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Editor:
Assoc Prof Robert N Gibson
University of Melbourne

Co-Editor:
Keith Henderson
ASUM Education Officer

Assistant Editor:
Margo Harkness
Queensland University of Technology

Production:
Merilyn Denning

Contributions
Original research, case reports, quiz cases, short articles, meeting reports and calendar information are invited. Please send via **Mail:** Editor ASUM Bulletin, 2/181 High Street, Willoughby 2068 Australia.
Tel: 61 2 9958 6200 **fax:** 61 2 9958 8002.
email: khenderson@asum.com.au
Contributors are advised to read the guidelines for contributors on the last page of this issue.

Advertising
Enquiries and bookings to:
email: asum@asum.com.au
tel: 61 2 9958 7655 **fax:** 61 2 9958 8002
mail: ASUM, 2/181 High Street, Willoughby 2068 Australia

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Membership and General Enquiries
email: asum@asum.com.au
tel: 61 2 9958 7655 **fax:** 61 2 9958 8002
mail: ASUM, 2/181 High Street, Willoughby 2068 Australia
website: http://www.asum.com.au

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Various aspects of safety in ultrasound practice feature in this issue of the Bulletin. President-elect Dr Stan Barnett draws attention to the work of the ASUM Safety Committee (of which he is Chair) and his commentary on current issues is important for all ultrasound operators. He highlights the need to be informed about potential biological effects which have been scientifically substantiated, and to be mindful of the potential risks versus benefits deriving from ultrasound examinations. In clinical practice some of the most harmful side effects seem to arise from another source, namely the suboptimal performance of diagnostic ultrasound yielding misleading information. This problem is being continually tackled with the tools of education and accreditation (or certification).

Stephen Bird, ASUM representative on the Australasian Sonographer Accreditation Registry, reports on the progress in the pivotal area of sonographer accreditation.

The varied ASUM sponsored education activities are highlighted by the reports on Mark Bryant, the Chris Kohlenberg Teaching Fellow for 2000, and the report by David Fauchon, the Beresford Buttery Trainee for 2000.

A different aspect of safety relates to that of the ultrasound operator, and Julia Janssen describes a study evaluating the level of risk arising from scanning patients who have had recent administration of radiopharmaceuticals.

The Standards of Practice Committee continues to review and revise examination guidelines, a further pillar of good ultrasound practice, and mid trimester and third trimester scanning guidelines are published in this issue.

Two articles provide practical tips and reasons for embarking on some form of research. The scientific process underpinning good research is perhaps the most fundamental and enduring foundation of good ultrasound practice.

We look forward to seeing you at the Annual Scientific Meeting in Auckland.

Robert N Gibson
Editor

Contents

President's Message

As this is my last editorial as your President I would like to take this opportunity to thank all those who have worked closely and laboriously with me over the last two years. I have been enriched by the various challenges and issues that have been placed before me. The office of President has certainly placed an extra load on my work load but I have gained in my own professional development. For this I am very grateful.

Not surprisingly the educational activities of the Society which originate from the Education Committee, under the able Chairmanship of Professor Robert Gibson has been the major focus of the Society. The publication of the*Bulletin* has continued to enjoy widespread support throughout the membership. The MOSSIP program, the ASUM website and all the workshops and education activities have been made possible through the Education Committee, together with the Education Officer, Mr Keith Henderson. Over the last two years the competition for hosting various education activities has been very keen. Some of our corporate members are holding education programs in addition to supporting ASUM's activities. I am hopeful that in the future more education activities can be hosted under the umbrella of ASUM with the full support of our corporate members. From the dialogue with our corporate members this is certainly possible with better co-ordination.

The Marketing Committee has been very active in the last 12 months trying to ascertain the needs of our members. This is an area that is very difficult to explore as various forms of surveys and questionnaires are often met with resistance. I feel that every member should convey their ideas to their local councillor or write directly to the secretariat. Unless the needs of the members are known to the Society it will be very difficult for the Society to fulfill their needs. I would certainly hope that members have a sense of belonging, rather than just being a member of the Society. The Marketing Committee under the Chairmanship of Mr Luke Fay is very keen to pursue this matter. I am very grateful to Luke for his continued contribution.

The two examination boards, the DDU and DMU Boards, have continued to work very hard over the last two years to offer examinations of a very high standard. I would like to thank Dr Jim Syme, Mrs Jill Clarke and the board members for their contribution. Dr Jim Syme has been the Chairman of DDU Board since 1989 and has signalled his retirement in September 2000. I would like to thank him, particularly for such a long contribution to the Society.

In February and May this year two leaders' workshops were held under the Chairmanship of Mr Luke Fay. The Chairpersons of various committees within the Council and also the state branches chairmen were brought together in February 2000 to explore the goals within each of these committees and branches. Each of these individuals departed from the meeting accepting responsibility to achieve two or three goals over the next twelve months. The exercise was a very fruitful one as the various leaders of the Society expressed and devised a common direction for the Society by performing individual tasks within a common goal. The group met in May prior to the Council Meeting for a report and it was encouraging to witness the achievement made from this.

At the present time the role of various committees within Council is being examined and a restructuring may occur in the next twelve months to make the Committees much more effective in delivering their stated functions. As all the Councillors within the Society are volunteers it is important that the Committees work very efficiently without taking unnecessary time to perform their functions. The Finance Committee will be playing a much more significant role in the control of the finance of the Society. It will be involved in the long term planning of the finance of the Society in addition to looking closely at the budgets of the Society from year to year. To this end the various departments within the Society will submit budgets which will be closely scrutinised and approved prior to the May Council meeting so that this budget can be approved at the Council Meeting before implementation for the following financial year. Unfortunately this is necessary, not only for good management, but to ensure that funds are spent appropriately for members' benefits.

I would like to take this opportunity to thank all those with whom I have worked over my two years as President, particularly the executive members, councillors, chairpersons and various members of the trade who have contributed and have been very helpful in making my job easier over that time. Lastly I would like to thank the staff Sue Butterworth, Keith Henderson, Wendy Calvert, Margaret Amis, Sandra Barnstable, Iris Hui and Marie Cawood at the ASUM Secretariat for assisting me in my capacity as the President.

Andrew Ngu
President

Vale Dr Gregory Davison

It was with sadness that we learnt of the death of Dr Gregory Davison after a period of illness. Greg was a member of ASUM for 22 years. During that time he was an active contributor to the Society's education programs at State and Federal level.

A full obituary will appear in the next issue of the *Bulletin*.

Sonographers and exposure to ionising radiation from nuclear medicine patients

Peer reviewed original research

Julia Janssen, Nuclear Medicine Technologist, Richard Smart, Principal Physicist, Erin McKay, Senior Physicist, Department of Nuclear Medicine, St George Hospital, Kogarah NSW

ABSTRACT

Occasionally, patients may require both nuclear medicine procedures and ultrasound examinations on the same day. In keeping with the ALARA principle (as low as reasonably achievable) the nuclear medicine investigation should preferably be performed after the other studies, thus ensuring that the sonographer does not receive unnecessary radiation exposure. However there are clinical circumstances in which an ultrasound examination is required on a patient who has already been injected with a radiopharmaceutical. This study examined the potential radiation exposure to the sonographer and measured the actual exposure received in a busy teaching hospital.

For each of five common nuclear medicine procedures (bone, lung, biliary, myocardial perfusion and gallium) the external dose rates were measured at distances ranging from zero to 100 cm from ten patients, at four time points up to 24 hours post injection. Additional measurements at 72 hours were made for those patients administered ^{67}Ga. The results indicate that the sonographer could potentially receive an external dose in the range 6-28 μSv, although in practice, no radiation exposure was detected from the 4 nuclear medicine patients scanned in the ultrasound department during a 5 week period. These results reinforce the advice from the NSW Health Department that a prior administration of a radiopharmaceutical is not, in itself, a contraindication to performing an ultrasound examination.

INTRODUCTION

Nuclear medicine investigations require the administration of a radiopharmaceutical to the patient. For most studies, and certainly for all studies that require imaging using a gamma camera, the radionuclide will emit gamma rays or characteristic x-rays during its decay that can be detected outside of the patient's body. As well as being used for imaging, this radiation can give rise to exposure of hospital staff or to exposure of the patient's family and friends.

Since 1980 a number of research groups have published data on the exposure to health workers and family members from radiation received from patients who have been administered a radiopharmaceutical for a diagnostic investigation (1-12). It is difficult to make a comparison with the early work of Brateman (1980), Harding (1990) and Tindale (1991); in nuclear medicine, different isotopes, doses and techniques are now in use whilst ultrasound has expanded from predominantly obstetric imaging to multi-focal investigations. Very little has been published on radiation exposure to sonographers from nuclear medicine patients in this new environment.

Furthermore, most investigators have measured the dose rates at the end of the studies when, for radionuclides such as ^{99m}Tc, the radiation levels will have been reduced due to radioactive decay. However, for some studies, the exposure to other staff may occur during the interval between the administration of the radionuclide and the imaging. This may occur, for example, for

- in-patients - the patient will be injected with the radiopharmaceutical on the ward, with the patient being transported to nuclear medicine later in the day; or
- out-patients - the patient may be asked to return to the nuclear medicine department later in the day after initially receiving the radiopharmaceutical.

During the intervening period the in-patient could, for example, receive physiotherapy while the out-patient may have scheduled an ultrasound investigation and the sonographer may not be aware that the patient was radioactive. Ideally all tests that require the member of staff to be close to the patient for prolonged periods of time should be performed before the nuclear medicine procedure, thereby eliminating any radiation exposure.

This issue was recently emphasised in NSW and the Department of Health issued a Circular (98/50 19/7/1998) regarding the potential exposure of sonographers to ionising radiation. The circular stated that:

> *It has come to the Department's attention that sonographers may be exposed to unnecessary levels of radiation during routine ultrasound examinations on patients who have been injected with a radiopharmaceutical. The following policy, as recommended by the Radiation Advisory Council, has been endorsed by the Department and should be drawn to the attention of medical imaging services:*
>
> *In accordance with the ALARA (as low as reasonably achievable) principle of minimising exposure to radiation, where practicable routine ultrasound examinations should not be performed after a patient has been injected with a radiopharmaceutical. In general, rescheduling of other imaging procedures*

requiring close patient contact should ensure the least unnecessary exposure to the health workers involved, except in those situations where the wellbeing of the patient necessitates otherwise.

It should be emphasised that prior administration of a radio-pharmaceutical is not, in itself, a contraindication to performing an ultrasound examination.

It is essential that accurate data are available for commonly performed nuclear medicine procedures so that the magnitude of the risk to sonographers and to other health professionals can be assessed. This study aimed to evaluate the potential exposure to sonographers from nuclear medicine patients and to measure the actual exposure of the sonographers in a busy teaching hospital.

Methods and Materials

Five nuclear medicine procedures were chosen which represented common requests on both in-patients and out-patients. The procedures included a myocardial perfusion study which will use the highest activity of ^{99m}Tc normally encountered in clinical practice, and a lymphoma scan using ^{67}Ga which emits higher energy photons than ^{99m}Tc and which has a significantly longer halflife (78 hours compared to 6 hours for ^{99m}Tc). The external dose rate was measured for 10 patients for each of the following studies:

^{99m}Tc myocardial perfusion approx. activity 1500MBq
(1 day protocol rest/stress 300 MBq rest / 1200 MBq stress)
^{99m}Tc lung approx. activity 240MBq
(40 MBq ventilation / 200 MBq perfusion)
^{99m}Tc biliary approx. activity 200MBq
^{99m}Tc bone approx. activity 800MBq
^{67}Ga Lymphoma approx. activity 370MBq

Two radiation survey meters were used, models PDR 510 and PDR 2 (Nuclear Enterprises Technology), which had been calibrated against the Australian secondary standard, to measure the external dose rate from the patients at 10 cm intervals to a distance of 1 metre. The dose rate meter was positioned at right angles to the right lateral chest wall, to approximate the position at which an sonographer would be seated whilst scanning a patient. The measurements were acquired immediately after injection, and again at 1 hr, 2 hr and 24 hrs post injection and in the case of ^{67}Ga, also at 72 hours.

In order to directly measure the radiation exposure that the sonographers were actually receiving, five sonographers in the ultrasound section of the St. George Hospital Radiology Department wore finger thermoluminescent dosimeters (TLDs) for a period of 1 month and the same 5 sonographers wore body TLD monitors at waist level for 3 months. In addition, 3 TLDs were taped to the patient's side of the ultrasound machine for 3 weeks.

Sonographers at St George Hospital do not routinely wear radiation monitors as the ultrasound department is well separated from the main x-ray imaging rooms and the staff do not perform radiological procedures.

Dose rate measurements

The average dose rates recorded for the five common nuclear medicine studies are given in Table 1, for the measured times and distances. The highest dose rates were recorded by patients undergoing a myocardial perfusion scan using ^{99m}Tc-sestamibi, with an average dose rate of 190 μSv/h at the body surface immediately following the stress injection. During the time of this study the standard activities of ^{99m}Tc-sestamibi were 300 MBq for the rest phase and 1200 MBq for the stress phase. These were adjusted for the patient's weight so that, for the 10 patients studied, the total activity ranged from 1145 MBq to 1790 MBq. At 2 hours after the stress injection the dose rate dropped off to 51 μSv/h at a distance of 30 cm (the typical time and distance at which a ultrasonographer might scan a nuclear medicine patient), and was 6 μSv/h at 100 cm away from the patient. Although the dose rate falls off with distance, the inverse square law does not accurately apply as the patient's activity distribution does not approximate a point source.

Patients injected with 800 MBq of ^{99m}Tc-HDP for a bone scan gave an average dose rate of 152 μSv/h at the body surface immediately after the administration. These patients may be injected in the ward, and are a potential source of exposure to others immediately following the injection. They are instructed to drink 4-5 glasses of water during the next 2 hours. This not only has the benefit of improving image quality as it increases the rate at which the radionuclide is excreted from the body thus reducing the concentration in the bladder, but the decreased voiding interval will also lead to reduced external exposure rates.

The dose rates for bone studies were similar to those recorded by Greaves and Tindale (10) when corrected for administered dose and time post injection. However, our dose rates for the cardiac scans were somewhat lower than those of the same study presumably due to the positioning of the dose rate monitor or differing attenuation from the patient.

The results for the biliary studies differ from the other four procedures as the dose rates at one hour were consistently higher than immediately post-injection. For biliary studies, the radioactivity is initially within the vascular compartment, but will become rapidly localised within the liver and gall bladder before entering the duodenum. The effect of this change in distribution of radioactivity has a significant influence on the dose rate close to the patient's body, but has little influence at greater distances.

Dose rates immediately post injection may be somewhat misleading as, with some studies, the patient may remain in the department for a further 1-2 hours before returning to the ward or having other investigations. Table 2 lists dose rates at the time of departure from the Nuclear Medicine Department.

The measured dose rates were used to calculate the radiation exposure that a sonographer would receive on the assumption that they would be exposed to the patient for a period of 30 minutes at a distance of 30 cm. Table 3 lists these estimates based on both the average and the maximum measured dose rates.

Table 1: Summary of average dose rate in μSv/h for 5 common nuclear medicine procedures (10 patients/study)

Study	Distance	Average dose rate inμSv/h				
		Immediately Post inj.	1 hr	2 hr	24 hr	74 hr
Bone	0 cm	152	137	109	8	N/A
	10 cm	111	89	73	6	
	30 cm	63	52	37	2.5	
	50 cm	39	27	16	1	
	100 cm	7	4	3	<0.5	
Lung ventilation & perfusion	0 cm	99	82	37	5	N/A
	10 cm	53	45	21	4	
	30 cm	20	18	11	2	
	50 cm	10	10	6	1	
	100 cm	3	2	1	< 0.5	
Biliary	0 cm	76	80	61	10	N/A
	10 cm	56	58	38	7	
	30 cm	27	28	21	4	
	50 cm	15	14	10	2	
	100 cm	2	2	1	< 0.5	
Cardiac rest & stress mibi	0 cm	190	154	136	12	N/A
	10 cm	143	115	101	9	
	30 cm	64	57	51	6	
	50 cm	38	31	26	4	
	100 cm	11	8	6	1	
Gallium	0 cm	155	135	123	67	35
	10 cm	75	72	69	48	23
	30 cm	34	38	37	29	13
	50 cm	25	24	23	18	8
	100 cm	9	7	7	5	1

Table 2: Average dose rates at time of departure from department

Study	Departure time relative to injection time	Average dose rates in μSv			
		10 cm	30 cm	50cm	100 cm
Bone	Zero	111	63	39	7
Lung	1 hr	45	18	10	1
Biliary	2 hr	38	21	10	1
Cardiac	1 hr	115	57	31	8
Gallium	Zero	75	33	25	9

TLD monitor results

Five sonographers were issued with finger and body TLD monitors for a period of 3 months. All finger monitors registered <100 μSv (the upper limit of detection for these detectors) while the body monitors recorded < 10 μSv. As there was evidence of poor compliance with the wearing of these monitors, five TLD's were taped to the side of the ultrasound machine for a period of 3 weeks to measure the radiation from any nuclear medicine patients who were scanned during that period, and again no radiation dose was recorded.

