CONTENTS include:
Diastolic Dysfunction in Stress Echo
6-8
Presentation in Infancy or Retirement
9-11
Applications of Valsalva
12-13
Musings over 25 years of ECHO
14-21
Physiologist led Paediatric and TOE Services
22-24
BSE 2016 National Echo Survey
25-26
Case Reports
27-29
Book Review
30
Annual Conference Edinburgh 2017
31-34
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A major threat to the ability of departments across the United Kingdom to deliver good quality, timely echocardiography is, in my opinion, the shortage of proficient echocardiographers. The Picker Survey, which is summarised in this issue of Echo, identified that 68.3% of departments had at least one post unfilled. This under-staffing becomes critical in a discipline that is in demand, with a 43% increase in commissioning of echocardiograms over the last 6 years. Given that most departments have five or fewer full-time echocardiographers, this makes clear what many of us know from our daily routine – that there is a constant pressure to deliver more scans with fewer people. In a country with an ageing population, increasingly exposed to the burden of chronic diseases such as heart failure and valvular heart disease, demand for echocardiography will continue to grow. My aim here is to try to explain what the British Society of Echocardiography has been trying to do to highlight this as an issue to the Department of Health (DoH), with a view to improving the situation.

Firstly, the BSE co-ordinated an approach in collaboration with the SCST, British Heart Rhythm Society and British Cardiovascular Society to the Chief Medical (CMO) and Chief Scientific Officers (CSO) that questioned the lack of response to the Strategic Review of Cardiac Physiology Services published early in 2015. This review was commissioned by the DoH, written by SCST and BCS, and highlighted a shortfall in cardiac physiologists as a threat to delivery of cardiology services. Although correspondence was received that acknowledged our approach and offered a meeting to discuss the review, a date was never made available. In informal discussions, representatives from the DoH made it clear that they were open to suggestions but were short of solutions at a time of financial duress for the NHS. In response, the BSE wrote an Options Analysis that was published in the last issue of Echo. This Options Analysis was a fully costed set of potential proposals to meet the shortfall in the workforce, completed with the help of an independent health economist, and included five alternatives. This was sent to the CMO, CSO, and NHS Clinical Lead for Cardiovascular Services by the BSE, SCST, BHRS and BCS, in the hope that a combined representation would be more effective than a proposal from a single professional society. Again, receipt was acknowledged and a meeting offered but never came. During these further representations, it became apparent that the DoH were unlikely to respond purely to approaches by societies such as the BSE on behalf of professionals within the NHS but involvement of patients would have a greater impact.

The lack of a patient voice within the BSE has been something that has been discussed for some time, raised first by Guy Lloyd when President. More recently, discussions with the patient-led charity Pumping Marvellous, whose Chief Executive and Clinical Lead I met following involvement with the All Party Parliamentary Group initiative in heart failure, has brought a working partnership into being. After receiving the results of the Picker Survey, a decision was made to use these results to engender meetings with the CMOs and CSOs of all four nations within the United Kingdom. That approach was made by the BSE in collaboration with Pumping Marvellous and has had, in my opinion, much greater impact because of patient involvement. Following further correspondence, there have been two meetings with the CSO from England, NHS Clinical Lead for Diagnostics, NHS Clinical Lead for Cardiovascular Disease and Programme Delivery Lead for 7 day services. No response has been received from Scotland and local co-ordination of approaches in Wales and Northern Ireland are in progress.

While a co-ordinated approach between the BSE and Pumping Marvellous may have helped to place our Society in meetings, there is no doubt that the DoH are in turn under pressure to deliver 7 day services. Moreover, in each of the meetings in England, it has been made clear that echocardiography is accepted as a major requirement for effective 7-day working, while at the same time recognising that the lack of availability of echocardiography is a major hurdle in delivery. Trusts are unable to meet the demands of Clinical Standard 5, which requires Trusts to be able to deliver emergency echocardiography within 1 hour, urgent echocardiography within 12 hours and routine within 24 hours every day of the week. More than 90% of departments cannot do this at present and few have the
resources to be able to meet these targets without either an increase in the workforce or a large increase in waiting time for routine out-patient requests. The government however, are committed to delivering 7DS and this will happen. Unfortunately, delivery is being demanded without additional, new sources of funding. It has been oft repeated ‘There will be no more money’.

Several of our recommendations are being actively considered within the DoH, including short-term and medium-term solutions. In the short-term, echocardiography may be placed on the national shortage occupations list, meaning that the NHS can continue to attract skilled echocardiographers from abroad to meet the immediate demand. To encourage those thinking of retiring from the profession, Trusts are to be encouraged to offer recruitment and retention premiums, which offer up to 15% increase in salary on an annual, renewable basis. This might be used not only to retain our most experienced echocardiographers but has the potential to be used to encourage back into the department those who have left to industry. A request has been made to cap locum employment, and it will be interesting to see the impact of new regulations this week on the exodus from departments if this is enforced. Perhaps of greater impact for the future, we have asked for a requirement to be imposed on all commissioners to consider whether providers of echo services train echocardiographers – at present, the burden of training is placed solely on NHS services and not on independent providers that recruit accredited staff. Demanding that all providers also train should increase the pool of available, proficient staff and spread the time demands of training. We have also asked that echocardiographers are ‘counted’ specifically as a group by the NHS, so that proper workforce planning can take place on a regular and reliable basis.

From the medium-term solutions suggested by the BSE, it has been made clear to us which will not be taken up. Those who have read the options analysis will know that there are many advantages to increasing the numbers entering the Scientific Training Programme but that central funding from Health Education England means this is considered expensive. This option will not be considered as the solution by the DoH. It was also pointed out frequently that departments had been reluctant to take on STP trainees – even though the BSE highlighted that, more recently, more departments had offered posts than there were trainees. It is possible that an increase in the numbers of Practitioner Training Posts may be increased but the limitation here is the time taken for individuals to progress through to the workplace and then to train in echocardiography. The option of leaving things to individual Trusts to sort out, which is effectively the current situation and has arguably been so for some time, has evident risks. Likewise, the option of simply relying on recruitment from abroad is an unacceptable solution in political terms to be openly accepted.

So where are we? My greatest concern at present is that the DoH will seek a short-term solution that will deliver 7DS but then not seek a conclusion to the much more fundamental problem of a shortage of echocardiographers. One of my greatest fears is that the CSO cites the example of a department of echocardiography in China where 50 scans are performed by an echocardiographer per session, reporting with voice recognition and patients moved on and off the couch by support workers. While I freely acknowledge that we can improve our productivity, I shudder to think of the quality produced by such an approach. It is clear however, that the BSE needs to actively engage in broadening education, training and accreditation in echocardiography beyond the department. I think it is almost impossible to imagine a situation where we would have enough physiologists trained in echocardiography to be able to deliver the 24/7, 7DS required to be able to meet a 1 hour deadline for an emergency scan. I am convinced that delivery of echocardiography within a department properly staffed by proficient, fully trained echocardiographers with support assistance and good equipment is the right approach to 7DS for both urgent (12 hours) and routine in-patient (24 hours) and out-patient scans (6 weeks). I also think that a 1 hour ‘point of care ultrasound’ could be delivered by a wide range of staff but should be supported by proper archiving, reporting and reviewing by fully trained proficient echocardiographers, with the default position then to perform a complete echocardiogram within 12-24 hours. I think this is an important time for echocardiography and how it is delivered in the UK, and I hope very much the BSE will be central to the debate.

Rick Steeds
DIASTOLIC FUNCTION IN STRESS-ECHO

Diastolic Function in Heart Failure

As heart failure (HF) was historically considered the result of impaired left ventricular systolic function, therapeutic interventions were based upon this assumption. However, new phenotypes have been identified in recent years, including HF with preserved LV ejection fraction (HFpEF); this has also been termed Diastolic Heart failure and Heart Failure with Normal Ejection Fraction (HFnEF). Despite the normal or ‘preserved’ LVEF, systolic function is typically abnormal through impaired longitudinal function.

HFpEF patients typically are older, more often female with hypertension and atrial fibrillation; myocardial hypertrophy and fibrosis are the main contributing factors to diastolic impairment. With an ageing population the prevalence of hypertension, obesity and diabetes is increasing and therefore, not surprisingly, diastolic HF with preserved ejection fraction is increasingly recognised, this now accounts for almost half of all HF diagnoses.

The Role of TTE and Exercise-Echo

TTE plays a pivotal role in the initial assessment of HF, including: LV systolic and diastolic function, valve disease, right ventricular function, pericardial assessment and pulmonary artery pressure.

When symptoms of dyspnoea or heart failure are primarily triggered by exertion, and yet resting LV systolic and/or diastolic function appear normal or only mildly impaired, exercise-echocardiography may offer additional information.

The assessment of both systolic and diastolic function under stress conditions may unmask a number of cardiac conditions including: LV systolic and diastolic function, valve disease, such as underlying coronary artery disease. Thus early identification of diastolic dysfunction (DDF) may only manifest as raised LV end-diastolic pressures/mLAP leads to a progressive increase in E max (elastic recoil) becomes more forceful, both average (septal and lateral) e’ values and maximum E velocity augment; due to the proportional increase in both values, the E/e’ ratio remains normal throughout.

However, when relaxation is impaired and exercise leads to a progressive increase in filling pressure, peak E velocity will rise proportionally with mean left atrial pressure (mLAP), while impaired myocardial relaxation results in constantly low e’ velocities throughout exercise. In this setting, exercise related diastolic impairment and associated increase in LV filling pressures/mLAP leads to a progressive increase in E max velocity and persistently low e’ value, this in turn leads to an increased E/e’ ratio.

Indications for diastolic stress echo

Diastolic dysfunction (DDF) occurs when LV relaxation is impaired with reduced restoring forces and increased chamber stiffness, initially leading to raised LV filling pressures and progressing to an increase in LA pressure.

Stress echo for assessment of diastolic function is indicated when the resting TTE study does not explain a diagnosis of HF or breathlessness; typically, only mild DDF is noted. This may represent presumed normal alterations with age or subclinical disease, such as underlying coronary artery disease. Thus early stages of DDF may only manifest as raised LV end-diastolic pressures at rest. However, by increasing cardiac output, increases in mean LAP and PCWP may be unmasked. This underpins the basis for diastolic assessment during stress testing.

If raised filling pressures are discovered on the baseline TTE (Grade II or III), progression to exercise is unnecessary as significant diastolic impairment has already been confirmed. Likewise, if the patient is found to have entirely normal diastolic function and normal e’ values (septal >7 cm/s, lateral >10 cm/s), exercise for diastolic assessment alone is not indicated (see Figure 1).

Diastolic Function During Exercise

During exercise, normal individuals increase stroke volume without a significant increase in LV filling pressure. As myocardial relaxation enhances and early diastolic suction (elastic recoil) becomes more forceful, both average (septal and lateral) e’ values and maximum E velocity augment; due to the proportional increase in both values, the E/e’ ratio remains normal throughout.

However, when relaxation is impaired and exercise leads to a progressive increase in filling pressure, peak E velocity will rise proportionally with mean left atrial pressure (mLAP), while impaired myocardial relaxation results in constantly low e’ velocities throughout exercise. In this setting, exercise related diastolic impairment and associated increase in LV filling pressures/mLAP leads to a progressive increase in E max velocity and persistently low e’ value, this in turn leads to an increased E/e’ ratio.

Performing the Exercise - Protocol

As pharmacological agents (Dobutamine, Adenosine, Atropine etc) do not provide the same level of physiological stress as physical exercise, the diastolic stress test is performed using either a treadmill or semi-supine bike.

Assessment of diastolic function at any point, whether at rest or during exercise, relies on separation of the passive (E, e’, E deceleration time) and active (A, a’) filling Doppler signals. During exercise, increasing metabolic demand drives the increase in heart rate (HR). As HR increases, the LV filling period shortens and the active and passive filling signals merge. Identification of the E max velocity becomes increasingly difficult until the point at which it is no longer identifiable, usually at around 105 bpm.
When using the treadmill, the assessment of diastolic function is performed in the recovery phase. Since high heart rates are often achieved, diastolic parameter acquisition can only occur once HR has fallen to a level usually 105 bpm and below.

However, with bicycle stress echo, assessment of diastolic function is not limited to recovery alone and can be performed during exercise, albeit HR depending. This not only offers the additional benefit of correlating the onset of symptoms with the estimation of LV filling pressures/mLAP at that time, but also allows the exercise protocol to be tailored to the patient’s symptoms, exercise capacity and echo findings.

Once the patient is connected to all monitoring equipment (usually 12-lead ECG, BP and SATs monitor) the bike is reclined and tilted leftward. The degree of tilt should be enough to provide images of diagnostic quality, but also allow the sonographer to scan for the duration of the test without discomfort.

Once in the exercise position, the echo windows should be optimised. Parameters that are to be measured during exercise should now be re-measured with the patient in this position to establish baseline reference values in the new windows.

For those who are physically able, the WHO protocol (starting resistance of 25W with 2 or 3 minute increments of 25W) is adopted. For those who have a low level of exercise capacity, a lower resistance protocol is available where resistance starts at 10W and increases by 10W every 2 minutes. Irrespective of the protocol undertaken, the patient should cycle at a rate of 55-65 revolutions per minute. Precise data acquisition is demanding and is best performed by experienced operators.

As part of the Stress-echo study, assessment of significant CAD and valve disease may be considered. The test usually aims to achieve 85% of target (maximum age predicted) heart rate in the absence of symptoms. Measures of diastolic function can therefore be performed both pre and post maximal exertion when heart rates are between 95 and 105 bpm.

**What measures do we make?**

The format for assessment of diastolic function during exercise is essentially the same as the one performed at rest. During each

**Table 1**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal</th>
<th>Abnormal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average or septal only E/e'</td>
<td>&lt;10</td>
<td>&gt;14 (&gt;15 if septal only)</td>
</tr>
<tr>
<td>TR velocity</td>
<td>&lt;2.8 m/sec</td>
<td>&gt;2.8 m/sec</td>
</tr>
<tr>
<td>Septal e' at baseline</td>
<td>&lt;7 cm/sec</td>
<td>-</td>
</tr>
<tr>
<td>Lateral e' at baseline (if only lateral velocity acquired)</td>
<td>&lt;10 cm/sec</td>
<td>-</td>
</tr>
</tbody>
</table>
How do we define positive and negative tests

Diastolic function is indeterminate if the criteria for normal or abnormal are not met. If determining LV filling pressure/mLAP is crucial for the onward management of the patient, further invasive haemodynamic testing (formal right and left heart catheterisation), including exercise, may be considered.

Summary:

Exercise testing is a non-invasive, physiological, and convenient investigation to evaluate symptomatic patients with suspected diastolic heart failure. Diastolic stress testing is particularly suited for those with evidence of grade I diastolic dysfunction, where the LVEDP may be raised but the resting LA pressure appears normal, and where pulmonary and other significant cardiac causes have been excluded. In comparison to the treadmill, bike stress testing offers the major advantage of real time assessment of diastolic haemodynamic parameters in conjunction with patient symptoms.

Shaun Robinson, Rajeevan Francis, Mirela Marinescu, Bushra Rana

WHAT’S NEW?

