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Many factors influence the way we apply information gained from diagnostic tests, including patient perceptions and expectations, as well as pretest probabilities. These factors impact on such areas as nuchal translucency measurements in early pregnancy. Harkness and Pritchard describe the way their practice attempts to handle the differing circumstances surrounding this single measurement.

Measurements of distance, or indeed other quantifiable ultrasound parameters, are not always a simple diagnostic tool. Position related and physiological changes, and interobserver and intraobserver variability, apart from the precision of the measurement tool, can all affect the diagnostic value of measurements. Thoirs and Williams report their findings relating to measurements of the cubital tunnel and make some recommendations for a protocol.

In another practically useful article, Nisbet and de Crespigny present a concise and practical review of prenatally diagnosed cystic lung lesions based on their large experience.

Stan Barnett brings us the first of a series of tutorials related to ultrasound safety and bioeffects, discussing current state of knowledge from an expert perspective, as well as highlighting areas of incomplete knowledge, reminding us that bioeffects may be significant in some clinical circumstances. This is a fundamental area of knowledge for ultrasound professionals.

Cherie Drinkwater's article provides some very practical and encouraging advice regarding preparation for the DMU, something that is particularly valuable for this style of examination. Good luck to all who are preparing for it this year!

Robert N Gibson
Editor

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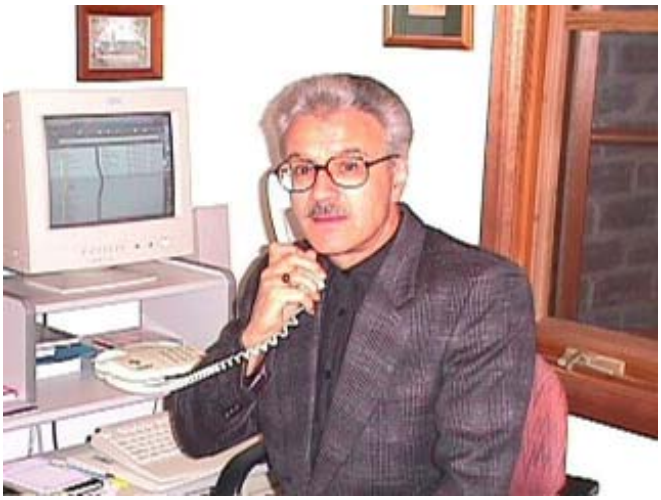
President's message



In February 2001 the ASUM held another of a series of Leaders Workshops. The purpose of the exercise is to encourage discussion and suggestions on future directions of our Society by the leaders of ASUM's professional committees. One of the agreed objectives for ASUM was to develop linkages outside Australasia, particularly with our neighbours in the Asia-Pacific region. The Executive Council has accepted the responsibility of beginning the process of creating strategic academic linkages and identifying areas where ASUM can develop a mutually beneficial program of training and accreditation. This will allow an opportunity to use the considerable professional expertise that exists within ASUM.

The Annual Scientific Meeting is a major showcase for ASUM professional activities and we are looking to a successful conference in Sydney, September 2001. As usual, there is a list of distinguished overseas speakers. The information has been distributed with the Bulletin. I would like to encourage submitted abstracts from as many as possible of our sonographer, medical and scientist members. It is a great opportunity to let others know about your clinical/research interests. We are fortunate to have high standards of practice in ultrasonography within ASUM and I believe that it is essential to recognise such an achievement. I hope that we can begin the process of developing linkages with our Asian counterparts by introducing some of them to our Annual Scientific Meeting. We have begun to use the services of the Sydney Convention and Visitors Bureau to assist ASUM in attracting interest from overseas.

Looking ahead some time from now, the year 2009 may be a memorable, interesting and productive one for medical ultrasound in Australia and for ASUM. I am pleased to say that ASUM Council unanimously supports a bid to allow ASUM to take on the responsibility of hosting the 12th Congress of the World Federation for Ultrasound in Medicine and Biology (WFUMB), in Sydney. This will be a major event for both Sydney and the ASUM. Those of us who were involved in medical ultrasound as far back as 1985 will recall the efforts involved in preparing for the WFUMB Congress in Sydney. The event will be considerably larger, more sophisticated and, doubtlessly, more spectacular. In preparation for our bid, ASUM is supported ably by the Sydney Conventions and Visitors Bureau. The WFUMB requires that potential host organisations present their complete and final bid at least seven years prior to the intended WFUMB congress. A final decision on the winning bid will be made by WFUMB at the congress six years before the intended one. For the 2009 World Congress, a decision will be made on the host organisation/venue at the time of the 2003 WFUMB Congress, to be held in Montreal, Canada. I would like to encourage members of ASUM to do their best to attend the 2003 WFUMB Congress to demonstrate our interest. Also, should ASUM be awarded the 2009 Congress, I am sure that there would be quite a party!

Hosting an event as prestigious as the WFUMB Congress is a major activity and has enormous opportunity to benefit ASUM, not the least of which will be a substantial increase in the Society's bank balance! This is an exciting opportunity for ASUM. It will also create a considerable amount of work and I am sure that the convenor will be looking for support from enthusiastic members if we win the bid. ASUM is facing strong competition with a bid to be submitted from the European Federation of Societies for Ultrasound in Medicine (EFSUMB) for the meeting to be held in Edinburgh, Scotland. At the time of writing, I am not aware of bids from any other affiliated organisation. The competing bids will be presented to a meeting of the WFUMB Administrative Council in March, 2002. From my interactions with various international committees I am certain that Australasian ultrasound professionals are highly regarded. I also believe that ASUM is acknowledged as a professional and credible organisation capable of undertaking the task of convening a large international congress. I am sure that ASUM has a strong and realistic chance of being awarded the honour of hosting the WFUMB 2009 congress. I will comment further on this activity when new information becomes available. In the meantime, let us all look forward to a successful ASUM 2001 conference in Sydney.

Dr Stan Barnett PhD
President

Prenatally diagnosed cystic lung lesions

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INTRODUCTION

Prenatal ultrasound can be a sensitive method for the detection of pulmonary abnormalities, although cystic adenomatoid malformations (CAM) can be difficult to differentiate from other cystic lung lesions. Fetal MRI may further improve the accuracy of prenatal diagnosis of fetal lung lesions, with some groups reporting high accuracy (1) although others have found it much less helpful (2). A woman carrying a fetus with a cystic lung lesion (CLL) may be inappropriately given a poor prognosis. This could happen either because of misdiagnosis, or because the sometimes florid findings of a CAM of the lung are misinterpreted as indicating that the condition is untreatable. Indeed a dismal outlook was suggested by some early publications (3).

In this paper the important features of disease processes leading to CLL will be described and illustrated.

DIFFERENTIAL DIAGNOSIS

The major differential diagnoses include:

Cystic Adenomatoid Malformation

CAM is a rare congenital malformation, which appears to result from an embryological insult occurring before the 7th week of gestation (4). These hamartomata are unilobar in 80 - 95% of cases (4). Reports of prenatal diagnosis of these lesions by ultrasound first emerged in the mid-1970's (5). CAM has been classified into type I - III by Stocker et al (4) utilizing clinical, histological and radiological criteria. More recently, Adzick *et al* (6) proposed a prenatal classification dividing CAM into 2 groups based on sonographic and gross anatomical findings. Macrocystic lesions contain single or multiple cysts that are >5mm in diameter. Microcystic lesions are more solid, appear echogenic on ultrasound, and contain cysts measuring <5 mm in diameter. Reports that prognosis for microcystic fetal CAM is worse than for macrocystic lesions (6, 7, 8) have not been confirmed in all studies (9) and may be accounted for by misdiagnosis in some cases as histological diagnosis is often not available in the published cases. In our series there was an increased neonatal death (NND) rate in the microcystic CLL group, however two of the four neonates who died had bronchopulmonary sequestration (BPS) diagnosed histopathologically and the other two died due to other abnormalities (10).

CAM is rarely associated with chromosomal abnormalities (8). Associated fetal anomalies occur in 12% of fetal CAMs (7). Bilateral chest masses are said to account for less than 2% of CAMs (6, 11). Most cases reported as bilateral CAM antenatally have been accounted for by laryngotracheal atresia, occasional unilateral CAMs crossing the midline, and rarely bilateral lesions (11).

Congenital Diaphragmatic Hernia (CDH)

CDH most commonly results from failure of the pleuroperitoneal canal to close completely. This should occur by week 10 of gestation (12). Failure of closure results in a herniation of abdominal viscera into the thorax, resulting in a mass effect that can prevent normal lung development. The fetal stomach may be mistaken for a macrocystic CAM (Figure 1). A bowel containing CDH may mimic a microcystic CAM or other cause of echogenic lung lesion. Ways of attempting to exclude a CDH on prenatal ultrasound include visualization of an intact diaphragm and an appropriately located stomach, liver and gallbladder. Fetal breathing movements may assist in visualizing the bowel sliding up and down in the chest through the diaphragmatic defect in some cases of CDH, and bowel peristalsis may be seen within the chest.

Bronchopulmonary Sequestration (BPS)

BPS is said to account for 0.15 - 6.4% of all congenital pulmonary malformations (13). It is part of the spectrum of bronchopulmonary foregut malformations. In BPS, a portion of lung parenchyma does not communicate with the tracheobronchial tree, and usually receives its arterial supply from a systemic vessel. Cases in which the artery arises from the thoracic aorta (14), celiac axis (15, 16) and abdominal aorta (16) have been described. BPS can be extralobar (covered by a pleural layer isolating it from the rest of the lung parenchyma) or intralobar (within the lung pleura). BPS can also cause an abdominal suprarenal mass (extralobar extrapulmonary sequestration) that is difficult to differentiate from other causes of a mass in this location. BPS generally results in an echogenic lung lesion that needs to be differentiated from a microcystic CAM, but occasionally results in a macrocystic lesion (17). There have been a number of case reports in which BPS and CAM appear to coexist (18, 19, 20), suggesting a similar embryological origin. BPS may be differentiated using colour Doppler in both the fetus and the neonate, by identifying a vessel arising from the aorta (often below the level of the diaphragm) to supply the area of echogenic lung (Figure 2). If one is unable to see a vessel, however, the diagnosis is not excluded. A pleural effusion may also be present; this is said to be because of twisting of the

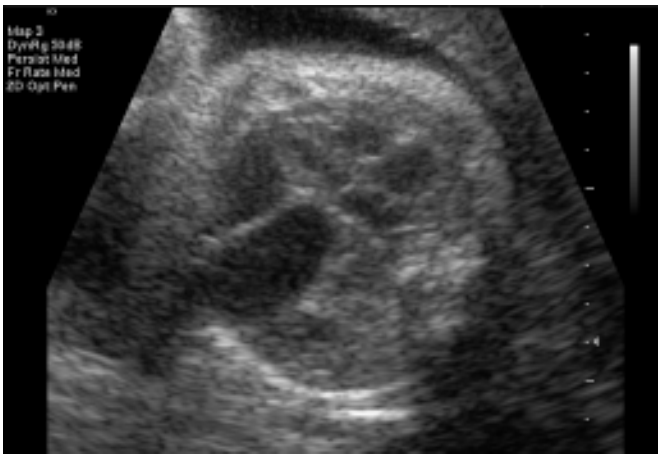

Figure 1 Cystic lesion within the left chest (35 weeks gestation). There is mediastinal shift present. The stomach was not visualized in the abdomen, making congenital diaphragmatic hernia a likely diagnosis.

vascular pedicle in extralobar pulmonary sequestration, resulting in obstruction to venous and lymphatic return. Postnatally the CXR can be normal, or else an opacity may be seen. BPS is often basal (15, 21). Postnatally CT can help to confirm the diagnosis.

Teratoma
Teratoma is a rare cause of CLL. There are several reports of mediastinal teratomas (22) however teratomas that appear to be within the lung are less commonly reported (10, 23). As with teratomas located elsewhere, they result in a lesion that may have both cystic and solid components, often with shadowing present.

Bronchogenic Cyst
Bronchogenic cysts are a rare bronchopulmonary foregut malformation that result from an abnormal budding of the foregut. They may remain attached to the tracheobronchial tree, in which case they are found in the lung pleura, mediastinum or along the trachea. The cyst may, however, separate and thus be found elsewhere (24).

Laryngeal Atresia
Laryngeal atresia may be isolated or occur in association with genetic syndromes such as Fraser syndrome (25). It results in bilateral large echogenic lungs, which result from an accumulation of fetal lung secretions (26).

Bronchial Atresia
Bronchial atresia results from a congenital obliteration of a proximal segment of bronchus. This results in a collection of mucus in the distal bronchi and the affected portion of lung appears large and echogenic on prenatal ultrasound due to the accumulation of fetal lung secretions. Postnatally, there is a bronchocele and under-ventilation of the affected part of lung. Thus it is a cause of lobar emphysema (27, 28, 29).

Mucus Plug
This has been found to be a cause of a homogeneous echogenic chest mass with associated mediastinal shift (30). In the fetus described, the mass disappeared ultrasonographically during the pregnancy. The neonate was symptomatic at birth and a bronchial mucus plug was found at bronchoscopy.

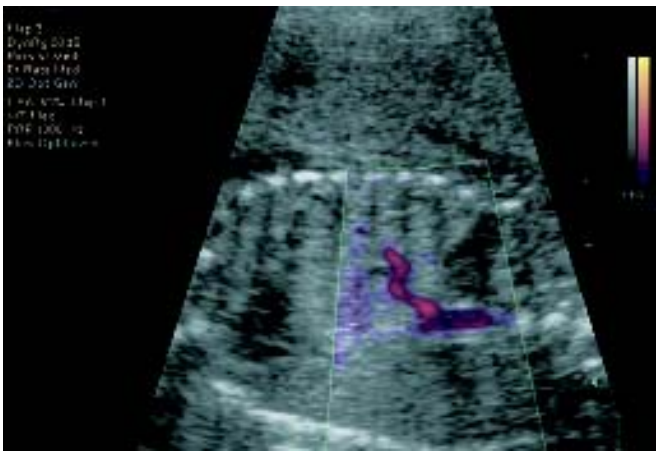

Figure 2 The blood vessel entering this lung lesion from the aorta raises the possibility of a bronchopulmonary sequestration.

Congenital Lobar Emphysema (CLE)
CLE is an important cause of postnatal respiratory distress. It most commonly involves the left upper lobe (28, 29). The pathogenesis varies and includes focal bronchial obstruction (extrinsic or intrinsic) in around half of cases. Thus congenital bronchial atresia and mucus plugs are causes of CLE, and mediastinal masses such as a bronchogenic cyst may cause CLE of an entire lobe (29). The abnormal area of lung appears echogenic on prenatal ultrasound (Figure 3). Postnatally some

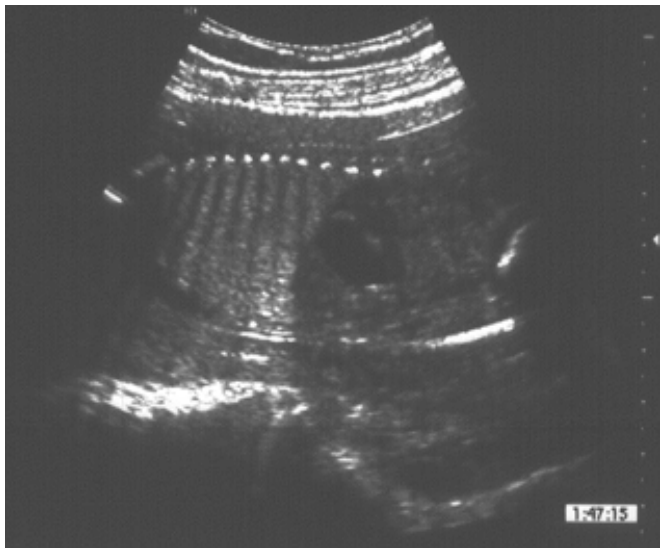

Figure 3 This echogenic lung lesion had disappeared by 32 weeks gestation. Postnatally congenital lobar emphysema was diagnosed on CT scan.

cases require surgical management (lobectomy) whilst others are managed conservatively (29). There has been one case reported in association with congenital cytomegalovirus infection (31). Alveolar damage (29) and the presence of a mucus plug (28) have been proposed to cause CLE following a viral infection.

Heterotopic Brain Tissue
There is an isolated case report of heterotopic brain tissue causing an appearance consistent with macrocystic CAM postnatally. The neonate had several other abnormalities present (32). Whilst this is not a major differential diagnosis, it is often mentioned in lists of differential diagnoses in the literature.

PRENATAL MANAGEMENT
When a CLL is found, careful anatomical survey is required looking for further fetal abnormalities. Referral should be made to a tertiary referral centre accustomed to managing such cases. The further ultrasound management of these cases involves an attempt to differentiate the cause of the chest lesion prenatally, using the features described above. An assessment of the size and location of the lesion and internal features of the lesion should be made. Internal features include whether the lesion is macrocystic (Figure 4) or microcystic (Figures 5, 6), and the size of the largest cyst within the CLL. One should also look for normal lung tissue on the side of the lesion as well as in the contralateral chest, and assess for the presence of mediastinal shift (Figure 7), pleural effusion and features of hydrops (Figures 8, 9, 10). An assessment of amniotic fluid volume should be made. At each scan an assessment of fetal growth and umbilical artery Doppler

waveform should also be performed. Karyotyping should be considered, although with the exception of CDH isolated CLL in an otherwise 'low risk' fetus has not been found to be associated with a high risk of aneuploidy (8). The presence of other risk factors such as further fetal abnormalities or advanced maternal age should be taken into consideration when discussing karyotyping.

PROGNOSIS

CLLs that are small, with little or no mediastinal shift and no other fetal abnormalities, are associated with a good prognosis (7, 33, 34). The most important indicator of poor prognosis is fetal hydrops (6, 9,3 5, 36, 37), which results from vena caval and cardiac compression secondary to extreme mediastinal shift (38). Marked cardiac deviation and polyhydramnios (39) have been found to be additional indicators of poor prognosis, as have a microcystic appearance and bilaterality (8). The amount of pulmonary hypoplasia secondary to the compression of the normal lung by the CLL is also important (3, 9). In our series (10) there was an increased neonatal death rate amongst fetuses with other abnormalities present, and those with lesions with a microcystic appearance prenatally. In addition an increased neonatal death rate was noted in those fetuses with bronchopulmonary sequestration. Fetuses with macrocystic lesions were more likely to require neonatal surgery (Table 1).

IN UTERO TREATMENT

In utero treatment of a CAM was first described by Nicolaides *et al* in 1987 (40). In the same year, Clark et al (41) decompressed a very large cystic lung lesion in a 20 week fetus using a shunt. Needle aspiration or pleuro-amniotic shunting may still be considered if there is a large lesion within a multicystic CAM requiring drainage to reduce pressure effects (3) (Figures 11, 12). Insertion of a shunt to drain a pleural effusion, particularly if hydrops is present, may also be carried out. In our series, two of three hydropic fetuses had a good outcome following shunt insertion (10). Fetal surgery, involving hysterotomy and fetal thoracotomy with excision of the affected lung (42, 43), has been performed in the USA for fetal CAM complicated by fetal hydrops because of its poor prognosis.

FOLLOW-UP

Saltzman *et al* (44) was the first to report spontaneous improvement of a CLL in a fetus. There are other early reports of spontaneous improvement or even apparent in utero resolution of fetal CLL (45, 46, 47, 48). Possible mechanisms whereby fetal

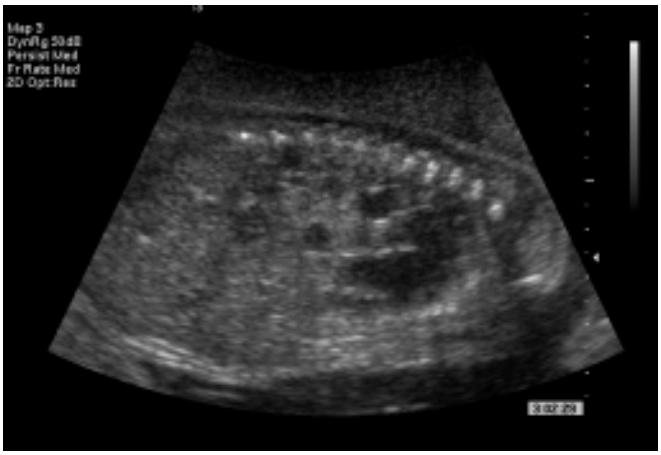

Figure 4 Macrocystic lung lesion. Longitudinal view demonstrating an intact diaphragm.