Sonographers at St. George Hospital recorded only 4 patients attending for ultrasound scans on the same day as a nuclear medicine scan in a 5 week period.

DISCUSSION

The ALARA principle is an integral component of the ICRP's approach to radiation protection (13). Thus, if a patient requires multiple investigations on the one day, whenever possible the nuclear medicine investigations should be performed after the other studies, thus ensuring that the other staff do not receive any unnecessary radiation exposure. This principle was emphasised in the NSW Health Department Circular 98/50. However this Circular also emphasises that *prior administration of a radiopharmaceutical is not, in itself, a contraindication to performing an ultrasound examination*. This statement recognises that clinical circumstances can arise whereby an ultrasound examination is required on a patient who has been injected with a radiopharmaceutical, and in whom a delay in the ultrasound study may adversely effect the patient's clinical management. Ultrasonographers therefore need to know what their exposure is likely to be from such a patient and to be confident that they are not putting themselves or their colleagues at risk by scanning this patient. Concern about the radiation exposure is likely to be heightened if the ultrasonographer is pregnant at the time.

This study was therefore established to measure the potential exposure to ultrasonographers from nuclear medicine patients, and also to measure the actual exposure in a busy teaching hospital. The results summarised in Table 3 indicate that, if the ultrasound scan is performed within 1 - 2 hours of the injection of the radiopharmaceutical, the dose to the surface of the ultrasonographer is likely to be in the range 6 μSv - 28 μSv. The ICRP recommendations (13) allow a limit of 2 mSv (ie 2000 μSv) to the abdomen of a pregnant worker. Using an average of 25 μSv per patient, a pregnant ultrasonographer would need to scan 2 nuclear medicine patients each week for the duration of the pregnancy in order to approach this limit.

In order to assess whether this was a significant issue at St. George Hospital, finger and body TLD monitors were issued to the ultrasonographers for a limited period. All readings were below the detection limits for the monitors. Ultrasonographers at St. George Hospital recorded only 4 patients attending for ultrasound scans on the same day as a nuclear medicine scan in a 5 week period. This attendance pattern would vary considerably from institution to institution but should be typical of a large teaching hospital where it would be unlikely that all the nuclear medicine patients would be scanned by the same ultrasonographer.

Table 3:
Surface dose estimates to ultrasonographers (Assume staff at 30 cm for 30 mins)

Study	Time after injection	Surface dose estimate in μSv	
		Using average dose rates	Using max. dose rates
Bone	0 hr	35	50
	1 hr	25	46
	24 hrs	1	2.5
Lung	1 hr	9	12
	2 hrs	6	8
	4 hrs	1	3
Biliary	2 hrs	8	10
	24 hrs	1.5	3
Cardiac	1 hr	28	44
	2 hrs	25	41
	24 hrs	3	5
Gallium	0 hr	18	42
	24 hrs	12	47
	72 hrs	2.5	7.5

Three features have been identified which may help to limit radiation exposure even further, they are:

1. Radiation stickers are inserted into each patient's notes, notifying staff that this patient has been administered a radiopharmaceutical and will remain a source of radioactivity for a specified time.

2. Where possible, the ultrasound investigation is scheduled before the nuclear medicine injection.

3. The patient should be asked to empty their bladder prior to the ultrasound examination.

Comparison with other forms of radiation exposure

It has been known for many years that everyone is exposed to background radiation, which is derived from cosmic radiation, terrestrial radiation sources, radon gas and natural internal exposure, principally from ^{40}K. The background radiation levels in Australia have recently been reviewed by Webb et al (14) and are summarised in Table 4. It should be noted that the background radiation levels vary considerably from one location to another. For example, the annual cosmic radiation dose increases from 0.3 mSv in Sydney to 0.4 mSv in Canberra to 0.5 mSv in Katoomba (15) and the external gamma radiation exposure in Perth is 0.83 mSv (16), compared to the Australian average of 0.6 mSv, due to the higher content of radioactive minerals in the

local building materials. Other parts of the world experience much higher background radiation levels and there is no epidemiological evidence that this contributes to a higher risk of cancer in these regions.

Most people are unaware that each time they fly in an aircraft they are exposed to increased background radiation levels because the cosmic ray component increases considerably with increasing altitude. The dose rate at sea level is 0.03 μSv/h. This increases to 2-5 μSv/h at an altitude of 10 km, the cruising altitude for most international flights (17). Thus a return flight from Australia to Europe, involving a total of 40 hours flying will contribute approximately 150 μSv of additional cosmic radiation exposure.

Table 4: Summary of background radiation in Australia

Source of exposure	Annual effective dose
External terrestrial	600 μSv
Cosmic (sea level)	300μSv
Internal (^{40}K and U/Th series)	400 μSv
Radon	200 μSv
TOTAL	**1500 μSv**

CONCLUSION

In keeping with the ALARA principle, whenever possible the nuclear medicine investigations should be performed after any other studies, thus ensuring that the staff do not receive any unnecessary radiation exposure. However, on the occasions when this is not possible, ultrasonographers can be confident that they will only receive a radiation dose that is in the range of 6-28 μSv. This exposure is less than that received on international flights and less than the variation in background radiation levels within Australia.

Abbreviations:
ALARA As low as reasonable achievable
HDP Hydrooxymethylene diphosphonate
MIBI Methyoxyisobutylisonitrile
TLD Thermolumonescent detector
ICRP International Commission on Radiological Protection

Units of Measurement:
Sv sievert
Bq Becquerel

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My thanks are extended to the staff in the Department of Ultrasound, St George Hospital for their co-operation and assistance in this study.

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Getting started in research

Assoc Professor Robert N Gibson MD,FRACR,DDU
Radiology Department, The University of Melbourne, The Royal Melbourne Hospital, Vic

A hurdle often seems to exist between the wish to be involved with research and actually getting underway. However, once that barrier is negotiated the process of what we broadly call research becomes easier and the development of research interests and the accompanying work tends to carry its own momentum.

In this article I outline some ideas and practical tips on how to get started in research and also some thoughts on why one should commit some energy and time to this area of professional activity.

This article is not about increasing the mass of one's curriculum vitae with no effort. There are a number of potential avenues for pursuing this strategy, particularly in the information technology age, and students are now tempted in a variety of ways. For example, Schoolsucks.com offers prewritten essays for $US19.97, custom written papers for $20 first page and $10 for each additional page, plus $10 for bibliography and footnotes. Fed Express outside USA costs $20 and takes 5 days ($10 extra for priority delivery). A fee of of $15 buys life membership geniuspapers.com!

TYPES OF RESEARCH

Research is generally classified as either basic, or applied (developmental).

Medical research can be divided into basic research, which is usually laboratory based, and clinical research. Clinical research relies on medical staff to link scientific and technological advances to patient care. This process relies on linkages between universities, research institutes, manufacturers, and teaching hospitals. Teaching hospitals and their various departments have a responsibility to fulfil this role.

New knowledge arises in various ways – sometimes by systematic experimentation and gathering of data, and other times by chance or serendipidity. In the fairy tale "The Three Princes of Serendip" the heroes are always making happy discoveries by accident and so it is sometimes with discoveries in medicine. However, even if chance is involved it is usually combined with an effort of a variable magnitude, sophistication and organisation - but effort and time are virtually always required. Kettering the automotive engineer said "keep on going and the chances are that you will stumble on something, perhaps when you are least expecting it. I have never heard of anyone stumbling on something sitting down". The current body of medical knowledge owes much to the persistence of researchers.

WHY RESEARCH?

The motives for research lie in the potential benefits.The benefits can be seen as benefits to the individual researcher, to the professional corporation, or to the community.

Professional bodies (*eg* departments, institutions and colleges) benefit in various ways which ultimately enhance the standing of that particular body and, in turn, its individual members. The community at large benefits through the acquisition of new knowledge, at least some of which will be transferred into better patient care in terms of effectiveness, cost or safety.

The individual can benefit by acquiring special interests and skills, enhanced scientific analysis skills, enhanced ability to critically assess medical literature – even more important in the environment of rapid scientific, therapeutic and technological advances - and satisfaction of intellectual curiosity. For most individuals the motivation is usually a combination of natural intellectual enquiry, requirements for career advancement and professional development. In best circumstances the benefits of research for the individual and the community coincide.

Having decided that research offers you benefit and/or attraction there are often real or imagined hurdles to negotiate and resources to access before you feel comfortable and skilled in the process.

THE FIRST STEPS

The desire to become active in research is sometimes difficult to match with a particular project in the early stages. The following ideas may be helpful:

1. Offer to help your more senior colleagues in their research activities. This has mutual benefit and will be greatly appreciated by busy senior colleagues, and you will almost invariably learn a great deal from them in the process. Aim to establish links with clinical colleagues.

2. Look at the nature of your clinical work with particular focus on what is high volume, and what is possibly unique or unusual about your practice.

3. Look at issues which puzzle you in your daily work and for which you cannot obtain satisfactory explanations or answers from colleagues or from the literature. Use gaps in your knowledge not just to further self-education but to expose underdeveloped areas of knowledge.

4. Talk to colleagues about your ideas.

THE RESOURCES

A selection of the following resources is needed in varying quantities:

1. Helpful colleagues - one or more of whom can take on a mentoring role. This may be within the clinical workplace or may be available through a tertiary institution.

2. Access to medical literature database search facilities eg. Medline. This is often most easily achieved via the Internet.

Medline is a bibliographic database from National Library of Medicine, and is the electronic equivalent to Index Medicus.

It scans more than 3,700 journals, 75% with English abstracts. Medline can be searched using Pubmed, a search engine of the National Library of Medicine, via Internet GratefulMed (IGM); indeed access to all sorts of databases can be gained via IGM. The strength of Medline is clinical science - about 31,000 new citations are added each month and the file contains over 9.2 million records.

3. Library resources to help with search strategies and retrieve relevant articles. Beware of overdoing the requests for articles. Look at the more recent review articles and work backwards from these articles in a cascade style.

4. A computer with word processor facilities, preferably with a reference manager database (eg Endnote) and an appropriate database application for any data collection.

5. Financial assistance - this may be required for materials or for research staff assistance. Much good research is cheap except in terms of your own and your collaborators time. It is important to accept this initially and then at the appropriate time to seek funding for part of that time commitment, whether it is your own time or that of a research assistant.

THE SKILLS

The essential skills:

1. Research plan design

This is best learnt by observing the plans of others and by seeking help from an experienced colleague, preferably one with whom you are working.

2. Identification and management of ethical issues

Many research activities will require the approval of the ethics committee. If in doubt discuss this with someone senior. Simple auditing of results in general should not require ethical consideration but extending an examination beyond clinical indications may do so.

3. Statistics expertise – either your own expertise or access to an expert.

If in doubt it is worth talking to somebody who understands statistics prior to embarking on a large study.

4. Management of time – yours and others.

Research can be very time consuming whether it is delegated or otherwise. Learn to manage your own time and be respectful of other people's time.

5. Presentations

One of the key skills to master is that of presenting your results. Presentations can describe research plans, case studies, work in progress or results of original research. The medium can be:

a. Oral Papers

Oral presentations should follow some basic rules

- Simple, slow and summarise
- Tell the audience
  - what you are about to say
  - say it
  - and say what you have just said

Analogous to the mantra of real estate agents, the three most important things in gaining confidence and skill in oral presentations are: *Practice, Practice, Practice.*

Make use of departmental meetings, hospital meetings, city or regional meetings and then national and international meetings.

b. Poster presentations

These are more time consuming to prepare but initially may be less intimidating compared with oral presentations. Good posters require adherence to certain guidelines (ASUM April 1997 Newsletter). One should try to avoid substituting artistic design for concise accurate reporting of research.

6. Writing

Worthwhile research is worth publishing so that people may access the knowledge. There are various styles of writing including case reports, case series reports, literature reviews, and the most fundamental style in research - the original research paper.

The original research paper should be broken into the following components as basic format.

a. Abstract - a brief summary of the following

b. Introduction - background to the research- " Why you did something".

c. Materials (patients) and Methods "How you did it"

d. Results "What you found"

e. Discussion "What do the findings mean (in relation to existing knowledge)".

References and reading

Poster Presentation. ASUM Newsletter. April 1997 pp14-15

Writing for Health Professionals. A Manual for Writers - 2nd Edition. Philip Burnard, Chapman & Hall 1996, ISBN 0-412-71980-0

Biomedical Research - How to plan, publish and present it. William F Whimster, Springer-Verlag 1997, ISBN 3-540-19876-8

American Medical Association Manual of Style - 9th Edition, Williams & Wilkins 1998, ISBN 0683-40206-4

A Review of Biostatistics: A Program for Self-Instruction. Paul E. Leaverton, Little Brown 1991, ISBN 0-316-51854-9

Some useful Websites

http://igm.nlm.nih.gov/
Internet Grateful Med. Easy way to access Medline and some other databases via PubMed

http://omni.ac.uk/
OMNI: Organising Medical Networked Information
UK gateway to high quality Internet resources in medicine, health, biological Research, biomedicine and the biosciences, and other areas within the health and the life sciences.

http://www.nlm.nih.gov/medlineplus/
National Library of Medicine's MEDLINEplus

http://www.medscape.com
Medscape - a wide range of services

http:/www.medweb.emory.edu/MedWeb/
Medical Libraries. A large index of links to medical libraries arranged alphabetically and by medical area.

Finding funding for research

Margo Harkness, Centre for Medical and Health Physics, Queensland University of Technology, Brisbane

Involvement in research can provide an interesting and stimulating experience for those involved in clinical diagnostic ultrasound. The research process requires a significant commitment by the individual/s involved, appropriate knowledge, skills and abilities and adequate resources. The resources involved in undertaking a research project can be considerable and are often underestimated. Resource requirements may include the following:

- time
- additional personnel
- additional equipment or extra load on existing equipment
- consumables
- incidentals such as transport costs, costs involved with presenting results etc.

When undertaking a research project of significant scope and duration it may be necessary to seek funding additional to that provided for in a department/ practice budget. In determining whether or not it is appropriate to apply for additional funding it is important to prepare a detailed project proposal that will then form the basis of the grant funding application. The advantages of preparing a detailed project proposal are that it:

- allows for a detailed analysis of the topic and review of the current literature
- allows for the formulation of a succinct hypothesis, and aims and objectives
- allows detailed planning
- allows a detailed assessment of the resources required to undertake the project
- provides direction as to an appropriate funding body.

In formulating the project plan and applying for external funding, a detailed analysis of the resources required and a budget are necessary. Formulating the budget can be quite difficult and there is often a temptation to "pad out" the budget in case the requested budget amount is not granted. However, the budget submission should be both realistic and justifiable. It is important to read the guidelines of the proposed granting body carefully in order to be clear about items which may be funded and those which are not.

Many different types of grants are available from a wide range of sources. It can be confusing trying to decide which is an appropriate body from which to seek funding and the type of grant which is most appropriate. The following is a non-exhaustive list of some of the different types of grants available:

- research fellowships (usually are largely salary components and some research costs)
- specific project grants
- exchange fellowships
- major laboratory infrastructure grants
- collaborative projects (usually government body and industry collaboration)
- donations/ bequests for specific research topics/areas
- contract research to address a specific need/problem.

Diverse funding sources exist and may be found at the local level (*eg* hospital research foundations, internal university grants or professional body grants), at the state level (*eg* Queensland Cancer Fund) or at the national level or international level.

Two of the major research funding sources in Australia are the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC). These Councils provide funding through open, competitive grant schemes where grant applications are externally reviewed by panels of recognised experts in the field. Generally, in order to be successful in obtaining a grant via these schemes, the applying researchers would need to have a substantial successful track record in research. The success rate of applications is usually in the order of 15%.

The NHMRC funds all medical and health discipline areas, from biomedical research to clinical health services and public health research. NHMRC grants are typically of three years duration. An institution (usually a university or teaching hospital) is responsible for the administration of the grant. Grants may support equipment, staff and supplies. Invitations to apply are usually widely advertised in the press and sent to institutions in December of each year. The ARC supports basic, applied and experimental research across all major discipline areas, but does not fund clinically based research.

In addition to the major granting bodies, there are numerous specific grant programs available which fund various types of research and have a diverse pool of funds available. Examples of such schemes are:

- Diabetes Australia Research Grants Program. This program provides grants to non-profit organisations to support research and education development in the area of diabetes.
- Australian Kidney Foundation. This program provides project grants, equipment grants and seeding grants for research into the causes, prevention and treatment of urinary tract disorders.
- Australian Rotary Health Research Fund (ARHRF). This program aims to promote better community health through the support and encouragement of projects that facilitate communication between participants, in specified fields, in order to stimulate research.

When commencing research, or considering being involved in research, it can be difficult to know how and where to find appropriate information regarding funding schemes.

Important information can be accessed via the following sources:

- professional body publications eg The ASUM Bulletin
- newspapers
- university research departments (easily accessed via the Internet). Examples include:
  http://www.unimelb.edu.au/research or
  http://www.qut.edu.au/draa/
- the Sponsored Programs Information Network (SPIN). This is a computer database with detailed and up-to-the-minute information about thousands of government and private funding opportunities from Australia and overseas. This can be accessed via the University of Melbourne Office for Research homepage (as above).

