to avoid artefact from abnormal flow near the vessel wall, (c) in the absence of fetal breathing, and (d) at an angle at or close to 0 degrees to the vessel. The vessel waveform should be measured in the presence of fetal or maternal conditions where fetal hypoxia is likely or thought likely, for example intrauterine growth retardation, maternal preeclampsia, and autoimmune disease.

Up until 36 weeks gestation, a progressive increase in the flow in diastole (a fall in systolic/diastolic (S/D) ratio) relates to a progressive increase in placental size and a low risk of fetal or neonatal morbidity or mortality (7). A progressive decrease in diastolic flow (increase in S/D ratio) however relates to an increased chance of fetal hypoxemia, acidemia and admission to a neonatal unit, and reversed flow in diastole is almost always associated with severe fetal compromise and the finding must be communicated with the obstetric caregiver as a matter of urgency. Apart from the situation of reversed diastolic flow however, the umbilical artery only provides a screening tool for the risk of fetal compromise. An abnormal S/D ratio, where there is still forward flow in diastole, requires further fetal assessment to determine the possibility of fetal hypoxemia or acidemia.

The fetal adaptive response to hypoxemia is to increase blood flow to the brain by decreasing resistance in the cerebral vessels. This decreased resistance is readily measured in the MCA. The Doppler measurement should be performed with a wide range gate, in the portion of the artery midway between the circle of Willis and the fetal skull, and with the fetus in the quiet sleep state and not breathing. Due to the proximity of a bone/brain interface, the artery should be interrogated for the shortest possible time required to obtain a good quality signal. The use of colour to place the pulse wave range gate is essential to gain a high quality signal in the shortest possible time.

Controversies in third trimester fetal welfare scanning

The normal S/D ratio in the MCA is high and signifies low risk of fetal hypoxia even to beyond term (see Figure 1).

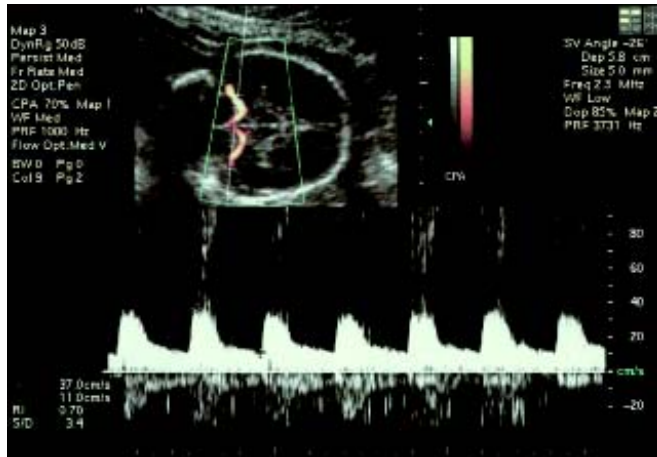


Figure 1 Normal MCA Flows

In cases of increasing hypoxemia, however, the diastolic flow increases and the S/D ratio will fall (8). A raised umbilical arterial S/D ratio with a normal MCA flow has not been associated with significant fetal morbidity within our unit. Once the MCA S/D ratio falls below 3.0, however, there is significant risk of fetal hypoxia and the possibility of fetal acidemia is investigated by looking for reverse flow in the fetal ductus venosus.

Interrogating the ductus venosus (DV) with Doppler ultrasound requires some practice but is possible in 100% of cases within our unit. The DV is best located at the point where it drains blood from the umbilical vein. A range gate placed 2mm from the origin will ensure usable signal from gestations as low as 25 weeks (see Figure 2).

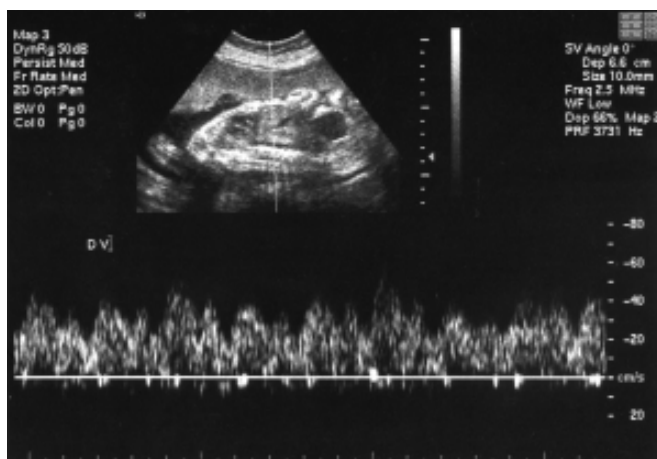


Figure 2 Normal ductus venosus flow

Reverse flow in the DV has always been associated with significant fetal acidemia (lactate > 6mmol/L) within our unit. Such a finding requires urgent consideration of delivery by the obstetric caregiver, and therefore the result must be conveyed as a matter of urgency.

Given the differential information that can be obtained from Doppler flow analysis, it is possible to employ a protocol for its use in fetal welfare assessment. A fetus with normal

growth and liquor in a low risk pregnancy requires no, or at most, an umbilical artery Doppler flow screening. A fetus with growth restriction, or at risk of hypoxia due to maternal disease can be screened with umbilical artery assessment before 36 weeks. If the assessment is abnormal, or the fetus is more than 36 weeks the MCA can be assessed to screen for cerebral redistribution of flow in response to fetal hypoxia. Given the presence of an abnormal MCA flow assessment, investigation of the potential of fetal acidemia with DV flows completes the fetal acid base assessment. Any report should reflect the normality or otherwise of the components measured.

The above protocol clearly is of use in screening for the possibility of fetal acidemia. However Doppler velocimetry is of limited use in disease processes where the placental circulation may not be compromised, as in fetal anaemia, or chorioamnionitis/fetal infection. In such cases the fetal biophysical profile (included with the cardiotocographic tracing) can be expected to provide useful clinical information as to the risk of fetal morbidity or mortality.

THE BIOPHYSICAL PROFILE

The biophysical profile has undergone a number of modifications since it was first reported, the most notable being the amniotic fluid volume required for a score of 2 to be attributed (4). The protocol for the profile requires for 30 minutes of scanning to be undertaken before an abnormal score can be attributed in any case. It is a fact however that up to 22% of normal fetuses can remain in the quiet sleep state (1F) for periods of over 30 minutes, and this, along with evidence that maternal hypoglycaemia, or drug ingestion including nicotine can lead to a false positive score limits the use of this form of fetal welfare monitoring (4). A falsely normal score may be found in maternal diabetes with hyperglycaemia, and cases of chronic hypoxia in gestations between 24 and 30 weeks associated with chronic maternal disease. Many authors, including Manning who helped develop the BPP, now conclude "It is common practice in many units including our own to supplement the information available by biophysical profile scoring with umbilical artery Doppler velocimetry and fetal growth" (4).

In our high-risk unit encompassing over 10,000 perinatal scans per year, the biophysical profile is similarly never performed in isolation. It is used to assess the already identified high-risk fetus where Doppler velocimetry suggests the onset of fetal hypoxia, but not acidemia, and there is a clinical need to prolong the pregnancy either due to severe prematurity, or due to the wish to administer antenatal steroids to improve fetal maturation. It is also used in those rare cases where fetal compromise is suspected but where there is no associated interruption of umbilical blood flow, as in fetal anaemia where there is consideration of early delivery, or possible fetal infection/chorioamnionitis. In such cases the BPP may be continued for 60 minutes in order to minimise a false positive score due to the physiological fetal 1F (quiet sleep) state. In our unit therefore, the BPP is seldom performed.

CONCLUSIONS

Clearly fetal welfare scanning in the third trimester relies on good clinical information being provided by the

referring practitioner for a meaningful assessment of the fetal status to be provided. The inappropriate use of fetal welfare scanning in the low risk normally grown fetus can lead to unwarranted intervention especially if the BPP is used with the fetus in the quiet sleep (1F) state.

Where a fetus is at risk of compromise, controversy as to whether one form of fetal evaluation is superior to another is misplaced given the unique information that can be gained from both Doppler velocimetry and the BPP assessment. Rather it is important to know the place of each investigation and use either or both to gain appropriate and accurate information as to fetal status.

Even in the absence of clinical information, using the modalities of assessment of growth, liquor volume, Doppler velocimetry, and biophysical profile, a third trimester ultrasound examination can provide the obstetric caregiver with relevant information as to the risks of fetal hypoxemia, acidemia, and fetal and neonatal morbidity that can allow an appropriately timed delivery of a healthy child.


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Hysterosalpingo-Contrast-Sonography (HyCoSy)

Tom Boogert MBBS FRACOG COGU DDU, Sydney Ultrasound for Women, Sydney 2000

ABSTRACT

Infertility affects up to 10% of couples in the Western World and 20-40% may be due to tubal disease. This is commonly the result of previous infection or surgery. Hysterosalpingo-contrast-sonography (HyCoSy) is a transvaginal ultrasound technique in which a solution of galactose (Echovist) or galactose and 1% palmitic acid (Levovist) is infused into the uterine cavity and observed to flow along the fallopian tubes or spill locally into the peritoneal cavity to assess tubal patency. In recent years HyCoSy is increasingly being used in preference to hysterosalpingography and laparoscopy as a first line investigation for infertility because of its convenience and safety. HyCoSy also allows examination of the other pelvic organs and because it is a dynamic study can give valuable information regarding tubal function.

INTRODUCTION

The management of tubal disease as a cause of infertility has changed dramatically in recent years. This is largely due to the rapidly improving results of assisted conception through in-vitro fertilisation (IVF) compared to the disappointing results achieved through tubal microsurgery.

It is now common practice to remove or ligate abnormal tubes and proceed directly to IVF rather than risk ectopic pregnancy and prolonged infertility. More sophisticated assessment of tubal function beyond mere patency may also become more important in the assessment of unexplained infertility. It should also be noted that meta-analysis of prognostic factors in infertility has demonstrated that only bilateral tubal occlusion predicts significantly lower pregnancy rates. A unilateral occlusion does not appear to be significant (1).

Hysterosalpingography (HSG) using fluoroscopy until recently has been the routine first line investigation for assessing tubal patency (2). Infertility specialists, however, almost universally perform a laparoscopy with dye to better evaluate the tubes, ovaries and associated peritoneal surfaces to confirm normal function and exclude other pathology such as endometriosis and pelvic adhesions. There are also significant risks associated with ionizing radiation and sensitivity to iodine based dyes which can be avoided using the HyCoSy technique which is more accessible to gynaecologists who use ultrasound in their clinical practice. Various techniques have been developed to evaluate the fallopian tubes sonographically over the years.

TECHNIQUES OF HYSTEROSALPINGOSONOGRAPHY

Saline or Hyskon alone

These techniques rely on detecting bubbles or debris moving through the interstitial portion of the tubes or turbulence at the fimbria and as these occur sporadically the results are variable. Bonilla-Musoles identified such turbulence in 24/54 distal tubes and abandoned the study (3).

Air

15-20 ml of air and saline injected through an 8 Fr foley catheter have been used in combination with over 90% concordance with HSG and laparoscopy in some units. Criteria for patency include proximal flow for at least 5 seconds or distal turbulence between the uterus and the ovary. Occasionally this needs to be supplemented with colour Doppler imaging to confirm pulsatile isthmic flow when imaging of the tube is uncertain (4). The theoretical risk of air embolism, however, must be considered with this technique.

Colour Doppler Imaging (CDI)

CDI has been used with saline infused through a hysterosonography catheter by Stern *et al.* (5). They observed colour flow within the interstitial portion of the tube or at the fimbrial end to confirm patency and achieved concordance with laparoscopy in 81% of patients.

Microspherical positive contrast agents

Deichert and Schlieff first used Echovist (Schering AG, Berlin) as an ultrasound contrast agent for sonohysterography in the late 1980s (6). It is a solution of microbubbles in a 20% galactose matrix that was developed to act as a signal enhancer for Doppler examinations in cardiac ultrasound. A new formulation of transpulmonary stable galactose has been developed by the addition of 1% palmitic acid, namely Levovist (Schering AG, Berlin), which performs a similar task but is more useful in echocardiography. Echovist is available in Europe but not Australia where only Levovist is available. This product has been approved for endovascular use but not gynaecological use in Australia although Echovist is now extensively used for this purpose in Europe. Schering may apply for approval for Levovist to be used for gynaecological scanning in the future if the market proves to be worthwhile but at present this procedure would not be cost effective.

The enhanced B-mode echoes generated by Echovist or Levovist make tubal visualisation easier and the addition of CDI further improves this, although with increasing experience this becomes less valuable. Flow for at least 10 seconds in a tubal segment visible on B-mode or CDI and/or local spill into the peritoneal cavity confirms patency. The presence of contrast in the pouch of Douglas at the end of the procedure suggests that at least one tube is patent and the use of pulsed Doppler in the isthmic region may be useful in detecting flow when visualisation remains poor despite the use of contrast.

Campbell reviewed the European experience with Echovist in 1994 (7) showing that the results were very operator dependent with a significant learning curve. Concordance with laparoscopy, however, was similar to that seen with hysterosalpingography at 86-90% when analyzed per fallopian tube. There have been numerous small studies

Hysterosalpingo-Contrast-Sonography

published, largely from Germany, confirming results comparable in accuracy to HSG in assessing tubal patency. Meta-analysis of three of these trials by Holtz *et al* (8) showed per tube concordance of 83% as well as a false occlusion rate of 12.8% and a false patency rate of 3.9%. In addition they reported that around 10% of patients experienced significant pain, mainly when the tubes were occluded, and vasovagal reactions or nausea occurred in 7% of cases of which 2% required treatment.

The results of the most recent and largest trial by Hamilton and Larson *et al.* (9) showed improved results reflecting both increased experience as well as the benefits of the dual contrast technique which uses saline first to evaluate the uterine cavity. The overall concordance rate with laparoscopy was 85.8%. They also pointed out that tubal patency was only part of the story and documented significant tortuosity and slow spill as potential signs of tubal malfunction. This was seen in around 5% of cases. Additionally the uterine cavity can be evaluated with sonohysterography with saline prior to tubal assessment with contrast medium.

The results of HyCoSy agree very well with those of laparoscopy with dye with respect to tubal patency with around 90.8% concordance. However in the diagnosis of tubal occlusion the results of HyCoSy are not as good with around 62.7% concordance with laparoscopy with dye. There are several reasons why this may be the case, the most common being tubal spasm and differing resistance between the tubes causing contrast to flow preferentially along the tube with least resistance. Subsequently if a tube is shown to be patent at HyCoSy it can normally be assumed that this is the case but if a tube is not shown to be patent it cannot be reliably concluded that it is anatomically occluded and further investigation may be warranted. This is the same for HSG.