Whilst pursuing older journals recently I came across an editorial published in the American Journal of Cardiology written by Harvey Feigenbaum. Many of you will recognise the name as most departments will have at least one edition of the text books which he has produced since the origins of Echocardiography in the late 1960’s. Harvey Feigenbaum is often referred to as the father of clinical echocardiography. The date of the article I am referring to was November 1974. To put that in perspective, in 1974 there were two M-mode only Echo machines in the UK and they were being utilised for clinical research and development, basically that is a rather elaborate description for the learning process of beginning to interpret and understand clinical echocardiography. Echocardiography therefore had not developed into any form of clinical service in the UK at that time. Returning to Harvey Feigenbaum’s 1974 article I have extracted some paragraphs, the main reason being that although the editorial was written over 40 years ago it would be hard to date it from the contents.

I quote:

“Probably our biggest current educational problem in echocardiography is the increased demand by physicians who want this examination available for the management of their patients.”

“Unfortunately, there are very few centres that sufficiently train physicians in echocardiography to meet the required standards. In addition, many practising cardiologists want to personally perform echocardiography. The question is, has echocardiography advanced to the point that one must undergo lengthy formal training before establishing a laboratory? This question has been answered in other areas. For example, a practising cardiologist could not visit an active cardiac catheterisation laboratory for a few days and learn the techniques sufficiently to start a laboratory of his own. Some workers in the field believe that the complexity of echocardiography has reached the point where one cannot learn the technique in a few days or even one or two weeks.”

“It is well known that technicians can perform the actual echocardiographic examination, in fact, they frequently obtain better quality echocardiograms than do physicians.”

“In our haste to start echocardiographic laboratories, if we let a lot of poorly trained or untrained people perform echocardiography, there is a good chance that the quality will drop to the point where the entire technique may be discredited. The popularity of echocardiography will persist only if the quality is maintained. As long as we continue to emphasise quality rather than quantity, there is no question that eventually there will be a sufficient number of well-trained Echocardiographers.”

It does seem that the problem of quantity versus quality was an issue, even in the very early days of echocardiography and this has persisted and increased progressively to date. It is interesting looking back to see that often there is nothing new.

Gordon Williams
Editor

References

AN INITIAL PRESENTATION IN INFANCY OR WHEN RETIRED

There are a number of cardiac conditions which may present in the very young or the initial presentation may not be until late adulthood, if at all. The timing of presentation is generally reflective of the severity of the condition, the more severe the earlier it presents. One that springs to mind is Non Compaction. When severe, affecting most of the left ventricular segments, the condition presents as intractable heart failure soon after birth. Prior to the more recent title of Non Compaction this severe version was termed “Spongiform Heart of the New-Born” in that the left ventricular myocardium appeared like a washing up sponge scourer, full of small holes. If only one or two left ventricular segments are non compacted they will be almost always at the apex rather than the base and the overall left ventricular function can be well maintained and the patient active and asymptomatic into adulthood. The condition may only be found incidentally if a Post Mortem is undertaken for a non cardiac death.

Another condition with a widely varying age range and presentation is a Hypertrophic Obstructive Cardiomyopathy, and there are others.

This article relates to the cardiac condition described and attributed to Ebstein in 1866. I can recall when undertaking a teaching ward round, taking medical students to see an infant aged 1 year admitted breathless and cyanotic due to Ebsteins’ Anomaly, then going to an adult cardiac ward to see a 50 year old man whose images appear in Figs 4, 5 and 6 in this article and on the front cover of this Edition of ECHO. Currently the incidental finding of Ebstein’s Anomaly in an asymptomatic adult is a referral for an Echo after the detection of a cardiac murmur. This was the mode of presentation of a 50 year old man whose images appear in Figs 4, 5 and 6 in this article and on the front cover of this Edition of ECHO.

Echocardiography is, without question, almost always the technique which initially identifies Ebstein’s Anomaly but there is significant aetiological information available from careful scrutiny of the Echo data.

The apical 4 chamber view permits identification of the motion of both the tricuspid and mitral valve, the anuli of both of valves, their leaflet attachments, a comparison of ventricular and atrial chamber sizes and structural changes.

Fig. 1. The normal position of the tricuspid leaflets, slightly off set apically compared to the mitral. Note the right ventricular trabeculations.

Fig. 2. Diagrammatically illustrating partial failure of delamination of the anterior tricuspid leaflet and failure of delamination of the septal leaflet. Tethering resulting in an apically displaced hinged point for the anterior leaflet.
Embryologically the atrio-ventricular valves were considered to be derived from the endocardial cushions. In this context, atrio-ventricular septal defects were considered endocardial cushion defects. However, it is now recognised that in respect of the tricuspid valve the smooth atrial surface of the valve leaflets develops from the endocardial cushion tissue but the underside or ventricular aspect develops from detachment of right ventricular endocardium, a process termed delamination freeing the leaflets and enabling them to move. In Ebstein’s anomaly there is a failure of detachment of the tricuspid valve leaflets from the myocardium the leaflets often being described as being tethered or “plastered” onto the right ventricular myocardium resulting in an apically displaced “hinge point” between the attached and free parts of the leaflet. The separation starts in the right ventricular cavity and progresses backwards towards the atrio-ventricular junction. The tricuspid annulus remains in its normal relationship to the mitral annulus. The tricuspid valve is therefore not displaced apically rather the leaflets do not free up to the annulus.

The normal tricuspid and mitral valve relationship from the apex is depicted diagrammatically in Fig. 1. The septal tricuspid leaflet is normally inserted slightly below (apically) compared to the septal portion of the mitral valve. From the apical view the septal and anterior tricuspid valve leaflets are recognizable, the posterior tricuspid valve leaflet not seen in this view. It is considered that tethering of the septal leaflet to the ventricular septum is present in over 90% of Ebstein cases and tethering to varying degrees of the anterior leaflet can be identified in approximately 80% of Ebstein’s patients.

The “hinge” point or site where there is movement of a leaflet gives the false impression that the leaflet is originating there and that the tricuspid annulus is displaced into the cavity of the right ventricle. This is not the case, the embryologic tricuspid annulus remains where it should and is usually readily identifiable so don’t mistake the point of movement of the hinging of a tricuspid leaflet to represent its origin from the annulus. The right ventricular myocardium above the hinge point does not develop into normal ventricular myocardium, it becomes thinned and then incorporated within the right atrium and referred to as atrialised of the inlet portion of the right ventricle. The functional or contractile part of the right ventricle is below the hinge point of the tricuspid leaflets down to and including the apex of the ventricle and the outflow or infundibulum of the right ventricle.

In 1988 Carpentier et al classified the degrees of Ebstein Anomaly into the following types:

**Type A** - the volume of the true right ventricle is adequate

**Type B** - large atrialised component of the right ventricle but the anterior leaflet on the tricuspid valve moves freely.

**Type C** - the anterior leaflet is severely restricted and may cause obstruction to the right ventricular outflow tract.

**Type D** - almost complete atrialisation of the right ventricle leaving only a small infundibular component.

Therefore, Type A is predominantly seen in late presenting adults and Type D predominantly the type presenting in infancy, this being the most severe version of the anomaly.

For those interested in genetics there has been some genetic identification with mutations of the sarcomere gene MYH7. Ebstein’s Anomaly is evenly distributed between males and females and not too surprisingly may occur in identical twins.

Given that there is some anatomical disturbance in the region of the atrio-ventricular node, there is in Ebstein’s Anomaly the substrate for pre-excitation to occur this being usually attributed to apical displacement of the septal tricuspid leaflet and compression of the AV node. Accessory pathways may occur around the tricuspid annulus. Wolff-Parkinson-White pre-excitation is relatively common occurrence and is quoted to occur in up to 25% of patients with Ebstein’s Anomaly. SVT’s of various types, together with atrial fibrillation or flutter are also not uncommon.

For those interested in heart sounds, the first heart sound is usually widely split with a loud tricuspid component (the sail sign) and a “scratching” sound may be audible if the anterior leaflet is flapping. The second sound is often normal unless there is a delay in the second sound due to the presence of right bundle branch block. The murmur of tricuspid regurgitation to varying degrees is common.

The ECG is not specific for the condition but first degree block is common as is right bundle branch block. Q waves are invariably present in the inferior leads and the anterior chest leads V1 to V4. The pre-excitation pattern of WPW as mentioned above may occur even if not symptomatic.

![Diagram](image1.png)  
*Fig. 3. Diagrammaticality illustrating more severe and differing failure of delamination (separation from the myocardium) of both anterior and septal leaflets resulting in offset apically displaced leaflets and more severe tricuspid regurgitation and reduced functional size of the right ventricle.*

Primarily we are interested in the 2-Dimensional Echo images. As far as the tricuspid valve is concerned the apical 4 chamber view is a standard view with leaflet identification of the septal and anterior leaflets not disputed. There are other views of the tricuspid valve where the leaflets are not so readily easily identified. The apical 4 chamber view provides the diagnostic information in respect of Ebstein Anomaly. In this view everyone conversant with normal echo imaging will readily
This is more commonly seen in the mid and distal or “whiplash” movement due to the redundant length of its anterior leaflet. The anterior leaflet is often abnormally long and has a “floppy” mechanism for tricuspid regurgitation in this group. Fail to co-apt with the anterior leaflet, this being the commonest.

The septal leaflet when restricted by tethering often is seen to fail to originate near to the tricuspid annulus but may be tethered or even stuck to the myocardium if there has been no delamination. Tethering of either leaflet can result in leaflets doming or prolapsing in diastole.

Aneurysm dilatation of the right ventricular outflow tract may be seen and is defined as an RVOT diameter of greater than twice the aortic root diameter.

If there is a degree of left ventricular systolic dysfunction in a patient with Ebsteins’ anomaly in the adult presenting group it is usually due to an inherent problem of the left ventricle e.g. ischaemic heart disease, rather than the Ebstein anomaly.

I have discussed the apical 4-chamber view where the septal and anterior leaflets are visualised but not the posterior leaflet (which may be similarly affected), because it is generally from the apical 4-chamber view that the Echo diagnosis and details of tethering are most consistently seen.

So much for the theory, to summarise the practical approach in respect of echocardiography I would suggest the following:

If at first sight on an apical 4-chamber view there seems to be something slightly odd about the tricuspid valve in a patient who has not previously been known to have any cardiac abnormality, look closely for the hinge point, initially of the septal leaflet and if in doubt measure the displacement compared to the septal mitral leaflet. This can be a more difficult measurement than it sounds for, again referring to the milder Ebstein patient seen in the initially presenting, previously undiagnosed adult, the septal leaflet may appear to originate near to the tricuspid annulus (within the normal distance) but may be tethered to the septum, with its free moving edge apically displaced. The septal leaflet, as a moving structure may be totally absent, although this is a commoner feature in the more severe varieties of Ebstein.

The anterior leaflet hinge may also and indeed frequently is apically displaced although not as consistently as the septal leaflet. Tethering, that is where the leaflet tissue has separated from the myocardium but can be seen to have muscular tethering strands to the myocardium restricting its movement can be identified in between 80 and 90% of adult Ebstein patients.

The septal leaflet when restricted by tethering often is seen to fail to co-apt with the anterior leaflet, this being the commonest mechanism for tricuspid regurgitation in this group.

The anterior leaflet is often abnormally long and has a “floppy” or “whiplash” movement due to the redundant length of its tissue. This is more commonly seen in the mid and distal (apical) parts of the anterior leaflet. The basal part, originating from the true tricuspid annulus, may be tethered or even stuck to the myocardium if there has been no delamination. Tethering of either leaflet can result in leaflets doming or prolapsing in diastole.

Surgical correction is difficult. If surgery has to be undertaken it usually is in the younger age patient with the more severe version of Ebstein’s. Late presenting adults usually and hopefully will not require surgery.

Cardiac catheterisation, undertaken in the pre-Echo era, to establish an Ebstein diagnosis was often complicated by the inducement of arrhythmias which could result quite rapidly in a low output state and some were not readily terminated by a cardioversion. Cardiac catheterisation is now rarely undertaken in respect of an Ebstein patient except in the occasional instance when it may be considered that pulmonary hypertension co-exists, this usually being for some other reason, i.e. not directly related to the Ebstein anomaly.
WHO WAS VALSALVA?

WHAT WERE HIS ATTRIBUTES, WHAT IS THE PHYSIOLOGY OF HIS MANOEUVRE AND HOW CAN IT BE APPLIED?

The Papal States were areas in the Italian Peninsula under the direct rule of the Pope from the 8th century until 1870, the territories being described as the Temple Power of the Pope as opposed to his ecclesiastical. Imola, one of the Papal States, was where Antonio Valsalva was born in 1666. He was the third of 8 children born to Pompeo Pini, a goldsmith and head of a well-to-do family who adopted the name Valsalva from a castle in the location of the family home. Valsalva was educated in humanities and mathematics but it was learning natural sciences that encouraged him to develop an interest in animal morphology. Valsalva moved to Bologna to study philosophy and then became a student of the founder of microscopic anatomy Malpighi. After qualifying as a doctor in 1687 he became Inspector of Public Health. In addition to medicine he became a respected teacher and researcher. One of his noted observations was to observe that the serum produced by gangrene was so acrid that after tasting it, its extreme sourness irritated the surface of his tongue for an entire day. In 1705 Valsalva was appointed lecturer in anatomy, later to become Professor, a post in which he continued for the rest of his life. Valsalva became known for his scientific integrity, typified when he was requested to give a considered opinion on colleagues' work, explaining that this would take some time. The response was that this would delay publication but Valsalva is then quoted to have replied "that's how I am, I love Morgagni (the author), but I love the truth more."

Valsalva described even the smallest muscle and nerves in the ear, describing the internal, middle and external parts of the ear including the Eustachian tube and described a method of inflating the middle ear utilising the Eustachian tube, nowadays this being termed the Valsalva manoeuvre. Another original detection he described was that when an individual suffered apoplexy (a stroke) that affected for example the left side of the body the source could be identified on the opposite side of the brain, in this case the right side. Similarly a stroke affecting the right side would be caused by injury to the left cerebral hemisphere.

Valsalva married late, at the age of 43 to the 17 year old daughter of a nobleman. Of their 6 children 3 died in infancy. When aged 55 Valsalva suffered a temporary dyslalia, this being a symptom of the fatal apoplexy that occurred to limit 2 years later.

As a Surgeon Valsalva described the importance of nephrectomy and his recognition and treatment of aneurysms. Current cardiological practice still uses the name "Sinus of Valsalva Aneurysm".