The other important source of information which should be accessed when embarking on research is the experience of others in the discipline who have been involved in research. ASUM is fortunate to have in its membership a wealth of experience, both in clinical ultrasound and in ultrasound research. Members are encouraged to seek out experienced members and their knowledge.

Bibliography

http://www.unimelb.edu.au/research
http://www.qut.edu.au/draa/

Who cares about ultrasound safety? *or* What the ASUM Safety Committee does for you.

Stanley B Barnett, PhD, Chair of ASUM Safety Committee

INTRODUCTION

Simply, every responsible user of diagnostic ultrasound equipment should have some understanding of the likelihood of risk to the patient from the examination. Research has shown that acoustic outputs from modern ultrasonographic equipment are sufficient to produce biological effects in some tissue. The likelihood of producing such biological effects varies according to the examination type and whether, or not, extraneous factors, such as echo-contrast agents, are introduced. Whilst it would be unreasonable to expect ultrasound users to become experts in the subject of radiation safety, reference to a set of published guidelines together with some background information can help provide reassuring answers to difficult questions. There is no substitute for a sensible and sympathetic response to patient enquiry, particularly if the patient has become disturbed by the occasional inflammatory article in the popular press. A recent example was the report that diagnostic ultrasound caused bleeding, the formation of heat shock proteins and alteration of the normal rate of cell division in the intestine of mice. One media article took an extreme view and suggested that ultrasound safety standards should be re-written on the basis of the report. In fact, the article referred to a paper that had been presented at a radiology conference. Subsequently, the paper was presented again at the annual conference of the British Medical Ultrasound Society, in December 1999. A paper has yet to be published in a peer-reviewed scientific journal. The capillary bleeding was observed in the gas-filled intestines in a study using a small number of mice. The observed effect is well known to ultrasound safety experts, and its action depends on the presence of a tissue/gas interface. Such a situation occurs naturally in herbivorous animals whose gut is usually filled with gas from vegetable fermentation. While the high attenuation coefficient of gas presents a barrier to the transmission of ultrasound at Megahertz frequencies the impact results in damage to tissues close to such a gas interface. The mechanism is not fully understood but is believed to be nonthermal in nature, therefore it is not exacerbated by the use of Doppler ultrasound. It is unlikely to have serious consequences in human ultrasound examinations. There is no possibility of adverse effect on the fetus from this particular bioeffect under current diagnostic exposure conditions and in the absence of gas bodies or echo-contrast media.

Different modes of ultrasound application use different pulsing conditions and, therefore may elicit different types of physical mechanisms of interaction with biological tissue. It is the responsibility of users of diagnostic ultrasound equipment to assess benefit and minimise risk from each ultrasonographic examination. Responsible ultrasound societies and organisations maintain an ultrasound safety committee or expert group whose function is to monitor and analyse data from scientific research and to disseminate current information in a form that is acceptable to members. The primary purpose of this article is to draw attention to the existence of the ASUM Safety Committee, to briefly summarise some current issues and include publication of the current set of ASUM safety guidelines. For more detailed information, readers are referred to recently published comprehensive reviews and reports (Barnett and Kossoff 1998; Barnett et al 2000; ter Haar and Duck 2000; WFUMB 1998). The ASUM Safety Committee comprises a small group of internationally reknowned experts in a range of disciplines. The committee has enormous experience (due to their advancing years and continued dedication to ensuring appropriate use of ultrasound in medicine) and includes; Dr S Barnett (CSIRO radiation biologist), Prof L de Crespigny (obstetrician), Prof M Edwards (past-Dean Veterinary Clinical Sciences Sydney University), Dr G Kossoff (physicist, retired).

ULTRASOUND SAFETY: Is there a Problem?

With recent changes in regulatory attitudes in the USA, the responsibility of care is being increasingly placed on the user/diagnostician. In the "good old days" when the FDA simply placed intensity limits on equipment output in the USA, it was assumed that no biological effects in tissue, or harm to the patient, could be produced from a diagnostic exposure below levels that were available in 1976. Even current data from human studies that show no adverse effects following intra-uterine exposures are obtained from equipment with similarly low power outputs. The acoustic output of modern diagnostic equipment has substantially increased in recent years, and various experimental studies have shown biological effects at the upper levels of equipment output. Nowadays, it is no longer correct to state that biological effects cannot be produced from diagnostic exposures. The important issue is to ensure that threshold levels are not exceeded. The threshold differs for each different type of ultrasound examinations. Clearly, the risk/benefit ratio changes according to the nature of the examination compared to the physiological condition of the patient.

Since its introduction over 30 years ago, there has been an extraordinary growth in the use of ultrasonic imaging as a diagnostic tool in medicine. This has led to the development of a wide range of specialised procedures and the evolution of sophisticated and diagnostically powerful modern equipment. Improvements in resolution and image quality and in grey-scale definition have been particularly important in obstetrics giving the capability of clearly imaging the developing fetus, embryo or maturing follicles. Pulsed Doppler (PD) spectral flow analysis and Doppler colour flow imaging (CFI) techniques offer the potential to

increase diagnostic effectiveness and are already finding some applications in early first trimester pregnancy, or embryosonography.

Some new technological developments have resulted in increased power outputs, to the extent that modern equipment is capable of emitting acoustic power levels sufficient to produce measurable effects in biological tissue. Meanwhile the FDA (Food and Drug Administration, Centre for Devices and Radiological Health, USA) has changed its regulatory requirement, increasingly placing responsibility for risk assessment on the user. The FDA now allows a relaxation of output limits for diagnostic ultrasound devices, such that the embryo or fetus may be exposed to a substantially increased intensity (nearly eight times) provided that the equipment incorporates an approved output display. Manufacturers in the USA were disappointed that any limits were imposed and continue to lobby the FDA to remove all exposure limits for all ultrasound applications on the basis of the output display. The purpose of the output display is to alert the user to the potential to produce biological effects during a particular examination. This trend towards self-regulation requires users to make decisions about appropriate examination exposures based on output information displayed on equipment. The FDA-approved AIUM/NEMA output display standard (ODS) displays the thermal index (TI) and mechanical index (MI) as indicators of the likelihood of producing biological effects due to thermal or non-thermal interaction with biological tissue. The display is required to be updated in real-time in each mode of operation, or whenever the equipment output controls are altered. Whilst there are some concerns about the inaccuracy of the estimated values of TI and MI, this option does give some feedback to users by which they might reduce ultrasound exposure. It is important to understand that thermal bioeffects are determined through a combination of increased tissue temperature and the duration for which the elevated temperature is maintained. This issue, together with a more detailed description of the application and limitations of the FDA-approved output display will be described in an article in a subsequent edition of the ASUM Bulletin.

Clearly, in order to make valid judgements, ultrasound users need to be informed about relevant safety issues. It is not appropriate to assume inherent safety under all conditions, simply because the equipment is commercially available. The user should understand that the highest power does not always produce the best diagnostic information, but that it certainly increases the risk of adverse bioeffects. The default acoustic output at start-up varies between equipment and between various operating modes.

In the past, safety of diagnostic ultrasound was largely assumed on the basis of the absence of independently verified significant adverse effects in mammalian tissue, either in the laboratory or in clinical practice. This absence of effects may have been in part due to the relatively low intensities applied by early diagnostic equipment, and in part due to the use of insensitive biological endpoints. The introduction of some new technologies, such as gas body echo-contrast agents, has increased the likelihood of producing biological effects in mammalian tissue. For example, the introduction of gas-filled contrast agents into the ultrasound field reduces the acoustic pressure threshold for haemolysis in the body by a factor of ten below that required to lyse blood cells by ultrasound alone.

Fundamental issues that have been raised recently include the risk to the embryo or fetus from the use of ultrasound in the 1st trimester and the benefit to perinatal outcome of routine obstetric scans. There is special concern for ultrasound exposure of the embryo since it is known to be particularly sensitive to damage. In an assessment of risk/benefit ratio, one might expect the benefit to outweigh the risk in most cases where there is a real expectation of obtaining diagnostic data that would have a beneficial effect on the continuing medical management of the patient. The basic philosophy of undertaking ultrasound examinations when medically indicated is advocated by major national ultrasound societies including the ASUM.

Where there is uncertainty about the outcome or risk, it is particularly appropriate to adopt an attitude of prudent use. The combination of recent changes in the regulation of medical ultrasound and continuing development of international safety standards allows the user access to substantially increased output power levels. The following statements summarise the opinion of the ASUM Safety Committee on some issues relating to the safe use of ultrasound in medicine. Many of these statements are based on conclusions of international expert bodies of which ASUM Safety Committee members are participants. The safety guidelines will be continually revised in the light of current scientific data and may be changed as new diagnostic techniques and applications are developed. Important issues yet to be considered include the use of diagnostic ultrasound where no medical benefit is expected, such as for the purpose of providing souvenir pictures or videos of a fetus.

ASUM SAFETY GUIDELINES

Safety of Ultrasound in Grey Scale Imaging in Obstetrics

Grey scale imaging by transcutaneous, transvaginal and endoscopic routes is a well established procedure in diagnostic medicine. To date, the results of follow-up studies on patients and children who had been examined before birth have not demonstrated a causal link between adverse health effects and ultrasound exposure.

Recommendations:

- *Care should be exercised to ensure that the examinations are performed prudently using the ALARA (as low as reasonably achievable) principle of applying lowest acoustic output and dwell time consistent with that required to obtain the necessary diagnostic information.*

Doppler Ultrasound

Doppler techniques are used over a broad range of applications from adult cardio-vascular to fetal examinations. Higher outputs are usually required to image

poorly reflecting structures lying deep in the body, such as in the measurement of flow in deep vessels in the large patient. Other applications can be performed effectively using considerably lower outputs, such as in fetal/ embryonic (transvaginal) examinations where attenuation by overlying tissue is low. Care and vigilance should be exercised to ensure that the examinations are performed with the minimum level of acoustic output necessary to obtain the required diagnostic information.

In modern equipment the highest intensity usually occurs with pulsed Doppler mode ultrasound. However, there is a large overlap in the ranges of intensities that are available for use in "Colour Flow (velocity) Imaging", "Power (amplitude) Doppler" and "Pulsed (spectral) Doppler".

In pulsed Doppler the beam is focussed onto a small volume and kept stationary so that the same tissues are insonated throughout the examination thereby maximising the heating. Data from studies with animals show that pulsed Doppler ultrasound can produce significant thermal effects, particularly near bone.

Nonthermal effects can result in capillary bleeding in gas-containing structures such as the lungs and intestine. The embryo and fetus do not normally contain gas.

Recommendations:

- *Care should be exercised to ensure that the examinations are performed prudently using as low as reasonably achievable (ALARA) acoustic output and dwell time.*
- *Users should take notice of exposure information provided by the manufacturer and minimise exposures to tissue structures containing bone and/or gas.*

Continuous Wave Doppler Fetal Monitoring

Diagnostic devices emitting continuous wave Doppler ultrasound are used to monitor fetal and neonatal heart-beat.

This equipment emits low power levels and its use is not contra-indicated on safety grounds, even when applied for extended periods.

Thermal Biological Effects

A significant body of information is available on thermal bioeffects, including the fetus. Although many questions remain, current knowledge permits a number of conclusions to be drawn on the thermal mechanism of production of biological effects of ultrasound.

In general, Doppler examinations (excluding continuous wave Doppler fetal monitoring) present the highest risk of inducing biological effects that are thermally mediated. This follows from the use of longer pulses and higher pulse repetition rates than those used in grey scale imaging.

Data from animal experiments have shown that some Doppler equipment can produce a biologically significant temperature rise, especially at bone/soft tissue interfaces, such as in fetal examinations in the 2nd and 3rd trimester.

The risk of adverse effects of heating increases with the duration of exposure.

The current FDA regulatory limit for ultrasound applications is 720 mW/cm^2 intensity (I_{SPTA}), estimated at the tissue of interest, i.e. attenuated according to the beam path length in tissue. For this intensity, it has been estimated that the maximum temperature increase in the conceptus can exceed 2°C.

Recommendations:

- *A diagnostic exposure that produces a maximum temperature rise of 1.5°C above normal physiological levels (37°C) may be used without reservation in clinical examinations.*
- *A diagnostic exposure that elevates embryonic or fetal temperature above 41°C (ie 4°C above normal body temperature) for 5 minutes or more should be considered potentially hazardous.*
- *The effects of heating should be reduced by minimising the duration of exposure.*
- *Due to the possible influence of potentiating factors duplex/Doppler ultrasound in febrile patients might present an additional embryonic and fetal risk.*
- *Care should be taken to use the minimum output consistent with obtaining the required diagnostic information and to minimise the duration of pulsed Doppler examinations in pregnancy.*

Acoustic Output and Equipment Output Display

The concept of an output display is to allow the user to determine the risk/benefit ratio of ultrasound procedures based on information provided on the equipment. Some modern equipment includes a form of display of output.

The FDA has approved an AIUM/NEMA real-time output display standard (ODS) that incorporates indicators of possible bioeffects;

Thermal Index (TI) estimates the potential for producing thermally-induced biological effects in soft tissue and bone.

Mechanical Index (MI) estimates the potential for producing nonthermal/mechanical biological effects in tissue.

It is necessary to understand that these indices have some limitations. Due to the difficulties of estimating tissue conditions, the indices (TI, MI) provide indicators of risk rather than quantifiable values. They also do not take account of extraneous factors such as dwell time, examination time, patient temperature or presence of contrast agents.

Recommendations:

- *Users of ultrasound diagnostic equipment should pay attention to any indicator of output, or of risk, displayed by the equipment to ensure that acoustic exposure is minimised to that necessary to obtain clinical diagnostic information.*
- *Use the ODS as indicators of risk rather than as quantifiable values.*

- *Users should appreciate that equipment that provides an output display can produce high intensities. For example, the embryo or fetus can be exposed to intensities as high as 720 mW/cm^2 under the FDA regulations. Equipment that has no output display is generally limited to intensities that do not exceed 94mW/cm^2.*

Acoustic Streaming

Flowing movement of particles in liquid-filled anatomical structures and body cavities is commonly seen in diagnostic imaging at higher levels of output used with modern ultrasound equipment.

The radiation force exerted on particles produces motion that is seen along the axis of the ultrasound beam in the direction away from the transducer.

The streaming velocities involved in clinical diagnostic applications are low, and the limited data on biological effects of streaming suggest that there are no safety concerns.

Ultrasound Contrast Agents

The imaging capabilities of ultrasound equipment can be substantially increased by the use of contrast agents containing microscopic gas bodies which provide echogenic interfaces when introduced into the sound beam.

It has been shown experimentally that cavitation-related effects of diagnostic ultrasound can damage mammalian tissues containing tissue/gas interfaces, such as lungs and intestines. Organs that do not contain gas are unaffected and these cavitation effects have not been reported in the fetus.

Studies on animals have shown that the probability of acoustic cavitation occurring in the body is increased when gas bubbles, in the form of contrast agents, are introduced into the body.

The peak pressure amplitude in the acoustic pulse is important in initiating cavitation effects. The maximum values for peak pressure amplitude in Doppler and B-mode equipment are similar.

Ultrasound equipment that provides an output display of a mechanical index (MI) does not include information about the enhanced risk of cavitation from contrast agents.

The presence of contrast agents should be taken into account when considering the risk of an ultrasound examination.

Recommendations:

- *When performing ultrasound examinations using echo-contrast agents, particular care should be taken to use the minimum transmit power necessary to apply the ALARA Principle.*

CONCLUSIONS

The use of diagnostic ultrasound in medicine has enjoyed a remarkable safety record. However, in recent years the margin between available acoustic output and the production of biological effects in mammalian tissue has become markedly reduced. At the same time, changes in the regulation and standards, and in the usage patterns will lead to increased responsibility on the user to assess risk/benefit of each diagnostic procedure. While advances have occurred in research into biological effects, it should be realised that there remain significant gaps in scientific knowledge. It is in the interests of all members of the ASUM ultrasound community to remain vigilant and ensure that best practice and prudent use of diagnostic ultrasound continues. Diagnostic ultrasound should only be considered safe if used prudently in accordance with the ASUM Safety Guidelines.

References:

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More on the ultrasound guidelines

Cheryl Bass, Chair, Standards of Practice Committee

In this edition of the Bulletin we are asking you to take the time to consider the revised guidelines for the mid and third trimester scan. It is anticipated that all Guidelines will soon be posted on the ASUM web site and as such freely available to all. Don't risk your patients being more informed than you are. Read them now!

The first change you will notice is that the 18 week scan has become the Mid Trimester Obstetric Scan. This is to reflect that although the majority of scans will still be performed at 18 weeks, it is recognised that in some circumstances, this may no longer be the ideal time. In particular the timing of the mid trimester scan is now influenced by the presence of risk factors for fetal abnormality as determined by the clinical history and, if performed, the results of a first trimester anatomy scan and the nuchal translucency thickness.

The second change is to the length of the checklist for fetal anatomy. I can almost hear a collective groan at the thought of more things to look for. But in fact many practitioners have already expanded their checklist and for those of you that have not I can only encourage you to try. Remember, when it was said we should do a 4 chamber heart view, we were doubtful and then Greg Davison said he was routinely visualising the lips and we were amazed. Now we are all doing these routinely and I am just asking you to extend the routine.