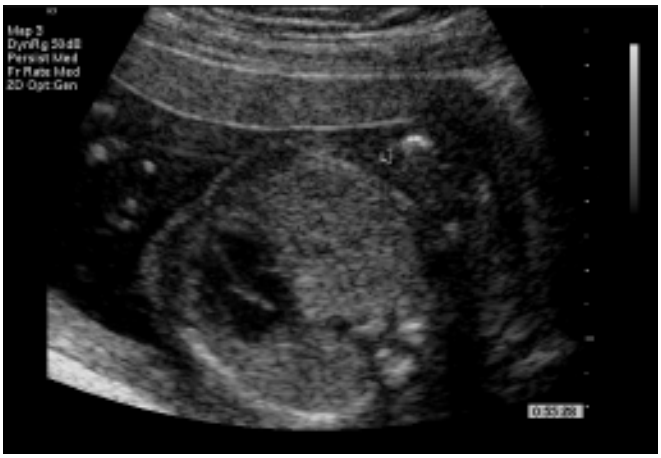

Figure 6 Microcystic left sided echogenic lung lesion seen in transverse view.

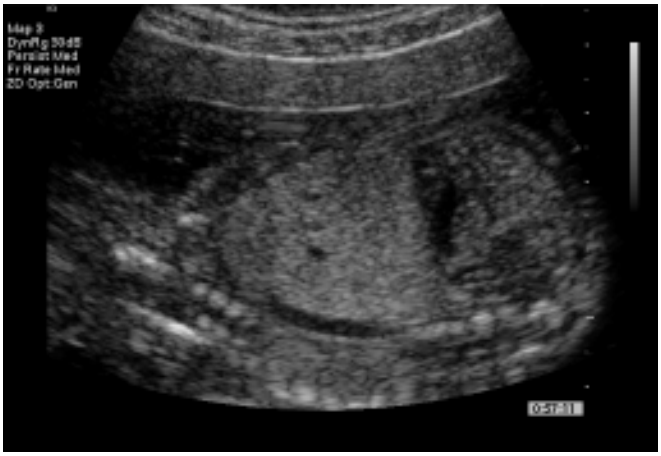

Figure 5 Microcystic left sided echogenic lung lesion seen in longitudinal view.

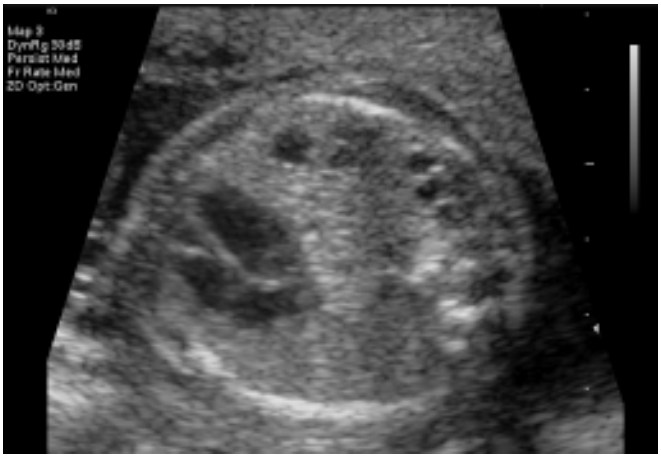

Figure 7 Left lung lesion with associated mediastinal shift (Same fetus as Figure 2).

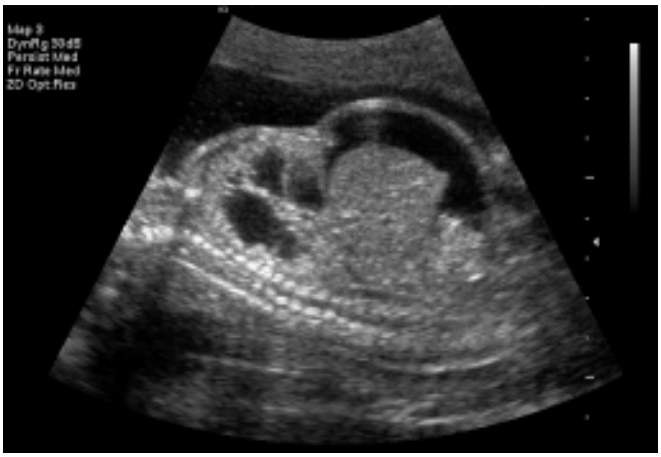

Figure 8

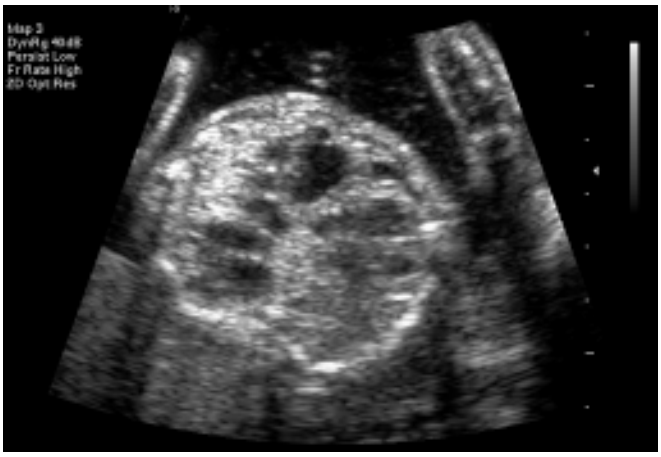

Figure 9

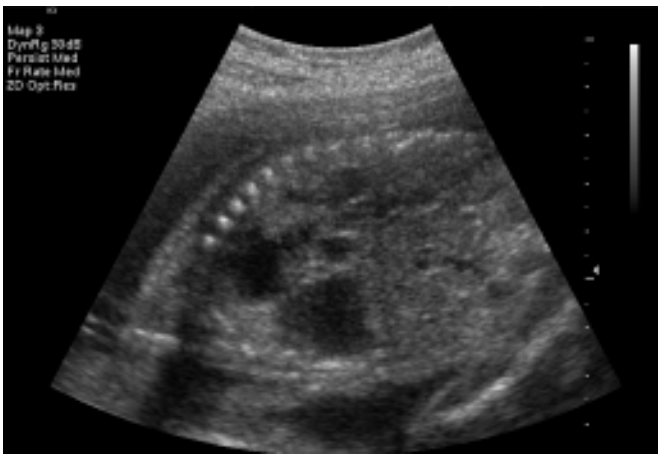

Figure 10

Figures 8, 9, 10 This fetus has ascites (Figure 8) and a small pericardial effusion (Figure 9) in association with a right sided macrocystic lung lesion. This is unusual in that there is no evidence of a pleural effusion. Two weeks later the ascites had spontaneously resolved and the lesion had decreased in size (Figure 10).

Table 1 Prenatally diagnosed cystic lung lesions - causes and outcome (10)

a. CAUSE

Microcystic lung lesion	27
Macrocystic lung lesion	29
CDH	4
Lost to follow up	3
TOTAL	63

b. OUTCOME

	MICROCYSTIC	MACROCYSTIC
• Neonatal Death	4	0
• Postnatal surgery	3	10
• Conservative management	17	18
• Termination of pregnancy	3	1
TOTAL	27	29

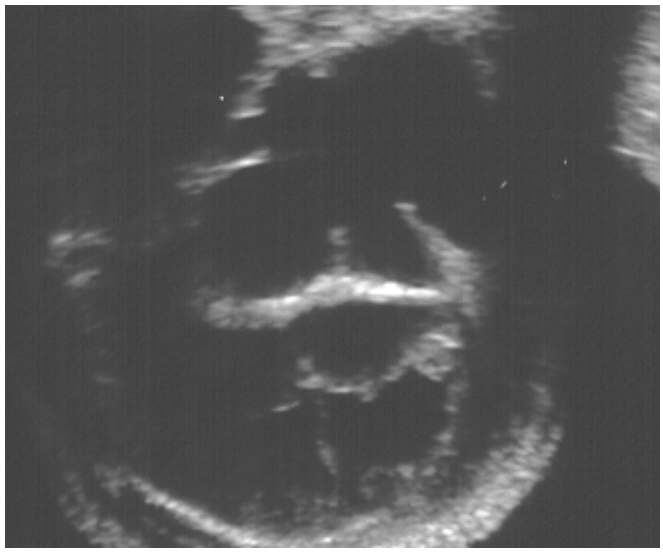

Figure 11 Pre-aspiration

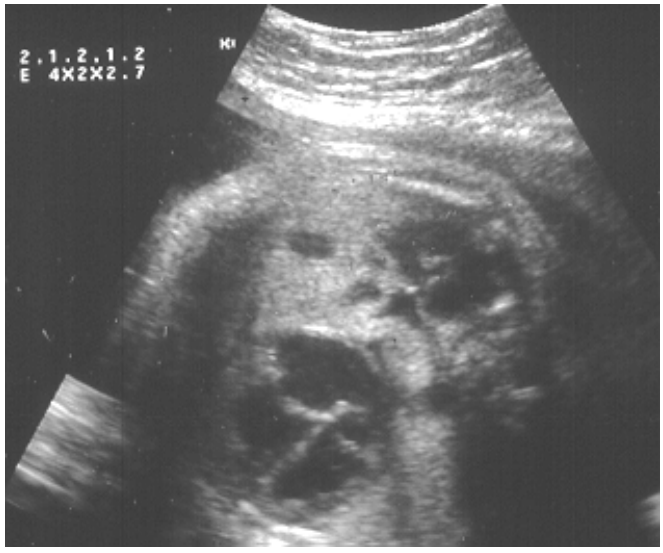

Figure 12 Post-aspiration

Figures 11, 12 This big cyst within a macrocystic chest lesion was aspirated several times during the pregnancy. Postnatal resection was carried out. Histology demonstrated a CAM.

CLLs appear to regress during pregnancy include involution of the lesion when it outgrows its blood supply (49) or spontaneous resolution of an obstructed bronchus. Disappearance of a lesion on ultrasound in late gestation may occur not because the lesion is gone, but may instead reflect changing characteristics of the lesion on ultrasound with loss of fluid/tissue interfaces in the mass resulting in reduced echogenicity (45).

It is suggested that CT or MRI imaging of the chest of all neonates diagnosed with a CLL prior to birth is undertaken, even if the lesion appears to resolve in utero and/or the neonatal chest X-ray is normal (50). Management of neonates has gradually changed. Previously CAM presented in the neonate as respiratory distress or in the infant as recurrent pulmonary infections (43). Small lesions may remain asymptomatic for years (51, 52). While surgery for all CAMs is encouraged by some, to prevent later infection (53) or malignant transformation (54), there is an increasing move toward conservative management of prenatally diagnosed CAMs in selected cases (7). Similar debate surrounds the management of lesions diagnosed as BPS (55), although there is a greater emphasis on removing the mass because of the risk of complications (such as hemoptysis) if a lesion with a large blood supply is left in situ (56).

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Reliability of measures of the cubital tunnel using high resolution ultrasound: a preliminary study

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ABSTRACT

We aimed to develop a protocol that measured structures of the cubital tunnel using high resolution ultrasound which was stable and reproducible. Ten asymptomatic subjects were invited to partake in the study. We tested reliability of the measurements using a test-retest design and a strict scanning and positioning protocol. Measurements were taken with the upper limb in three different test positions - with the elbow extended, with the elbow flexed 90 degrees, and with the elbow fully flexed. A measurement was considered to be reliable if no significant difference ($p<0.05$) was demonstrated between the test and re-test, Pearson's correlation co-efficent was greater than or equal to 0.5, and the ICC values were greater than or equal to 0.6. Reliability was demonstrated for the majority of measures. This study demonstrates that the structures of the cubital tunnel can be reliably measured when a closely controlled positioning and measurement protocol are undertaken.

INTRODUCTION

The ulnar nerve passes through the cubital tunnel at the elbow and is a significant site of neuropathy in the upper extremity (1, 2). The cubital tunnel extends from the level of the medial epicondyle of the humerus to the distal articulation between the coronoid process of the ulna and the trochlea of the humerus. The roof of the tunnel is formed by an aponeurosis bridging the two heads of the flexor carpi ulnaris muscle, one head arising from the medial epicondyle of the humerus and the other arising from the olecranon process of the ulna (Figure 1). A separate structure, the cubital tunnel retinaculum forms the roof of the proximal tunnel. It has two bony attachments, one to the medial epicondyle and the other to the olecranon process (3). Proximally the osseous floor of the tunnel is formed by the medial edge of the trochlea of the humerus, the retro-epicondylar groove, the olecranon process of the ulna and the medial epicondyle of the humerus (Figure 2). The medial collateral ligament and the medial capsule of the elbow joint form the soft tissue floor of the tunnel.

High-resolution ultrasound (HRUS) is an accepted imaging modality to visualise the ulnar nerve and associated structures at the cubital tunnel (4-7). Measurements of the ulnar nerve at the cubital tunnel using HRUS have been shown to have a role in the diagnosis of neuropathy (4), however to the authors' knowledge, no study has been performed to show that HRUS measurements of the ulnar nerve are stable and reproducible. The aim of this study was to develop a set of reliable measurements using HRUS for structures at the cubital tunnel in an asymptomatic population. This aim was achieved after working through a number of separate experimental protocols but only the methods and results of the final testing protocol are reported in this paper.

STUDY DESIGN

Five asymptomatic volunteers (10 elbows) aged between 18-30 years were invited to participate in this test-retest design where each subject was examined on two consecutive days using the same testing protocol. Ethical approval was obtained from the University of South Australia Ethics Committee and each subject provided written consent. The scans were performed on an ATL

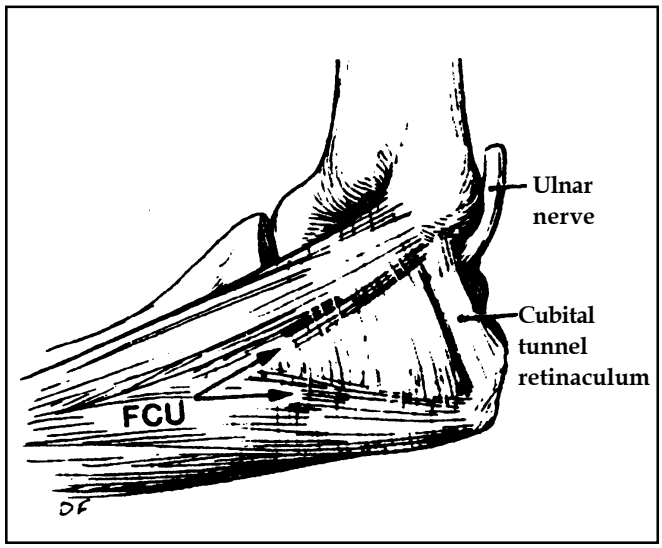

Figure 1 Anatomy of the cubital tunnel (adapted from (3))

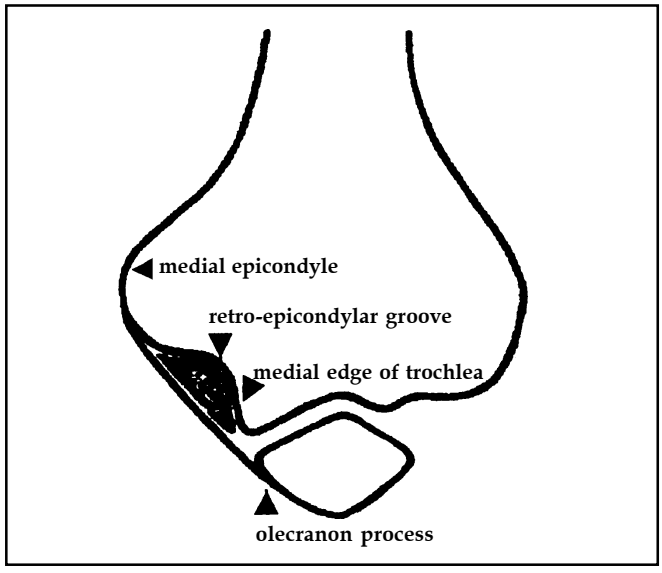

Figure 2 Structures forming the osseous floor of the proximal cubital tunnel

Table 1 Summary of the measurements tested for reliability.

		Measurement	Description
Scanning plane for measurement	Transverse to proximal tunnel. (parallel to the plane connecting the medial epicondyle with the olecranon)	D meol (cm)	Distance between the most prominent points of the medial epicondyle and the olecranon process. If these structures appeared flattened the measurement was taken from the innermost part of the prominence. Figure 3
		CT area (cm^2)	The cross-sectional area of the proximal osseous cubital tunnel was measured using the electronic calipers to measure D meol, and then to trace along the inner aspect of the bright echo which represented the osseous floor of the tunnel. The tracing was continuous over the gap where the medial lip of the trochlea articulated with the olecranon. Figure 4
		UN AP p (cm)	Height of the nerve in the proximal tunnel. Figure 5
		UN trans p (cm)	Width of the nerve in the proximal tunnel. Figure 5
		UN area p (cm^2)	Cross-sectional area of the nerve in the proximal tunnel.
		UN/CT%	Ratio of the UN area p to CT area expressed as a percentage ([UN area p/ CT area] x 100).
	Perpendicular to the course of the nerve	UN AP d (cm)	Height of the nerve in the distal tunnel.
		UN trans d (cm)	Width of the nerve in the distal tunnel
		UN area d (cm^2)	Cross-sectional area of the nerve in the distal tunnel.
	Parallel to the course of the nerve	UN long p (cm)	Height of the nerve measured at the proximal tunnel. (If the nerve was curved at this point the measurement was taken on the curve). Figure 6
		UN long d (cm)	Height of the nerve measured at the distal tunnel. Figure 7
	Parallel to the retinaculum	R width (cm)	Thickness of the cubital tunnel retinaculum measured immediately superficial to the centre of the ulnar nerve. The measurement was taken from the leading edge of the bright reflector (representing the most superficial border), to the deepest edge of the bright reflector (representing the deepest border). Figure 8

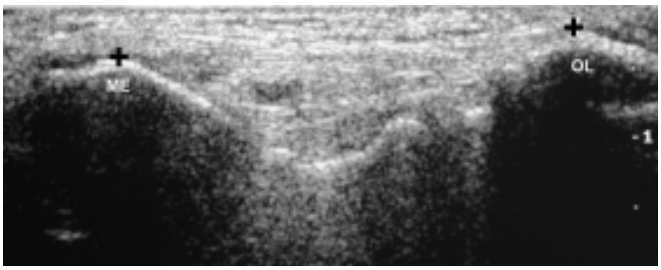

Figure 3 D meol. Distance (cm) measured between the cursors. ME: medial epicondyle of humerus. OL: olecranon process of ulna

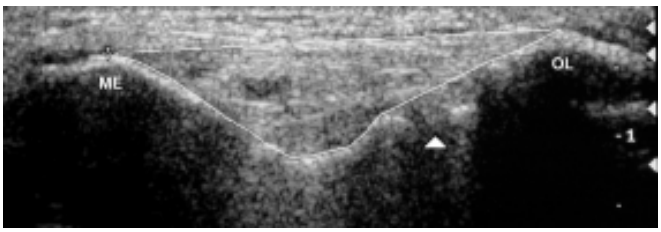

Figure 4 CT area (cm^2). Electronic calipers are used to trace the area of the proximal osseous cubital tunnel. Note the measurement is continuous over the articulation of the trochlea and olecranon (arrowhead)

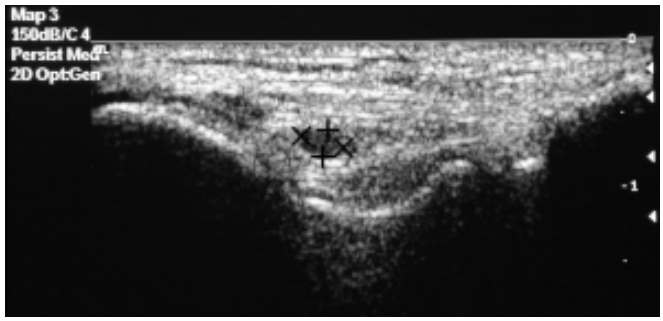

Figure 5 Cross-sectional measurements of the proximal nerve (cm). Ulnar nerve (UN) AP p (cm) - distance between calipers (+). UN trans d (cm) - distance between calipers (X).