Finally, Valsalva described madness to be an organic disease. Aspects of medicine attributed to Valsalva are:

1) Valsalva's ligaments (3 ligaments that attach the ear to the side of the head)
2) Valsalva's manoeuvre (to be discussed below)
3) Valsalva's muscle (the tragicus muscle – a band of vertical muscle in the ear)
4) Valsalva's dysphagia (normally swallowing occurs without conscious effort but some individuals suffer from disorganised swallowing but can swallow by making a conscious effort. In the words of Valsalva “now swallow hard.”)
5) Valsalva's antrum (an area of small air spaces in a portion of the temporal skull bone related to the middle ear).
6) Sinuses of Valsalva (aortic root sinuses)
7) Aneurysms of the Sinuses of Valsalva

From the perspective of echocardiography the relevant eponyms are:

The right and left coronary arteries originate from the bulges at the root of the ascending aorta just above the aortic valve. Valsalva published in 1740 the first anatomical account of the aortic sinuses. He had observed similar sinuses in birds and mammals and concluded they must be there to serve a purpose. He postulated that their function was to dissipate the violence of systemic contraction by allowing blood to enter the sinuses during systole whereby the sinuses expanded. He astutely recognised that the sinuses being thin-walled and expansive would expand in systole and then aid coronary artery filling during diastole. Being thin walled, these aortic sinuses are vulnerable to excessive dilatation over time and can become aneurysmal. Again, Valsalva described this occurrence hence its eponym of “Sinus of Valsalva aneurysm”. This has significant relevance to current Echocardiography with Echo being, in clinical practice, almost always the first imaging modality to detect such an aneurysm. Of interest, when an aneurysm does occur it is invariably of the right sinus (in 65-85% of cases) or the non-coronary sinus (10-30%) rather than affecting the left sinus (less than 5%).

(b) The Valsalva Manoeuvre.

When an individual consciously forcibly tries to undertake an expiration but the glottis is closed, the thoracic muscles and rib cage cause a significant increase in intra-thoracic pressure. The consequence of inducing a very positive intra-thoracic pressure is compression of the intra-thoracic blood vessels, arterial and venous plus compression of the cardiac chambers, particularly the atria. Venous compression reduces venous return and filling to the right heart and hence cardiac output, whilst arterial compression increases peripheral resistance and hence transiently an increase in blood pressure. This is referred to as phase 1 of the manoeuvre and is illustrated in Fig 1.

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With a reduction in cardiac output the blood pressure soon falls (phase 2 or strain phase). In an attempt to maintain cardiac output the heart rate increases, thereby attempting to stabilise the fall in blood pressure.

When the individual then opens the glottis and recommences respiration, again the arterial pressure briefly decreases as the external compression on the aorta is removed (phase 3). As the cardiac output then returns, due to cessation of reduced venous return, the blood pressure rises above the pre-procedural level due to the combination of increased cardiac output output still in the presence of an increased arterial resistance and general sympathetically mediated increase in total peripheral resistance which had been induced as a response to the immediately preceding fall in blood pressure. The blood pressure falls approximately 5-7 secs after the onset of the Valsalva strain. This late increase in blood pressure is termed the over-shoot blood pressure and is phase 4 of the manoeuvre. All then returns to normal. The phases and blood pressure response are illustrated Fig 1. For an effective Valsalva manoeuvre the individual should persist with the strain for 15-25 secs before releasing the strain.

Although we may think of the Valsalva manoeuvre as a specific event occasionally undertaken, it is in reality undertaken by all of us on a daily basis. Typical examples are when lifting heavy objects whilst breath holding, straining when constipated or less frequently during parturition, although occurring daily with coughing and sneezing or again less frequently if being a member of a brass band.

What are the clinical or diagnostic applications of undertaking a Valsalva manoeuvre? The initial observations of Valsalva when undertaking the manoeuvre were described as an aid to inflating the Eustachian tube. However, it has subsequently been recognised that
the manoeuvre has many other applications.

(i) Autonomic nervous system function
From the basic description of the events which occur during the manoeuvre, the changes in heart rate and blood pressure provide an assessment of sympathetic, vagal and baroreceptor function.

(ii) Assessment of Left Heart Failure – is the ejection fraction less than 40%?
A simple clinical test now almost forgotten by clinicians was used for years to identify systolic failure of the left ventricle, in the days before the term Ejection Fraction and its percentage values came into clinical practice. Echocardiography has surpassed this bedside test. For those interested it is undertaken as follows:

You need a proper “sphygmomanometer”. With the sad removal of the mercury sphyg, an aneroid one is the only alternative. Digital sphygs. are of no use for the purpose of this test.

With the patient supine and relaxed, take at least two BP readings to ensure stability and consistency of the systolic value. The BP cuff placed over the upper arm and auscultating over the brachial artery, as the inflated cuff is decreased the pulsating sounds heard are termed the Korotkoff sounds after the Russian physician who described them.

Then re inflate the cuff to 10-15 mm above the previously recorded systolic pressure. No sound will be audible.

Instruct the patient to commence the Valsalva manoeuvre and simultaneously continue to listen over the brachial artery. During phase 1 of the manoeuvre the BP will rise and the pulsating sounds become briefly audible reflecting the increased level of systolic blood pressure.

No sounds are heard during the strain phase of the procedure or the transient dip of blood pressure in phase 3 but during phase 4 there is normally an over-shoot of blood pressure when the pulsating sounds again become audible, the blood pressure having risen above the held inflated cuff, this being depicted in Fig2. This is the expected normal finding in the presence of a well-functioning left ventricle which is capable of responding by generating an increase in systolic blood pressure.

In a patient with impaired left ventricular function which is incapable of generating an increase in cardiac output in response to release of the Valsalva manoeuvre the overshoot blood pressure response does not occur and hence there will be no audible pulse sounds over the brachial artery during phase 4.

Correlation studies with Echo indicate that if the ejection fraction is less than 40%, no phase 4 sounds are generated.

A quick and simple bedside technique!

c) Evaluation of Heart Murmurs
Echocardiography has again replaced the clinical expertise in murmur evaluation such that the generation of physicians brought up with auscultatory skills is rapidly disappearing. The ease of ticking a request card for an Echo is understandable, it is quicker and less demanding for the physician and undoubtedly more accurate but has removed the sense of satisfaction of accurate clinical interpretative skills.

Two types of murmur are influenced by a Valsalva manoeuvre.

A left ventricular ejection murmur, if it intensifies during the Valsalva, it reflects dynamic left ventricular outflow tract obstruction (rather than valvular), in other words very probably a hypertrophic obstructive cardiomyopathy. Palpation and recognition of a double apex beat (a palpable A wave preceding the systolic LV beat) and an early cut-off of the carotid pulse complete the triad of physical signs for the clinical recognition of a hypertrophic obstructive type of cardiomyopathy.

The second clinical circumstance is when mitral valve prolapse is suspected on auscultation. Undertaking a Valsalva manoeuvre, if it is prolapse, brings forward in systole the onset of the murmur and the click if one is present.

(d) Terminating an SVT
As described during phase 1 of the Valsalva manoeuvre, the heart rate slows due to an increase in vagal, parasympathetic tone, a baroreceptor reflex. The vagus nerves parasympathetic motor fibres feed to the SA node and directly to the myocardiun, releasing acetylcholine which in turn can slow the electrical impulses both of the sinu node and the AV node, resulting in a slowing of the heart rate. On release of the Valsalva the slowed heart rate may break the reciprocating transmission of a supraventricular tachycardia.

(e) Identifying the presence of a PFO
A “bubble study” request to an Echo Dept. is almost always undertaken using a Valsalva manoeuvre. Bubble contrast when injected peripherally will enter the right heart, the amount of bubble contrast visualised within the right atrium depending on the timing of the injection of bubbles to the timing of the onset of the Valsalva manoeuvre. During the strain of the second phase of the manoeuvre the atrial pressures are approximately balanced due to the increased intra-thoracic pressure compressing the vena cavae in the right heart but balanced by the increased left ventricular afterload from aortic compression, hence the atrial pressures are approximately equal. On release of the Valsalva strain, venous and right heart compression is rapidly released at a time when the left heart has been under-filled for several beats due to previous reduced filling from reduced right heart and pulmonary flow. This sudden increase in right atrial filling results in its pressure transiently exceeding the left atrial pressure permitting right atrial flow including the bubbles to enter the left atrium if a PFO is present. The optimal time for imaging then is at the time of release of the Valsalva.

A Valsalva manoeuvre can be augmented by putting the patient’s head down or raising the legs just prior to release of the strain phase, these positional changes increasing the venous return. This may potentially explain defaecation syncope, not an uncommon occurrence.

Much is therefore owed to Valsalva for his clinical astuteness in those early days. He is one of the few whose name is still used on a daily basis within the practice of modern medicine, particularly cardiology.

Gordon Williams
Editor

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THE BSE NEWSLETTER AND ECHO
MUSINGS OF THE LAST QUARTER OF A CENTURY

What was originally conceived as and unofficially briefly called “The Echo Club”, rapidly metamorphosed and became a fledgling society in 1991. At an early meeting later that year in Glasgow before it was named the BSE, the “few” reasonably considered that dissemination of “what was going on” in terms of developing what we considered at the time would be some form of Echo Users Society would help to embody and embrace those that were already aware of it and encourage a wider membership to join. I volunteered to write such brief news as we had which was mainly in respect of planning forthcoming meetings. It was typed on two sides of an A4 sheet of paper and posted. The Society’s activities grew remarkably quickly. We commenced penniless and were indebted and extremely grateful to Hewlett Packard Ltd who at the time were producing Echo machines as they allowed the few founder members’ use of one of their London offices for meetings to organise and develop the Society’s activities.

Fig. 1. The front page header of an early BSE Newsletter

Fig. 2. An advertisement detailing the BSE having space allocated at a British Cardiac Society meeting. It is of interest to note the two subjects which were considered debatable issues in the practice of echocardiography at that time.
On the basis that we were determined that this Echo User’s Group would not be a temporary affair which would fizzle out, one of our early tasks was to establish an appropriate title. A number of suggestions were made but the one which received the majority support was the British Society of Echocardiography, naturally abbreviated to “BSE”. Our initial promotion of a Society termed “BSE” met with some derision from a number of individuals, for at that time the same abbreviations, that is “BSE”, was in common usage for Bovine Spongiform Encephalitis, otherwise more commonly known as “Mad Cow Disease”. This dreadful and fatal condition was afflicting many individuals in the UK at the time, hence the disapproval of some for using the abbreviation “BSE”. However we felt we could ride that out and pressed on regardless.

The BSE was soon developing protocols for accreditation in addition to meetings and receiving some advertisements to be circulated so there was a need for an enlarged newsletter. The late Graham Leech took up this challenge as he was computer literate and had an early software edition of Publisher. Graham changed the single sheet newsletter to an 8 page stapled production. The header part of the front page of an early edition is reproduced in Fig. 1. Note the original BSE symbol and also we could only afford a one colour production - black.

The BSE became an affiliated subgroup of the British Cardiac Society. The Cardiac Society allowed us some office space at their offices at 9 Fitzroy Square, London and we were allocated space on the programme of the British Cardiac Society (as it was then termed) annual meetings. I have reproduced in Fig. 2. an example of our participation at one of their meetings.

3.7 MEMBERSHIP - CAROLINE WESTGATE:
Membership has fallen over the last year with people not renewing their subscriptions. Caroline has asked if anyone has any ideas as to why people were not renewing membership to please let the Council know so that something could be done about it. Some members had been sent several reminders but had still not paid. Caroline also asked members to “spread the word” about the BSE and try to attract as many new members as possible.

Fig. 3. Extract from the AGM minutes of 1993 documenting falling membership

Congratulations!
To Dr Antoinette Kenny, formerly SR at Papworth, who has been appointed consultant Cardiologist at Freeman Hospital, Newcastle. Many of you will remember the presentation on Mitral Valve repair surgery that Antoinette made at the BSE session at Wembley last year.

Also to three more Senior Registrars who have been appointed as Consultant: Dr Christopher Jones, (University Hospital of Wales) to Princess of Wales Hospital, Bridgend; Dr Maurice Pye (St George’s, London) to York District Hospital; and Dr Simon Witerton (London Chest) to Dorchester.

And to Morag Cunningham, formerly Chief Technician at the Brompton Hospital, and now at Glasgow Royal Infirmary, has had a second child, a baby boy called Andrew.

Fig. 4. The early BSE newsletters incorporated members’ personal details!

Fig. 5. The header of the front page of the new style newsletter which commenced with issue 12 in 1995 embodying the new emblem of the BSE
Whilst generally the membership of the BSE grew year on year that was not always the case and I reproduce top left an extract of the minutes of our Annual General Meeting held on the 18 May 1993. Fig. 3.

Caroline Westgate was at the time Membership Secretary with the secretarial work of the BSE being undertaken on a part-time basis initially by Beverley Charters and then Denise Hughes. The Society was still essentially penniless and we were grateful that Hewlett Packard donated us a laser printer to help improve communications.

By mid-1994 the BSE was proud to have reached a membership total of 750 which made the BSE the largest affiliated group of the British Cardiac Society. The newsletter however was all embracing at that time including printing individuals’ personal data an example of which is illustrated in Fig. 4.

The BSE newsletter increased in content, principally related to BSE activity, although there were no readable educational articles at that time. The style of the newsletter changed with edition 12 in January 1995 the change being principally the adoption of a new BSE symbol. An example of the new front page header now being as illustrated in Fig. 5.

The newsletter had now grown varying between 6 and 12 pages, still produced by Graham Leech, but in conjunction with a printer with whom he was acquainted although we could still only run to black on white and no colour.

The BSE had programme time allocated at the British Cardiac Society annual meetings but in addition the BSE’s own autumn annual meeting had now become well established being held in hotels in different parts of the UK. Although a meeting held in Brighton on the 25/26 November 1994 was generally considered very successful there were some that were not happy. Two newsletter extracts following that meeting are reproduced in Fig. 6.

Fig. 6a. 

‘Dear Editor: I write to complain about the choice of Brighton as the venue for the Autumn meeting of the BSE. Would it not be better to pick somewhere that is easy for more people to get to? Birmingham was central to England, Harrogate was central to Great Britain, but Brighton is central only to those people who live on the Sussex coast. Coming after the Spring meeting with the BCS in Torquay, the choice of Brighton is ridiculous.

Most BSE members are technicians, and technicians these days often have difficulty getting approval to go to conferences, because of their high hotel and travel costs. It does not help that the registration cost of this meeting has doubled since last year.

Remember that Great Britain extends from the South of England to the North of Scotland. This fact should be borne in mind when possible future venues for BSE meetings are being considered’

SOCIAL EVENING

The ‘50’s and 60’s social evening at Brighton was sold out well in advance and those of us who got tickets had a wonderful time. There was a live Rock ‘n Roll band, plus a disco, a demonstration of Jive dancing, with hot buffet meal and plenty to wash it down with. In the spirit of the occasion, our numbers included a number of (ageing) Teddy Boys, ‘birds’ in chiffon skirts and Bobby Sox; a very cool Marlon Brando, and an amazing Hippie apparition from Bracknell, Berks!

Somhow, Jethro, the Cornish Yokel who gatecrashed the Harrogate meeting and regaled us with bawdy repartee, turned up again, this time resplendent in a sort of Country Squire outfit and relating some rather unpleasant stories about certain eminent members of the Society!

It was a lot of fun for some of us to bring back memories and the realisation next morning that we are not as young as we were, and for those who can’t actually remember the 60’s, a view of the time when Buddy Holly, Elvis, Bill Haley and the Comets ushered in one of the greatest modern pop music cults of all time.

Fig. 6b. 