The paragraph on fetal abnormality has been significantly altered as it was felt that the guidelines should reflect the philosophy behind the mid trimester scan rather that trying to teach the technique.

In the Third Trimester Guidelines, the fetal wellbeing section was the only area which generated discussion and great care was taken with the wording. Note, in particular, the statement stressing that interpretation of fetal wellbeing should be based on an integrated assessment. Note also that "a formal assessment requires 30 minutes observation."

The other paragraphs in the mid and third trimester scan guidelines have been "tidied up" in line with current practice but not substantially altered.

If you have any comments, criticisms or suggestions let me know so that they can be addressed and where appropriate be incorporated into the next Guidelines. I anticipate that the guidelines will be reviewed every three years.

In conclusion I encourage you not only to read the guidelines but also to work with them in mind. The ASUM publishes the Guidelines to assist its members in maintaining a high standard of ultrasound practice. They are not intended to be a legal document but as they are the only standards document published in Australia it would be naïve not to expect some to refer to the Guidelines in cases of litigation.

Guidelines for the mid trimester obstetric scan

Revised October 1999

18-20 weeks is the most common time for performing this scan in an otherwise low risk pregnancy but examining the fetal anatomy may be appropriate at other times depending on the clinical situation.

The information gained aims to provide the patient and the doctor involved in her care with as much information as possible about the pregnancy in the safest and most cost-effective manner.

The limitations of ultrasound must be appreciated. Technical factors, such as fetal position and maternal obesity, may make full assessment impossible.

EQUIPMENT

Studies should be performed using high quality real time equipment. The availability of colour Doppler is advisable.

If state of the art equipment is not available both the patient and the referring doctor should be aware that the examination is less complete and the ability to detect fetal abnormality may be reduced.

COMMENT

Each department/practice should decide its own policy on making hard copy images available to the referring doctor and the patient.

THE EXAMINATION CHECKLIST

1. **Fetal number**
2. **Fetal cardiac activity**
3. **Gestational age**
4. **Fetal anatomy, including detection of malformation**

Head	- Falx	( )
	- Cavum Septum Pellucidum	( )
	- Skull Bones	( )
	- Lateral Ventricles	( )
	- Choroid Plexus	( )
	- Cerebellum/Vermis	( )
	- Nuchal thickness	( )
	- Cisterna Magna	( )
Face	- Orbits	( )
	- Nose	( )
	- Jaw	( )
	- Lips	( )
	- Profile	( )

Diaphragm - Right ( )
- Left ( )

Heart - FHMD ( )
- Position ( )
- Axis ( )
- 4 Chambers ( )
- Intraventricular Septum ( )
- Foramen Ovale ( )
- Mitral Valve ( )
- Tricuspid Valve ( )

Great Vessels - Left Ventricular Outflow Tract ( )
- Right Ventricular Outflow Tract( )
- Aortic arch ( )
- Ductal Arch ( )

Abdomen - Stomach / Situs ( )
- Kidney (Left) ( )
- Kidney (Right) ( )
- Bladder ( )
- Abdominal Wall ( )

Spine - Ossification Centres
Coronal ( )
Sagittal ( )
Axial ( )
- Skin Line ( )

Extremities - 12 Long bones ( )
- Hands/Fingers ( )
- Feet/Toes ( )
- Position of joints ( )

Umbilical Cord - Insertion ( )
- 3 Vessels ( )

5. Amniotic Fluid Volume **( )**

6. Placenta - Site **( )**
- Clear of Os ( )
- Distance from internal os ( ) cm
- Reaching/Covering os ( )

7. Cervix - Normal length ( )
- Open/Closed ( )

8. Maternal anatomy - Uterus **( )**
- Adnexa ( )

COMMENTS

Gestational Age

This should be assessed by the bi-parietal diameter (BPD), head circumference (HC) and femur length (FL). Abdominal circumference (AC) is normally measured to check fetal proportions.

These values should be reported and a single gestational age assessment given. If the ultrasound due date differs from the menstrual date by more than 2 standard deviations, a revised estimated date of delivery (EDD) together with a predicted range should be given.

The BPD chart distributed by the Australasian Society for Ultrasound in Medicine (ASUM) is recommended.

Fetal Anatomy Including the Detection of Abnormalities

Each practice should develop a protocol on the procedure to be followed when an abnormality is detected. This protocol should include guidelines for the immediate care of the patient and how the referring doctor will be informed.

Careful evaluation of normal fetal anatomy according to the checklist should detect many major anatomical abnormalities.

It is important to remember that an apparently minor defect may be the only pointer to a major chromosomal abnormality.

Some structures may not be demonstrated because of maternal size, fetal position and other factors. Repositioning or rebooking the woman may be necessary to complete the examination.

If the assessment of fetal anatomy is limited, for whatever reason, the report should reflect the limitations of the scan.

Sex Determination

Determination of the sex of the fetus is rarely medically indicated. Care should be taken not to show the genitalia to those not wishing to know the sex of their fetus. If sex determination is requested this information should be provided based on positive identification of the external genitalia. Patients should be made aware that ultrasound assessment of fetal gender is not 100% accurate.

Multiple Pregnancy

Additional information required when a multiple pregnancy is diagnosed.

1. Ensure that the anatomy of each fetus is demonstrated.
2. Comparison of fetal size and amniotic fluid volume of each sac should be made.
3. Placental number, presence or absence of interposed membrane should be recorded.
4. An attempt should be made to confirm or determine chorionicity.
5. Identifying the sex of each fetus may assist in determining the chorionicity.

Placental Localisation

The relationship between the lower margin of the placenta and the internal os should be determined. If the relationship between placental position and the internal os is still uncertain at the end of the scan, preferably with both a full and empty bladder, then a repeat scan at 34 weeks, or earlier if clinically indicated should be considered. Repeat scans should only be necessary in about 5% of all cases.

Amniotic Fluid Volume

Qualitative evaluation of amniotic fluid is accurate when assessed by an experienced operator. It can be supplemented by quantitative evaluation of the 4 quadrant cumulative measurement of amniotic fluid or in cases of oligohydramnios, the depth of the deepest pocket of fluid.

Maternal Anatomy

All pelvic masses should be documented, measured and where possible the organ of origin be determined and a short differential diagnosis given. If a pelvic mass is present the position and appearance of the maternal kidneys should be documented.

The cervix should be assessed.

Guidelines for the performance of third trimester ultrasound

Revised October 1999

HISTORY

The last menstrual period (LMP) or previously calculated estimated date of delivery (EDD) and previous obstetric history should be noted. It is often useful to review any available ultrasound records. The indication for the examination should be carefully considered and the examination targeted to answer the clinical problem.

EQUIPMENT

Studies should be performed using high quality real time equipment, preferably with colour Doppler capability.

THE EXAMINATION

Full evaluation should include assessment of the following points. As stated previously each examination should be targeted to the requirements and needs of the patient and referring doctor. All points need not necessarily be assessed each time:

1. Fetal number, presentation and lie
2. Fetal cardiac activity
3. Measurements of fetal size
4. Fetal anatomy
5. Fetal wellbeing
6. Placental localisation
7. Amniotic fluid volume
8. Detection and evaluation of maternal pelvic or adnexal masses

COMMENTS

Measurements of Fetal Size

The biparietal diameter, head circumference, femur length and abdominal circumference should be measured. A weight estimation should be given. Refer to the appropriate ASUM recommended charts ("ASUM Standard BPD Chart" - D3 and "Statement on Normal Ultrasonic Fetal Measurements" - D7).

When the dates are unknown, the wide variation of ultrasound estimation of gestational age in the third trimester should be indicated in the report.

Fetal Anatomy

The extent of evaluation of the fetal anatomy will depend on the clinical indication for the scan, the result of any previous high quality fetal anatomy scan and the time elapsed since the last scan. Where appropriate the fetal anatomy should be examined as described in the Mid Trimester Obstetric Scan. (Refer to ASUM Policies and Statements - D2). Some details of fetal anatomy may not be visible at this gestation. It is particularly important to try and assess the brain, heart, stomach and kidneys. However when these structures cannot be visualised it is usually not necessary to recall the patient.

Fetal Wellbeing

Interpretation should be based on an integrated assessment and not on one factor alone.

In addition to fetal size the following parameters should be assessed when clinically appropriate:

a) Fetal cardiac rate and rhythm.

b) Some or all of fetal movement, respiratory movement, tone and amniotic fluid index.

c) Umbilical artery waveform, including the RI or S/D ratio and presence or absence of diastolic flow.

NB: Formal assessment of the parameters in point b) the biophysical profile, requires a strict protocol and up to 30 minutes observation time. Caution should be exercised in reporting abnormalities in shorter observation times.

Placental Localisation

The location of the placenta should be recorded. If it is low, great care must be taken to determine its relationship to the internal os.

Gently pushing the presenting part up out of the pelvis can sometimes help in determining the lower edge of the placenta.

A transvaginal or transperineal scan may be helpful in doubtful cases. Particular care is needed if transvaginal examination is performed on a patient who may have placenta praevia. If such an examination is proposed, it may be appropriate to discuss the matter first with the referring doctor.

Amniotic Fluid Volume

Quantitative evaluation of the Amniotic Fluid Index using the 4 quadrant method is preferred. The measurement should be correlated with the gestational age. Alternatively oligohydramnios can be recorded if no pockets of fluid are visible greater than 2 cm vertical depth and polyhydramnios if pockets are greater than 10 cm vertical depth.

Detection and Evaluation of Pelvic or Adnexal Masses

Any masses in the pelvis displacing the presenting part should be evaluated.

Ovarian masses may be situated near the fundus of the uterus.

Urachal adenocarcinoma: A case report

Louise Lee, Sonographer, Medical Imaging Department, Gold Coast Hospital, Southport Qld

Neoplasms of the urachus are rare, accounting for only 0.01% of all adult cancers (1) , 0.2-0.34% of all bladder cancers (2) and 20–40% of all primary bladder adenocarcinomas. Urachal carcinoma mainly affects the middle aged to elderly patient with males accounting for 75% of cases (1-3).

The urachus itself is a vestigial remnant of the cloaca and allantois (2). It lies within the space of Retzius (retropubic space) bounded by the transverse fascia anteriorly and the peritoneum posteriorly (4). The following describes a case of urachal adenocarcinoma presenting in pregnancy.

CASE HISTORY

A 34 year old pregnant female (G5P4) presented with frank macroscopic hematuria. She had a family history of lethal cancer (<40–45 years of age). The microurine test was grossly blood stained but contained no growth of organisms. Renal function was normal.

Ultrasound demonstrated an intrauterine pregnancy of 16 weeks gestation. No abnormality was demonstrated in the kidneys. The bladder was empty and therefore was not able to be assessed. Cystoscopy was recommended, but due to the associated risk to the pregnancy it was felt that this should be done after delivery. The bleeding stopped within 24 hours and the patient was discharged.

Three weeks later the patient re-presented with a 1 week history of frank macroscopic hematuria with clots and was now experiencing lower abdominal pain. The attending medical officer gave the provisional diagnosis of placenta percreta.

Ultrasound findings

A single viable foetus was seen. Foetal heart beat and liquor volume were normal. The placenta was anterior and clear of the internal os. There was a reasonable depth of myometrium between the placenta and the external surface of the uterus with no evidence of invasion of the placenta into the bladder wall.

Within the bladder there were multiple complex echoes seen swirling with patient movement indicative of multiple blood clots. In the apex of the bladder there was a 20 mm complex mass (figures 1 and 2) containing calcification and associated shadowing (figure 3). Depending on the angle of approach this lesion appeared sometimes within the bladder and sometimes within the abdominal wall (figure 4). No flow was seen within the mass on colour Doppler.

Findings were regarded as being of a urachal lesion. Due to the patient's age and sex the lesion was suspected to most likely be a complicated urachal cyst.

Management

As the patient's clinical symptoms were worsening and a urachal lesion had been identified by ultrasound, cystoscopy was deemed necessary. This demonstrated a lesion in the apex of the bladder. Tissue samples were obtained by biopsy. The pathological findings were consistent with a urachal adenocarcinoma.

Due to the patient being pregnant she could not undergo the normal computed tomography chest-abdomen-pelvis for staging. Instead an ultrasound of the abdomen was performed to assess if there was any metastatic spread to the liver or any associated lymphadenopathy. A chest x-ray was performed (with abdominal lead shielding) to look for secondaries in the lungs. In both examinations no abnormality was detected. Finally Magnetic Resonance Imaging was carried out to investigate if there were any pelvic nodes. Distinguishing nodes from prominent veins was made difficult due to the pregnant state of the patient, however no obvious pelvic nodes were identified. The tumour was demonstrated on the anterosuperior aspect of the bladder.

As the urachal adenocarcinoma appeared to be localised with no obvious metastatic spread it was decided that immediate surgery should be performed to remove the lesion despite the ongoing pregnancy. A partial cystectomy and complete excision of the tumour and urachus was performed.

Surgical/pathological findings

The removed tumour was 20 x 12 x 10 mm, well marginated and mobile. The tumour extended deeply into the superficial portion of the muscle layer of the bladder. There was no involvement of any vessels, however some of the surrounding nerves appeared to have tumour permeation of their lymphatics. The local excision appeared to be clear of any tumour cells as the adjacent mucosal epithelium consisted of morphologically normal transitional cell epithelium. Microscopically the tumour consisted of moderately well differentiated mucus secreting adenocarcinoma cells.

To date the patient is doing well and has since delivered a healthy baby girl.

DISCUSSION

This case documents a rare tumour in which the diagnosis and management was complicated by the patient's pregnancy.

Urachal adenocarcinomas are usually solitary masses arising from the dome of the bladder and commonly extend into the perivesical fat, space of Retzius and the abdominal wall. They are usually complex in nature with the demonstration of calcification increasing the specificity of the diagnosis (1,3,5).

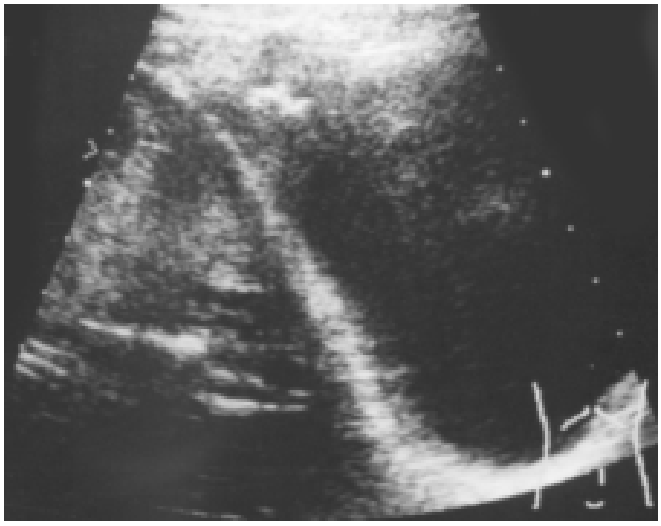

Figure 1 Longitudinal image of the lesion in relation to the bladder and the uterus

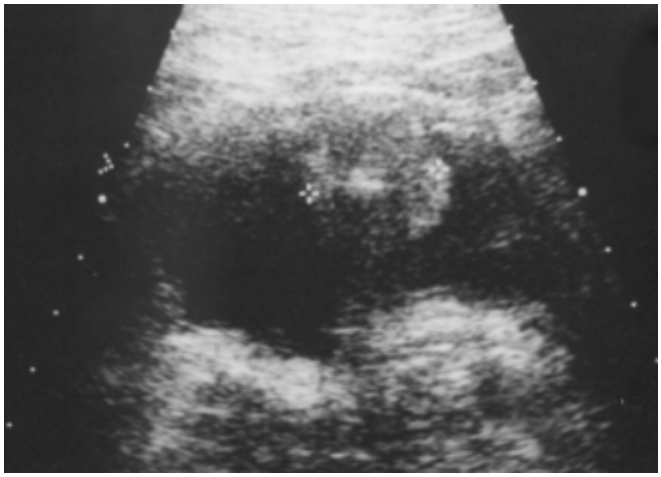

Figure 2 Transverse image of the lesion

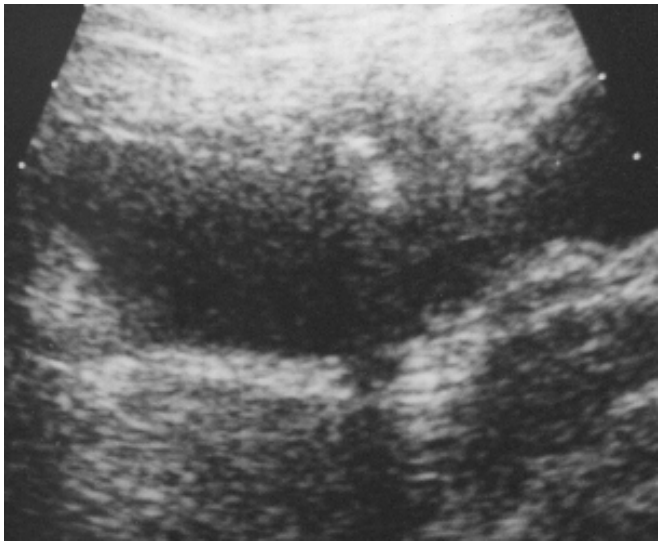

Figure 3 The demonstration of calcification with associated posterior shadowing increases the specificity of the diagnosis of urachal adenocarcinoma

