Australasian Society for Ultrasound in Medicine

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This issue of the ASUM Ultrasound Bulletin is the last of Dr Glenn McNally's present term as Editor. From September Glenn will assume the office of President of the Australasian Society for Ultrasound in Medicine. We are very grateful to Glenn for his contribution over the past three issues. The new Editor is Dr Roger Davies of Adelaide.

A long-serving member of the editorial team has also retired. Margo Harkness has served as Assistant Editor since the inception of the Bulletin in 1998. Her input and drive has been an important factor in the success of the Bulletin. Louise Lee takes Margo's place on the editorial committee.

In this issue, Denise Ladwig reviews the imaging modalities available for the diagnosis of adenomyosis, a common gynaecological condition for which diagnosis is sometimes elusive. Lino Piotto, Roger Gent and Lloyd Morris present an overview of intussusception and the means that should be employed to extend the paediatric examination when the suspected intussusception is not found. Lynda Hopkins presents a useful protocol for quantitation of the left ventricle which students and practicing sonographers are likely to find most useful.

Anna Parsons' review "Principles of scanning the female pelvis", prepared as an introduction to her five talks at the 2002 O & G Conference is reprinted. These 5 talks are being released by ASUM on CD-Rom.

This issue features three case reports. Neil Pennell and Gary Pritchard present a rare combination of DORV, VSD and severe pulmonary stenosis. Louise Lee presents two cases not regularly seen by most sonographers. The first is a case of leiomyomatosis peritonealis disseminata; the second a case of umbilical metastases, frequently the first presenting sign in patients with unknown malignant disease.

This content, together with reports, notices and calendar items, represents excellent reading. Enjoy it, and please remember to record your learning in your MOSIPP record.

Keith Henderson
Co-Editor

Contents

President's message

This is the final President's column for my term of office. There are some major events and issues that I would like to record. Firstly, I would like to sincerely thank all members of various committees of ASUM for their continuing dedicated efforts. There have been some major changes within ASUM during the past two years, but these would not have occurred without the continuing support of Council and the Executive Committee. I would like to extend personal thanks to Mary Young (Honorary Secretary), Kaye Griffiths (Assistant Honorary Secretary), Janine Horton (Chair, DMU Advisory and Sonographer Affairs Committee) and Glenn McNally (Treasurer and President-Elect). We have been supported during the past year by an enthusiastic and highly professional Chief Executive Officer, Dr Caroline Hong. With her experience in the health industry, she has transformed the ASUM office and has been of tremendous professional benefit and support. Dr Glenn McNally will take over from me as President at the time of the 2002 Annual General Meeting. At that time Council and its committees will be formed as prescribed in the new constitution. All positions except for President and Immediate Past-President will be abolished and replaced with new members. Some Councillors have nominated to take office in the new Council, understanding that all terms of office begin from scratch. Councillors will serve for three years, while Treasurer and Honorary Secretary serve for one year. I shall be pleased to hand over Presidency to Glenn McNally's capable hands. He will retire from his position as Editor of the Bulletin, the role to be taken over by Dr Roger Davies.

Attendance at international conferences is an essential and important part of our life and career in medical ultrasound. I have been fortunate to have been invited this year to present lectures at quite different medical conferences. In April, I enjoyed the privilege of being a guest speaker at the JPR 32nd Annual Congress in Sao Paulo, Brazil. This was a fascinating experience that allowed the creation of good friendships and professional linkages. I attended this quite large and well-organised radiological congress at the invitation of the President Renata Mendonca MD, of the Paulista Radiological Society of Sao Paulo. This was a fully funded invitation and I participated as an international guest speaker, in my capacity as President of ASUM and as representative of the Safety Committee of the WFUMB. I presented a lecture on ultrasound-induced fetal intracranial heating and potential biological effects of diagnostic ultrasound. My host, Dr Giovanni Cerri, created opportunities to discuss issues relating to ultrasound safety with interested members and officers of the Federation of Latin American Ultrasound Societies (FLAUS). Drs Fernandez (President of FLAUS), Cerri and Mendonca extended an extremely warm and enthusiastic welcome and most generous hospitality to ensure a successful and memorable visit. I believe that the visit has helped to establish good linkages for future long-term professional association of our organisations. Dr Cerri is currently nominated for the position of President-Elect of WFUMB. In July, I attended the EUROSON conference in Warsaw as an invited speaker representing the WFUMB Safety Committee at a special session on safety of medical ultrasound. I was invited to speak on the contentious topic of the appropriateness of scanning live models at scientific conferences. The organisers covered the cost of conference registration. Later in July I attended the annual meeting of the New Zealand branch of ASUM in Hamilton, NZ. I presented a paper on trends in ultrasound safety. The overseas guest speaker was Dr Philipe Jeanty from Nashville, USA. The NZ branch deserves our sincere congratulations on running an interesting and successful meeting. The lecture room was packed to capacity throughout the meeting. Congratulations to Martin Necas, convenor.

In September of this year ASUM will host its annual scientific meeting on Queensland's Gold Coast. I am pleased to say that we have included Dr David Pilling, President of British Medical Ultrasound Society (BMUS) amongst the list of invited distinguished overseas speakers. On behalf of ASUM, I sincerely hope that this initiative will lead to the development of strong academic links and friendships between our professional societies. Dr Pilling is my counterpart in the UK, in terms of ultrasound society office bearer, and leads the EFSUMB bid to host the WFUMB World Congress of 2009 in Edinburgh. I wish him and his association the best of luck in their enterprise. However, I do believe that the ASUM and Sydney offer an attractive and cost-effective option that is hard to beat and which will appeal to a larger number of congress delegates, particularly from the Asia-Pacific region.

ASUM continues its commitment to develop linkages and to assist in the development of high standards of diagnostic ultrasound practice in our region. We have been approached by a range of organisations interested in forming academic alliances to promote the process of international education and accreditation. A number of linkages have been established with ASUM members already having the opportunity to participate in training programmes in the Asia-Pacific region. We have also enjoyed visitors to Australia. Dr Roger Davies has generously accepted short-term visits to the Queen Elizabeth Hospital, Adelaide. ASUM has a great deal to offer, particularly in terms of improving education and standards of practice in diagnostic imaging. I look forward to continuing to promote ASUM in achieving its goals of advancing standards of practice in our region.

Last but not least, I would like to thank my wife, Shirley, who has been a great support to me during my term as President.

Dr Stan Barnett PhD
President

From the desk of the CEO

Queen's Birthday Honours
Congratulations David Robinson and Mary Rickard

It was great news to hear that two ASUM members were mentioned in the Queen's Birthday list. We have not even recovered from celebrating with Kaye Griffiths AM for her award on Australia Day in January this year.

Dr David Errol Robinson was awarded Member of the Order of Australia (AM) on 10th June 2002 for service to science and medicine through the development of ultrasound technology and research into the clinical application of ultrasound in obstetrics. David was a founding member of ASUM and it is great to see his work and contribution to ultrasound recognized widely.

Dr Mary Theresa Rickard was awarded Member of the Order of Australia (AM) on 10th June 2002 for service to medicine through the integration of population-based screening of the early detection of breast cancer and the development of education programs for health professionals. Mary is well known in the ultrasound industry locally and internationally.

Letters of congratulations were sent to both David and Mary on behalf of members, Council and staff.

ASUM 2002 Annual Scientific Meeting
19-22 September 2002 Gold Coast

Registrations are still coming in for the ASUM 2002 Annual Scientific Meeting to be held at the Gold Coast at Conrad Jupiters. The Organising Committee has prepared an interesting program with strong scientific, clinical and social programs relevant for the continuing education of members and anyone with an interest in ultrasound. We are grateful to the positive response from our sponsors and exhibitors for this meeting. You can register online on www.icms.com.au/asum2002. We hope to see many members from Australia, New Zealand and overseas at this international meeting. All ASUM member registrants can claim up to 18 points in MOSIPP to fulfil their ASAR CPD requirements. The RANZCOG, RANZCOR, SDMS, RACP will also award points towards continuing education.

WFUMB 2009

As previously reported, ASUM is bidding to host the WFUMB 2009 Congress in Sydney. EFSUMB is also bidding to host this world federation meeting on Edinburgh. Preliminary presentation bids from ASUM and EFSUMB were made to the WFUMB Council in Nashville at the AIUM meeting in March this year. ASUM is actively planning the final presentation for June 2003 at the WFUMB 2003 Congress in Montreal. ASUM, as a society has a strong administrative and governance structure to host a world class congress in Sydney. Sydney has world class convention facilities, infrastructure and attractions which will support a successful world congress. It is hoped that the decision in June 2003 will be in favour of ASUM.

Asia Linkages - Singapore and Malaysia

The President and I were privileged to be invited speakers at the 5th International Asian Vascular Society Congress which was held in Singapore, to speak on the ASUM Asia Link program and promoting excellence in ultrasound. ASUM was one of the co sponsors of the AVS Congress. ASUM members featured highly as speakers and delegates at this meeting which was attended by about 400 people from 32 countries. Dr Alex Chao, an ASUM member in Singapore, was the Scientific Convenor who was responsible for putting together an interesting program which involved many members from ASUM.

Whilst in Singapore, we also met with representatives of the Medical Ultrasound Society of Singapore (MUSS), representatives of the ultrasound industry and various meetings partners. There is strong interest from the MUSS in working in collaboration with ASUM to promote the highest standards in ultrasound in medicine in the region through educational and professional activities.

We also met with several key leaders and representatives at the University of Malaysia, representatives of the Asian Federation Societies of Ultrasound in Medicine and Biology (AFSUMB) and the Malaysian Society for Ultrasound in Medicine (MSUM).

These connections and liaisons were supported by Council and focused at exploring ways for collaborative action to advance common objectives in promoting high standards in medical ultrasound in the region.

NZ ASUM 2002 in Hamilton

This meeting was successfully convened by Martin Necas with an attendance of more than 100 delegates at the Le Grand Hotel in Hamilton.

The keynote speaker, Philippe Jeanty was very informative and entertaining. ASUM is very grateful to the sponsors and the Organising Committee of the NZ Branch who made this meeting so successful. The President, Dr Stan Barnett and I were fortunate to be able to address the NZ members at the "Meet the President and CEO" session to update members on the activities of ASUM and fielded questions. Martin Necas and Mike Heath were presented with recognition awards for their services to ASUM at the Gala Dinner.

DMU Technical Seminar July 2002

ASUM ran a DMU Technical Seminar from 27-28 July 2002 in Sydney. It was essentially a physics top up program to assist candidates in the final stages of their preparation for the DMU part 1 and part 2 examination. ASUM is grateful to Mark Byrant, Mike Dadd, Louise Morris, Jane Fonda and Jill Clarke for their contribution at this seminar. This seminar was well attended and found to be highly valuable by the DMU candidates.

ASUM Interventional Workshop October 2002

This workshop is back by popular demand. We are grateful to Matthew Andrews for convening this workshop and members of the Education Committee for their contribution.

It will be held at the Aikenhead Conference Centre, St Vincent's Hospital, Melbourne. The Education Committee

with the support of Keith Henderson and Tim Brown, have put together an interesting and interactive program.

This workshop is intended to meet the needs of experienced clinicians as well as providing a helpful background for those beginning in the field, by providing a comprehensive understanding of current interventional applications of diagnostic ultrasound with practically orientated lectures, live scanning sessions and hands on practice using phantoms. Don't forget, you can claim CME points for your attendance. For information, please contact asum@asum.com.au

Council matters

The ASUM Council met on 18 May 2002 and some of the agenda items considered include:

- Adoption of new Constitution on 20 April 2002, with a new structure for Council effective from the next AGM
- The next AGM will be held on Saturday 21 September 2002 at the Gold Coast at Conrad Jupiters at 10.30am. Details are enclosed in this Bulletin.
- Expressions of interest for ASUM Committees and Boards of Examiners were encouraged from the membership.
- Release of the first ASUM Asia Link magazine which was proudly sponsored by Toshiba, Siemens Medical Solutions, GE Medical Systems, Philips Ultrasound, Sydney Convention & visitors Bureau, Perth Convention Bureau and the Burswood International Resort Casino (venue for ASUM 2003).
- ASUM's bid to host the WFUMB 2009 Congress in Sydney
- ASUM Booth at the AIUM/WFUMB 2003 Congress in Montreal, Canada.
- Budgets for 2002-2003 and 2003-3004
- ASUM Branches funding
- Subscription fees to remain unchanged for 2003-2004 financial year.
- Appointment of Gauld Tulloch Bove as Financial Auditors for the year ended 30 June 2002.
- New membership which continues to grow.
- ASUM 2002 international speakers
- ASUM Guidelines for reducing injuries to Sonographers / Sonologists, appearing in "ASA Sound Effects"
- DMU and DDU reports
- Branch reports
- Marketing and Public Relations media campaign of ASUM.

New Council structure

In accordance with the new Constitution, Council size will reduce from 19 to 12 effective from the next AGM on 21 September 2002. There will be 7 medical/scientist Councillors and 5 sonographer Councillors.

Membership renewal

We would like to thank all members who have renewed their membership promptly and taken advantage of the early bird discounts. This Society can only grow and remain strong with the support of its members. It is good to see many members promote the Society in their professional work and travels. ASUM is always grateful to members who encourage and introduce new members to the Society.

Any member who recommends or introduce 5 or more members to the society in any one year will receive an appropriate thank you gift from ASUM.

Member services

All members should have received a copy of the ASUM Image Database CD-Rom and the inaugural Asia Link Magazine with the previous issue of the ASUM Ultrasound Bulletin. The CD-Rom is a result of many hours of dedication from contributors and the Secretariat staff. We are also very grateful to our sponsors Toshiba, Siemens Medical Solutions, GE Medical Systems, Philips Ultrasound

Asia Link Magazine

To date about 4000 copies have been circulated widely in Australia, New Zealand, Asia and WFUMB Affiliated organizations. I am pleased to report the tremendous positive feedback on this new initiative. Again, I would like to acknowledge the support from our sponsors Toshiba, Siemens Medical Solutions, GE Medical Systems, Philips Ultrasound, Sydney Convention & Visitors Bureau, Perth Convention Bureau and the Burswood International Resort Casino.

It was very fulfilling to work on this new project and we welcome comments from the membership.

Thank you

I would like to thank Dr Stan Barnett, Dr Glenn McNally, Mary Young, Kaye Griffiths AM, Janine Horton and all members of Council for their support and assistance to the ASUM Secretariat Team.

I have particularly enjoyed working with a hardworking, decisive and forward thinking President who is supported by an equally dedicated Council.

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

Location Specific Practice Numbers (LSPNS)

New Federal Government Requirements

ASUM has just received advice that the Federal government will be introducing new requirements in the area of diagnostic imaging over the next 12 months.

It is proposed that in September 2002, a pre-registration form will be sent to all known providers of diagnostic imaging services and practice sites informing them of the changes and new requirements.

It is expected that in February 2003, HIC will forward LSPN registration packs for registration by 1 May 2003. The LSPN will then need to be quoted on patient accounts and claims from 1 May 2003 in order for patients to receive Medicare benefits.

For further information, please contact Ms Samantha Robertson A/g Director, Diagnostics and Technology Branch, Department of Health and Ageing on 02 62897315.

GE Medical Systems Adv
(repeat of last issue page 3)

Imaging features of adenomyosis

Dr Denise Ladwig B.MED MRANZCOG DDU, Fellow Medical Imaging, Royal Hospital for Women, Randwick NSW 2031

ABSTRACT

This review focuses on the imaging modalities available for the diagnosis of adenomyosis. Accurate diagnosis is essential for optimal management of patients. Adenomyosis is a common gynaecological condition, and both sonographers and sonologists should be familiar with the characteristic imaging features. Symptoms are non-specific and not helpful in diagnosis.

INTRODUCTION

Adenomyosis is a common benign gynaecological condition. Rokitansky[1] first described the condition in 1986. It is characterized by the presence of heterotopic endometrial glands and stroma within the myometrium, with secondary smooth muscle hypertrophy and hyperplasia[2]. It is unclear why smooth muscle changes are associated with the ectopic endometrium[3]. Imaging plays an important role in the diagnosis of adenomyosis. Clinical diagnosis can be difficult. Adenomyosis may be suspected in less than half of patients undergoing hysterectomy[4]. The signs and symptoms of adenomyosis are non-specific. Adenomyosis may present with menorrhagia, dysmenorrhoea, pelvic pain and infertility[5]. It may also be asymptomatic. The severity of symptoms correlates roughly with the extent of the disease. The precise cause of menorrhagia is unknown. The uterus affected by adenomyosis may have poorer contractility. Prostaglandins may also play a role, as administration of mefenamic acid reduces blood loss[6]. Adenomyosis may coexist with uterine myomas (19 – 56%), endometriosis (6 - 20%) and endometrial hyperplasia (6 – 43%)[7]. There is also an increased risk of endometrial adenocarcinoma[8]. Endometrial ablation is more likely to fail in the presence of adenomyosis. There are currently no diagnostic serum markers, although CA125 has been suggested as a screening technique[9].

Adenomyosis is commonly diffuse, although focal deposits also occur. In generalized adenomyosis, adenomyotic deposits are distributed widely throughout the uterus, typically commencing in the uterine fundus and then progressing towards the cervix. As myometrial involvement increases, the uterus gradually enlarges. The uterine contours and endometrial cavity are usually not deformed. Focal deposits of adenomyosis are known as adenomyomas. They are circumscribed nodular aggregates of smooth muscle and endometrial glands. Adenomyomas may be single or multiple. Adenomyomas must be distinguished from leiomyomas, which consist of bundles of smooth muscle cells arranged in an interlacing pattern. The distinction may become extremely important in decisions regarding clinical management. Surgical removal of an adenomyoma is extremely difficult or impossible, as there are no planes of cleavage with respect to the myometrium. The definitive surgical treatment for adenomyosis is usually hysterectomy. Leiomyomas compress the surrounding tissue, forming a pseudocapsule. They may be surgically removed (myomectomy), particularly if conservation of fertility is desired.

The pathogenesis of adenomyosis is poorly understood, with numerous theories proposed. Invagination of the basalis endometrium into the myometrium is currently favoured[6]; *de novo* development of adenomyosis from Müllerian rests in an extrauterine position is also a possible explanation. The trigger for such invasion or transformation remains unknown. Hyperestrogenism and impaired immune-related growth control in the ectopic endometrium may contribute. Adenomyosis usually atrophies after menopause.

The exact incidence of adenomyosis is uncertain. Adenomyosis is fundamentally a histopathologic diagnosis. Adenomyosis is reported to occur in 5– 70 % of hysterectomy specimens[5]. The incidence is dependent on the histological criteria used, the selection of specimens evaluated, and the thoroughness of pathologic examination. Adenomyosis is found in 10-50% of postmortem examinations. Benson and Sneeden[10] suggested that the endometrium must extend from the basalis into the myometrium by at least 2 low-power fields (8mm). Bird *et al.*[11] found adenomyosis in 61.5% of 200 consecutive hysterectomies, although half their cases occurred less than one low-power field below the basal endometrium.

HYSTEROSALPINGOGRAPHY

Hysterosalpingography may demonstrate a spiculated, tuft or lollipop-like pattern[12]. Goldberger *et al.*[13] described numerous short spicules (1-4mm) extending from the endometrial cavity into the myometrium in 38 of 150 patients with proven adenomyosis, during hysterosalpingogram. The poor sensitivity and specificity of this technique limits its usefulness as a diagnostic procedure. It is difficult to differentiate these changes from patterns produced by vascular or lymphatic extravasation[14]. Hysterosalpingography is no longer used for the diagnosis of adenomyosis.

TRANSABDOMINAL ULTRASOUND

Transabdominal ultrasound has proven to be an inconsistent means of diagnosing adenomyosis. The subtle changes of adenomyosis are not easily detected with the resolution provided by transabdominal ultrasound. Most studies analyzing the role of abdominal ultrasound have been small, thus limiting their usefulness. Walsh *et al.*[15] found 5 – 7 mm irregular sonolucent zones within the myometrium of nine women (honeycomb pattern). Subsequent pathology available on 4 patients suggested that these spaces were due to blood filled cavities. In a study of 80 women assessing the role of abdominal ultrasound, Siedler *et al.*[7] found that transabdominal ultrasound had a sensitivity of 63%, specificity of 97% and a positive predictive value of 71% in preoperative diagnosis. Buli *et al.*[16] did not detect adenomyosis using transabdominal ultrasound.