Two extracts from the newsletter of January 1995 relating to the November 1994 BSE annual meeting in Torquay. Fig 6a from a disgruntled member and 6b an extract describing the social event.
That Brighton meeting embraced the social event as a main feature of the annual BSE meetings which was appreciated by the majority at annual meetings for many years but has faded recently.

A further change in the presentation style of the newsletter occurred in 1997, the main difference being we could now afford two colours, that is black and green. Fig. 7. is a reproduction of the front page of the new style. Reading the front page the problem of excess demand compared to available resource had become almost unmanageable, even then. The text could have been written for a current edition!

Fig. 7. Front page of a new style newsletter which appeared in 1997.
2002 ushered in Petros Nihoyannopoulos as the fifth BSE President. Petros commenced his presidency with making appointments respectfully asking Council members to take on new responsibilities. As part of this shake-up, Graham Leech was to develop a new membership database in exchange for relinquishing having to produce the newsletter. I was asked if I would return to being the Newsletter editor/producer. Having taken on the production of the Newsletter again I continued with the same format that had been established by Graham Leech, that is similar to the style depicted in Fig. 7. but considered that in addition to containing information on the various activities of the BSE the newsletter should contain some interesting, easily read and hopefully educational articles. My intention was that such articles should, whenever possible, be reflective of the practice of undertaking echocardiography and in so doing contain practical hints or tips and not be similar to the factual content of the chapters in various standard echocardiographic text books. The simple logic of that being that for standard information most Echocardiographers would already have access to standard reference text books. It was rather the information that was generally not contained in books or heard in formal lecture presentations which would be of practical value to the readers of the Newsletter.

A number of relatively small articles began to appear. A typical one related to the problems which may be encountered with the use of Midazolam when sedating to undertake a TOE, this being reproduced in Fig. 8.

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**SEDATION WITHOUT COMPLICATION?**

Reviewing the recent Journals revealed the usual scientific papers, which may or may not ultimately metamorphose into practical reality. One short review I read with interest and certainly has practical relevance. Wenzel *et al.* in the October 2002 edition of the Journal of the American Society of Echocardiography (Vol. XV, No. 10, Part II, page 1297) described the central nervous system side effects of Midazolam in a series of 104 consecutive patients with 6 adverse responses, i.e. 6%.

Midazolam is the commonest intravenous sedation for TOE studies and in their series the dose given was relatively small, averaging 5 mg.

Briefly summarised, the reported cases were:

i) A 75 year old who became extremely aggressive requiring 4 people to restrain him. He settled with intravenous flumazenil.

ii) A 67 year old lady who after 3 mg of Midazolam started singing the 'Hallelujah Chorus' from Handel's 'Messiah'. This continued during the whole of the TOE investigation, which was completed!

iii) A 20 year old who at the end of the TOE investigation unceasingly burst into tears and only stopped after i.v. Flumazenil, when the patient abruptly stopped crying and commenced laughing.

iv) Both developed intense hiccups following

v) Midazolam. (They provide an illustration of the inter-atrial septal movement during hiccups).

vi) A 52 year old who developed extremely unpleasant experiences of a psychotic reaction after Midazolam.

The authors discuss the central nervous effects of Midazolam and remind us to inform patients that they should not drive for 12 hours after receiving the drug.

For the critical among you, I didn't misspell hiccoughs, presumably the above is American or even Esperanto!

*Gordon Williams*

**P.S.** I can add another example: When we first started doing TOE's around 1988, the then young and dashing SpR Dr Mark deBelder received a proposal of marriage from rather plump Jamaican lady in her 60's whom he had sedated with a few milligrams of Midazolam!

*Graham Leech*

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*Fig. 8. An early short “article” in the newsletter of January 2003.*
An article which appeared in the July 2003 edition was termed “No Smoke without fire”. Although it was written a long time ago its contents are still relevant today.

NO SMOKE WITHOUT FIRE

In the mid-1980’s after attending a meeting in the USA where I was able to see for the first time Transoesophageal Echo being used, I came back to Leeds and announced we were going to acquire an echo transducer to put down patients’ throats. In those days precordial transducers were large and heavy as many were mechanically driven devices with the motor contained within the transducer such that their weight could easily do serious damage if used as an offensive weapon or even just slipped out of a greasy hand. My swallowing suggestion was met with a deluge of ridicule (until I explained in more detail). We then acquired in Leeds the first Transoesophageal probe in the UK only to realise there were no books or training videos on how to use it, we just had to find our own way, particularly in respect of interpretation of the images. These were monoplane probes which required considerable manipulation to obtain all the required images, a task made much easier when biplane followed by multi-plane probes were later developed.

The initial amazing observation was just how stunning the images were compared to the precordial imagery of the day. So impressed were we that when the first mitral stenotic patient was studied and we saw for the first time that “swirly” stuff in the left atrium we interpreted it as actually seeing red blood cells! Rational debate concluded that the resolution couldn’t be that good. Our American colleagues had already given such images the title of “Spontaneous Contrast” or “Smoke”. There was much international debate into what actually “spontaneous contrast” was in the context of the causation of the signal. It certainly is spontaneous in that it is visible without provocation and it does generate a degree of image contrast, but what is its derivation? Such “smoke” is known to occur in situations where blood is moving slowly and much had already been written and debated in respect of there being an increased association with blood clotting, thrombosis or embolism when “smoke” exists. The intrigue into the causation of the “smoke” signal prompted basic research and it is interesting to read the paper of Reeder et al (JASE, Vol vii, 2, 1994). They pointed out that the requirements for the “smoke” signal are low flow rates, the presence of red blood cells and plasma proteins. Their study included examining the micro-anatomic features of red cells exhibiting “spontaneous contrast” using scanning electron microscopy. They devised a model for creating the contrast signal using human blood, a beaker and a stirring bar. The blood elements were sampled at times of high and low spontaneous echogenicity and studied by the electron microscope. Spontaneous contrast was maximal at complete stasis or low flow rates and could be abolished by the agitation of blood with continuous stirring. During low flow states and high echogenicity, “clumping” of red cells could be seen but no evidence of platelet aggravation or adherence of fibrin strands nor of platelets to red cells. No morphologic features of activation of the coagulation system were therefore seen. They concluded that spontaneous contrast is caused by reversible red cell clumping and that it is independent of the activation of the clotting system, at least in the short term. This explains why the “smoke” is reversible depending on the flow rates. It also explains that whilst we cannot see single red cells, “clumps” of red cells are visible as echo reflector signals (so we weren’t so far out thinking we were visualising red cells!). “Smoke” then is a marker of low flow states and indeed clinically we do see it in such situations, e.g. at the apex of severely impaired left ventricles, or in aneurysms, etc. Smoke present in a patient with severe mitral stenosis may disappear following mitral valve replacement and subsequent increased flow rates.

We cannot ignore the clinically observed propensity of thrombotic risk but presumably that is a consequence of long-term low flow and red cell adherence. The clinical conclusion, then, is that where there is “smoke”, it is significant and complications may result.

Gordon Williams
With the regular appearance of articles in addition to the BSE administrative content the Newsletter gradually increased to 16 pages for the majority of editions continuing in this format and style until 2004.

I had considered for some time that with the regular production of educational or interesting clinical content the Newsletter could be the basis of development into a larger more substantial full colour Echocardiography Members Journal rather than just being a Newsletter. I debated this concept for some time but did not share it with Council members of the BSE principally as I was of the view that in doing so would precipitate lengthy
debate with conflicting opinions and the creation of a journal for BSE members would perhaps never happen. I didn’t intend any disrespect to Council members of 2004 but given that everything undertaken for the BSE by all Council members was done by giving up their own personal time I felt the most expeditious approach was just to get on with it.

Choosing an appropriate title wasn’t too difficult, it just needed to be short. I decided upon “ECHO” but underneath in smaller text made reference to it being “The Journal of the British Society of Echocardiography” and under that “incorporating the BSE NEWSLETTER”. The British Society of Echocardiography emblem acknowledging affiliation to the British Cardiac Society was at the top with the Issue Number and Date. Thicker front and back cover pages with improved quality paper for the inside pages, full colour printing and enlarged content to 28 pages completed the changes for the first edition of ECHO. The issue numbering continued from those of the previous Newsletters hence the first edition of ECHO was Issue number 48 appearing in May 2004 the front page of which is reproduced as figure 10.

When the first edition of ECHO was circulated it was met not too surprisingly with divergent opinions. Some considered it was a major advance and was welcomed, although others considered it would become too expensive, there would not be enough content for it to continue and that it would die and revert back to being a newsletter.

Within the first edition of ECHO I wrote a short explanatory text explaining that ECHO was intended to be a clinical rather than a scientific journal. I made reference to the abundance of journals already printing research work and I did not see ECHO entering into that field. Rather it was intended to be a members’ journal. However, audit projects which generally are clinically based are often not published but could well be suited to appear in ECHO.

The production of ECHO is rather more complex than it might at first sight appear.

Essentially, everything printed has to fit the page. Preferably articles should commence at the top of a page and finish at the bottom right hand column. If the text is a little too short it isn’t acceptable to leave a blank area on a page. The font size must remain constant and the same for all articles so just increasing the font size, that is stretching or enlarging the print to fill a gap doesn’t work. The editor has to write some more text to someone else’s article or précis it if the article spills over a few lines onto a new page. The same goes, but to a lesser degree of accuracy, allowing some font variation for advertising and minutes of meetings, examination pass lists etc. so that all pages are appropriately completely filled. Organising the order of the contents is the next step. This “production” work is undertaken by the Editor working with the graphic designer invariably sitting together on a one to one basis. Proof reading and corrections then follow before an edition can be “signed off” for printing.

For each edition of ECHO you receive, many hours have gone into the writing of articles and production issues described above.

In the early editions of ECHO we did not have case reports but gradually and progressively they appeared. A short review of echocardiography related articles in current journals was a regular feature as an aid to help readers keep up to date.

Articles were, and still are, very slow to be submitted although ECHO has continued and I believe is appreciated by the membership of the BSE. For quite some time each edition of ECHO has comprised 40 pages. Indeed, it is the firmly held view of the current President and the Council of the BSE that ECHO is a valuable integral part of the BSE and I am sure it’s true to say that the BSE membership wish prosperity and longevity to the continuation of “ECHO”.

Gordon Williams
Founder, Producer and Editor of ECHO.
PHYSIOLOGIST LED PAEDIATRIC ECHOCARDIOGRAPHY CLINICS

Background

The role of the cardiac physiologist within healthcare is constantly evolving. This has led to an increase in Cardiac Physiologist led services being developed. We have developed and implemented some of these services in York Hospital, one of which is the physiologist led Paediatric Echocardiography clinic.

Congenital heart disease is the most common birth defect with an incidence of approximately 8/1000 live births in the UK. The 2016 Congenital Heart Disease Standards and Service Specifications is a collection of documents setting out adult and paediatric standards and service specifications for congenital heart disease services in England.

Standard 6 describes service specification for paediatric cardiac services and has 3 levels:

- **Level 1**: Specialist Children’s or ACHD Surgical Centres
- **Level 2**: Specialist Children’s or ACHD Centre Centres (non-surgical)
- **Level 3**: Local Children’s or ACHD (DGH)

At York we run as a Level 3 Local Children’s Cardiology Centre. Our role is to try and ensure children receive as much of their non-interventional treatment as close to their home as is safe. The service is supported by both the Yorkshire Paediatric Congenital Network and a local Consultant Paediatrician with Expertise in Cardiology (CPEC).

When setting up a service there are several readily available models or frameworks for a hospital to choose or adapt. The approach we have adopted in York is a physiologist led paediatric echocardiography clinic with support from the CPEC and the Level 1 tertiary centre, (Leeds General Infirmary).

Prior to starting my current post in York I had over 20 years’ experience working in the Leeds tertiary paediatric echocardiography department and have previously held Paediatric TTE accreditation. During my time in Leeds I performed unsupervised scanning and reporting of patients of all ages with complex congenital heart disease.

When I joined York in 2000 we set up both an inpatient and outpatient paediatric echocardiography service, accepting referrals from the local paediatricians (not general practitioners). Although no formal referral criteria were specified, I routinely triaged all the requests we received. As part of the service I also attend and scan patients in the monthly paediatric outreach clinic which is led by a Consultant Paediatric Cardiologist from Leeds. Our inpatient workload has not increased and inpatient cases are requested and scanned on an ad hoc basis.

The benefits of our service are twofold; firstly the patients are seen quickly (the average waiting time for a routine paediatric echocardiogram is 2 weeks). This allows for prompt identification of pathology but in most cases provides the parents with much needed reassurance in the presence of normal findings. Secondly it acts as a form of triage so that only patients with significant cardiac pathology are seen in the paediatric cardiology outreach clinic.

Review of service

We perform 1 dedicated paediatric outpatient echo list per week and in-patients are seen on an ad hoc basis. Patients referred into the service range from premature babies to patients 16 years of age. As a result we use a number of different imaging transducers which cover the frequency ranges needed (12 – 3 MHz) to get the best possible images for each individual patient. We work to a dataset which we have adapted to provide a simplified version of the one used in our adult clinics. The echo report is also simplified and does not include many measurements unless pertinent to the clinical question. At the end of the examination I give the patient and parents the results; if the echo is normal and they have been referred with a murmur I give them an information sheet on innocent murmurs. When I find pathology I use the information sheets on that relevant pathology provided by the tertiary centre. Very occasionally I will find significant pathology and on those rare occasions I will speak directly to the tertiary centre and arrange admission or urgent review if necessary. We have the capability to send echo images to the tertiary centre for review. Not all patients with pathology are referred to the cardiology outreach clinic, for example if I find a small atrial shunt in a neonate or a very small apical VSD I will suggest a rescan in 12 months to reassess. Very occasionally I will find pathology I use the information sheets on that relevant pathology provided by the tertiary centre. Very occasionally I will find significant pathology and on those rare occasions I will speak directly to the tertiary centre and arrange admission or urgent review if necessary. We have the capability to send echo images to the tertiary centre for review. Not all patients with pathology are referred to the cardiology outreach clinic, for instance if I find a small atrial shunt in a neonate or a very small apical VSD I will suggest a rescan in 12 months to reassess. The physiologist lead paediatric echocardiography service has been established for 16 years, with the number of referrals continuing to rise year upon year. The number of inpatients referred has remained fairly consistent (around 35 per year) and in comparison to the outpatients the majority of inpatients scans are abnormal.

In addition to the weekly outpatient list I also attend the monthly paediatric cardiology outreach clinic. This is a multidisciplinary clinic led by a Paediatric Cardiologist from the Tertiary Centre, with support from a specialist nurse, the local paediatrician with an interest (CPEC) and myself. During the clinic I scan the patients and have an opportunity to discuss cases seen in the physiologist led echo service. I use this clinic to maintain my skills in scanning patients with complex congenital heart disease.

Number of patients referred to service

As the clinic became established the referrals through to the service have continued to grow year upon year.

![Number of Outpatient Referrals to the Physiologist Led Paediatric Echocardiography Clinic](image-url)
Of note, the number of patients seen in the cardiology outreach clinic has not been affected significantly by the physiologist led service (250 patients seen in 2000 and 260 in 2016).

Although the outreach numbers suggest little change, the physiologist led service has ensured that only patients with significant pathology that need follow up and seen in these clinics.