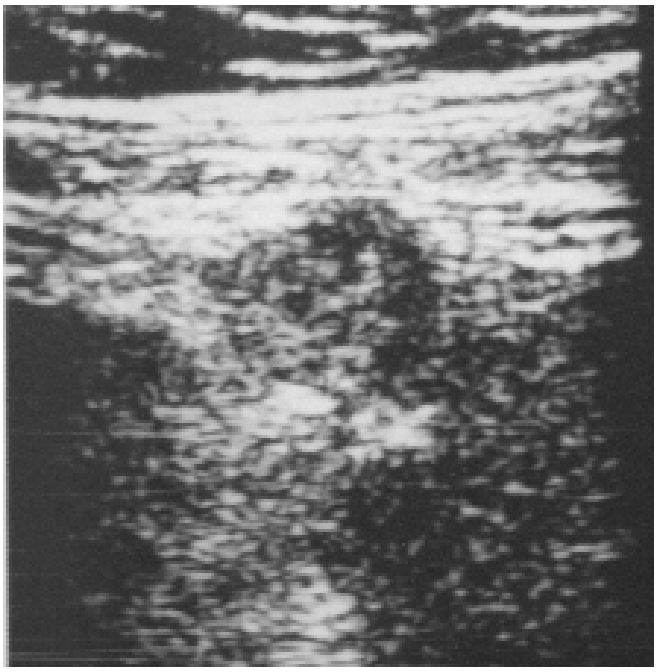

Figure 4 The use of 7 MHz linear probe improves visualisation of the lesion within the abdominal wall

Clinical presentation includes:

- hematuria (2,3,6-9)
- suprapubic mass (2,6-9)
- abdominal pain (2,6-9)
- discharge of blood, pus or mucus from the umbilicus (2,6,9)
- increased frequency of urination (1,3,9)
- dysuria (1,6,3-9)
- mucouria (1,6,7)

Urachal adenocarcinoma usually has a poor prognosis with a 5 year survival rate of 7-16% (2). This probably results from late discovery due to its location as well as urachal tumours' predilection for local invasion (10). Local recurrence commonly occurs within 2 years following surgical excision. Metastasis may occur to the lymph nodes, lung, liver, bone and the peritoneal cavity. Treatment is usually by excision of the lesion and partial or complete cystectomy. Radiotherapy or chemotherapy currently is not believed to be of much benefit (9).

Much has been written in the literature about the use of CT in identifying the presence of urachal tumours, while little has been documented on the usage of ultrasound. As this case demonstrates, ultrasound is also capable of identifying such lesions.

Ultrasound was the modality of choice in this situation as it was non-invasive and did not involve the use of ionizing radiation. The extra-peritoneal location makes it easily accessible to ultrasound, as there is little interference from overlying loops of bowel (5). It is important however, that the patient has a full bladder, as was highlighted in this case. The loss of the bladder window, due to the bladder being empty, not only prevented the bladder from being assessed but also prevented this lesion from being visualised

in the initial scan. Ultrasound shows well the anatomical location, size, shape and complexity of the mass (8). In particular the ability of ultrasound to identify calcification as an echogenic structure with associated posterior shadowing increased its specificity. Ultrasound may also be used in the staging process to demonstrate the presence of secondaries in the abdomen, to direct fine needle aspiration/biopsies in obtaining samples for histological sampling as well as in following up patients post-operatively.

On CT and MRI the presence of a mass in the dome of the bladder that has extravesical extension in the midline and contains calcification is suggestive of urachal carcinoma. No enhancement appears to occur with the administration of intravenous contrast media. This is believed to be due to the mucous content of such tumours (9). On MRI (figure 5) the varied mucoid content of urachal adenocarcinoma results in a varied appearance, and commonly there is an increase in the signal intensity on T2-weighted images (4,5).

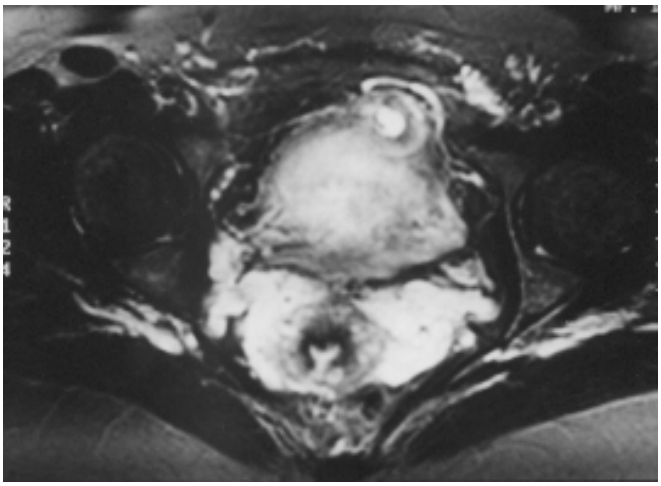

Figure 5: Transverse MRI image at the level of the lesion. T2-weighted images commonly show imcrease in signal intensity

Plain films and urography are usually of little benefit. Occasionally calcification may be seen on a plain abdominal x-ray (5) ~ <5% (9), while a deformity of the apex of the bladder may be apparent on urography (3,11) ~ 10% (7).

It should be stressed that radiological impression is only an indicator of possible diagnosis. Histological assessment is the only true method of definitive diagnosis.

Differential diagnosis includes sarcoma, transitional and squamous cell carcinoma of the bladder, urachal cyst, a benign complex urachal remnant or mucin producing adenoma of the gastrointestinal tract (9).

CONCLUSION

A complex mass lesion that:

- is located in the dome of the bladder and has extravesical extension along the midline
- contains calcification
- is clinically symptomatic

should be suspected of being a urachal carcinoma and should be histologically assessed.

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Book reviews

Title: Intraoperative, Laparoscopic and Endoluminal Ultrasound
Editor: Robert A Kane
Publisher: Harcourt
Year: 1998
Approx Price: $A306.85

This is a 15 chapter, 224 page book compiled by an impressive list of contributors.

The purpose is described as "To provide a comprehensive state-of-the-art survey … intended for experienced practitioners and as a guide for those interested in utilizing these techniques".

The book covers the full range of intraoperative, endoscopic and endoluminal applications, including a few areas not so commonly covered, ie intraoperative ultrasound of the spinal cord, ultrasound assisted thoracoscopy, bronchoscopy and mediastinoscopy as well as intraoperative ultrasound of the breast.

Each chapter is written by a different author, which leads to much repetition of basic principles and indications. The reader does however get the feeling that the authors do have a vast experience in techniques described, and many useful hints to avoid pitfalls are given.

Time after time, the point is made that for best results, close liaison between surgeon, sonographer and radiologist is needed, and a few practical hints to overcome logistical problems of combining scanning and surgical operating time are given.

The chapters on oesophagus, stomach, rectum and anus, pancreas, liver, biliary tract and laparoscopic techniques are very good. Minor criticism includes a lack of diagrams to display common biliary anatomical variants. Also, the intraoperative vascular ultrasound chapter reads like an overview aimed at someone not familiar with routine carotid or renal artery Doppler ultrasound.

The images are very good and comprehensive. The chapter on intraoperative ultrasound of the spinal canal has excellent correlation with MRI images.

There are no major omissions, though as this is a relatively new and expanding field, it may date quickly.

Despite the minor criticisms, this is an impressive book. It would appeal to, and be of great use to, someone keen on the techniques but just starting out. Its main benefit would be as a practical guide to avoid the mistakes made by the authors early in their own experience.

It will have a limited readership of those actively involved with these techniques, and is not intended for those interested in "dabbling" infrequently.

Rick Dowling FRACR

Title: Ultrasound Board Review: Questions and Answers for Self-Assessment
Editor: Michael M Abiri
Publisher: Thieme, New York
Year: 1999
Approx Price: $A50.25

This handy self-assessment book containing 700 exam questions is divided into 5 Chapters: Abdomen, Renal, Pediatric, Gynecology, Obstetrics, Small Parts and Physics (d'oh, those American spellings!). All questions are of the standard Multiple Choice Question (MCQ) or True/False type. Most of the MCQs have 5 distractors and some request a True / False answer for *each* distractor.

The clinical chapters are soundly based on the ultrasound appearances of typical pathology. An impressive emphasis is placed on actual ultrasound images from which questions are constructed. Unfortunately the images are from older equipment and are not of the best quality. Likewise, while many of the answers have good explanations, some of the references are dated. While intended for Radiology registrars, the level of the majority of questions will suit both registrars and those sonographers studying at DMU Part 2 level or university equivalent.

The Small Parts chapter gives excellent coverage of scrotal and thyroid ultrasound, and includes parathyroid, musculoskeletal, prostate, breast and some basic vascular questions. The inclusion of a chapter on paediatrics is welcome, as this topic is often omitted in general ultrasound exam books of this type. The physics chapter is a must for sonographers and registrars preparing for exams, and is all too short at 50 questions.

Books of this type have a rather one-off usefulness and so will only attract the keenest students. As an acquisition for the departmental library however, it would be valuable. It may also provide inspiration for educators constructing exam papers, although no statistical data (*eg* discriminator indices) are included.

Jill Clarke, AMS, MHlthScEd

Title: Peripheral Vascular Ultrasound: How, Why and When
Author/Editor: Abigail Thrush, Tim Hartshorne
Publisher: Churchill Livingstone
Year: 1999
Approx Price: $A85.95

This well presented book lives up to its title. Although confined to the diagnosis of peripheral vascular disease it covers all aspects succinctly.

The introductory six chapters cover ultrasound and imaging principles, the Doppler equation, colour and amplitude imaging. Most importantly these chapters stress the relevance of these principles to vascular applications.

Each of the different regions of peripheral vascular diagnosis has a dedicated chapter. Areas of vascular disease covered include extracranial cerebral circulations, upper

and lower limb arterial, aneurysmal disease, lower limb chronic venous insufficiency, upper and lower limb DVT, graft surveillance and vein mapping. In each chapter the anatomy of the region under investigation is described and displayed diagrammatically. Patient symptoms and presentation are briefly discussed, followed by a logical and practical description of an appropriate scanning technique. The text is supplemented with diagrams of transducer placement with respect to the anatomy, as well as the resultant duplex images produced. Normal and abnormal ultrasound findings, measurements and the limitations and pitfalls of each technique are discussed. To complete each chapter, differential diagnoses and other associated pathologies are described. The final chapter discusses numerous topics, each of which needs to be considered when providing a vascular ultrasound service.

The book, although small in size at 215 pages, covers all areas of peripheral vascular ultrasound thoroughly. It does not attempt to cover abdominal Doppler, transcranial Doppler and dialysis access grafts. For students of physics a more comprehensive and technical text may need to be consulted but for a working knowledge of ultrasound physics with respect to vascular applications this information is presented clearly. The chapters are logically set out and the text is well supported with clear anatomical diagrams, colour duplex images and pulsed wave Doppler spectra. The comprehensive index allows specific topics to be quickly accessed.

A text well worth the read.

Lucia Pemble

Title	**Three-Dimensional Ultrasound**
Author/Editor:	**TR Nelson, D B Downey et al**
Publisher:	**Lippincott, Williams & Wilkins**
Year:	**1999**
Approx Price	**$A79.95**

This beautifully presented book should be considered for purchase by anybody thinking of commencing work in 3D ultrasound. The book has many strengths. The layout of the chapters is well structured to assist the reader absorbing the fundamentals. Each chapter commences with an overview and then a point summary of the key concepts. At the end of each chapter, and when relevant at the end of sub-sections, is a "how to do it" section which is most useful. There are large numbers of excellent illustrations presented throughout the text. The illustrations are carefully planned to demonstrate specific points, they are appropriately labelled with some line diagrams which make the images readily interpretable. In addition, there are frequent tables that highlight the advantages and disadvantages of 3D ultrasound in particular clinical areas.

It is particularly pleasing to note the clinical perspective presented by the authors. Throughout the book they demonstrate a breadth of understanding of both the physics and regions of the body under discussion. This enables them to clearly spell out the benefits and disadvantages of 3D in the various organ systems and for particular diseases. This book not only demonstrates the appealing images that can be produced with the technology but also offers a clear clinical perspective – the clinical segments provide extensive summaries and references of published works. The book demonstrates that no longer can one question that there is clinical merit of 3D ultrasound in making some diagnoses, but there is clearly much work to be done to resolve the extent of the impact that 3D ultrasound will have on clinical management.

The first chapter started very badly. The first key concept is that "the primary role of visualisation in medicine is to provide the physician with information". Also in the first chapter "physicians need these imaging systems for their own insight….". One unfortunate side of specialisation in imaging is that one becomes focused on the imaging technology and the information that can be gleaned. The benefits to the patient can be lost in the excitement of the imaging. It is sad to see that the authors have focused entirely on the technology and its benefits to the physician at the complete exclusion of any consideration of potential patient benefit.

Following the Overview section, there is an excellent presentation summarising the 3D technology. There are chapters on acquisition methods, visualisation and display methods, and quantitative analysis methods. These well-structured chapters clarify and clearly explain very difficult concepts.

The major section of the book is on clinical applications. These examine in step-wise fashion 3D ultrasound examination in obstetrics, gynaecology, the genito-urinary system, abdomen, vascular, cardiac system, the breast and ophthalmology. The authors spell out when 3D ultrasound has been demonstrated to be superior to 2D, and when it currently offers little advantage. Medical benefits are demonstrated in obstetrics, particularly in the assessment of fetal anomalies.

3D in interventional applications touches on an area of potential great benefit in both diagnostic and therapeutic techniques. Although the authors claim that "fast 3D implemented in a user-friendly manner will improve the quality of interventional procedures, this short chapter merely touches on some selected areas of the body leaving the impression that this is more of a "work in progress" segment.

There is a short segment on "emerging clinical applications" which potentially offers ideas for those interested in researching new areas in 3D.

The authors in their final chapter list areas where improvement is needed to facilitate clinical acceptance of 3D. I suspect that clinical introduction of 3D ultrasound also will be enhanced when the top of the range ultrasound equipment also has top of the range 3D imaging capability. At that time imaging specialists will presumably become accomplished at 3D scanning in a time frame that does not unduly lengthen the examination. The benefits of this technology that are demonstrated in this book could then be passed on to patients in routine practice.

It is easy to become carried away by the technology. The October 1999 AIUM statement should be noted: "3D should not be considered more than a developing technology".

Lachlan de Crespigny

Title:	**Practical Head and Neck Ultrasound**
Editors :	**Anil Ahuja and Rhodri Evans**
Publisher:	**Greenwich Medical Media Ltd**
Australian Agent:	**Blackwell Sciences Asia Pty Ltd**
Year:	**2000**
	ISBN:1-900-151-995
Price:	**$A140**

This book arose from the course notes produced by Anil Ahuja and Rhodri Evans for the annual Head and Neck Ultrasound Workshop held at Morriston Hospital, Swansea. The editors have written four of the nine chapters.The remaining chapters are by sonologists except for one chapter by two maxillofacial surgeons at Morriston Hospital.

The introductory chapter is a concise and clear exposition of anatomy that a sonologist needs. Subsequent chapters are on the salivary glands, thyroid, larynx, lymph nodes, biopsy techniques, carotid Doppler and "What the surgeon needs to know". The chapters are well written and, despite having many authors, have a consistent quality and clarity. There is liberal use of boxes to summarise important points. The chapter "Lumps and bumps in the head and neck" is a novel method of answering queries that are posed in daily scanning. The chapter on the larynx was an eye-opener. The chapter by the maxillofacial surgeons is informative and pertinent. The quality of the ultrasound images is excellent .The references at the end of each chapter are up to date.

In conclusion this is a well produced book which will be in daily use in our practice. At $ 140 it is excellent value.

Iain Stewart MRCP (UK), FRCR
Canberra

Chris Kohlenberg Teaching Fellowship (sponsored by Diasonics GE) Report on WA program - June 2000

Elvie Haluszkiewicz

Mark Bryant, a senior Sonographer with *North Coast Radiology, Lismore,* was appointed as visiting Fellow for this year's program of workshops and tutorials that covered a wide range of topics as well as a wide geographical area.

A rather gruelling schedule was arranged for Mark, because on site educational opportunities such as these are rare and simply too good to miss. In hindsight, a more sedate pace would have been kinder!

As well as the solid travel itinerary, the wide range of topics requested provided quite a challenge. Mark was asked to cover physics, fetal anomalies, musculoskeletal topics, renal and groin as well as examination technique during the 6 days. He did all this with energy, enthusiasm and without complaint!

After comprehensive and successful sessions in Darwin and Port Hedland, Mark arrived in Perth for a branch meeting, and further workshop and tutorial sessions. Both were extremely well attended. Branch organisers were appreciative of the local support for our guest.

