

SOCIETY FOR VASCULAR TECHNOLOGY OF GREAT BRITAIN AND IRELAND

SVT STUDY DAY

Friday 17th June found us on a short journey up the M6/M56 to Withington Hospital in search of additional knowledge and new/re-newed acquaintance with our colleagues.

We were welcomed on the second floor in the Research and Training Unit, by coffee, biscuits and a blast of heat generated by central heating and half a dozen working scanning machines. This was quickly remedied by turning thermostats down, flinging open windows and shutting the blinds. Proceedings began with a welcome from Rachel Harris who introduced Professor Charles McCollum (Professor of Vascular Surgery at Withington/University Hospital of South Manchester) who highlighted the growing importance of vascular technology and technologists to the Surgeon.

After the introduction we divided up into our chosen workshops. There were seven on offer. We chose in the morning to see lower limb arterial duplex scanning demonstrated by Tim Hartshorne, who although not using the particular equipment he usually used still managed to convey a great deal of useful information. We were encouraged to participate and were especially thankful to the young lady representative of B & K equipment who loaned her "normal" limbs.

After more coffee we watched lower limb venous scanning ably demonstrated by Kate Somerville and Maria Grouden, who also produced a very artistic handout for us. A splendid lunch was laid on and we all tucked in and thoroughly enjoyed it. Throughout the day we had the opportunity to see different scanning equipment and discuss machine problems with the twelve companies who supported the Meeting. They also provided stands, equipments, expertise and factsheets or article re-prints which were eagerly collected.



Manchester Workshop, National Committee:

(from left to right) Jackie Walton – Ex-President; Maria Grouden; Kate Somerville – Secretary; Greig Butler; Rachel Harris – President; Dominic Foy – Conference Secretary; Rachel Cuming – Treasurer; Mary Ellis – Vice President.

The afternoon session was especially interesting for us as we watched demonstrations of extra-cranial duplex scanning, an area we do not at present scan. In fact we were put on the spot, being unable to correctly name the cranial arteries, but we can now.

The heat of the day affected the viscosity of the ultrasound gel and plenty slid down the back of the necks of our volunteer subjects - whom incidentally we must thank for their tolerance. Tea was followed by our fourth and final session, on upper limb assessment. Again we were given a comprehensive handout which will be very useful within our Department. Although we did not see the other three workshops we are informed they were equally valuable and well presented.

On behalf of the fifty delegates in attendance, we would like to thank everyone who worked so hard to make such a successful, enjoyable, informative and informal study day.

We were also heartened to find that our working practices and protocols were not far off the mark and returned to our District Hospital ready for anything - well almost.

Rosalind LEA

Barbara JAGGARD-SMITH

Leighton Hospital, Crewe Cheshire

How safe is ultrasound for Vascular diagnosis ?? Should the scan be "canned"?

R. Cumming BSc DMU

A recent Guardian Article (Wed May 25th 1994) high-lighted the possibly damaging effects of ultrasound for the unborn child. One link with an increase in left-handedness was presented as a dubious negative finding but another, associated with the use of Doppler ultrasound suggested a link with reduced birth weight. This is perhaps at first glance, a worrying advertisement for the field. This worry seems unfounded as little attention was given to the types of women referred for these fetal Doppler scans and the fact that the mothers referred for scanning were high risk, and therefore of concern to the clinician in the first place... a chicken and the egg situation perhaps?

But in any diagnostic test there may be some probability of damage or injury and so any practitioner should be aware of any risks and how to minimize them.

Pulsed B-mode (gray-scale) ultrasound operates with very short pulses (ie the beam is only incident upon the tissue for short periods) and uses very low intensities. But, Doppler modes of operation generate much higher intensities than those in imaging modes (see table 1) because the beam is stationary and the average intensity over time at any location will be greater. Transducers designed for imaging are less efficient when used for Doppler and many systems increase power outputs to compensate. The power outputs are also raised to increase the strength of the

backscattered signals received from blood cells as these are very much weaker than the echoes needed to produce a B-mode image.

The intensity of ultrasound is also raised since the use of Doppler ultrasound increases the number of pulses in a given tissue in a given time and additionally, the process of increasing the sample volume increases the pulse length increasing the time of tissue insonation. But some systems do reduce signal amplitude to compensate for this.