As discussed previously the patients referred to clinic tend to span a wide range of ages. The majority of patients seen in the clinic are aged 1 year or less (43%) and in general we tend do see fewer older patients referred to the clinic.

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Results of Outpatient Studies 2016 (inpatients not included)

214 patients were referred for echocardiography in 2016 with a range of clinical indications. The most common being heart murmur.

From the referrals received to the service we only found pathology in the patients who were referred with a heart murmur. 80% of the patients referred through to the service had normal echocardiograms. This helped to provide the parents with much needed reassurance. The patients did not need to attend the cardiology outreach clinic, and so freeing up clinic appointments for the patients with significant pathology.

Only 13 patients (6%) seen in 2016 were referred on to the cardiology outreach clinic and the other 201(94%) were managed locally by the referring paediatrician (interestingly we only found a congenital defect when the patient has been referred with a murmur).

Advice for centres looking to set up paediatric Level 3 services.

As it is recommended that physiologists are involved in the level 3 congenital standards you may be considering developing your own paediatric cardiac investigations.

As far as echocardiography is concerned the vast majority of children we see are normal, but this can be the most difficult part of this work. It is much easier when you find a significant abnormality as the patient is then followed up by the paediatric cardiologists.

What is much more difficult is to diagnose and report normality confidently as by doing this you ensure the child will not be seen again unnecessarily. Below are some tips I have compiled through my experiences so far.

**Useful Tips**

1. It is common to see slight flow acceleration in neonate but by increasing the colour Doppler scale it is easier to recognise normal and abnormal flow
2. Similar to adult echocardiography you will see good and suboptimal imaging subjects. In difficult cases role the patient on to the left to improve image quality.
3. Trivial pulmonary regurgitation is a normal finding
4. Ensure when excluding a PDA you scan from both the parasternal short axis and again from the arch to confidently include/exclude pathology
5. If accepting referrals for a family history of congenital heart disease ensure you only accept 1st degree relatives (otherwise you may be swamped). In the tertiary centre they only accept 1st degree relatives and those with a murmur.
6. When scanning uncooperative children it is important to get the most important information at the beginning of the study
7. Create links with the paediatric cardiologists and sonographers in the paediatric cardiology centre

Summary

Echocardiography in children is a challenging but rewarding aspect to the role of a cardiac physiologist. A physiologist led service provides a timely investigation and in most cases provides early reassurance and reduces the number going through the outreach clinic. Data shows there is a role for this physiologist led service as the numbers are increasing whilst the outreach clinic remains stable.

Like any service there is a need for quality control, audit and governance with support from the local CPEC and the tertiary centre including a paediatric cardiologist.

Jane Allen, Chris Attwood
York NHS Teaching Hospitals Trust
PHYSIOLOGIST LED TOE SERVICE

The role of Cardiac Physiologists and Healthcare scientists has expanded over recent years. Within the Echo world, there are a number of Trusts who offer a range of Physiologist-lead services, including Transoesophageal Echo (TOE), stress echo and valve clinics. The provision of these services and the ways in which they have developed differ greatly around the country. Role development has proved more challenging in some Trusts than others, and it is helpful to be aware of some of the ways in which these challenges have been overcome. Some Trusts will support Physiologists to become competent in techniques such as cannulating and administering contrast agents, whilst in other Trusts this has not yet been sanctioned. The advent of State Registration may help to clarify this.

In my own institution, we offer a TOE service by Physiologists in the Catheter Laboratory as part of the Structural Heart Disease programme. The Trust provides Transcatheter Aortic Valve implantation (TAVI), PFO/ASD/paravalvular leak closures via device, Mitraclips and Left Atrial Appendage closures. The interventional team work closely with the Imaging Consultants and the Echo department, and as the programme has expanded the need for good quality TOE support has meant that the imaging Cardiologists cannot cover all the sessions. Appropriate training and support has allowed experienced Echo Physiologists to fill this gap. Since the majority of the procedures are performed under General Anaesthetic, intubation and administration of medication is undertaken by the Anaesthetist, allowing the Physiologist to concentrate on obtaining the images and communicating findings to the Interventionalist.

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Formal training for Physiologists in TOE in our Trust consists of working towards BSE Accreditation, together with a departmental logbook of procedures within the Cath lab (TAVI, PFO closures etc). All those undertaking training are already BSE TTE Accredited, working at Band 7 or above, with plenty of experience in supporting the Cardiologist-led TOE lists. This means that we already have experience in interpretation of the images. Physiologists spend their early training in the Cardiothoracic Theatre under the supervision of Cardiac Anaesthetists to become competent and safe in handling the probe. The Heartworks Simulator is a very useful training tool - this gives a 3D computer display of a heart with the imaging plane shown. This allows an accelerated learning-curve in obtaining the correct images, particularly demonstrating when the left ventricle has been foreshortened. Once the Physiologist understands the images required and the manipulation of the probe, they will obtain the images in sedated patients under the direction of the Cardiologists and spend time in the Cath Lab working with more experienced Physiologists. We now have 3 BSE TOE Accredited Physiologists, with another in training, and this allows us to routinely support the TAVI lists, freeing up the Cardiologists for other duties. The TOE not only helps in sizing, positioning and evaluating the implant, it can be invaluable when complications occur – thrombus, pericardial effusion, impaired LV function etc can all be quickly and effectively assessed.

When considering role expansion, it is essential to have the support of Managers and Cardiologists. Consider exactly what you want to provide and what suits your particular set up and Trust Policy. The number of Physiologists undertaking TOE Accreditation has increased in the last few years and many also undertake formal training in intubation and administration of relevant medication prescribed in advance by Medical staff. Where this is not yet accepted, as in our centre, Physiologists can perform TOEs in the Catheter lab. and elsewhere in partnership with Medical staff. This partnership can be particularly useful when ad-hoc TOEs are needed – these can be performed by Registrars training in Echo in conjunction with an Accredited Physiologist, supporting training and ensuring that ad-hoc TOEs can be performed in a timely, comprehensive manner. This has allowed expansion of the role of the Physiologist, the provision of a good quality TOE service subject to the same Quality Assurance standards as our TTE service and a strengthening of the links between Cardiologists, Physiologists and Anaesthetists, all within the constraints of Trust Policy and Clinical Governance.

Jane Lynch
University Hospital of South Manchester NHS Foundation Trust
2016 BSE NATIONAL ECHOCARDIOGRAPHY SURVEY

The results are now in for the 2016 National Echocardiography Survey, which was carried out on behalf of the British Society of Echocardiography by the Picker Institute. Accurate intelligence is vital to the many roles the BSE has lobbying on behalf of UK echocardiography. The purpose of our survey was simply to collect information about the echocardiography workforce and activity throughout the United Kingdom as, until now, surprisingly little accurate information has been available. Our aim is to produce annual, reliable reports that demonstrate the demand for echocardiography, the availability of echocardiographers, the opportunities for training, and the demographic variation in services across the United Kingdom. The survey was carried out on-line and was sent to the most appropriate contact at the 225 NHS echocardiography departments, identified through the use of regional representatives of the BSE as the person responsible for delivery of echocardiography. The survey was open for six weeks in total with 3 reminders sent out to non-completes. In total, 105 hospitals provided results, giving a 47% response rate, considered a representative sample by the Picker Institute and comparable to the 44% response rate for the NHS Staff Survey used to inform the Department of Health. A big thank you to all who completed the survey, as this important work would not be possible without your input.

The results make somewhat uncomfortable reading, and clearly show the pressure that UK echocardiography services are under at present, and are likely to continue to face in the future. Overall results can be reviewed for each of the questions (see tables) but particular results that we wish to highlight are:

1. 70% of departments have less than 5 echo physiologists performing TTE full-time. The practicalities of delivering a 7-day echocardiography service when a department has less than 5 echo physiologists must be considered in future service planning. 93% of echocardiography departments do not
currently provide a 7-day echocardiography service.

2. At least 40% of departments within the UK have one or two echo physiologists planning to retire within the next five years. Couple this with the result that nearly one third of departments within the UK have not had any physiologist trained in echo to proficiency standard within the past year, and it becomes quickly apparent that maintaining an adequate workforce will remain a real challenge in the next few years.

3. Around 40% of UK echocardiography departments currently use locums. This is at considerable cost to the NHS. Furthermore, 68% of echocardiography departments have at least one unfilled echo physiologist post and thus the need for locums is likely to continue for the foreseeable future.

4. Approximately 33% of echocardiography departments have a waiting time for a routine in-patient echocardiogram of >48 hours, and nearly 10% of departments have a wait of >5 days. This in turn must impact on the bed shortage issue that is common to many hospitals, with patients waiting as in-patients for routine echocardiography.

5. Despite waiting time guarantees, nearly 19% of patients wait more than 6 weeks for a routine outpatient TTE. This is up to 30% in Scotland, 66% in Northern Ireland and 75% in Wales.

The survey results provide powerful evidence that more needs to be done to help us meet the workforce and workload challenges that are ahead. Rick Steeds, BSE President, is already in discussions with NHS England and representatives from the NHS in the devolved nations because of information from this survey, lobbying on your behalf regarding the future planning of the echocardiography workforce in the UK. The information provided by this survey is instrumental in driving forward a clear plan to increase the number of trained and supported echocardiographers. We plan to repeat this survey at the end of 2017, to track changes with time. Once again, your contribution is absolutely vital so please contribute to the survey to help us help your department.

*Rick Steeds, BSE President*
1) Unexplained Dilated Right Heart in an Asymptomatic Patient

Abstract
The incidental finding of a dilated right heart on echocardiography in an otherwise asymptomatic patient is not an uncommon finding and should prompt further investigation into an underlying cause. When an unexplained dilated right heart is noted in an asymptomatic patient, the echocardiographer should carefully consider the presence of an atrial septal defect (ASD). If not identified but suspected clinically, a transesophageal echocardiography (TOE) should be requested. We report a 41 years old male investigated for a bacteraemia in whom a TOE study was undertaken looking for vegetations but incidentally revealed a sinus venosus atrial septal defect. This case highlights the importance of considering transesophageal echocardiography in every patient where an unexplained dilated right heart is identified on a transthoracic study.

Introduction
The incidental finding of a dilated right heart echocardiographically in an otherwise asymptomatic patient is not an infrequent finding and should prompt further investigations into a possible underlying cause. Common causes of right heart dilatation are atrial septal defect (ASD), pulmonary hypertension or rarely a cardiomyopathy effecting the right ventricle e.g. arrhythmogenic right ventricular dysplasia (ARVD). Right heart dilatation secondary to left heart disease would be readily identifiable. Most of the aetiologies can be identified via a good quality transthoracic echocardiography, lung function tests and imaging of the lungs (Computed Tomographic Pulmonary Angiography CTPA). However, when these investigations exclude all conditions other than a possible ASD, the presence of an ASD requires positive identification or exclusion which depending on its anatomical situation cannot always be done by transthoracic echocardiography. In this case report, we discuss a patient who was found to have moderately dilated right heart but transthoracic echocardiography did not reveal the cause.

Case presentation
A 41-year-old type 1 diabetic man was admitted in April 2017 with a 3 week history of intermitted pyrexia with rigors and vomiting. He had no chest pain, palpitation, dyspnea or haemoptysis. There was no history of cardiac disease in childhood. His diabetes had caused end stage renal failure requiring peritoneal dialysis.

Blood pressure on admission was 126/68 mmHg, heart rate 82 bpm and the jugular venous pressure not elevated. Cardiac auscultation revealed a soft systolic murmur over the pulmonary area. No abnormality of the second heart sound movements were identified. There was no pedal oedema and no rash.

An ECG revealed partial right bundle branch block with a normal axis (Fig. 1). Laboratory results showed deranged renal function. The chest X-ray showed cardiomegaly and pulmonary plethora (Fig. 2). Blood cultures were positive for Staphylococcus Aureus on 11/4/17.

On reviewing his previous medical records, interestingly, right heart dilatation had been noted on transthoracic echocardiography previously in 2014 but no identifiable cause had been identified at that time. In the light of the positive blood cultures and systolic murmur, an echo was requested in the form of a transthoracic study (TTE) which again demonstrated a moderately dilated right heart with normal function, dilated right atrium, mild tricuspid regurgitation with and an estimated Pulmonary Artery systolic pressure (PASP) of 55-60 mmHg (Fig. 3). With no evidence of vegetations on the TTE study he underwent transesophageal echocardiography (TOE) which did not show either vegetations or abscess formation. Surprisingly however, it revealed a sinus venosus type of atrial septal defect with a significant left to right shunt explaining the previously dilated right heart. The atrial defect measured 1 cm and was located very high in the atrial septum near the entry of the sinus venosus.
superior vena cava to the right atrium (Figs 4 and 5).

**Outcome**

Following antibiotic treatment a referral regarding surgical closure of the defect has been made with deliberations ongoing in respect of the level of pulmonary hypertension. Currently he is stable with no ongoing cardiac symptoms.

**Discussion**

This case is particularly interesting because it demonstrates the importance of considering a TOE study on any patient who has unexplained right heart dilatation when no obvious cause is found on TTE, respiratory investigations or computed tomographic pulmonary angiography (CTPA). A TOE study is a much more sensitive investigation in identifying a sinus venosus atrial septal defect than a TTE study due to the TOE being able to image the superior aspect of the inter atrial septum near the atrial roof, an area not always clearly imaged transthoracically in an adult.

Atrial septal defects can occur anywhere within the atrial septum although by far the majority are centrally situated within the fossa ovalis, otherwise termed a secundum atrial septal defect. Low in the atrial septum a defect may occur as part of an atrioventricular defect otherwise known as a primum atrial septal defect or endocardial cushion defect. Atrial defects may be multiple with a number of small defects which can occur in association with a secundum defect. Sinus venosus atrial defects may occur in close proximity to the entrance of either of the vena cavae although a superior one is far more frequent than one related to the inferior caval entry.

The incidence of the commoner types of atrial septal defect are secundum approximately 75%, primum 15 - 20%, sinus venosus 5 - 10% and coronary sinus related approximately 1%.

The prevalence of atrial septal defects is estimated to be approximately 4 per 1000 children. The number remaining unidentified into adulthood is unknown due to the majority of adults with an ASD being asymptomatic, at least until late adulthood but is less than 1 per 1000.

Right QRS axis, right atrial enlargement and partial right bundle branch block are the typical ECG features recorded from an adult with a secundum or sinus venosus atrial septal defect. Left axis usually identifies a primum defect. Some sinus venosus ASDs have an inferior P wave axis.

The chest X ray of an adult with an ASD almost always reveals cardiomegaly, prominence of the right and left main pulmonary arteries and pulmonary plethora with a narrow mediastinum due to absence of the SVC shadow.

**Fig. 3.** Two-Dimensional Transthoracic echocardiography revealing a dilated right atrium but no atrial septal defect.

**Fig. 4.** Transesophageal bicaval midesophageal view with and without colour Doppler imaging showing a sinus venosus atrial septal defect high in the atrial septum near the SVC entrance to the right atrium.

**Fig. 5.** Midesophageal 0 degree modified 4 chamber TOE image with colour Doppler imaging showing the sinus venosus atrial septal defect with left to right shunting.
perpendicular.