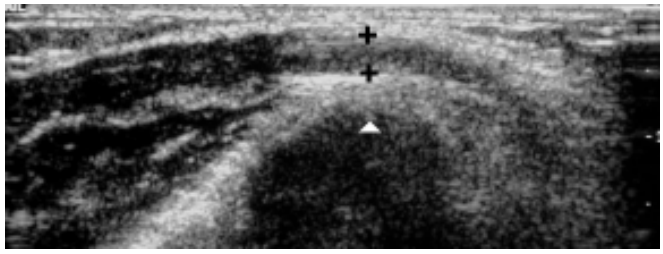

Figure 6 UN long p (cm). Distance between the cursors. Arrowhead marks medial epicondyle.

HDI 5000 ultrasound system (Advanced Technology Laboratories). A 5-12 MHz linear array transducer was used. One qualified sonographer performed all measurements. Measures were taken using the ATL software in-built electronic calipers.

PROCEDURE

The measurements were made with the subject lying supine, with the arm under examination abducted 90 degrees from the body and the head and neck aligned with the long axis of the body. A soft neck collar was used to maintain a constant neck position to limit the potential confounding effect of neural tension induced by cervical rotation (8). In all test positions, measures were taken in order to reflect variations in size or geometric orientation as a result of position on the nerve, tunnel and retinaculum rather than pathology. There were three test positions:

Test position 1: The upper limb was fully extended at the elbow with the wrist in full extension and supination.

Test position 2: The elbow was flexed 90 degrees so that the angle formed by the lower arm and the upper arm was 90 degrees. A foam block was used to keep this angle constant and the upper arm at the elbow was supported with the aid of sandbags for stabilisation.

Test position 3: The elbow was flexed to the maximum degree of flexion possible

MEASURES

For the purpose of the study the proximal cubital tunnel was defined as at the level of the medial epicondyle and the distal cubital tunnel was where the nerve passed deep to the flexor carpi ulnaris muscle. Table 1 summarises the measurements taken.

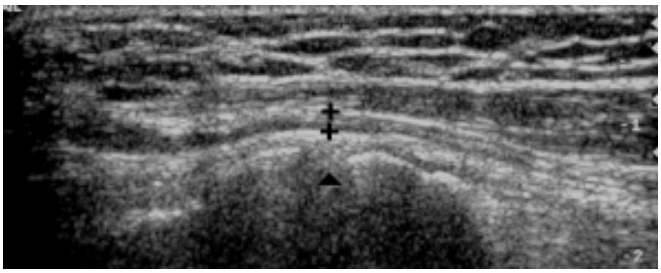

Figure 7 UN long d (cm). Distance between the cursors. Arrowhead marks articulation between coronoid process of ulna and the trochlea of the humerus.

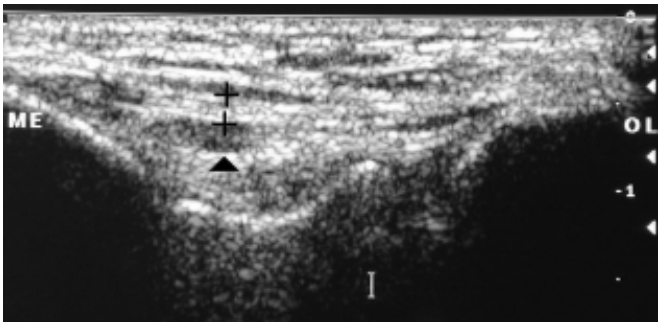

Figure 8 R width (cm). Distance between the cursors. Note measurement taken immediately superficial to ulnar nerve (arrowhead).

All transverse measurements of the proximal tunnel were taken from an image which clearly demonstrated the osseous structures of the floor of the proximal tunnel, the medial epicondyle, olecranon, retro-epicondylar groove and the medial edge of the trochlea. This image was in effect a template, which determined a reproducible scanning plane.

All measurements of the distal nerve were made at the level of the articulation between the coronoid process and the trochlea. Transducer pressure was minimised to prevent mechanical distortion of the nerve. The bright borders of the nerve were excluded from all nerve measurements.

Measurements of the nerve when visualised in a plane perpendicular to the course of the nerve were standardised. If a branch was seen to be coming off the nerve and it was where the measurement would normally be taken, the irregularity of the contour of the nerve was not included in the measurement. When the nerve was orientated obliquely in the tunnel so that it was difficult to determine which measurement represented the height and which measurement represented the width of the nerve, the largest measurement was deemed to be UN trans, and the shortest measurement was deemed to be UN AP. The cross-sectional area of the nerve (UN area) at each site was calculated as the product of the height of the nerve (UN AP) and the transverse diameter of the nerve (UN trans).

DATA ANALYSIS

All data collected was interval and was analysed by parametric statistical tests. A paired two sample for means t-test (t-test) was used to assess significant difference ($p<0.05$) between the test and re-test. Pearson's correlation co-efficient (r) was calculated to assess linear correlation. Values between 0.5 and 0.75 were considered to represent moderate to good correlation, and values greater than 0.75 were considered to represent very good to excellent correlation (9). Intraclass correlation co-efficients (ICC) were calculated to assess the variability between the two tests. Values between 0.6 and 0.79 were considered to represent moderately high reliability and values greater than or equal to 0.8 were considered to represent very high reliability (10). A measurement was considered to be reliable if no significant difference ($p<0.05$) was demonstrated between the test and re-test, Pearson's correlation co-efficent was greater than or equal to 0.5, and the ICC values were greater than or equal to 0.6.

RESULTS

Five subjects (4 female, 1 male), aged between 18-24 had measurements taken on each elbow ($n=10$). Data was available for all measures in three positions, except for R width, which was measured in position 3 only.

Table 2 reports mean values and standard deviations for all measures. Table 3 shows the results of the analysis including significant findings. The majority of measures in each test position met the three criteria for reliability. Position 1 resulted in the lowest number. The measurements of the nerve taken in a plane perpendicular to the nerve in the distal tunnel did not meet the criteria for reliability.

DISCUSSION

Measurements were taken in varying degrees of elbow flexion because the configuration of the anatomy of the cubital tunnel changes with elbow flexion and extension. This variability may be contributary to in the development of cubital tunnel syndrome

(3, 11-14). As the elbow flexes the shape of the osseous floor of the proximal tunnel becomes shallower and the cubital tunnel decreases in volume. In addition, the distance between the olecranon process and medial epicondyle increases with associated stretching of the cubital tunnel retinaculum and aponeurosis of the flexor carpi ulnaris muscle. With elbow flexion the ulnar nerve stretches and elongates and in some cases moves to the tip of the medial olecranon, or anterior to it, which may be a factor in friction or compressive neuropathy.

In general, this protocol demonstrated that a variety of measures of the ulnar nerve in both the proximal and distal cubital tunnel could be reliably measured using HRUS. With respect to compression syndromes, the ratio of ulnar nerve to cross-sectional area of the tunnel (UN:CT%) has the potential to reflect the relationship between the size of the nerve and the tunnel in the setting of cubital tunnel syndrome. The cubital tunnel retinaculum was measured in the fully flexed position only, because it was difficult to visualise in the other positions.

The effect of elbow position on the reliability of measures was dramatic, with the fully flexed position being associated with a greater number of measures fulfilling all three criteria for reliability. Specifically, in position 1, four of the 12 measures met the criteria for reliability, whereas this rose to eight in the position 2 and nine in position 3. We postulated that in the closed packed positions of the elbow the structures were more geometrically approximated, and that there was less variability in the scanning planes.

Table 2 Mean measures and standard deviations. (SD)

Measure	Position 1	Position 2	Position 3
D meol (cm)	1.8 (0.14)	2.7 (0.23)	3.0 (0.15)
UN AP p (cm)	0.2 (0.07)	0.2 (0.06)	0.2 (0.08)
UN trans p (cm)	0.2 (0.06)	0.3 (0.08)	0.3 (0.09)
UN area p (cm^2)	0.1 (0.06)	0.1 (0.04)	0.1 (0.06)
CT area (cm^2)	0.8 (0.14)	1.1 (0.21)	1.1 (0.27)
UN/CT (%)	10.0 (8.74)	6.2 (2.97)	6.4 (3.81)
UN long p (cm)	0.3 (0.09)	0.2 (0.10)	0.2 (0.11)
UN long d (cm)	0.2 (0.03)	0.1 (0.03)	0.2 (0.03)
R width (cm)			0.1 (0.04)

The distal cross-sectional measurements of the ulnar nerve (UN AP d, UN trans d, UN area d) did not reach the criteria for acceptable reliability. This is likely to have resulted from minor variations in transducer orientation and lack of permanent anatomical landmarks to determine a reproducible scanning plane. Proximal cross-sectional measurements were more successful probably because the proximal bony tunnel served as a template for transducer orientation. Such a template did not exist for the distal nerve.

In the development of this protocol we were able to improve our results with stricter criteria for measurements as well as controlling the position of the subject's head, neck, upper body and angle of shoulder abduction. It should be considered that as the ulnar nerve derives from the cervical spine (C8 – T1), changes in neck position between occasions of testing have the potential for altering neural tension in the upper extremity and be a possible confounding influence.

CONCLUSION

If measurements of the structures at the cubital tunnel are to be used in a diagnostic, longitudinal, clinical setting they must be reproducible and stable. The results of this study demonstrate that the cubital tunnel and more specifically the ulnar nerve can be reliably measured in both cross-section and longitudinal planes when a closely controlled positioning and measurement protocol are undertaken. Further investigation is needed to determine normal values for these measurements and correlative studies to determine the efficacy of HRUS in the diagnosis of ulnar neuropathy at the cubital tunnel.

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Table 3 Results of statistical tests for the final testing protocol. The shaded areas represent the values that met the criteria for reliability Note: ICC values can be compromised when there is little variability between subjects.

		Position 1			Position 2			Position 3	
	t-test	r	ICC	t-test	r	ICC	t-test	r	ICC
D meol	0.4	0.52	0.52	0.29	0.91	0.9	0.88	0.75	0.61
UN AP p	0.16	0.6	0.48	0.89	0.96	0.94	0.63	0.94	0.91
UN trans p	0.32	0.81	0.88	0.26	0.82	0.8	0.53	0.71	0.72
UN area p	0.26	0.93	0.92	0.45	0.88	0.87	0.38	0.93	0.93
UN AP d	0.009	0.36	-0.11	0.24	0.75	0.56	0.14	0.52	0.42
UN trans d	0.02	0.61	0.19	0.27	-0.37	-0.37	0.85	-0.33	0.26
UN area d	0.009	0.07	-0.28	0.24	0.05	-0.01	0.48	0.07	0.09
CT area	0.67	-0.03	0.01	0.36	0.93	0.87	0.88	0.95	0.96
UN:CT%	0.7	0.87	0.87	0.63	0.9	0.88	0.31	0.89	0.89
UN long p	0.14	0.78	0.75	0.12	0.83	0.75	0.26	0.9	0.87
UN long d	0.23	0.66	0.59	0.87	0.8	0.8	0.81	0.72	0.73
R width	N/A	N/A	N/A	N/A	N/A	N/A	0.16	0.81	0.78

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2D and 3D ultrasound in the prenatal diagnosis of otocephaly - a complex craniofacial abnormality

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ABSTRACT

This paper is a report of the prenatal diagnosis of a case of Otocephaly using 2-dimensional (2D) and 3-dimensional (3D) ultrasound. Otocephaly is a very rare and lethal condition characterised by a host of craniofacial abnormalities involving the mandible, temporal bones, ear, mouth, eyes and brain. The extent of the pathological features is not well appreciated using 2D ultrasound and diagnosis is usually late.

Our department had recently purchased a Medison Voluson 530D MT 3D Ultrasound machine at the time of this case. We were keen to explore its applications for obstetrics and gynaecology other than simply producing appealing photographs of fetal faces. The use of 3D ultrasound proved invaluable in this case. We were able to document the striking features of this very complex pathology and provide the parents with a likely prognosis at 26 weeks gestation.

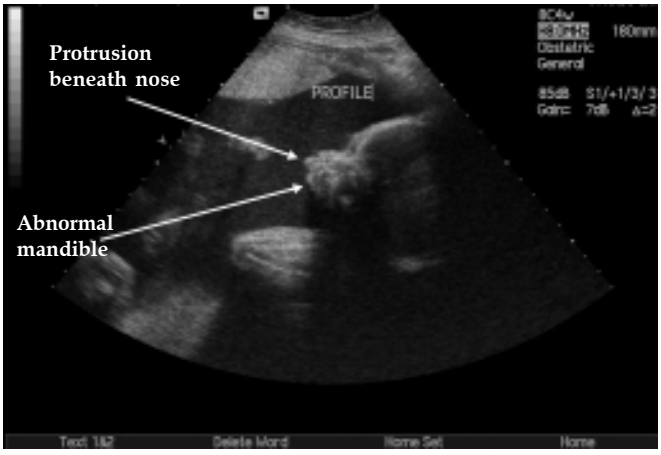

Figure 1 2D Sagittal image of facial profile. Note the projection of soft tissue inferior to the nose, and abnormal chin appearance.

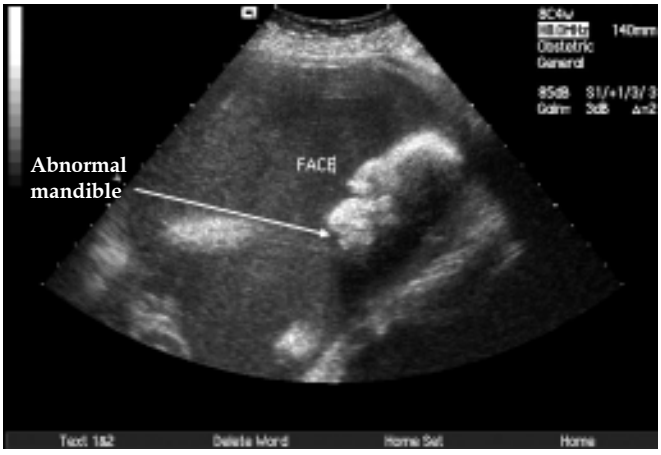

Figure 2 2D Coronal image of fetal face.

CASE REPORT

A 19 year old gravida 2, para 0 woman presented to this department at approximately 19 weeks gestation for her routine fetal anomaly scan. She had undergone an uneventful dating scan at 8 weeks at another centre. There was no known family history of congenital abnormalities.

The fetal anomaly scan was performed on an ATL 3000 2D ultrasound machine. This initial scan was limited by the fetal head position which was low in the maternal pelvis essentially inhibiting visualisation of the fetal face and lips. Other fetal anatomy appeared normal at this stage. The liquor volume also appeared normal. The fetal stomach was identified at this time, however, in retrospect it was quite small. Arrangements were made to review the lips and face the following week.

The patient returned the following week (then 20 weeks gestation) and she was again scanned with the ATL 3000 2D machine. This time the fetus was in breech presentation enabling better visualisation of the lips and face (Figures 1 and 2). The resulting profile was clearly abnormal and it was considered that the fetus had a small mandible resulting in malocclusion of the jaws. Follow up was arranged for a 26 week cardiac scan to exclude major heart defects in view of this finding.

At 26 weeks gestation the patient returned for the cardiac scan and review of the fetal face, this time using an Acuson Sequoia 512 2D ultrasound machine. Immediately it was noted that the patient had developed severe polyhydramnios, with an amniotic fluid index of 32 cm. The fetal stomach could not be positively identified which was suggestive of a condition inhibiting fetal swallowing. The cardiac scan was unremarkable. The developing facial profile was increasingly disturbing and it was concluded that the fetus had a bilateral cleft lip and possible low set ears. The patient was then moved to the Medison 3D ultrasound machine and the fetus rescanned in the 3D mode.

3D imaging facilitated a more realistic appreciation of the fetal face (Figures 3, 4 and 5). Apart from the bilateral cleft lip, the mouth appeared very small (microstomia) with a vertical slit-like opening. The mandible appeared to be absent. The ears were clearly in an abnormally low and anterior position on the fetal neck. 3D imaging was optimised in this case by the excessive liquor which acted as an acoustic window.

The patient was counselled and opted to continue the pregnancy despite the poor prognosis. She underwent several ultrasound guided amniocentesis reductions for polyhydramnios caused by the fetus' inability to swallow (due to the abnormally small mouth) to reduce the risk of premature labour. A Caesarean section was performed at 35 weeks and a live female infant was delivered. Attempts to establish an airway failed and the baby died 19 minutes after birth. Autopsy confirmed the sonographic findings and the official diagnosis of otocephaly was made. (Figures 6 and 7).

THE PATHOLOGY

Otocephaly is an extremely rare and invariably lethal congenital abnormality. The incidence is believed to be less than 1 in 70,000 newborn infants (1). The pathogenesis is thought to be due to defective neural crest cell migration which results in incomplete development of the mandibular prominence of the first branchial arch (2). The mandible, external ear, part of the middle ear and the body of the tongue form from the first branchial arch and this explains the association of otocephaly with abnormalities of the ears, mouth and mandible (3). Most fetuses die shortly after birth from respiratory insufficiency due to incomplete formation of the oropharyngeal pathways (2).

Otocephaly is characterised by a host of craniofacial abnormalities. The ears are set anteriorly and abnormally low

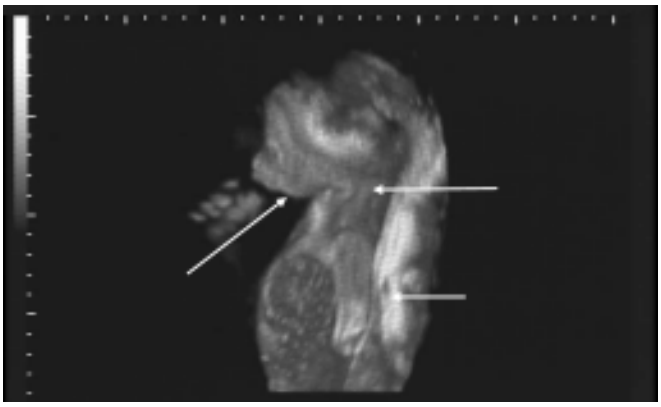

Figure 3 3D Sagittal image of the facial profile. The chin is absent.

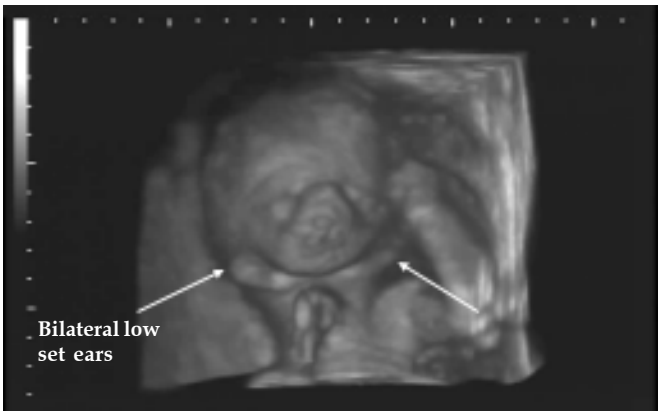

Figure 4 3D Coronal image of fetal face. The abnormal mouth and nose are clearly seen. Note the cleft in the upper lip. The ears are set low and anteriorly on the fetal neck and are fused at their lower borders.