There are several other reasons why the results of HyCoSy may not agree with reference procedures such as laparoscopy with dye including significant time delays between procedures and even the possibility that the reference procedure is incorrect. More commonly the skill and experience of the operator may cause errors of interpretation with the newer technique. The results of comparative trials have clearly improved over time confirming that there is a significant learning curve with this test.

HyCoSy technique

It is suggested that patients are given premedication with 550mg Naproxen (2 Naprogesics) about one hour before the procedure which is performed in the follicular phase of the cycle, ideally around day 10-12. A baseline transvaginal scan is recommended to exclude other pelvic pathology as well as exclude pregnancy and possible pelvic infection, suggested by significant adnexal tenderness. It is also recommended that the patient should not lie flat to enhance pelvic fluid accumulation.

A balloon catheter (5-8 Fr) is passed through the cervix after cleansing with antiseptic (Figure 1). Using the dual contrast technique sterile saline is instilled to evaluate the cavity prior to balloon insufflation otherwise the balloon may obscure the cavity. Once the cavity has been assessed the balloon is inflated and further saline infused (up to 20ml)

in order to better outline the uterus and the ovaries which will facilitate the demonstration of normal tubal spill.

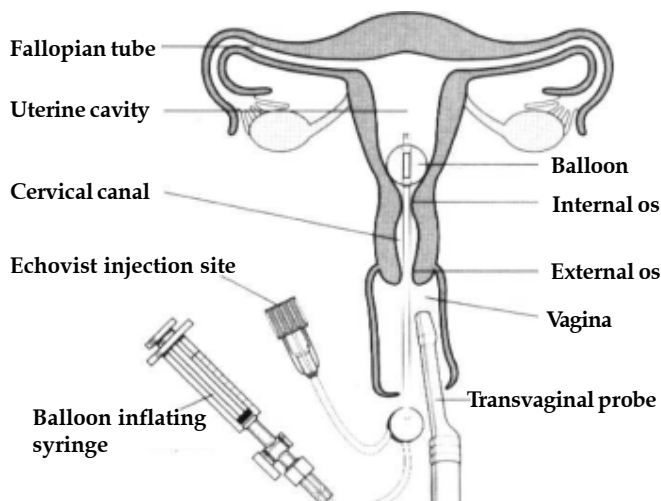


Figure 1

The Levovist suspension is only prepared once the catheter is properly located to avoid waste or delay as the microbubbles dissipate over time. It takes approximately 3-4 minutes to prepare the suspension during which time the residual saline is infused and the uterine cornua and ovaries are identified. Up to the full 12.5 ml of Levovist (2.5 gm ampoule) may be required and this is infused slowly to avoid cornual spasm. Small aliquots of 2-3 ml may facilitate visualisation particularly when using CDI.

The tubes are scanned in an oblique coronal plane with the transducer moving from the medial to lateral aspect (Figure 2). A gentle rocking motion may be required to optimise tubal visualisation. Contrast should be seen to flow unencumbered along the proximal tube (5-10 seconds of continuous flow confirming patency) with no abnormal accumulation which would suggest a hydrosalpinx and ideally peripheral spill should be seen around the ovary. CDI can be of value if tubal visualisation is suboptimal with the same criteria for patency (Figure 3). Delayed flow and abnormal tortuosity should be noted as these may be significant findings. Occasionally pulsed Doppler may be of value to confirm continuous interstitial tubal flow when adequate visualisation cannot be achieved (Figure 4).

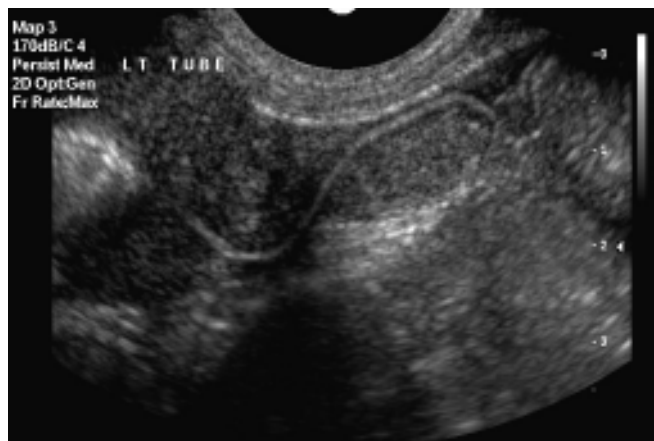


Figure 2



Figure 3

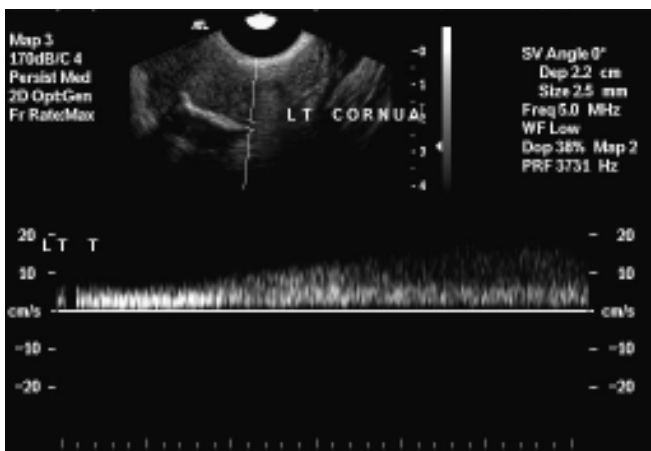


Figure 4

If there is apparent bilateral isthmic occlusion cornual spasm is a possibility. This can be overcome by waiting 5 minutes for spontaneous resolution or may occasionally require the use of a smooth muscle relaxant. Avoiding rapid infusion and cold solutions may also help prevent this.

In up to 10% of patients this procedure causes significant pain, particularly when there is bilateral tubal occlusion and this may be associated with a vasovagal reaction or nausea. In this situation the procedure may have to be abandoned and immediate aspiration of the infused fluid often relieves the symptoms although this may be difficult. Simple analgesia may be required and it is recommended that the patient be observed for at least 30 minutes if significant symptoms arise.

CONCLUSION

Prior to the development of HyCoSy routine investigation of tubal patency through HSG and laparoscopy with dye

was expensive, time consuming and unpleasant for the patient as these involved the use of surgery, general anaesthesia, hospitalisation, and in the case of HSG, ionising radiation.

HyCoSy provides a low-risk outpatient procedure that is of comparable accuracy indicating which direction further diagnosis and treatment of infertility should take. It is suggested that, in the future, this technique along with transvaginal ultrasound will provide an ideal screening test for tubal patency in the investigation of infertility and should expedite the management of this problem.

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Ventricular Septal Defects – a dilemma in counselling!

Dr Gary Pritchard, Brisbane Ultrasound for Women, Spring Hill, Queensland

Accurate detection of defects in the fetal cardiac interventricular septum (VSD) is an important aspect of fetal morphological scanning. Congenital heart defect (CHD) is the most common congenital defect, with an incidence of 2.5 per 1000 for major CHD (as defined) in NSW (1) and all CHD at a rate of 3.8 per 1000 births in Europe (2). Isolated VSD is the most common of these defects occurring in about one third (38%, 642/1694) of the European cases of CHD investigated between mid 1996 and the end of 1998.

VSD detection is important because of the number of associated conditions that may be present. In Drose's (3) excellent text "Fetal Echocardiography" there is a list of 10 drugs that are thought to be associated with VSDs as well as 32 different chromosomal defects, and 57 syndromes that have VSD as a feature in the diagnosis. It also contributes to the higher rates of spontaneous intrauterine death (16%), neonatal death (15%) and infant or childhood morbidity (3%) compared to fetuses without CHD (3).

Despite its importance, the detection rate of VSD, even in recent times, is low. It was only 5.3% (4/74) between 1994 and 1996 in NSW (1), and as an isolated defect was 7% in Europe (2) between 1996 and 1998. There was an improved detection rate of up to 20% (2) if complicated by another cardiac anomaly. In addition, VSD has the highest false positive rate when scanned at routine obstetric sonogram (23%; 15/64) and by a specialist in fetal echocardiography (57%; 4/7) (4).

ULTRASOUND CRITERIA FOR DETECTION OF VSD

B-mode

1. A clear and distinct interruption of the usual contour of the septum.
2. The defect is visible in two sonographic planes.
3. A high amplitude, hyperechoic "sharp" specular reflector representing the interface of the muscle and blood may be present in a true VSD. (Apical 4 chamber view is best but beware of the dropout artefact (Figures 1 and 2))

Doppler Imaging

Colour doppler imaging may help, but due to the fact that the pressures in the right and left ventricles are equal, there may be no consistent flow across the defect prenatally. In addition, the direction of any flow is approximately perpendicular to the beam in the standard 4 chamber view. Power Doppler imaging may be more useful. Absent flow does not exclude a VSD.

CASE SUMMARY

The patient was a 34 year old G3P2 woman referred for a morphology scan at 18 weeks. There was a past history of the second child developing congestive cardiac failure in the



Figure 1 Artefactual dropout

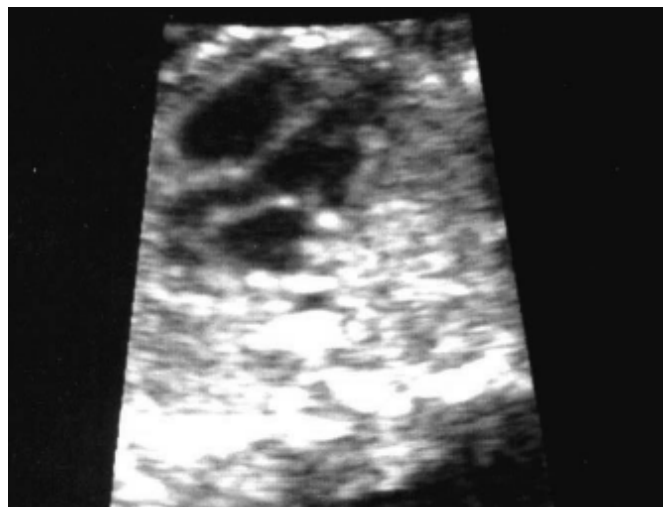


Figure 2 Artefact confirmed

early neonatal period due to tricuspid valve dysplasia and regurgitation. Spontaneous recovery occurred. The father had also developed cardiac failure as an infant, in association with a cardiac murmur (predating echocardiography) which also spontaneously recovered.

Ultrasound examination

Ultrasound examination demonstrated a single fetus with normal biometry for gestation. There was a 2.3mm defect in the membranous part of the interventricular septum (Figure 3). There was colour flow across this region with colour Doppler. There were no other cardiac anomalies identified, and other anatomy was developing normally. There were no markers for aneuploidy on specific search.

As a result of the findings, there was considerable discussion about the need for amniocentesis given the miscarriage rate.



Figure 3 Perimembraneous VSD

During the counselling, two important questions arose.

1. What was the chance of spontaneous closure?
2. What was the chance of this fetus having Down Syndrome (DS)?

Spontaneous prenatal closure

Spontaneous closure is an event known to occur both prenatally and postnatally. Drose (3) quotes papers showing a rate of 74% spontaneous prenatal closure but noted that those which were perimembraneous were included in the group less likely to close. Paladini (5) studied 68 fetuses with isolated VSD at a Fetal Cardiological Unit in Italy. The mean gestational age was 24.8 weeks. They noted the overall closure rate of 32% with a higher rate of closure of small perimembraneous outlet defects (43.8%). Paladini classified the defects more likely to close as being small (1.5-2.0mm in size), subaortic location and that such closure occurred before 30 weeks. Malalignment VSDs were never observed to close. The data were insufficient to ascertain a differential closure rate between fetuses with normal karyotype and with Trisomy 21. Anderson *et al.* (7) studied 69 autopsy specimens of hearts with perimembraneous VSDs and noted that half of the inlet defects closed whereas none of the outlet defects showed any evidence of closure.

Association with down syndrome (DS)

There are two parts to this question.

1. What proportion of DS have VSDs?

There is general agreement that atrioventricular septal defects (AVSD) and VSDs are the two common types of CHD in DS. There are only occasional other ones seen, eg Tetralogy of Fallot, coarctation, double outlet right ventricle. There is general agreement that there is a difference between the incidence of CHD in prenatal series and postnatal series, and Paladini's article (6) quantified that to be 40% vs 16% for VSD. This figure however did not correlate with our clinical impression.

2. What proportion of fetuses with VSD have DS?

This is the more important question but is more difficult to answer. Paladini (5) questioned the 26.6% association of all types of VSD with abnormal karyotype. The type of VSD most commonly associated with DS involves the

inlet perimembraneous septum below the AV valves. It is difficult to detect. For inlet perimembraneous defects, the conclusion was that 50% have DS (5). Drose (3) noted that extracardiac and chromosomal abnormality complicate approximately 50% of fetuses with prenatally detected VSD, but did not subclassify the groups. Again our experience did not seem to support these findings.

Brisbane Ultrasound for Women experience

From our database, we had identified 72 cases of suspected or actual VSD.

Closure

There were 10 terminations for major CHD or aneuploidy plus CHD. Of the rest, 8 were suspected when amniocentesis was performed at 16 weeks but not confirmed at a later gestation. Twenty-four (24%) were observed to close during pregnancy, the latest noted closure being by 30 weeks.

Aneuploidy

Seventeen fetuses had a VSD and another cardiac anomaly. Of these, 1 had DS, 5 had Trisomy 18 and 2 had Trisomy 13, ie 8/17 (47%) had aneuploidy.

There were 55 cases of VSD and no other cardiac defect. (Soft markers were not considered in this analysis. Their presence would increase the risk of DS). The karyotype of 9 fetuses is not known, 1 had Triploidy (it also had multiple other findings), 2 (4%) had DS.

Of the 72 DS fetuses that we have scanned, the incidence of CHD was 20% (14/72). There were 11 (15%) with AVSD, 2 (3%) with VSD and 1 with Tetralogy of Fallot.

Our study has a number of significant differences from those quoted in the literature, not least of which is the much earlier gestation at which our examination is performed. This fact is likely to explain the low number of VSDs identified in our DS group. The early gestation also negated the possibility of subclassifying the perimembraneous VSDs. In addition, our follow-up is less complete.

In view of our experience, we are uncomfortable with providing a risk of 50% for the fetus having DS when the VSD is the only abnormal finding, and therefore have elected to use the figure of a 4% chance that a fetus with an isolated VSD has DS. We are aware that this figure is likely to be an underestimate given the limitations of cardiac examination at this early gestation.

CONCLUSION

There is a paucity of information available about the association between the finding of isolated VSD and abnormal karyotype. Our data do not correlate with the available literature. From our experience, we would recommend an amniocentesis when a VSD is found as, although the rate of 4% may be an underestimate, it is still much higher than the miscarriage rate from amniocentesis of 0.5%. If another cardiac or structural abnormality is found, the chance of aneuploidy is significantly higher at about 50%. We would welcome learning of the experience that other practitioners have had in dealing with this clinical situation.