The biological effects of ultrasound have been investigated for over 60 years and there are some known effects of ultrasound in biological tissue, for example, very high intensity levels of ultrasound have been used to destroy tissues as in Meniere's disease, and some tumours.

Physical effects:

Heating from attenuation/absorption of ultrasound. The temperature rise during ultrasound investigations has been shown to be approximately 1°K at an intensity of 100 mW/cm² (spta). This type of temperature fluctuation can arise normally in the absence of ultrasound. It is also assumed that any hazard from heating is unlikely as conduction of heat occurs in tissue, blood flow cools the tissue by convection and if close to the skin, radiation from the surface occurs. Note that sustained increase in fetal temperature *in utero* of greater than 2.5°K **can** lead to increased

abnormalities.

If small gas bubbles of 1µm diameter are artificially introduced into tissue, ultrasound exposure may result in an increase in their size. Collapse of these bubbles after expansion can result in the generation of very high extremely local temperatures (>1000 °K which is hotter than the surface of the sun) and this process of "cavitation" could conceivably result in chromosomal damage. But even the inside of a cigarette can reach local temperatures of 2000°C ! However it must be remembered that the devices used to generate these effects use continuous wave ultrasound at intensities generally greater than those used in diagnostic procedures.

It is uncertain whether microbubbles causing cavitation exist in tissue normally, but may occur in blood (and ovarian tissues) during ultrasound aspiration where the aspiration fluid contains microbubbles. At higher levels of intensity than that used diagnostically, definite cavitation can be demonstrated in tissues, but not unequivocally at lower intensities.

Biological effects:

Chromosomal damage has not been reproducibly demonstrated at diagnostic intensities - no firm conclusions can be drawn.

Some reports have shown an increase in the naturally occurring rate of sister chromatid exchange, again this has not been proven at diagnostic levels. No serious statistically significant

biological effects in human populations exposed to diagnostic levels of ultrasound have so far been demonstrated.

However it must be recognised that any long-term follow-up studies, to investigate the adverse effects of a diagnostic tool that has only been in routine use for 10-15 years is virtually impossible and so it seems prudent to minimise the exposure to the patient.

Some guidelines to an approach of exposure minimization could be to...

Use the lowest practicable transmitted power consistent with obtaining the desired diagnostic information. This

especially applies to M-mode & Doppler where the beam is stationary and incident upon tissues for a comparatively long time.

Reduce the total exposure time whenever possible. Avoid holding the transducer steady over the same tissue for extended periods and remove the transducer from the skin when not actually observing the image. It is my opinion that exposing a friable, ulcerated, internal carotid plaque to a very long period of exposure, could potentially be a risk, in spite of the high blood flow and potential rapid heat dispersal.

Transcranial ultrasound imaging

could be an area of controversy especially during intra-operative monitoring. So care should be taken, especially when training, not to "hover" over one area for too long.

Once sufficient diagnostic information has been obtained - stop scanning !

Use the smallest practical sample volume size and PRF to obtain the required information.

It is the author's opinion that, in most cases, the overall benefits of non-invasive ultrasound diagnosis vastly outweigh any potential risks of exposure - but only with the operator being aware of the need to minimize any hazard.

Table 1: Absolute Maximum Outputs of a range of diagnostic systems. Source 1

Mode	Power(mW)	ISPTA mW/cm2		
		B-mode	M-mode	Doppler
Linear array	38.2	3.1	118.0	—
Phased array	—	117.0	243.0	1266.0
Annular array	18.9	41.9	321.0	1354.0
Mechanical sector	22.9	29.3	203.0	1281.0
Continuous wave	75	—	—	600.0

Sources:

1 Diagnostic Ultrasound Reviews Volume 1 - Safety of Ultrasound (Scientific Medical Systems. Arden Press House)

2 The Guardian Wednesday May 25th 1994

3 Doppler Ultrasound - Principles & Instruments. F.W.Kremkau. (W.B.Saunders Co)

4 Physics & instrumentation of Diagnostic Medical Ultrasound. Peter Fish. (John Wiley & Sons Ltd)

DATES FOR YOUR DIARY

- 14th – 15th Sept.** Practical Colour Doppler for radiologists Glasgow Royal Infirmary 0462 670899
- 28th – 30th Sept.** 3rd International Conference of Ultrasound Angiography John Radcliffe Hospital, Oxford 081 740 311/3245
- 23rd Nov.** 3rd Annual Conference SVT Edinburgh 0202 704566 to run back to back with
- 24th – 25th Nov.** Society for Vascular Surgeons Annual Conference. Literature enclosed.
- 13th – 15th Dec** The British Medical Ultrasound Society Scarborough 071 636 3714
- 10th – 11th April** 17th Charing Cross International Symposium Vascular Imaging for Surgeons 081 846 9887

ARE WE ADEQUATELY PROTECTED FROM THE MENACE OF LITIGATION?