About 20 DMU candidates attended the session on exam technique held at Royal Perth Hospital. Here, the value of Mark's experience as an ASUM examiner was evident and the written, practical and the OSCE aspects of the DMU were discussed at length. So lengthy in fact, that everyone was quite unaware that the session had gone overtime by nearly an hour! This example alone highlighted Mark's willingness to share his expertise and information.

The final sessions of the program were warmly hosted by *Imaging The South* in Mandurah and Bunbury. Here, as had happened elsewhere, every effort was made by the host practice to accommodate the activities. It was also pleasing that all available sonographers made the effort to participate in the teaching sessions.

Mark's deep interest in sonographer education was evident throughout these tutorials and workshops. Working with participants as they scanned, he skilfully helped them refine their technique, referring to the underlying principles of physics and including useful suggestions where appropriate.

Thanks must go to all involved in the 2000 Teaching Fellowship. The clinical centres embraced the arrangements from the outset, providing facilities, with others in the background working to ensure maximum attendance and uninterrupted sessions. These efforts were appreciated.

ASUM WA Branch would like to extend their thanks to *North Coast Radiology* for releasing Mark from his normal duties to undertake such a valuable teaching program. We would also like to thank Mark Bryant for putting in so much work on our behalf. Thanks also to the Diasonics GE representative in WA, John Periera.

We are all indebted to Diasonics GE for their generous sponsorship of the Chris Kohlenberg Teaching Fellowship from which many ultrasound professionals working in isolated or remote areas have benefited.

Pictured above. Kevin Jones, Mark Bryant and Ian Went

Chris Kohlenberg Teaching Fellowship (sponsored by Diasonics GE) Report on Darwin program - June 2000

Kim Lipman
Seminar Co-ordinator

On Sunday the 18th June, Darwin sonographers gathered at Royal Darwin Hospital for a Seminar on Obstetric and Musculoskeletal Ultrasound as part of the Chris Kohlenberg Teaching Fellowship sponsored by Diasonics GE. Our guest speaker, Mark Bryant from North Coast Radiology in New South Wales, was met with our somewhat warmer climate for his brief 36 hour stop-over. A small group of 10-15 Darwin sonographers provided a friendly environment.

Mark Bryant and sonographers during musculoskeletal session.

Mark provided us with a relaxed yet comprehensive style of lectures and tutorials on obstetric and musculoskeletal ultrasound. The afternoon provided time for practical workshops and lots of questions for Mark to tackle. Plenty of coffee and food breaks ensured the group remained cheerful and talkative despite the lovely warm Sunday outside. Later in the evening we gathered for a few social drinks and a casual meal by Cullen Bay marina.

It was a great pleasure to have Mark Bryant as our guest speaker. He provided us all with plenty of fresh ideas and valuable knowledge. All the sonographers found it to be extremely helpful as well as reassuring.

I would like to take this opportunity to thank Mark, Diasonics GE sponsors of the Chris Kohlenberg Teaching Fellowship, the Radiology Department of Royal Darwin Hospital, NT Imaging and all the Darwin sonographers who assisted in the organisation of the day. It was a great success and was appreciated by all those who attended.

ASUM & Diasonics GE announce a second Teaching Fellowship for 2001

Luke Fay
Chair, Membership and Marketing Committee

Standards of ultrasound practice in Australia & New Zealand are recognised as being some of the highest in the world. For this we must recognise the pioneers including the Ultrasonics Institute and the clinicians with whom they worked. Through their research, experimentation and, most importantly their education efforts, diagnostic ultrasound has flourished here.

In recognition of the value of ultrasound education, Diasonics GE is committed to supporting ASUM's education activities through the Chris Kohlenberg Travelling Fellowships, Beresford Buttery Overseas Traineeship and various other workshops and symposia.

Due to the enormous success of the Travelling Fellowships we are delighted to announce that the program has been expanded to include two Fellows each year. The origin of the Travelling Fellowship was in requests from members outside of the major cities for better access to training. The Education Committee and Keith Henderson responded with this concept. Now in its third year, lectures have been conducted throughout New Zealand, rural New South Wales, the Northern Territory and regional Western Australia.

Diasonics GE is proud to be associated with such successful initiatives as testimony to our desire to further standards of ultrasound practice in Australia and New Zealand.

1999 Beresford Buttery Overseas Traineeship (Sponsored by Diasonics GE)

As the recipient of the 1999 Beresford Buttery Overseas Traineeship I had the privilege of attending two courses, 3D Ultrasound Seminar and Fetal Cardiac Ultrasound, run by the Thomas Jefferson University in Philadelphia, USA. I selected the courses from the range of Ultrasound Education Programs offered by Thomas Jefferson University.

Shortly before my departure to attend the courses, my workplace purchased an ultrasound machine with a 3D package. This was the motivating factor for choosing to attend the 3D Ultrasound Seminar. Prior to attending the seminar my attention to 3D ultrasound was at the level of surface rendering. I was open to how surface rendering may assist obstetric ultrasound but was struggling to find an application outside of an aesthetic nature. The seminar widened my approach to 3D ultrasound from simply surface rendering to the issue of multiplanar imaging and volume acquisition.

The multiplanar aspect of 3D ultrasound allows a structure to be looked at slice by slice after an examination, as much as we are able to do in our minds in real time. The images produced using 3D ultrasound allow a clinician to sit down with a patient and help them to fully understand the situation with their fetus. Conjoined twins and gastroschisis are two examples of this application. In a similar way, surface rendering allows much better patient understanding of the extent of abnormalities, such as cleft lips.

Advantages were also shown in the potential for multiplanar reconstruction. For example, a bicornuate uterus is reconstructed from cross sectional and sagittal images into a true coronal plane. The fundal branching of the endometrium can be seen clearly as a single image.

The staff of Thomas Jefferson University indicated that they are researching new algorithms for endometrial volumes. If various clinical applications of multiplanar imaging, surface rendering and volume acquisition can be found, 3D ultrasound in obstetrics and gynecology will become more widely used.

Following the didactic sessions I had the opportunity to participate in a practical session which provided hands on experience. I was disappointed, considering the potential advantages of 3D ultrasound, that this session was limited to attempts at surface rendering fetal faces with less than convincing results.

I attended the Fetal Cardiac Ultrasound course with the expectation of acquiring protocols for a fetal cardiac scan, including the normal colour and spectral trace appearances for cardiac anatomy. Whilst a handout was provided that detailed this information, the lecture time was oriented towards identifying the common forms of congenital heart disease. This, I believe, proved more beneficial than my expectations of the course. There are many resources available for protocols on fetal cardiac ultrasound. The focus on common cardiac diseases provided me with much more confidence and improved ability to determine particular types of cardiac defects which may be present in fetuses. It will also allow me to continue improving my skill in interpreting the changes to colour flow patterns and the spectral trace.

The main lecturers in the course were a paediatric cardiologist and a fetal and paediatric cardiac sonographer. They showed us many video examples of ultrasounds of common forms of congenital heart disease and how the ultrasound appearances vary from the normal findings. Their input was invaluable.

Dr Barry Goldberg, the head of the ultrasound department at the Thomas Jefferson University Hospital, was kind enough to show me through the entire centre. I thank him for his hospitality which extended to taking me out to lunch with his office staff on the final day of my course.

Dr Barry Goldberg and David Fauchon

I am grateful to Diasonics GE for sponsoring the Beresford Buttery Overseas Traineeship, which made this valuable learning experience possible. I hold Diasonics GE in high esteem for their contribution to the ultrasound profession and believe that providing the opportunity to attend Ultrasound Education Programs at Thomas Jefferson University ensures continued growth of the profession. I would also like to express my appreciation to the Education Staff of ASUM for their administration of the Traineeship.

David Fauchon
Christopher Kohlenberg Department of Perinatal Ultrasound
Nepean Hospital, Penrith NSW 2750

Australasian Sonographer Accreditation Registry report on meetings held 18 March and 3 June 2000

Stephen Bird ASUM representative to ASAR

Following the intense workload involved with course accreditation at the previous meeting, attention has turned back to improving the service delivery of the Registry to its members.

The efficiency of the interface between the ASAR and the sonographic community has long been an area, which requires improvement. Over the next few months work is continuing, to change the billing periods to a January 1st calendar year system. This will replace the previous system of 3 billing periods depending on the time of application and will improve efficiency of our database and CPD requirements for those using the MOSIPP system. Improvements in turn around time for correspondence, new applicants and applications for CPD activity will flow from this change. The good news for ASAR members is that many of you will receive some free time on the Registry as rather than having fees due in May or September 2000, these will be held off until January 2001. It is not often that you get something for nothing these days!

The ASAR web site has been launched at www.asar.com.au and in time this will provide a source of up to date Registry information as well as making application for CPD activities easier. Links to on line approved CPD activities will also be available through the web site, providing yet another opportunity to collect the required CPD credits.

The strong support for the processes of the Registry continues to be demonstrated by the rising number of sonographers seeking AMS status. The strong level of voluntary support for the Registry has been the dominant feature of the process since its inception. This clearly demonstrates the passionate desire within the sonographic community for the process of accreditation.

Sonographer accreditation has been born of the ASAR and supported by the Federal Government, however a broader process of accreditation is also evolving in parallel through the Royal Australian and New Zealand College of Radiologists (RANZCR). The latest draft accreditation document refers to sonographer accreditation directly.

"All sonographers must be:

Accredited Medical Sonographers (AMS) or hold the equivalent qualification (DMU or ASAR recognised equivalent);

or

Have a minimum five years full time experience and either become Accredited Medical Sonographers or obtain the equivalent qualification (DMU or ASAR equivalent) by 31 December 2004."

In some respects the above statement is a little confusing with reference to the Registry and various educational programs, however the intent is clear and must be applauded. The largest employer group for sonographers in Australasia is making clear their support for sonographer education and accreditation.

In turn we must be ensuring that all individuals practicing diagnostic medical ultrasound in Australasia without a recognised qualification are aware that only finite time exists for them to enter and complete one of the ASAR accredited qualifications. This is a major step forward for the profession as for the first time we will be able to define all individuals working as AMS and have an independent benchmark level of training broadly accepted and enforced.

As the ASUM representative to the Council of the ASAR I can assure readers of the Bulletin that the Registry is in a healthy position and poised to grow with the increasing demands being placed upon it.

If you are currently on the Registry please send all of your accumulated CPD documentation to the secretariat NOW and the database will be updated prior to the January 1st invoices being posted.

For more information please contact:

ASAR Secretariat, PO Box 516, Turramurra, NSW 2074, Australia.
Ph: 02 9449 1098 Fax: 02 9488 7496
Email: asar@ozemail.com.au

or contact Stephen Bird (ASUM ASAR Representative)
at: sjbird@camtech.net.au fax 08 8297 1802

ASUM Council

Mary Young, Honorary Secretary

Council gathered once again for the May meeting 2000. Many of the councillors had already participated in workshop organised by the Marketing Committee to try to make ASUM activities more directed towards our members needs. Our thanks go to Luke Fay and Diasonics GE for the organisation and venue.

Andrew Ngu, as President, warmly welcomed Dr Christian Wriedt as the incoming Chairman of the DDU Board. Dr Jim Syme will be stepping down as Chairman after the Council Meeting in Auckland. Dr Syme has steered the DDU Board for many years, and has ensured that the examination is held in high esteem, both nationally and internationally.

Business arising from the minutes of the last meeting included a report from Dr Gareth Phillips regarding the accreditation of vascular laboratories, and the difficulties in dealing with the Health Department.

The ASAR continues to flourish, with almost all ultrasound courses being accredited.

New Business included a lively discussion on the proposed budget for 2001-2002. Maurice Molan has worked long and hard to make the budget figures more meaningful and reflect more realistically the actual budget. Budget and accounting reform is ongoing with the appointment of a new accountant (April) and new auditors.

Fifty-nine new members in various categories are warmly welcomed.

David Carpenter asked that the Scientific Councillor be an ex-officio member of the Safety and Education Committees and this was carried unanimously.

David also initiated some discussion in regard to remuneration of invited speakers at ASUM metings, and after consideration, it was decided that the Education Committee should consider the contribution of lecturers annually, and recommend suitable recognition to Council.

Committees and Boards presented their reports with the Auckland Meeting proceeding on schedule and the program for the Sydney Meeting in 2001 being almost complete.

The Obstetric Workshop in Melbourne has been well supported, and a Vascular Workshop in Melbourne for 28-29 April 2001 is to be convened by John Vrazas with planning already commenced.

The DDU Board reported that the examination will possibly become redundant in the future, as more specialties seek approval for examinations in their particular field. However, there is no recommendation for change at present.

The DMU Board has been approached to certify a mammographers ultrasound role.

ASAR is also considering a mechanism to accredit suitable courses in sub-specialties. A discussion paper is to be prepared for the August Council Meeting.

The Education Committee has not met since the last Council Meeting. MOSSIP is currently under review and the *Bulletin* continues successfully. The DMU Part 2 preparation course will be extended to Brisbane in 2001.

The Teaching Fellowship has been awarded to Mark Bryant, a sonographer from Lismore, who will visit Darwin, Port Hedland, Perth and Bunbury.

Sponsors have continued to support paper and poster prizes for the 2000 scientific meeting.

Roy Manning has accepted an appointment to the adjudication panel for the Beresford Buttery Traineeship for 3 years from 2000.

The Standards of Practice Committee is currently working on protocols. The Guidelines for the Performance of Scrotal Ultrasound (D10) have been amended and will be distributed with a later issue of the *Bulletin*.

The Marketing Committee report from Luke Fay included some new and exciting developments with a proposed research foundation, a mentoring program and more efforts to promote ASUM educational programs to non-members.

The Corporate Members report from David Rigby included the suggestion that companies currently running independent educational programs could be encouraged to hold these programs in conjunction with ASUM.

The next Council Meeting will be held in Auckland on Sunday 27 August 2000 at the conclusion of the Scientific Meeting.

Due to the earlier date of this year's Scientific Meeting it has not been possible to complete the annual audit and print and distribute the financial statements and hold the Annual General Meeting in Auckland. This will be held in Melbourne in October, in conjunction with a Branch meeting. The notice of meeting and financial report, incorporated into the Member Services publication will be distributed to all members in late September.

Joint ASUM/AMSIG Musculoskeletal workshop Annual Scientific Meeting Hobart 15 - 16 April 2000

Rob Jones ASUM Workshop Convenor

Tasmania is a small place as you probably know, and most of us wear several hats. So, when Keith Henderson asked if I would be interested in convening a musculoskeletal workshop in Hobart and almost simultaneously Hobart's turn came up to host the Australasian Musculoskeletal Imaging Group (AMSIG) Annual Scientific Meeting the opportunity to combine the two (and halve the work) was too good to miss. It also helped that I was the State Chairman for ASUM and Mike Alcock the Deputy Chairman and that Mike Alcock was the President (and convenor) of AMSIG and I the co-convenor. As I said, Tasmania is a small place!

As usual when involved with organising a meeting, the first concern is "will anyone come?" and the second is "will anyone come" and the third is "can we get enough sponsorship to break even". Also, as usual, most people registered at the last moment and whilst the trade gave plenty of verbal support for the idea we remained anxious until we had written confirmation or (even better) a cheque.

Well suffice it to say we needn't have worried. We received approximately a hundred registrations for the AMSIG meeting and had to limit the registration to the workshop to a hundred because of limitations of space.

The combined meeting worked by having a joint plenary "State-of-the-Art" ultrasound lecture at the start of each session (*eg* shoulder, groin, knee etc). Following this ASUM Workshop delegates moved to the workshop room for a live scanning demonstration given by the plenary lecturer, whilst AMSIG delegates remained in the plenary room for further talks on related (generally) non-ultrasound related topics.

There were five major sponsors of the workshop (Acuson, ATL, Diasonics GE, Med Apps, Medtel/Aloka and Toshiba) and one general sponsor/trade booth (Meditron). Toshiba also kindly sponsored the Friday night welcome cocktail reception. It is largely due to the generous support of these sponsors that the workshop was such a success and I would like to take this opportunity to thank them.

Each major sponsor supplied a state-of-the-art machine (and applications staff) to the trade exhibition area and each machine was spotlighted in turn (and at random) for each appropriately named workshop session. This worked by having tiered seating for 100 around a central stage area. The image on the machine was projected via digital projector to a large back screen and a video camera highlighting the probe position screened as an insert into a corner of the big picture.

The general feedback from workshop delegates was that this system worked well and that everyone had a good view. It was also seen as an advantage that the plenary lecturer then demonstrated live scanning technique for both continuity and quality of presenters. Where else would you be able to hear in one day Frank Burke, John Read, Jenny Noaks and Neil Simmonds (to name but a few) give an hours lecture followed immediately by a live demonstration?

Feedback from AMSIG delegates was also generally positive. There is generally not a lot of US in this meeting but by showcasing it at plenary sessions, on this occasion musculoskeletal ultrasound was given the prominence it really deserves (author bias!).

All in all a successful combined meeting which made a moderate profit but, more importantly, demonstrated that cooperation between disparate groups with a common interest can not only work but be truly synergistic.