Ventricular Septal Defects - a dilemma in counselling

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Bioeffects of diagnostic ultrasound: How has research progressed?

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INTRODUCTION

The study of bioeffects of ultrasound has a fascinating history. It has been a quite fruitful area of research due, largely, to the dedicated efforts of small groups of researchers and the continued enthusiastic academic interactions. Early research, using relatively crude endpoints, looked for effects of ultrasound exposure at therapeutic levels, while later studies have been developed to evaluate potential effects from low-level diagnostic-type exposures. Interpretation of accumulated data forms the basis for the development of guidelines to ensure the continued safe and effective use of ultrasound in medicine. With the evolution to modern diagnostically powerful ultrasound imaging equipment the level of acoustic output has increased and pulsing conditions changed. The recent introduction of non-linear propagation in harmonic imaging increases diagnostic resolution but also adds a further level of complexity to bioeffects studies. The development of echo-contrast agents for use with diagnostic imaging introduces another risk factor that needs to be thoroughly investigated in terms of risk/benefit assessment.

Throughout the development of bioeffects research the essential value of mechanistic studies has been recognised. Nevertheless, the quest for knowledge has left some areas of bioeffects research with questions that remain unanswered. Some reports of adverse effects on embryonic and fetal development following diagnostic levels of exposure have been generally discounted due to absence of a plausible mechanism. On the other hand, low intensity pulsed ultrasound is used beneficially in therapeutic applications, while the mechanism of interaction is not fully understood. Science develops gradually through the spread of knowledge. Interest in continuing research on bioeffects and safety has been supported through various ultrasound organisations, notably the World Federation for Ultrasound in Medicine and Biology (WFUMB) which has played a vital role in publishing and encouraging the spread of scientific information on this topic.

WHY ARE MECHANISMS IMPORTANT?

The subject of bioeffects and safety of diagnostic ultrasound has advanced gradually over decades to its current, relatively mature, status. As with any field of medical research, the study of biological effects and potential adverse health effects of diagnostic ultrasound has occasionally encountered some controversy. With the knowledge that comes from an understanding of the mechanism of interaction it is now possible to infer that some reports of apparently adverse effects of low intensity ultrasound on chromosome appearance and cell development were probably due to peculiarities in the experimental exposure system. For example, insonation of suspensions of cells in protein-rich nutrient media can create situations where

inertial cavitation becomes an important consideration that would not otherwise exist in an *in vivo* exposure situation. Where the exposure system introduces a liquid/gas interface the opportunities for inertial cavitation are further enhanced. Plastic culture vessels have high absorption coefficients, so the opportunity for thermal effects, particularly in populations of cells that grow attached to culture flask walls, is greatly increased. The development of knowledge on mechanisms of interaction has become an essential element of proper understanding of ultrasound-induced bioeffects and the likelihood of significant adverse consequences of human exposures.

Whilst it is generally agreed that ultrasound exposures used in diagnostic imaging do not result in adverse or harmful effects in patients there is evidence that they can cause biological effects. In fact, there have been some interesting developments that have shown low intensity pulsed ultrasound to be effective in producing bioeffects that have therapeutic benefit. Under appropriate pulsing conditions, the rate of cell growth and repair can be enhanced. This principle forms the basis of a therapeutic device, approved by the FDA, that significantly enhances the rate of repair of bone fractures (1). The temporal average intensity is on the order of 30 mW/cm², being low even by comparison with acoustic output from modern B-mode scanners. Although this is a fairly recent commercial application, the stimulatory effect of pulsed ultrasound on fibroblastic growth has been known for some time. Such stimulating effects on soft tissue ulcer repair were demonstrated in the early work of Mary Dyson and colleagues at Guy's hospital, London (2). The effect is thought to result from acoustic streaming generated within fluid filled areas in proliferative tissue.

Recent research at the University of Rochester, New York, has found that exposure to pulsed ultrasound with unusually low pulse-repetition-frequency (prf) can result in haemorrhage in fetal soft tissue (3). This occurs preferentially when the soft tissue is adjacent to bone, such as in the fetal brain. The use of such low prf means that the temporal average intensity value is orders of magnitude below 100 mW/cm², that was once thought to be the intensity value below which biological effects would not be produced in mammalian tissue (4). It has been speculated that this, apparently non-thermal, effect results from a radiation pressure mechanism, the effect being due to the relative motion between ossified bone and surrounding soft tissue, caused by radiation force on the bone.

Other effects observed in animals exposed to diagnostic levels of ultrasound, thought to be due to non-thermal interactions, include the haemorrhage of tissues of the lungs and intestine. These effects have only been reported where a soft tissue/gas interface is present in the ultrasound beam.

As the effects have only been studied in animals it is speculated that there may be a small risk of producing similar minor bleeds in lungs in neonatal echo-cardiographic examinations when lung tissue may be inadvertently exposed. The clinical significance of these findings is uncertain, however they are unlikely to occur in obstetric scanning because the embryo and fetus do not normally contain gas bodies. The use of gas body echo-contrast agents is, therefore, inadvisable (5) in obstetric ultrasonographic examinations. It is now well known that gas-encapsulated (bubbles) echo-contrast agents are destroyed in sound fields in diagnostic exposures. However, it has only recently been recognised that such bubble collapse can damage capillary blood vessels. A recent study (6) reported capillary rupture in mice injected with Optison contrast agent following exposure to a diagnostic device for a few seconds, where the equivalent MI=0.4. Note that the FDA regulations allow equipment to operate with a maximum MI value of 1.9 and that the output displays on ultrasound equipment do not take account of risk associated with the use of contrast agents.

THE CHALLENGE TO SCIENCE

Today's challenges in research on biological effects of ultrasound involve developing greater understanding of interactive mechanisms responsible for alterations to cell structure and function. This is particularly important when non-thermal mechanisms are involved. There is a need to develop more sensitive assays in molecular biology to determine subtleties of potential interaction at the level of gene expression which may lead to significant changes in the development of whole organ systems. As an example of such molecular studies, increase in aggrecan gene expression has been suggested as a possible mechanism for ultrasound-induced accelerated bone growth using a rat femur fracture model (7). Some important original work, undertaken by the Ultrasonics Laboratory in collaboration with the University of Sydney, on ultrasound induction of stress proteins (8) and delayed embryonic development (9) demonstrated key elements of such research which requires further careful study. Although embryo-sonography is promoted in some countries as an essential part of obstetrics antenatal management, there is surprisingly little useful data on biological effects of currently used diagnostic outputs on embryonic development.

THE ROLE OF WFUMB

Some of the interesting studies on biological effects have been evaluated by expert groups through symposia organised by WFUMB. The workshop-style meetings provide an excellent opportunity for focused debate on issues that are of global concern to the safety of diagnostic ultrasound. I am pleased to have been given the opportunity to participate in these activities. It is hoped that this positive encouragement will continue amidst the otherwise general financial restrictions on international research. Recent symposia dealt with thermal bioeffects (10) and non-thermal mechanisms (5). Publication of the proceedings of these international expert workshops helps to spread knowledge on the subject of safety of diagnostic ultrasound. However, rapid technological development in imaging applications requires continual monitoring of the expanding subject of

bioeffects to keep safety information current. To this end the Safety Committee of WFUMB has published some relevant review papers (11, 12, 13).

THE ROLE OF ASUM

As a professional society, ASUM has an obligation to its members and the Australian community to ensure high level standards of practice in the effective and safe applications of ultrasound in medicine. The ASUM mission statement being, "*The purpose of ASUM is to promote the highest possible standards of medical ultrasound practice in Australia and New Zealand*".

Such high levels of patient care are achieved by being responsive to the needs of the patient. As diagnostic equipment has become more powerful the margin of safety (in terms of avoiding any bioeffects) has reduced and responsible care providers will ensure that they are familiar with any potential risk in assessing risk/benefit ratio associated with their particular specialty. The ASUM Safety Committee exists for the purpose of providing essential authoritative information to help develop policy that provides an appropriate margin of safety without being unnecessarily restrictive.

The development of practical safety guidelines for ASUM has been largely based on the conclusions achieved in the WFUMB Safety Symposia. ASUM policy statements and safety guidelines are published in a separate folder and are available from the ASUM office on request. Interested readers would also be advised to access the ASUM website.

In order to ensure that our expertise and involvement is maintained at a level recognised internationally, ASUM is represented at meetings of expert groups such as the WFUMB Safety Committee, and the International Electrotechnical Commission (IEC), developing international safety standards. ASUM is regularly represented as a liaison member of the Bioeffects Committee of the American Institute of Ultrasound in Medicine, and has been invited occasionally to participate in meetings of the European Committee on Radiation Safety (ECURS) of the European Federation of Societies for Ultrasound in Medicine and Biology. ASUM is an affiliated member society of the WFUMB and our members continue to play effective and influential roles.

FUTURE OF RESEARCH

The productivity of research on ultrasound bioeffects is remarkable, considering the meagre funding that is typically associated with research on health and safety issues. This outcome is, doubtlessly, due to the dedicated efforts of a few groups of researchers that have survived over decades to develop the expertise gained from continuity of research programs. It is pleasing to see that some of this effort has been recognised in a historical review by the WFUMB (14), which highlights research activities of selected individuals who were identified for their significant contribution to the science of acoustics and bioeffects of diagnostic ultrasound. The documentation of a series of personal histories gives an interesting insight into the development of research and the particular areas of specialty in a range of countries. With the continuing advances in diagnostic power of modern

ultrasonographic equipment and development of new applications, particularly in obstetrics, it is vital that dedicated and productive research into bioeffects of ultrasound is maintained. The support of ultrasound organisations like the WFUMB and ASUM is essential in this regard. The formation of an ASUM Research Foundation may provide an opportunity for fertile research on bioeffects and clinically based studies relevant to the efficacy and safety of diagnostic ultrasound.

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Transvaginal ultrasound assessment of the cervix in the prediction of spontaneous preterm birth in women with threatened preterm labour

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BACKGROUND

Spontaneous preterm labour continues to be a major dilemma in modern obstetric care. Current strategies for predicting and preventing preterm birth are suboptimal. The diagnosis of preterm labour is based on uterine contractions, but of varying frequencies, and the presence of cervical change. The problem with spontaneous preterm labour is detecting cervical change in its early stages and before preterm birth becomes inevitable.

AIMS

Primary aim - to explore the value of the appearance of the cervix in differentiating between those women who would continue their pregnancy to term and those who would

experience further episodes of preterm labour culminating in preterm birth.

Secondary aim - to determine if the cervical findings provided any information about the time interval when repeat episodes of preterm labour resulting in preterm birth may occur.

PATIENTS & METHODS

- ❖ women referred for transvaginal ultrasound assessment of cervix after an episode of threatened preterm labour
- ❖ assessment performed after uterine contractions had ceased either spontaneously or following treatment
- ❖ singleton pregnancy between 20 and 34 weeks gestation with intact membranes and no bleeding

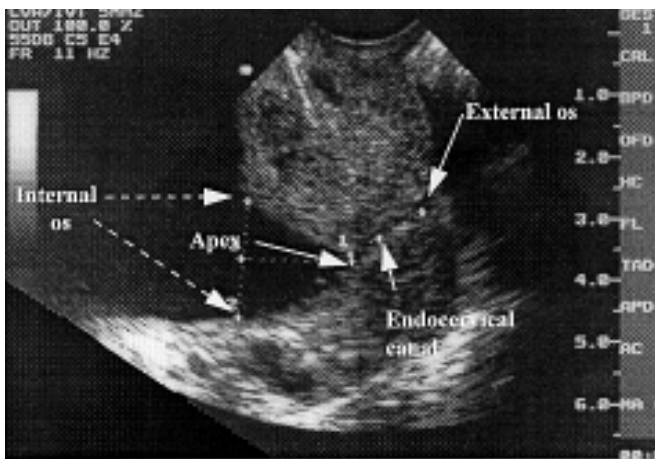


Figure 1A Transvaginal ultrasound image of an abnormal cervix with internal os dilatation and shortened endocervical canal. Apex of funnel is shown.

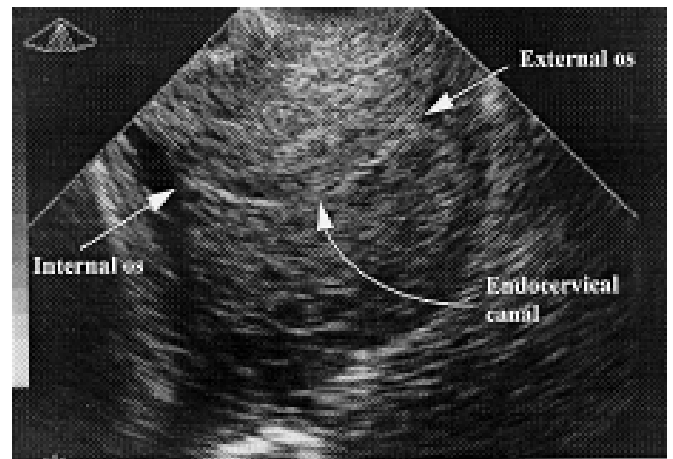


Figure 2A Transvaginal ultrasound image of a normal cervix showing internal os, endocervical canal (curved) and external os.

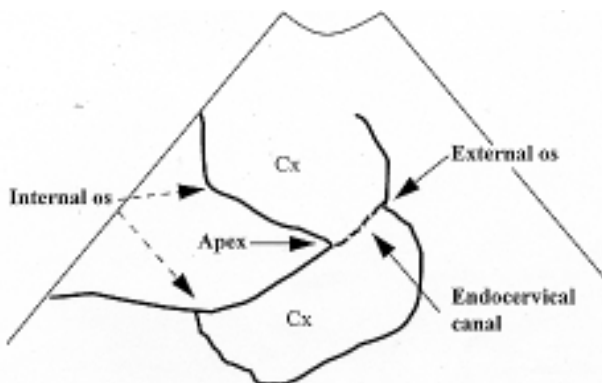


Figure 1B Diagrammatic representation of Figure 1A showing measurement of endocervical canal from apex of funnel to external os (white dotted line).

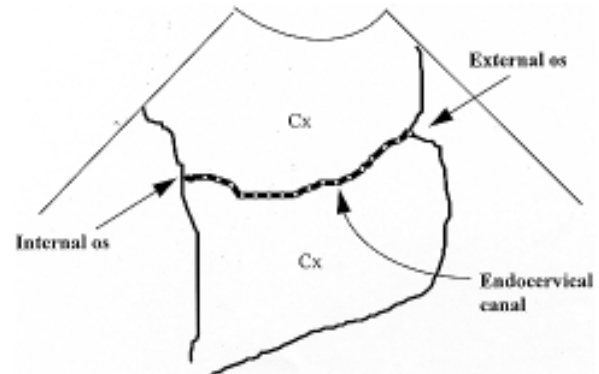


Figure 2B Diagrammatic representation of Figure 2A demonstrating where the endocervical canal length was measured (white dotted line).