It is virtually impossible to read a newspaper, magazine or similar publication today and not encounter the subject of litigation in one form or another. In the past decade the number of claims made by one party against another alleging improper treatment or injury due to accidental damage has spiralled in an unprecedented fashion. This is most likely due to a number of reasons: increased public awareness of their civil rights and entitlements, avaricious solicitors and the realisation by a certain group in society that litigation is an easy way of making a few bucks. The medical profession in general has been on the receiving end of a growing number of allegations in this area with claims for compensation directed at both individual doctors or the hospital itself. This rapid increase in the number of claims is reflected in the high premiums now being demanded from insurance companies and because of the medical malpractice exposures it is even difficult to attract insurers at all in Ireland.

As employees, we assume that we are protected by our respective hospital insurance schemes against litigation. However the question as to whether we are in fact adequately covered or indeed whether we should consider acquiring additional personal insurance is one that has arisen at a number of paramedical meetings recently in both Britain and Ireland. This is an important issue to address when we consider how the advances in technology over the past few years have dramatically changed many of our job profiles and we are now assuming a much higher level of responsibility.

Bearing this in mind I decided to investigate this subject further with our own Administration Dept. St James's Hospital, in conjunction with nine other hospitals, has moved to a self-insurance programme since February 1994. This scheme covers all non-medical staff for any claim made either against them or the department in which they work. The hospital accepts the fact that staff are sometimes required to perform duties that are not necessarily specified within their job description but are done with the knowledge and consent of their superiors. Other tasks such as the lifting of patients is also often carried out, due to necessity, by personnel who are not specifically trained in

this area and they will also be covered for any accident that may occur whilst performing such duties. Currently any person who suffers injury that occurs within the hospital environment is entitled to be compensated through the hospital insurance scheme regardless of the circumstances in which it happened. However this does not exempt a member of staff from facing disciplinary procedures or indeed dismissal from their job if it is believed that they were acting totally inappropriately or outside their bounds of authority at the time the injury was sustained.

Following clarification of this subject I felt assured that at the moment I am sufficiently insured for the duties I perform and that in fact acquiring additional personal insurance may prove to be more troublesome than beneficial if a patient were to submit a claim against my personal insurance for an injury sustained whilst in my care and if I felt that this injury was primarily caused by an environmental factor (eg faulty equipment, I would then have to argue my case with the hospital or indeed make a counter claim against them.

To conclude my article, I feel that as technologists we have a duty and responsibility to both our employers and patients to ensure that the need for litigation is reduced to a minimum. Although accidents will occur even in the most ideal environment with the most diligent of staff, it is possible to reduce the problem significantly if we maintain a sense of the following:

Awareness:

Being aware of the surrounding environment and removing any obstacles that may cause injury eg cables, broken furniture or faulty equipment.

Diligence: Performing all duties in a meticulous and diligent manner in order to minimise the possibility of erroneous diagnosis.

Professionalism

Maintaining a polite and professional manner when dealing with patients helping to diffuse any hostile feelings which may be developing.

Finally I do feel that it is worthwhile taking a few minutes to find out the policy in your own institution regarding insurance cover for paramedical staff as this is bound to differ slightly from one hospital to another. It may also be beneficial to forward an up-to-date job description to the administration department, clearly outlining your current responsibilities or at least to clarify that you have the full support on this issue from your consultant/physicist in charge.

**Marla Grouden,
Chief Vascular Technologist,
St James's Hospital, Dublin.**

Technical Update

ALOKA SSD – 2000

Focal Frequency Enhancement

The unique sensitivity to returning echoes achieved by Aloka in designing the SSD-2000 'infinity series' ultrasound scanner has opened up extensive new possibilities to improve performance. Among these is the concept of **Focal Frequency Enhancement** (FFE).