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TRANSVAGINAL ULTRASOUND

Transvaginal ultrasound has improved the detection of adenomyosis, although visualization may be impeded by coexisting pathology such as leiomyomas. The limited scanning distance of transvaginal ultrasound occasionally limits evaluation of the entire uterus, if the uterus is greatly enlarged. Changes are often subtle and missed unless specifically looked for. Diagnosis is most accurate during real-time assessment rather than using hard-copy images. This leads to a lack of reproducibility, making serial assessment of an individual patient difficult. Several findings on transvaginal ultrasound have been reported in the literature. These include uterine enlargement not explained by the presence of leiomyomas, asymmetric thickening of the anterior or posterior myometrial walls, lack of contour abnormality or mass effect, heterogeneous poorly defined areas within the myometrium, small myometrial cysts, and increased myometrial echotexture. Bromley *et al.*[17] studied 51 women suspected of having adenomyosis. 43 women had pathologically confirmed adenomyosis. All patients had a mottled heterogeneous appearing uterus, 95% had a globular uterus, 82% had small myometrial lucent areas, and 82% had an indistinct endometrial stripe (Figures 1 and 2). Brosens[2] found endovaginal ultrasound had a sensitivity of 86%, specificity of 50% and positive predictive value of 86%. In their study, poorly defined myometrial heterogeneity was the best predictor of adenomyosis. Reinhold *et al.*[18] reported a sensitivity and specificity of 86% in 100 women undergoing hysterectomy. Asymmetry of the uterus may be noted, as the posterior wall tends to be more commonly affected than the anterior wall. Fedele[19] described small anechoic myometrial lakes (1-3mm). The lacunae should be distinguished on colour or power Doppler from dilated veins, which are usually in the outer myometrium. These lacunae may represent small areas of focal haemorrhage or glandular secretions, however the glandular components are generally basal in nature and do not respond to cyclic hormonal change[20]. In addition, it would seem that the implants are not particularly prone to haemorrhage[10]. It has been suggested that the changes in myometrial echotexture are due to smooth muscle changes within the adenomyosis[19]. Reinhold *et al.*[18] did not demonstrate myometrial cysts in patients without adenomyosis. Botsis *et al.*[21] evaluated transvaginal ultrasound for the differentiation of adenomyomas from leiomyomas. Lesion margin, lacunae and echogenicity were useful for distinguishing between these entities. Adenomyomas typically appear as non-homogeneous circumscribed areas within the myometrium, with poorly defined margins, and containing hypoechoic lacunae (Figures 3 and 4). Leiomyomas typically appear as well circumscribed nodules within the myometrium, with distinct margins and heterogeneous texture. Lacunae were noted in fewer than 10% of patients with leiomyomas. These investigators found that by using the appearance of the margin and the presence or absence of lacunae, 95% of leiomyomas could be correctly diagnosed with transvaginal ultrasound[21]. Bromley *et al.*[17] also found lacunae in some patients with leiomyomas and suggests these may be secondary to cystic degeneration.

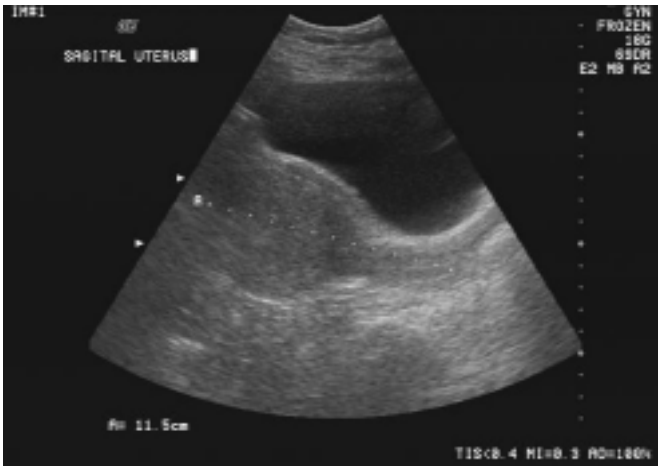

Figure 1 Globular uterus on transabdominal ultrasound

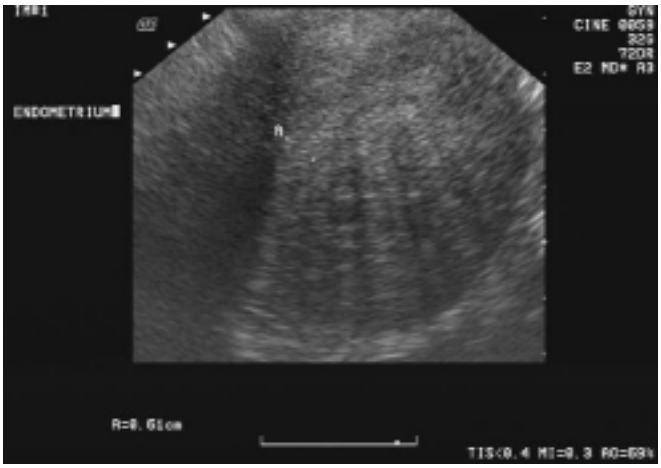

Figure 2 Indistinct endometrial stripe and heterogeneous myometrium on transvaginal ultrasound.

Colour Doppler assessment may help in differentiating adenomyosis and leiomyomas[22]. Leiomyomas usually have one or two outer circumferential feeding arteries with few intratumoral vessels. Small tumour size and uterine contractions can affect visualization of blood flow in leiomyomas. In adenomyosis, the vascular architecture generally appears unremarkable, with either randomly scattered vessels or intratumoral blood flow seen. There is conflicting data regarding the relationship between blood flow impedance and uterine tumours. Hirai *et al*[23] could not find a statistical difference in resistive index (RI) and peak systolic velocity between adenomyosis and leiomyomas. Chiang *et al.*[22] found that 82% of adenomyosis had a pulsatility index (PI) of arteries within or around uterine tumours >1.17, whereas 84% of leiomyomas had a PI <1.17. The authors suggest that using the PI will improve diagnostic accuracy, rather than using morphologic criteria alone.

The indistinct endometrial stripe commonly noted with adenomyosis limits assessment of the endometrium. This is a potential problem, particularly as endometrial hyperplasia and carcinoma are thought to occur more frequently with adenomyosis[5, 8]. Bromley *et al.*[17] found endometrial abnormalities in 12% of their study patients, including 2 with endometrial carcinoma. Saline infusion sonography (SIS) may improve visualization of the endometrial cavity.

MAGNETIC RESONANCE IMAGING (MRI)

The cost and limited availability of MR imaging in Australia limit its general applicability for the diagnosis of adenomyosis. Reports in the literature are conflicting regarding the accuracy of MR imaging compared to sonography. MR imaging may be more sensitive and specific than transvaginal ultrasound[24], although some investigators have found that transvaginal ultrasound and MR imaging have similar sensitivity and specificity[18]. An advantage of MR imaging over sonography is its reproducibility, as standard images are produced. On MR imaging, adenomyosis appears as an area of predominantly decreased signal intensity compared with that of the outer myometrium. On T2-weighted images, diffuse adenomyosis appears as a thickening of the functional zone and focal adenomyosis as a low-signal-intensity mass poorly delineated from the adjacent myometrium. Diagnostic criteria used for adenomyosis in MR imaging are controversial. Twelve millimetres has been suggested as the upper limit of normal junctional zone thickness[18], however difficulty measuring the junctional zone is reported in up to one third of women with pathologically proven adenomyosis[25]. Other authors propose using junctional zone thickness of greater than 5mm[26], although this tends to produce a high false positive rate[27]. In adenomyosis, the interface between the surrounding myometrium is usually poorly defined and infiltrative with minimal distortion of the uterine contours or endometrial cavity. Leiomyomas are usually well defined with a greater mass effect. Adenomyomas can mimic leiomyomas or even endometrial polyps on MR imaging[28]. Mark *et al.*[26] correctly diagnosed adenomyosis in 8 of 21 premenopausal patients using MRI. Togashi *et al.*[29] evaluated MR imaging in 93 patients with uterine enlargement secondary to adenomyosis and leiomyomas. MRI correlated well with pathologic diagnosis in 92 cases. In only one case, it failed to distinguish between adenomyomas and degenerate leiomyomas. In a prospective study with double-blind comparison, Reinhold *et al.*[18] found transvaginal ultrasound was as accurate as MR imaging in the diagnosis of diffuse adenomyosis, however they stress the importance of meticulous ultrasound examination. These investigators found a sensitivity and specificity of 89% for transvaginal ultrasound and 86% for MR imaging, a positive predictive value of 71% for transvaginal ultrasound and 65% for MR imaging, and a negative predictive value of 96% for transvaginal ultrasound and 95% for MR imaging. Bazot *et al.*[25] also found that transvaginal ultrasound was as effective as MR imaging for the diagnosis of adenomyosis however sonography was less sensitive when adenomyosis was associated with leiomyomas. Both ultrasound and MR imaging seem to correlate poorly with histopathology regarding the grade and degree of adenomyosis. If the uterus is large, exceeding 400ml in volume, neither transvaginal ultrasound or MR imaging may accurately detect adenomyosis[30].

CONCLUSION

Adenomyosis is a common condition. Until recent years, it has proved an elusive diagnosis, depending on histopathologic examination of hysterectomy specimens. Improvements in imaging technology, particularly transvaginal ultrasound and magnetic resonance imaging, has led to increased diagnosis of adenomyosis before surgery. For most patients, transvaginal ultrasound will accurately demonstrate the characteristic changes of adenomyosis. Some patients may benefit from additional imaging with MR imaging, especially when fertility-sparing surgery is contemplated. MR imaging may also be useful for monitoring disease progression or regression during hormonal therapy. Accurate diagnosis is essential to effective clinical management

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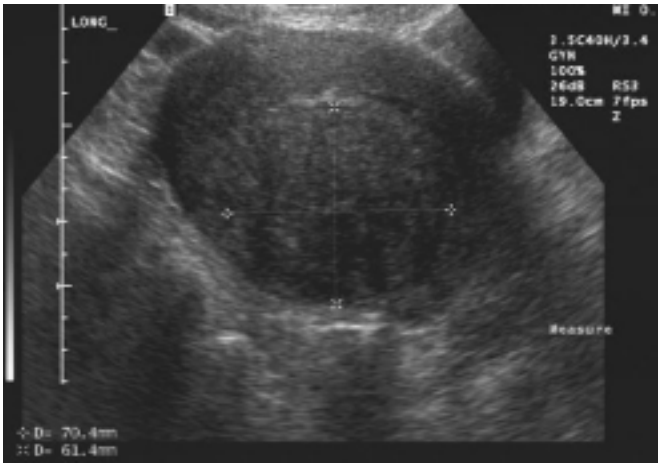

Figure 3 Adenomyoma in posterior corpus of uterus on transabdominal ultrasound (longitudinal axis)

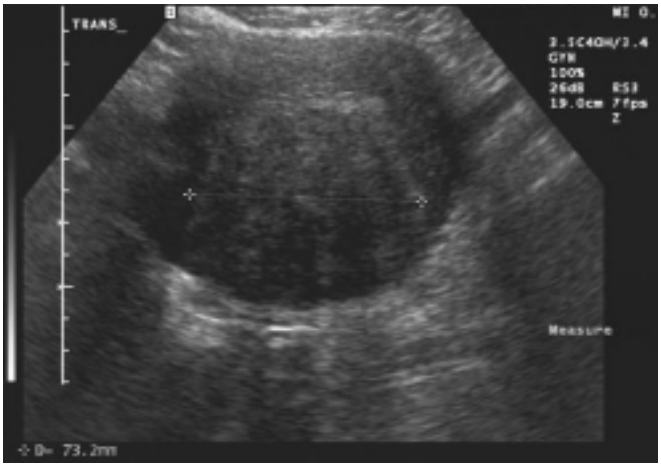

Figure 4 Adenomyoma in posterior corpus of uterus on transabdominal ultrasound (transverse axis)

Sonography of paediatric patients with suspected intussusception

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ABSTRACT

The use of ultrasound in the detection and exclusion of intussusception in children clinically suspected of having this condition is now well recognised. The mean age at presentation is 18 months. The duration of symptoms is typically less than 48 hours and these would include colicky abdominal pain, blood and mucous per rectum and vomiting. However, not all children clinically suspected of suffering from intussusception have this condition.

When ultrasound examination does not reveal an intussusception then the examination should be extended to look for other causes of the patient's signs and symptoms. Abdominal masses, renal tract disease, pancreatitis, malrotation(+/- volvulus), appendicitis and gastroenteritis can all cause signs and symptoms suggestive of intussusception.

In our experience ultrasound has been extremely sensitive in the detection of intussusception and in the detection of other causes for the patient's symptoms (surgical and non-surgical).

In the instances that no intussusception is found we feel the ultrasound examination should be extended to try to identify other pathology. At the Women's and Children's Hospital, Adelaide, ultrasound has now become routinely used for the investigation of children clinically suspected of suffering from intussusception. This paper will demonstrate a range of pathologies we have found in patients presenting with signs of intussusception.

WHAT IS INTUSSUSCEPTION?

Intestinal intussusception is one of the most common causes of abdominal emergency in early childhood[1-3]. In this condition, a portion of bowel wall invaginates into the portion of the bowel immediately distal to it. The central invaginated bowel is termed the intussusceptum and the surrounding returning bowel and exterior ensheathing bowel is termed the intussuscipiens (Figure 1).

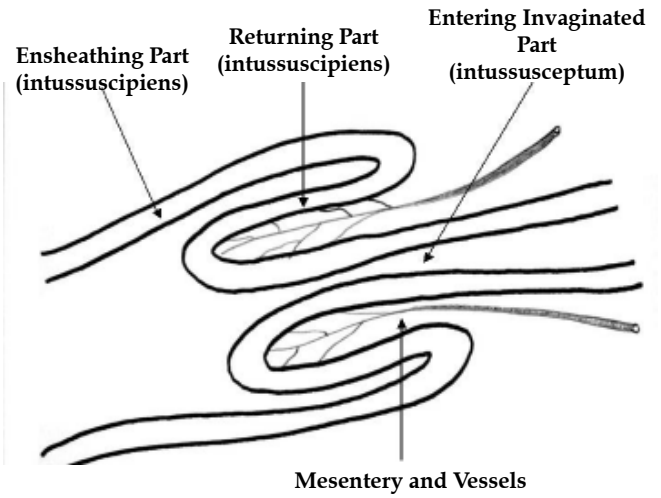

Figure 1 Schematic diagram of an intussusception.

Intussusception occurs most commonly in the first two years of life but is occasionally seen in older children and adults. It is thought that most cases arise as a result of hyperplasia of Peyer's patches, causing swelling in the intestinal wall, which is pushed distally by peristalsis, dragging the wall of the bowel with it. Support for this suggestion comes from the frequent occurrence of intussusception in acute mesenteric adenitis[4].

The invaginating process tends to be progressive once it has started and the blood vessels which supply the bowel are dragged into the intussusception. As the condition advances, interference with the blood supply of the intussuscipiens causes venous occlusion and subsequent mucosal congestion, resulting in blood stained mucosa passing through the rectum. Progressive constriction obstructs arterial flow and gangrene of the bowel wall ensues[5]. Perforation and peritonitis may then result, causing morbidity and ultimately death of the child if left untreated.

The commonest location is at the ileocaecal juction, where the ileum invaginates into the large intestine, with the ileocaecal valve forming the apex.

The main clinical features are intermittent attacks of colic and the passage of blood and mucus per rectum. A sausage shaped tumour may be palpable in the abdomen. Later there is vomiting due to intestinal obstruction. The diagnosis can usually be made clinically, but when the clinical signs are not clear-cut, intussusception remains a difficult condition to diagnose.

The characteristic ultrasound appearances of intussusception are well known[1-3, 6-13]. The classical 'concentric rings sign' is seen in the transverse view whilst in the longitudinal view, the appearance has been described as the 'pseudo-kidney sign' (Figures 2a and 2b).

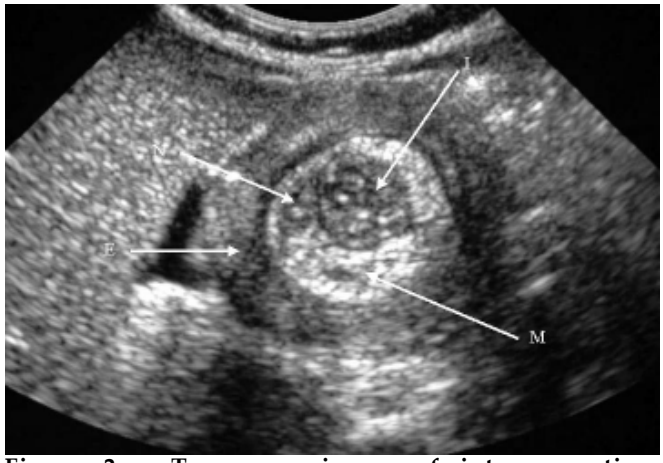

Figure 2a Transverse image of intussusception, I=Intussusceptum, N= mesenteric lymph node, E= Intussuscipiens, M= mesentery

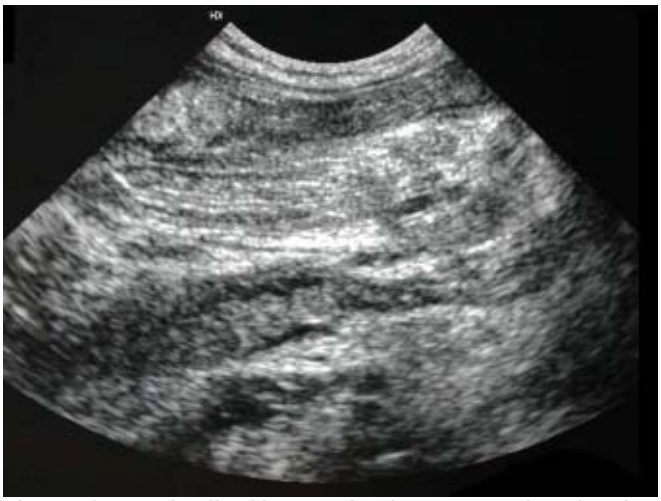

Figure 2b Longitudinal image of an intussusception showing the pseudokidney sign

Ultrasound is very reliable in excluding intussusception, but when this has been done the examination should be extended to look for other pathologies. The following examples of pathology have been found in patients who underwent an ultrasound examination for suspected intussusception.

PYELONEPHRITIS

Case 1. This 12 month old patient presented with screaming attacks of colic and a right palpable abdominal mass. Plain abdominal radiographs were performed, which revealed the presence of a soft tissue mass in the right flank, thought to represent an intussusception. Ultrasound examination showed no evidence of an intussusception, but revealed an enlarged echogenic right kidney (Figure 3). This kidney measured over seven centimetres in length, well above the 95th percentile for a child of 12 months. In this case ultrasound made the correct diagnosis of pyelonephritis and prevented an unnecessary diagnostic enema.

Other renal tract pathology which we have found in children clinically suspected of having an intussusception includes pelvi-ureteric junction obstruction, cystitis, mesoblastic nephroma and ectopic pelvic kidneys.

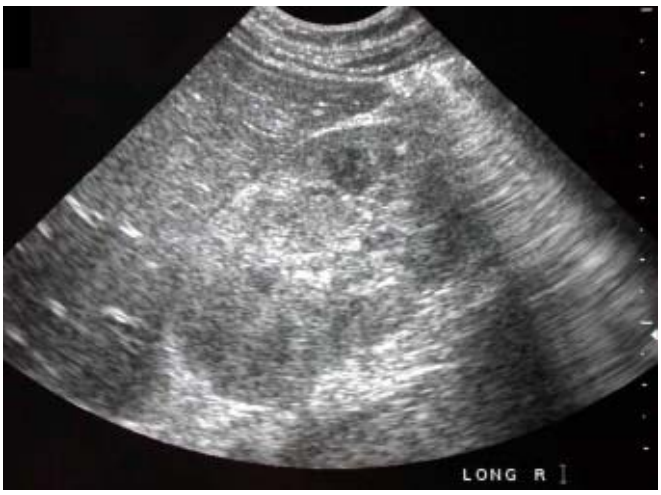

Figure 3 Longitudinal image of right kidney with pyelonephritis

APPENDICITIS

Case 2. In this case the Barium Enema was negative for intussusception but showed an abnormal filling defect indenting the caecum. This defect was evaluated with ultrasound, confirming the absence of an intussusception. Additionally the ultrasound examination did reveal an enlarged inflamed appendix which was bulging into the caecum (Figure 4).

Had the ultrasound been done in the first instance, the enema would have been unnecessary.

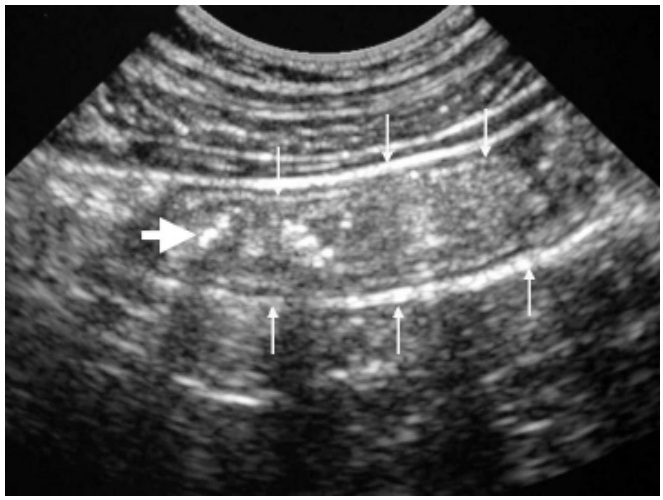

Figure 4 Longitudinal image of appendix (arrows) with an appendicolith (arrow head)

HAEMOLYTIC URAEMIC SYNDROME

Case 3. An eight month old child presented with symptoms of intussusception which was excluded by ultrasonic examination. However it was noted that the wall of the colon was considerably thickened (Figure 5). This appearance is consistent with several conditions, but in a child of this age it would most likely be caused by haemolytic uraemic syndrome (HUS). In this condition there is an abnormal activation of the clotting mechanism leading to vasculitis and wall thickening in the bowel. This patient was discharged, but readmitted 4 days later with renal failure, at which time HUS was confirmed.