Transvaginal ultrasound assessment of preterm birth

- ❖ only the scan immediately following the episode of preterm labour was reported in this study
- ❖ women who were subsequently delivered electively before 37 weeks excluded from all analyses
- ❖ all results reported to the clinician

RESULTS

An abnormal cervix was defined as a closed endocervical canal length <30 mm plus internal os dilatation of > or = 5 mm (Figures 1A and 1B). A normal cervix is shown in Figures 2A and 2B. Results are summarised in tables 1-4.

DISCUSSION

The study reported here was to ascertain if transvaginal ultrasound assessment of cervical status could contribute to the prediction of repeat episodes of threatened preterm labour resulting in preterm birth and when these events might occur.

Table 1 Patient characteristics of the 60 women who presented with threatened preterm labour.

	Abnormal Cervix n=25	Normal Cervix n=35	Significance
Age	27.6 ± 7.0	27.4 ± 5.0	ns
Gravida	4.2 ± 2.4	3.1 ± 2.0	ns
Nulliparous	5 (25%)	7 (25%)	ns
Previous miscarriage	14 (56%)	16 (46%)	ns
Previous <34 week birth	12 (48%)	10 (29%)	ns
Smoker	15 (60%)	10 (29%)	p=0.015
Gestation at TPL episode	28.0 ± 3.8	27.3 ± 3.6	ns
Gestation at study	28.0 ± 3.8	27.5 ± 3.6	ns

Table 2 Cervical measurements (mm) at the transvaginal scan. Significant differences were found in relation to delivery at <37 weeks particularly with a markedly shorter endocervical canal (mean decrease of 19 mm) and a mean increase of 15 mm in internal os dilatation.

	Term delivery (> or = 37 weeks) n=43	Preterm delivery (<37 weeks) n=17	p value
Overall cervical length	37.6 ± 6.7	31.0 ± 7.4	0.001
Closed endocervical canal	33.8 ± 8.9	14.8 ± 10.1	<0.0001
Internal os dilatation*	6.1 ± 1.3	21.5 ± 2.9	<0.0001#
Diameter	35.1 ± 4.9	30.2 ± 9.3	0.01

* m±SEM; # Mann Whitney U

Table 3 Patient outcome data showing the interval from the transvaginal scan to delivery was significantly shorter in the group with an abnormal cervix. Only women from the abnormal cervix group delivered within < or = 1, <7 and <14 days of the ultrasound findings. There were significant differences in the gestation at delivery as well as the incidence of preterm birth both at <37 weeks and <34 weeks.

	Abnormal Cervix n=25	Normal Cervix n=35	Significance
Study to delivery interval (weeks)	5.2 ± 5.0	11.8 ± 4.1	p<0.0001
Delivery in < or = 1 day	5 (20%)	0	p<0.001* (RR 0.80; CI 0.66 - 0.97)
Delivery in <7 days	7 (28%)	0	p<0.0013* (RR 0.72; CI 0.56 - 0.92)
Delivery in <14 days	10 (40%)	0	p<0.0001* (RR 0.60; CI 0.44 - 0.83)
Gestation at delivery (m±SEM)	33.1 ± 1.1	39.2 ± 0.3	p<0.0001#
Delivery <37 weeks	16 (64%)	1 (3%)	p<0.0001 (RR 22.4; CI 3.17 - 158.1)
Delivery <34 weeks	12 (48%)	0	p<0.0001 (RR 0.52; CI 0.36 - 0.76)

* Fisher's exact; # Mann Whitney U

Table 4 Sensitivity, specificity and predictive values for spontaneous delivery within 1, 7 and 14 days of the transvaginal scan and for delivery at <37 weeks and <34 weeks gestation.

	Delivery in < or = 1 day	Delivery in <7 days	Delivery in <14 days	Delivery <37 weeks	Delivery <34 weeks
Sensitivity	100%	100%	100%	94%	100%
Specificity	64%	66%	70%	79%	73%
Positive Predictive Value	20%	28%	40%	64%	48%
Negative Predictive Value	100%	100%	100%	97%	100%

This study clearly demonstrates that abnormal cervical findings are significant in the prediction of preterm birth with the endocervical canal length alone as the most significant predictor. These findings are similar to those of Crane *et al.* (1) and Rageth *et al.* (2). This current work also showed that of the women with an episode of threatened preterm labour in their current pregnancy, if their cervix was abnormal, 20% delivered within one day, 28% within a week, and 40% within two weeks. This indicates that there is only a limited time available to institute an effective treatment for these women. The high sensitivities for preterm birth (either <37 weeks or <34 weeks) show that almost all those who delivered preterm had an abnormal cervix. In their review of transvaginal ultrasound assessment of the cervix and preterm birth, Leitich *et al.* commented that '... a high sensitivity rate would be the primary target and a lower specificity would be tolerated in most clinical settings...' when planning the management of these women (3). The sensitivities and specificities in this current work were 94% and 79% for delivery <37 weeks, and 100% and 73% for <34 weeks.

The important aspect of the high negative predictive value (100%), which shows that all the women with a normal cervix progressed beyond 34 weeks, is the identification of the women for whom tocolytic treatment is unnecessary. As Rageth *et al.* stated '... the determination of cervical length by ultrasound constitutes at least a step towards avoiding unnecessary intravenous tocolytic therapies...' (2). This is particularly significant in view of the recent review of the effects of tocolytics in the treatment of preterm labour which came to the identical conclusion of reports from 10 years

earlier, namely, that tocolysis prolongs pregnancy but does not confer any benefits on the neonate and can have adverse effects on the mother (4). Transvaginal ultrasound of the cervix could also have a role in assessing the effectiveness of any future tocolytics or innovative treatments for preterm labour.

CONCLUSIONS

Transvaginal ultrasound of the cervix can identify those women with an abnormal cervix following an episode of threatened preterm labour who are at increased risk of preterm birth. It also identifies the women with normal cervixes and therefore at low-risk of preterm birth which potentially could reduce unnecessary interventions.

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New Zealand Sonographers - a survey of musculoskeletal problems in the workplace

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A survey was undertaken on behalf of the New Zealand branch of ASUM, with the primary objective being to determine the profile of work-related injuries and musculoskeletal symptomatology among sonographers in New Zealand. Also the aim was to look at the causes of these problems and to contribute ideas to overcoming them.

The survey took the form of a self-administered questionnaire, based on previous studies undertaken in the United States (1, 2), and Canada (3). Content in the survey included: personal details (gender, age, height, weight, general health and physical fitness), work related information, musculoskeletal symptomatology, treatment, causes and effects, and methods of overcoming these problems.

Initially a pilot study was sent to 25 sonographers in Otago and Southland, with general, cardiac and vascular backgrounds. There was a very pleasing 84% return rate. After a slight modification the survey form was eventually sent to those north of the Waitaki to all sonographers listed on the New Zealand branch of ASUM database. A further 170 questionnaires were distributed and 78 were returned. Including the pilot study, there was a total of 99 returned survey forms, giving a response rate of 51%.

The average age of the New Zealand sonographer was 38.4 years and the average years of experience was 9.8.

To look at the musculoskeletal symptomatology the question was asked: "Have you experienced pain or discomfort that you believe is a direct result of your scanning activities?"

The response to this question was 93% of the sonographers experienced pain or discomfort in performing their work. Other studies using this or similar questions have had 81% - 88.5% positive rates. These included studies by Necas in Washington, USA (2), Wihlidal & Kumar in Alberta, Canada (3), and Pike et al, USA (1).

The symptoms reported are displayed in Figure 1.

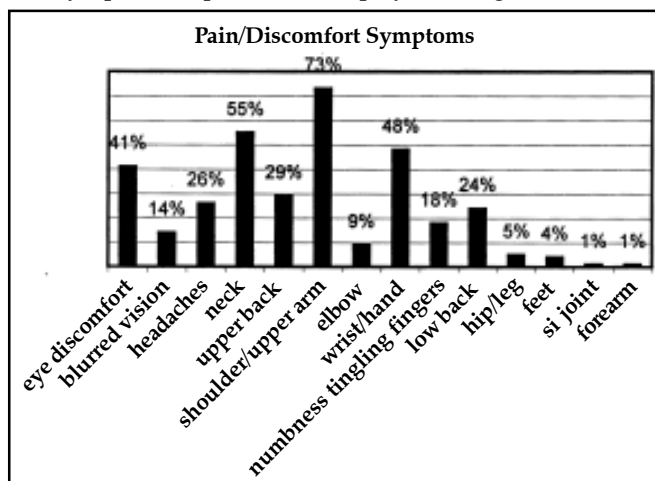


Figure 1

The majority of the symptoms were in the upper limb and neck. Sixty-eight out of the 92 sonographers experiencing symptoms (73.9%) reported pain or discomfort in the shoulder and upper arm. Also high on the list of symptoms was eye discomfort (41%), which has also been shown in other studies to be a problem with prolonged viewing of video display units and inadequate workplace lighting (4, 5).

Of those experiencing pain or discomfort, 51% sought treatment of some form. There was a wide range of treatments, from physiotherapy and anti-inflammatory treatment to yoga and shiatsu. 37% had physiotherapy and 26% had anti-inflammatory treatment.

The consequences of these symptoms were varied:

Time off	16%
Reduced hours	8%
Reduced regular work duties	21%
Reduced recreational activities	25%
Reduced home activities	17%
Changed jobs	2%

Time off averaged 9.8 days for the 15 sonographers requiring it. Reducing hours was often difficult to achieve because of the pressure of workload and staffing levels. Sonographers spoke of feelings of "guilt and letting the team down". As one sonographer put it "I am seriously considering reducing hours, but present staffing levels make this difficult". Those who had to reduce or change their regular work duties reported effects on productivity. Those who had to reduce recreational activities reported effects on their lifestyle and fitness. Reduced home activities often meant increased costs for cleaners and gardeners. Change of career was forced on two sonographers because of the symptoms and ongoing problems. Of all the sonographers who have experienced pain or discomfort, 69% continue to work with pain or discomfort.

The survey went on to investigate different aspects which may have had an effect on the numbers having or continuing with symptoms.

Number of years working as a sonographer was assessed to evaluate any patterns of symptoms, with increasing years. Figure 2 shows that there was no real pattern. The number experiencing symptoms was high in all groups and numbers continuing with symptoms seesawed, peaking in the 10-15 year range.

GENERAL HEALTH

Sonographers were asked to rate their perceived level of general health, with all participants selecting the average to excellent ranges. Increasing levels of general health did not positively influence the numbers of sonographers continuing to work with symptoms. A higher level of general health did not increase the chances of recovering from symptoms (Figure 3).

A survey of musculoskeletal problems in the workplace in NZ

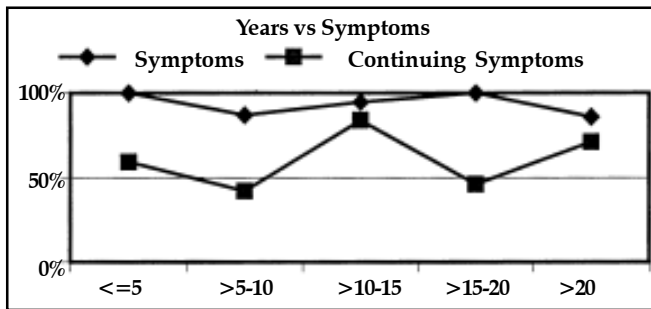


Figure 2 Years of employment as sonographer versus symptoms

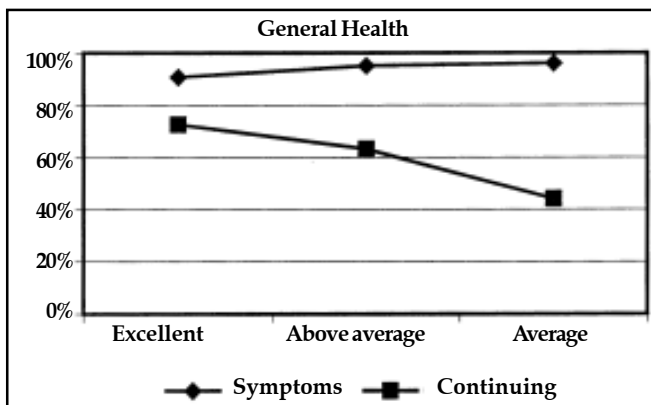


Figure 3 Self-perceived level of general health

PHYSICAL FITNESS

The survey looked at the influence of physical fitness. Participants were asked to perceive their own level of physical fitness. Although the rate of sonographers having some symptoms was similar in each group, the percentage of those continuing with symptoms was much greater with each drop in the level of fitness (Figure 4). With a very high level of physical fitness, approximately 35% continued to have symptoms, whereas with a low level of physical fitness 100% continued to have symptoms. There was a greater recovery rate with increased fitness. For many sonographers improving physical fitness made a positive impact. This has also been shown in other studies (6). As one participant put it: "Regular weight training and stretching has ensured I have a strong and flexible upper body and especially wrists - something few women have compared to men. Upper body and upper limbs are the 'machinery' of scanning".

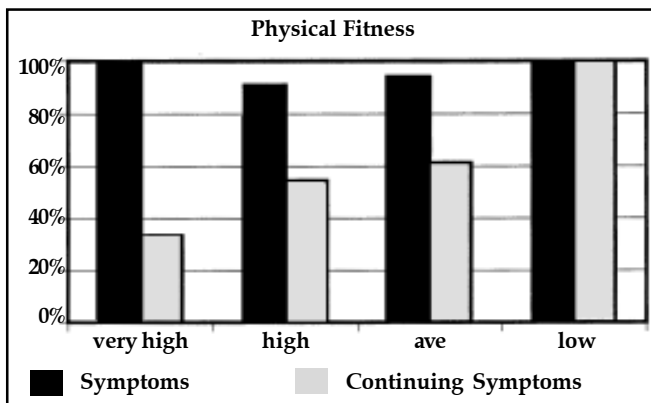


Figure 4 Self-perceived level of physical fitness

Sonographers were asked to indicate the level of stress they experienced in their work, and whether this level of stress was acceptable or not. Stress levels were divided into five groups, ranging from minimal to severe, with 80% of sonographers selecting the average to severe ranges. As the stress level increased the percentage of those dissatisfied increased. Overall 31% of sonographers were dissatisfied with the level of stress they were experiencing in their workplace.