Although there are no absolute guidelines for the investigation of isolated right heart dilatation, the American College of Cardiology/American Heart Association (ACC/AHA) guidelines for adults with congenital heart disease highlight that false negative diagnoses are relatively common for atrial septal defect in adults, especially patients with sinus venous defects. Patients with unexplained RV volume overload by TTE should be studied by TOE or another imaging modality to fully evaluate the atrial septum and pulmonary veins and to rule out defects in the roof of the coronary sinus.

Reviewing the literature, a study comparing TTE with TOE for diagnosing the presence of sinus venous atrial septal defects showed that only 44% of sinus venous defects were identified by transthoracic echocardiography. One retrospective study from 1995 described that in 25 sinus venous atrial septal defect patients detected by transesophageal echocardiography only 3 patients were diagnosed by transthoracic echocardiography which is a mere 12%. Another study performed in 1991 stated that transthoracic echocardiography failed to demonstrate the sinus venous defect in six of eight patients a failure rate of 75%.

In the case presented, the patient was referred with a heart murmur in 2015. A dilated right heart was identified transthoracically but no cause was found at that time.

On re-presentation with an unrelated problem, a TOE study demonstrated a sinus venous ASD as the cause of the right heart dilatation.

In conclusion, this case study highlights that a transthoracic echo study may miss a sinus venous atrial defect and that a TOE study should be considered when there is no readily apparent cause for right heart dilatation.

Kaung Myat Thu, Santhanakrishnan Balasubramanian, Sanjay Gupta, York Teaching Hospital

References

2) Left atrial mass

A previously well 78 year old male was referred for outpatient echocardiography by his general practitioner following recurrent episodes of dyspnoea and atypical chest pain. His transthoracic echocardiogram showed a pedunculated mobile mass attached to the lateral wall of the left atrium. The mass did not involve the mitral valve and was not of any haemodynamic consequence (see images). The appearances were consistent with a myxoma in an unusual position.

The patient was referred to the local surgical centre where he underwent successful excision of the lesion. Surgery confirmed a left atrial tumour attached to the posterior wall that was 1cm lateral to the posterior mitral valve annulus. Histological analysis confirmed a myxoma.

Primary cardiac tumours are a rare finding, with myxoma being the most common. Whilst the majority of myxomas originate in the atria, most commonly in the left atrium they can occur anywhere in the heart. The usual site of attachment is to the fossa ovalis. This case demonstrates a rare position for a myxoma to occur and is a reminder that a myxoma can occur anywhere within the heart.

Surgical excision is the only definitive treatment for patients with a myxoma and should be performed as soon as possible, particularly if there is any impact on the mitral valve function or where there is a high risk of embolism.

Jonathan Hinton and Marian Benca, Worthing Hospital

References
1. Reynen, K. Cardiac Myxomas. NEJM 1995. 333; pp1610-7
BOOK REVIEW

Echocardiography
The Normal Examination and Echocardiographic Measurements
Third Edition

Author Bonita Anderson
Book Review by Chris Attwood, York Hospital
Publisher: Echotext, Australia.
RRP £90

Fresh off the press for 2017 this 3rd edition of this reference textbook does exactly what the author Bonita Anderson set out to do.

Spanning 15 chapters this textbook covers the basic principles of adult transthoracic echocardiography, and addresses the theory, practical aspects and limitations in detail. When it comes to advanced echocardiography techniques the book covers the subject of strain imaging briefly, however there is no 3D or contrast echo content.

In my opinion a good text book should provide the information you need in a manner which is both easy to read and understand. Bonita Andersons book is a shining example of this being done well. The layout of this edition is very easy on the eye. Pages are well structured and not cluttered and provide tables, still frame echo images and schematics clear all of an excellent quality.

Each chapter covers a different fundamental topic of echocardiography, and presented in a logical manner. I was particularly impressed with the first chapter titled “Basic Principals of Two-Dimensional Ultrasound Imaging”. This chapter covers ultrasound physics and discusses how they relate to practical image optimisation. It is covered in depth, but is not a ‘heavy read’ and would be an excellent starting point for anyone working towards BSE accreditation or simply beginning a career in echocardiography.

We had the original edition of this book in our department and, although a great book in its own rite, there have been some excellent additions to this third addition which work really well. The book uses panels and information boxes to highlight ‘key points’ from the main text, and to provide the reader with practical examples for calculations such as fractional shortening. There are also page long ‘Technical Tip’ sections which take the reader through how in practice measurements should be taken, the pitfalls of the measurement and how to avoid them.

As mentioned earlier the only things missing from the book are 3D and contrast echo content along with a more in depth look into strain imaging. This could be viewed as a negative, however I would argue (as the author rightly states in her foreword) the book is aimed at providing students and teachers with the fundamentals of echocardiography, and the content is expertly weighted towards achieving this goal.

In summation If you are looking for a textbook covering more advanced echo techniques in detail, this book will not provide this for you, but that is not what it was aimed to do. This is a well written, in depth text book which covers the fundamentals of echocardiography, and in my opinion would be an excellent source of reference material for any echocardiographer. Retailing at £90 on Amazon, I would highly recommend this textbook as a quality edition to any departments echo reference literature.
BSE’s Annual Scientific Clinical and Scientific Meeting will be returning to the beautiful, historic city of Edinburgh on Friday 10th and Saturday 11th November. This year’s meeting will run parallel sessions based around the theme of Structural heart disease and Congenital. We have a number of exciting speakers lined up including Dr Allan Klein, President of the American Society of Echocardiography and Prof. Bogdan Alexandru Popescu, Professor of Cardiology, University of Medicine, Bucharest. President, European Association of Cardiovascular Imaging. For the first time, we will also be teaming up with Pumping Marvelous to present a patient orientated session which will explore how echocardiography played a vital role in the story of patients.

**ABSTRACT SUBMISSION IS NOW OPEN!**

There are two categories for submissions:
- *Investigator of the year*
- *STP Investigator of the year*

The winning abstracts for each category will be invited to submit the full manuscript to Echo Research and Practice. Both Technical and Scientific submissions are welcomed. Abstracts in the Investigator of the year category will be given as poster presentations in the exhibition area on Friday 11th November. Abstracts in the STP Investigator of the year category will be presented as oral presentations within the STP programme on Friday 10th November. BSE members working in echocardiography who are participating in research are invited to submit Technical or Scientific Abstracts summarizing their project. We are particularly keen to receive submissions from echocardiographers or departments reflecting novel working practice, advances in echocardiographers or interesting audits. Full details and application forms can be found on the BSE website.

**HANDS ON TRAINING/ SIMULATOR SESSIONS**

In conjunction with our industry partners, BSE are happy to once again provide hands-on training and simulator sessions at this year’s Annual Meeting. The training will be provided as classroom style learning to allow for larger groups within the training. These sessions will cover a range of topics and level from basic Core Knowledge at STP level to more advanced Echocardiographers and Physicians with a thorough knowledge of basic echocardiography techniques, looking to expand their expertise.
REGISTRATION

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TRAVEL

Located in the heart of the city, the EICC is easy to get to whether you’re arriving by plane, train or car. Edinburgh’s main bus terminal is located at St Andrews Square. Bus connections stretch right across the UK. For details of these routes please visit www.nationalexpress.com or www.citylink.co.uk. Edinburgh has two railway stations - Waverley and Haymarket. Waverley is the main station and has direct routes to many cities across the country, including over 25 daily departures from London. Edinburgh Trams run between the Airport and York Place every 8-10 minutes Monday to Saturday and every 12-15 minutes on a Sunday. The closest tram stop to the EICC is at Haymarket Station. The first tram from Edinburgh Airport departs at 06:15 and the last is 22:45. There is an excellent taxi service from the airport to the city. You’ll find official airport taxis at the taxi rank outside the terminal building (follow the signs within the airport). It costs approximately £15 to get a taxi from the airport to the city centre and the journey takes 20 minutes depending on the time of day. The Airlink 100 operates a frequent bus service (every 10 minutes at peak times) between Edinburgh Airport and the city centre, with designated stops en route. The service starts at 04.30 and runs until 00.22 at night, with the journey taking 20 minutes. Tickets cost £4.50 single and £7.50 return. Delegates are advised to disembark at Haymarket Railway Station and to follow signs for EICC on foot (5 minute walk). The N22 bus also departs from outside the Airport entrance and runs every half an hour through the night until the Airlink service starts again. For more information about these services visit www.flybybus.com.

ACCOMMODATION

Negotiated rates in Edinburgh have been arranged by Reservations Highway. Accommodation can be booked using the downloadable form available on the BSE website. These accommodation options are local to the venue in Edinburgh City Centre. Delegates may wish to search further out of the city centre for cheaper rates.
Annual General Meeting

This year’s AGM will take place on the evening prior to the Annual Conference. We invite all BSE members to join us for this meeting.

Thursday 9th November

18:00 - 19:00

Early onsite Registration will be available at the EICC the evening prior to the conference.

Thursday 9th November

17:00 - 18:00
We are now accepting abstract submissions for the BSE 2017 Annual Meeting

There are two categories for submissions:

- Investigator of the year
- STP Investigator of the year

The winning abstracts for each category will be invited to submit the full manuscript to Echo Research and Practice.

The template for submission is available as a download on the BSE Website. Both Technical and Scientific submissions are welcomed.

Abstracts in the Investigator of the year category will be given as poster presentations in the exhibition area on Friday 11th November. Abstracts in the STP Investigator of the year category will be presented as oral presentations within the STP programme on Friday 10th November.

BSE members working in echocardiography who are participating in research are invited to submit Technical or Scientific Abstracts summarizing their project. We are particularly keen to receive submissions from echocardiographers or departments reflecting novel working practice, advances in echocardiographers or interesting audits.

The following rules must be noted:

- More than one submission may be entered from a department, as long as there is a distinct difference between each subject. All submissions will be judged by a panel of experts.
- You may choose to either:
  - a, submit for publication in the on-line conference supplement only; or
  - b, submit for both the supplement and moderated poster presentation.
- Up to five submissions will be selected by the panel for presentation at the BSE Annual Meeting on Friday 11th November in London; the lead Author of the submitted abstract must be available to present on that date.
- Lead authors of abstracts accepted for presentation will have their registration fee for the event waived; lead authors of abstracts published in the conference supplement will be able to register at the early bird rate.
- The live presentation will be judged by an expert panel that were not involved in the original selection of presentations.
- The Lead author will present the abstract for approximately 5 minutes followed by 5 minutes of questions from the judging panel and meeting delegates.
- All moderated abstracts will be published in the online conference supplement and printed in the conference programme. Furthermore, the Lead Author of the winning abstract will be invited to write a summary of their work for publication in the ERP Journal.
- Based on the overall score (written abstract submission plus oral presentation), the British Society of Echocardiography investigator of the Year (2017) will be awarded. The winner will be announced during the Lifetime Achievement Award session.
- The submission deadline is Friday 1st September 2017.
We now invite nominations for the 2017 Lifetime Achievement in Echocardiography award. Do you know someone you think should be formally recognised for their contribution to the field of Echocardiography? Let us know who and why they should receive the lifetime achievement award.

Previous recipients are Graham Leech (Cardiac Physiologist), Gill Wharton (Cardiac Physiologist), Dr Gordon Williams (Consultant Cardiologist), Professor Mark Monaghan (Consultant Clinical Scientist), Professor John Chambers (Consultant Cardiologist) and Dawn Appleby (BSE Office Manager).

All submitted nominations will be considered by BSE Council.

Nominations and a short statement as to why you have nominated the individual should be sent to secretary@bsecho.org by Friday 8th September 2017.
On Thursday 19th January, our usual bi-monthly meeting of Council was replaced for the first time with a horizon scanning event for the British Society of Echocardiography. The aim of the day was to review the strengths and weaknesses or our Society, with discussion thereafter by all elected Council members, Committee Chairpersons, co-opted members and office staff. Each section of the Away Day was led by two people, whose names are given at the start of each section. This is a summary of the day for your information, with action plans resulting from the discussions outlining what we hope to be able to deliver within 3-5 years. Throughout the day, the objectives on which the Society was founded were clearly visible and used as a guide for all discussions. These objectives as outlined in the Articles of the Association are as follows:

- The protection and preservation of health and the effective relief of sickness by:
  - the advancement of education and training and the promotion of best practice in Echocardiography in relation to the diagnosis and treatment of heart disease;
  - promoting high standards of professional competence in Echocardiography for the protection and benefit of the public;
  - providing or facilitating training for those involved in the practice of Echocardiography;

To advance, promote and carry on study and research into Echocardiography and to disseminate the useful results of any such research, within the United Kingdom and the Republic of Ireland.

The Secretariat
Organisation and Representation:
Gill Daniell & Rick Steeds

The BSE currently works mainly through volunteers standing for Council and Committees, with many others supporting work in education and accreditation. The Office/Secretariat has been in many ways reactive, with Chairs, Committee members and volunteers driving Accreditation and Education events. As the Society grows larger, which has been the case for several years (currently over 4000 members), it becomes increasingly important for the Office/Secretariat to drive the calendar and then seek additional input where necessary. It is expected that the role of the office then might become more like that of the secretary of the American Society of Echocardiography (ASE) and European Association of Cardiovascular Imaging (EACVI).

Membership of the Society will also hopefully grow further, as there is no sign that demand for echocardiography, education, training and accreditation is declining. Moreover, there is major growth in use of echocardiography in non-cardiology disciplines such as acute medicine, as well as continued growth from new registrars in cardiology who will all be required to achieve basic proficiency in transthoracic echocardiography during core training from this year. Balancing this is the increasing reluctance of Trusts to allow staff professional leave to attend Council and other non-Trust events, combined with the simple pressure of work-load for those in the NHS at a time when funding is contracting. These two competing pressures – more demand on the Society (in particular Accreditation and Education) vs reduction in the availability of ‘volunteer hours’ – emphasises the need to make the office central to running BSE activity. In addition, there was discussion whether there should be payment to Trusts to permit release of the President in future, which might give the Society the benefit of more, dedicated time.

ACTION: Calendar for office, officials and committees to be published, with time-points highlighted for activity, e.g. submission of final annual meeting programme, dates for practical accreditation, etc.

To facilitate the transition, there needs to be staff expansion within the office but also a review of work patterns and increased utilisation for automated processes, for example with re-accreditation reminders, payments for courses and accreditation. Before we can increase the number of staff within the office, we must be sure that our financial status is stable and able to fund these increases. As an intermediate solution, we have agreed to appoint a junior administrator (Leanne) to support the current staff and have recruited a new staff member, Ann, to work alongside Jo Thanjal in Accreditation.

ACTION: Junior office member and replacement for Accreditation Officer - DONE

The Council:
Gill Daniell & Rick Steeds

The discussion on the Office/Secretariat then switched to the structure of the Society and its Officers and Committees. There has been difficulty with the role of Chair in Communication, as this covers several duties yet often has involved an individual who has had to work alone without the support of other Committee members. Moreover, the duties have tended to cross over all committees and their activities, so the expectation is that this role or Committee will no longer exist in its current form. There is a business plan in development for further improvement to online activities of the BSE but a central theme is that the BSE will need a dedicated office member to monitor the electronic content of the web-site, ensuring that this is regularly refreshed and perform simple maintenance. This person will need to be responsible for up-loading educational output, including lectures from meetings and cases, as well as directing feeds from ERP and Echo.