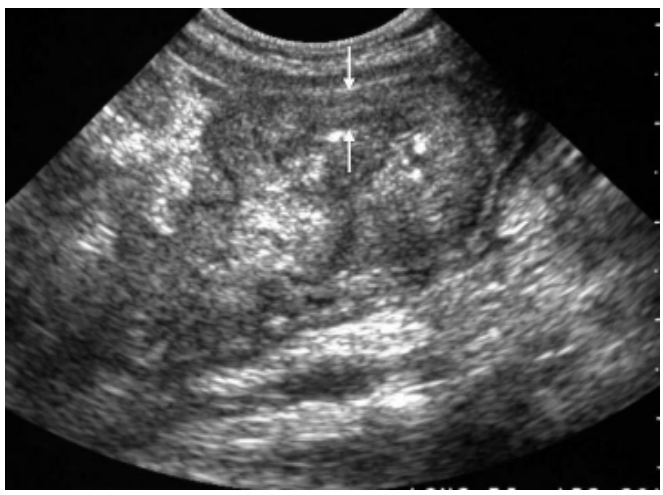

Figure 5 Longitudinal image of ascending colon with HUS. Note the thickening of the bowel wall (arrows)

GASTROENTERITIS

Case 4. A two year old child presented with screaming attacks of colic thought to be due to intussusception. Plain abdominal radiographs showed some fluid filled loops of small bowel but no soft tissue mass lesion. An abdominal ultrasound was performed, which confirmed the presence of multiple fluid filled small loops of bowel, and demonstrated a fluid distended colon (Figure 6). These features are consistent with gastroenteritis. With careful scanning technique, we can be confident there is no surgical condition present.

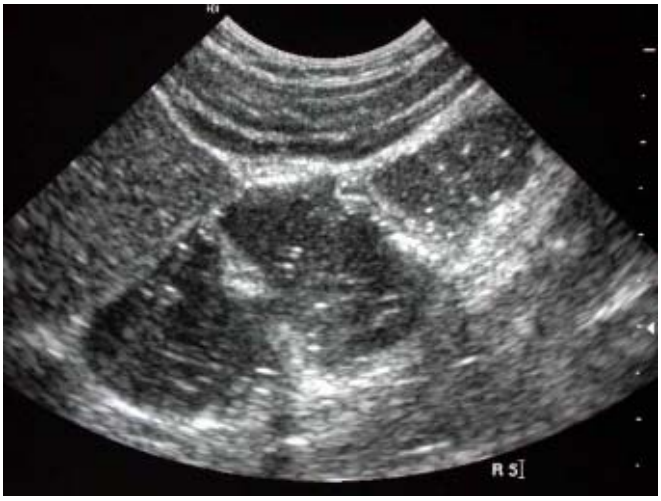

Figure 6 Longitudinal image of fluid filled ascending colon

MALROTATION

Case 5. Another condition which can commonly present with these symptoms is malrotation of the intestine, resulting from failure of the gut to undergo its normal 270 degree anti-clockwise rotation in the first trimester. Ultrasound examination in this two day old patient showed no intussusception. Transverse imaging showed reversal of the normal SMA/SMV relationship with the SMV to the left of the SMA (Figure 7). This is consistent with a midgut malrotation. Also this patient displayed the ultrasonic 'Whirlpool sign'[14] suggestive of a volvulus. Barium Meal confirmed the ultrasonic diagnosis of midgut malrotation with volvulus.

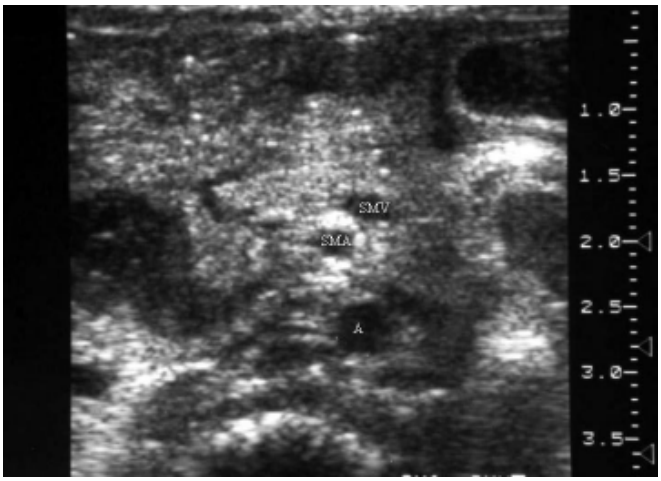

Figure 7 Transverse image of upper abdomen showing reversal of SMA and SMV. A= Aorta, SMA= superior mesenteric artery, SMV= superior mesenteric vein

PANCREATITIS

Case 6. Sometimes symptoms do not relate to the urinary tract or gut, as in this child where ultrasonic evaluation of the abdomen showed no intussusception, but did reveal a swollen pancreas, consistent with pancreatitis (Figure 8). Again ultrasound demonstrated its ability to exclude the need for surgical intervention.

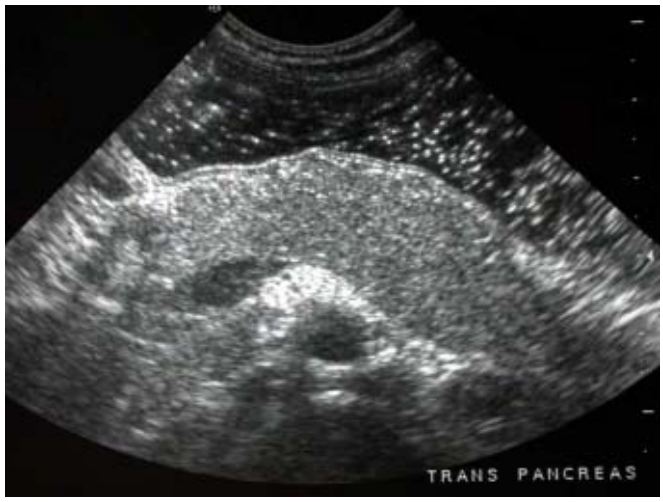

Figure 8 Transverse image of enlarged pancreas

FOREIGN BODY

Case 7. One of the more bizarre causes of a suspicion of intussusception was found in this 1 year old boy who presented with vomiting and colicky abdominal pain. Plain abdominal radiographs showed evidence of a small bowel obstruction. Ultrasound examination of the abdomen revealed multiple dilated small bowel loops, but no evidence of an ileo-colic intussusception. Distally within the small bowel however, there were two ovoid, solid, filling defects, of relatively homogeneous echogenicity (Figure 9), and of uncertain significance. After questioning the mother of the child, the full clinical picture was ascertained. She revealed that her son had vomited up two whole, dried apricots, after having swallowed four of five of them whole. This unusual ultrasound appearance is thought to represent swollen, ingested, whole dried apricots which have caused a small bowel obstruction.

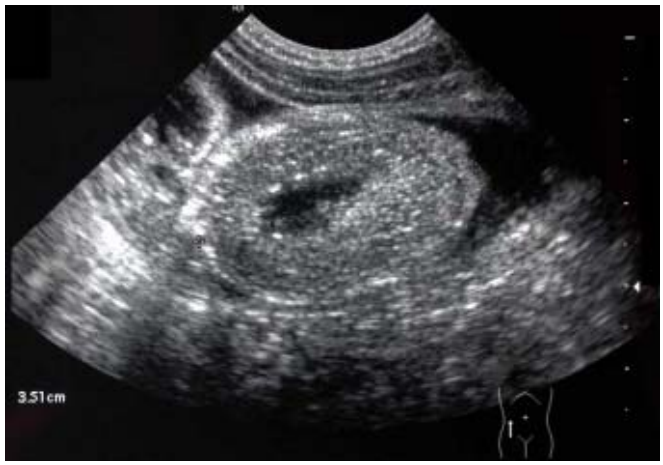

Figure 9 Longitudinal image of lower abdomen showing foreign body within small intestine

MESENTERIC ADENITIS

Case 8. When all other causes for the patient's signs and symptoms have been excluded, a diagnosis of mesenteric adenitis may be possible. This of course is helped by the presence of enlarged mesenteric lymph nodes, throughout the abdomen (Figure 10). We don't routinely re-scan these children as mesenteric adenitis is normally a benign, self limiting disease. In the presence of enlarged lymph nodes however, the possibility of malignancy should also be considered.

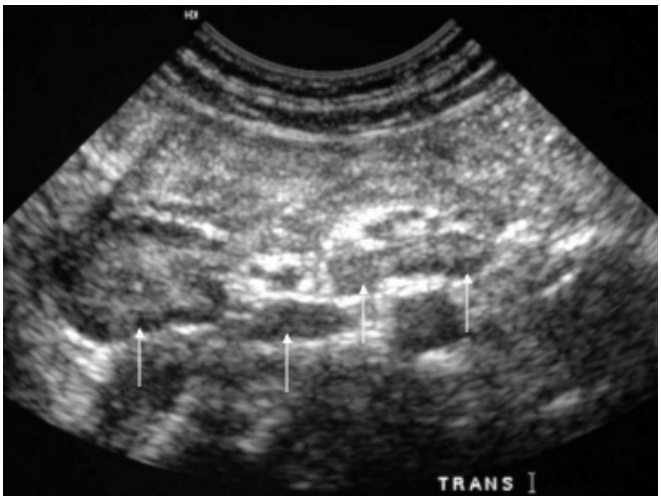

Figure 10 Longitudinal image of lower abdomen showing enlarged mesenteric lymph nodes (arrows)

CONCLUSION

Ultrasound has proven very reliable in the detection/ exclusion of intussusception. When ultrasound examination does not reveal an intussusception then the examination should be extended to look for other causes of the patient's signs and symptoms. Abdominal masses, renal tract disease, pancreatitis, malrotation(+/- volvulus), appendicitis and gastroenteritis can all cause signs and symptoms suggestive of intussusception.

With good scanning technique, ultrasound can reliably provide an alternate diagnosis which can then allow appropriate treatment.

We believe the use of barium/air enemas may be avoided by the use of ultrasound as a diagnostic test for intussusception. This is significant because Barium enemas give each patient an effective radiation dose of approximately 2-4 mSv, which equates to approximately 150-200 chest x-rays. Radiation dose to the radiologist, radiographer, nurse, surgeon and parents, may also be avoided.

In our experience ultrasound has been extremely sensitive (sensitivity 100%, specificity 100%) in the detection of intussusception, and also in the detection of other causes for the patient's symptoms, surgical and non-surgical.

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Leiomyomatosis peritonealis disseminata: a case report

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Leiomyomatosis peritonealis disseminata (LPD) is a rare disorder characterized by multiple subperitoneal smooth muscle nodules[1,2]. It is most commonly seen in women of reproductive age[2-4] and is frequently associated with pregnancy or oral contraceptive use[2,4-6]. Less frequent associations have been reported with the use of tamoxifen[4,7], oestrogen producing ovarian tumors[4,5,7,8] and endometriosis[2,8]. The following report describes a case of LPD in a woman who, while still of reproductive age, had no other associated risk factors.

CASE HISTORY

A 40 year old female presented with increasing lower abdominal fullness and cramping relieved by menstruating. She was gravida 2 para 2, with her 2 children being 15 and 12 years of age. She had no history of weight loss or decrease in appetite. She was not on the oral contraceptive pill and used no regular medication. Her previous surgical history included a hysteroscopic fibroid polypectomy 5 years ago, followed by a left breast lumpectomy 6 months later. Pathology demonstrated a leiomyoma and a fibroadenoma respectively.

RADIOLOGICAL FINDINGS

On ultrasound the uterus was normal in size, shape and echotexture with a thin endometrial thickness. The ovaries were not identified. Multiple (>10) round, well defined, hypoechoic mass lesions of varying size were present bilaterally in the adnexa. The largest was 4.5 cm in transverse diameter. The liver contained a 5 mm cyst with no visual evidence of metastatic disease. No ascites was present.

Findings were regarded as being of multiple lymph nodes involving the internal and external iliac chains. Differential diagnosis included lymphoma, peritoneal carcinomatosis, differentiated leiomyosarcoma, metastatic disease and endometriosis.

The patient then progressed to computed tomography (CT) to identify if any of the lesions involved the bowel. Again multiple low attenuating nodules were seen in the pelvis with some of these masses being related to the bowel and adjacent mesentery.

MANAGEMENT

Blood tests were performed to look for tumor markers. The serum CA 125 was elevated with a result of 59 kU/L (normal < 30 kU/L). The other routine blood tests were unremarkable.

Using ultrasound guidance, an attempt was made to biopsy two of the pelvic lesions. The lesions were relatively mobile and biopsy was unsuccessful. As such the patient underwent a diagnostic laparoscopy and biopsy. The pathological findings were consistent with LPD. The upper abdominal organs appeared free of disease.

Due to the extensive nature of this presentation, the patient's previous history of intrauterine leiomyoma requiring removal and the increasing level of the patient's pain, radical resection of the lesions was performed. Surgery included a total abdominal hysterectomy, bilateral salpingo-oophorectomy, debulking of multiple fibroids on the sigmoid colon, small bowel and pelvic peritoneum, appendectomy, infracolic omentectomy and para aortic/iliac lymph node sampling. All visible disease was excised.

SURGICAL/PATHOLOGICAL FINDINGS

Multiple nodules of up to 5 cm were removed from the omentum, the peritoneum of the small and large bowel, on both pelvic walls and within the pouch of Douglas.

Macroscopically the uterus was bulky and the ovaries appeared normal. The aortic lymph nodes were enlarged. The removed nodules were firm with a white, smooth, rubbery surface.

Microscopically the nodules consisted of smooth muscle bundles consistent with LPD. Similar cells were present within the sigmoid and small bowel nodules, the appendix, the omentum, the pelvic side wall, the uterus, both fallopian tubes and both ovaries. The mitotic count was less than 2 per 10 high-power fields, which is not histologically malignant. There was also no evidence of malignancy in the para aortic or iliac nodes.

PATIENT OUTCOME

The patient has had an uncomplicated postoperative course. At 12 months post surgery the patient is doing well with no evidence of recurrence of her disease.

DISCUSSION

Clinical presentation

Although many of the documented cases of LPD have been discovered incidentally during surgery, others may present with symptoms such as pain[3,5,9], palpable lump[3,4,10], irregular uterine bleeding[4,10], urinary frequency due to mass effect on the bladder, urosepsis secondary to obstruction of the ureters by the pelvic mass[1,10] and gastrointestinal bleeding and peritonitis following implantation into the bowel wall[1,9].

Pathogenesis

The pathogenesis of LPD remains uncertain. The following possibilities have been postulated.

1. That LPD results from the predisposition of subperitoneal mesenchymal stem cells to differentiate into smooth muscle cells[1]. Due to the frequent association with pregnant women or those taking oral contraceptives[1,5], this proliferation is believed to be stimulated by oestrogen[4].
2. LPD has occasionally been diagnosed in post menopausal women[2,5] and in patients who have not taken hormonal

therapy, as well as reoccurring in those who have undergone surgical excision of LPD lesions[5]. Therefore it has also been hypothesized that LPD may result from an increased tissue sensitivity to normal and diminished levels of oestrogen and progesterone[1, 11]. Of interest there has even been one reported case of LPD in a male[12].

Imaging features

While there is a relatively extensive amount of literature addressing the pathological diagnosis of LPD, little has been written about the radiological features. This may be due to many of the cases of LPD being diagnosed after an incidental finding during laparoscopy/laparotomy.

In particular the use of ultrasound is rarely documented. As this case demonstrates, ultrasound is also capable of identifying the presence of such lesions. While ultrasound is sensitive to the identification of such nodules, it is very nonspecific. Findings on ultrasound will depend on the location, size and number of subperitoneal nodules present. Lesions are usually solid, but their echocharacteristics may vary. Most commonly LPD appears as multiple, well circumscribed, homogeneous, hypoechoic lesions[3] (Figure 1). With an echogenicity similar to uterine parenchyma they mimic uterine leiomyomas (Figure 2). Conversely pedunculated leiomyomas arising from the uterus may give the appearance of LPD[1]. If LPD nodules are located adjacent to the iliac vessels they can be confused with lymphadenopathy (Figures 3 and 4). Likewise, if the lesions are diffusely spread throughout the abdomen and pelvis they may be confused with peritoneal carcinomatosis. In

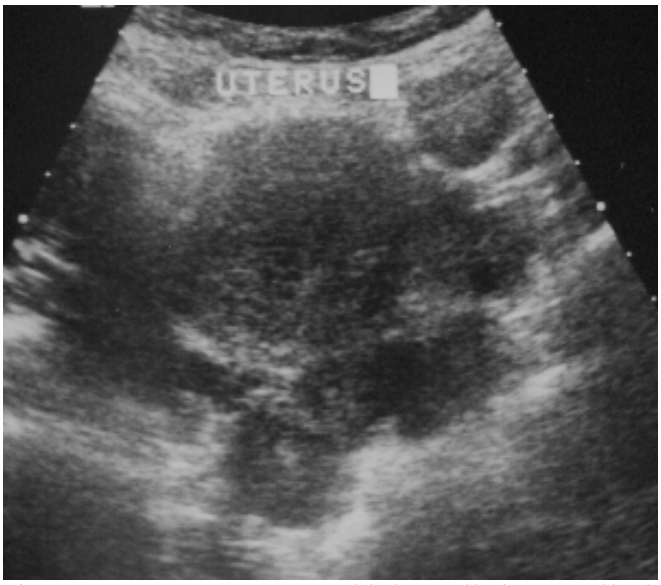

Figure 1 LPD appears as multiple, well circumscribed, homogenous, hypoechoic lesions. Seen here adjacent to the transverse uterus

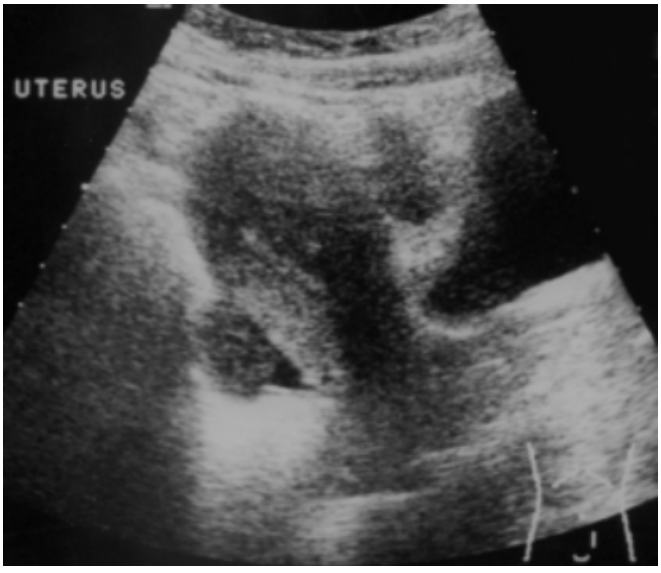

Figure 2 LPD is commonly isoechoic with the uterine parenchyma. As such it may mimic pedunculated leiomyomas arising from the uterus

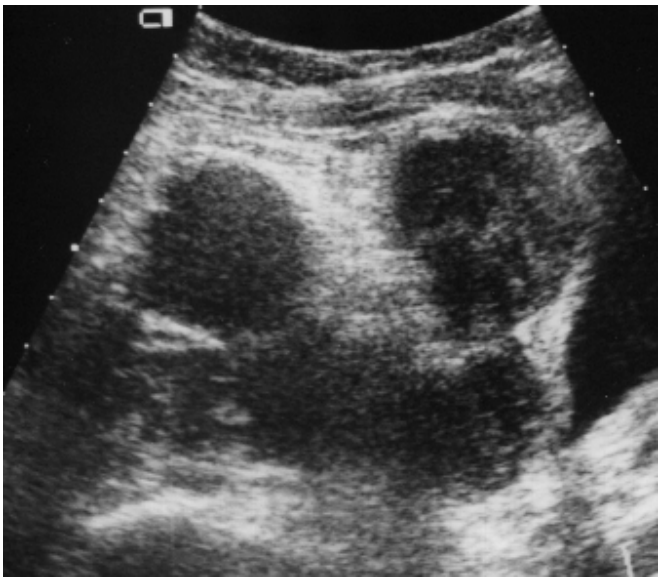

Figure 3

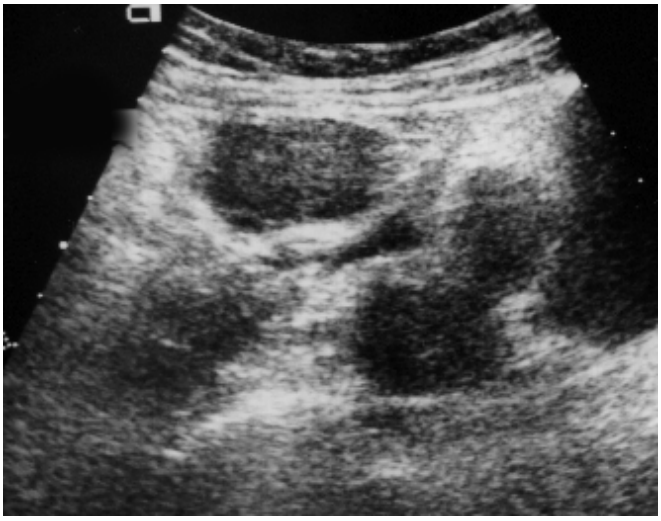

Figure 4

Figures 3 and 4 Multiple LPD nodules located in both adnexa.

such cases however, ascites and liver metastases are usually also present. Such findings are not reported to be associated with LPD[1, 3]. As such LPD may be suggested as a possible diagnosis preoperatively.

Ultrasound may also have a role in guiding biopsies for histological sampling and in serial assessment of lesions if treated conservatively.