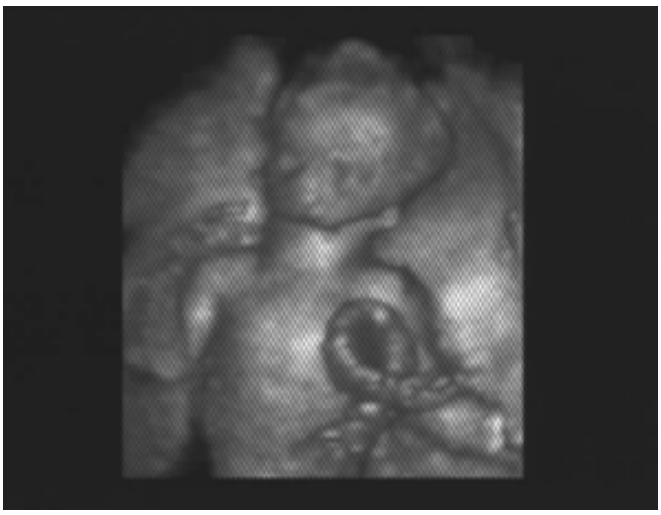

Figure 5 3D Coronal image of the fetal face and thorax.

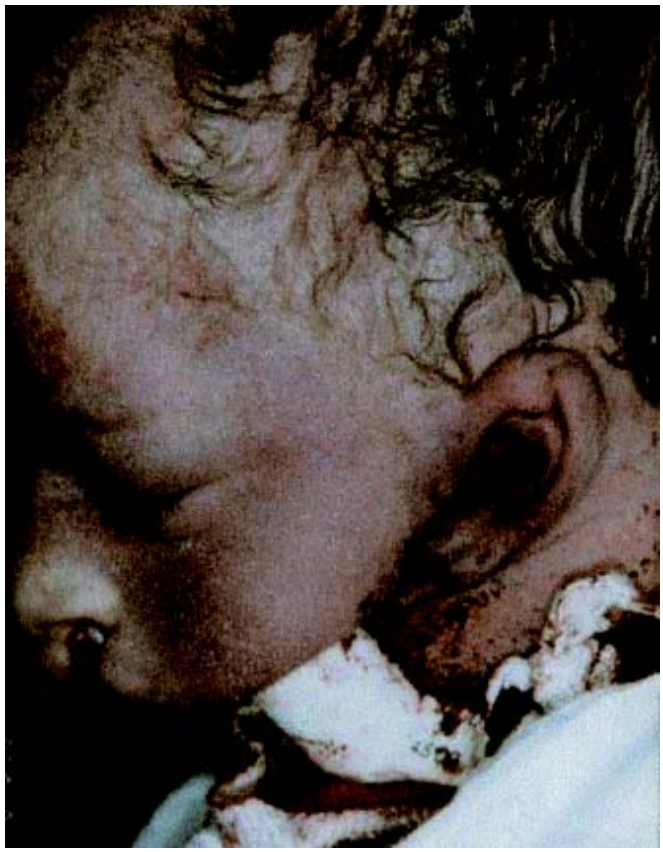

Figure 6 Post mortem photograph showing the facial profile.

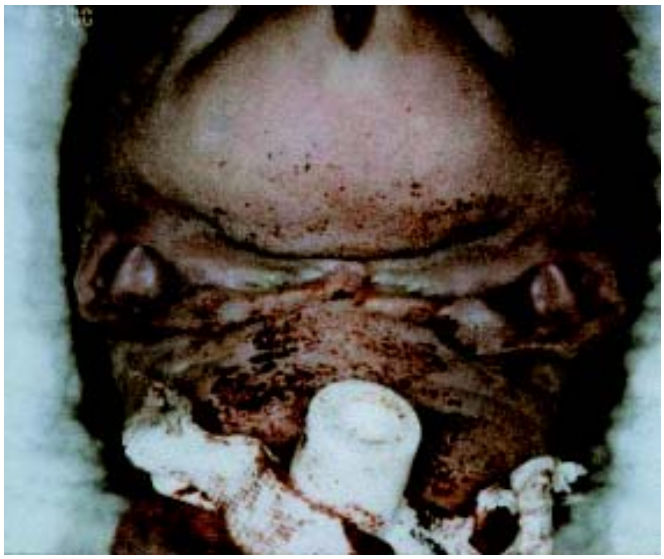

Figure 7 Post mortem photograph showing the ears, absence of the chin and the vertical slit-like mouth opening (superiorly).

on the neck, and may be fused at their lower borders (synotia). The mouth is small (microstomia) and the oral cavity usually ends blindly with no communication with the pharynx. The tongue is small or absent and there is partial or total absence of the mandible (agnathia). Affected fetuses may demonstrate these classic features only, such as the fetus in our case. However, otocephaly may be associated with other midline cranial defects such as holoprosencephaly, encephalocele, varying forms of cyclopia and the presence of a proboscis. Associated defects of the viscera such as situs inversus, renal agenesis, heart abnormalities and adrenal agenesis have also been reported (4).

When presented with such a range of potential associated abnormalities it can be appreciated that sonographic prenatal diagnosis may be initially difficult. There are reports of otocephaly being diagnosed sonographically as early as 20 weeks gestation, and others where diagnosis was not made until 35 weeks (3, 5). Sonographically, otocephaly should be suspected when the mandible cannot be identified, the ears are in an unusually low and anterior position, and the stomach shadow is absent, particularly in the presence of polyhydramnios. Polyhydramnios, however may not present until the third trimester as fetal swallowing does not greatly influence liquor volume until then (3).

DISCUSSION

Prenatal diagnosis of otocephaly is infrequent and may be assisted by 3D ultrasound (6). Admittedly, the initial 2D images obtained in this case gave a fairly obscure indication of the pathology due to the suboptimal head position at 19 weeks. Had the patient been scanned with the 3D machine at this time it is unlikely that the images would have added any significant diagnostic information.

It has been the experience of staff in this department that 3D ultrasound has its limitations. There is time involved in obtaining the optimal 2D section to facilitate a diagnostic 3D image and this is still dependent on fetal position. Also, the fetus must be relatively still as movement during the few seconds of volume acquisition results in a distorted 3D reconstruction, and therefore one must make several attempts at a section if the fetus is particularly active. Finally, the volume of data collected after a sweep must be manipulated to optimise the 3D reconstruction and this takes more time. For these reasons sonographers in this department prefer to use 3D scanning only when an abnormality is suspected after 2D scanning. We have had most success with facial, skeletal and uterine abnormalities to date.

However, the addition of 3D ultrasound did contribute greatly in this case. The family were better able to comprehend the child's appearance and problems, and were prepared for the likely prognosis. The obstetric team were also well informed for the ongoing pregnancy and prepared for the delivery despite the obviously poor prognosis.

CONCLUSION

As this department becomes more skilled with our Medison 3D ultrasound machine we anticipate that we will discover further applications for its use. 3D technology is growing and is certain to expand our prenatal diagnostic capabilities in the future.

ACKNOWLEDGEMENTS

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Patient consultation and counselling in nuchal translucency assessment

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INTRODUCTION

Chromosomal abnormalities are thought to be present in approximately 6% of zygotes with many of the affected cells either never implanting or spontaneously aborting. Of the pregnancies that progress, the most common chromosomal defects result in a range of phenotypic expressions and structural abnormalities (1).

A number of screening and diagnostic tests are available that can be applied in pregnancy in an attempt to identify the chromosomally abnormal (aneuploid) fetus (2). Trisomy 21, or Down Syndrome, is the most common chromosomal abnormality and represents approximately 50% of aneuploid fetuses. It is widely known about in the general population and the cause of considerable anxiety in many pregnant women. Much of the antenatal chromosome testing performed is primarily for the detection of Trisomy 21. The reported accuracy of the screening tests vary considerably and the invasive diagnostic tests carry a risk of pregnancy loss. In order for the tests to be used in the most appropriate and cost-effective way, the relationships between the tests needs to be understood by ultrasound practitioners, patients and clinicians.

This paper presents a flow chart of possible decision paths, combining both screening and diagnostic tests to aid in the consultation of patients considering investigation for chromosomal defects. The flow chart was developed initially as a guide for the personnel at Brisbane Ultrasound for Women (MH and GP) to discuss the role of nuchal translucency assessment in the detection of aneuploidy. It soon became apparent that patients gained increased insight and understanding from its use and it is used as the basis for discussion of results with the patient. They are given a copy to take away for further consideration and are encouraged to call the practice if they have further questions. The flow chart is <u>not</u> given to patients as a "stand alone" information sheet, as this is not its purpose. It is designed to be used as a discussion tool and it is inappropriate for it to be used in any other way.

DISCUSSION

The choice of appropriate screening and diagnostic tests for chromosomal abnormalities, and the resultant decision-making pathway chosen, is largely influenced by the needs and beliefs of the individual patient. The utilisation of the available tests and the significance of the results will vary considerably depending on those individual needs and beliefs (3).

All the tests have advantages and disadvantages and are based on differing techniques for the assessment of the pregnancy. A summary of the key features of the commonly used screening and diagnostic tests is presented in Table 1.

The flow chart, developed and used at Brisbane Ultrasound for Women since 1998, for use in the consultation process is presented as Figure 1.

In order for the flow chart to be used effectively, it is important that persons involved in the counselling have a thorough understanding of all aspects of the possible pathways. A thorough knowledge of the laws for termination applicable in the particular jurisdiction is important, as this is a focal point of interest for many patients regardless of risk determination and the particular circumstance of their pregnancy. Not all elements of the flow chart need to be discussed with each patient. Its use can easily be modified depending on the patient's risk assessment and level of decisiveness.

Counselling can effectively be performed by sonographers, provided they are well educated in the area and have appropriate back-up when needed for difficult cases.

FLOW CHART: Major elements

Patient priority categories

Pregnant women and their partners, when considering the options for prenatal testing for chromosomal defects, need to understand the procedures and risks involved, the advantages and disadvantages of the tests and the possible implications of the results (3). Individuals' priorities in making these decisions differ. They are influenced by factors such as family circumstances and religious, moral and philosophical viewpoints and previous obstetric experiences.

Generally the priority which underlies most individual's decision making can be classified into one of three groups.

Priority A "Must know"

Persons in this group:

- wish to have the most accurate diagnostic test possible
- often opt for chorionic villus sampling (CVS) due to the earlier availability of results compared with amniocentesis

In such circumstances, undertaking additional non-invasive testing such as nuchal translucency (NT) screening would not be appropriate or cost effective.

However, some patients desiring invasive testing may prefer to have a non-invasive NT screening test first to help guide their decision making and if the risk assessment were low, choose to have amniocentesis, rather than CVS, for the advantage of the lower reported miscarriage rate. Sometimes, if a very low risk result is obtained from the NT assessment, the patient may decide to defer a decision to undergo invasive testing at that time, effectively changing to a "Priority B" category.

Priority B "No threat to this pregnancy unless increased risk indicated" (by screening test/s)
Persons in this group:

- are concerned about the risk of chromosomal abnormality but are reluctant to undergo invasive testing unless recommended
- are usually prepared to accept the miscarriage risk, of a diagnostic test, if the ***pregnancy specific*** screening test indicates a high risk of aneuploidy
- are usually prepared to accept the small risk of aneuploidy if the screening test calculated risk is significantly reduced compared to the background risk and the miscarriage risk

Counselling in this group needs to carefully focus on:

- the fact that screening tests cannot exclude or confirm chromosomal defects
- ***low risk does not equal no risk.***

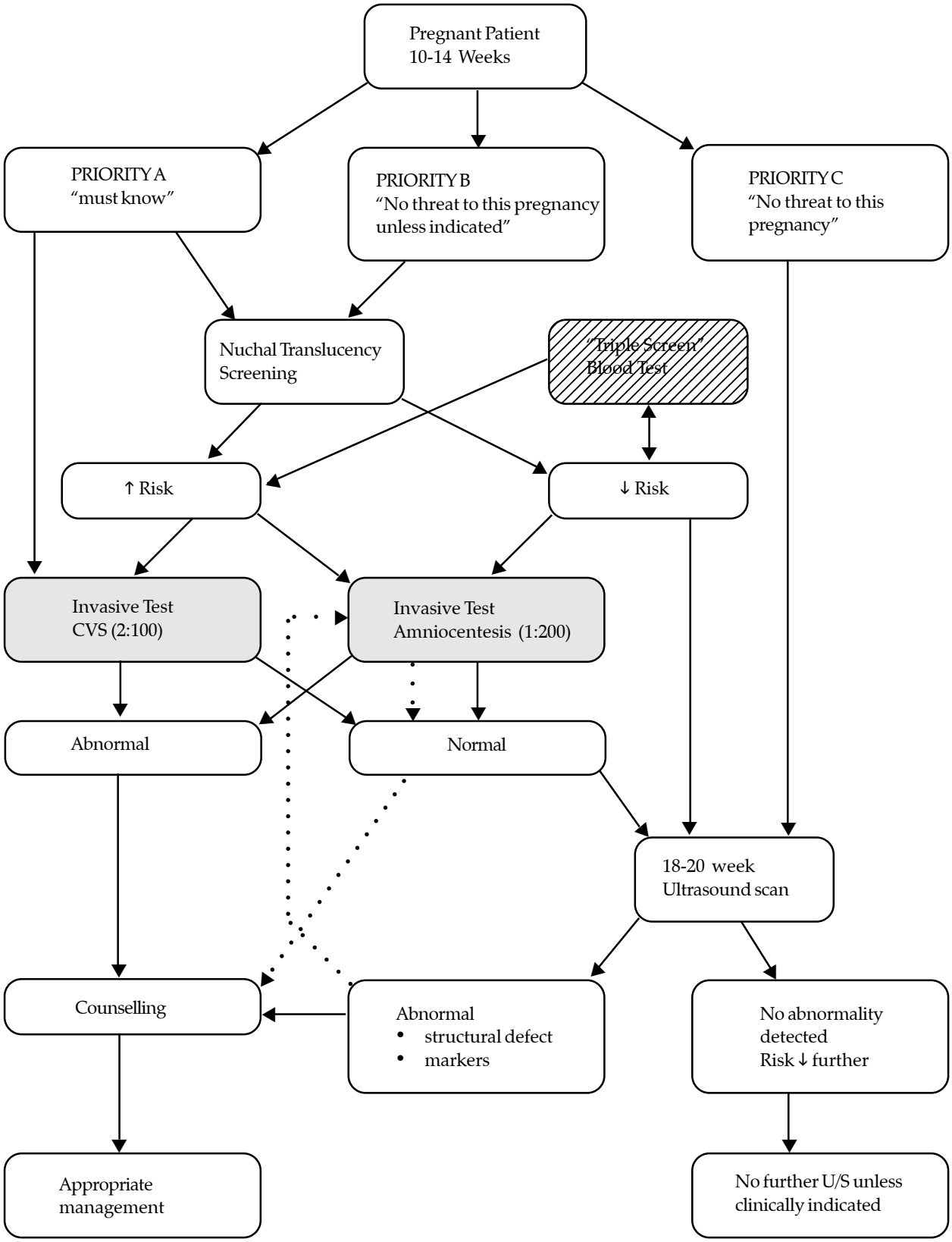
If the NT assessment indicates a significantly reduced risk of chromosomal defect some patients may opt to have maternal serum screening ("Triple Test") as an additional screening test. If the maternal serum screening is also low risk, this usually serves as additional reassurance to the patient, as does the 18-20 week morphology scan result that shows no detected structural anomalies or chromosome "markers".

One of the most common misconceptions regarding aneuploidy diagnosis is that many patients believe (incorrectly) that an amniocentesis must be performed at 16 weeks, or it is too late. The flow chart highlights the fact that this is not the case. Following explanation, many patients with a low risk nuchal translucency result are prepared to delay a final decision regarding amniocentesis until the result of the 18-20 week morphology scan is known. If no markers for aneuploidy are detected at this scan, the risk for Trisomy 21 is considered to be reduced even further over the nuchal translucency risk. The feasibility of this strategy is aided by the availability, in many centers, of Fluorescent In-Situ Hybridisation (FISH) analysis of the amniotic fluid. This provides preliminary results for Trisomy

Table 1 Tests for the assessment of aneuploidy

CHORIONIC VILLUS SAMPLING **Test type:** Diagnostic **Procedure:** Direct sampling of placental issue at approximately 11-13 weeks gestation **Advantages:** Early and rapid results. Accuracy 97% **Disadvantages:** Miscarriage rate of approximately 1-2%. More uncomfortable than amniocentesis. Technically can be difficult. Higher method failure rates than amniocentesis.	**MATERNAL SERUM SCREENING ("Triple Test")** **Test type:** Screening **Procedure:** Maternal venous blood sample obtained and analysed at 15-18 weeks gestation. **Advantages:** Non-invasive assessment of risk for chromosomal and neural tube defects. Relatively inexpensive and painless. **Disadvantages:** Erroneous results if dates incorrect. Risk assessment only, not definitive answer. Accuracy approximately 60% (4).
AMNIOCENTESIS **Test type:** Diagnostic **Procedure:** Direct sampling of the amniotic fluid from 15 weeks gestation **Advantages:** Most accurate assessment of fetal chromosomal status (99%). Relatively quick and less uncomfortable than CVS. **Disadvantages:** Miscarriage rate of approximately 0.5%. Delay in full results (10+ days). This disadvantage has been lessened with the introduction of Fluorescent In-Situ Hybridisation (FISH) analysis. Second trimester test.	**NUCHAL TRANSLUCENCY SCREENING** **Test type:** Screening **Procedure:** Ultrasound scan at 11.5-13.5 weeks gestation to measure nuchal translucency and crown-rump length, and to assess for major structural abnormalities. Computer generated risk assessment based on measures. **Advantages:** Relatively quick, painless procedure. Allows early assessment of dating and viability. Accuracy for detection of fetuses at high risk of chromosomal defects approximately 75-80% (4). **Disadvantages:** Technical precision of measurements and access to computer program required. Risk assessment only, not a definitive test.
MATERNAL AGE ASSESSMENT **Test type:** Screening **Procedure:** Notation of maternal age and comparison with arbitary "high risk" cut-off age. **Advantages:** Quick, simple, completely non-invasive. **Disadvantages:** Accuracy of approximately 30% (age 37) (4). No other information obtained regarding pregnancy status.	**18-20 WEEK MORPHOLOGY SCAN** **Test type:** Screening **Procedure:** Detailed ultrasound examination of fetus and environment to assess for structural defects and variations ("markers") at 18-20 weeks gestation. **Advantages:** Non-invasive, usually positive bonding experience for patient. A significant amount of detailed information regarding the progress of the pregnancy can be obtained if high quality scan performed. **Disadvantages:** Highly operator dependent. Good quality equipment and training required for accurate results. Accuracy for detection of fetuses at higher risk of chromosomal defects approximately 50% for Trisomy 21 and 80% for Trisomies 13 and 18 (4). Trisomy 21 may not be detectable if no markers present.

Figure 1 Consultation Flow Chart developed by Brisbane Ultrasound for Women



(• • • • • • > no previous karyotyping performed)

21 to an accuracy of approximately 90%, in many cases within 2 working days.

Occasionally, following discussion of the NT screening result, a patient with a low risk assessment will decide to undergo invasive testing - essentially changing to Priority A category. This is not surprising when we consider that an individual's perspective on acceptable risk levels varies considerably (3).

Priority C "No threat to this pregnancy"
Persons in this group:

- do not wish to undergo any form of invasive testing which could potentially result in miscarriage, no matter what the circumstances
- have a variety of reasons for this that may include religious or moral beliefs, a history of infertility, or be based on previous obstetric experience.

In these circumstances, provided thorough counselling has been undertaken, the use of non-invasive screening tests, even the 18-20 week morphology scan, may not be warranted.

However, an 18-20 week morphology scan provides clinically useful, non-threatening information about dates, number of fetuses and placental site. It is an appropriate test to discuss with patients in this group as:

- it allows for the detection of a range of structural abnormalities where alterations to management of the pregnancy or delivery arrangements may be required, for example anencephaly or serious cardiac defect
- if an abnormality is found at the 18-20 week scan the patient may reassess the situation and elect at that point to undergo invasive testing.

Counselling Guidelines
When counselling patients regarding the assessment of aneuploidy, it is essential that several key issues are addressed and that the patient understands these issues.

In order to ensure counselling is thorough and comprehensible the following points are suggested for inclusion in any discussion with patients:

- an explanation of the difference between screening and diagnostic tests
- an explanation that ***low risk does not equal no risk*** . It is essential that patients understand that a low risk or "good" NT result does not exclude Trisomy 21 or other abnormalities
- a discussion of the patients perceived "priority". *It is important to realise that this may (and often does!) change as results become known.*
- a discussion of the purpose, accuracy, disadvantages, advantages, timing and costs of the tests
- the results of tests should be discussed in the context of possible further testing or decision pathways
- a discussion of the possible implications of the results
- the opportunity for the patient to ask questions or for clarification of any issues. The flow chart is useful in highlighting issues which otherwise the patient may not be aware of, or may feel uncomfortable in raising.