ACTION: Business planning for growth of office staff, with particular consideration to support online activities.
There was also discussion of the role of the Council and whether it should seek to ratify all activity of the Committees or only selected work streams that had major financial implications for the Society. To ensure that Committees have as much devolved power as possible to encourage their work and ensure activity in a timely fashion, it was thought that the Council should receive reports from Chairs and working groups, but that Council would not routinely re-discuss this work. Council meetings will be stream-lined to start at 13.00 and continue until 16.30, with the President and Office lead needing to ensure focus of discussion on those matters of most importance. This would also have the added benefit that Committees and working groups could have the opportunity to meet in the mornings before Council, meaning that travelling costs and the number of days that elected officials had to be away from their Trust could potentially be reduced.

**ACTION:** Council to start 13.00; managed programme until 16.30. Morning meetings available.

There was also discussion about inclusiveness and trying to optimise communication with BSE members. To ensure that decisions at Council are open, that members are kept abreast of matters arising, and hopefully to encourage participation, there will be a trial of a web-based question and answer section open to members on all Council sessions. The first to go live will be in May, and the idea is for members to send in e-mail questions to the Office or Chairs and these to be read and answered. These can be sent in up-front but the hope is that in time, this can be an open Q/A session for 30 minutes. Also, all Council meetings will be summarised and made available on our web-site once signed off.

**ACTION:** Council meetings to be summarised and published after each meeting in Echo. Questions to be posed live to Council at end of meeting from members and Regional Representatives.

In discussion regarding Committee Chairs and the tenure of other Officers, it was felt that there should be affixed term of 3 years in office, with the capacity to stand for a further 3 years if there was support from the Council and Committee itself. This has not been clarified before but was thought to be important to try to remove any criticism that the same faces represented the Society. As part of the ‘hand-over’ between Chairs, Committee members and elected members, as well as the office, standard operating procedures are being written and again will be made available on the web-site for all to review and for information to those thinking of standing for positions. In addition, as part of this organisation of structure, the attached plan has been agreed to outline the BSE as it currently stands.

**ACTION:** 3-year term for Chairs, with standard operating procedures for all available on web, available to those taking up new posts

**Membership:**

**Gill Daniell & Rick Steeds**

There was a further discussion continuing from the above regarding the relationship between the Office, Council and members. Communication with the office is thought to be effective, and the BSE office staff provide personal and immediate contact to members via phone & emails. One issue highlighted was the need for office members to be able to cross-cover during leave, and also concerns regarding the current high workload, although the hope is that will improve with a new Accreditation Officer and Office Junior.

**ACTION:** Cross-cover in office.

Regular communication to members is carried out in a structured format through a monthly email to members and through articles in Echo. In addition, Gill has led a growth in on-line communication with all office staff both on Facebook and Twitter, the latter highly successful at the last Annual Meeting.

**ACTION:** Written short summaries of Council to be produced for more effective communication; continue to work on social media to inform members and encourage participation (Facebook videos; Twitter; live feed from Council)

One of the strengths of the BSE was felt to be the enthusiasm and dedication from all those involved. A founding principle of the Society has been the equality of all those on BSE Committees/Council, with active encouragement to a mix of physiologist and cardiologists and a wide range of people from different levels. As in many other professional societies at present, there is an awareness of the need to keep the structure and membership of the Council/Committees ‘fresh’ by ensuring regular exchange of people. Similarly, the positions on council need to be reviewed to make sure they are being supported and utilized effectively (e.g. Regional Champions, Communications etc.) New individuals should be supported as they join Committees and Council

**ACTION:** A review of the structure of the council committee should take place with focus on the introduction of new members, making available standard operating procedures.

**Finance:**

**Manj Virdi & Vishal Sharma**

Historically it has been difficult to get people interested in managing the finances of the BSE and indeed there have only been 3 Treasurers of the Society since it was formed. Previously the administration of financial matters within the office was shared between staff with no prior financial training or experience. The finance structure within the BSE had not adapted as quickly as required, given the rate of growth of the BSE as a member organisation. The Treasurer’s role was a demanding one, with all invoices and bank transfers needing to be approved and processed personally by the Treasurer. The Treasurer was even personally responsible for making salary payments each month to the office staff via bank transfer each month. Consequently, over the last 4 years, the current finance team have worked extremely hard to improve the processes within the BSE, and bring it in line with what is required. These changes include but are not limited to:

1. Appointment of a dedicated financial administrator (Manj Virdi) with significant experience in finance and accounting.
2. Delegation of invoice processing and payment of staff
salaries from the Treasurer to the finance officer and company accountants.

3. Development of almost real time accounts. Previously payments received and processed were not updated regularly and a list of transactions was sent to the accountants at 6 monthly intervals for uploading into the accountancy software. Consequently, it was not possible to obtain an accurate financial position of the BSE and generate financial reports when required within a given tax year. Now all transactions are reconciled and entered directly into the new updated accounting package by Manj in real time. Consequently, an accurate up to date financial position and report can be generated immediately when required. As a result of the increased efficiencies within the office, we have managed to reduce the fee payable to our accountants by £2000 per year.

4. We have developed a workplace pension for staff to ensure compliance with future legal requirements.

5. We have established an investment fund. Previously although investments have been discussed, this was never established and as a result the BSE cash reserves remained in a standard bank account. In recent years' this had been attracting an interest rate of around 0.1%. After significant amount of background research, multiple meetings with potential investment partners and a large amount of time spent setting up the fund, £300000 was invested into an ethical investment fund with Chase de Vere in March 2016. As of March 2017, this had increased in value to £342000, approximately an annual rate of interest of 14%.

However, it is widely recognised that in order for the society to continue to grow and to further improve member services, there needs to be sufficient financial resource to pay for these enhancements. This remains challenging as this is balanced by the desire to keep costs to members as low as possible.

Prior to the away day a short survey regarding the financial priorities for the BSE was sent to all of those attending. The key findings of this were:

1. That Departmental Accreditation and enhanced Individual Accreditation processes were felt to be the most important areas for the BSE to improve.

2. Increasing the political influence of the BSE to promote echocardiography and support the sonographer workforce was the second most important priority. It was noted that this was not explicitly included in the Objectives of the society at present.

3. That there was a high risk to the BSE posed by difficulty of committee members being released by employers. It was felt that this should be mitigated by a combination of increasing the role and number of office staff but also considering reimbursing employers for the time spent working for the BSE for those with prominent busy roles (e.g. President, Chair of Accreditation/Education)

4. There was support for a Fellowship of the BSE scheme both to recognize contributions to echo but also to potentially attract new members.

There was a general discussion regarding areas around maximising financial revenue so that it can be reinvested in improved member services and pay for planned changes such as a website overhaul and increased staffing within the office. At present the financial income for the society only comes from 2 sources - Annual membership fees and Educational events (particularly the Annual Conference). Accreditation has been making a small loss for a number of years. However, expenses incurred go up every year through inflation.

The following were the ideas agreed to increase revenue

1. Introduce a Fellowship scheme. This discussion was subsequently linked to the idea of Level 3 accreditation in the Accreditation section.

2. Review membership and conference fees annually and consider increasing by a small amount annually to cover inflation pressures (rather than necessitating a large increase after many years of no increase as occurred in 2016).

3. Increase accreditation fees. These have been at £150 for quite some time but have not been covering costs, particularly since the practical examination has been introduced. They are still considerably lower than EACVI (450 Euro)

4. Increase reaccreditation and DLM fees as they have remained static for quite some time at £40, and £15 respectively.

5. Allow non-members to purchase videos from conferences, as now it is only available to members. This needs to be balanced against the possibility of members choosing not to come to the meeting but watching online instead (although reaccreditation points will only be available for those attending).

**ACTION: Develop a fellowship scheme. Review fees for conference and membership annually**

**Accreditation:**

*Keith Pearce, Jane Lynch & Jo Thanjal*

It was felt that Accreditation has made great strides with regards the various options provided by the BSE for individual accreditation. In particular, it was felt that the development of practical assessment has raised the profile of BSE accreditation and has ensured that a robust, competency-based assessment can be delivered that no other imaging organisation is able to replicate, such as EACVI. The inclusion of other accreditation processes such as Critical Care and Community was thought to add strength and breadth to the Society. There is an awareness of the need to continue to make Accreditation as accessible and rapid a process as possible. As a result, proposals for an electronic accreditation examination are to be piloted and if successful, this would enable people to undertake the accreditation in closer proximity to their workplace.

**ACTION: Multi-access electronic accreditation to be costed and sourced.**

From an individual accreditation perspective, a suggestion was discussed in detail for a Level 1/2/3 accreditation system like...
other imaging societies. The current basic adult TTE proficiency standard would be perceived to be at Level 2 with the opportunity to develop a framework for level 3 +/- fellowships of BSE. This was thought to be an important development to enable recognition of those who develop advanced practice, either as specialist physiologists, imaging cardiologists or from other disciplines. It was also recognised that the current perceived level 1 FEEL/FICE type courses are endorsed by the BSE, which was in most cases closely involved in their set-up but no longer accredit or quality control these courses. These types of credentialing courses are becoming more popular and they are unofficially looking to further develop their remit to include Doppler/measurements/quantification. This was felt to be a risk to maintaining the quality standard for echocardiography. It was strongly felt that the BSE proficiency or equivalent remained the minimum standard for a complete echocardiogram and that this should be maintained. However, the BSE will explore how it can support point of care ultrasound (Level 1), whilst recognising that this did not replace a complete study and seek to develop advanced echocardiography (Level 3) certification.

**ACTION: Level 1 and level 3 accreditation**

From the discussion following a preliminary survey sent by Vishal Sharma, Treasurer of the BSE, Departmental Accreditation (DA) was felt to be one of the most important areas of growth for the BSE. In discussion, it was felt that this receives the least amount of time and resource. The concept of DA becoming embedded within the Individual Accreditation system was raised, although it may be better suited to a component of a larger new subcommittee with the overarching theme of clinical standards, this would include DA/Audit agendas/Operating procedures/Quality Assurance etc.

**ACTION: Quality and Standards Committee to be considered.**

**Education:**

**Sanjeev Bhattacharya & Thomas Matthew**

The focus of the discussion was to critically assess the current educational activities and identify ways to improve the educational offering to BSE members.

**Strengths**

Meetings continue to be well attended with good feedback
Multiple online educational portals – core and distance learning modules available. Question bank will be online soon.
Presentations are now available from all meetings.
Core group of volunteers keen to contribute.

**Weakness**

Time constraints delay several projects completing at expected timeline.
Lack of good IT platform to develop new online material.
Need to seek more member input into education offering.
Research opportunities/collaborators not well developed or advertised.

**Issues discussed with possible solutions in the short to medium term:**

**Meetings:**

- Enhanced member feedback to improve content and relevance of the meeting to members. Proposals include compulsory feedback forms and enhanced social media presence to get feedback.
- The organization of the annual meeting needs to be streamlined with deadlines for the final programme to enable early advertisement of meetings.
- The IT system for meeting registration needs optimization to improve workflow/workload of BSE office staff. At present it is very time consuming.

**Protocols/Online Education**

- International societies already produce peer reviewed guidelines for a wide range of pathologies. Rather than repeat this work it was felt the BSE should produce short quick reference guides for echocardiographers.
- It was felt we should seek more member engagement to identify what they find useful and what is lacking in our current education offering. Proposal is to get feedback via regional reps and social media.

**Research**

- Current research infrastructure is not well developed. In addition, support for research activities is not well advertised. We plan to develop a database of research activity and resources (Corelabs) within UK to encourage/foster research collaboration. We will also improve advertisement of research support schemes i.e research endorsement scheme to improve uptake.
- We are currently developing a national stress echo registry to allow both an audit of clinical practice and answer specific research questions. Once up and running other registries could be developed based on this experience.

**IT Strategy and Communications:**

**Dan Knight & Tim Griffiths**

The BSE online presence is crucial for its members, profile and office workflow. Recently some aspects of the IT setup have been difficult to sustain, such as supporting the DA website infrastructure. Furthermore, the different IT components of the BSE are disparate both in terms of where they are hosted and also how and who maintains them. In several instances individuals, familiar with a specific individual component are required to operate that system. A key request in terms of workflow was consideration of a central management system to improve uptake.

Aside from addressing immediate limitations with the current IT systems, a full review of the BSE’s IT components will be considering where these need to be in 3 to 5 years. In order to review the BSE’s IT and online strategy, we need to fully understand the scope of the problem so that the cost for work on each IT component can then be more accurately estimated. Work on each component can be prioritised according to cost and
need. Individual person(s) and third party companies could then be invited to quote for the specific work required.

**ACTION:** Review of all existing IT processes and systems to be carried out, and time scale over which these should be upgraded or replaced. Areas identified for IT review include:

- **Main website review and refresh - recommendations for an overall strategy for web presence.** The discussion focused significantly on this component, including:
  - Lack of search feature: difficult to find anything/navigate website
  - How to increase traffic – content reviewer (BSE person as curator, e.g. paid 2-3 hrs/wk), therefore ability to easily load new content also required for a new website
  - Ability to monitor traffic – how many users access different parts of the website and how to collate these data
  - Functionality – ‘archive’ vs. educational content, simplified (e.g. drop down menus)
  - Ability to view on phones/hand-held devices etc.
  - Office: (1) Gill/Manj to write manual processes that could be automated, (2) ways in which users submit communication to the office needs review
  - Education committee – ability to access conference videos (restricted)
- Blogs, members invited to this role.
- Departmental Accreditation rewrite.
- Update iOS and Android apps to make them present a more standard output and receive some content from the website. Ideally these would be consolidated to one source code/development platform.
- Conference app for iOS and Android
- Bring Distance Learning Modules in house.
- *Quality Assurance Module review/rewrite.*
- *Integrate Echo Res Practice into website/apps.*
- *Integrate Echo in Africa into website.*

The discussion regarding current member communications considered how to engage members more in the decision-making processes of the BSE (e.g. council). For example:

- **Social media – is the current strategy working, if not then why not?**
- **Picker survey – whilst the survey had a reasonable response rate, why not higher?**
- **Regional reps structure – is this working?**

**ACTION:** Regional Rep’s to play a key role in engaging with council & committees. Regional rep structure potentially integral to delivering and supporting effective communication. Stronger link to training committee to disseminate info through to reps as another avenue to engage members. Regional Rep’s could become a committee in its own right. Also, encouragement needed to attend council meetings to share views with fresh ideas.

‘Echo’

- Suggested to ask Regional Reps to contribute articles
- Recirculate emails for articles (done after the away day)

**Member engagement**

- The format being changed to two meetings in a day, with a member staying on for council
- Suggestion made to live stream a 30-minute live Q&A feed to council – open access for members, need to advertise in echo (email sent to Regional Rep’s after away with feedback and suggestion of future opportunity for live streaming to council)
- Due to the time constraints attending multiple committees and some duplication of work, change committee meetings to the morning and council to the afternoon.