Incidence of symptoms was in the 90% plus range for all levels of stress. When comparing the stress levels with the percentage of sonographers continuing with symptoms, there was little difference. The percentage of those continuing with symptoms was between 60 and 65% for all of the groups, except for those experiencing minimal levels of stress and all 100% of this group reported continuing symptoms.

ACTIVITIES CAUSING SYMPTOMS

The survey included open-ended questions enabling sonographers to list what they thought were the causes of the pain or symptoms. Common themes constantly came through in the comments from the sonographers and are summarised below.

Activities causing symptoms:

- Maintaining downward pressure
- Extending arm for long periods of time
- Holding one position for a long period of time
- Reaching/leaning across beds
- Wrist flexion extension
- Twisting neck to view the monitor
- Not having any choice in your postural position
- Not enough breaks during the day
- Lack of variety of ultrasound studies, affecting concentration as well as muscle strain
- Viewing video display unit for long periods

The patient could always be blamed:

- Large obese patient, requiring increased downward pressure to optimise images
- Immobile patients who just can't help you
- Patients in hospital beds that are just too wide or sink in the middle
- Multiple pregnancies, particularly in the 3rd trimester
- Leg vein studies or carotid studies

The equipment came in for some of the blame:

- Probes too heavy, too big, too small
- Unable to adjust equipment adequately, particularly monitor and keyboard height and position
- Patient couches being non-adjustable in height
- Chairs being non-adjustable in height
- Image recorders with cassettes in positions where you needed to reach/stretch/twist to change them

ADJUSTMENTS TO WORKSTATIONS AND TECHNIQUES

The survey then went on to look at what adjustments sonographers were making to scan techniques and workstations to help reduce or overcome the problem. The suggestions are listed below.

Adjustments to workstations and scan techniques:

- Adjust the workstation to suit yourself, before you start scanning a patient, not after you get symptoms
- Frequently change position - avoid holding one position for a long period of time.
- Relax your arm while recording images
- Have the patient move as close to you as possible
- Avoid bending over the patient
- Try different transducer grips
- Stretch/exercise between patients
- Make a bigger hole in the top of the gel bottle. This will reduce the amount of force required to apply gel to the patient
- Use an arm support – this is often the patient
- Vary the patient list – helps with concentration as well as muscle fatigue
- Have a break – if you really need one take one and don't forget to stretch
- Have all the accessories in easy reach – gel, towels, cassettes – minimise the stretching/twisting
- Keep fit

There were specific adjustments to equipment which sonographers suggested would be beneficial and included the following.

Adjustments to equipment:

- Keyboard and monitor need to be independently adjustable
- Frequently used controls should be grouped and easily accessible
- Footrests on machines
- Cable supports to take the weight of the cable.
- Lighter probes and cables, perhaps one day it will be cordless probes
- Of course many sonographers felt a new ultrasound machine would help enormously!

Only 36% of sonographers have received any education in ergonomics and only 21% reported that someone trained in the field of ergonomics has assessed their workstations. As one sonographer wrote: "It is important that sonographers are familiar with the principles of ergonomics. This will assist them in reducing the musculoskeletal health hazards in the work environment."

SUMMARY

The act of scanning requires downward pressure to optimise images. This is the primary action in developing musculoskeletal symptoms, with static loading on the muscles (7). Support your forearm, minimise the time of downward pressure, rest your arm, and constantly be aware of your posture. Adjust the workstation to suit yourself.

Educate trainees, having them develop awareness of posture from early in their careers. Constantly remind them to set the equipment to suit them and move the patient closer.

Ergonomics education is important. Employers and sonographers must be proactive with this. Equipment needs should be addressed, in the way of adjustable patient couches and chairs, which allow the sonographer to establish a more neutral working environment. Work places need to be assessed by occupational health experts and sonographers must recognise the need to be fit for work.

Musculoskeletal injuries and associated time loss, decreased productivity and medical expenses represent a substantial cost to our industry in general. The majority of our sonographers continue to work with discomfort or pain and many have a decreased ability to perform their regular duties. The overall perception is that it is the act of scanning that produces the high prevalence of musculoskeletal discomfort and as sonographers we must strive to develop techniques to reduce this problem.

SURVEY PARTICIPATION PRIZE

The winner of the prize for participating in the survey was drawn at the New Zealand branch of ASUM meeting in Queenstown in July 2001 and it was Karen Robertson of Tauranga. Congratulations Karen and thanks to all participants for taking the time to complete the survey form.

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Editor's Note

Readers are referred to a related article by Geoffrey Stieler "Ergonomics in Ultrasound" published in the ASUM Bulletin Vol 1. No. 4. November 1998.

Book Reviews

Title: Vascular Ultrasound of the Neck - An Interpretive Atlas
Authors: Antonio Alayon and William McKinney
Publishers: Lippincott, Williams & Wilkins,
Published: Philadelphia 2001
Approximate cost: \$A303.60

This recent publication is an attempt to convey the vast body of information of cerebrovascular ultrasound (predominantly of the neck) in a concise atlas format. It is a lavish, glossy production of 146 pages with the bulk of the text presented in a legend format to Doppler spectral and ultrasound images. The book is written by Antonio Alayon and William McKinney, the latter author highly regarded in the field of cerebrovascular ultrasound medicine.

Each chapter is centered around a specific theme, including separate chapters on normal ultrasound vascular anatomy. In keeping with its primary purpose as a teaching and reference guide, each chapter finishes with a section entitled "Pearls and Pitfalls" in which key items of information used in every day practice to avoid diagnostic error are again highlighted. To ensure that there has been some knowledge retention, each chapter finishes with a list of multiple choice questions (the answers are also provided!) There is also a full list of references for those wishing to undertake further reading.

The book begins with the procedure for undertaking a clinical interview, including measurement of blood pressure and palpation of arterial pulses, and a demonstration of diagnostic ultrasound technique. This is followed by a chapter of the normal anatomy of the aortic arch and carotid system, with the focus on grey scale imaging to establish normal vascular anatomy of the neck.

The chapter on "Normal Hemodynamics" is pitched at a very basic level and probably would have benefited from further elaboration on some of the physical principles of vascular haemodynamics such as the interrelation between flow, pressure and blood vessel calibre.

The chapter on carotid arterial pathology uses ultrasound criteria for grading carotid artery stenosis that will not be familiar to most ASUM members, and reflects the system used at Wake Forest University, North Carolina. Carotid stenosis is graded in intervals of 50-74%, 75-94%, 95-99% and takes the somewhat unusual stance of defining a critical stenosis as "greater than 75% diameter narrowing". Readers will be more familiar with the ASUM criteria which has (I believe) a more logical interval categorisation. This is particularly relevant given that the clinical trials for carotid stenosis have determined that 70% is the critical cut-off for defining moderate vs severe carotid stenosis, and therefore the need for carotid endarterectomy. The other issue relevant here is that the transcranial Doppler is also helpful in defining the severity of internal carotid artery stenosis (eg with reversal of flow across the Circle of Willis). Given that the accurate definition of carotid stenosis is of such clinical

importance, a brief description of the haemodynamic principles involved would also have been helpful (eg explaining why blood flow decreases as the stenosis becomes critical).

The book gives an excellent description and images of the various morphological aspects of the carotid plaque. There is a chapter on the different vascular anatomical variants that are encountered in everyday practice as well as a chapter on Doppler spectral and imaging artifacts. This is an important area that is often overlooked but is a common (and avoidable) source of error.

For all its excellent images this book does however have some shortcomings. Surprisingly, there is no discussion or presentation of power Doppler and its use in carotid imaging. There is also no mention of newer ultrasound techniques such as harmonic imaging or the use of the echocontrast agents.

In summary, this book is an excellent reference source for sonographers starting to learn about vascular ultrasound of the head and neck, or for those looking to refresh their knowledge of this area. It is of lesser value for those with established expertise who may require a greater depth of knowledge and discussion.

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Title: Abdominal Ultrasound
– A practitioner's guide
Author: Kathryn A Gill
Publisher: WB Saunders Company
Year: 2001
Approximate cost: \$A223.00

This 470 page hardcover text is an attractively presented and well-illustrated book. The majority of the contributors are very experienced sonographers and sonographer educators and the text is aimed directly at the student sonographer. There are many design features that are intended to make the reading and study of the text enjoyable and as easy as possible. Numerous coloured summary text boxes highlight important points, a very good glossary is provided and each chapter has a self-review quiz with detailed explanations of the correct answer provided at the back of the book. A series of anatomy labelling exercises are also provided to help the student sonographer learn the basic anatomy.

The text is divided into three sections. Section one is a three chapter introductory section with easy to read, basic information relating to points such scan planes, labelling, definitions and transducer manipulation techniques. An overview of the role and basic principles of other imaging modalities is provided in chapter 2 and would be of

particular use to student sonographers not from a diagnostic radiography background. Apart from a brief description of some common B-mode artifacts there is no section on basic physics information other than that provided in chapter 3, which is a whole chapter on Doppler basics. It's a quite good overview chapter but I thought it seemed a little out of place.

Section three forms the main part of the text with 11 individual organ system specific chapters. Each chapter includes an overview description of relevant anatomy and main relevant pathology tests. Descriptions of the main pathologies associated with each organ system are concise, easy to read and aimed at the student sonographer, rather than experienced medical personnel. The topics covered in the individual chapters are; abdominal vascular sonography, liver, gallbladder and biliary tree, pancreas, kidneys and bladder, spleen, non-routine views, thyroid, breast, scrotum and prostate. The chapter on non-routine views covers areas such as the retroperitoneum, abdominal wall and adrenal glands and provides a well-illustrated overview of these areas. The chapters on breast, thyroid, scrotum and prostate again provide a good overview although it seems odd, to me, to include these areas in a text on abdominal ultrasound.

The final section on emerging trends has two interesting chapters on abdominal applications of ultrasound contrast agents and abdominal applications of intraoperative sonography. These chapters were easy to read, well-illustrated and provide a good overview of these topics.

Overall, I enjoyed reading this book and think it would be appealing and useful to student sonographers in the early stages of their training and in preparation for examinations. It would be a useful text for those individuals and departments involved in student training and teaching as the scanning tips, summary boxes and review questions would make useful teaching resources.

Margo Harkness
Senior Lecturer in Medical Ultrasound
Queensland University of Technology

Title: Clinical Ultrasound: Comprehensive Text; Second Edition
Author/Editor: H Meire, D Cosgrove et al
Publisher: Churchill Livingstone
Published: 2001
Approximate cost: \$A1,163.00

This three volume set, consisting of two abdominal and general volumes and a third obstetric and gynaecology volume, which can be purchased separately, supercedes the first edition published in 1992. As the editors state in the preface, ultrasound in the intervening period "has advanced at a dizzying pace". The text draws on a wide range of sonologist, sonographer and scientific contributors from the United Kingdom, continental Europe and the USA, providing a broad perspective in the current practice of ultrasound.

Each volume has a large number of chapters with a uniform format. The novel approach of splitting each major topic area into several chapters (eg the renal tract is covered by six chapters; 'The Normal Kidney', 'Medical and Infectious Renal Diseases', 'Renal Masses and Trauma', 'The Renal Collecting System', 'The Lower Urinary Tract' and 'Renal Transplants'), each having different authors, makes reading specific topics easy. The introduction page of each chapter provides a summary of headings, facilitating selective reading. Page layout liberally includes multiple headings, summary tables, diagrams and ultrasound images. The quality of images varies, although overall there are certainly abundant, well annotated and presented images mostly of up-to-date standard. It is pleasing to see colour images treated as a routine part of ultrasound imaging throughout the text.

The inclusion of chapters dedicated to the chest, the anterior abdominal wall, the skin, the peritoneum and retroperitoneum, the adrenals and the lymph nodes attest to the comprehensive nature of this text. Topics such as endoluminal, endoscopic and paediatric hip ultrasound are not given specific chapters, but are covered in other chapters.

The musculoskeletal system chapter describes an area of ultrasound which has advanced considerably since the publication of the first edition of this text. Coverage of ultrasound findings is comprehensive, however the absence of scanning technique and applied anatomy details of the rotator cuff is disappointing.

An entire volume is dedicated to Obstetric and Gynaecological Ultrasound, providing a thorough and up to date reference manual. A separate chapter is dedicated to each of the major system anomalies with a chromosomal marker chapter. One criticism of a text titled "Clinical Ultrasound" is that there is no overall chapter written from a clinical perspective discussing the current role of ultrasound in the management of pregnancy. Specifically, a discussion on current trends for numbers of scans during pregnancy and when they should be performed would be relevant in an era of increasing ultrasound quality.

Despite some minor criticisms, this text provides an excellent overview of the current status of ultrasound in clinical practice. It would be a valuable resource in any ultrasound department and if one were to invest in only one major text, this would not disappoint.

Matthew Andrews

ASUM 2001 - First Asia Link Program

7-8 September 2001

Preliminary report

ASUM has achieved what it has set out to do from this inaugural Asia Link Program held in Sydney as part of the ASUM 2001 Annual Scientific meeting, especially in fostering positive relationships and exposing influential key leaders from ultrasound societies in Asia to ASUM and Australia and vice versa.

There was overwhelming support from the Asian leaders for continuing cooperation between ASUM and ultrasound societies in Asia, a possible joint convention in the future and continuing exchange of information and expertise.

ASUM is very fortunate to be supported by the Sydney Convention and Visitors Bureau (SCVB) and it is due to the hard work of the Executive Council, led by the President, which made the program successful in achieving a focus for the future.

Dr Stan Barnett, President of ASUM was the key driver of this new initiative, supported by Executive and with the approval of Council, in developing a policy of extending academic linkages with neighbouring countries in the Asia-Pacific region and to explore opportunities to assist in education and accreditation within our region.

We were privileged to have 12 speakers at the ASUM 2001-Asian Link Program, 7 from Asia and 5 from ASUM.

Of the ASUM contingent, Dr Stan Barnett, introduced the concept of developing Asia-Pacific Linkages in ultrasound. Dr Andrew Ngu, past President of ASUM, reported on ASUM's experience in education and certification. Ms Margo Harkness, from the Queensland University of Technology, spoke on the role of sonographers in the ASUM. Mr Mike Heath, Chair of the NZ Branch of ASUM, also gave the sonographers' perspective on the value of education and accreditation. Dr Fergus Scott, Convenor of ASUM 2001, spoke on the ASUM Annual Congress and its potential role in Asia / Pacific linkages

We were also privileged to have key leaders from Asia, with speakers representing Japan, Thailand, Korea, Taiwan, Singapore and Malaysia.