If the result is "abnormal" ie an increased risk assessment, the following points need to be emphasized:

- a thickened nuchal translucency is not in itself an abnormality. It simply provides a risk assessment
- a thickened nuchal translucency is not only seen in aneuploidy. There is a wide range of other conditions that have been reported in association with thickened nuchal translucency (5).

Those involved in counselling must have an appreciation of the implications of a high risk result and the appropriate further investigations that may be required if the pregnancy is found to be chromosomally normal following invasive testing. In particular, it is important that high quality fetal echocardiography be performed at approximately 19-20 weeks gestation, as part of a high quality morphology scan.

When involved in counselling it is important to always remember - *everyone is different*! The aim of any counselling is for the patient to understand the information they have been given and be *empowered* to make a decision.

Another major advantage of the flow chart is that it allows consistency of counselling from patient to patient and between the personnel involved. If used consistently and appropriately, it may also help provide a record of the discussion with a patient. This may be of importance if a dispute were to arise over what information was or was not provided.

CONCLUSIONS
The presented flow chart has been developed by Brisbane Ultrasound for Women. It is used as part of the consultation process for patients undergoing prenatal testing for chromosomal abnormalities, particularly nuchal translucency (NT) assessment. It has been found to be an effective tool to aid a patient's understanding and decision making. It is a useful resource that provides a visual and tangible aid for the ultrasound practitioners or clinicians involved in consultation with the patients.

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AUTHORS' NOTE

Case report - Ultrasound of ulnar nerve entrapment at the elbow

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CLINICAL PRESENTATION

A 75 year-old presented with 4 months of paresthesia and numbness of the right 5th and medial 4th fingers, accompanied by hand weakness. Past history included a spinal meningioma, an ependymoma of the cauda equina, a right carpal tunnel release, and left wrist tenosynovitis.

An ulnar nerve conduction study demonstrated a nerve conduction block in the right ulnar nerve at the elbow. An ultrasound examination was performed to exclude a focal ulnar nerve lesion in this region.

ULTRASOUND FINDINGS

The ulnar nerve and surrounding structures were examined with a compact linear 10-5 MHz probe, at the level of the elbow joint. An approximately 1cm length segment of the nerve showed focal fusiform thickening with hypoechogenicity (Figures 1 and 2). The affected region measured 4mm in maximum diameter with the normal-appearing nerve proximally and distally measuring 2mm diameter. No focal mass lesion was seen.

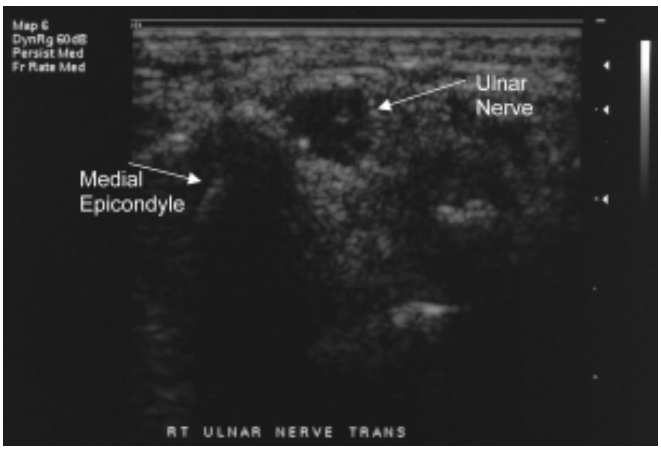

Figure 1 Transverse image of the thickened ulnar nerve at the elbow

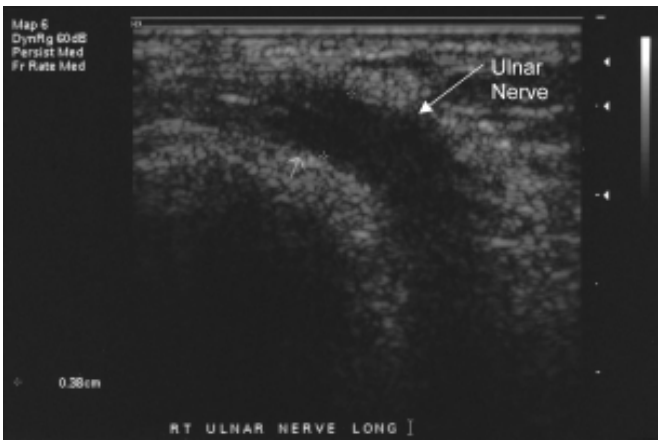

Figure 2 Longitudinal image of the thickened ulnar nerve at the elbow

A subtle joint effusion was also seen with posterior synovial out-pouching that displaced the thickened segment of the nerve (Figure 3). An adjacent bony spur arising from the medial epicondyle of the humerus was also noted on ultrasound and seen on a plain x-ray. A subsequent MRI scan also showed focal swelling of the ulnar nerve in the epicondylar groove and adjacent bony spurring. Again no focal mass was identified and thus focal ulnar neuropathy was diagnosed.

SURGICAL FINDINGS AND FOLLOW-UP

Surgery for ulnar nerve decompression was performed. At operation, fusiform inflammatory swelling of the nerve was seen at the level of the medial epicondyle. There was no neuroma, nor any other intraneural abnormality. Neurolysis with epicondylectomy was performed to decompress the nerve in this region. Six months after surgery, the patient reported nearly complete resolution of the original symptoms. An ultrasound examination at this stage demonstrated the ulnar nerve to be of normal echogenicity and thickness in the region of the elbow joint (Figure 4).

DISCUSSION

Ulnar Nerve Anatomy

The ulnar nerve is a branch of the medial cord of the brachial plexus. In the upper arm it passes anterior to the triceps muscle, on the medial side of the brachial artery. As it approaches the elbow, it pierces the medial intermuscular septum and descends between it and the medial head of the triceps muscle.

To enter the forearm, the ulnar nerve extends around the posterior aspect of the elbow joint (Figure 5). At this level, it passes between the medial epicondyle of the humerus and the olecranon, and is closely applied to the ulnar collateral ligament. It can be easily palpated here as a rounded cord posterior to the medial epicondyle. Its close proximity to the bony structures and joint capsule of the elbow can be appreciated in Figure 6.

Distal to the elbow, the nerve passes between the two heads of the flexor carpi ulnaris muscle and then descends deep into this muscle to accompany the ulnar artery towards the hand.

Ulnar Nerve Sonography

As it can be palpated at the posterior elbow, the ulnar nerve is easily examined with ultrasound at this level. The patient is supine with the hand placed behind the head flexing the elbow to 90 degrees, thereby allowing easy access to the region of the medial epicondyle. An alternative to this is the seated position with the hand behind the back, also with the elbow flexed.

Transverse and longitudinal images of the visible length of the nerve are obtained. The nerve is also observed in real-time with dynamic flexion and extension of the elbow. Surrounding anatomy should also be interrogated. On ultrasound, the normal

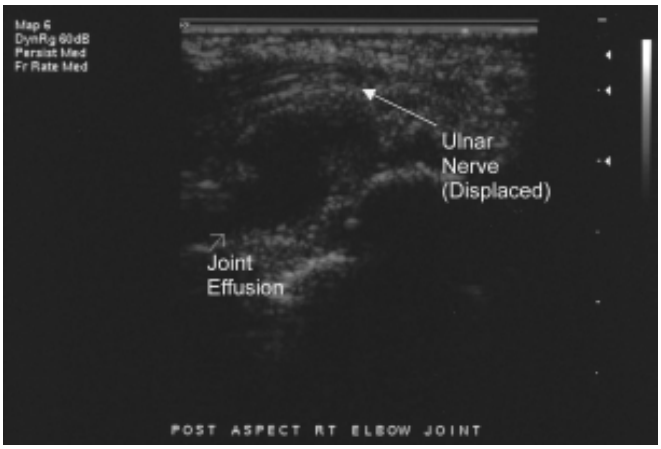

Figure 3 Longitudinal image demonstrating an elbow joint effusion causing displacement of the ulnar nerve

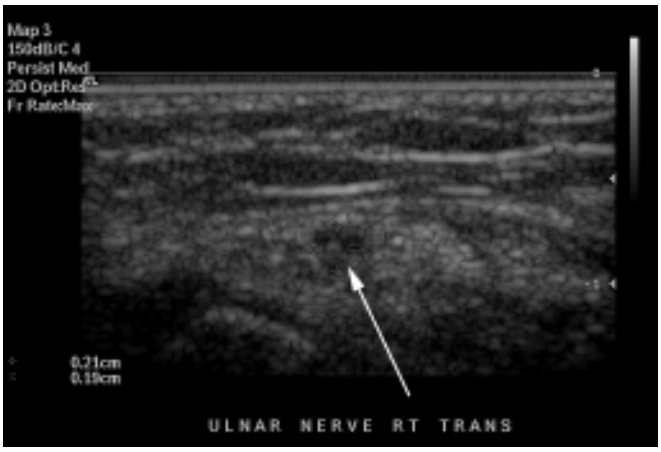

Figure 4 Normal transverse ultrasound appearance of the ulnar nerve, 6 months after surgery (note absence of medial epicondyle)

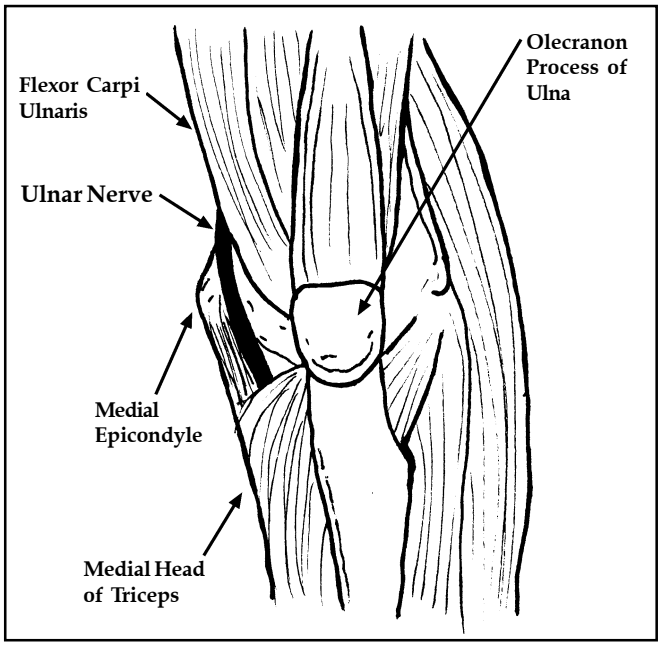

Figure 5 Diagram demonstrating the postero-medial course of the ulnar nerve at the level of the elbow

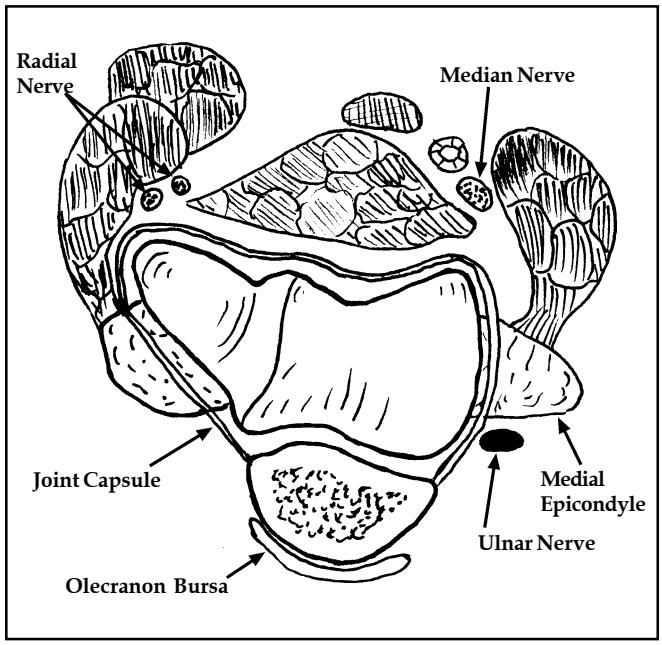

Figure 6 Axial diagram of the ulnar nerve, demonstrating its relationship to other structures at the elbow

nerve has a fibrillar pattern and is less echogenic than tendons (1). Comparison scans with the contralateral nerve are also performed.

Pathology Of Ulnar Nerve Entrapment

Compressive neuropathy of the ulnar nerve at the elbow is a relatively common phenomenon (2). In its passage posterior to the medial epicondyle, the nerve is required to course through a confined space (a fibro-osseous tunnel, formed by the ulna, medial epicondyle and a specific fascial sheet) and is subject to stretching and compression forces (3). Normally, the nerve can easily glide through these spaces on flexion and extension of the elbow, but if narrowing of this space restricts its excursion, inflammation can occur. A cycle of swelling, further loss of excursion, progressive nerve damage and perineural scarring results (4). Causes of this restriction include neuromas and adjacent bony or joint abnormalities, as in this case.

CONCLUSION

This case of compressive neuropathy demonstrates ultrasound as an ideal modality for assessment of ulnar nerve pathology in the elbow region.

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Acoustic streaming, radiation stress and bioeffects

Stanley B Barnett PhD

INTRODUCTION

Under certain circumstances during an ultrasound scan the real-time image clearly shows echogenic particles flowing in a particular direction within liquid filled cavities in the body. With the advent of modern multi-mode applications in ultrasonography such flowing motion can be observed with B-mode in conjunction with Doppler mode. This ultrasound-induced streaming is an observable biological effect occurring during diagnostic exposures. The questions to be answered are; 1) how is the streaming caused, and 2) what is the clinical significance? The answer to the first question is reasonably straight-forward, that of the second question is somewhat more speculative.

When ultrasound passes through a medium it exerts a force on the particles in that medium. This force associated with acoustic radiation is known as the radiation pressure. The potential for biological effects resulting from exposure to such forces during an ultrasound diagnostic examination depends largely on the properties of the tissue. If the medium has low viscosity, such as water, urine, cerebro-spinal fluid, amniotic fluid or blood then the particles within the liquid (and the liquid itself) can be pushed in the direction of the ultrasound beam away from the transducer. This bulk movement of liquid is known as acoustic streaming.

Although the forces resulting from ultrasound propagation are small, some of the effects that they produce can be easily observed under appropriate conditions. Motion of particles along the path of an ultrasound beam in liquid-filled cavities has been reported in diagnostic applications as well as in laboratory experiments. For useful review articles, see Barnett 1998 and Duck 1998 (1, 2). This tutorial, prepared in consultation with members of the ASUM Safety Committee, examines aspects of radiation stress effects in the context of ultrasound safety.

RADIATION STRESS

When an ultrasound beam reaches a surface, such as an interface between soft tissue and bone, or tissue and air in the lungs a force, or stress, is generated which pushes the surface/interface away from the source of ultrasound. The strength of this push will depend on the shape and acoustic character of the interface and on the power and angle of incidence of the beam. The local stress acts at every point on the surface within the acoustic beam. It is commonly called radiation pressure. The radiation pressure is greatest on the axis of the beam where the intensity is greatest, and lower towards the edges of the beam. The total force on a surface results from the summed radiation pressure, and it is proportional to the total acoustic power. Measurement of this force is a standard method of determining acoustic power.

So, what happens within a volume of tissue or fluid when an ultrasound beam passes through it? Some of the energy absorbed from the beam generates an internal force acting in the direction of wave propagation, the radiation pressure (or radiation stress) gradient. This stress gradient is related to acoustic intensity and the attenuation properties of the medium. For a plane wave, the radiation stress gradient is derived by $2\alpha I/c$ where c is the speed of sound, I is the local intensity and α is the attenuation coefficient. The stress gradient is greater at higher acoustic frequencies (because attenuation increases with frequency) and varies throughout the field as the intensity varies. So, for an unscanned beam (Doppler and M-mode) the radiation pressure gradient is greater at the focus and on the axis of the beam than elsewhere. In addition the radiation stress gradient can vary because of variation in the absorption coefficient due to tissue inhomogeneity or nonlinear enhancement.

Radiation stress is experienced only during the passage of an acoustic pulse. Between pulses no stress is generated. For pulsed Doppler and pulse-echo applications the magnitude of the stress therefore depends on the intensity averaged within each pulse, and not on the time-average intensity. For continuous wave ultrasound systems such as physiotherapy units and fetal heart monitors, the stress is proportional to the time-averaged intensity.

Acoustic streaming results from the radiation stress field in a liquid. The liquid is driven away from the transducer by the radiation stress gradient from absorption of acoustic energy. The flow velocity is proportional to the acoustic power and the attenuation coefficient. The maximum velocity reached in a fluid is limited by the viscosity of the fluid and by the geometric boundaries of the fluid space. Measurements of streaming from commercial scanners (3) reported a maximum streaming velocity in water of 14 cm/sec in pulsed Doppler mode operating at a frequency of 3.5 MHz. Streaming velocities in imaging fields were lower and did not exceed 2 cm/sec. The streaming and intensity profiles were found to be similar and maximum velocity occurred at the beam focus. It is important to note that pulsing conditions for equipment in clinical use have changed significantly over the past decade with substantial increases in intensity and acoustic power, particularly for B-mode. The use of increased line density associated with write-zoom facility has led to the present situation where power and I_{spta} intensity for B-mode generally exceeds that of M-mode (4).

Streaming is established within about a second of the beam being switched on, so that it can occur well within the dwell times used in clinical ultrasonographic scanning. Streaming has also been observed in-vitro in blood, human serum albumin and amniotic fluid. Streaming has been observed in water within beams where the acoustic power is as low as 1 mW, at the lowest end of the power levels used by commercial ultrasound equipment. Therefore, streaming is occurring more frequently during diagnostic ultrasound examinations than was previously appreciated. In fact, it is now recognised that low-level streaming always occurs when diagnostic ultrasound beams propagate through liquids.

Although there is little information available in the scientific literature, a growing number of clinical users are reporting observations of acoustic streaming. Streaming was first reported

in Australia at an annual scientific meeting of ASUM in 1990 when Dr. Rex Betheras demonstrated particle movement in fluid-filled ventricles of the brain (5). Subsequently, Chatterton and Spyropoulos reported streaming induced by colour Doppler ultrasound at the 1997 ASUM Conference (6). There have also been anecdotal reports of observations of streaming within a scrotal hydrocele abscess, and in the ventricles of an infant brain following haemorrhage. Streaming has also been observed during colour flow and power Doppler examinations of ovarian cysts. Streaming induced fluid movement in breast cysts was reported by Nightingale *et al* (1995) (7) and proposed as a diagnostic tool for distinguishing solid from fluid filled cysts.

The situation has become more complex with the introduction of imaging modalities using non-linear propagation. One of the non-linear effects is an increase in the local absorption of acoustic energy associated with an acoustic shock. Since both radiation stress and acoustic streaming depend on absorption, both can increase in non-linear beams. Shocks can easily form in liquids such as urine and amniotic fluid in vivo, and therefore stress enhancement may be expected in fetal tissue when it is scanned behind these fluids.

RADIATION STRESS ON FLUIDS AND TISSUES

In fluids and cell suspensions, fluid displacement occurs as a result of acoustic streaming. There are no scientific data on which to base an assessment of whether, or not, stirring either amniotic fluid or fetal body cavity fluids will present a biological hazard. Shear forces will be greatest at the boundary of a stream, and are unlikely to cause damage to cells in suspension. Acoustic streaming has been shown to alter diffusion across lipid membranes (8). Other non-thermal non-cavitational effects that have been reported in soft tissues include physical and sensory effects. Blanching of the choroid of the eye prior to the onset of thermal damage (9) is thought to be due to radiation stress causing compression of the blood vessels. A recent report of fetal tissue damage at a boundary (10) concluded that the effect resulted from the relative motion between ossified bone and surrounding soft tissue, caused by radiation force on the bone. This study applied ultrasound pulses at low repetition frequency, and with amplitudes in the diagnostic range, to the abdomen of pregnant mice. The fetal tissue showed evidence of haemorrhage but only where the soft tissue was near to developing bone or cartilage.