On CT and MRI, LPD appears as multiple solid masses dispersed throughout the pelvis. On unenhanced T1-weighted MRI images, LPD masses have a similar signal intensity to skeletal muscle or uterine parenchyma. With the administration of gadolinium, enhancement is varied. As such the use of intravenous contrast is of little diagnostic value in determining LPD. On T2-weighted images the signal intensity remains low due to the smooth muscle component[1].

While radiological means will identify the presence of multiple nodules, it should be stressed that radiological impression is only an indicator of possible diagnosis. Histological assessment is the only true method of definitive diagnosis. However, as this rare condition is being reported with increasing frequency, familiarity with its imaging features is necessary to suggest the possibility of such a diagnosis in the appropriate clinical setting.

CA 125 as a marker for LPD

The use of CA 125 as a tumor marker is also fairly nonspecific. While it is a marker for serous ovarian carcinoma, it may also be elevated in other malignancies such as those of hepatic, pancreatic, gastrointestinal, lung or gynaecological origin. Of note is that CA 125 can also be elevated in the case of non-malignant conditions that involve the peritoneum or pleura. As such CA 125 cannot be used as a marker to differentiate between LPD and malignant tumors such as peritoneal carcinomatosis[13].

Therapeutic options

Due to the varying course of LPD its management is still controversial. Since LPD frequently regresses after reduced exposure to oestrogen (post partum and withdrawal of oral contraceptives) many treat LPD conservatively[3,4]. However, while the majority of LPD cases are benign there have been a few reported cases of malignant transformation[2,9]. As such other clinicians advocate aggressive surgical excision, especially in postmenopausal women or patients not desiring more children.

CONCLUSION

This case demonstrates a rare condition in which an essentially benign disease can take on the characteristics of a metastatic disease. Due to the possibility of LPD mimicking peritoneal carcinomatosis on imaging studies and at surgery, it is important to be aware of this entity and its features on ultrasound. While the sonographic appearance of LPD may appear ominous (multiple nodules dispersed throughout the pelvis and abdomen), the absence of ascites or liver metastases should allow the suggestion of LPD as a possible preoperative diagnosis.

ACKNOWLEDGMENT

I wish to thank Dr. Tom Snow and Ms Margo Harkness for reviewing this report.

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Umbilical metastases or Sister Mary Joseph's nodules: A case report

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Umbilical metastases are commonly known as Sister Mary Joseph's (SMJ) nodules. They account for 30% of all umbilical tumours [1] and are found more frequently in females (60%) than in males (40%)[2]. This case study describes recurrent SMJ nodules in a patient initially presenting with Dukes' C carcinoma of the colon.

CASE HISTORY

In October 1998, a 67 year old male presented with iron deficiency anaemia and a history of minor erosive prepyloric gastritis with helicobacter pylori on biopsy. On colonoscopy a haemorrhagic obstructing carcinoma was identified at the level of the hepatic flexure. There was also mild sigmoid diverticular disease and an additional 5 mm benign sigmoid polyp. Histologically the hepatic flexure lesion was an infiltrating moderately differentiated adenocarcinoma, consistent with a colonic primary. The patient then progressed to surgery, undergoing a right hemicolectomy. At surgery it was noted that the adenocarcinoma invaded through the full thickness of the colon wall extending into the pericolic fat. In addition four out of ten pericolic lymph nodes were effected. This classified the patient as having a Dukes' C carcinoma of the colon. Further staging showed a clear chest x-ray, no liver metastases on abdominal ultrasound and his blood screen (full blood count, liver function tests and tumour markers) were within acceptable limits. Over the next six months the patient underwent six courses of combination chemotherapy (5FU and folinic acid).

In the twelve months following the chemotherapy the patient continued to be well with normal blood tests, abdominal ultrasounds and colonoscopies. In April 2001 the patient presented with two nodules, one that had arisen in the umbilicus and a subcutaneous one in the lateral margin of his scar. Neither nodule was particularly tender with the patient, on the whole, feeling well. His weight was stable and his bowel motions were normal. His blood screen was essentially normal with the exception of a slightly raised CA 19 of 43 kU/L (normal < 40). Computered tomography (CT) showed an 8 mm lymph node in his chest with no other lesions in his liver or abdomen. Soft tissue thickening of the abdominal wall in the region of the umbilicus was noted. A more detailed assessment of this region was carried out by ultrasound. This showed a lobulated nodule of mixed echogenicity posterior to the umbilicus with a similar appearing area lateral to the patient's scar. Fine needle aspiration of the subcutaneous nodule and biopsy of the umbilical nodule showed moderately differentiated adenocarcinoma. This was believed to have arisen from his previous bowel cancer. Excision of the two nodules was carried out. The umbilical lesion extended into the calciform ligament. Further chemotherapy was suggested, however the patient declined. For the following twelve months the patient felt well and displayed no symptoms. The tumour marker levels decreased to within normal limits.

In march 2002, a screening CT detected liver lesions and increased thickening of the anterior abdominal wall. Ultrasound was carried out to characterise these areas. Unfortunately the lesions within the liver were hypoechoic and solid in nature, keeping with metastases. Assessment of the anterior abdominal wall demonstrated three clusters of heterogeneous nodular lesions surrounding the umbilicus.

Presently the patient is now starting to be symptomatic with increasing abdominal pain, weight loss, fever and sweats. Ultrasound monitoring of the abdominal wall and liver lesions have demonstrated significant progression of his disease. Liver function tests are now deranged. The patient is to start palliative chemotherapy with the prognosis at this point in time being relatively poor.

DISCUSSION

History

The term SMJ Nodule was coined by Sir Hamilton Baily (1960) in recognition of Sister Mary Joseph (1856-1939) who worked as Dr William Mayo's scrub nurse. She is credited with observing that patients with intraabdominal tumours of the gastrointestinal and gynaecological tracts present with a firm umbilical nodule[2,3].

Anatomy

The umbilicus serves as an aperture for the umbilical vessels, uraches and vitelline duct in the fetus. As an infant this becomes closed and forms a fibrotic plate[4].

Clinical presentation

Clinically umbilical metastasis is often present as a firm, irregular, small nodule that may be painful and ulcerated with serosanguinous or purulent discharge[1,5]. It may also present as a diffuse induration of the subcutaneous tissue. The clinical significance of being aware of such nodules is that they may be the first symptom of an underlying cancer[2,3] or an indication of recurrence in a patient with a previous history of cancer. In addition misdiagnosis as an umbilical hernia frequently occurs[2].

Etiology

Most cases involve metastasis of adenocarcinoma[2], with the most common site for the primary being along the gastrointestinal tract (50%)[1] or the female genital tract[2,3]. In men the most common site is the stomach while in women the most common primary site is the ovary. Other primary sites include the gallbladder[2,5], breast, prostate[2,3], penis[2], pancreas[1,5], liver[3] and the lung[1].

Pathophysiology

The umbilicus is particularly susceptible to receiving neoplastic cells due to its anatomical and embryological connections. Metastases may occur via the following pathways:

1. Contiguous extension from the anterior peritoneal surface[1-3].
2. Extension along embryological remnants (falciform, median umbilical and omphalomesenteric ligaments)[1,2].
3. Propagation through lymph ducts via retrograde flow from the inguinal, axillary and paraaortic nodes[1-3].
4. Propagation via the venous network[1-3].
5. Arterial spread[1-3].
6. Tumour cell implantation in an umbilical hernia[2].
7. Iatrogenic implantation via laparoscopy or percutaneous needle biopsy etc[1].

Differential Diagnosis

Differential diagnosis includes endometriosis, benign tumours (granuloma, melanocytic nevi, papilloma, fibroma, epithelial /epidermoid cysts etc.) and primary umbilical carcinoma (melanoma, squamous/basal cell carcinoma, sarcoma, and adenocarcinoma). Endometriosis and benign tumours make up 32% of umbilical tumours while primary tumours account for the remaining 38%[1].

Prognosis

The presence of umbilical metastases usually represents advanced metastatic disease. As such the associated prognosis is generally poor with only 13.5% of patients surviving for more than 2 years[2]. However, there have been reported cases of long-term survival in patients who had a solitary nodule and underwent aggressive surgery and chemotherapy.

Imaging features

Most of the literature addressing SMJ nodules, indicates the use of CT (Figure 1) as the method for examining umbilical masses. Little attention has been given to the use of ultrasound. As this case demonstrates, ultrasound is also capable of identifying and examining the extent of such lesions. Ultrasound is ideal as it is non-invasive and does not involve the use of ionizing radiation. It also has the added benefit of better tissue characterisation than CT. The extra-peritoneal location of SMJ nodules makes them easily accessible to ultrasound, as there is little interference from overlying loops of bowel. Ultrasound shows well the anatomical location, size, shape and complexity of the nodules. Most commonly SMJ nodules appear as either a single or cluster of heterogeneous oval masses with a fairly regular outline (Figures 2 and 3). The absence of fat, bowel and an intact abdominal wall aids in the differentiation from an umbilical hernia. Likewise the absence of a recanalized para-umbilical vein differentiates these nodules from caput medusa[3].

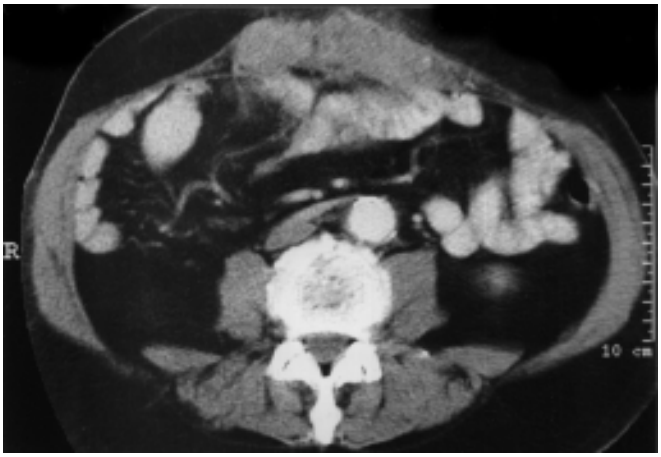

Figure 1 CT demonstrates thickening of the anterior abdominal wall

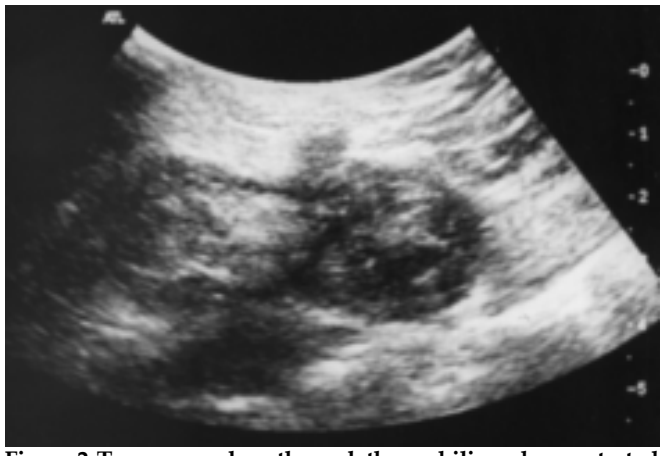

Figure 2 Transverse plane through the umbilicus demonstrated two heterogeneous SMJ nodules

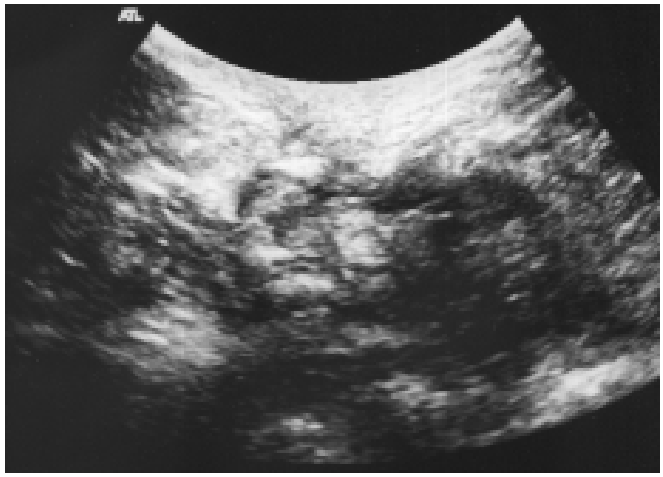

Figure 3 Transverse plane through the lateral margin of the patient's scar shows a cluster of SMJ nodules

Ultrasound may also be used in the staging process to demonstrate the presence of liver lesions and lymphadenopathy, to direct fine needle aspiration/biopsies in obtaining samples for histological sampling as well as in following up patients post-operatively or providing serial assessment of lesions if the patient is being treated conservatively.

While ultrasound will identify the presence of one or more complex nodules, it should be stressed that sonographic impression is only an indicator of possible diagnosis. Histological assessment is the only true method of definitive diagnosis.

CONCLUSION

Sister Mary Joseph's nodules are frequently the first presenting sign in patients with unknown malignant disease.

cont'd on page 22

Double-outlet right ventricle: an unusual presentation at 16 weeks gestation

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ABSTRACT

The combination of a Double-Outlet Right Ventricle (DORV), Ventricular Septal Defect (VSD) and severe pulmonary stenosis represent an unusual finding at second trimester ultrasound assessment. There is a significant risk of chromosomal abnormality (particularly 22q11 deletion – DiGeorge Syndrome) associated with this anomaly[1]. Any complex cardiac anomaly, irrespective of the karyotype, carries a high morbidity/mortality risk in the postnatal period. Should such cases go to term they would generally require tertiary-level management and often, early surgery. Prompt, accurate identification of the anomaly and appropriate referral to a fetal cardiologist for a prognostic opinion are crucial. This case indicates the value of thorough assessment of the fetal heart even at 16 weeks gestation. It also illustrates the utility of 3-D volume analysis in this task. There is also clear demonstration of the confusion that can arise in the diagnosis of complex heart anomalies, at early gestations, due to variability in expression and in the overlap in the ultrasound appearances of closely related anomalies. The value in most circumstances of further assessment near 20 weeks with a cardiological opinion cannot be overstated. Furthermore, this case illustrates that a 'normal' karyotype does not mean a 'normal' fetus and that it is appropriate to attempt to assess morphology at amniocentesis to prevent the patient from assuming this to be the case.

CASE REPORT

A 29 year old woman presented for amniocentesis at 16 weeks gestation in her first pregnancy. The indication was patient request. The pregnancy had been uncomplicated. There had been no known contact with teratogens and there was no significant maternal/paternal history. In particular, there was no maternal diabetes and no known familial heart disease.

The most striking feature of the initial transverse images of the fetus was of an elongated 'cystic' structure in the left side of the chest just superior to the heart. This structure clearly arose from the right ventricle almost perpendicular to the interventricular septum and the impression was of a markedly enlarged right ventricular outflow tract (RVOT) with flow that was, while somewhat turbulent, in the normal direction. Using colour Doppler, flow could easily be followed into the distal aortic arch / descending aorta from this vessel with a short slightly narrowed segment suggestive of the ductus arteriosis. No aortic arch could be identified in the typical position on the B-mode images although colour Doppler did suggest some retrograde flow into the area superior and medial to what was thought to represent the ductus. The head / neck vessels were small and tortuous and their origins difficult to identify.

The initial impression on obtaining a 4-chamber view was of relatively normal appearances. The situs and overall size of the heart were normal. The left ventricle did appear marginally smaller than the right but the atria were proportionate and the mitral and tricuspid valves had a typical configuration. Closer inspection of the B-mode images raised the possibility of a membranous VSD and there also appeared to be some turbulent flow crossing the septum from left to right in this area. However, the most obvious clue to a VSD was the absence of any other identifiable outflow from the left ventricle. Apart from being a little small the left ventricle appeared to be functioning reasonably well but no normal Left Ventricular Outflow Tract (LVOT) could be identified. Posterior to the large right ventricular outflow vessel described previously, and running parallel to the long axis of the heart there was a thin echogenic double-linear structure suggestive of a hypoplastic vessel. This closely followed the expected line of the LVOT and was thought to most likely represent an atretic ascending aorta. At this gestation the suggested diagnosis was aortic atresia/ interrupted aortic arch and VSD. With the exception of some deficiency of the inferior cerebellar vermis, a not uncommon finding at 16 weeks gestation, no other fetal anomaly could be identified.

A 3D volume data set of the heart was obtained using the VOLUSON™ RAB 2-5MHz probe. The technique used involves imaging the heart in 2D from the standard 4-chamber view. High resolution zoom is applied so that the heart virtually fills the screen. The volume region of interest box is narrowed to encompass the heart and also a small segment of the vertebral body (to allow left-right orientation). The sweep angle is narrowed to 15 degrees. A rapid sweep is then initiated. It lasts only for a fraction of a second and encompasses about 1 heartbeat. The stored volume set is then assessed to ensure a full view of the septum. The data set is saved to Sonoview™, an image management program, for later analysis.

Following counselling, an amniocentesis was performed without complication. Both Fluorescent In-Situ Hybridization analysis and culture indicated a normal male karyotype. There was no deletion at 22q11 on VYSIS probe. The patient was referred for a rescan and cardiological opinion at 18 weeks. The findings suggested d-Transposition of the Great Vessels (TOGV) or possibly Double-Outlet Right Ventricle as well as a VSD and significant pulmonary stenosis/ atresia. A large, tortuous aorta was clearly demonstrated arising from the right ventricle but the origin of the stenotic pulmonary artery was less easily identified. The suggestion was that the right ventricle was the most likely origin. No ductus could be seen. Following discussion of the findings, their implications and prognosis with the Cardiologist and the referring Obstetrician, the parents elected to terminate the pregnancy. The autopsy report concurred with the findings of the cardiological scan revealing DORV, VSD and significant pulmonary stenosis. Although the pulmonary

artery appeared to be patent it was too small to probe. No syndromal association was noted. There was no abnormality in the other organs.

DISCUSSION

DORV is a rare congenital anomaly, occurring in approximately 0.33 to 0.9 per 1000 live births[2]. The most common definition of DORV is of a condition in which more than 50% of both the aorta and pulmonary artery arise from the ventricle that has right ventricular morphologic features (i.e. moderator band, coarsely trabeculated internal surfaces)[2]. Within this definition there is a broad spectrum of variations in the anatomical relationship between the aortic root and the pulmonary artery. There is almost invariably a VSD associated with DORV, and its position relative to the great vessels (i.e. subaortic-68%, subpulmonary-22%, doubly committed-3%, remote-7%) further complicates the classification of the pathology[2]. The most commonly encountered associated heart anomaly is pulmonary stenosis, which occurs in up to 70% of cases[2]. A range of other cardiac abnormalities has been associated with DORV in addition to some chromosome abnormalities (22q11 deletion, Trisomy 9, Trisomy 18) and other syndromes (e.g. CHARGE syndrome, short rib polydactyly)[1]. Maternal diabetes and use of a number of drugs (e.g. Isotretinoin) also increase the risk of the abnormality[2].

The ability to view the interventricular septum in the planes recognized in paediatric and adult scans is limited by the restriction in the fields of view available in utero. Current technology allows reconstruction of the volume data sets in planes to mimic those assessed postnatally. Perhaps the lack of this ability in real-time is the reason for the poor sensitivity for in-utero detection of VSDs. Viewing the septum from a reconstructed biventricular view may prove to be useful as it did in this case. It remains important to remember that the "fallout" artifact of the membranous septum will also be present in each plane of reconstructed images.

For anyone involved in obstetric ultrasound this case illustrates a number of points. There is considerable overlap in the pathology and ultrasound appearances of many complex heart abnormalities, especially ones that involve incorrect orientation and/or origin of the great vessels (e.g. TOGV, DORV, DOLV, Tetralogy of Fallot). During assessment it is important not only to consider the origins of, and relationship between the great vessels, but also to search for any septal defect (usually VSD) and assess its position relative to the vessel origins. In this particular case the assessment was made considerably more difficult by the severe degree of pulmonary stenosis. Even at the 18-week scan it remained difficult to determine the origin of the tiny pulmonary artery. At 16 weeks it was difficult to identify at all. In the absence of any other significant fetal anomaly it is vital to reassess any complex cardiac abnormality identified at an earlier examination, after 18 weeks preferably with the opinion of a fetal cardiologist. The ability to accurately assess cardiac structure and function increases markedly in the period between 15 and 20 weeks. The 18-20 week period is also optimal for the detection of co-existing anomalies and for considering any syndromal diagnosis. It must also be noted that VYSIS probe for 22q11 deletion investigation requires a specific request. This region is not examined by the cell culture and band analysis of a 'routine' amniocentesis karyotype. This case demonstrates that while there are very real benefits to be gained from performing more than a cursory scan at the time of amniocentesis, it is also important to consider the technical limitations at this gestation and the value of a more complete assessment closer to 20 weeks.