The broad band frequency profile produced by an electronic transducer array can be altered by varying the shape of the voltage pulse used to generate the beam. Similarly, the variable band pass filter, which selects the frequency the system receives at, according to the depth of the returning echo, works best if it is tuned to receive the optimum balance of frequency and signal strength at any given depth. This is dependent upon the emitted

frequency profile.

In the SSD-2000, Aloka has linked both transmitted broad band frequency profile and the variable band pass filter in reception to the selected focal setting. This ensures optimum conditions for image at any given depth in the image.

To see the effect of FFE on image quality, fax KeyMed Customer Services on (0702) 465677 to arrange an evaluation, or telephone (0702) 616333.

Frustration Free!

Thanks to Rachel Harris, the very same, we can now look forward to reducing the time and aggravation involved whilst marking veins. Having diligently scoured the art shops of Bath for a suitable pen, she has come up with a two stage marking system. She recommends a Caran D'Arche Neocolor 11 crayon - which really does mark through gel. After removing the gel the residual mark is then enhanced by your usual alcohol-based skin marker. Simple but very effective. Thank you Rachel. For further information contact Rachel Harris 0225 824440.

Questionnaires

Thank you very much for the excellent response to the Duration of Tests questionnaire, the information has yet to be collated but as soon as the holiday season is over this will be done. A similar response was achieved for the protocols survey. However for the virtuous amongst us you can't quite relax just yet. The education committee have a questionnaire that they too would like answered. So for those of you who were just too busy to complete the first two, here's your chance to ease your guilty conscience. If you like, your replies to all three would still be very welcome!

Summer Nuptials!

This summer sees several of our members tying the knot,

Congratulations!

*Maria Micciche married Trevor Morgan
21.5.94 now Maria Morgan*

*Mari Sheppi married Keith Watson
30.7.94 now Mari Watson*

*Rachel Cuming marries Peter Norris
20.8.94 stays as Rachel Cuming*

*Rachel Harris marries Simon Walker
10.9.94 stays as Rachel Harris*

Correction

In the May issue of the Society Newsletter an article appeared on skills and equipment. We have been asked to point out that the staff at the Dublin hospital have the same skills and qualifications as the majority of our Society's members and that any implication to the contrary, from the title of the article was completely unintended. We are pleased to take this opportunity to clarify the situation.

Annual Meeting of Society for Vascular Technology of Great Britain and Ireland

Wednesday 23rd November 1994

The Assembly Rooms, Edinburgh

The society invites all members to submit abstracts and/or case studies of not more than 250 words, for the above meeting. Research fellows with an interest in vascular imaging, plethysmography or applications of Doppler ultrasound are also cordially invited to submit abstracts for consideration.

Closing date:

Friday 9th September 1994

All submissions to:

Mary Ellis

Department of Surgery, 4 North,
Charing Cross and Westminster Medical School,
London, W6 8RF.

Tel: 081 846 7360

General enquiries to: Dominic Foy Tel: 0202 704566

Membership

Ordinary Membership:

Ordinary membership is open to all persons whose primary skill is non-invasive vascular investigations. Also persons involved in supervisory and/or educational roles in a clinical setting. Ordinary membership will include all vascular technologists, research nurses and those persons involved in aneurysm screening. Ordinary members have the right to vote and hold elected office. All other society members are designated Associate members.

Associate Membership:

Associate membership is open to all persons interested in the field of vascular technology, but who are not directly involved in non-invasive vascular investigations. Associate members will include interested surgeons, radiologists, company representatives, administrative staff etc. Associate members may not vote or hold office, but will otherwise enjoy the same rights and privileges as ordinary members.

SURNAME: FIRST NAME: TITLE:

WORK ADDRESS:

TELEPHONE:

JOB TITLE:

MEMBERSHIP

ELIGIBILITY: ORDINARY ☐ ASSOCIATE ☐

APPLICATION TYPE: RENEWAL ☐ NEW MEMBER ☐

DUES: The Membership fee is £10.00 for 1993/94 renewable on 1st September 1994. Please make cheque payable to: Society for Vascular Technology of Great Britain and Ireland.

SIGNATURE: DATE:

Completed application forms and cheques should be sent to:

Kate Somerville, Membership Secretary, Vascular Technologists, Vascular Laboratory,
Department of Surgery, The Middlesex Hospital, Mortimer Street, London, W1N 8AA.