There have been a number of reports of accelerated healing of bone fractures in vivo using low intensity pulsed ultrasound (11, 12). Although the precise biophysical mechanism is unknown, it is possible that it arises from the application of mechanical force to the cellular system. Enhancement of soft tissue regeneration has also been reported using low intensity therapeutic ultrasound (13, 14). The effect, following exposure to low intensity pulsed ultrasound is probably caused by acoustic streaming generated within fluid filled areas in proliferating wound tissue.

Dalecki *et al* reported a decrease in aortic pressure caused by ultrasound insonation of frog hearts (15). They showed that an equivalent effect could be produced when the beam was incident on a total absorber in contact with the surface of the heart, demonstrating radiation force as the responsible mechanism. Amongst neuro-sensory responses, a number of papers have reported that the auditory nerve may be directly stimulated by ultrasound (16). The mechanism is unknown but we can speculate that it is the direct effect of the varying stress field across the neural structures.

BIOLOGICAL CONSEQUENCES

Radiation force effects are responsible for ultrasound bioeffects that are non-thermal and non-cavitational in nature. In adult tissue the forces generated by radiation stress are unlikely to be significant compared with the tensile strength of tissue. However, embryonic tissue does not have the structural strength of the intercellular matrix that develops in later fetal and adult life. Thus, the embryonic period of development, particularly during cell differentiation and migration, may be vulnerable to mechanical stress. Currently, there is insufficient evidence to know whether or not the passage of an ultrasound beam could exert sufficient radiation stress to cause permanent displacement of cells. In the absence of good evidence, users should be aware of the potential for bioeffects arising from radiation forces. It is therefore prudent to reduce the exposure, particularly when ultrasound scanning is carried out during the first trimester, whenever this can be done without compromising diagnostic information.

ACKNOWLEDGEMENTS

This tutorial was prepared as an initiative of the ASUM Safety Committee. I am grateful for comments on the manuscript from Prof. Marsh Edwards and Drs. Lachlan de Crespigny, Dave Carpenter and George Kossoff.

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Book reviews

Ultrasound: A Practical Approach to Clinical Problems

Editors: EI Bluth, PH Arger, CB Benson, PW Ralls, MJ Siegel
Publisher: Thieme
Published: 2000 ISBN 3-13-116831-5
Approximate cost: $A 315.25

This 650-page text is edited by a group of well-known authors and has contributions by another 60 authors, most of whom are familiar experts in the ultrasound field. The text was developed from material presented at a special course on ultrasound at the Radiological Society of North America (RSNA) Annual Meeting in 1996. The text is a 2000 publication and it would seem that much of the material has been updated since the 1996 RSNA course.

The focus of the text is on individual chapters providing an approach to common clinical problems and presentations. It covers a wide area with 8 sections including: The Abdomen; Male Genital System; Female Pelvis; Obstetric Patient; Pediatric Patient; Vascular System; Musculoskeletal System; and Superficial Organs. The largest of the sections are the abdomen (12 chapters), female pelvic (7 chapters) and obstetric sections (13 chapters). The aim of the book is to review the current state of sonography in regard to what the editors see as important clinical issues. It is therefore predominantly written with the clinical issue as the chapter title. For example, excellent chapters are included with titles such as "Sonography in the evaluation of abnormal liver function tests", "The evaluation of erectile dysfunction", "Triple marker screening positive for Down Syndrome" and "Tamoxifen".

Radiologists are the primary target market for the text and it focuses more on clinical issues and possible diagnostic findings rather than on how-to-do an examination in a particular area. However there is wealth of information that is of equal importance to sonographers and the text is highly recommended for them. There is very good background clinical material on presenting signs, symptoms, other possible investigations and their role in relation to ultrasound. The chapters on the male genital system, female pelvis and obstetrics are particularly good in this regard.

The sections on the vascular system, musculoskeletal system and superficial organs are brief, compared to other sections, and are not meant to be comprehensive. These sections do provide a good overview of the common clinical problems in these areas though, and are well worth reading. A good and interesting overview chapter on Intraoperative Ultrasound is included.

One disappointing feature, I thought, was that the chapter on "Uterine size less than dates" seemed a bit outdated and would appear not to have been updated since the 1996 RSNA course. The chapter started well with good definitions and explanations of the correct terminology in relation to intrauterine growth restriction (IUGR), but barely mentions the use and role of Doppler. Also, as the text is predominantly written by American authors, Australian sonologists and sonographers need to be aware of some of the differences in clinical practice and expected standards between the USA and here. For example, the discussion on the role of sonography in the evaluation of raised maternal serum Alpha Fetoprotein is based on the American system and is not necessarily the same as the Australian scenario. The chapter overall provides some very useful information however. Similarly (as is the case in many texts), the evaluation of the fetal cardiac outflow tracts is described as an optional extra, rather than as a standard part of the examination, as is the case in published Australian standards.

An extensive series of high quality and interesting images are provided to complement the text. The text is well presented with extensive reference lists provided at the end of each chapter.

Overall, I found this an excellent text and would think it very suitable in any general ultrasound department. The text would be very appropriate for radiologists and radiology registrars. It would also be very applicable to all general sonographers and student sonographers, particularly those in the more advanced stages of their training. This would be a valuable text for departments involved in ultrasound teaching and is strongly recommended.

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The Safe Use of Ultrasound in Medical Diagnosis

Editors: G. ter Haar and F.A. Duck
Publisher: BMUS and BIR
Published: 2000 ISBN 0-905749-42-1
Approximate cost: 20 pounds sterling

This 120 page soft covered book provides an excellent overview of the issues involved in the safe use of ultrasound. Each chapter was contributed by one or more experts working in the field of ultrasound safety. It is a timely publication as there is now a greater emphasis on clinicians taking responsibility for risk assessment based on the possible bioeffects that are reported by the scientific community and the equipment output display of 'safety indices' provided by the manufacturer. As the editors point out, " the primary purpose of this book is to inform users about the principles (of safety) and evidence on which this safe practice depends".

The first three chapters deal with the manner in which an ultrasonic wave propagates in body tissues, how it interacts with tissues and how it is measured. This knowledge establishes the biophysical basis for the various safety issues in later chapters. The next three chapters (4, 5, and 6) describe the thermal and mechanical bioeffects of ultrasound and give useful information regarding the 'on screen' labelling (safety indices) that are now widely displayed on ultrasound scanners. The current status of bioeffects research is described in chapters 7 to 9, with chapter 8 devoted solely to the behaviour and safe use of contrast agents. The final two chapters (10 and 11) provide a good review of the regulations and recommendations regarding the use of diagnostic ultrasound.

The editors are to be commended for producing a very readable publication with an extensive list of references and some innovative educational features. These include a summary of the key points for each chapter and a series of summary statements for each paragraph along the highlighted side margins of each page. A glossary at the end of the book provides a useful guide to the technical terms that are used in the book. The only minor criticism I have is that the use of small margins at the top and bottom of each page make some of the pages appear daunting.

In conclusion, I would strongly recommend this book as a comprehensive and yet succinct summary of the safety issues in diagnostic ultrasound and would be very useful to clinicians, those in clinical training and research scientists. It is interesting to note that the British Medical Ultrasound Society thought so highly of it that it provided each member of its society with a free copy.

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Clinical Doppler Ultrasound

Editor: PL Allan, PA Dubbins, MA Pozniak, WN McDicken
Publisher: Churchill Livingstone
Published: 2000
Approximate cost: $A 150

This 293 page paperback text on non-cardiac Doppler ultrasound is contributed to by physicists, radiologists and an obstetrician and gynaecologist.

It has the usual format of initial chapters on physics of Doppler, haemodynamics and blood flow. Chapters are then dedicated to carotid and vertebral arteries, peripheral arteries, peripheral veins, aorta and IVC, liver, kidney, renal transplantation, prostate, penis, scrotum, female pelvis and clinical applications in obstetrics. Each chapter follows a similar format of anatomy, Doppler technique followed by acomprehensive section on the application of Doppler ultrasound including a balanced assessment of its advantages and limitations.

High quality, appropriate and well-annotated illustrations and Doppler images, both colour and spectral are provided liberally throughout the text. Many chapters contain useful tables summarising major points.

The physics chapters are comprehensive and easily readable. The principles of contrast agents are explained, however the clinical chapters provide little on the applications of contrast agents.

The peripheral veins chapter has a practical discussion of all facets of ultrasound detection of deep venous thrombosis, which is not dissimilar to that found in many texts. In addition there is a well thought out section on varicose veins and chronic venous insufficiency, topics that are often not well covered in Doppler texts.

The beauty of this book is the simplicity with which it covers a wide range of applications of Doppler ultrasound. It is predominantly dedicated to specific vascular examinations, but does include some more general uses of Doppler such as the assessment of hepatic mass lesions, testicular neoplasms and prostate cancer. A minor criticism is that as Doppler has become an integral part of most general ultrasound examinations, a general discussion of the application of Doppler would be useful. The inclusion of the non-carotid neck (including thyroid, parathyroid and lymph nodes) and abdominal viscera other than the liver and kidney would have added to the comprehensiveness of the text.

That not withstanding, this well-priced text, which could be virtually used as a handbook, would make an extremely useful addition to any ultrasound department's library.

Matthew Andrews FRANZCR

Studying for the DMU

Cherie Drinkwalter, NMUA Sonographer

Cherie Drinkwalter sat the general sonography DMU examination in 1999. Originally a Nuclear Medicine Tech, Cherie' trained in ultrasound at Ultrascan, NSW. She has worked as a full time sonographer at Nuclear Medicine and Ultrasound Associates in New South Wales for 2 years, and is currently working part-time while caring for her new baby, Ella.

Okay, so by this stage some of you would have attended the DMU Prep. Course and have been filled in on the 'MILLIONS' of dedicated hours you'll need to focus on ultrasound study to even consider sitting the first part…

Yes, it's all a bit mind-blowing when it gets thrown at you in a condensed 5-day course. I remember walking out of there on some of those days feeling so overloaded with information. It seemed that the easiest thing to do would be to throw it all in and take up underwater basket weaving for a hobby (it sounded easier anyway). But by stepping back and taking some time out, you soon realise that no one really expected you to know absolutely everything at that stage anyway – so don't stress. The Prep. Course was to be used as a learning experience in preparing you for what you'll be up against later.

So, the focal point now is "*what steps do I need to take to get me there?*"

I found that organising a study plan was a good foundation to base my preparation on, and although I didn't always follow it to a 'T', it was helpful getting me back on track when I would start to stray or panic a little as the exam dates drew nearer. Depending on the study modes that work best for you, your study plan and basic time management will vary. Whether you prefer group study sessions or personal study will depend on how much you actually draw from each session and whether you go away a little more confident or a little more confused. Personal study time worked better for me to begin with, until I had the information and details clear in my head. Beginning with group sessions stressed me out more because we had four different ways of remembering things and everyone spent, what I thought was time wasted, on discussing things that should have been a 2-minute issue. So for me, sticking to studying alone, gave me less distractions and allowed me to pick the subject I was interested in that day – without making compromises for someone else. But, in taking the personal study option, don't shut out all other study influences in your life. I found it good to speak with people who'd sat past papers (whether they had passed or not) and listen to the input they had to offer.

I also had a great colleague at work, who would throw questions at me, whenever she felt the urge, just to keep me on my toes. At first, I got worried because I couldn't answer all of her questions. But as time passed, I got used to the confrontations and if I didn't know the answer off the bat, I still had time to look it up and get back to her later. You may find that sometimes, off the wall questions like this may standout and be easier to remember, because they are not just a part of those never-ending pages of notes that you begin to accumulate. The doctors were also very encouraging when I showed interest in sitting the second part of the DMU. They were helpful in answering any questions I had in reference to patients and interesting case studies. I was also allowed a few days of fully paid study leave for the year, which saved me from completely using up my annual leave days (though I did use some of these for study). Also, while at work, I found that I could maintain my interest a little more by applying what I had studied the day before to my scanning practice – particularly physics artifacts. I would actually try to identify artifacts in the scan I was doing and explain to myself why they arose and how I could overcome them. Hey, call me crazy, but by the time you are a couple of weeks out from the exam date, you will tend to catch yourself at times doing exactly the same thing. Although it isn't a formal way to study, it helps make some sense to what you've just read over 5 times.

I made efforts to take my own notes from several sources and included doctors' inputs who'd seen certain cases of pathology that I hadn't. Looking back at that list, there was an awful lot to cover, and yes, it is daunting to think that you need to know absolutely everything in that Handbook inside-out and back-to-front. But unless you've been graced with a photographic memory, you're just not going to be able to know **EVERYTHING** and then expect to regurgitate it back out word-for-word. Some things you see in that paper, you won't be totally ready for and others, you will be able to write for days on.

Now it's up to you to set yourself a goal and work toward it. Firstly, determine your comfort zone. What time are you prepared to give each week to study, work, sleep, food and leisure? How much do you need to dedicate to get yourself through? Self-directed learning takes planning, persistance and a lot of self-motivation to stay with the programme to the end. So, if you are ever in need of a break, take some time out – go for a walk, watch some TV, bake a cake, go to the gym – do whatever it takes to give yourself time to clear your head. This way, when you hit the books again it's easier to refocus and your time spent studying will actually count. It's one thing to say that you studied for 5 hours last night, but what's the true definition of 5 hours - 5 full hours of intense study or 1 hour of study and 4 hours of daydreaming and drawing DOODLES along the margin of your notes (Don't worry, everyone does it at one time or other). There are no prizes for the hours spent studying, but there aren't any for those not willing to work either. Just try to stay focussed and clear headed while you study, and reward yourself with reasonable breaks. Basically, you will need to know enough so that you are confident in yourself, not only for the exam but also in your day-to-day work practice.

People visit our workplace everyday and are putting their health issues in our hands. They trust that this Sonographer knows what they're doing and understands the repercussions that their work has on the well being of their patients. It is for this reason that you should recognise the DMU as a way to broaden the options of your chosen profession and not just look at it as a bunch of exams. In the lead-up, as you go through your research, group and personal study, and practical scanning time, you will not only be benefiting from the experience, but in turn, your patients will benefit from your extended knowledge and the confidence in which you conduct their ultrasound.

Yes, the hours can be long and tiring, and the literature is not always straight-forward but hang in there and work through it - just think, it will definitely be worth your while in the end.

Adjudication of prizes and awards at the ASUM Annual Scientific Meeting

Information for presenters and contributors to the scientific program

Due to the generosity of ASUM Corporate Members a range of prizes and awards are offered for proffered presentations at the Annual Scientific Meeting. Prizes and awards are for specifically designated purposes as described on the published list of prizes and awards.

Adjudication of the prizes and awards is undertaken by an Adjudication Panel, under the auspices of the ASUM Education Committee. The Adjudication Panel is normally chaired by the Chairman of the Education Committee and has, as its members, persons selected by the Chairman, in consultation with others as required. Selection of panel members is based on considerations including professional expertise, geographical location to ensure a balance of representation, a balance of sonologist, sonographer and scientist members, and willingness to participate.

In order to conduct the adjudication of prizes and awards in the most objective and equitable way guidelines for adjudication and scoring sheets are used by the panel. The stated purpose of the prize or award, usually as agreed to in consultation with the sponsoring Corporate Member, is a major factor in determining the eligibilty of contributions for a particular prize or award.

For the purpose of prizes and awards, contributions to the scientific program are broadly categorised into 4 groups:

1) Oral presentation of a descriptive clinical or literature review type

These may include a case study description, the description of a new technique or a literature based review of a particular topic.

2) Oral presentation of original research

This type of presentation will typically describe the methodology, results and conclusions of scientifically conducted, original research.

3) Poster presentation of a descriptive clinical or literature review type

These may include a case study description, the description of a new technique or a literature based review of a particular topic.

4) Poster presentation of original research

This type of presentation will typically describe the methodology, results and conclusions of scientifically conducted, original research.

Eligibility for particular prizes and awards is based on the nature of the presentation, professional category of the presenter and

ASUM 2001
31st Annual Scientific Meeting
Prizes

ASUM Corporate Members again generously support the Annual Scientific Meeting prizesto be awarded at the conference dinner during ASUM 2001 in Sydney (7-9 September)

The Giulia Franco Poster Award

(Clinical Research or Technical Research)

sponsored by **Toshiba (Australia) Pty Ltd Medical Division**

1st prize value $3000 *2nd prize value $500*

to be awarded for the best two Clinical or Technical Research poster presentations

Best Research Presentation Award

sponsored by **Acuson**

Value$1500

to be awarded for the best proffered research paper

Best Sonographers Research Presentation Award

sponsored by **ATL Ultrasound**

Value $1750

to be awarded for the best proffered research paper by a sonographer

Best Clinical Presentation Award

sponsored by **Siemens Medical**

Value $1000 plus a shield

other criteria as described in the relevant prize or award description. In submitting a presentation for consideration for prizes and awards, contributors are advised to read the list of prizes and awards, and their descriptors, carefully.

Adjudication Guidelines
The following lists the components of a presentation that are considered by the adjudicators during assessment. The categories and suggested weighting of each component are guides only and may be modified as appropriate by the adjudicators.

1) Oral presentation of a descriptive clinical or literature review type

Suggested weighting

Introduction **5 %**
Acknowledges Chair and audience
Sets the scene, why topic was chosen
Aims/ hypothesis/purpose clearly stated

Content **50 %**
Describes the problem/issue/technique in detail
Discussion relates to, and is supported by relevant literature
Literature is appropriate and current
Comprehensive coverage
Relates topic/ issues to local context/ conditions

Conclusion **5 %**
Summary of discussion/major points
Outlines recommendations for future work

Presentation **10 %**
Clear and audible
Systematic structure, references cited appropriately
Slides well sequenced, relate to verbal text and easily viewed
Well timed

Originality/ Value of topic **30 %**
The topic shows an originality of approach
The topic is relevant and beneficial to the profession

2) Oral presentation of original research

Suggested Weighting

Introduction **5 %**
Acknowledges Chair and audience
Sets scene - refers to literature and work already done in the field
States aims/hypothesis clearly

Methodology **10 %**
Describes the materials and methods used
Describes study design
Describes sampling methods
States any variables

Results **20 %**
Presented clearly and concisely
Appropriate use of statistics
Results are valid

Discussion **20 %**
Outlines limitations of study
Original thought/analysis of results is evident
Relates to, and is supported, by relevant literature

Conclusion **5 %**
Summary of findings
Outlines any recommendations for future work/ action

Originality/ Value of research **30 %**
The topic displays an originality of topic/ approach
The research is relevant and beneficial to the profession

Presentation **10 %**
Clear and audible
Systematic structure, references cited appropriately
Slides well sequenced, relate to verbal text and easily viewed
Well timed

3) Poster presentation of a descriptive clinical or literature review type

Suggested Weighting

Introduction **5 %**
Sets scene - refers to literature and work already done in the field
Indicates why topic was chosen
States aim clearly

Content **50 %**
Describes the problem/issue/case in detail
Approach to problem/ issue/ technique is valid
Discussion relates to, and is supported by, current literature
Original thoughts on topic are evident

Conclusion **5 %**
Presents summary of findings
Outlines any recommendations for future research/ action

Design **10 %**
Logical, easy to follow
Information presented concisely, references cited appropriately
Text eye catching and easily viewed
Important points well illustrated

Originality/ Value of topic **30 %**
The topic displays originality of topic/ approach
The research is relevant and beneficial to the profession

4) Poster presentation of original research

Suggested Weighting

Introduction **5 %**
Sets scene - refers to literature and work already done in the field
Indicates why topic was chosen
States aim/ hypothesis clearly

Content **50 %**
Methods clearly outlined
Results clearly presented with appropriate and valid use of statistics
Outlines limitations of study method
Original thought/ analysis of results is evident
Discussion relates to, and is supported by, relevant literature

Conclusion **5 %**
Presents summary of findings
Outlines any recommendations for future research/ action

Design **10 %**
Logical, easy to follow
Information presented concisely, references cited appropriately
Text eye catching and easily viewed
Important points well illustrated

Originality/ Value of topic **30 %**
The topic displays originality of topic/ approach
The research is relevant and beneficial to the profession

Highlights of the council meeting held on Saturday 24th February 2001 at the Novotel, Brighton-Le-Sands, Sydney

After a very full program in the Leaders Workshop on Friday afternoon and Saturday morning, Councillors met for the first time since the Auckland Scientific Meeting with an almost full Council in attendance.