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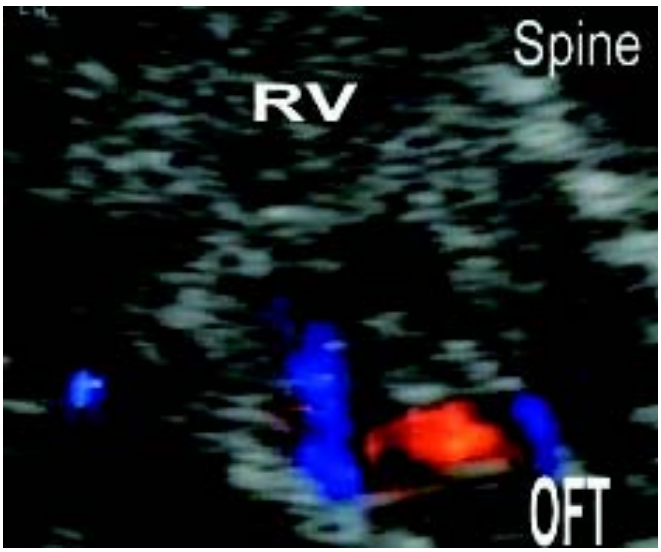

Figure 1 This view shows the unusual orientation of the outflow tract from the right ventricle

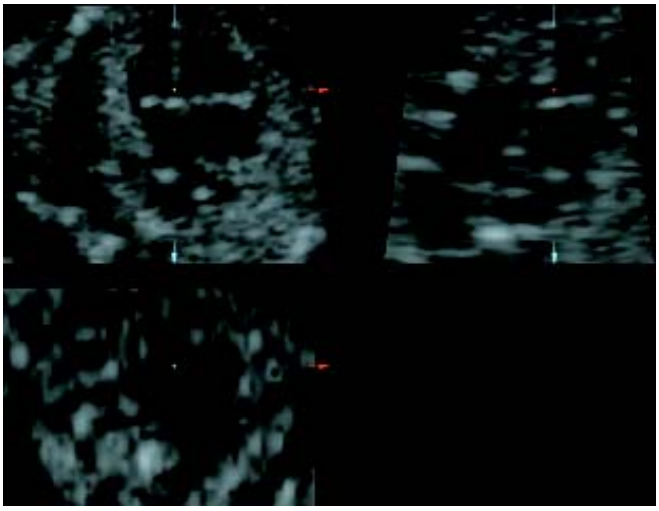

Figure 2 Orthogonal planes of VSD. The standard 3 plane display shows the VSD as an interruption of the septum in the B plane

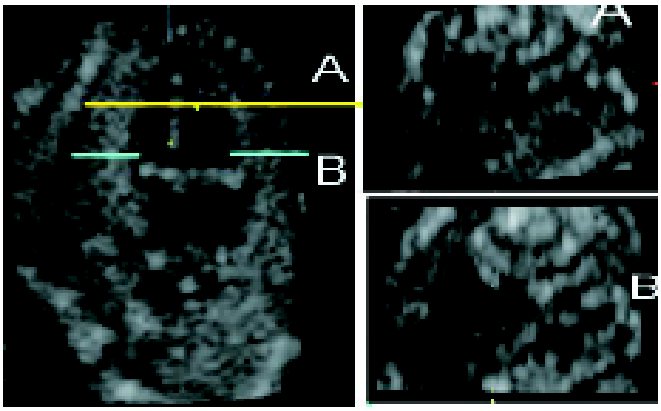

Figure 3 This image demonstrates the standard biventricular view only obtained in the fetus by volume reconstruction. The intact part of the septum in plane A and the VSD in plane B

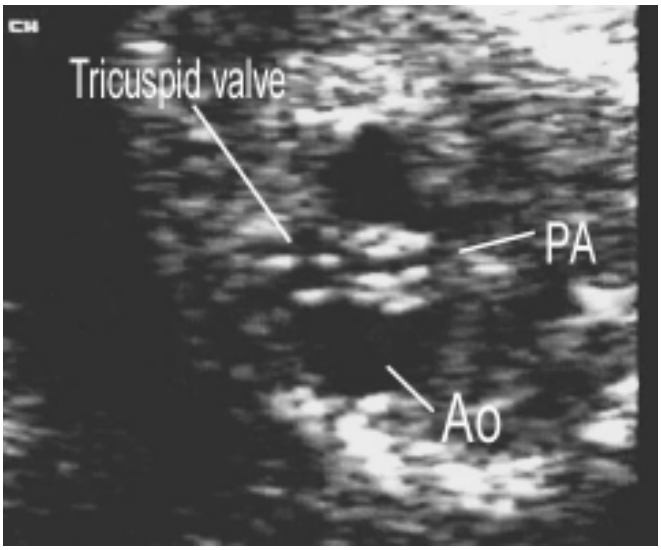

Figure 4 RVDT valve: this image demonstrates the complex relationship of the valve and outflow tracts. Also note the tiny central vessel (PA) which was identified as the Pulmonary Artery at autopsy.

cont'd from page 19 - ***Umbilical Metastases***

Noting the presence and significance of such umbilical lesions will improve the accuracy of diagnosis and in turn staging. This is especially important when asymptomatic masses are detected incidentally on a routine ultrasound scan. If presented with a patient with such a nodule, detailed examination of the abdominal and pelvic organs in search of a possible primary as well as the presence of lymphadenopathy are warranted.

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International Ultrasound Workshop

LV cavity volume measurements

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A brief review of the recommendations for quantitation of the left ventricle by two-dimensional echocardiography by the American Society of Echocardiography Committee on Standards[1]

In 1989 Schiller et al[1] published their benchmark paper on quantitation of the left ventricle, recommending the biplane Method Of Discs (MOD) as it is independent of pre-conceived ventricular shape. This method is also known as the disc summation method or modified Simpson's rule. Cavity volume measurements are used to derive an estimation of the left ventricular ejection fraction, particularly in ventricles with regional wall motion abnormalities. This is now commonly performed as part of a comprehensive echocardiogram. Whilst ultrasound instrumentation, specifically the introduction of harmonic imaging, has improved the quality of images dramatically since that time, the recommendations on technique hold firm. As time spans out from an original paper, the technical requirements for valid application of the method sometimes become distorted. The original work is quoted in two of the most commonly utilised technical echocardiography texts in Australia[2-3]. The purpose of this thumbnail review presented as a table (Table 1) is to serve as a reminder of the essential considerations for the correct acquisition of images from which cavity volume measurements may be made, not to retread detailed ground already covered in these excellent texts. The original paper is worthy of reading in its entirety as it contains wide ranging general and technical considerations.

Table 1 Essential considerations for LV Cavity Volume Measurements

Transducer frequency **Focal zone** **Gain**	Highest frequency that provides adequate penetration, optimised gain and focal zone as close as possible to the centre of volume of the ventricle.
Displayed image	Meticulous attention to detail is required to obtain correct orientation of imaging planes. Ventricle should be imaged and digitised in the most magnified presentation that allows complete endocardial border definition.
Patient positioning	Steep left lateral recumbency.
Transducer positioning	The transducer should be applied toward the posterior axillary line, well posterior to the palpable apex impulse location, then slowly drawn over the apex impulse until the qualitatively maximum image of the left ventricular chamber is achieved.
Image planes **Apical four chamber**	Obtained from a plane through the middle lateral wall of the left ventricle where the right ventricle is at its widest.
Apical two chamber	This view is presumed to be nearly orthogonal (60 to 90 degrees) to the four chamber. It does not include the aorta and outflow tract.
Image selection **End-diastolic volume**	The frame at or before initial systolic coaptation of the mitral valve marks end-diastole (ie valve closed), OR The first frame in which the QRS complex appears.
End-systolic volume	End-systole is marked by the frame preceding initial early diastolic mitral opening (ie valve closed), OR The smallest visible cavity area.
Measurement of cavity volumes	The length of the ventricular cavity is measured from the apex to the middle of the (closed) mitral valve plane. Segments that leave the image plane are not to be fabricated. For non-contiguous endocardial definition, bridging of small (less than 20% of the entire endocardial outline) gaps may be used. That measurements in which the long-axis lengths of the 4 chamber and 2 chamber differ by more than 20% be discarded.

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ASUM 2003 Adv

Principles of scanning the female pelvis: the ultrasound assisted pelvic examination

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This abstract was presented by Dr Parsons as an introduction to her lectures at the 2002 ASUM Obstetric and Gynaecological Conference.

Her five presentations are being prepared for distribution onCD-Rom. This set of five CD-Roms is available for purchase and individual titles can be rented from the ASUM Library.

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LEARNING OBJECTIVES

1. To review the components and technique of an efficient, comprehensive ultrasound-assisted pelvic examination
2. To understand sonographic orientation for optimal imaging
3. To be able to extract the maximum amount of information from each examination

TRANSDUCER ORIENTATION

All transducers have a marker on them that identifies one edge of the sector represented on the screen. In North America this 'leading edge' of the sector is often placed on the left side of the screen, with the transducer or probe site at the top of the image. In Europe and Israel the probe site is placed at the bottom of the image. Individual preference determines the orientation of the sector on your screen. Once this has been established, however, it is much easier to maintain one's orientation and eye-hand coordination while scanning if one's thumb is always fixed on the probe at the location of the 'leading edge' while scanning

SAGITTAL Orientation **TRANSVERSE Orientation**

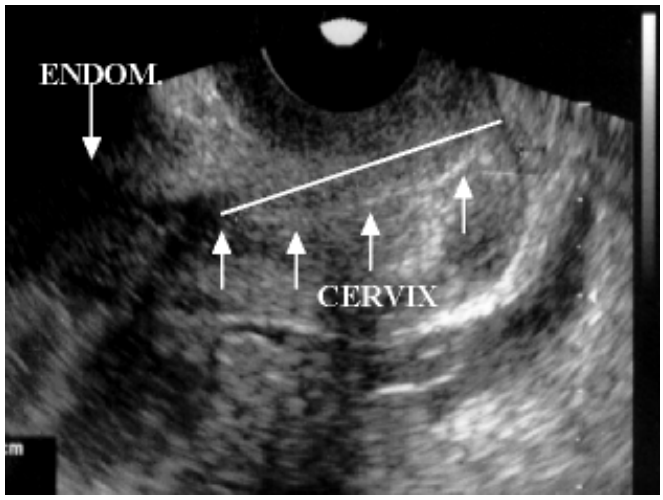
This thumb is not allowed to rotate across the patient's midline, since this reverses the image on the screen.

SYSTEMATIC EVALUATION OF THE PELVIS HOW TO FIND THE UTERUS

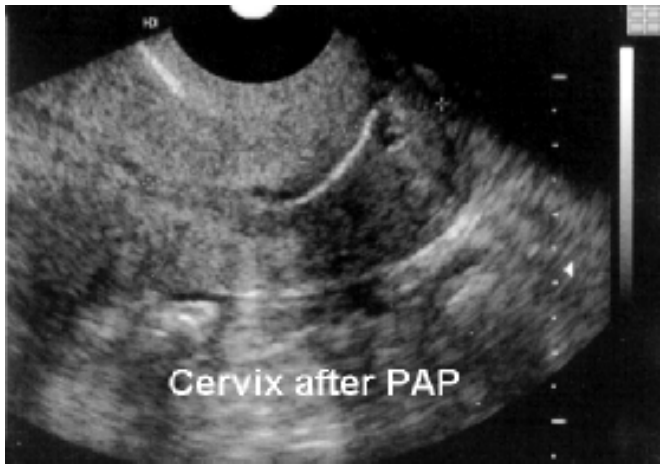
Vaginal ultrasound is the method of choice with which to initially evaluate the uterus when the vagina is available. The abdominal route (through a full bladder) is still preferred in children, and women without a vagina. In women with very atrophic vaginas, a week of .5 gram of estrogen cream every night before the scan, or the use of an estrogen ring will usually make it possible for the patient to tolerate the procedure comfortably. Very large uteri are best seen in toto from the abdomen, but in order to ascertain that the mass is in fact uterine, the cervix must be identified, and that is best done vaginally.

The uterus is rarely oriented perfectly to the patient's midline, and may be so distorted that it is unrecognizable, but the cervix is almost always available. It is attached to the bladder at the point where a C-section is performed. If one keeps this in mind, it is easy to locate the cervix without sliding beyond it into the posterior fornix. The cervical canal is highlighted as a bright dotted line following the use of a Cytobrush for an endocervical Pap smear.

THE CERVIX: THE KEY TO ORIENTATION



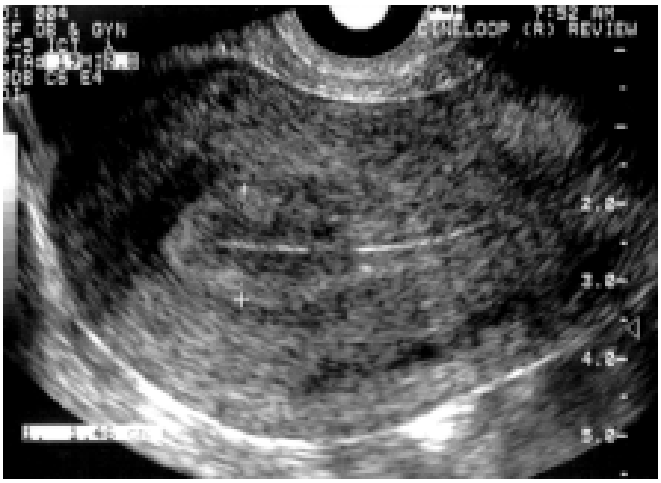
- Attached to the bladder
- Best seen as the probe enters the vagina
- Obtain the sagittal view, and measure the length from internal to external os



- Focus on entire cervical canal to obtain true midsagittal view of uterus

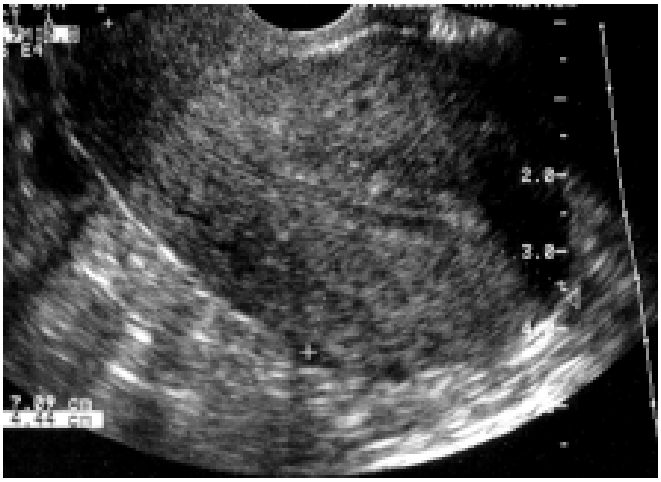
SYSTEMATIC EVALUATION OF THE UTERUS

The most informative view of the uterus requires that the angle of insonation be as perpendicular as possible to the axis of the uterus. This allows the best resolution of the endometrium, and the most reliable measurements of the uterine volume. In about 90% of women, the vagina is perpendicular to the uterus; about 20% of women have retroverted uteri, 70% have anteverted uteri and 10% have axial uteri in line with the vagina. It is essential to have the probe in contact with the uterus through the vaginal wall, for best resolution.



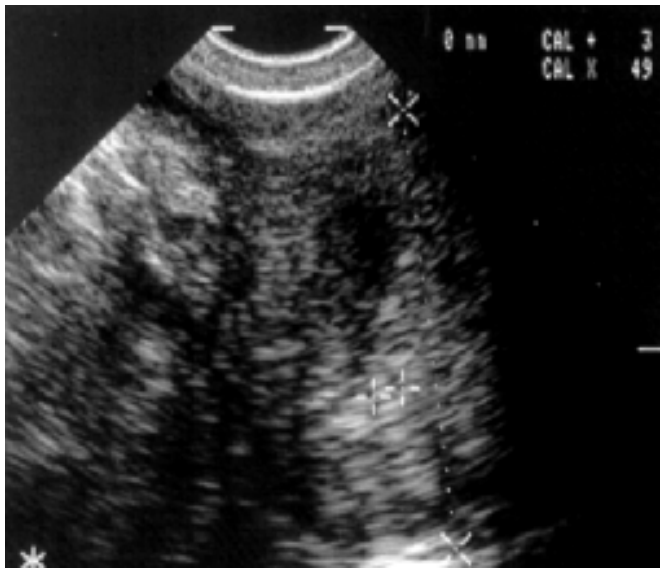
Mid Sagittal Uterus

- Anteverted: bladder is between probe and fundus
- Touch the organ for best resolution

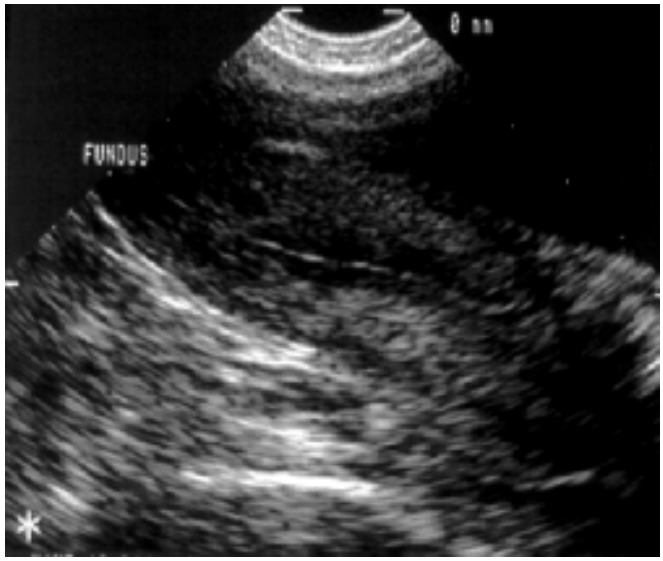


Retroverted Uterus

- The cervix is between the probe and the bladder
- Probe touches posterior fundus through vagina



Axial Uterus, TVS



Axial Uterus, Transabdominal

An example of the inadequacy of scanning 'down the barrel' of the axial uterus. In this case, a long fixed cervix prevents one from flipping the fundus to a position that is perpendicular to the vagina, and the best image is obtained through the abdomen. This is a baboon. Human cervices allow easier manipulation of the uterus, except in postmenopausal women with atrophic vaginas and tiny fundi, obesity and other situations where the cervix is fixed.

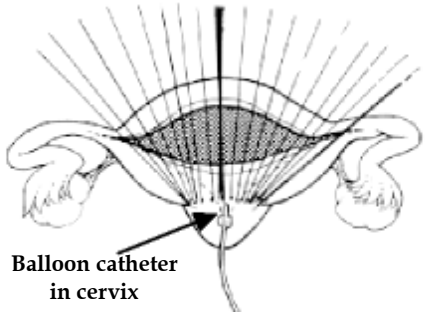
AXIAL UTERI (those with the uterine axis in line with the vagina)

- Endometrium is indecipherable or may look thicker than it is
- Manipulate by pushing into retroversion with the abdominal hand, with the probe in the posterior fornix
- View from abdomen or rectum
- Use saline infusion to define endometrium

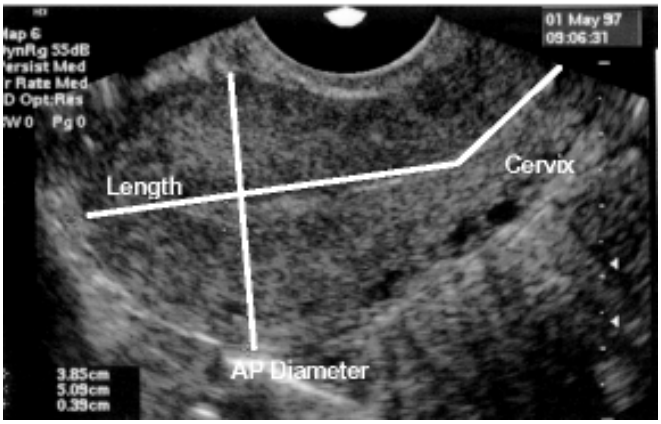
Once the midline of the uterus is identified, a systematic evaluation of the uterus is possible.