New members February – June 2000

ASSOCIATE MEMBERS

Hayley A Alderton	SA
Brendon Bacon	TAS
Gail Barbour	NZ
Sharon K Barker	WA
Gillian M Batchelar	NZ
Paul Batt	VIC
S Bauch	WA
Susan Bellamy	NSW
Christopher Bevan	WA
Amanda Blair	QLD
Cristina Blefari	SA
N Bolmat	VIC
Catherine A Brazzale	VIC
Jessica L Brent	NSW
Anthony Bruce	NSW
Debra L Buck	QLD
Joanne M Burkett	NZ
Karen Carmody	VIC
Paula Carryer	NZ
Donna Cater	NSW
W Chan	NSW
Craig Cheetham	WA
Sara Chitty	NZ
T Clark	NSW
William Clissold	NSW
Philippa Cooper	WA
D Coppen	WA
Brooke M Cossins	NSW
J Cox	WA
B Cramp	QLD
G Crawford	TAS
Claire L De Booy	VIC
Roderick Deans	VIC
Lisa Dubowsky	SA
K Duong	SA
Timothy S Eller	QLD
Venessa Engelbrecht	NZ
Esam Fikak	VIC
Katherine Fitzgerald	NZ
Denise Fong	NZ
Martin Forbes	VIC
Grant M Foster	VIC
Caroline Frankland	VIC
N Gale	VIC
Catherine B Golding	TAS
Carlie Gray	SA
Jacqueline Harper	VIC
Tania Harrison	NZ
C Hawke	WA
Y Hines	NSW
L Holden	NSW
Hayley Horsfall	SA
Laura H Horton	NZ
Nicole Hosking	NSW
Tim Huynh	VIC
Laura Iancu	VIC
Suzanne E Jones	WA
K Joyce	WA
Janine Kaye	NSW
Alison M Keay	NZ
Elizabeth Kelly	VIC
Rhonda Kent	WA
M Khomin	NSW
Michelle Kilby	NZ
Holly Kilmurray	NSW
Richard Langston	WA
Hongvan Thi Le	NSW
Vivienne Lee	VIC
Lisa Liu	NSW
Charisse Low	NSW
Jennifer Lynch	NSW
Kimberley S Maclean	NZ
Ewa Maruszczak	NSW
Linda Mathieson	NZ
Lindsay D McCallum	VIC
G McCauley	NSW
Michelle A McConnell	NSW
Lorranie A McEnroy	WA
Jason Mewburn	VIC
Sharon Minch	NSW
Justin Molloy	NZ
A Mullens	QLD
Joseph Mulley	NSW
Sheila Mulvey	VIC
Aliyh Namah	NZ
Donna L Napier	NSW
Samer Nasser	NSW
Marija Nesovic	NZ
K Ng	QLD
P Nguyen	VIC
G Nichols	VIC
Carolyn Nydam	QLD
Lisa J O'Dell	NSW
Melanie Oates	NSW
Patrick O'Dell	NSW
Olasunbo Olalere	NSW
Diane Oppawsky	VIC
Kristy M Ouwerkerk	QLD
Andrea M Packer	VIC
Katherine M Perkins	SA
Daniel Phillips	VIC
Karen Pont	NSW
Lisa Quach	NSW
R Quigley	NSW
A Radnor	VIC

K Reid	WA
Joseph A Reiken	QLD
Angus B Richmond	VIC
Gareth Robb	NZ
Catherine L Robinson	NSW
John Russell	VIC
Shona J Russell	WA
Catherine Scott	NSW
Rebekah Semaan	QLD
Ingrid Siles	VIC
Sharon Smith	NSW
Karthika SreesKantapathy	NSW
Katherine M Stanton	SA
Irina Starjiuskaia	ACT
Hayley Tedman	QLD
J Thomas	NZ
Kim Thorpe	NZ
B To	NSW
Adam Tolfree	NSW
Deborah Tucker	NSW
N Van Sparrentak	VIC
Alison Vance	QLD
Aaron Wallace	NZ
Karen Wallis	NZ
Katie Watts	WA
Jessica White	NSW
P Wilkinson	NZ
Eric Williams	WA
Kylie Williams	WA
S Witham	VIC
Sharyn A Woodhouse	NZ
Sonya Woronzow	WA
Kate Wright	SA
Jin Yu Yan	NSW
Tien Yeap	QLD

FULL MEMBERS

J Addison	WA
Luke Baker	NSW
Tracey Berrell	NSW
Janette Boyd	NSW
Urvashi Bilimoria	VIC
Sue Bradley	NSW
Ian Catchpole	QLD
Paul Condon	QLD
Tina Cullen	NSW
Suguna Ganesan	NSW
Madeleine Glasson	NSW
Emma Homes-Walker	NSW
Caroline Hylands	WA
Rony Kapoor	NSW
Aletta Landman	NZ
J Macaulay	QLD
Louise M Mestrov	QLD
E Ng	NSW
Justin O'Leary	NSW
Bronwyn Park	QLD
F Patel	NZ
Le-Anne Robinson	VIC
David S Rose	QLD
John Russell	VIC
Mark Stevens	NSW
Kaye Swallow	NSW
Joanne Trewin	VIC
M Tucker	SA
B Welson	ACT
S Wong	QLD

TRAINEE MEMBERS

W Abhayaratna	ACT
Z Barker	NSW
Lisa Begg	QLD
Meabh Ni Bhuinneain	VIC
Michael Chew	NSW
Stephen Cole	NSW
J Cook	NSW
Kellie A Foder	QLD
Glenn J Gardener	NSW
Maureen Hollyoak	QLD
Anne MacGibbon	NSW

CORRESPONDING MEMBER

Elizabeth McCarthy	UK

DDU examination results

The following were successful in the examinations held in May - June 2000

Part I

Zoe Barker	NSW
Michael Chew	NSW
Helen Clarke	WA
Stephen Cole	NSW
Jennifer Cook	NSW
David Ferrar	NZ
Gavin McGill	NSW
Tony Tan	Vic
Shell Wong	Qld

Part II

David Chung	NSW
Siobhan Lee	NSW
Anne MacGibbon	NSW
Sashi Siva	NSW
Dereck Souter	NZ
Jan Swinnen	NSW

RMIT UNIVERSITY Department of Medical Radiations Science

Since 1981, The Royal Melbourne Institute of Technology has offered a

Graduate Diploma in Ultrasonography

The course is a two year part-time program designed for people who are already engaged in ultrasound practice, but wish to cultivate and advance their knowledge in all aspects of sonography. Distance education (external studies*) provides the flexibility necessary for remote and/or busy people to access university education and earn a living at the same time.All subjects offered in the Graduate Diploma program may be undertaken as

Single Subject Enrolments

People not wishing to undertake a whole course can choose to just enrol in subjects of particular interest. For example, Vascular Sonography, Ethics and Medico-legal Studies, Ultrasonic Instrumentation and Abdominal Sonography to name a few.

Course applications close November 30 for the start of year and May 31 for the mid-year-intake. Late submissions will be considered.There is no closing date for single subject enrolments.

Admission requirements and further information:

Telephone 61 3 9925 7700, Fax 61 3 9925 7466, or email the Course Co-ordinator at lombardo@rmit.edu

Extra information available at our website: http://www.rmit.edu.au/

*Some block attendance on campus is required.

SONOGRAPHERS

Bored with your present routine?
Like to see more of this great country of ours?
Like to travel?
Like sun, surf, sailing, fishing?
Like being your own boss?

The person/s we are looking for is a sonographer with DMU or equivalent preferably with small parts and Doppler experience (although not essential). Probably single, this person wants to earn a good living travelling to parts of Western Australia conducting ultrasound clinics, unsupervised, using the latest equipment, including teleradiology, as well as having a good time.

The principal radiology practice is based in Geraldton, Western Australia and for the first part of a minimum one year contract (with option to extend) the successful applicant will be based in Geraldton, travelling south, north and the midwest. Accommodation and vehicle supplied.

The package is around $70K

Are you this person?

Then apply with CV to: Practice Manager, Geraldton Radiology, SJOG, PO Box 132, Geraldton WA 6531

Phone 61 8 9964 3757 Email alikong@hotmail.com

Imaging the South
DIAGNOSTIC IMAGING SPECIALISTS

DR JOHNNY WALKER
& ASSOCIATES

SONOGRAPHER

Imaging the South, a young, growing and innovative Diagnostic Imaging Team dedicated to regional, rural and remote health services in Western Australia require an enthusiastic sonographer to join our team of sonographers based in Bunbury, 200 km south of Perth. Bunbury is a regional city in the south west of Western Australia with a population of approximately 35,000 and the practice services a greater population of approximately 100,000.

The successful applicant will have minimum requirements of:

·Diploma of Medical Ultrasonography of the Australasian Society for Ultrasound in Medicine, or equivalent

·Accredited or eligible for accreditation to the ASAR

Experience in vascular and musculoskeletal ultrasound is desirable, however applicants without this experience should still apply, as training will be provided in these areas.

The position involves scanning in all facets of ultrasound, except cardiac, and the opportunity to work at some of our other sites outside Bunbury may be required (within an hours drive) from time to time.

Please forward applications to: Mr Alex Hearn
PO Box 734
Bunbury WA 6231

Or email: a.hearn@imagingthesouth.com.au

SONOGRAPHER
Radiology Services - Auckland Healthcare

An exciting opportunity exists at Auckland Hospital for a suitably qualified fulltime sonographer to join our ultrasound team in the newly refurbished department. We have three ultrasound rooms, all with ATL equipment (2 x 3000 and 1 x 5000) and also a procedure room with an ATL 1500 for interventional procedures.

Auckland Hospital is a 600 bed acute teaching hospital where 8000 ultrasound examinations are performed annually. It is a tertiary referral centre providing an ultrasound service for a variety of specialities. The range of examinations includes general abdominal, vascular, musculoskeletal, small parts, transplants and paediatric ultrasound at the Starship Children's Hospital.

The workload is varied, challenging and interesting with inpatient and outpatient services. In addition there is the opportunity to be involved in various research projects that are being conducted at Auckland Hospital.

Qualification - DMU Part II or equivalent

Closing Date: open

If you are interested, please ring Radiology at Auckland Hospital 64 9 307 4949 ext. 7065 and ask to speak to Julia Metcalfe (email jmetcalfe@ahsl.co.nz) and forward written application and copy only of CV to: Radiology Human Resource Department, c/o Green Lane Hospital, Green Lane West, Auckland 3. Fax: 64 9 630 9776

CONTINUING EDUCATION PROGRAMS

REVIEW – KEEP UP TO DATE – LEARN NEW APPLICATIONS WITH THE AUSTRALIAN INSTITUTE OF ULTRASOUND

Reviewing current trends and keeping up to date with your peers is an ongoing process which can be assisted by registration at one of our interesting and informative courses.
The AIU Course schedule for the remainder of 2000 is filling fast - so call today to register your interest or ask for more information

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ULTRASOUND TECHNIQUES IN OBS & GYNAE	OCTOBER 7TH & 8TH
MUSCULOSKELETAL ULTRASOUND TECHNIQUES	NOVEMBER 4TH & 5TH
FAST TRACK TRAINING (BEGINNERS)	DATES ON APPLICATION - 2 WEEK COURSE
TRAIN THE TRAINER FOR SONOGRAPHERS	AUGUST 14TH - 16TH (call for further dates)
FAST TRACK OBSTETRICS	DATES ON APPLICATION - 5 DAY COURSE

NB: All course fees attract 10% GST

Contact US...
Phone: 61 7 5526 6655 Fax: 61 7 5526 6041 Email: sue@aiu.edu.au
Program Information: Sue Davies Registration Information: Sally Ashwin

DMU

DMU Parts I and II Written exam - *2 September 2000*

DMU Closing date for exemption - *27 April 2001*

DMU Closing date for applications - 1 *June 2001*

DMU Parts I and II Written exam - *25 August 2001*

The 2001 DMU Handbook will be available on *1 February 2001*

For further information contact: DMU Coordinator ASUM 2/181 High St Willoughby NSW 2068 Australia ph 61 2 9958 0317, fx 61 2 9958 8002 dmu@asum.com.au

The DMU information on the ASUM website is currently being updated and includes information on: the examinations Parts I and II, sample questions, case studies and examiners report.

DDU

DDU Closing date Part I applications - *9 Oct 2000*

DDU Part I exam - *20 Nov 2000*

For further information contact: Marie Cawood ASUM 2/181 High St Willoughby NSW 2068 Australia ph 61 2 9958 7655, fx 61 2 9958 8002 asum@asum.com.au

ASUM

Vascular Education Sub-committee
Vascular Meetings Brisbane
Meetings are planned for
Tue 11 Sep 2000 – Princess Alexandra Hospital
Tue 7 Nov 2000 – Queensland Diagnostic Imaging
Contact: Lucia Pemble Fax 61 7 3344 4987

ULTRASONOGRAPHER

A busy Hamilton Practice is seeking a sonographer DMU or equivalent qualification (MRTB Registered). A full range of ultrasound examinations are undertaken with some rotational work to hospitals and clinics in the area. Experience in vascular and breast ultrasound an advantage but not essential. Good remuneration and on-going professional development is provided. Apply to: The Manager, Hamilton Radiology Ltd, PO Box 262, Hamilton, NZ. Ph: 64-7-8394909, Fax: 64-7-8395780 Email: hamrad@xtra.co.nz

URGENT SALE GENUINE BARGAIN

Toshiba SSA-340A Ecoccee CX Compact Colour Doppler - 2 years old. 1 x 6 MHz 121 deg vaginal probe. 1 x 3.75 MHz 128ch 68 deg gen obs probe Pulsewave colour and colour angio capable. Very low use, in excellent condition. Please phone Larissa 61 2 9417 1244

Invitation for proposals for the 2001 Chris Kohlenberg Teaching Fellowships

(Sponsored by Diasonics GE)

The Chris Kohlenberg Teaching Fellowship was established by ASUM in association with Diasonics GE to increase the opportunity for members outside the main centres to have access to quality educational opportunities. It has been awarded twice in 1998 and once in 1999 to provide educational opportunities for members in Regional areas of New Zealand, Queensland and New South Wales. For 2001, Diasonics GE has increased the number of Teaching Fellowships to 2.

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

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

Branches wishing to propose programs for the Teaching Fellow should, in the first instance, contact Keith Henderson ph 61 2 99586200 fax 61 2 99588002 email khenderson@asum.com.au

Nominations and proposals should be addressed to: The Education Officer ASUM 2/181 High St Willoughby 2068 Australia, and should be received before 22 November 2000.

ASUM DMU Preparation Courses

February/March 2001

Coordinator: Keith Henderson

- DMU Part I Preparation Course (General and Obstetric, Vascular, Cardiac)
  University of NSW, Sydney 7-11 February 2001
- DMU Part II Preparation Course (General and Obstetric, Vascular, Cardiac)
  University of NSW, Sydney 7-11 February 2001
- DMU Part II Preparation Course (General and Obstetric)
  The Royal Melbourne Hospital, Melbourne 7-11 March 2001

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

The DMU Part II Preparation Courses are interactive programs designed to assist candidate's preparation for the DMU Part II examination. Each program will comprise lectures, tutorials, workshops, film reading and a trial OSCE. Separate programs exist for general and obstetric, vascular and cardiac specialties. If insufficient registrations are received for any one speciality, ASUM reserves the right to cancel that program and refund the course fees.

Places in the Part II courses are strictly limited and will be allocated as applications are received, with priority being given to ASUM members.

Registration brochures are included with this issue of the *Bulletin* and on ASUM's website: http://www.asum.com.au

ASUM

Head and Neck Workshops and Seminar

Featuring Anil Ahuja

Radiologist, Prince Of Wales Hospital Hong Kong

Joint Editor with Dr R Evans of:
"Practical Head and Neck Ultrasound"

Full-day Workshops
Brisbane: Sunday 29 October 2000
Canberra: Saturday 4 November 2000

Evening seminar
Adelaide: Tuesday 31 October 2000

A registration brochure is included with this *Bulletin* and on ASUM's website:http://www.asum.com.au

Enquiries:
ACT: Pam Cooke PO Box 303 Woden ACT 2606, email: cookefm@dynamite.com.au
Brisbane: Roslyn Savage fx 61 7 3881 2464, email: markros@powerup.com.au
Adelaide: Stephen Bird fx 61 8 8297 1802, email: sjbird@camtech.net.au

Dr Ahuja's visit is made possible by the generous sponsorship of ATL Ultrasound

ASUM Vascular Workshop 2001

28 - 29 April Melbourne

Convenor: Dr John Vrazas

Further details will be published in the November 2000 *Bulletin*

Local and International Speakers with hands-on workshops

For further information contact: Dr John Vrazas 61 3 9288 4310 email vrazasj@svhm.org.au

or

Dr Rick Dowling 61 3 9342 7255

ASUM Workshop

Ultrasound Technical Workshop

for

Radiology Trainees, Obstetric Trainees Specialist O&G's Performing Office Ultrasound Radiologists & Obstetricians seeking to update their technical skills

4 - 5 November 2000

The Royal Hospital for Women, Sydney

Convenor: Glen McNally

Numbers will be restricted in order to assure all participants the opportunity for hands-on scanning with live patients in the small group workshops covering:

- greyscale imaging
- 18-20 week scan
- abdominal scanning
- carotid Doppler
- Kidneys
- DVT
- Obstetric Scanning (1st and 2nd Trimester)
- Gynaecological Scanning

Other topics covered in didactic lectures include image optimisation, artifacts and nuchal translucency assessment.