Highlights from the meeting include:

- A proposed restructure of Council to reduce the number of Councillors, and give each Councillor a "Portfolio", and perhaps combine some of the present committees.
- The recruiting of an Executive Officer
- A bid to host the 2009 WFUM Meeting in Sydney
- To promote linkages with South East Asia and the Pacific region for academic, training and credentialling purposes. ASUM has a lot to offer our nearest neighbours, and we should be actively seeking ways and means for interaction.
- Glen McNally has accepted nomination for the position of Treasurer, following the resignation of Maurice Molan. Thanks to Maurice for his contribution during his term as Treasurer, it is an enormous task.
- Membership and ways of attracting new members was discussed, and the President expressed concern that ASUM does not do very much to recognise the expertise and contributions of its own members. Should we not implement an Honorary Fellowship for local members?
- The 31st Annual Scientific Meeting planning is well under way, (see brochure), and plans are well in hand for the 2002 meeting in Brisbane from the 19-22 September. Perth is the venue for the 33rd Annual Scientific Meeting.
- The DDU and DMU boards are working hard for this year's candidates to sit for their respective examinations, and the Education Committee is to be congratulated on the excellent production of the CD ROM of interesting cases.
- The Bulletin is to continue with an Editorial Board to assist Rob Gibson as Editor
- The proposal to initiate a Research Foundation is progressing, the groundwork still has to finalised to enable the greatest cost benefit to both the researchers and to the Society.
- The Safety Committee is developing a revised "live scanning" policy, and is interactive with the AIUM Bioeffects Committee. Stan Barnett would like to see liaison with the other international Societies, and is active in promoting this.
- The Marketing Committee organised the Leaders Workshop, and thanks to Luke Fay and David Rigby for this initiative.
- Reports were received from some of the Branches, and the meeting closed at 5:15 pm.

Mary Young DMU AMS
Honorary Secretary

Australian Vascular Ultrasound Accreditation Board

The Australian Vascular Ultrasound Accreditation Board (AVUAB) was instituted 4 years ago as an intersocietal group with representatives from the Royal Australasian College of Surgeons (RACS), the Royal Australian and New Zealand College of Radiologists (RANZCR), the Royal Australasian College of Physicians (RACP), the Australian and New Zealand Association of Nuclear Medicine Physicians (ANZANMP), the Australian Institute of Radiography (AIR), the Australian Sonographer's Association (ASA), the Australian Sonographer's Accreditation Registry (ASAR) and the Australasian Society for Ultrasound in Medicine (ASUM). Its purpose was to establish a process for Vascular Ultrasound Accreditation. We completed a comprehensive set of Accreditation Documents 2 years ago and throughout the process have been in contact with the Department of Health.

It was our initial intention to manage the Accreditation process ourselves but with the advent of RANZCR accreditation program, it was not felt practicable to operate two independent programs. It was therefore decided that the AVUAB would offer its documents to any accrediting body (the RANZCR at present but in future the RACS and any other interested party) to use as a template. The AVUAB would continue to meet once or twice a year to make amendments to the documents in the light of feedback from the accrediting bodies and to reflect any change in technology. It was still felt desirable to mail out our document to ALL vascular ultrasound providers. For this, funds were needed and the Department of Health agreed to supply such funds. Unfortunately the contract attached to such funds has not proven sufficiently flexible to enable us to happily avail ourselves of those funds. We have therefore decided to drop our request for funds and to make the documents available to all interested parties via the internet. Information regarding the documents is being distributed via the various society newsletters.

The documents can be viewed on ASUM's website address at www.asum.com.au and clicking on 'AVUAB' which appears on the front page. The documents will be incorporated in modified form by the various accrediting bodies. We would be most interested in any feedback regarding the documents. Please address all comments via the internet to <avuab@bigpond.com.au>.

We ask for all comments by 1 September please.

Gareth Phillips
Chairman
Australian Vascular Ultrasound Accreditation Board

DMU part 2 preparation course - Melbourne

The Melbourne DMU Part Two preparation course was held at the Royal Melbourne Hospital on Wednesday 28th February - Sunday 4th March. Eighteen keen and enthusiastic students arrived bright and early on Wednesday, with a very full program ahead of them. By Sunday afternoon, they had extended their knowledge considerably, and were looking a little worse for wear!

The program began with a full day of gynaecology and obstetrics, with wonderful lectures being given by various obstetricians. Dr Simon Meagher even had his own case study questionnaire, with a can of Guinness for the student with the most correct answers - it was needed at the end of a long day. Day two began with a session at the University of Melbourne pathology museum, and ended with the Royal Melbourne staff sharing their knowledge of abdominal and renal studies. By day three, Mike Dadd and Roger Gent had arrived for the physics lectures, which were broken up with some small parts lectures, and some film reading. All attendees enjoyed the drinks and nibbles at University House at the end of the day. Day four involved more physics, an excellent musculoskeletal lecture, and the mock OSCE - I think some of the students needed the can of Guinness after the OSCE! Day five finished up with some physics and paediatrics with Roger Gent, and also involved a very useful session with a successful DMU candidate from last year. Some very tired, but more knowledgeable students were glad to leave at 3 o'clock.

This has been my first year as convenor of this course, and I found it to be a very interesting time. This course gives students an opportunity to mix with other people in similar study situations, and also gives them a network of people to contact when they may need help in the course of their study. It also gives them an opportunity to experience new or different techniques from those in their own department. Some of the students at the course came from New Zealand, Western Australia, and remote country locations. Hopefully, they have made study partners, or gained contacts to help them when they encounter a problem.

All the lectures given were along the DMU course guidelines, and were delivered by excellent speakers. The mock OSCE is a excellent opportunity (and for some the only opportunity) to experience the conditions of the OSCE exam. Even though it was only for 1 hour and not three, the students gain an excellent idea of what is required of them. The students appreciated the experience, and enjoyed discussing the answers the next day. Film reading is an essential part of the course, with some students unfamiliar with describing ultrasound appearances from film. A new session was introduced this year which gave the students an opportunity to talk to a successful DMU candidate. This session was well received, with ideas on study plans, study partners, and time dedicated to study being discussed.

Overall, the five days were very successful. Thank you to all the speakers who generously gave their own time freely to help out with the course. Look forward to an equally successful course in 2002.

Margaret Condon
Convenor

Vascular DMU prep course

February is a busy time of the year, the last month of summer and the DMU Preparation Course is conducted. I accepted Keith Henderson's invitation to convene the Vascular section of the DMU Prep Course to replace Donna Oomens who has moved to USA.

The DMU Prep Course is an intensive course seeking to lay foundations of study for the DMU candidates. Part I and Part II DMU candidates are streamlined with lectures based upon the curriculum.

The candidates enjoyed the varied lectures; in particular the mock OSCE, as this was conducted under proper exam conditions and gave the candidates an idea of what to expect in the real OSCE's.

Half way through the course, a cocktail hour was held with some of the lecturers attending, giving the candidates a chance to socialise and ask questions.

The overall response was an enthusiasm to leave the DMU Prep Course and study hard. I believe the DMU Prep Course is a valuable tool from which to develop a study pattern for the DMU, for candidates to be reassured that there are others in a similar situation and an opportunity for networking to obtain advise or resources.

I thoroughly enjoyed convening the vascular section of the DMU Prep Course.

Lucy Taylor-Turner
Vascular Prep Course Convenor

Staff changes

Wendy Calvert resigned from ASUM's Administrative staff at the End of February. Wendy worked as Assistant Education Officer from November 1996. Her primary responsibilities involved the administration of MOSIPP, the organisation of some educational activities, the maintenance of the calendar, liaison with branch Education Officers, maintenance of the ASUM Website and administration of prizes and awards. As Secretary to the Education Committee, she was influential in maintaining the momentum of the Society's educational activity. Her caring nature and willing support will be missed by the friends that she had in the office as well as amongst the faculty and participants of activities with which she was involved.

Tim Brown joined ASUM last month as the new Assistant Education Officer. He completed a degree in Secondary Education from Sydney University in 1999 and worked in the Technology and Applied Studies Department in one of Sydney's High Schools last year. There he taught a wide range of technology related subjects including Design and Technology and Computer Studies. Tim enjoys outdoor activities and completed the ultra marathon from Katoomba to Jenolan Caves last month. He also plays for the "mighty Roselea Blues" soccer team and is a keen member of the Anglican Church in Carlingford.

New members January – March 2001

FULL MEMBERS

Michael Clarke	VIC
Shirley Comninos	VIC
Paul Drury	WA
Sue Kennedy-Andrews	SA
Jennifer Klein	NSW
Chris Lawson	VIC
Allen Lee	NSW
Hayley Pendergast	QLD
Craig Pennell	WA
Gopala Rangan	WA
Sheryle Rogerson	VIC
Fiona Sarode	NSW
Louise Tarr	NZ
John Van Den Broek	VIC
Daniel White	VIC
Christopher Wilkinson	SA

ASSOCIATE MEMBERS

Rebecca Bary	NZ
Kelley Black	NSW
Benjamin Bolton	QLD
Amy Brasher	NSW
Hayley Brown	SA
Sean Burke	WA
Stavros Dodos	VIC
Loredana Dumitrescu	WA
Stavroula Georgiou	NSW
Mark Goddard	QLD
Yuli Goh	VIC
Anthea Gow	VIC
Eric Grebert	NSW
Grace Gu	NSW
Teresa Hayes	NSW
Alice Hollingsworth	VIC
Emmanuel Joseph	NSW
Kelly Kinder	WA
Sally King	NSW
Janelle Laing	QLD
Luisa Laudani	VIC
Minh Le	VIC
Tam Le	SA
Philip Lewis	NSW
Jacqueline Malone	SA
Dawn Mbogo	QLD
Jo McCann	NZ
Arusha Naidoo	WA
Rosemary Napthali	NSW
Thi Cuc Nguyen	NSW
Elena Pancewicz	SA
Colin Patrick	WA
May Quah	VIC
Harneet Verma	WA
Laurent Quiqueree	NSW
Anita Rubin	QLD
Maren Shepherd	NT
Kristen Shilkin	NSW
Linda Stanley	WA
Rebecca Stapley	SA
Maria Steenkamp	QLD
Rebecca Thomson	NSW
Tirith Treatt	NSW
Janice Velasco	NSW
Zinta Walter-Burns	VIC
Judith Zhu	NSW

TRAINEE MEMBERS

Denise Ladwig	NSW
Jo-Dee Lattimore	NSW

UK

Vascular Technologist / Sonographer

MTO 4

Salary range £ 21053-24630

We are looking for a Full Time Vascular Technologist to join a busy single-handed Vascular Laboratory at Torbay Hospital.

The department provides diagnostic and monitoring of peripheral arterial and venous disease, graft surveillance, carotid, vertebral and some abdominal studies using Colour Duplex Ultrasound.

You should have at least 2-3 years experience of diagnostic vascular ultrasound.

Torbay Hospital is set in the heart of Devon, South West England, with many outdoor opportunities. Extending from the countryside of Dartmoor to the coastline with its walks and water sport activities. It is only 1 hour to Bristol and 3-4 hours to London.

For a job description and general enquiries:

Marie Hanley, Chief Vascular Technologist
E mail: marie.hanley@sdevonhc-tr.swest.nhs.uk
Tel: 44 1803 655595
Closing Date: Friday 1st June 2001

EXCITING OPPORTUNITY LONDON, UK

EXPERIENCED VASCULAR SONOGRAPHER

Excellent hours, salary& holiday package Aus$82-96,000

Are you a friendly flexible experienced vascular sonographer? Would you be interested in working in London for 1-2 years as part of a small independent team of vascular technologists? The position offers excellent vascular experience in some of London's best hospitals. You will have team support and a good degree of day-to-day independence. Smart appearance and flexible working attitude are a must. Possibility of relocation package.

We require a minimum of 4 years full time vascular ultrasound experience and the full range of vascular tests. Applicants must hold British passport or be eligible for a work visa. Call Kate Sommerville on 00 44 207 720 3173 or email katesommerville@cs.com for more information.

MONASH UNIVERSITY

GRADUATE DIPLOMA IN MEDICAL ULTRASOUND

New! State of Art Course By Distance Education February, 2002 intake.

Applications also invited for mid year 2001,single subject **SON 4010: Embryology,Anatomy and Pathophysiology**.
Applicants would then continue into program in 2002.
For graduates of a Degree program in Radiography & Medical Imaging or equivalent. DMU or equivalent exemptions granted.
Enquiries and applications
Administrative Officer,
Department of Radiography & Medical Imaging
PO Box 64, Monash University, VIC, 3800, Australia.
Phone: +61 3 9905 1212; Fax: +61 3 9905 8149
ultrasound@med.monash.edu.au
www.med.monash.edu.au/BRadMedImag/courses/SON3402/

The Prince Henry and Prince of Wales Hospitals

Incorporating the Albion Street Centre and Community Health Services and Programs Northern Sector

Vascular Ultrasonographer 2 Positions

Internal Reference Code: POW0178

Applications are invited for the above positions in the Vascular Diagnostic Centre at the Prince of Wales Hospital, a major teaching hospital of the University of New South Wales. This combined public and private diagnostic facility services the Prince of Wales Adult, Children's and Private Hospitals as well as general practices and specialist medical practices in the area. The facility offers diagnostic vascular ultrasound across the spectrum of vascular disease using C.W. doppler, duplex doppler, and pletysmography. The facility is incorporated in the Department of Vascular and Transplantation Surgery.
Essential: Applicants should have the Diploma of Diagnostic Ultrasound or equivalent.
Enquiries: Contact Dr J E Frawley at the Prince of Wales Private Hospital, telephone: 02 9650 4972
Closing Date: 31/5/2001

View more advertisements at http://seh.monster.com.au

Applications for the above positions, including a brief curriculum vitae with names and contact numbers of three referees and quoting the position number, should be forwarded to the **Human Resource Recruitment Office, Prince Henry and Prince of Wales Hospitals, Clinical Sciences Building level 1, Cnr High and Avoca Streets, RANDWICK NSW 2031**

PROSPECTIVE APPLICANTS MUST BE CURRENT EMPLOYEES OF THE SOUTH EASTERN SYDNEY AREA HEALTH SERVICE

FACILITIES OF SOUTH EASTERN SYDNEY AREA HEALTH SERVICE

HEARTS, VESSELS & WOMEN'S BUSINESS

THE AUSTRALIAN INSTITUTE OF ULTRASOUND

INVITES YOU TO EXTEND YOUR KNOWLEDGE IN THESE AREAS

Advanced Echocardiography - June 2nd & 3rd

An intensive two days of discussion & practical scanning on all things cardiac

Advanced Vascular Techniques - June 16th & 17th

Leg Arteries, Abdominal Vasculature, Superficial Veins & other topics

ASK ABOUT EXTENSION DAYS FOR FURTHER "HANDS-ON" TUITION IN ECHO & VASCULAR

The World of Women's Imaging - July 21st & 22nd

All the latest on the various topics in women's imaging, plus a viewpoint from a breast surgeon, a gynae oncologist & an endocrinologist

Contact Us...
Phone: (07) 5526 6655 Fax: (07) 5526 6041 Email: sue@aiu.edu.au
Program Information: Sue Davies Registration Information: Sally Ashwin

NORTH COAST SUB-BRANCH OF THE ASUM

in conjunction with

NORTH COAST SUB-BRANCH OF THE AIR

PROUDLY PRESENTS

Ballina Imaging Conference 2001

Ballina Beach Resort

September 29 - 30

Please mark this event in your academic / social diary

Program details and Conference Registration form
will be in forthcoming editions of Spectrum and Bullitin

Due to this being a long weekend in NSW it is advisable to book your accommodation at the Ballina Beach Resort as soon as possible. Please mention the conference when booking. Resort contact number is (02) 6686 8888
Accommodation starts at $93.50 (dbl) per room per night.

For more information contact Peter Ogg or Barry Lennon (02) 6622 2288

ASUM NZ Branch Annual Meeting

Millennium Hotel Queenstown
12TH – 15TH July 2001
&
DDU and DMU Exam Preparation
Thursday 12TH July (PM)

ASUM NZ Branch presents the Annual Scientific Meeting at the Millennium Hotel, Queenstown. We are delighted to announce the following speakers:

Anil Ahuja
Radiologist, Prince of Wales Hospital Hong Kong
Joint Editor with Dr R Evans of:
'Practical Head and Neck Ultrasound'
Sponsored by ATL

Pru Pratten
Musculoskeletal Sonographer,
Private Practice, Dr Robert Jones & Partners, Adelaide
Sponsored by NZ Branch ASUM

Brian Trudinger
Professor of Obstetrics & Gynaecology,
Westmead Hospital, Sydney
Sponsored by G E Medical Ultrasound

Call for Papers, Posters and Student Sonographer Case Studies
Please consider whether you could contribute a poster to the conference. Also, student sonographers are encouraged to take the opportunity to present a brief case study. Expressions of interest are to be conveyed to the convenor *as soon as possible*.

Prizes
The Gerald Duff and Alison Sommerville Memorial Prize for best proffered paper, $500, best registrar, best student sonographer presentation and best poster prizes, $400 each.

Sponsors
ASUM NZ Branch gratefully acknowledges the meeting sponsorship by:
Acuson; AGFA; Aloka (Medtel); ATL; General Electric Medical Systems Ultrasound; Kodak; Schering; Toshiba

Program
The intent is to commence on the Thursday evening with a social event at the Millennium sponsored by Toshiba with academic sessions on the Friday, Saturday and Sunday mornings. The afternoons and Friday evening will be free time. The Saturday evening function will be at the Skyline restaurant, sponsored by Acuson.

Please Note
Queenstown will be busy, as it is the last week of the school holidays and the beginning of the Queenstown Festival. Early booking of accommodation and air flights is strongly recommended!

Convenor
Mike Heath, Fax: (09) 521 1545; Email: m_lheath@xtra.co.nz

ASUM ACT Branch

ASUM 2001 Journal Club meetings are now held on the first Thursday of each month. Meetings are held in the conference room of the Imaging Department of the Canberra Hospital at 5.30pm. You can find details about May 3 and June 7 events in the calendar listings in this Bulletin. Other meetings scheduled for 2001 occur on the 5th July, 2nd August, 6th September, 4th October and the 1st November, unless otherwise advised. Contact: Ian Dalziel, Ph: 02 6201 6140; Email: Ian.Dalziel @calvary-act.com.au

ASUM NSW Branch

An extraordinary meeting with special guest speaker, Dr Roy Filly is planned for Wednesday 1st August at the Royal Hospital for Women's Lecture theatre. Refreshments are to be served from 6.00pm with the lecture commencing at 6.30pm. A DMU Physics Technical Seminar is planned for the 21st and 22nd of July with guest speakers, Roger Gent and Mike Dadd presenting.

ASUM NSW Branch

North Coast Sub Branch of ASUM

Bi-monthly scientific meetings are scheduled for May, July and September. For details see Calendar listings on the website www.asum.com.au

A combined ASUM and AIR 2 day Conference will commence on Saturday 29th September. Contact: Barry Lennon, Ph: 02 6622 2288; Email: lemonhed@ncrad.com

ASUM QLD Branch

Bi-monthly Meetings for 2001

Vascular meetings scheduled for this year occur on Tuesdays the 15th May, 17th July, 18th September, and 13th November. The Annual General Meeting is to be held in conjunction with the Vascular meeting on Tuesday 17th July. A DMU Physics Day will be held at Prince Charles Hospital on Sunday 15th July. Contact: Roslyn Savage, Ph: 0417 720 875; Fax: 07 3881 2464.

ASUM SA Branch

The DMU Prep Course began on March 20 and will run for 5 months, concluding on August 7. Contact Chris Paxton for more details, Ph: 08 8297 0588. A combined ASUM and ASA Musculoskeletal meeting has been organised for May 24, see the calendar listings in this Bulletin for further details.