MANUEVERS TO OBTAIN A MENTAL 3 DIMENSIONAL IMAGE OF THE UTERUS

- Sagittal Plane: Start at midline cervical canal
- Fan from cornu to cornu to ascertain symmetry and shape of the cavity and fundus

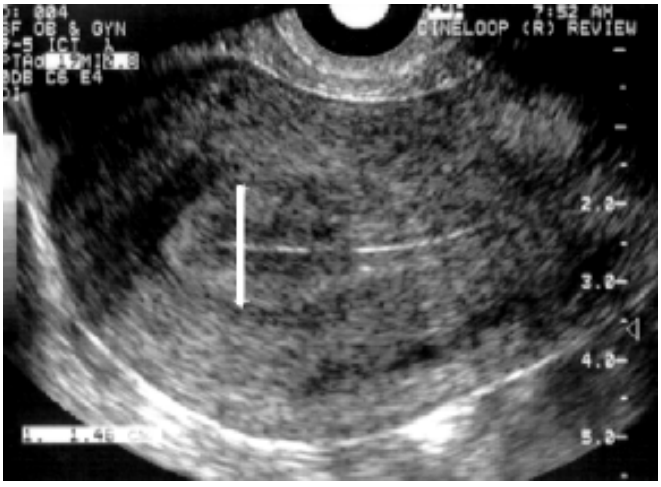


- Measure fundal length from internal os to fundal serosa in midsagittal or longest plane
- Measure AP diameter at the thickest part of the fundus



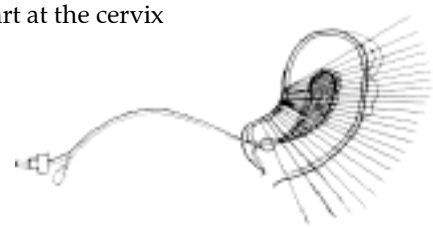
MEASUREMENT OF ENDOMETRIUM

- Measure at thickest site: should be within 5mm of fundus
- Both walls, not including intracavitary fluid
- Measure from basalis to basalis layers

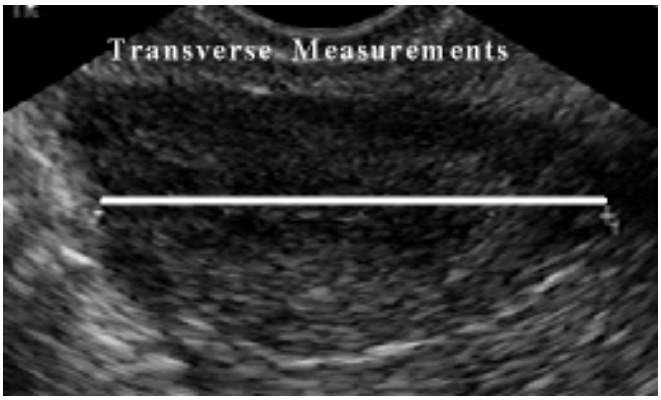


TRANSVERSE PLANE

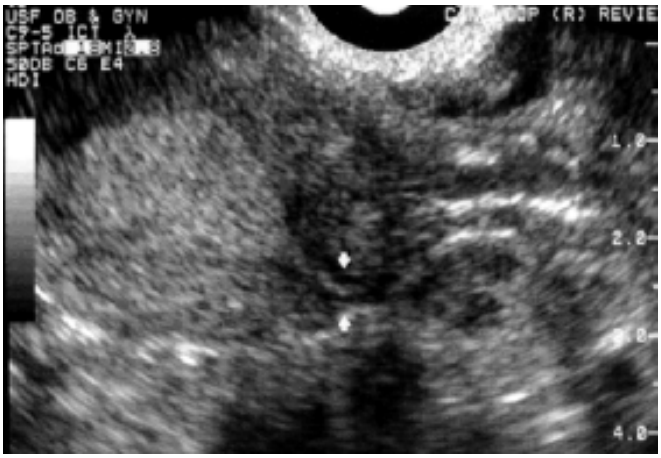
- Usually oblique at the top of the fundus in an anteverted uterus
- Start at the cervix



- 'Section' the uterus from external os to the fundal serosa
- Keep endometrium in midline to determine symmetry



- Identify internal tubal ostia to confirm normal cavitary shape
- Find the ovaries attached to the utero-ovarian ligaments
- Left internal tubal osrium in secretory uterus (arrows)



SONOGRAPHIC EVALUATION OF THE ENDOMETRIUM

The uterus is an excellent bioassay of hormonal function: the fundus enlarges with exposure to estrogen, and the appearance and thickness of the endometrium changes typically in response to endogenous and exogenous hormones. When evaluated in conjunction with the history and ovarian appearance, the sonographic appearance of the uterus allows rapid evaluation and diagnosis of hormonal dysfunction, reproductive maldevelopment and morphologic abnormality.

LAYERS OF THE UTERUS

The uterus is composed of three layers of myometrium

- External longitudinal layer under the serosa, and surrounding the arcuate vessels
- Middle interdigitating multi-directional fibers deep to the arcuate vessels
- Inner layer of circular fibers with little connective tissue: this is the hypoechoic layer that outlines the endometrial basalis layer

Sonographic Significance of the endometrial basalis:

- defines the hypoechoic inner myometrium ('junctional zone")
- moves with inner layer contractions
- interrupted by invasive endometrial processes: adenomyosis, carcinoma
- interrupted or distorted by myometrial processes: myomata, sarcomas
- polyps arise from the basalis but do not interrupt it
- unchanging through the cycle; source of functionalis layer, discussed below

HISTOLOGIC BASIS OF THE ORIENTED ENDOMETRIAL IMAGE

Glands are the largest feature of the endometrium, and their size and arrangement determine the echogenic pattern when correctly scanned. The functionalis layer of proliferative endometrium is hypoechoic due to narrow glands and a low gland to stroma ratio. The diameter of the glandular lumen increases as both estradiol levels increase in the proliferative phase, and as progesterone rises in the secretory phase[1], and is reflected sonographically as echoes fill in the layers from basalis to lumen, following the direction of glandular development. Fleischer first described this effect, ascribing it to glandular widening and ectasia, resulting in more randomly oriented interfaces[2]. Stromal changes are not visible: edema comes and goes in the midproliferative and the midsecretory phases without a concomitant change in the ultrasound image. Diminution of glandular volume, as seen with the use of the antiestrogen clomiphene citrate, produces a thinner layer with a relatively hypoechoic pattern at midcycle[3]. This effect of clomiphene may seen in the secretory phase: Fewer clomiphene treated women had fully echogenic (grade 4) endometrium, and in midcycle estradiol receptors were lower than in controls[4]. Any endometrium is echogenic if it is viewed across the glands.

Any cause of increased glandular volume will produce hyperechoic endometrium: one cannot reliably distinguish between hyperplastic, secretory, disorderly proliferative or neoplastic endometrium with ultrasound. However, the presence of a corpus luteum suggests secretory endometrium.

MEASUREMENT OF ENDOMETRIUM

- Measure at thickest site: should be within 5mm of fundus
- Measure both walls, not including intracavitary fluid
- Measure from basalis to basalis

EVALUATION OF THE ENDOMETRIUM INCLUDES:

- Symmetry
- Thickness
- Hormonal Effect

ENDOMETRIAL SYMMETRY – KEY QUESTIONS

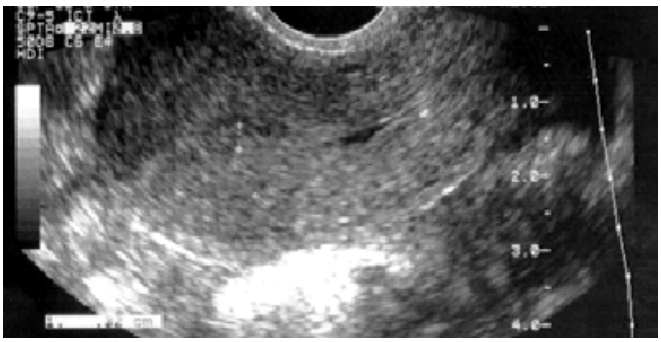
- Is there an anomally?
- Is the basalis intact?
- Is there an intracavitary mass?

ENDOMETRIAL THICKNESS

- May be difficult to measure with adenomyosis
- Indicates stimulation: if <4mm and symmetrical functionalis is unstimulated or suppressed
- Expect it to be $\leq$4mm:
  - in untreated postmenopausal women
  - in women on OCP's or DepoMPA
  - in women treated at least 3 weeks with a GnRH agonist

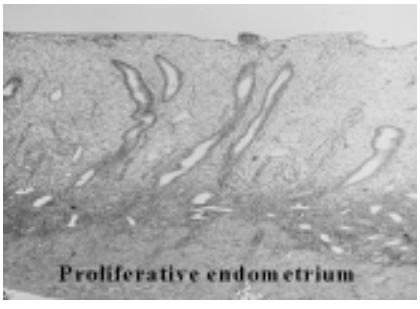
HORMONAL STATUS

- Compare endometrial image with:
  - History: LMP treatment is it appropriate?
  - Ovarian Activity: Is it consonant?
- Echogenicity depends on:
  - angle of insonation
  - glandular development (organization and glandular volume)

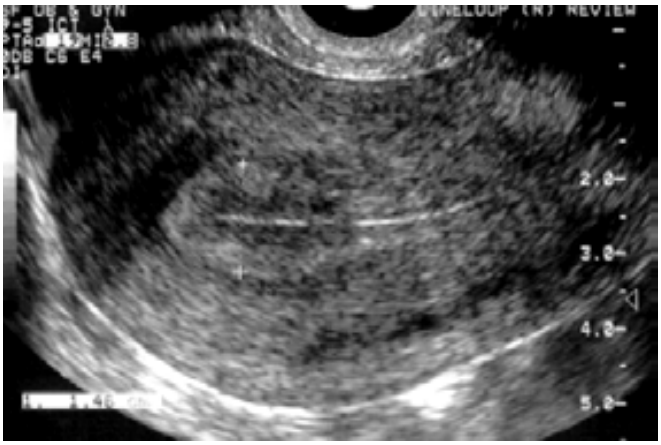


Menstrual endometrium

- After 3 days of bleeding should be obscure: only basalis is left
- Poor specular reflection off the raw surface



PROLIFERATIVE: WHY ARE THERE 3 LAYERS?



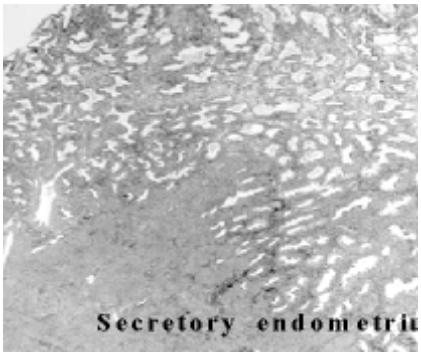
- Basalis layer: not hormone responsive; defines interface between endo- and myometrium
- Functionalis: thin straight glands: when viewed end-on they are echopenic
- Bright specular relection: smooth luminal surfaces

Luminal surface **K**

Functionalis layer **K**

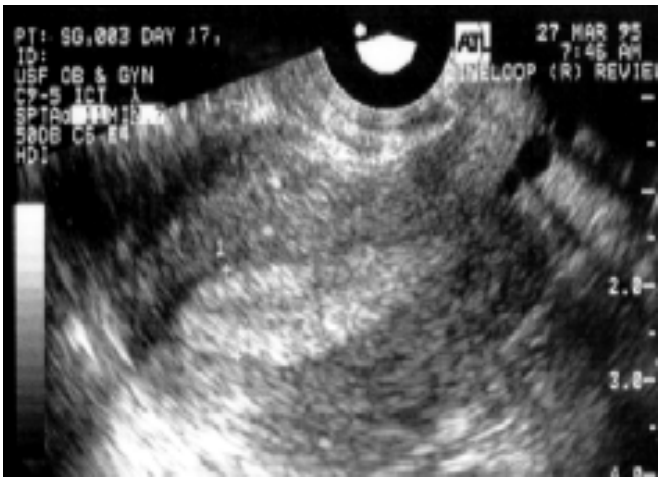
Basalis layer **K**

Myometrium **K**



Secretory endometrium: a nonspecific image of massive glands

- Glands become tortuous and occupy more volume
- Process occurs from basalis to lumen within 2 days of ovulation
- Look for a Corpus Luteum



THE ENDOMETRIAL IMAGE IS UNRELIABLE WHEN:

- the angle of insonation is less than 45 degrees to the uterine axis
- there is no visible endometrium
- endometrium is distorted by myomata
- there is severe adenomyosis
- there are intrauterine synechiae

THE UTERINE IMAGE AS A BIOASSAY OF HORMONE STATUS

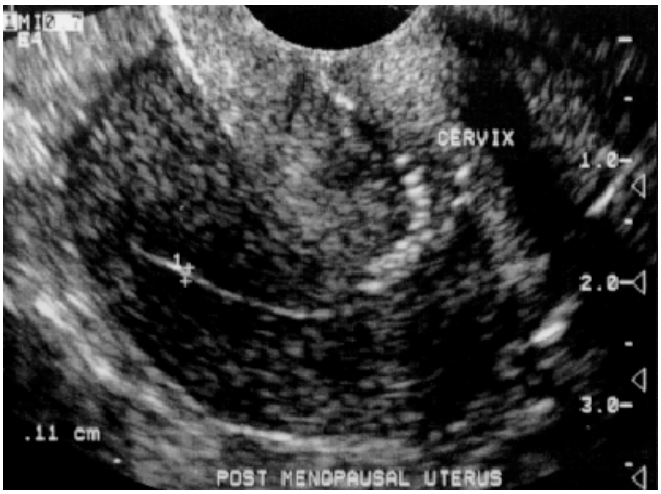
Once one understands the histological basis of the endometrial image, one can use it and the ovarian image to

- ascertain the presence of cyclic function
- determine if amenorrhea is hypo- or euestrogenic
- monitor the effects of treatment

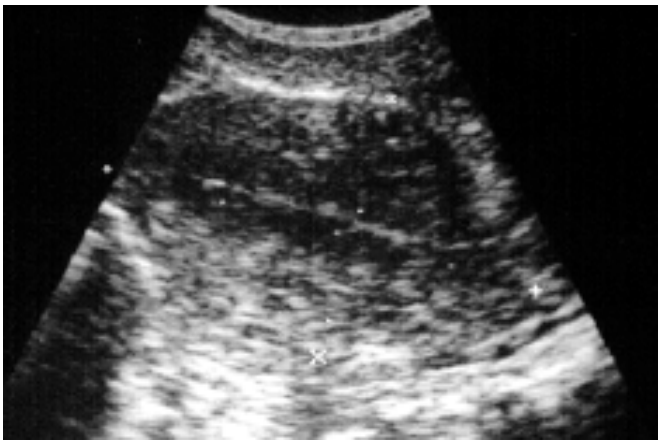
For instance, the three-layered endometrium indicates there has been normal proliferation from an exposed basalis layer, by exogenous or endogenous estrogen. The thickness reflects the sum total of the estrogen effect; it is less when estrogen is low or opposed. On the other hand, suppressed or unstimulated endometrium consists of only the basalis layers, and these should produce a double-walled thickness of less than 5mm. The classic example of this is the endometrium of an untreated postmenopausal woman.

EXPECT ENDOMETRIUM TOTALLING < 5MM IN:

- Women on low-dose oral contraceptives for > 2 cycles (except Desogen)
- Women on a GnRH agonist following their withdrawal bleed
- Women on DepoProvera for > 3 months
- Women who have had a negative progestin challenge
- Postmenopausal women who are on standard continuous combined HRT



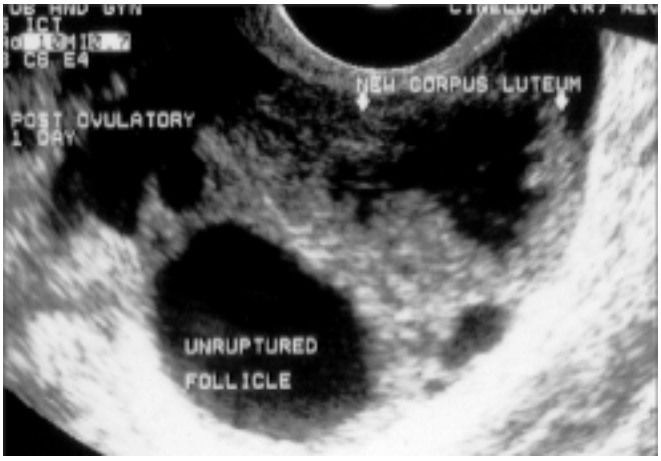
Postmenopausal Uterus after pap



29 years old, OCP's for 3 years

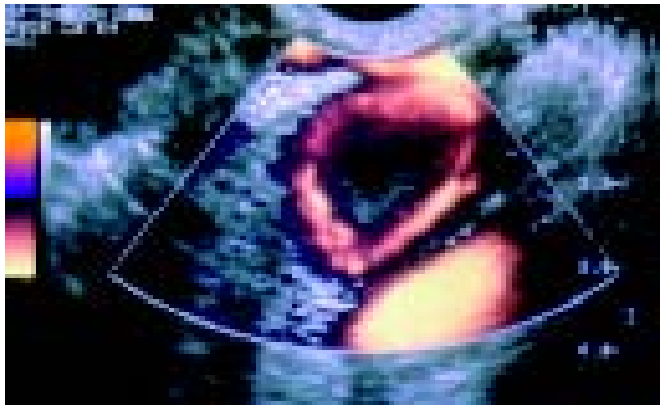
Significance of the corpus luteum

- Establishes that the woman is cycling
- Allows the possibility of pregnancy or eliminates it in its absence
- Occurs on the side of ectopics in over 80% of cases
- Is expected to be associated with massively glandular (thick and fuzzy) endometrium—must be explained if it isn't
- May be seen in women on low dose or triphasic OCP's with 'break through bleeding"—explains the problem
- Understanding its image prevents confusion with neoplasms, repeat scans and unnecessary surgery
- Identification of the CL is The primary indication for the use of power Doppler in the pelvis



Features of the Corpus Luteum

- Ovoid perimeter; corrugated thick fuzzy walls if normal
- Always has a central blood clot, the size of the clot determines the thickness of the wall and the size of the corpus luteum. Normally less than the size of the dominant follicle whence it arose (<3cm), but can be very large if excessive hemorrhage occurs
- Pregnancy enlarges it by a couple of mm and enhances the fluid filled center—becomes a little more cystic
- Wreathed with equatorial ring of vessels, with a feeding arteriole where the peak systolic velocity can exceed 150 cm/sec; usually PI is well under 1
- NEVER HAS DEMONSTRABLE CENTRAL VESSELS
- Constantly changing appearance over time, regresses after 2 weeks unless pregnancy ensues



CONCLUSION

The ultrasound assisted pelvic examination allows one to determine and map the sites of pain discovered during the examination, during the imaging process. Showing the woman her internal organs and discussing their appearance and relationship to her symptoms with her can ameliorate the unpleasant aspects of the examination, as well as reassure and even educate her.

Integration of the gynecological and pertinent past medical history with the vaginal ultrasound images, patient's sensations, imager's sense of organ mobility and vascular anatomy thus allows an immediate assessment of:

1. Pelvic anatomy
2. Hormonal status or response to treatment
3. Organ mobility
4. Sources of pelvic pain
5. Vascular anatomy

Attention to all of these components into the clinical assessment or report allows us to begin to use ultrasound to its full potential for improving the reproductive health of women.

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1. Johannisson E, Parker RA, Landgren B-M, Diczfalusy E. Morphometric analysis of the human endometrium in relation to peripheral hormone levels. Fertil Steril 1982;38:564-71
2. Fleischer AC, Gordon AN, Entman SS, Kepple DM. Transvaginal sonography of the endometrium: current and potential clinical applications. Crit Rev Diagn Imaging 1990;30:85-110
3. Rogers PAW, Polson D, Murphy CR, Hosie M, Susil B, Leoni M. Correlation of endometrial histology, morphometry and ultrasound appearance after different stimulation protocols for in vitro fertilization. Fertil Steril 1991;55:583-7
4. Nakamura Y, Ono M, Yoshida Y, Sugino N, Ueda K, Kato H. Effects of clomihene citrate on the endometrial thickness and echogenic pattern of the endometrium. Fertil Steril, 1997;67:256-60
5. Parsons A. Ultrasound of the human corpus luteum. Ultrasound Quarterly 1994;12:127-166

Chris Kohlenberg Teaching Fellowship

Sponsored by GE Medical Systems

Where has the Teaching Fellowship been?

Sponsored by:

GE Medical Systems Ultrasound

Where is the Teaching Fellowship going in 2002?

New South Wales

Dr Andrew McLennan will be the fellow for the meetings and onsite workshops conducted in mid November in the following locations:

- Wagga Wagga, on the 14th and 15th November, Contact: Nick Stephenson, Ph: 02 6925 3733.
- Wodonga, on the 16th November Contact: Debbie Wass, Ph: 02 6056 3499.

Andrew is an obstetrician and gynaecologist, certified as a sub-specialist in O&G ultrasound by the Royal Australian and New Zealand College of Obstetricians and Gynaecologists. He is a partner in Sydney Ultrasound for Women and is a Visiting Medical Officer at the Royal North Shore Hospital Maternal-Fetal Medicine Unit. He is currently a member of the RANZCOG ultrasound sub-specialty committee, the NSW Health prenatal diagnosis working party and the Australian Association of Obstetric and Gynaecological Ultrasonologists executive.

Andrew's main interest is in first trimester screening and diagnosis. He is responsible for introducing nuchal translucency screening to Australia and is a founding member of the national first trimester screening education, training and audit committee. As part of that responsibility regular first trimester screening workshops to accredit practitioners have been conducted over the past 3 years.

The planned activities will include formal presentations on recent developments in O&G ultrasound with a focus on first trimester ultrasound as well as new gynaecology imaging techniques and on-site workshops.

Victoria

Dr Cheryl Bass will be the fellow for the meetings and onsite workshops conducted in the following locations:

- Wangaratta on the 8th and 9th October, Contact: Allan Garside, Ph: 03 5722 0105.
- Bendigo on the 22nd and 23rd October, Contact: Ann-Marie James, Ph: 03 5454 8633.
- Shepparton on the 29th and 30th October, Contact: Rhonda Kerdemelidis, Ph: 03 5821 6566.

Cheryl has been interested in ultrasound since she was a registrar at the Royal Adelaide Hospital. After obtaining her fellowship she moved to Melbourne, initially taking up a position at the Alfred Hospital. She has two subspecialties, women's health and musculoskeletal imaging. As a radiologist at the Mercy Hospital for Women she acquired expertise in O&G ultrasound and has an ongoing interest in gynaecological ultrasound. She joined Breast Screen Victoria in 1994 and currently combines her breast screen assessment and reading commitments with working at Victoria House Medical Imaging in Prahran.

For the past 8 years Cheryl has specialised in musculoskeletal imaging with an emphasis on sports injuries. Her interest is primarily in ultrasound but includes all modalities. She has taught ultrasound to many people at many different levels and is passionate about achieving a uniform standard of musculoskeletal ultrasound.

Until recently she has been Chairman of the ASUM Standards of Practice Committee and as such has been heavily involved with updating the ASUM guidelines. In this role she has been liaising with the government committee on infection control in a health care setting and this will help formulate the ASUMs recommendation for disinfection of vaginal transducers.

Recently, now that her children are older, she has had more time for research. Last year her paper on Tensor Fascia Lata Tendinopathy was published in Skeletal Radiology and she also published a pictorial essay on Tennis Elbow in the ASUM Ultrasound Bulletin. This year two more papers have been submitted, one on gluteus medius insertional tendinopathy and the other on dynamic ultrasound of the calcaneofibular ligament.