- Professor Hiroke Watanabe, President of both the World Federation of Ultrasound in Medicine and Biology (WFUMB) and the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB), from the Meiji University of Oriental Medicine, Kyoto, Japan, talked about Ultrasound Training in Japan. Prof Watanabe also presented a brief history of World Federation of Ultrasound in Medicine and Biology (WFUMB) and the Asian Federation for Societies of Ultrasound in Medicine and Biology (AFSUMB).
- Dr Kittipong Vairojanavong, President-elect AFSUMB, Vice President WFUMB, Past President Medical Ultrasonic Society of Thailand, from the Department of Obstetrics & Gynaecology, Rajavithi Hospital, reported

on the AFSUMB education program and challenge of extending education to remote areas - Thailand experience.

- Professor Byung Ihn Choi, WFUMB Council, Secretary AFSUMB, Convenor of WFUMB 2009, Professor of Radiology at Seoul National University, Korea, spoke on Education and Research of Ultrasound in Korea.
- Professor T'sang-T'ang Hsieh, Secretary General, Federation of Asia & Oceania Perinatal Society and President, Chinese Taipei Society of Ultrasound Medicine, talked about the Society of Ultrasound in Medicine of the Republic of China (Taiwan).
- Professor Raman Subramaniam, Past President of Malaysian Society of Ultrasound in Medicine (MSUM) and on the Council of MSUM, Professor, Obstetrics & Gynaecology, International Medical University, Malaysia reported on the problems with training in ultrasound in a developing country.
- Dr Chintana Wilde, President, Medical Ultrasound Society Singapore (MUSS), Senior Consultant, Singapore General Hospital, talked about Ultrasound Practice and Accreditation in Singapore.
- Professor Basri Johan Jeet Abdullah, President, Malaysian Society of Ultrasound in Medicine (MSUM), Department of Radiology, University of Malaya Medical Centre, Malaysia spoke on ultrasound training and certification in Malaysia.

The entire proceedings of the Asia Link program will be published in a future issue of the ASUM *Bulletin*.

Where to from here? Whilst it is early days since the Asia Link program was held in Sydney, there are ongoing discussions and expressions of interest on several areas.

- a) ASUM 2001 - Asia Link Program, cooperation, joint convention and possibly a new federation are agenda items for discussion at the Administrative Council meeting of AFSUMB held on 23 October 2001.
- b) Expressions of interest from Korea to bring a delegation to ASUM 2002 ASM at the Gold Coast, Queensland.
- c) Request for an ASUM member to speak at the Korean Society of Medical Ultrasound (KSMU) in Medicine conference.
- d) Suggestion to invite speakers to include those from Asia for future ASUM Annual Scientific meetings.
- e) Expressions of interest relating to train the trainer programs, travelling fellowships to Asia, etc.
- f) Interest to attend educational courses conducted by ASUM from Asian ultrasound societies, to minimise duplication and to reach a wider audience.
- g) Joint cooperation with other societies to promote ASUM when ASUM speakers are involved in overseas meetings.

The Executive Council is committed to continuing the ASUM-Asia Link Program. Members who missed attending

the ASUM 2001 meeting and would like a copy of the abstracts of ASUM 2001 Asia-Link Program, please email me.

There are already many ASUM members who have or will be presenting lectures in ultrasound at meetings of professional societies or colleges in Asia. They are encouraged to contact me so that I can develop a database of experienced

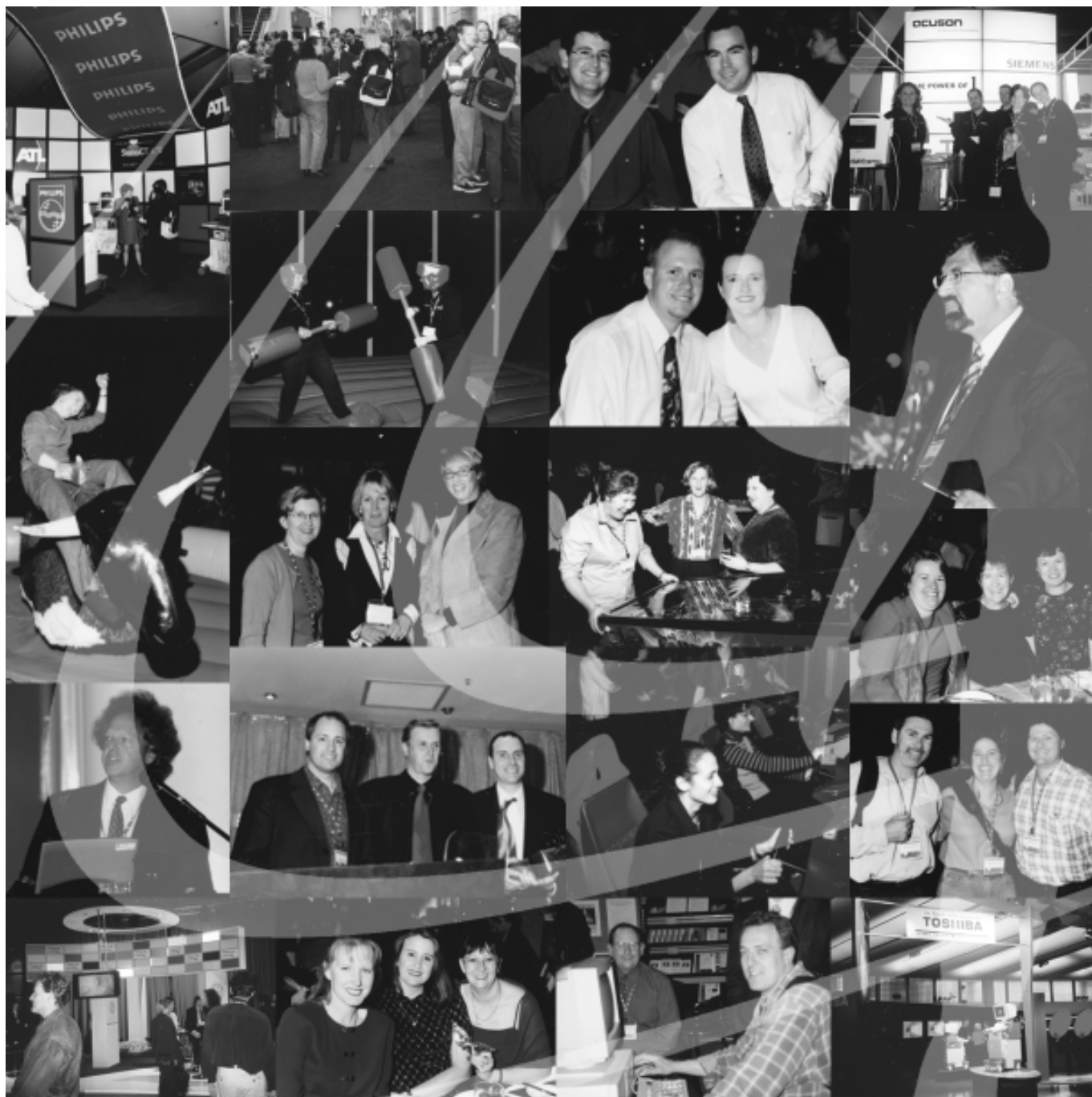
and active ASUM presenters at Asian meetings or who have provided training in Asia. I also look forward to suggestions from interested members.

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

Sydney was the venue for the ASUM 2001 - First Asia Link Program held on 7-8 September 2001. Collage of photos



ASUM 2001 31st Annual Scientific Meeting held at the Sydney Convention & Exhibition Centre in Darling Harbour, Sydney



DDU Chair's Report

This year marked a transition from the long standing successful chairmanship of Dr James Syme to the new chairman Dr Chris Wriedt. It was inevitable that there would be some minor hiccups, but by and large, these were overcome.

- 20 Candidates sat DDU Part 1 of which 13 were successful.
- 20 Candidates sat DDU Part 2 of which 18 were successful.

It was noted by the DDU Board of Examiners that the standard of candidates for the DDU Part 2 had shown a marked improvement on previous years.

Some changes have been proposed for the DDU Part 2 examination. An extra station will be added to the film reporting section. The viva examination films will be vetted and discussed amongst the examiners prior to them being presented to the candidates.

It is noted, with regret, that Dr Rob Gibson has resigned from the DDU Board of Examiners after many years of exemplary service. The DDU Chairman and DDU Board of Examiners would like to thank him very much for his efforts over the years.

Dr Chris Wriedt

Chairman, DDU Board of Examiners

2002 DDU Examination Dates and Fees

Part I Examination Fee

A\$385.00 (includes GST) for ASUM Members

A\$660.00 (includes GST) for Non members

Part II Examination Fee

A\$660.00 (includes GST) for ASUM Members

A\$935.00 (includes GST) for Non members

Part II Casebook Fee

A\$275.00 (includes GST)

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

PLEASE NOTE THE FOLLOWING INFORMATION PERTAINING TO THE NEXT DDU EXAMINATIONS

2002 Part I

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

2002 Part II

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

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

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

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

"BALLINA 2001" Medical Imaging Conference

To all those who sponsored, supported and participated in the Ballina 2001 Conference, a hearty thankyou for rendering it a success. Held on the 29th and 30th September 2001 at the Ballina Beach Resort, and with a delegation of 90 people, the scientific content included basic MRI physics, correlation between US, CT and MRI in musculo-skeletal pathology, the latest criteria for chromosomal abnormality detection in the foetus, advanced obstetric complications and the complementary role Nuclear Medicine has to play in the diagnostic process.

Presentations on medico-legal responsibilities and ergonomic considerations generated vigorous discussion. The generosity of our sponsors enabled practical ultrasound scanning sessions to take place.

Furthermore, and in keeping with the hedonistic lifestyle for which the northern NSW coastal area is renowned, the Sunday sessions were "kicked off" with a delicious French champagne breakfast accompanied by a very entertaining and informative commentary. (Fortunately a presentation on constructive financial planning and management followed thereafter!!!!)

In all, a very pleasant weekend, which served the essential purpose of promoting continued professional development, especially for those working in regional Australia. Thank you again to all those involved.

Jacky Wilkosz



ASUM 2002

Conrad Jupiters, Gold Coast, Queensland

**Skills Development Day
19 September 2002**

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

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

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

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

**Ros Savage
Convenor**



1st November 2001 Medicare Benefit Schedule Changes

All ASUM members should be aware of the key changes included in the 1st November 2001 Medicare Benefit Schedule.

1) Sonographer Accreditation (Pg 389 DIH7)

"From 1 November 2001, sonographers performing medical ultrasound examinations (either R or NR type items) on behalf of a medical practitioner must be suitably qualified and involved in a relevant and appropriate Continuing Professional Development program. For further information, please contact the Department on (02) 6289 7727, or the Australasian Sonographer Accreditation Registry on (02) 8850 1144 or through their website at <http://www.asar.com.au>"

This requirement was foreshadowed in a letter to all relevant medical practitioners and their professional associations last November and was included in the May 2001 Supplement to the MBS. It reflects the Government's desire to ensure the provision of high quality diagnostic imaging services under the MBS.

In order to make the accreditation process as inclusive as possible, sonographers experience and clinical capability are being taken into account.

Where a medical practitioner has a sonographer perform an ultrasound on their behalf and receives a Medicare benefit for that service, the sonographer must satisfy one of the following criteria:

- 1 Be Registered or eligible for Registration on the basis of an accredited post graduate qualification in medical ultrasound; or
- 2 Be a student undertaking an accredited course of study or a Diploma of Medical Ultrasound. Such students will be eligible to be placed on the Register of Students; or
- 3 Sonographers who at 1 November 2001 can demonstrate 5 years of greater clinical experience within Australia or New Zealand and supply suitable references will be eligible for Registration; or
- 4 Sonographers working in an approved clinical setting, who at 1 November 2001, have less than 5 years clinical experience within Australia or New Zealand as a sonographer and are currently ineligible for Registration will have until 31 December 2004 to be enrolled in a course of study which will lead to an accredited qualification or undergo a one off competency assessment.

(Those individuals seeking recognition within category 4 must elect to undergo competency assessment or to enrol in an accredited qualification. They must notify the Australasian Sonographer Accreditation Registry (ASAR) in writing of their choice by 1 November 2001.)

The Register referred to above will be administered by the Health Insurance Commission (HIC).

Continued eligibility for the Register will be contingent upon the sonographer meeting the requirements of a CPD program.

For ASUM Members the CPD component of the regulation may be satisfied by participation in the MOSIPP program. Sonographers participating in MOSIPP will have their MOSIPP credits electronically transferred to ASAR each February.

Successful continuous participation in MOSIPP is accepted by ASAR as adequate CPD activity.

Student sonographers must provide ASAR with evidence of enrolment in an accredited education program. Proof of enrolment in any of the ASUM DMU's can be obtained by contacting the ASUM office.

Some student sonographers may be uncertain as to which education program they wish to enrol in. ASAR will accept a letter from a sonographer's employer stating their intention to enrol within the next 12 months. Once this 12-month period has elapsed the sonographer must provide evidence of enrolment in an accredited program to remain on the Register of student sonographers.

For further information on this regulation please contact ASAR on (02) 8850 1144

2) Other Records of Diagnostic Imaging Services (Pg 381 DIB1.5)

"These records must include the report by the providing practitioner on the diagnostic imaging service, for ultrasound services, where the service is performed on behalf of a medical practitioner the report must record the name of the sonographer."

It has been confirmed that the use of the christian name initial followed by the full surname is adequate.

For further information regarding this regulation please contact the Department of Health and Aged Care on (02) 6289 7727.

3) Vascular Ultrasound

Members should be aware that changes have been made to some Doppler item numbers. Please refer to the 1st November 2001 Medicare Benefit Schedule for full details.

Stephen Bird

DMU Student status

Diploma of Medical Ultrasonography (DMU) Student Status has now been introduced. The DMU Student Status will satisfy government regulations regarding the conduct of medical ultrasound examinations, permitting provisional accreditation of trainee sonographers studying toward the DMU who require accreditation because they are performing ultrasound examinations on behalf of medical practitioners in Australia.

The Diploma of Medical Ultrasonography Student Status is offered by the DMU Board of Examiners (DMU Board) of the Australasian Society for Ultrasound in Medicine (ASUM), to appropriately qualified persons of good standing, who have been deemed eligible for acceptance to Part I or Part II of the examination under the DMU Regulations. DMU Student Status will be available in any

year in which the trainee is studying towards the DMU but not registered to sit the examination, up to a maximum of two years for the Part I examination and 5 years between the Part I and Part II examinations.

Persons with DMU Student Status shall be able to seek admission to the Australasian Sonographer Accreditation Registry (ASAR) under Category 2 (a student participating in an ASAR accredited program of study in medical ultrasound) or to register with the Commonwealth Department of Health and Aged Care as a student sonographer. Information about the ASAR is available at <http://www.asar.com.au>

To obtain an application form for DMU student status, contact DMU, ASUM, 2/181 High St. Willoughby; NSW 2068 Australia; fax (61 2 9958 8002); email dmu@asum.com.au

MOSIPP, CPD and Accreditation

MOSIPP is ASUM's CPD program. It is provided as a free service to ASUM members. MOSIPP is recognised by ASAR as fulfilling the CPD requirements for Sonographers. Members can obtain a MOSIPP diary by contacting the office. ASUM encourages members to record their CPD on-line.