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**Golden FATE Card competition**

**First International competition for Focus Transthoracic Echo.**

**Organised by PICEU Foundation Pune India & Prof Erik Sloth Denmark.**

For further details please visit [http://piceufoundation.com/about-gfc.html](http://piceufoundation.com/about-gfc.html)
Now in its fourth year, Echo in Africa is a collaborative project between the British Society of Echocardiography and SUNheart which takes place in Cape Town, South Africa. Volunteers are invited to take part in this project screening students from secondary schools in low socio economic rural communities in Cape Town for early stage rheumatic heart disease. This project will give these children early access to diagnosis and necessary aftercare through the Tygerberg Hospital as well as validating a scanning protocol to be used in the communities using portable devices.

Most afternoons and all evenings during the project are free for volunteers to explore Cape Town, there are several excursions that you can choose from including wine tasting, a visit to Table Mountain, an evening at Cape Point and (on Friday to Saturday only) an overnight Safari! One weekday afternoon will also include a visit to a local charity project, for those who wish to help distribute clothing and toys to the local children who live in the Townships.

Volunteers screened a total of 1264 children in 2016. Ninety of these children were found to have a possible heart abnormality that required further assessment. These 90 students have been brought back to Tygerberg Hospital Cardiology service for further testing which has now been completed. All this would not have been possible without the time and skill of our volunteers.

The project will take place on the following dates in 2017:

-**Week 1:** 20th Feb – 24th Feb  (cancelled)
-**Week 2:** 27th Feb – 3rd Mar  (cancelled)
**Week 3:** 16th Oct - 20th Oct  (fully booked)
**Week 4:** 23rd Oct - 27th Oct  (fully booked)
**Week 5:** 30th Oct - 3rd Nov

Further information and application forms can be found on [www.bsecho.org/echo-in-africa/](http://www.bsecho.org/echo-in-africa/)
Top 5 Tips from 2016 volunteers

1. Don’t be afraid to travel on your own. This project gives you the opportunity to get to know people in a way that just isn’t possible during meetings and conferences.
2. If you can, tag an extra couple of days’ holiday on to the week to go exploring. There are too many amazing experiences to be had in Cape Town in just one week!
3. Don’t think you’re not good enough to do it. There are a wide range of volunteers all with varying experience. There is also great support from the team in South Africa.
4. Check your passport before you go! Are there at least 2 full blank pages? Is it valid for a minimum at least 30 days from the date of exit from South Africa?
5. Take your camera! There are a lot of moments you will want to remember forever.

“Echo in Africa was one of the best experiences I have had both personally and professionally. Everybody who was there worked as a team. There was no stress during the entire week. The children were brilliant, it was a privilege to work with them.”
Julie Kelly, Cardiac Physiologist, North Cumbria University Hospitals, 2016 Volunteer

“I really believe it’s a once in a lifetime opportunity & experience in the most beautiful country I’ve been to. The theoretical and practical lessons I’ve taken from the two weeks have been invaluable in my development moving forward, and I feel that echocardiographers of all levels of experience would benefit.”
Liam Batchelor, Trainee Cardiac Scientist, Papworth Hospital NHS Foundation Trust 2016 Volunteer
The BSE are pleased to announce that there are now 2 application windows for members to claim a bursary for travel and registration to echo meetings.
The next window runs from 1st June 2017 – 30th June 2017.

In order to be eligible, you must fit the criteria:

1. Applicants must be current full paying BSE members working in a public hospital in the UK or Ireland at the time of application.
2. No individual who has received a travel award from BSE during the last 2 years can apply.
3. No more than one award will be given to a single institution in the travel bursary year.
4. The travel bursary year will run from 1st April to 31st March annually. Early applications are advised, as once the budget is spent no further bursaries will be agreed until the following bursary year.
5. Application must be made via the travel bursary request form available on the BSE website.
6. The completed bursary request form must be emailed to finance@bsecho.org at least 6 weeks in advance of the meeting/course being applied for.
7. The award will only cover travel costs (second class rail or budget airfare) and course registration fees. Accommodation, meals and other costs are not included.
8. Bursaries cannot be paid in advance - any recipient must cover the full costs and claim reimbursement as in point 9.
9. Payment of the travel award will only be made when the following are submitted:
   a. proof of attendance at the meeting/course
   b. a brief written report suitable for inclusion in ECHO
   c. original receipts for travel, accommodation and registration fees
10. The BSE panel will endeavour to review and respond to the application within 3 weeks of the application but will not be held responsible should the meeting/course be fully booked by the time of the decision.

To apply for a bursary please visit: http://www.bsecho.org/events-courses/bursaries/ and send completed application forms to finance@bsecho.org

COMMUNICATING WITH THE SOCIETY

General enquiries to admin@bsecho.org - 020 7345 5185
BSE, Docklands Business Centre, 10-16 Tiller Road, London, E14 8PX
Tel: 020 7345 5185          Fax: 020 7345 5186

We can also be contacted via email to:

Accreditation Queries (Exams, Logbook Submission, re-accreditation and practical assessments)
Jo Thanjal at jo@bsecho.org   Ann at ann@bsecho.org & accreditation@bsecho.org

Financial matters (payments, direct debits, duplicate receipts)
Manjinder Virdi at finance@bsecho.org

Meetings and Events – admin@bsecho.org

For submission of educational articles or case reports for ECHO:
Dr. Gordon Williams at drgjwilliams@gmail.com and/or admin@bsecho.org

Echo Research Practice Journal related should be directed to
Echo Research And Practice, Bioscientifica Ltd, Euro House, 22 Apex Court, Woodlands, Bradley Stoke, Bristol BS32 4JT
Tel: 01454 642274   www.echorespract.com
RECENTLY ACCREDITED MEMBERS

Congratulations to the following members who have recently achieved BSE Accreditation

Transthoracic Accreditation
Dr Sulaiman Al-Najdi NHS Greater Glasgow & Clyde
Dr Bashir Alour University Hospital Southampton
Dr Juliana Barla Eastbourne Hospital
Mrs Danielle Bluff Addenbrooke’s Hospital, Cambridge
Miss Christine Crossett Altnagelvin Area Hospital
Miss Claire Gardner Monklands Hospital
Mr Walter Genco Central Manchester University Hospital
Mr Damian Hough Mid Cheshire Hospitals NHS Foundation Trust
Dr Manish Jain Royal Brompton & Harefield NHS Foundation Trust
Dr Jawahar Lal Basildon and Thurrock University Hospitals
Mrs Shabina Malik University Hospital Coventry and Warwickshire NHS Trust
Mr Francisco Martins Royal Berkshire Hospital
Mr Stuart McNeil Northern Devon District Hospital
Dr Mark Peterzan University of Oxford Centre
Dr Anastasia Vamvakidou Northwick Park Hospital

Transoesophageal Accreditation
Dr Huda A Abdelmouth Warral University Teaching Hospital
Dr Graham Pent Northern General Hospital
Dr Nicholas Goddard University Hospital Southampton NHS Foundation Trust
Dr Allan Harkness Colchester Hospital

Critical Care Accreditation
Dr Ben Messer Royal Victoria Infirmary
Dr Rajiv Rooplalsingh Royal Brisbane & Women’s Hospital

Practical Assessment TTE Accreditation
Dr Nabeel Ahmed Ealing Hospital NHS Trust
Miss Afia Ali St Mary’s Hospital
Dr Ebrahim Alskaf Queen Alexandra Hospital
Mrs Hannah Baddeley Lincoln County Hospital UHVT
Dr Alexander Brown Queen Elizabeth Hospital
Mr Filippo Carneri Colchester hospital University
Mr Richard Clements Queen Alexandra Hospital
Mr Alessio De Luca Colchester General Hospital
Miss Lisa Dineen Mater Private Hospital Cork
Mrs Menalyn Episioco Solihull Hospital
Miss Catarina Ferreira Colchester Hospital University
Dr Kenneth Fung Barts Health NHS Trust
Mr Leo Gifford West Suffolk Hospital
Miss Marie Goodwin Royal Wolverhampton New Cross
Miss Teleri Haf Gravell Withybush General Hospital
Miss Hannah Heard Guys and St Thomas’
Mrs Tracey Hickling Nottingham University Hospitals (City Campus)
Miss Sarah Hughes Wycombe Hospital
Mr Sohel Issaq Good Hope Hospital
Miss Ana Mesquita Colchester General Hospital
Mrs Prathibha Muraleedharan Nair RD&E
Mr Anilkumar N Sukumaran Basildon Hospital
Mr Chris Northern Queen Elizabeth Hospital Birmingham
Miss Lucy Orum ULHT Pilgrim Hospital
Mr Mark Passey Darent Valley Hospital

Practical Assessment Critical Care Accreditation
Dr Joseph Riddell University Hospital of Wales

Practical Assessment TOE Accreditation
Dr Walid Omer Ahmed St James’s Hospital
Mr Arionilson Pedro Gomes Royal Sussex County Hospital
Dr Hind Elzein Wythenshawe Hospital
Dr Timothy Fairbairn Liverpool Heart and Chest Hospital
Mrs Erica Jane Henry Manchester Royal Infirmary, Central Manchester NHS
Dr Kerrynne Johnson Leeds University Hospitals Trust
Dr Nabeel Sheikh NHS Tertiary Centre
Dr Andreas Zafiropoulos Western Sussex Hospitals NHS Trust

Whaddon Medical Centre has been awarded

BSE Accredited Department status in the following areas

Transthoracic Echocardiography

BSE President Chair Departmental Accreditation
Award Date: 1st February 2017 Valid Until: 1st February 2022
DATES FOR YOUR DIARY 2017
BSE members can also see up-to-date details via the Events Calendar on the website www.bsecho.org

2nd – 6th June
ASE 28th Annual Scientific Sessions
Registration is now open
Location: Baltimore Convention Centre,
Baltimore, MD
Contact: www.asescientificsessions.org

5th – 7th June
BCS Annual Conference
Registration is now open
Location: Manchester Central
Contact: www.bcs.com

20th June
BSE Written Examination: TOE
Registration is now open
Location: Birmingham Repertory Theatre
Contact: accreditation@bsecho.org

20th June
BSE Practical Examination: TOE
Registration is now open
Location: Birmingham Repertory Theatre
Contact: accreditation@bsecho.org

22nd June
ACTACC Intra-Operative & Critical Care Echocardiography
Registration is now open
Location: Birmingham REP Theatre & Central Library
Contact: www.actaccmeetings.co.uk/registration

23rd July
BSE Practical Examination: TTE/TOE
Registration opens: 24th April 2017
Location: John Radcliffe Hospital, Oxford
Contact: accreditation@bsecho.org

15th October
BSE Practical Examination: TTE/TOE
Registration opens: tbc
Location: Blackpool
Contact: accreditation@bsecho.org

10th & 11th November
BSEcho2017
Registration opens: 15th May 2017
Location: EICC, Edinburgh
Contact: admin@bsecho.org

Full details and course descriptions for all these courses are available from the BSE website.

Travel/Accommodation
Bursaries available to BSE members for BCS Conference 2017

The British Cardiovascular Society have agreed to provide a limited number of travel packages (travel and one night’s accommodation) again for this event for 2017. These will consist of hotel accommodation for the Monday night (5th June) together with reasonable travel expenses. This year June) together with reasonable travel expenses. This year they have decided that these packages should be offered to Healthcare Scientists who are SCST, BSE or BHRS members, with a maximum of 2 individuals per clinical department. Packages will be awarded on a first-come first served basis (with the stipulations above). Enquiries regarding these travel packages should be addressed to adomakoe@bscs.com, with details of membership number(of SCST, BSE or BHRS) and clinical department.
British Society of Echocardiography
Affiliated to the British Cardiovascular Society

Do you run an Echo Core Lab?

The BSE is creating a database of Core Labs.

Please fill in the survey below to register yours on the BSE website.

https://www.surveymonkey.co.uk/r/NNS3QKT

Imperial College Healthcare NHS

HAMMERSMITH ECHOCARDIOLOGY

12-16th June 2017
W12 Conferences
Hammersmith Hospital
London
Register online at www.w12conferences.co.uk
- TOE imaging
- LIVE from the OR
- Stress echo for the assessment of valve disease
- Live demo – contrast echo

GIG CYMRU NHS WALES
Bwrdd Iechdyd Cwm Taf
Health Board

Community Echo Lead/Echo Manager
Band 8a Salary £40,028 - 48,034 per annum
Full time 37.5 hrs over 5 days

An exciting opportunity has arisen for a Community Echo Lead/ Echo Team Manager to work in the dynamic and developing Cardiopulmonary Diagnostic Unit within Cwm Taf UHB. We are looking to recruit a highly experienced and clinically competent echocardiographer to support the Head of Echocardiography in delivering a high quality service. The individual will have proven team leading / management expertise to lead the team and be able to innovatively support in the planning, development and delivering of safe and efficient services. The post holder will be responsible for the day-to-day management of the echocardiography services across the UHB sites, as well as participate in routine and advanced techniques such as DSE, TOE, Dysynchrony and physiologist- led valve clinics etc. Whilst based at Prince Charles Hospital you will be required to travel between the sites as service requires. In collaboration with the Head of Echocardiography you will actively participate in establishing and delivering a new community based echocardiography service across various sites within Cwm Taf UHB. Cwm Taf University Health Board is situated in the heart of South Wales just north of Cardiff, between the beautiful Brecon Beacons National Park and the M4 motorway.

The area is steeped in history, widely recognised across the UK and around the world as the driving force of the industrial revolution and the coal industry. The area is reverting to its pre-industrial beauty and you’ll find a wide range of landscapes. Majestic mountains, country parks, forests, waterfalls, natural and man-made lakes, which together with the built environment produces a unique and interesting region. There are many valleys in Wales, but nowhere is there such pride and passion, and nowhere will you find so warm a welcome as within Cwm Taf.

Ability to speak Welsh is desirable for this post but not essential.

For further details / informal visits contact: Catherine Templeton, Head of Echocardiography on 01443 443226 or Dave Tyler, Head of Cardiopulmonary Diagnostics on 01685 72403.

For further information and to make an application please visit www.jobs.nhs.uk

Closing date: 29th June 2017.

The Trust operates a No Smoking Policy, is committed to equality and welcomes applications from Welsh speakers.
Free open access publishing for BSE members in 2017

Echo Research and Practice’s recent indexing in the Web of Science Emerging Sources Citation Index is an important step towards securing an impact factor for the journal. We will soon be assessed for indexing in the Web of Science, Science Citation Index Expanded database, which is required to obtain an impact factor. This means that citations to papers published in 2016 and 2017 will count to the journal’s first impact factor. As such, the journal is at a pivotal stage in its development and support from the BSE membership is critical.

In recognition of this, the BSE is delighted to offer its members completely free open access publishing in Echo Research and Practice in 2017. (*please see terms and conditions below). The BSE is proud to offer this unique benefit to its members and encourage them to support the journal in its aim to be the leading open access title in the field.

*Terms and conditions

The first, last or corresponding author must have been a member of BSE between 1 April 2016 and 31 December 2016. All submissions are subject to peer review and the journal’s usual acceptance criteria.

Submit now at: www.EchoResPract.com
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