As the Chris Kohlenberg Fellow, she is very much looking forward to visiting regional centres to exchange ideas and share the knowledge that she has gained working in a specialist environment over the last few years.

Anna Parsons Lectures

Dr Anna Parsons is Professor of Radiology at the University of Florida, Tampa, USA. She is well known for her expertise in gynaecological imaging, particularly in the area of endometrial assessment and the role of ultrasound in the management of the infertile patient. In April ASUM was delighted to have Dr Parsons present 5 talks at the 8th Obstetric and Gynaecology Conference, entitled:

- Endometrial Assessment
- Chronic Pelvic Pain
- Sonographic Workup of Premenopausal Bleeding
- Ultrasound of the Uterus and Ovary in Postmenopausal Women
- Ultrasound and Infertility (including tubal assessment)

These talks were digitally recorded onto video are now available for purchase on CD ROM.

Anna Parsons Lectures CD Set (5 talks)	Members	$198
	Non members	$495

Individual titles will be available from Wednesday 2nd October for rental through the video library for $38.50 (members only).

NSW ASUM Branch Meeting

Date: Tuesday 24th September 2002

Topics: Duplex ultrasound assessment of chronic venous insufficiency

Upper extremity venous duplex examination
Ann Needham, RN, RVT
Technical Director,
Vascular Diagnostic Services, Chattanooga

Venue: University of Sydney
Faculty of Health Sciences
East Street, LIDCOMBE
School of Medical Radiation Sciences
Building M - Room M118

Time: Refreshments: 6.00pm
Commencement: 6.30pm

Contact: Jane Fonda 02 9351 9185

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Mark Your Diary

Ultrasound Symposium

An Ultrasound Symposium is being planned in an Asian city for the Easter Holiday 2003.

Mark Your Calendar

1st Annual ASUM Multidisciplinary Workshop Sydney 21-23 March 2003

Interactive Workshop program in:

General Ultrasound

Obstetric Ultrasound

Gynaecological Ultrasound

Vascular Ultrasound

Cardiac Ultrasound

Breast Ultrasound

plus FMF 1st Trimester Screening Theoretical Course

Book reviews

Title: Textbook of Mammography (2nd Edition)
Author: Several
Editors: Audrey K Tucker and Yin Y Ng
Publisher: Harcourt
Published: 2001
Approximate cost: $A325.05

This general textbook of mammography includes a dedicated chapter on breast ultrasound as well as specific reference to ultrasound guided techniques in the chapter on intervention. It also includes relevant ultrasound images in more general chapters describing benign and malignant diseases of the breast.

"Ultrasound: imaging, dynamic and haemodynamic features", is the title of the dedicated ultrasound chapter. It is written by D. O. Cosgrove and W. E. Svensson, both well recognised authors in this field. The chapter is 23 pages in length. It is a succinct account of breast ultrasound, covering topics of technique,normal findings and pathological features, both benign and malignant. The authors also discuss some important diagnostic problems for ultrasound, such as small carcinomas, scars, artefacts and potential pitfalls in interpretation.

The concise text in this chapter is well supported by good quality ultrasound images, including multiple colour doppler images.

The text is also well referenced with a list of many relevant and up-to-date references at the end of the chapter. This list would be a good starting point for wider and more specific reading on breast ultrasound.

Overall, this dedicated ultrasound chapter in a general text of mammography, would be a handy reference in the diagnostic setting of image workup of breast symptoms. Importantly, included in this chapter is a section on the role of ultrasound in the management of breast disease. This is a good summary of the uses of breast ultrasound and it also offers perspective for its use in the diagnosis of breast disease.

The chapter titled "Interventional Techniques", is written by M. Brown and Y. Y. Ng. It includes comprehensive sections on ultrasound guided cyst aspiration and fine needle aspiration, core biopsy and pre operative needle localisation. Text is well illustrated with clear line diagrams and relevant ultrasound images. Again this concise account would be a useful reference in a busy radiology department.

Although the ultrasound images used in the dedicated ultrasound sections of this book are of high quality, unfortunately the few illustrative examples used in other chapters are a little disappointing by comparison.

The ultrasound sections of this general mammography textbook would be a useful reference in a general radiology department, where often a succinct description of ultrasound features is required in the imaging workup of breast symptoms.

Dr Arlene Mou

Title: Transvaginal sonography of the normal and abnormal fetus
Authors: Bronshtein M, Zimmer Z
Publisher: Parthenon
Published: 2001 ISBN 1-85070-693-X
Approximate cost: $A223.33

What makes this text different to others is that it provides a review of the transvaginal ultrasound assessment of the normal and abnormal fetus up to 17 weeks gestation. It therefore includes the benefits of transvaginal ultrasound between 14-17 weeks gestation, a time in gestation when most of us would routinely resort to transabdominal examination.

The 267 page hard back presents the experience of a team of 9 clinicians from the Rambam Medical Center, Haifa, Israel over a 15 year period; a team with international reputation who have made a substantial contribution on transvaginal ultrasound to the world literature over this time. Their experience from 30,000 examinations is presented in an easy to read fashion.

There are 15 chapters in total with chapter sizes ranging from 6 to 44 pages in length and with an average chapter length of 17 pages. Each chapter is well referenced. Assessment of each major organ system is presented with additional chapters on sonoembryology, Doppler studies during early gestation, chromosomal abnormalities, the cervix placenta and membranes and fetal growth. There is a wealth of images scattered throughout each chapter and most are of good quality. Each chapter gives a brief account of the common fetal anomalies with reference to the benefits of transvaginal scanning where appropriate. The book was not written as a complete reference of embryo/fetal anatomy and pathology but rather it provides a balanced approach to the benefits of vaginal scanning in all gestations and leaves the reader with practical tips that will surprise even the most avid reader. I would recommend this book as a useful adjunct to one of the more comprehensive tests such as Nyberg's or Callen's textbook of obstetric ultrasound.

Dr Simon Meagher
BSc MRCPI FRACOG FRCOG DDU COGU

Meet the CEO, Dr Caroline Hong and the ASUM Secretariat

Present L to R: James Hamilton, Iris Hui, Timothy Brown, Caroline Hong, Marie Cawood, Keith Henderson, Insert: Chris Phippen

What is your role as CEO of ASUM?

I was appointed as Chief Executive Officer in July 2001 to work closely with the ASUM Executive in implementing the decisions of Council.

ASUM is incorporated as a company limited by guarantee under the rules of the Corporations Law. In fact, ASUM Councillors are actually the Directors of the ASUM company and have the same legal responsibilities and duties of any company director. On a daily basis, I work closely with the President, the Finance Committee and the Executive Committee to support the Council in achieving a strong and relevant society for its members. During the last 12 months, ASUM has been going through some major positive changes and I am glad to be offered the opportunity to work with such a diverse and talented group of people on Council.

How many staff are there working at ASUM?

There are 6 permanent staff and 3 casuals. ASUM is very fortunate to have a team of highly qualified and professional staff. We are a multicultural lot – with a good mix of Australian born, Asian born and New Zealand born. The ASUM office is located in the north shore suburb of Willoughby in Sydney. ASUM is one of few ultrasound societies in the world that has a permanent Secretariat office and a team of employed professional association staff.

Being CEO means that I am ultimately responsible for all the Secretariat staff and the overall daily operational aspects of the Society. I have to make sure that all my people are aware of the purpose and objectives of the Society and that they work together synergistically as a harmonious and productive team.

There is an increasing trend worldwide towards professionalism in societies and many organisations are beginning to see the value in employing people with experience in the association or not-for profit sector to help their organisations grow and deal with the daily complexities of the not for profit sector. Managing a society in the not for profit sector is often complex and very different from managing a corporate organisation. One key difference is the ability to work with the diverse range of skills and interests of volunteers in achieving the objectives of the Society.

The role of the ASUM staff is defined by the 3 elements in the structure of ASUM. The members of the Society elect the directors to the board, which is the Council. The Councillors, as directors of ASUM direct the society on members' behalf. The CEO is appointed to manage the affairs of the Society on a daily basis. She is supported by a team of employed staff to implement the decisions of Council and act in the best interests of the Society.

Tell me about your ASUM staff?

Iris Hui is my Executive Assistant and is highly skilled in many administrative and secretarial duties. She is also often the first point of contact for many members with their enquiries. Another aspect which is not known to many people is her desktop publishing skills and she is responsible for most of the layout for the ASUM Ultrasound Bulletin.

Keith Henderson is the longest serving staff member and is well known to members in his role as Education Officer and Co-Editor of the ASUM Ultrasound Bulletin.

Tim Brown is the Assistant Education Officer. Tim is also responsible for maintenance of the ASUM website, MOSIPP and many educational activities of the Society.

Marie Cawood is responsible for the administrative aspects of membership. She is also the Coordinator for the DDU, which continues to gain in popularity amongst our medical members.

James Hamilton joined us in February 2002 as the DMU Coordinator from an extensive background in education administration. He is the one who wears brightly coloured braces to the office and has a bubbly personality to match.

Chris Phippen is a chartered accountant who works part time for ASUM. Her responsibility is to produce the necessary financial reports, monthly and year end accounts, budgets and Business Activity Statements.

What are the main priorities?

The main purpose of ASUM is to promote the highest standards of practice in ultrasound in medicine. Everything we do as a Society has to point towards achieving this purpose. Some of the main priorities include:

- Promoting ASUM, excellence in ultrasound and our members locally as well as internationally
- Providing membership services through a variety of education programs, resources, services and products
- Communicating with our members through the ASUM Ultrasound Bulletin, the ASUM website and professional meetings
- Working effectively to support the Council and branches
- Constantly working on retaining and increasing membership

- Establishing and strengthening liaisons and relationships with the ultrasound community in the Asia Pacific region through the ASUM Asia Link Program
- Working and planning for future joint meetings between ASUM and the ultrasound societies in the Asia Pacific region.
- Developing and strengthening liaisons with various organisations and working on the bid to host a world congress, the WFUMB 2009 Congress, in Sydney
- Planning and organising the ASUM Annual Scientific Meetings and various other meetings
- Planning and establishing an ongoing program of education resources, workshops, symposiums and seminars for the diverse group of members
- Providing support to strengthen the development and growth in the DMU and the DDU

In the last issue of the ASUM Ultrasound Bulletin, the President highlighted that the development of international professional liaisons is essential for the proper understanding and development of best standards of practice of ultrasound in medicine. In an increasingly competitive global ultrasound community, it is exciting to work with a broad global minded and forward thinking Council which encourages international liaisons and opportunities as far ahead as 2009.

What do you do outside your work for ASUM?
All the ASUM staff have busy personal lives. Many are involved with their families and their community activities. I encourage my staff to strive for balance in their work and personal lives. We do it by having some flexibility at work. It is easy for us to spend ridiculous hours at work because there is no end to the emails, facsimiles, phone calls and correspondence which come in continuously. We have to be very good at communicating, prioritising and managing deadlines.

I work fulltime at ASUM. Outside my busy working life, my husband and I are involved in a variety of professional and community activities. My two children and husband occupy my time with all their activities and interests. I would have to say that my favourite pastime (if there is spare time) is enjoying our boat cruising the beautiful Sydney harbour and not doing very much. As long as there are people, food and fun, I am in it.

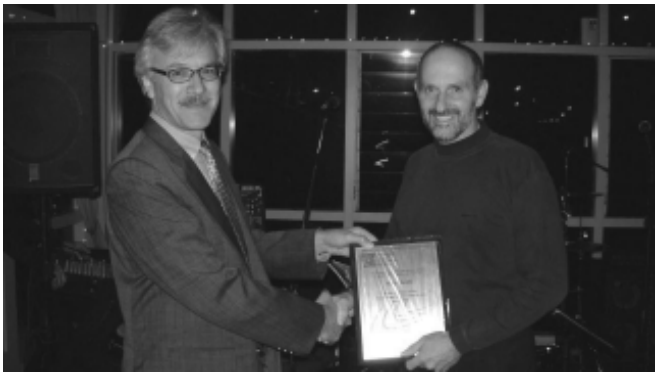
What have you enjoyed most from working for ASUM in the past 12 months?
I enjoy and admire the intellect in our members and their willingness to contribute to the Society. It is easy for me to feel proud to be working in such a great organisation because I feel aligned with the purpose and objectives of the Society. I have a great team of staff who are truly professional and skilled in their work. I also work with a very supportive and forward thinking Board of Directors. I find this all very inspiring and meaningful.

ASUM New Zealand Branch Annual Scientific Meeting Hamilton 18-22 July 2002

This year, the New Zealand Branch of ASUM held its Annual Scientific Meeting in Hamilton. Sonographers, radiologists, obstetricians, and other medical professionals met at the Le Grand hotel for a four day conference with an international flavour. Dr Philippe Jeanty, from Nashville, USA had been selected as the keynote speaker for the conference, and delivered a stunning set of lectures on fetal ultrasound imaging. Amongst the sixteen other speakers were Australian ASUM guests, as well as outstanding New Zealand speakers who presented a wide range of topics in obstetric, musckuloskeletal, general, and vascular ultrasound . Half-day vascular ultrasound workshop was also held at Waikato Hospital by members of the hospital's Vascular Lab, the only public unit dedicated to vascular ultrasound in the central North Island. Hamilton is ideally situated for holding a national event, says Martin Necas, a well known local sonographer and NZ ASUM conference convener. It is no surprise that this year's meeting attracted some of the greatest attendance numbers in the history of NZ meetings, with over 120 registered delegates from ultrasound imaging labs all over the country. New Zealand enjoys a good international reputation and has high quality standards in ultrasound imaging. Annual scientific conferences and other ASUM sponsored educational meetings are a great way of promoting learning, and maintaining good standards. This year's conference has highlighted the enthusiasm of NZ sonographers and sonologists, and will hopefully serve as a model for future scientific meetings.

Opening ASUM NZ 2002 at Le Grand in Hamilton NZ

Delegates at Trade Exhibit, ASUM NZ 2002



Stan Barnett, President, presenting recognition plaque to Mike Heath, Chair of NZ Branch

Stan Barnett, President, presenting recognition plaque to Martin Necas, Convenor of ASUM NZ 2002

Caroline Hong, Stan Barnett, Philippe Jeanty, Martin Necas, Ana Bircher

Stan Barnett and his wife, Shirley Barnett at the Gala Dinner

Asia Link Program "Letters of thanks"

MALAYSIAN EXPERIENCE IN ADELAIDE

Dear Dr Caroline Hong

Re: Placement experience at TQEH, Adelaide

I would like to extend my heartfelt gratitude and appreciation to ASUM generally and Dr Roger Davies specially for having accepted me for training at TQEH during my recent visit from 12 to 28 February 2002.

I arrived at the Radiology Department, TQEH on Tuesday 12 February and was introduced to the department staff and staff of ultrasound by Ms Doreen Marks. I had the pleasure of meeting Drs Roger Davies, Megan Gunn and Jacqueline Kew and the sonographers. I was impressed by the efficiency and team-work of the staff, patient care and management.

Specific ultrasound protocols were adhered to especially the sonograms, and in view of this I did not participate much in practical aspect what with the workload and patients' appointments.

However the placement has given me a chance to update and sharpen my scanning skills and know-how, to learn new techniques especially in vascular and musculoskeletal ultrasound.

I also went over to LMHS Imaging/Ultrasound Department and watched the sonographers at work. However, as the vascular workload was less than at the TQEH I had only a day at LMHS. The range of vascular work included renals, renal allograft, carotids, venous and arterial insufficiency/ incompetence studies, graft assessment, and musculoskeletal ultrasound especially shoulders.

I was very impressed by the state-of-the art ultrasound. The experience has given me more self-confidence and interest in vascular and musculoskeletal work. Should I say a moral boost with less "fear" to indulge in demanding ultrasound studies.

I would like to again express my thanks for the support and encouragement while at TQEH and LMHS. I also had the pleasure of visiting Dr Rebecca Linke at the WCH and had the chance to watch and learn CHD US from the sonographers there. The radiologists and sonographers in Adelaide have been very helpful to me. It has indeed been a most worthwhile and brain-picking experience for me, though I wished that I had stayed longer to learn more.

Yours sincerely

Rose Osman
Radiology Department
UMMC, Kuala Lumpur

AUSTRALIAN EXPERIENCE IN THAILAND

Dear Caroline

I am writing to you to let you know that the ASUM Asia Link Program led to an exciting experience for me. My name is Rebecca Long and I am a Vascular Sonongrapher at Peninsula Vascular Diagnostics in Victoria. At PVD I am the Education Co-ordinator for our in house and Preceptor programs.

Following the inaugural Asia link program at the ASUM 2001 Conference I had an opportunity to meet Kittipong Vairojanavong. One of the things that struck me about many of the Asian countries was the lack of education opportunities for obviously very enthusiastic people. So I pondered how can I help? After many emails between Kittipong and myself, in November of 2001 I was the guest lecturer at the 3rd Scientific Meeting of the Medical Ultrasound Society of Thailand. The format of the day was three lectures and practical demonstrations on the topics of carotid and vertebral arteries, DVT, and lower limb arterial examinations. Philips Thailand sponsored the day and provided a machine for the demonstrations, as well as arranging the venue and providing lunch.

The day was very well received with about 50 - 60 participants, and I was asked questions constantly for the whole day, which is apparently quite unusual as often the Thai people are too polite to ask.

For me it was a great to meet fellow sonographers (although in Thailand it is the Radiologist who perform all the ultrasounds - there is no such thing as a Sonographer), and to share my knowledge.

I also had an opportunity to make great new friends as Kittipong and his wife Nittaya made our stay in Bangkok a pleasure.

So all of this came about because of the ASUM Asia Link Program and I hope that we can encourage relationships between Australia and Asia and promote these sorts of "knowledge sharing" events.

Regards

Rebecca Long
Peninsular Vascular Diagnostics
Melbourne, Victoria

Asia Linkage Program

Singapore

ASUM was one of the co-sponsors at the recent 5th International Asian Vascular Society Congress held in Singapore in May 2002.

Dr Alex Chao, a prominent ASUM overseas member, was the Scientific Convenor who put together a successful program with contributors from Australian and ASUM. The participants include John Harris, Jennifer Kidd, John Gurry, John Crozier, Charles Fisher, John Fletcher, Reginald Lord, James May, Virginia Makeham, Alison Burnett, Caroline Hong and Stan Barnett.

Dr Stan Barnett, President and Dr Caroline Hong, CEO of ASUM met with Dr Chintana Wilde, President of Medical Ultrasound Society of Singapore and her Executive members in Singapore to forge cooperation between the two societies. From left to right -
Back row: Dr Douglas Ong, Dr James Khoo, Dr Richard Lo
Front row: Dr Stan Barnett, Mrs Shirley Barnett, Dr Gervais Wan, Dr Mary Rickard, Dr Chintana Wilde, Dr Caroline Hong

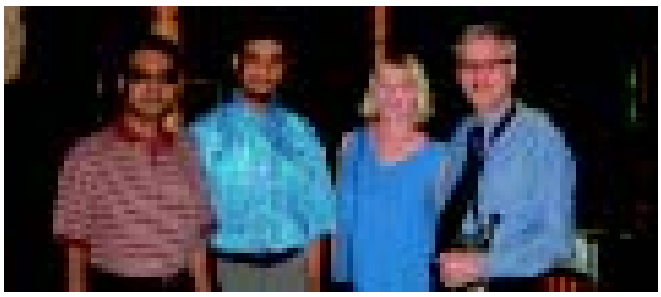
The AVS Organising Committee singing to their hearts content at the Gala Dinner, which was attended by delegates from more than 32 countries, including Australia.

Australians at the Gala Dinner

Malaysia

ASUM continues close relationships with Malaysia through meetings with representatives of the Malaysian Society for Ultrasound in Medicine (MSUM) and the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB). Training and education are areas for cooperation between societies.