In MOSIPP, professional learning activity is defined as activity that causes you to consider and make a decision about your practice. It is immaterial whether this occurs as paid employment or "in your own time".

ENTERING YOUR CPD DATA ON-LINE

1. Open your web browser and type <http://www.asum.com.au/mosipp> into the command line.



2. On your first visit you will need to register. Registration secures your data. Select "MOSIPP Registration" and follow the on-screen instructions. When you have completed the form select "Submit Registration". When you receive your password you can begin your data entry.
3. To enter your data, select one of the Bulleted items at the lower centre screen. These are:
 - Self-Directed Learning
 - Organised and Group Activities
 - Professional Activities

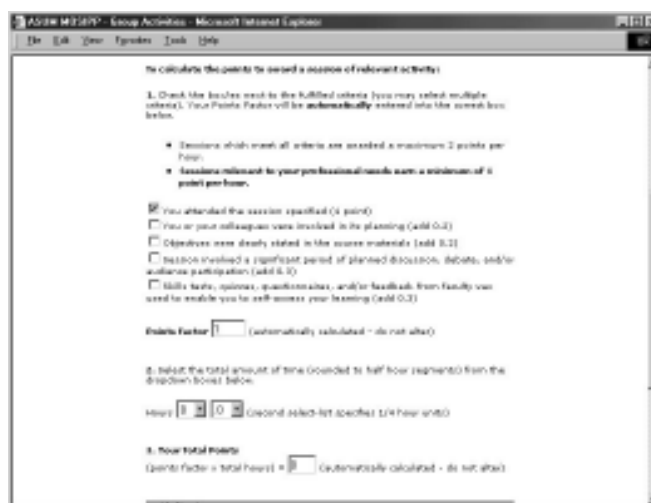
4. Self-Directed Learning Activity should only be recorded if it caused you to consider your practice. Record your learning that results from reading, study, individual problem solving, research, peer discussion, preparation for teaching etc in this screen.

The date should be changed to the month in which the activity occurred.

If you used literature that you think would be useful to others, enter it in the reference section. This will lead you to another screen to enter full bibliographic details.

5. Attendance at organised meetings, conference, clinical meeting, individual teaching session, etc should be recorded in the "Organised and Group Learning Activities" screen.

Some activities are worth more than one point per hour. Fill in the items on the screen, and your points will be automatically calculated



6. Other activities, which contribute to the profession without directly contributing to your own professional development (eg teaching, organising meetings, examining, mentoring), should be recorded in the "Professional Activities" screen.

Life member

Dr James Syme, Life Member



At the Annual General Meeting held on 6 September 2001, Dr James Syme was elected as Life Member for his outstanding contribution to his profession and to the Society, most recently as Chair of the Diploma in Diagnostic Ultrasound (DDU) Board of Examiners.

James Syme

MD, FRACP, DDR, FRCR, FRANZCR, DDU, Hon MIR

Jim Syme, a Melbourne radiologist highly respected throughout Australia and New Zealand, was elected a Life Member of ASUM at the Society's Annual General Meeting on 6th September 2001.

A member of the Society for over 25 years, Jim was a member of Council from 1984 to 1987. He represented ASUM on Ultrasound Liaison Committee from 1984 to 1987 and was a member of the Board of Examiners for the Diploma of Diagnostic Ultrasound from 1987 to 2000. From 1989 to 2000 he was Chairman of the Board of Examiners.

Jim accepted the position of Chairman of the DDU Board after a distinguished career in radiology during which time he held many offices within the now Royal Australian and New Zealand College of Radiologists and was the recipient of several notable honours within the College. He was the Thomas Baker Memorial Fellow in 1964, Rohan Williams Travelling Professor in 1979, received the Gold Medal of the RANZCR in 1984 and was elected to Life Membership of that College in 1993. Jim was a member of the RANZCR Council from 1968 to 1991 and was President of the College from 1989 to 1990. He was Warden of the Membership of the RANZCR from 1970 to 1988.

During his time as Chairman of the DDU Board, Jim consolidated the widespread respect for the DDU both as a diploma worth having and for the rigour of its administrative processes and conduct of the actual examination. During his time as Chairman the DDU was awarded to 136 medical practitioners.

During his 25 years of membership, Jim Syme has been a strong supporter of and tireless worker for the Society. The work for the DDU Board was carried out largely in his own time with the support and help of his lovely wife, Helen, to whom the Society is also indebted. This highly principled, meticulous, wise and thoughtful man has made a unique contribution to the Society. His election to Life Membership is applauded universally.

Honorary member

Dr Kittipong Vairojanavong, Honorary Member



Dr Kittipong Vairojanavong, currently Vice President of the World Federation of Ultrasound in Medicine and Biology (WFUMB), President-Elect of the Asian Federation of Ultrasound in Medicine and Biology (AFSUMB), and past president of the Thailand Society of Ultrasound in Medicine, was awarded

Honorary Membership for his worthy contribution to ultrasound.

Both Dr Jim Syme and Dr Dittipong Vairojanavong were presented with their special award plaques at the ASUM 2001 Gala Dinner in front of more than 300 guests in Sydney.

New Members July – September 2001

FULL MEMBERS

Paul Baines	NZ
Leo Barnett	QLD
Ronald Benzie	NSW
Sallyann Brock	NZ
Edmund Cadogan	NZ
Lyndal Cohen	NSW
Anne Delon	SA
Lynne Evans	WA
Michael Gray	NSW
Steven Harvey	NSW
Celia Kakoschke	VIC

Jan Klimek	NZ
Raymond Marshall	VIC
Julie Nieuwerkerk	WA
Catherine Spencer	NZ
ASSOCIATE MEMBERS	
Kathleen Armstrong	QLD
Quang Tien Bui	NSW
Joanna Calder	WA
Anna Dobson	NZ
Angela Gidley	VIC
Nevleen Govind	NSW

Herman Kortman	VIC
Peta Marshall	NSW
Khanh Nguyen	NSW
Michelle Rose	WA
Edwina Russell	NSW

TRAINEE MEMBERS

Steven Dubenec	NSW
Emlyn Jones	QLD
Christine Manely	TAS
Anne Miller	NSW
Justin Nasser	QLD

French Qualified Sonologist

French Qualified Sonologist, member of ASUM, interested by ultrasound contacts in Australia, seeking a sonographer position for 6 months to one year.

14 years experience in general, cardio-vascular and foeto-obstetrical examinations. Qualified in prenatal and foetal medicine, good medical English.

To anyone interested, please write to:

Dr PEYROT marc
B.P. F1 98848 noumea cedex
New Caledonia
Fax: 687 264 144
Email: marc.peyrot@caramail.com

Sonographer

Sonographer required for either part/full-time attendance at either both or one of our Practices in Bondi Junction and Hurstville, Sydney

Clinical mix covers all forms of ultrasound except echocardiography.

Please apply to Dr Bryan Fain on 0412 648 029, 02 9389 9499



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<p>• AQUAFLEX® Ultrasound Gel Pad - Standoff *US 04-02 2cm x 9cm gel pad, 6 pads/box</p>	<p>• THERMASONIC® Gel Warmer *US 82-04-20 CE Multi-bottle gel warmer</p>
<p>• POLYSONIC® Ultrasound Lotion *US 21-28 1 U.S. gallon with dispenser bottle, 4 per case</p>	<p>• TRANSEPTIC® Cleansing Solution *US 09-25 250ml clear spray bottle, 12 per box</p>

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QUEENSLAND UNIVERSITY OF TECHNOLOGY CENTRE FOR MEDICAL, HEALTH AND ENVIRONMENTAL PHYSICS

2002 Cardiac Ultrasound Continuing Education Series

Location: Melbourne, Victoria
When: Wednesday 29 May - Saturday 1 June 2002
Who: The Centre for Medical, Health and Environmental Physics, QUT and Philips Medical Systems Australasia Pty Ltd in association with The Prince Charles Hospital and the Alfred Hospital Heart Centre.

Location: Brisbane, Queensland
When: Monday 8 July - Saturday 13 July 2002
Who: The Centre for Medical, Health and Environmental Physics, QUT in association with Philips Medical Systems Australasia Pty Ltd and The Prince Charles Hospital Echocardiography Laboratory.

For further information or to obtain registration brochures for any of the above courses, please contact

Margo Harkness
 Telephone +61 7 3864 2490
 Fax +61 7 3864 1521
 Email : m.harkness@qut.edu.au

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS



Comprehensive scientific program commencing on Friday afternoon. Live scanning workshops will be held concurrently with the scientific program on Saturday and Sunday.

Welcome Drinks on the Friday evening is the ideal opportunity to catch up with colleagues. The ever-popular Gala Dinner, featuring a fantastic local band, will be held on Saturday night.

Registration brochures will be available in December.

Why not consider presenting a paper or poster? Great prizes will be on offer.

If you require further information, please contact:

**ASA Secretariat
PO Box 709, Cheltenham
Victoria 3192
Ph: 03 9585 2996
Fax: 03 9585 2331
Email: enquiries@A-S-A.com.au
www.A-S-A.com.au**

NEW ULTRASOUND PROGRAMS FROM RMIT UNIVERSITY

GRADUATE DIPLOMA (SONOGRAPHY)

- * No on-campus attendance sessions.
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- * 8 Subjects –user friendly workload.
- * New study materials.
- * Full ASAR accreditation.

MASTER OF APPLIED SCIENCE (SONOGRAPHY)

- * After completing the GradDip(Sonography) students undertake a further year of part-time study and complete a minor research thesis
- * Full ASAR accreditation.
- * Advanced standing in this program is available for previous studies.

Closing date for semester 1, 2002 is Friday December 7th, 2001 (Round 1), Friday January 11th, 2002 (Round 2). For further information please contact the program coordinator:

Mr Paul Lombardo, RMIT University – Division of Medical Radiations,
PO Box 71, Bundoora, Vic, 3083. Tel: (03) 9925 7942 Fax: (03) 9925 7466
Email: paul.lombardo@rmit.edu.au

ROYAL ADELAIDE HOSPITAL

STATE OF THE ART IMAGING

2ND DENTAL RADIOLOGY CONFERENCE

23rd – 24th March 2002

The annual State of the Art Imaging Conference is held in Adelaide, South Australia. The year 2002 topic is 'DENTAL RADIOLOGY'.

This 2 day Radiology Conference will be of interest to radiologists, dentists and others with an interest in dental imaging and dental radiology.

For further information you are invited to visit our website at <http://www.stateoftheartimaging.com.au> or contact Dr S Le P Langlois, or Susie Lazzaro, Department of Radiology, Royal Adelaide Hospital, North Tce, Adelaide SA 5000, Ph: 08-8222 5145, Fax: 08-8222 5964 or email: info@stateoftheartimaging.com.au

**ASUM
Obstetric, Gynaecology and
Paediatric Workshop**

**19-21 April 2002
Sydney**

Convenor: Dr Glenn McNally

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

**Dr Anna Parsons, Dept of Obstetrics
and Gynaecology, University of
South Florida, Tampa, Florida**

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

ASUM Victorian Branch

Ultrasound Lecture Series for 2002

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

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

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

VENUE: Royal Melbourne Hospital

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

Checks payable to ASUM Victorian Branch.

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

**DMU Preparation Course
Sydney**

DMU Part I Preparation Course
(General, Obstetric, Vascular, Cardiac)
DMU Part II Preparation Course
(General, Obstetric, Vascular, Cardiac)

The DMU Part I preparation Course is an intensive course to assist candidates preparation for DMU Part I examination. The program includes lectures, laboratory sessions and tutorial for general and obstetric, vascular and cardiac specialities. The venue is the University of New South Wales, Sydney. If insufficient registrations are received, ASUM reserves the right to cancel the course and refund the course fees.

The DMU Part II preparation Courses are interactive programs to assist candidates preparation for DMU Part II examination. Each program will comprise lectures, tutorials, workshops, film reading and a trial OSCE. Separate programs exist for general and obstetric, vascular and cardiac specialities. The venue is the University of New South Wales. If insufficient registrations are received, ASUM reserves the right to cancel the course and refund the course fees.

Registration brochures will be published on ASUM's website: <http://www.asum.com.au> and have been included as an insert with this edition of the Bulletin. For further information contact Tim Brown tbrown@asum.com.au tel 612 9958 6200 fax 612 9958 8002

Please note that the DMU Preparation Course previously run in February in Melbourne will not be held in 2002.

Videotape Lending Scheme Collection

Second release of tapes from the 30th Annual Scientific Meeting, 2000

Following the successful Annual Scientific Meeting in Auckland last year, ASUM is pleased to release 4 new titles into the videotape lending scheme. This second series of talks covers musculoskeletal ultrasound and current ultrasound safety issues. Below is the abstract from each of these presentations.

An order form is on page 40 of this *Bulletin*.

Tape 1: 25/132

ULTRASOUND OF THE SHOULDER - A REVIEW INCLUDING PITFALLS AND THE POST-OPERATIVE SHOULDER (Philip Lucas, 2000)

A review of shoulder ultrasound as a diagnostic test in the assessment of rotator cuff pathology will be given with particular attention to diagnostic pitfalls. In addition, an approach to the post-operative shoulder will be illustrated.

ULTRASOUND OF THE HAND AND WRIST - A REVIEW (Philip Lucas, 2000)

A comprehensive review of the current status of ultrasound of the hand and wrist will be given with particular attention to the imaging of the tendons, ligaments and joints. Pathologies such as tendinopathy, carpal tunnel syndrome, ganglion cysts and common soft tissue tumours will be illustrated.

Tape 2: 25/133

ULTRASOUND OF THE ANKLE AND FOOT - A REVIEW (Philip Lucas, 2000)

A review of the current status of ultrasound in the assessment of pathology in the foot and ankle will be given with particular attention to the tendons, ligaments and joint structures. Pathologies such as tendinopathy, ligament sprains, impingement syndrome, plantar fasciitis and common soft tissue tumors will be illustrated.

ADULT HIPs, GROINS AND SCIATIC NERVES – NOT TO MENTION HERNIAS (Pru Pratten, 2000)

In all anatomy books, the "groin" is a very small area in the scheme of things: the pathology to be found there, however, is immense – and most can be seen on ultrasound.

The following regions can be seen:

- Bony surfaces – including all tendon origins and insertions, and bursae.
- Musculature – all major muscle groups.
- Ligaments – especially posterior.
- Nerves – sciatic, lateral femoral cutaneous, and to a lesser extent femoral and obturator.
- Joint – anterior aspect of the adult hip joint.