Registration is restricted to medical practitioners who:

- hold a specialist qualification in ultrasound
- or are enrolled in a recognised course in preparation for a specialist qualification in ultrasound
- or have passed DDU part 1

A registration brochure is included with this Bulletin and on ASUM's internet site: http://www.asum.com.au

Enquiries: Wendy Calvert ASUM 2/181 High St Willoughby NSW 2068 ph 61 2 9958 6200 fx 61 2

Ultrasound Events

Fri 25 Aug 2000 - 3 days ASUM 2000. *Venue:* Carlton Hotel, Auckland, New Zealand. *Contact*: ASUM. 2/181 High Street, Willoughby NSW 2068. Ph: 61 2 9958 7655; Fx: 61 2 9958 8002; Email: asum@asum.com.au

Fri 25 Aug 2000 – 3 days AIUM Diagnostic Ultrasound in the 21st Century. Venue: New York City. *Contact:* Stacey Bessling, Public Relations Coordinator. Ph: 301 498 4100 or 800 638 5352; Email: sbessling@aium.org Website: www.aium.org

Wed 30 Aug 2000 - 3 days BMUS Study Days & Workshops 2000. Scottish Ultrasound Course. *Venue:* Glasgow. *Contact:* BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 44 20 7636 3714; Fx: 44 20 7323 2175; Email: secretariat@bmus.org

Sat 2 Sep 2000 DMU Examinations. Part I examination. Part II written examination. *Venue:* Various. *Contact:* DMU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 7655; Fx: 02 9958 8002; Email: dmu@asum.com.au

Thu 7 Sep 2000 - 3 days 24 Dreilaendertreffen der OEGUM, DEGUM, SGUMB. *Venue:* Vienna. *Contact:* Ultraschall 2000, c/o ECR-office, Neutorgasse 9/2A, A-1010 Vienna, Austria. Ph: 43 1 535 1305; Fx: 43 1 535 7037; Email: office@ultraschall2000.org

Sun 10 Sep 2000 - 5 days Ultrasound 2000: 1st International Ultrasound Symposium. *Venue:* Istanbul. *Contact:* Valor Tourism and Travel Ag., Portakalcicegi Sokak 2/7, A. Ayranci, 06690 Ankara, Turkey. Ph: 90 312 4402490/4409758; Fx: 90 312 4474610

Thu 14 Sep 2000 - 3 days Annual Conference of the Diagnostic Medical Sonographers Society. *Venue:* Dallas. *Contact:* Betsy Hunt, 12770 Coit Rd, Suite 708, Dallas, TX 75251-1314, USA. Ph: 1 972 2397367; Fx: 1 972 2397378

Sat 17 Sep 2000 - 5 days 18th Biennial Congress of the Societas Internationalis De Diagnostica Ultrasonica in Ophthalmologia. *Venue:* Paris. *Contact:* Prof. Nicola Rosa, Eve Dept., 2nd Univ. of Naples, Via Pansini 5, I-80131 Napoli, Italy. Ph: 39 081 566 6768; Fx: 39 081 769 2360; Email: nicrosa@tin.it

Oct 2000 BMUS Study Days and Workshops 2000. Obstetric Ultrasound Study Day. *Contact:* BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 44 20 7636 3714; Fx: 44 20 7323 2175; Email: secretariat@bmus.org

Wed 4 Oct 2000 10th World Congress On Ultrasound In Obstetrics and Gynaecology. *Venue:* Zagreb. *Contact:* H.K.O., Lascinska c. 94, HR-1000 Zagreb, Croatia. Ph 385 1 234 7801; Fx: 385 1 234 7663; Email: congress@hko.hr

Wed 4 Oct 2000 - 4 days 5th Congress of the International Society of Musculoskeletal Ultrasonography. *Venue:* Prague. *Contact:* Jan Poul Assoc, Prof. MC, PhD., Univ. Children's Hospital, Cernopolni 9, 662 63 Brno. Czech Republic. Ph: 420 5 45122111; Fx: 420 5 574616; Email: jpoul@mail.muni.cz

Sun 7 Oct 2000 13th Congress Eur. Fed of Soc. For Ultrasound in Med. & Biology - Euroson 2001. *Venue:* Edinburgh. *Contact:* Mrs Gianna Stanford, EFSUMB, Carpenters Court, 4a Lewes Road, Bromley, Kent BR1 2RN, UK. Ph: 44 181 4028973; Fx: 44 181 4029344; Email: efsumb@CompuServe.com

Mon 9 Oct 2000 DDU Examinations. Closing date for Part I Applications. *Contact:* DDU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 7655; Fx: 02 9958 8002; Email: asum@asum.com.au

Sat 9 Oct 2000 - 2 days CME Conference Vascular Ultrasound: State-of-the-Art. *Venue:* San Francisco. *Contact:* UCSF, Radiology Postgr. Education, 3333 California Street, Suite 375, San Francisco, CA 94143-0629, USA. Ph: 1 415 476 5731; Fx: 1 415 476 9213; Email: cme@eadiology.ucsf.edu

Tue 10 October 2000 ASUM NSW Branch meeting. Cardiac and Mammography Topics. *Venue:* Nepean Hospital, Great Western Hwy, Kingswood. *Contact:* Jane Fonda, Ph: 02 9351 9185; Fx: 02 9351 9146; Email: j.fonda@cchs.usyd.edu.au

Thu 12 Oct 2000 BMUS Study Days and Workshops 2000. Role Extension - The Way Forward. *Venue:* Swansea. *Contact:* BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 44 20 7636 3714; Fx: 44 20 7323 2175; Email: secretariat@bmus.org

Sun 15 Oct 2000 - 6 days World Congress of High-Tech Medicine. *Venue:* Hanover. *Contact:* Management Institute Herrenhausen GmbH, Herrenhauser Strabe 83-99, 30 419 Hanover, Germany. Web site: http://www.high-tech-med.com

Mon 16 Oct 2000 - 4 days World Congress of High-Tech Medicine. *Venue:* Hanover. *Contact:* Management Institut Herrenhausen GmbH, Herrenhauser Strabe 83-99, D-30419 Hanover, Germany. Ph: 49 511 7907 444, Fx: 49 511 27957 44; Email: info@high-tech-med.com; Web: http://www.high-tech-med.com

Tue 17 Oct 2000 ASUM Victorian Branch Scientific Meeting. Ultrasound of the Hand. *Contact:* Mark Brooks, Ph: 03 9496 5431; Fx: 03 9459 2817

Fri 20 Oct 2000 Annual Meeting Society of Radiologists in Ultrasound. *Venue:* Chicago. *Contact:* Suzanne Bohn, 1891 Preston White Drive, Reston, VA 20191, USA. Ph: 1 703 6488997; Fx: 1 703 2629313

Tue 24 Oct 2000 ASUM Queensland Branch Meeting. *Contact:* Roslyn Savage; Ph: 0417 720 875; Fx: 07 3881 2464; Email: markros@powerup.com.au

Fri 27 Oct 2000 - 3 days Annual Meeting Society of Radiologists in Ultrasound. *Venue:* Washington. *Contact:* Susan Roberts, Administrative Director, 44211 Slatestone Court, Leesburg, VA 20176-5109, USA. Ph: 1 703 858 9210; Fx: 1 703 729 4839; Email: info@sru.org

Fri 27 Oct 2000 - 3 days 10th Annual Meeting and Postgraduate Course of the Society of Radiologists in Ultrasound. *Venue:* Washington. *Contact:* SRU, 44211 Slatestone Court, Leesburg, VA 20176-5109, USA. Ph: 1 703 858 9210; Fx: 1 703 729 4839; Email: mrobertson@arrs.org

Sun 29 Oct 2000 ASUM Qld Branch. Head and Neck Lecture and Workshop. Anil Ahuja - Hong Kong. *Venue:* The Evan and Mary Thompson Auditorium, Wesley Hospital, Brisbane. *Contact:* Ros Savage, Fx: 07 3881 2464; Email: markros@powerup.com.au

Tue 31 Oct 2000 ASUM SA Branch. Head and Neck Lecture. Anil Ahuja - Hong Kong. *Venue:* Maxwell Lecture Theatre, Women's and Children's Hospital, Adelaide. *Contact:* Steven Bird, Fx: 08 8297 1902; Email: sjbird@camtech.net.au

Nov 2000 ASUM Victorian Branch Scientific Meeting. Combined ASUM/ASA case presentation night. *Contact:* Mark Brooks, Ph: 03 9496 5431; Fx: 03 9459 2817

Sat 4 Nov 2000 ASUM ACT Branch. Sound and Stars. Head and Neck Lecture and Workshop, Dinner and Star Gazing

with Anil Ahuja - Hong Kong. *Venue:* The Canberra Hospital Auditorium, Canberra and Mount Stromlo Observatory. *Contact:* Pam Cooke, Fx: 02 6281 4261; Email: cookefm@dynamite.com.au

Tue 7 Nov 2000 ASUM NSW Branch meeting. Obstetric Ulrasound - Millenium Party. *Venue:* Royal North Shore Hospital, Pacific Hwy, St Leonards. *Contact:* Jane Fonda, Ph: 02 9351 9185; Fx: 02 9351 9146; Email: j.fonda@cchs.usyd.edu.au

Sun 12 Nov 2000 - 3 days International Symposium 2000. Educating for Quality Healthcare. *Venue:* Brisbane. *Contact:* Mater Education Centre, Raymond Terrace, South Brisbane, 4101. Ph: 07 3840 8521; Fx: 07 3840 8344; Email: ncarring@mater.org.au; Website: www.i-web.com.au/conference2000

Wed 15 Nov 2000 BMUS Consortium for the Accreditation of Sonographic Education. Open Forum. *Contact:* Sue Pearce, CASE Co-ordinator, c/o BMUS, 36 Portland Place, London, W1N 3DG. Fx: 0171 323 2175

Mon 20 Nov 2000. DDU Examinations Part I Examination. *Venue:* Various. Contact: DDU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 7655; Fx: 02 9958 8002; Email: asum@asum.com.au

T**ue 5 Dec 2000 - 3 days** BMUS 32nd Annual Scientific Meeting and Exhibition 2000. *Venue:* Eastbourne, Sussex. *Contact:* BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 44 20 7636 3714; Fx: 44 20 7323 2175; Email: secretariat@bmus.org Website: www.bmus.org

Wed 7 Feb 2001. ASUM DMU Part I and Part II Preparation Courses. General and Obstetric, Vascular and Cardiac strands. *Venue:* Sydney. *Contact:* ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 6200; Fx: 02 9958 8002; Email: education@asum.com.au

Wed 7 Mar 2001. ASUM DMU Part II General and Obstetric Preparation Course. *Venue:* Melbourne. *Contact:* ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 6200; Fx: 02 9958 8002; Email: education@asum.com.au

21 Mar 2001 - 5 days AIR Brisbane 2001. *Venue:* Brisbane Convention Centre. *Contact:* Brisbane 2001, PO Box 1, Royal Brisbane Hospital, Brisbane, QLD, 4029. Website: http://www.giant.netconnect.com.au/AIR/default.htm

Sun 11 Mar 2001. AIUM 2001 *Venue:* Orlando, Florida. *Contact:* AIUM's Prof. Dev. Dept., Suite 100, 14750 Sweitzer Lane, Laurel, MD 20707-5906. Ph: 1 301 498 4100; Fx: 1 301 498 4450; Email: conv_edu@aium.org

Wed 18 Apr 2001 - 3 days XVII International Congress "The Fetus as a Patient". *Venue:* Pattaya City, Chonburi, Thailand. *Contact:* C/o Suphavit Muttamara, MD., RTCOG, 8th Floor, 2, Soi Soonvijai, New Petchburi Road, Bangkapi, Bangkok 10320, Thailand. Ph: 66 2 716 5721/716 5722; Fx: 66 2 716 5720

Sat 28 Apr 2001 – 3 days ASUM Vascular Ultrasound Workshop 2001. *Venue:* Hilton Hotel, Melbourne
Contact: ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 61 2 9958 7655; Fx: 61 2 9958 8002; Email: asum@asum.com.au

Sat 6 May 2001 - 6 days Euroson School on 3D Ultrasound Imaging Eurodop 2001 / 5th Ultrasound Angiography Conference. *Venue:* Princesa Sofia-Intercontinental Hotel, Barcelona, Spain. *Contact:* HITEC, Dept. of Imaging, Hammersmith Hospital, 150 Du Cane Road, London W12 OHS, UK. Fx: 44 20 8383 1610; Email: hitec@hhnt.org

Wed 9 May 2001 - 3 days 3rd International Congress on Vascular Ultrasound and Magnetic Resonance. *Venue:* Amsterdam, The Netherlands. *Contact:* Mediscon, PO Box 113, NL-5660 AC Amsterdam, The Netherlands

Sun 20 May 2001 - 3 days 5th World Congress of Echocardiology and Vascular Ultrasound. *Venue:* Seoul. *Contact:* Organising Secretariat: International Society of Cardiovascular Ultrasound, PO Box 323, Gardendale, AL 35071 USA, Ph: 205 934 8256; Fx: 205 934 6747; Email: lindyc@uab.edu

Wed 4 Jul 2001 - 4 days 10th International Congress on Twin Studies. *Venue:* London. *Contact:* Congress Secretariat, 51 Westmoreland Road, London SW13 9RZ, UK. Fx: 44 20 82874427; Email: jwgowing@netcomuk.co.uk

Thu 12 Jul 2001 – 4 days NZASUM 2001. New Zealand Branch Annual Scientific Meeting. *Venue:* Millennium Hotel, Queenstown. *Contact:* Mike Heath; Email: m_heath@xtra.co.nz

Sun 5 Aug 2001 - 4 days CSANZ - 49th Annual Scientific Meeting. *Venue:* Auckland. *Contact:* Organising Secretariat: The Conference Company, PO Box 90-040, Auckland. Ph: 64 9 360 1240; Fx: 64 9 360 1242; Email: infor@tcc.co.nz

Thu 30 Aug 2001 - 3 days Congress of the Asian Fed. of Soc. for Ultrasound in Medicine and Biology. *Venue:* Kuala Lumpur. *Contact:* Dr Ravi Chandran, Gleneagles Intan Med. Ctr., Suite 202, 282 Jalan Ampana, 50450 Kuala Lumpur, Malaysia. Ph: 60 3 4577500; Fx: 60 3 4571500

Fri 7 Sep 2001 ASUM 2001-Annual Scientific Meeting. *Venue:* Darling Harbour Convention Centre, Sydney. *Contact:* ASUM. 2/181 High Street, Willoughby NSW 2068. Ph: 61 2 9958 7655; Fx: 61 2 9958 8002; Email: asum@asum.com.au

POSTER

The 18-20 Week Obstetric Ultrasound Examination

A copy of this poster, prepared by the sonography and medical staff of the practice of Drs Peter Warren and Glenn McNally is included with this issue of the *Bulletin*.

Production of this poster, and its distribution to ASUM members, is made possible by the generous sponsorship of Diasonics GE.

Additional copies of this poster are available for purchase, rolled in a tube, for $22 (members) or $44 (non-members).

To order, copy and complete this form, and send it with payment to:

Obstetric Poster, ASUM, 2/181 High St, Willoughby, NSW 2068, Australia.
Fax 61 2 9958-8002

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Please supply the poster:

Dynamic Transperineal Sonography Detection of Pelvic Floor Pathology at $22 (ASUM member) / $44 (non-member) (inclusive of 10% GST)

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Guidelines for authors

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

ORIGINAL RESEARCH

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

QUIZ CASES

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

CASE REPORTS

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

FEATURE ARTICLES

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

FORUM ARTICLES

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

CALENDAR ITEMS

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

CORPORATE NEWS

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

FORMAT

Manuscripts

Manuscripts should be submitted in triplicate in print and on PC formatted diskette as MS Word documents in plain text (please do not use styles).

- Font size: maximum 12, minimum 10
- Double spacing for all pages
- Each manuscript should have the following components: Title page, abstract, text, references, tables, legends for illustrations.
- Title Page should include the following:
  - ❖ Title of manuscript, the full names of the authors listed in order of their contribution to the work, the department or practice from which the work originated, and their position.
  - ❖ Corresponding author's name, contact address, contact telephone number and facsimile number (where available) for correspondence.
- Abbreviations may be used after being first written in full with abbreviation in parentheses
- Relevant references should be cited using the Vancouver style, numbered according to the sequence of citation in the text, and listed in numerical order in the bibliography.

  Vancouver style format should be used.
  Examples of Vancouver style:

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

Abstract

All manuscripts for Feature Articles and Original Research must include an abstract not exceeding 200 words, which describes the scope, major findings and principal conclusions. The abstract should be meaningful without reference to the main text. Up to 8 key words should be listed at the end of the abstract to assist in indexing.

Images

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

Hard copy images should be presented as glossy print or original film. Any labelling should be entered on the front of the glossy print using removable labels (eg Letraset). On the back of the print include the authors name, figure number and a directional arrow indicating the top of the print.

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

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