Prof Raman Subramaniam and Dr Stan Barnett exhanging notes on ultrasound equipment in Malaysia



Dr Stan Barnett and key leaders in ultrasound in Malaysia, representing MSUM and AFSUMB. From left to right: Prof Ravi Chandran, Prof BJ Abdullah, Mrs Shirley Barnett and Dr Stan Barnett

Dr Barnett and Prof Ng Kwan-Hoong of the University of Malaya Medical Centre, Kuala Lumpur, Malaysia

New members April - June 2002

FULL MEMBERS

Jilane Anderson	NSW
Guy Armstrong	QLD
Lynette Arnesen	QLD
Michael Barker	WA
Tim Bate	NSW
Neil Berlinski	VIC
Zeljko Boksic	NSW
Mary Carmody	VIC
Ann Carr	SA
Wan Pang Chan	QLD
Ron Chang	QLD
Selinter Davison	NSW
Peter Dobson	VIC
Stephen Doust	NSW
Shiri Dutt	QLD
Ann Enns	QLD
Rebecca Falkenberg	NSW
Soak Fung Foong	NSW
David Freidin	VIC
Scot Fullston	NT
Isobel Furnival	NZ
Alison Galpin	NSW
Maisie Gong	NSW
Bryn Granland	WA
John Hehir	ACT
Ian Highet	QLD
Lisa Hui	NSW
Peter Hunter	NSW
Maria Jenkins	NSW
Geoffrey Johns	VIC
Rajeev Jyoti	ACT
Geoff Kelsey	QLD
Cushla King	NZ
Jill King	VIC
Davy Kou	NSW
Paul Lau	VIC
Sinh Le	QLD
May-Wan Lee	NSW
Joanne Lennox	NSW
Julie Lukic	NSW
Susannah Mahar	VIC
Joanna Marsden-Williams	NSW
Stephanie Martin	NSW
Adele McDonnell	WA
Rob McGregor	ACT
John McLaughlin	QLD
David Mitchell	QLD
Florence Miu	NSW
Matthew Morrall	NSW
William Mott	NSW
Philip Mutton	ACT
Premakanthie Naidoo	NSW
Swaran Nand	NSW
Aisha Naqi	NSW
Yvonne Newton	NSW
Parvin Niknafs	NSW
Risto Nikolich	NSW
Tuyet Nong	SA
Guy O'Connell	NSW
Isidor Papapetros	NSW
Julie Parij	NSW
Linda Passfield	SA
Geoff Paul	NSW
Helen Peters	NSW
Tanya Pilgrim	QLD
Grant Rees	NZ
Martin Ritossa	SA
Kenneth Roper	NSW
Susan Rowe	NSW
Avi Saks	NSW
Wafa Samen	NSW
Paula Scanlon	SA
Peter Scott	ACT
Ursula Selopranoto-Ridley	NSW
Ken Sikaris	VIC
Grant Smith	WA
Lisa Stenberg	NSW
Katrina Stevens	NSW
Peter Sylow	NSW
Sandra Thorpe	NSW
Susan Tomarchio	QLD
Geoffrey Trim	NSW
Simon Turner	WA
Michael Uhr	QLD
Toni Uptin	QLD
Matthew Vogels	QLD
Wendy Waghorn	NZ
Nikki Whelan	QLD
Jeanne White	WA
Rosemary White	QLD
Veronique Wilson	VIC
Jane Wood	SA

ASSOCIATE MEMBERS

Madeleine Alston	VIC
Soren Andersen	VIC
Lynette Arnesen	QLD
Susan Arnold	QLD
Sarah Bainbridge	NZ
Kareen Basset	QLD
Dane Beck	QLD
Alison Bennett	QLD
Kathryn Benstead	WA
Jane Best	VIC
Zeljko Boksic	NSW
Susan Bolton	QLD
Mary Carmody	VIC
Fiona Carolan	NSW
Ann Carr	SA
Gregory Chiavaroli	VIC
Ross Christie	NZ
Joanne Cleary	VIC
Cameron Collard	QLD
Wendy Coulls	NSW
Simon Cunliffe	NZ
Brooke Cunninghame	NSW
Trent De Carle	NSW
Michelle Doolan	NSW
Renae Edser	QLD
Alison Egar	NZ
Ali Elkhaled	NSW
Kylie Elmore	QLD
Ann Enns	QLD
Judith Errey	WA
Fernando Fernandez	NSW
Robert Fowler	VIC
Scot Fullston	NT
Alison Galpin	NSW
Ann Garton	NZ
Jennifer Gerlach	NSW
Anna Glass	NZ
Maisie Gong	NSW
Emma Graham	QLD
Xiangyong Gu	NZ
Micaela Gumbley	NSW
Miao Miao He	NSW
Lisa Hui	NSW
Rebecca Hunter	NZ
Sanja Ivkovic	NSW
Merrin Jackson	NSW
Jamie Jackson	NSW
Graham Jenkins	WA
Sarah Johns	WA
Huw Jones	QLD
Thayalini Kesavan	NSW
Davy Kou	NSW
Paul Lau	VIC
Sinh Le	QLD
Peter Ling	NSW
Linda Lott	NZ
Kate Loveday	WA
Kathryn MacKinlay	NZ
Kimberley Maclean	NZ
Anatoly Margovsky	NSW
Katie Maslin	WA
Rosemary Mason	WA
Marie McDonnell	NSW
Fiona McIntyre	NSW
Lisa Miller	NSW
Nerida Minett	NSW
David Mitchell	QLD
Florence Miu	NSW
Sarah Moan	NZ
Direshni Naidu	WA
Ngoh Ngoh Nestor	VIC
Tam Nguyen	QLD
Tuyet Nong	SA
Peter Nowill	QLD
Shawn O'Leary	NZ
Narelle Oliver	WA
Steven Parker-Hill	VIC
Wayne Pitcher	NZ

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Carly Porter	NSW
Kimberley Prince	QLD
Stephen Race	NSW
Emily Reed	VIC
Grant Rees	NZ
Nicole Reid	QLD
Adam Reinhard	VIC
Tyrone Riley	NZ
Stephen Risson	QLD
Shelia Ryan	QLD
Shyama Sadanandan	WA
Tasma Scott	WA
Christine Shaw	NZ
Sumi Shrestha	NZ
Jodie Sibley	QLD
Jennifer Surdy	VIC
Peter Sylow	NSW
David Taylor	ACT
Christopher Thomas	QLD
Nicole Threlfo	NSW
Susan Tomarchio	QLD
Amelia Tonta	VIC
Derrek Toussaint	QLD
Pia Tunbridge	NZ
Cheryl Urek	SA
Nicholas Vanderpoll	NSW
Matthew Vogels	QLD
Kimara Wallace	VIC
Zhi Hui Wang	VIC
Juliet Watson	NZ
Gillian Whalley	NZ
Rosemary White	QLD
Renee Wight	NSW
Alan Williams	VIC
Jacqueline Williamson	VIC
Christine Wong	NSW
Christopher Worne	NSW
Amanda Wright	NZ

TRAINEE MEMBERS

Grazyna Imielska	NSW
Nelli Nedeva	NZ
Raffi Qasabian	NSW

DDU examination results

The following were successful in the examinations held in May - June 2002

Part I

Ruth Arnold	NSW
Con Arronis	NSW
Andrea Barkehall-Thomas	VIC
Claire Campbell	VIC
Victor Chen	QLD
Arvind Deshpande	QLD
Jodie Dodd	SA
Steven Dubenec	NSW
Ley-Ping Eu	VIC
Jaspal Hunjan	NSW
Clive Jankelowitz	VIC
Keith Joe	VIC
Fredrick Joshua	NSW
David King	SA
Alka Kothari	ACT
Peter Leung Ho Yin	HK
William Moir	VIC
Dilip Naik	NZ
Naguesh Naik Gaunekar	SA
Tamara Nowland	NSW
Justin Nasser	VIC
Aiden O'Loughlin	NSW
Jeremy Pereira	VIC
Faisal Rashid	NSW
John Roberts	NSW
Edwin Tam	NSW
Mark Teoh	VIC
Rodney Teperman	VIC
Amarendra Trivedi	VIC
Stuart Turner	SA
David Walters	SA
Mark Westcott	SA

Part II

Lisa Begg	VIC
Lewis Chan	NSW
Denise Ladwig	NSW
Elizabeth McCarthy	VIC
Michel Sangalli	NZ
Geoffrey Trim	NSW
Kay Wilson	SA

DDU 2003 examination dates and fees

Part I Examination Fee

A$990.00 (includes GST) for ASUM Members
A$1,254.00 (includes GST) for Non members

Part II Examination Fee

A$1,760.00 (includes GST) for ASUM Members
A$2,024.00 (includes GST) for Non members

Part II Casebook Fee

A$330.00 (includes GST)

Fees quoted above are from 1 July 2002 and may be subject to change.

PLEASE NOTE THE FOLLOWING INFORMATION PERTAINING TO THE NEXT DDU EXAMINATIONS

2003 Part I

Part I written examination will be held on Monday 19 May 2003. Closing date for applications Monday 24 March 2003

2003 Part II

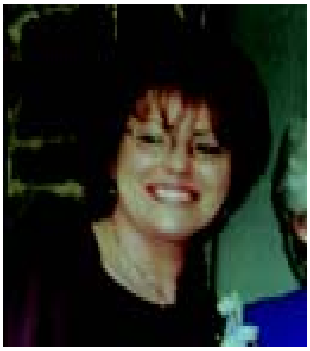
Casebooks for 2003 Part II DDU Examination must be submitted by Monday 20 January 2003 and accompanied by the prescribed fee of A$330.00 for all participants.

Part II written examination will be held on Monday 19 May 2003. Closing date for applications Monday 24 March 2003.

Part II oral examination will be held on Saturday 14 June 2003 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. It is advised that all applicants read through the DDU handbook. For the latest copy, please download from our website www.asum.com.au or contact ASUM on 61 2 9958 7655.

Susan Margaret Joels, 1950-2002



Susan Joels RN, DMU (1979), DMU – Vascular Ultrasound (1990), AMS, who died in Melbourne from pancreatic cancer on June 17th, was a founding member of the Board of Examiners for the Diploma of Medical Ultrasonography, and a true pioneer of the sonography profession.

Susan, born in London where she graduated as a Registered Nurse, came to Australia with her husband and two young boys in 1972, settling in Brisbane. **She was Queensland's first sonographer**. Her ultrasound career began in 1974, at Greenslopes' Repatriation General Hospital, with Dr. V.K Clifton, establishing examination protocols in the abdomen and the heart. She lectured at the Mater General Hospital and the QIT (latterly known as the QUT), in abdominal and vascular ultrasound.

When ASUM established the DMU, Susan absolutely represented the professional sonographer and was the obvious choice to steer northern Australia towards sonography certification. She embraced our founding efforts with science and also with art! She organized Australia-wide exams! She developed curricula! She co-authored the "Doppler" Superficial Neck Guidelines of the ASUM Study Guidelines, in the late 80's.

Susan chaired the DMU Board of Examiners from 1981 to1982, the first "remote" Chair of the Society's certification. She created excellence during her term, I know, I followed her leadership, thankfully some years later! (KG). She truly demonstrated her character when she presented for examination, and attainment of the DMU-Vascular Ultrasound in 1990, Mater General Hospital no mean feat for a past Chair of the DMU. I know no other of such fortitude!

Susan moved to Melbourne several years ago, where she worked and was greatly loved.

She had an incredible life outside of sonography. She created the most exquisite porcelain dolls, beginning with "the Gibson"; then it was onto leadlight windows and frames, with which she beautifully decorated her homes. Between these "creations" and sonography, she needed an "outlet", which was comfortably achieved by hot-air ballooning and gliding.

Susan is survived by her children: Owain, Iain and Renee.

Susan, you left lovely footprints on our hearts.

Jenni Morrison, Kaye Grifiths

COME TO BEAUTIFUL VANCOUVER BRITISH COLUMBIA

A full time position as a Diagnostic Medical Sonographer awaits you at our progressive, highly reputable private clinic.

We serve as a referral site for high risk obstetrical patients, breast fine needle and core biopsies as well as abdominal, gynecological, small parts and some musculoskeletal scans. Our dedication to high quality diagnoses and patient care contributes to our excellent reputation in the Vancouver area. Our team of sonographers enjoys a friendly and relaxed atmosphere in which to focus their skills.

A very competitive salary and benefits package is offered.

Please submit your resume to:

Greig Associates X-Ray, Ultrasound & Mammography
Attention: Jill Anglin, Head Sonographer
5732 Victoria Drive
Vancouver, BC
Canada V5P 3W6
Phone: 604-321-6774

"During my year long stay, I am thoroughly enjoying my work environment as well as the beauty and adventure that British Columbia has to offer", Leone, New Zealand.

Desperately Seeking Ultrasound

Desperately seeking an ultrasound machine for volunteer work in China.

It will be used to assist surgery on bears rescued from the horrendously cruel bear bile farms. The bears have steel cannulas indwelling in their gall bladders. This creates a large fibrous tissue ball which encases surrounding structures. These need to be identified and dissected out. Also, lost cannulas must be found elsewhere in the abdomen.

The ultrasound machine required will have the following specifications: Minimum 3 1/2 megahertz, Penetration min 25 cm, B mode imaging, Grey scale

CAN YOU HELP SAVE THE BEARS

Please contact Claire Oelrichs BVSc, Phone: 02 66871107, Fax: 02 66871682, Email: highnoon@breakofday.com.au

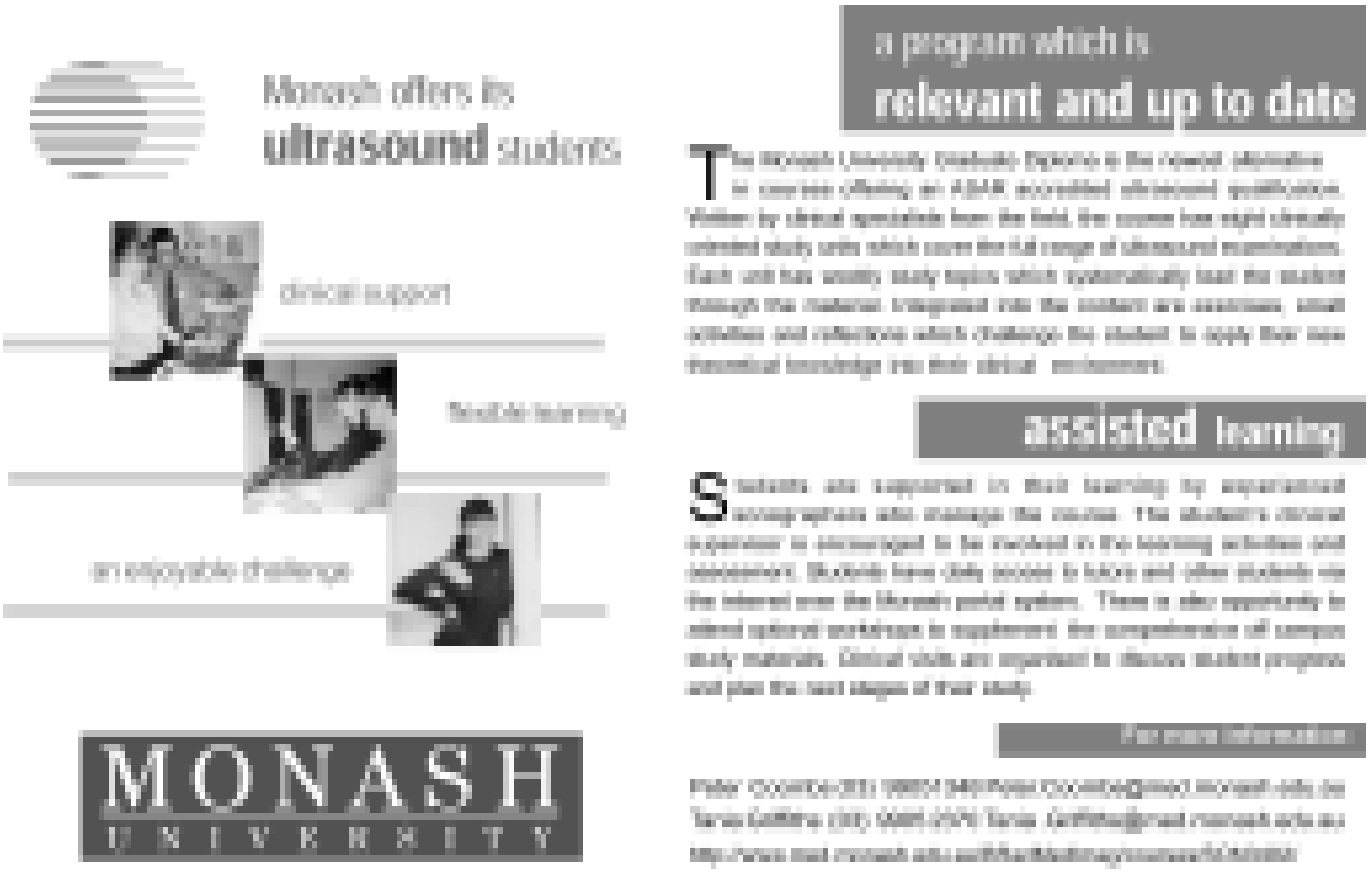
Sonographer

Solo Radiologist requires sonographer with expertise in general u/s, musculoskeletal, obstetric and vascular work for six weeks Nov/Dec 2002. ATL 5000 + Dry laser printer.

This is a comprehensive Accredited Practice with moderate work load and pleasantly located in Parramatta, NSW

Good pay for good work.

Reply to: Radiologist on Fax 9630 2675



AUSTRALIAN INSTITUTE OF ULTRASOUND

DUE TO PUBLIC DEMAND

FURTHER TRAIN THE TRAINER FOR SONOGRAPHERS PROGRAM SCHEDULED

⊙ **November 11th – 13th (places filling fast)**

DON'T FORGET TO BOOK THE FOLLOWING DATES IN YOUR DIARY

⊙ **Oct 12th-13 Ultrasound Techniques in O&G**

Either review your current knowledge and update or use this weekend of intense O&G ultrasound to bolster your learning curve with lectures, discussion & practical tuition.

Lectures on all trimesters of pregnancy and multiples along with case studies and lectures on gynaecologic ultrasound

⊙ **Nov 16th-17th Musculoskeletal Ultrasound Techniques**

Come along to benefit from lectures, practical tuition and discussion with first class tutors on the intricacies of musculoskeletal ultrasound techniques. Call to discuss further practical days after the weekend program.

⊙ **FastTrack training – Small number 1 & 2 week programs still available - Call for dates**

The latter part of the year is filling up fast, call to discuss dates still available for your individualised program.

Register now – either by phone, fax, and email or on-line at *www.aiu.edu.au*

Contact Numbers
Phone: (07) 55266655 Fax: (07) 55266041 Email: sue@aiu.edu.au
Program Information: Sue Davies Registration Information: Sally Ashwin

Ultrasound events

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

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

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

Thu 3 Oct 2002 - 3 days Annual Convention Society of Diagnostic Medical Sonographers (SDMS) *Venue:* Atlanta, Gerogia, USA. *Contact:* 12770 Coit Road, Ste 708, Dallas, TX 75251, USA; Ph: 1 972 239 7367; Fax: 1 972 239 7378; Email: bplater@sdms.org

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

Mon 7 Oct 2002 - 5 days Asian and Oceanian Society for Pediatric Radiology and Australasian Society for Pediatric Imaging. *Venue:* National Wine Centre, Adelaide/Kangaroo Island, South Australia. *Contact:* Dr Roger Davies, The Queen Elizabeth Hospital, 28 Woodville Road, Woodville, SA 5011; Website: www.cdnpacs.com/conference

Wed 9 Oct 2002 BMUS Nephrology Workshop/5th BMUS Interventional Ultrasound Workshop. *Venue:* Sheffield, England. *Contact:* BMUS, Ph: 44 0 20 7636 3714; Fax: 44 0 20 7323 2175

Wed 16 Oct 2002 ASUM WA Branch. Joint ASUM and RACR meeting. *Venue:* Royal Perth Radiology tutorial room. *Contact:* Michelle Pedretti, Ph: 08 9400 9030; Email: michelle.pedretti@maynegroup.com.au; pedrets@aol.com

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

Sat 19 Oct 2002 - 2 days ASUM Interventional Workshop *Venue:* Melbourne. *Contact:* ASUM, 2/181 High Street, Willoughby NSW 2068; Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email: asum@asum.com.au

Fri 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 ORE, UK; Ph: 44 20 8725 2505; Fax: 44 20 8725 0212; Email: johnson@sghms.ac.uk

Sun 10 Nov 2002 - 5 days The Annual Conference of Engineering and Physical Sciences in Medicine. *Venue:* Rotorua Convention Centre, Rotorua, New Zealand. *Contact:* Isla Nixon, Convenor; Ph: +64 9 3074949 ext 6205; Website: www.epsm2002.com

Wed 11 Dec 2002 - 3 days BMUS 34th Annual Scientific Meeting. *Venue:* Manchester International Conference Centre, England. *Contact:* 36 Portland Place, London W1B 1LS UK; Ph: 44 0 20 7636 3714; Fax: 44 0 20 7323 2175; Email: bmus2002@bmus.org; Website: www.bmus.org

Wed 11 Dec 2002 ASUM WA Branch. Joint function with ASA: Christmas Meeting. *Contact:* Michelle Pedretti, Ph: 08 9400 9030; Email: michelle.pedretti@maynegroup.com.au; pedrets@aol.com

Fri 21 Mar 2003 - 3 days Annual ASUM Multidisciplinary Workshop. *Venue:* Novotel Brighton Beach, 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

Apr 2003 (Tentative) ASUM Ultrasound Symposium in Asia *Contact:* ASUM, 2/181 High Street, Willoughby NSW 2068; Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email: asum@asum.com.au

2003 13th World Congress on Ultrasound in Obstetrics and Gynecology. *Venue:* Israel. *Contact:* Ms S Johnson, ISUOG Secr, 3rd fl, Lanesborough Wing, St George's Hospital Medical School, Cranmer Terrace, London SW17 ORE, UK; Ph: 44 181 7252505; Fax: 44 181 7250212; Email: johnson@sghms.ac.uk

2003 19th Annual congress International Society "The Foetus as a Patient". *Venue:* Barcelona, Spain. *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

Fri 30 May 2003 - 3 days Australian Sonographers Associations 10th Annual Conference. *Venue:* Hilton Hotel, Adelaide. *Contact:* Elaine Trevaskis, Ph: 03 9585 2996

Sun 1 Jun 2003 - 4 days AIUM hosting the 10th Triennial World Congress of the World Fed for Ultrasound in Medicine and Biology. *Venue:* Montreal, Quebec, Canada *Contact:* Brenda Kinney, AIUM; Ph: 1-301-498-4100; E-mail: bkinney@aium.org; Website: www.aium.org

Thu 4 Sep 2003 - 4 days ASUM 2003. 33rd Annual Scientific Meeting of the Australasian Society for Ultrasound in Medicine. *Venue:* Burswood International Resort, Perth, Western Australia *Contact:* ASUM, 2/181 High Street, Willoughby, NSW, 2068; Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email: asum@asum.com.au