- And then there are the hernias - indirect, direct, Sportsman's, femoral, obturator.

Examples of the more common pathology, the majority being sporting injuries, will be shown, with emphasis being on the dynamic component of the examination – especially the hernias.

Tape 3: 25/134

SONOGRAPHY OF THE HIP JOINT IN PAEDIATRIC PATIENTS (Roger Gent, 2000)

Sonography has two major applications in the investigation of hip joints in paediatric patients. In neonates and babies it is used to assess these joints for developmental abnormalities, while in older children, the main application is in the detection of fluid within the joint.

Sonography of Developmental Dysplasia of the Hip (DDH)

Sonography is now widely used in the assessment of hip joints in neonates and babies, for evidence of DDH. It is generally agreed that the sonographic examination for these patients should, as a minimum, consist of an anatomical assessment of joint development, and also a dynamic component, to demonstrate the degree of movement of the femoral head when stress is applied.

Anatomical development is assessed using images of the mid-coronal plane of the joint, showing the shape and depth of the acetabulum, and the position of the femoral head. Two measurements are commonly used to quantify joint development and are undertaken using software calculations available on most ultrasound systems. The degree to which the bone of the acetabular roof covers the femoral head can be calculated by extending a cursor, along the line of the lateral margin of the ilium, through a circle outlining the margin of the cartilaginous head. A normal hip will have more than 50% coverage. The shape of the acetabulum can be quantified by calculation of the alpha angle (Graf), between the line along the lateral margin of the ilium and the line of the ossified acetabular roof. This angle should measure 60° or more.

The dynamic component involves assessing the degree of movement of the femoral head in relationship to the acetabulum, when stress is applied. A modified "Barlow manoeuvre" (application of postero-lateral stress, with the hip joint flexed and slightly adducted), is commonly used, since in cases when dislocation is possible, it is most likely to occur in a posterior direction. The plane of scanning is transverse to the torso, along the line of the femoral shaft (perpendicular to the coronal view).

It is generally agreed that the ultrasound examination should not be performed in the first two weeks of life, to

Education

reduce the number of cases where the findings are equivocal, and which necessitate recall of the patient for a follow-up study. This is also likely to avoid any maternal hormonal influence causing increased joint laxity, suggestive of significant abnormality.

Hip Joint Sonography in the Older Child

In infants and older children, ultrasound is used to detect fluid within the joint capsule, particularly the inferior joint recess, which extends anteriorly along the femoral neck. An anterior approach is used, with the transducer aligned with the axis of the femoral neck. Ultrasound is very reliable in the detection of fluid, but is not reliable in determining its nature.

When present, fluid causes an anterior bowing of the joint capsule, so that its margin is no longer parallel to the anterior margin of the femur. The two conditions commonly resulting in fluid in the joint are septic arthritis and transient synovitis (irritable hip). When fluid has been demonstrated, differentiation between these entities is a clinical matter (fever, ESR, WCC etc). A major role of the ultrasound examination is avoiding an unnecessary arthrotomy in cases when septic arthritis is clinically suspected, but where no fluid is present within the joint.

It should be recognised that signs and symptoms of hip disease can be caused by a range of pathologies, particularly those affecting muscles controlling the hip joint. The psoas muscle and muscles around the hip joint should also be examined in these patients, particularly when the symptomatic joint shows no evidence of fluid.

Tape 4: 25/135

CURRENT ULTRASOUND SAFETY ISSUES

(Stan Barnett, 2000)

A long period of practice with a good safety record has engendered the notion that ultrasound equipment is safe as long as it is used according to the guidelines. Earlier limits on acoustic output have been progressively relaxed increasing the importance of the operator monitoring the intensity at the target. There are reasonable safety margins in practice, but

significant potential bioeffects exist, which operators should be aware of.

In this presentation Dr Barnett deals with these issues:

- The significance of TI and MI displays.
- What is the risk of bioeffects?
- Are bioeffects a health hazard?
- The issues that operators should be aware of to ensure that suitable safety margins are maintained.
- Ultrasound examination in cases where there is no medical indication.

A catalogue of other titles is published in the September 2001 *Bulletin* (v4n3). A full catalogue can be viewed on ASUM's website www.asum.com.au

Videotape Lending Scheme Order Form

Tax Invoice / Order form (includes 10% GST)

ABN 64 001 679 161

	Members	Non-Members
(for the loan of up to 3 videotapes)	\$36.00	\$72.00

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N.B. Material is sent by courier. Do not quote a PO box.

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25/ _____

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Signature _____ (W) () _____

**Return this form to ASUM, 2/181 High Street,
Willoughby, NSW, 2068, Australia Fax: 02 9958 8002
Orders will not be processed until full payment is received.**



GE Medical Systems
Ultrasound

Beresford Buttery Overseas Traineeship

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

It is with great pride that GE has the opportunity to offer an annual traineeship in the field of obstetric and gynaecological ultrasound, in memory of Beresford Buttery FRACOG, DDU, COGUS who made an inestimable contribution to his profession.

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

The award will be made to applicants:

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

Applications should include:

- ❖ a *curriculum vitae*
- ❖ details of current and post employment, particularly in the field of obstetrics and gynaecology
- ❖ testimonials from two referees in support of the application including contact address and telephone number
- ❖ an outline of professional goals and objectives
- ❖ an indication of benefit from award of the Traineeship
- ❖ The successful applicant is asked to provide a written report on return from the course at Thomas Jefferson Research and Education Institute.

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

GE Beresford Buttery Overseas Traineeship
c/- ASUM
2/181 High Street
Willoughby NSW 2068 Australia

Chris Kohlenberg Teaching Fellowships 2002

Proposals are invited for the 2002 Chris Kohlenberg Teaching Fellowships sponsored by Dasonics GE.

In 2001 the Education Committee accepted program proposals from the South Australian and New Zealand branches for the 2001 Teaching Fellows. These programs have been successfully completed with. Reports will be published in the February 2002 Bulletin.

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

The ASUM Dasonics Teaching Fellowship is awarded on the basis of demonstrated knowledge, clinical background and teaching ability. The Fellow is appointed by the Education Committee, which considers nominations from committees, branches and members of ASUM. The Teaching Fellow will conduct workshops and meetings primarily (but not exclusively) in Australian and/or New Zealand centres that would not normally host scientific meetings. In addition the Teaching Fellow will be available to conduct workshops in hospital ultrasound departments during the day.

Members wishing to nominate for the fellowship should provide details of their background and experience which qualifies them for appointment as the Chris Kohlenberg Teaching Fellow.

Branches wishing to propose programs for the 2002 Teaching Fellows should, in the first instance, contact Keith Henderson ph (02) 99586200 fax (02) 99588002 email khenderson@asum.com.au

Nominations and proposals should be addressed to:

The Education Officer
ASUM
2/181 High St
Willoughby 2068 Australia

and should be received before 22 November 2001.

Ultrasound Events

Tue 27 Nov 2001 ASUM Victorian Branch Scientific Meeting. Combined ASUM/ASA case presentation night. *Contact:* Mark Brooks Ph: 03 9496 5431; Fax: 03 9459 2817

Tue 11 Dec 2001 - 4 days 13th EUROSON/33rd BMUS Annual Scientific Meeting & Exhibition *Venue:* Edinburgh International Conference Centre, Scotland *Contact:* The British Medical Ultrasound Society, 36 Portland Place, London W1B 1LS, UK Ph: 44 0 20 7636 3714; Fax: 44 0 20 7323 2175; Email: euroson@bmus.org; Website: www.bmus.org

2002 Annual Convention Society of Diagnostic Medical Sonographers (SDMS) *Venue:* Las Vegas, NV, USA *Contact:* Beth Plater, Dir of Meetings and Conv, 12770 Coit Road, Ste 708, Dallas, TX 75251, USA Ph: 1 972 239 7367; Fax: 1 972 239 7378; Email: bplater@sdms.org

2002 18th Annual congress International Society "The Fetus as a Patient". *Venue:* Budapest, Hungary *Contact:* Dr FA Chervenak, MD, Cornell Univ, Dept of OB/GYN, 525 East 68th Street, New York, NY 10021, USA Ph: 1 212 746 3184; Fax: 1 212 746 8717; Email: mad2011@mail.cornell.com

Wed 6 Feb 2002 ASUM Victorian Branch. Ultrasound lecture series for 2002 commences. *Venue:* Royal Melbourne Hospital *Contact:* Marilyn Ph: 03 9342 8786; Fax: 03 9342 8369

Fri 8 Feb 2002 - 3 days 6th World Congress of Echocardiology and Vascular Ultrasound *Venue:* Hotel Ashok, New Delhi, India *Contact:* Dr Satish K Parashar, C-144 Sarita Vihar, 110044 New Delhi, India Ph: 91 11 6945873/694 6552; Fax: 91 11 694 2222/695 1055; Email: parashar@ndf.vsnl.net.in

Wed 20 Feb 2002 - 5 days ASUM DMU Part 1 and Part 2 Preparation Course *Venue:* University of New South Wales *Contact:* Tim Brown Ph: 02 9958 6200; Email: education@asum.com.au

Sat 9 Mar 2002 - 5 days Joint meeting of the Perinatal Society of Australia and New Zealand with the Federation of Oceania and Asia Perinatal Societies *Venue:* Christchurch, New Zealand *Contact:* Susan Day at Wyeth Clinical Services Email: days@labs.wyeth.com

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

Fri 19 Apl 2002 - 3 days ASUM Gynaecology Workshop *Venue:* Sydney *Contact:* ASUM, 2/181 High Street, Willoughby NSW 2068 Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email: asum@asum.com.au

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

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

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

Wed 26 Jun 2002 - 5 days Euroson 2002: 14th Congress of the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB). *Venue:* Palace of Culture, Warsaw, Poland *Contact:* Imaging Diagnostics Department, Brodno Country Hospital, ul Kondratowicza 8, 03-242 Warszawa, Poland Ph: 48 22 8119677; Fax: 48 22 8119591; Email: usgptuwj@euroson.edu.pl

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

Thu 19 Sep 2002 - 4 days ASUM 2002 *Venue:* Jupiters Casino on the Gold Coast *Contact:* ASUM, 2/181 High Street, Willoughby NSW 2068 Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email: asum@asum.com.au

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

Wed 16 Oct 2002 - 5 days Congress of the Mediterranean African Society of Ultrasound (MASU) *Venue:* Int Conference Centre, Kampala, Uganda *Contact:* Prof Henry Kasozi, Mulago Hospital, PO Box 7051, Kampala, Uganda Ph: 256 41 53 0137; Fax: 256 41 53 0412

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

Fri 1 Nov 2002 - 5 days 12th World Congress on Ultrasound in Obstetrics and Gynecology *Venue:* Hilton, New York, NY, USA *Contact:* Ms S Johnson, Ex Dir, ISUOG, 3rd fl, Lanesborough Wing, St. George's Hospital Medical School, Cranmer Terrace, London SW17 0RE, UK Ph: 44 181 7252505; Fax: 44 181 7250212; Email: johnson@sghms.ac.uk

Dec 2002 34th Annual Scientific Conference and Exhibition of the British Medical Ultrasound Society (BMUS) *Venue:* United Kingdom *Contact:* BMUS, 36 Portland Place, London WIN 3DG, UK Ph: 44 20 7636 3714; Fax: 44 20 7323 2175; Email: secretariat@bmus.org; Website: www.bmus.org

2002 DMU Examination Dates and Fees

DMU Calendar 2002

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

DMU Fees 2002

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

* GST applies to Australian Residents only

Council Members

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Stan Barnett, NSW

President-elect

to be appointed

Honorary Secretary

Mary Young, Vic

Assistant Honorary Secretary

Kaye Griffiths, NSW

Honorary Treasurer

Glenn McNally, NSW

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Janine Horton, WA

Glenn McNally, NSW

Mary Young, Vic

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Stan Barnett, NSW

Glenn McNally, NSW

Mary Young, Vic

Corporate News

Toshiba Medical

At the Annual Scientific Meeting this year, Toshiba returned to the marketplace with a new look Premium Compact Ultrasound System - Nemio. The Nemio is the first system in a new range of equipment being launched by Toshiba over the next 6 months.

The Nemio provides Premium Level Performance in a very compact design. The system features advanced ergonomic keyboard design, panoramic imaging, 3D and Fusion 3D imaging and comprehensive DICOM and networking facilities.

Corporate Members

Acuson A Siemens Company (*Acuson*)

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Rentworks Ltd (*Medical Leasing Equipment*)

Don Hardman 02 9937 1074

Schering Pty Ltd (*Ethical Pharmaceuticals*)

Philip Owens 02 9317 8666

Shimadzu Medical Systems (*Shimadzu*)

Dennis Tramosljanin 02 9898 2444

Toshiba (Aust) P/L Medical Division (*Toshiba*)

David Rigby 02 9887 8003

For more information on Nemio, contact your local Toshiba representative.

Toshiba is also pleased to announce the winner of the 96cm LCD Toshiba Television Competition held at the ASUM meeting in September. The winner is Sean Williams from Riverina Medical Imaging. Congratulations to Sean.

Guidelines for authors

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

ORIGINAL RESEARCH

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

QUIZ CASES

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

CASE REPORTS

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

FEATURE ARTICLES

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

FORUM ARTICLES

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

CALENDAR ITEMS

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

CORPORATE NEWS

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

FORMAT

Manuscripts

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

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

- Title Page should include the following:
 - ❖ Title of manuscript, the full names of the authors listed in order of their contribution to the work, the department or practice from which the work originated, and their position.
 - ❖ Corresponding author's name, contact address, contact telephone number and facsimile number (where available) for correspondence.
- Abbreviations may be used after being first written in full with abbreviation in parentheses.
- Relevant references should be cited using the Vancouver style, numbered according to the sequence of citation in the text, and listed in numerical order in the bibliography.

Vancouver style format should be used.

Examples of Vancouver style:

1. In-text citation: ...as documented in previous studies (1-3). Note: Not superscript
2. Journal article: Britten J, Golding RH, Cooperberg PL. Sludge balls to gall stones. *J Ultrasound Med* 1984;3:81-84
3. Book: Strunk W Jr, White EB. The elements of style. (3rd ed.) New York: Macmillan, 1979
4. Book section: Kriegshauser JS, Carroll BA. The urinary tract. In: Rumack CM, Wilson SR, Charboneau JW, eds. *Diagnostic Ultrasound*. St Louis, 1991:209-260

Abstract

All manuscripts for Feature Articles and Original Research must include an abstract not exceeding 200 words, which describes the scope, major findings and principal conclusions. The abstract should be meaningful without reference to the main text.

Images

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

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