The Chris Kohlenberg Teaching Fellow will be coming to SA in late 2001. This Diasonics GE sponsored fellowship will occur at Mount Gambier on Nov 6th, Whyalla on Nov 8th and Adelaide on Nov 10th. The fellow for the meetings is Dr Victor Hurley who will be presenting on Obstetrics and Gynaecology in Ultrasound. Contact: Stephen Bird, Ph: 08 8297 0588.

ASUM Victorian Branch

The following bi-monthly scientific meetings are scheduled for 2001:

Tue 15 May 2001	Liver Imaging. Joe Sasadens will talk on Hepatitis C. Judy Lees will talk on cirrhosis/ portal hypertension.
Tue 31 Jul 2001	Dr Roy Filly presents on the topic Obstetrics & Gynaecology. Sponsored by Acuson.
Sun 30 Sept 2001	Vascular Ultrasound.

ADDITIONAL MEETING

On Thursday 19th July there will be a combined ASUM/RANZCR meeting to be held in LaTrobe lecture theatre Royal Melbourne Hospital. For further details regarding this and other meetings, consult the calendar listings in this Bulletin.

ULTRASOUND LECTURE SERIES

Suitable for people commencing training in diagnostic ultrasound. This lecture series will run at 6.30pm - 8.30 pm on Wednesdays from June to October 2001. Venues and dates to be advised and will be posted on the calendar at www.asum.com.au/open/calendar Contact Geoff matthews

ASUM WA Branch

Royal Perth Hospital will be the venue for 3 days of DMU activities on the 15th, 16th and 17th of July. Consult the Calendar listings in this Bulletin for more details regarding these DMU events and other educational meetings. Contact Kim Batt on 08 9224 2121.

ASUM and Acuson present: Roy A Filly MD

Melbourne Tuesday 31 July
Sydney: Wednesday 1 August

Roy A Filly MD is Professor of Radiology, Surgery and of Obstetrics, Gynaecology and Reproductive Sciences at the University of California San Francisco. He is co-founder of the UCSF Fetal Treatment Program and also holds the academic positions of Clinical Professor of Radiology and Nuclear Science at Stanford University and Clinical Assistant Professor in the School of Science and Engineering, Seattle University.

Dr Filly has published more than 400 papers including the original description of the utility of ultrasound for the detection of pancreatitis, pancreatic pseudocyst and pancreatic carcinoma in 1970, and landmark papers demonstrating that real-time sonography was the method of choice for the diagnosis of twins and fetal demise. His series of papers on the fetal ventricles and posterior fossa of the fetus have dramatically impacted prenatal diagnosis of fetal central nervous system anomalies. His most recent work is in the arena of fetal therapy and ultrasound.

Contacts: Sydney - Jane Fonda 02 9351 9185 j.fonda@cchs.usyd.edu.au ; Melbourne – Mark Brooks fax 03 9459 2817

These meetings are proudly sponsored by Acuson

acuson
A Siemens Company

ASUM Tasmanian Branch

There are two remaining events for the year in Tasmania. The first is a 2 day meeting scheduled for the 21st and 22nd of July, looking at Abdominal Ultrasound. The 2nd meeting is to be held on November the 3rd. For details see Calendar listings in this Bulletin, or contact Fiona Thompson, Ph: 03 6223 2941.

DMU Technical Seminar

"A Physics top-up program designed specifically for candidates of the Diploma in Medical Ultrasound Parts 1 and 2."

Faculty: Roger Gent, Mike Dadd

Room 118, Building M
The School of Medical Radiation Sciences
University of Sydney
Cumberland Campus
East Street
Lidcombe

Saturday 21st and Sunday 22nd of July 2001

Enquiries:
Tim Brown, Tel: (02) 9958 6200
Email: education@asum.com.au

ASUM Vascular Workshop 23 – 24 June 2001

St Vincents Hospital Melbourne

Convenor: Dr John Vrazas

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

Ken Rholl

Director, Section of Cardiovascular and Interventional Radiology, INOVA Alexandria Hospital, Alexandria, Virginia

Director, Noninvasive Vascular Laboratory, INOVA Alexandria Hospital

Director, Section of Cardiovascular and Interventional Radiology, Potomac Hospital

Immediate Past President, Intersocietal Commission for the Accreditation of Vascular Laboratories

Joseph Polack

Associate Professor of Radiology, Harvard Medical School

Director, Noninvasive Vascular Imaging, Brigham and Women's Hospital

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

Beresford Buttery Overseas Traineeship

(Sponsored by Diasonics GE)

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

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

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

ASUM and Diasonics GE invite applications for the 2001 Diasonics GE Beresford Buttery Traineeship Award

The award is made to applicants:

1. who seek to further develop their skills and experience in obstetric and gynaecological ultrasound
2. have as a minimum qualification Part I of the DDU or DMU (or equivalent) or have been awarded the DDU or DMU (or equivalent) within the last 5 years since 21 December 1996)
3. have been financial members of ASUM for a minimum of 12 months prior to the closing date

Applications should include:

- a curriculum vitae
- details of current employment
- testimonials from two referees in support of the application including contact address and telephone number
- an outline of professional goals and objectives
- an indication of benefit from award of the Traineeship

The successful applicant is asked to provide a written report on return from the course at Thomas Jefferson Research and Education Institute.

Applications addressing the criteria should be forwarded by **Friday 29 June 2001** to Diasonics GE Beresford Buttery Overseas Traineeship, c/- ASUM, 2/181 High Street, Willoughby NSW 2068 Australia

DMU 2001

Examinaton Dates & Fees

Parts I and II Written exam	- 25 August 2001
Closing date for exemption	- 27 April 2001
Closing date for applications	- 1 June 2001

FEES (include GST)

ASUM Members	Non Members
Part I A$385.00	Part I A$660.00
Part II A$660.00	Part II A$ 935.00

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

Chris Kohlenberg Teaching Fellowships 2001

(Sponsored by Diasonics GE)

Two Chris Kohlenberg Teaching Fellowships have been awarded in 2001:

Victor Hurley will conduct meetings in South Australia. Initial plans involve meetings at Mt Gambier on 6 November, Whyalla on 8 November and Adelaide on 10 November. For further details contact Steven Bird fax 61 8 8297 1802 email sjbird@camtech.net.au

Quenton Reeves will conduct meetings in New Zealand in September/October. Meetings are tentatively planned for Dunedin, Christchurch and Wellington, with a Saturday workshop in Auckland. For further details contact Mike Heath fax 64 9 529 1545 email m_lheath@xtra.co.nz

ASUM joins Diasonics GE in congratulating doctors Hurley and Reeves on their appointment as Chris Kohlenberg Teaching Fellows for 2001.

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 annually since 1998 to provide educational opportunities for members in New Zealand, Queensland and New South Wales Northern Territory and Western Australia. It is named to commemorate Dr Chris Kohlenberg, who died while travelling to educate sonographers.

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

Nominations and proposals should be addressed to: The Education Officer ASUM 2/181 High St Willoughby 2068 Australia, and should be received before 22 November 2001.

DDU 2001

Examination Dates & Fees

Please note that there will be only one DDU Part I examination from 2001 onwards.

2001 Part I EXAMINATION
Part I written examination will be held on 21 May 2001

2001 Part II EXAMINATION
Part II written examination will be held on 21 May 2001

For applicants who pass the Part II written exam the Part II oral examination will be held on 16 June 2001 in Sydney.

Oral Examination for Cardiology candidates will be held in Melbourne on a date to be determined.

For a copy of the latest DDU handbook, DDU application forms and further information regarding DDU contact ASUM on 61 2 9958 7655

Ultrasound Events

Tue 15 May 2001 ASUM Queensland Branch Meeting. Dr John Clouston and Mr Brian Starkoff will be presenting on Ovarian Veins and Venography vs Ultrasound. *Venue:* Wesley Hospital Auditorium *Contact:* Roslyn Savage, Ph: 0417 720 875; Fx: 07 3881 2464

Tue 15 May 2001 ASUM Victorian Branch Meeting - Liver Imaging *Venue:* Ground floor lecture theatre, Mercy Hospital for Women *Contact:* Dr Mark Brooks, Ph: 03 9496 5431; Fx: 03 9459 2817

Thu 17 May 2001 Echo - Port Douglas *Venue:* Sheraton Mirage Hotel, Port Douglas *Contact:* Sharon Bain, ID Meetings & Events, PO Box 998, Crows Nest NSW 1585; Ph: 02 9965 4257; Fx: 02 9906 1955; Email: S.Bain@idtours.com; Website: www.idtours.com

Fri 18 May 2001 ASUM North Coast Branch Meeting - MRI vs Ultrasound comparison on Musculoskeletal areas *Venue:* St Vincents Private Hospital Lismore, North Coast Radiology Rooms *Contact:* Barry Lennon, Ph: 02 6622 2288; Email: lemonhed@ncrad.com

Fri 18 May 2001 - 3 days Cardiology 2001. The 3rd Annual Port Douglas Heart Meeting and Exhibition *Venue:* Sheraton Mirage Hotel, Port Douglas *Contact:* Sharon Bain, ID Meetings & Events, PO Box 998, Crows Nest NSW 1585; Ph: 02 9965 4257; Fx: 02 9906 1955; Email: S.Bain@idtours.com; Website: www.idtours.com

Sat 19 May 2001 ASUM NZ Branch Workshop - Nuchal Translucency Screening *Venue:* National Women's Hospital, Claude Road, Epsom, Auckland *Contact:* Sabrina Young, National Women's Hospital, Claude Road, Epsom, Auckland; Ph: 09 630 9943 ext 3252

Sun 20 May 2001 - 3 days 5th World Congress of Echocardiology and Vascular Ultrasound. *Venue:* International Convention Center Seoul, South Korea *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

Mon 21 May 2001 DDU Part I and II Written Examination *Contact:* DDU Co-ordinator, ASUM, 2/181 High Street, Willoughby NSW 2068; Ph: 02 9958 7655; Ph: 02 9958 8002; Email: asum@asum.com.au

Thu 24 May 2001 ASUM SA Branch. Combined ASA/ASUM Musculoskeletal Meeting. Dr Iain Duncan will be speaking on Wrist and Foot Ultrasound. *Venue:* The Queen Victoria Lecture Theatre Women and Childrens Hospital *Contact:* Stephen Bird, Ph: 08 8297 0588; Fx: 08 8297 1802

Fri 25 May 2001 – 3 days AMA National Conference *Venue:* Sheraton Towers Southgate, Melbourne *Contact:* Australian Medical Association, Po Box E115, KINGSTON, ACT, 2604; Ph: 02 6270 5400; Fx: 02 6273 5706

Sat 26 May 2001 - 4 days Euroson School: Small Parts (Thyroid, Testis, Lymph Nodes, Musculo-Skeletal) Ultrasonography / Romanian Annual Conference in Ultrasonography (SRUMB) *Venue:* Adam Muller Guttenbrum Bldg, Timisoara, Romania *Contact:* Roxana Sirli, MD, County Hospital Timisoara, 145 L Rebreanu Boul, 1900 Timisoara, Romania; Ph: 40 93 537 039; Fx: 40 56 200208; Email: rsirli@aut.uttt.ro

Fri 1 Jun 2001 DMU Examinations. Closing date for Part I and Part II Examinations. *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 Jun 2001 ASUM ACT Branch Meeting - Dr Sue Bell on Hysterosonography *Contact:* Ian Dalziel, Ph: 02 6201 6140; Email: Ian.Dalziel@calvary-act.com.au

Fri 15 Jun 2001 ASUM WA Branch. DMU Mock OSCE. *Venue:* Bruce Hunt Meeting Rooms 3 & 4, Royal Perth Hospital *Contact:* Kim Batt, Ph: 08 9224 2121

ASUM 2001

Skills Development Day, 6 September 2001

31st Annual Scientific Meeting, 7 – 9 September 2001

The ASUM2001 Organizing Committee invites you to attend the 31st Annual Scientific Meeting at the Sydney Convention and Exhibition Centre. We have an exciting program, which utilises internationally recognised authorities to lead a scientific program involving plenary and workshop sessions, and an exhilarating social program.

A registration form, together with full details of the scientific program, is included with this Bulletin and can be accessed on ASUM's website.

Invited Overseas Faculty Includes:

- John Lindsay: Mayo Clinic, Rochester
- Garry Le Quesne: King Faisal Hosp., Saudi Arabia
- Demetrios Economides: Royal Free Hosp., London
- Ted Lyons: Winnipeg, Canada
- Peter Burns: Toronto, Canada
- Andrew Nicolaides: St Mary's Hosp. London

Posters and Proffered Papers

A feature of past ASUM Annual Scientific Meetings has been the posters and free papers proffered by registrants. Posters and papers submitted by registrants are generally eligible for a range of generous prizes, offered by our corporate sponsors.

Sat 16 Jun 2001 DDU Part II Examination. Oral Examinations except Cardiology candidates *Venue:* Sydney except Cardiology candidates. Cardiology candidates will be examined in Melbourne on a date to be determined. *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 16 Jun 2001 – 2 days ASUM WA Branch. DMU Part 2 Film Reading Weekend. *Venue:* Radiology Department, Royal Perth Hospital *Contact:* Kim Batt, Ph: 08 9224 2121

Sat 23 Jun 2001 – 2 days ASUM Vascular Ultrasound Workshop 2001 *Venue:* St Vincents Hospital, 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

Tue 26 Jun 2001 Sixth Annual Symposium on Contrast Echocardiography *Venue:* Sheraton Seattle Hotel and Towers, Seattle, Washington *Contact:* ATL Learning Centre, Website: www.atl.com or Email: ATL-Bothell.learning-center@Philips.com

Wed 4 Jul 2001 - 4 days 10th International Congress on Twin Studies *Venue:* Imperial College, London, United Kingdom *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_lheath@xtra.co.nz

Thu 12 Jul 2001 – 4 days New Zealand Branch ASUM Annual Meeting *Venue:* Millennium Hotel Queenstown *Contact:* Mike Heath, Fx: 09 521 1545; Email: m_lheath@xtra.co.nz

Sun 15 Jul 2001 ASUM Queensland Branch. DMU Preparation-Physics. *Venue:* Prince Charles Hospital *Contact:* Roslyn Savage, Ph: 0417 720 875; Fx: 07 3881 2464

Tue 17 Jul 2001 ASUM Queensland Education Program. Vascular Meeting *Venue:* Mater Public *Contact:* Roslyn Savage, Fx: 07 3881 2464; Email: markros@powerup.com.au

Thu 19 Jul 2001 ASUM Victorian Branch Meeting. ASUM/RANZCR Combined Meeting. *Venue:* LaTrobe Lecture theatre, Royal Melbourne Hospital *Contact:* Dr Mark Brooks, Ph: 03 9496 5431; Fx: 03 9459 2817

Sat 21 Jul 2001 – 2 days ASUM Tasmanian Branch Meeting - Abdominal Ultrasound *Venue:* Radiology Conference Room Launceston General Hospital *Contact:* Fiona Thompson, Ph: 03 6223 2941

Sat 21 Jul 2001 ASUM Victorian Branch Meeting - Dr Roy Filly on Obstetrics & Gynaecology *Venue:* Ground floor lecture theatre, Mercy Hospital for Women *Contact:* Dr Mark Brooks, Ph: 03 9496 5431; Fx: 03 9459 2817

Sat 28 Jul 2001 ASUM North Coast Branch. Trial OSCE, DMU Part 2 Practical Exam. *Venue:* North Coast Radiology, 16 Keen St, Lismore *Contact:* Barry Lennon, Ph: 02 6622 2288; Email: lemonhed@ncrad.com

Tue 31 Jul 2001 ASUM Victorian Branch Meeting. Extraordinary Meeting with special guest speaker, Dr Roy Filly *Venue:* TBA *Contact:* Mrs Mary Young, Ph: (ah) 03 9818 8455; Fx: 03 9818 8098; Email: robertmary.young@bigpond.com

Sun 5 Aug 2001 - 4 days CSANZ - 49th Annual Scientific Meeting *Venue:* Auckland, New Zealand *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

Wed 15 Aug 2001 ASUM WA Branch. Dr Bev Hewitt to present on, 1st Trimester Ultrasound – Nuchal and Beyond *Venue:* Radiology Department, Royal Perth Hospital *Contact:* Michelle Pedretti, Ph: 08 9400 9030

Sat 25 Aug 2001 DMU Part I and Part II Written Examinations *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

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

Tue 18 Sep 2001 ASUM Queensland Education Program. Vascular Meeting *Venue:* RBH *Contact:* Roslyn Savage, Fx: 07 3881 2464; Email: markros@powerup.com.au

Wed 26 Sep 2001 ASUM WA Branch. Vascular Meeting with Dr A Kaard *Venue:* Radiology Department, Royal Perth Hospital *Contact:* Michelle Pedretti, Ph: 08 9400 9030

Sat 29 Sep 2001 – 2 days Ballina Imaging Conference 2001. Combined AIR/ASUM meeting. *Venue:* Ballina Beach Resort *Contact:* Barry Lennon, Ph: 02 6622 2288; Email: lemonhed @ncrad.com

Sun 30 Sep 2001 ASUM Victorian Branch Meeting - Vascular Ultrasound *Venue:* Ground floor lecture theatre, Mercy Hospital for Women *Contact:* Dr Mark Brooks, Ph: 03 9496 5431; Fx: 03 9459 2817

Tue 21 Oct 2001 - 5 days Congress of the Asian Federation of Society for Ultrasound in Medicine and Biology *Venue:* The Shangri-La Hotel, Kuala Lumpur, Malaysia *Contact:* Mrs Janet Low, Executive Secretary, Department of Radiology, University of Malaya, Medical Centre, 59100 Kuala Lumpur, Malaysia; Ph:60 3 750 2069; Fx: 60 3 758 1973; Email: janetl@medicine.med.um.edu.my

Tue 23 Oct 2001 - 5 days 11th World Congress on Ultrasound in Obstetrics and Gynecology *Venue:* Convention Centre, Melbourne, Australia *Contact:* Andrew Ngu, c/- ISUOG, 3rd fl., Lanesborough Wing, St George's Hospital Medical School, Cranmer Terrace, London SW17 ORE, UK; Ph: 44 20 8725 2505; Fx: 44 20 8725 0212; Email: johnson@sghms.ac.uk

Fri 26 Oct 2001 - 3 days Annual Meeting Society of Radiologists in Ultrasound *Venue:* Inter-Continental Hotel, New Orleans, LA, USA *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

Sat 3 Nov 2001 ASUM Tasmanian Branch Meeting *Venue:* University of Tasmania – Sandy Bay Campus *Contact:* Fiona Thompson, Ph: 03 6223 2941

Tue 13 Nov 2001 ASUM Queensland Education Program - Vascular Meeting *Venue:* Queensland X-ray *Contact:* Roslyn Savage, Fx: 07 3881 2464; Email: markros@powerup.com.au

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

Tue 11 Dec 2001 - 4 days EUROSON 2001 and 33rd BMUS Annual Scientific Meeting *Venue:* EICC, Edinburgh, Scotland *Contact:* BMUS, 36 Portland Place, London WIN 3DG, UK; Ph: 44 20 7636 3714; Fx: 44 20 7323 2175; Email:euroson@bmus.org; Website: www.bmus.org

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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.

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

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

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

Images
Images may be submitted as hard copy (in triplicate) or in digital format. All images sent must have all personal and hospital or practice identifiers removed. **Images must not be embedded 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.

Please do not submit images direct from CPD cameras as these may present problems.

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Contrast Ultrasound Technical Application Specialists

Committed to research and technical innovation in the field of in-vivo diagnostic imaging, we are seeking Specialists to successfully support the launch of a new product onto the European market. They will report to the Worldwide Sales and Marketing organization.

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- Act as an information/communication link between WW Ultrasound Marketing and local Marketing/Sales staff regarding customer concerns and feedback
- Co-operate with Marketing and Training to: develop and deliver training for product use and documentation; resolve customer issues
- Provide support at trade shows and congresses.

QUALIFICATIONS

- Excellent skills in Doppler and Color Flow imaging
- Clinical Utrasound experience in a hospital setting or in a position similar to the present one
- Fluent German and English, an additional European language is highly desirable
- Proactive and dynamic personality, highly developed interpersonal and communication skills, team-work approach, problem solving attitude, well developed time management skills
- Willingness to travel

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