News Pulse

October 2009
Irish Cardiac Society
Special Edition

IRISH SOCIETY OF CARDIOLOGICAL TECHNOLOGY

Welcome to the Clinical Physiology Meeting at ICS

On behalf of Irish Society of Cardiological Technology we would like to welcome you to this Irish Cardiac Society Special Edition. Normally our e-journal is emailed to people on our mailing list, but once again to mark the Clinical Physiology Meeting at the Irish Cardiac Society, Medtronic have kindly agreed to cover the cost of printing this special edition.

This is our seventh edition of NewsPulse, the first being produced this time last year, so if you haven't been receiving them in your inbox and would like to simply send an email to editor@isct.ie, or just visit the website www.isct.ie and submit or update your contact details.

The journal is your journal, so don't be shy, if you have an interesting case, have come across an interesting article or simply have an observation, comment or some news you want to share, then this is the place to do it. We welcome both readers and contributors from those working in the field from all corners of the island.

In this journal we hope to give you articles from each of the areas we work in to appeal to your particular area of interest. Inside there is also on over view of some of the talks taking place in the main scientific meeting which may be of interest.

We would like to thank the organising committee both from the Northern Irish Branch of the SCST, in particular AnnMarie Magee from Craigavon Hospital, and those from the ISCT committee who are helping out today, particularly the likes of Anne-Marie Galligan, Orlagh Harrington, Niamh Harding to name just a few.

This year saw the introduction of online registration via the ISCT website and this has proved to be a success, those who have pre-registered will be able to simply collect their certificates of attendance. Remembering that we are typing this before the event (and not wanting to tempt fate) we are hoping that registration on the day (technology permitting) will also be able to take place via the power of the PC.

We sincerely hope you enjoy the day and that you find it interesting and we would ask that you fill out and return the evaluation sheets to help us in improving the event.

Final thanks to all our speakers and to all of you for attending!

Inside this issue:

New graduate's poster accepted for ICS meeting

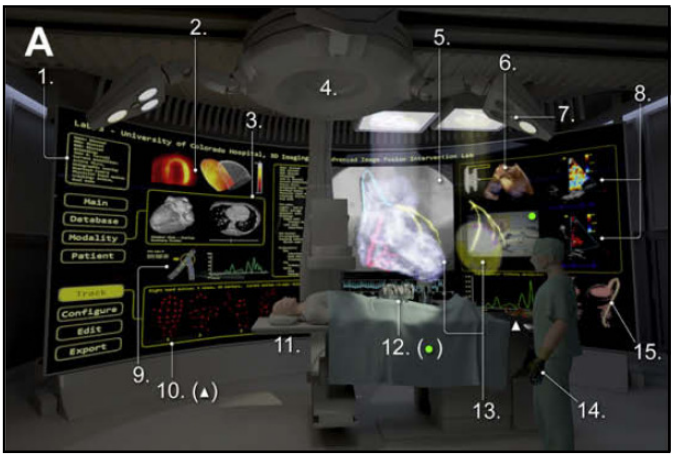
Celine Coffey, who graduated from the degree in Clinical Measurement from DIT this year, had her work, which she submitted for her final year thesis, accepted as a poster presentation in the main scientific session of the Irish Cardiac Society Meeting. Her study looked at Echocardiographic measures of LV systolic function, as well as standard BP measurement, as a way of assessing the optimal pacing mode for patients with sick sinus syndrome. Comparing VVI versus DDD with ventricular pacing versus DDD with intrinsic ventricular activation Celine found that both systolic and mean BP were best in DDD with intrinsic ventricular activation. She used LVOT VTI as a measure of cardiac output and again found that intrinsic activation of the ventricles gave the best cardiac output. Measuring systolic tissue doppler velocities from six basal segments, she found that DDD with intrinsic ventricular activation again gave the best mean systolic TDI velocities, implying best global systolic function. Celine's work was done under the guidance of a number of the technicians in University Hospital Galway, particularly Brenda Barry.
When Celine graduated initially she was employed in the Cardiac Department of Naas General Hospital and only left there recently to take up a full-time post in St Vincent's University Hospital.
Celine's poster will be on display on Friday from 1500-1530.

Did you graduate from DIT in 2000

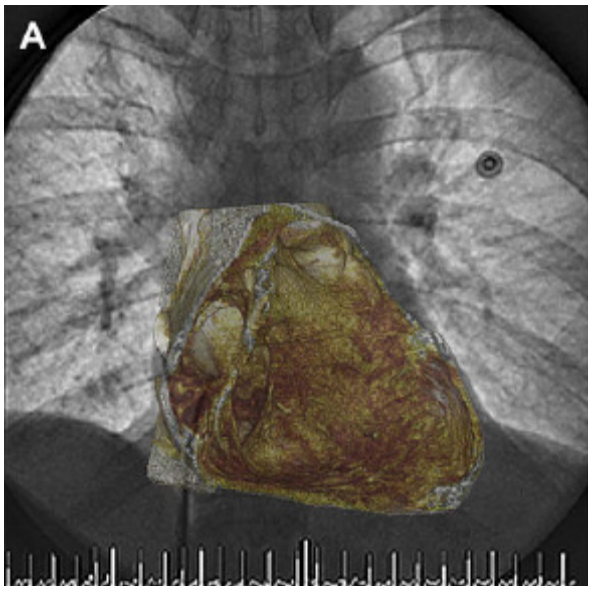
In this the 10th year of the Clinical Physiologists meeting, we thought it might be interesting to see who was graduating from the course in Kevin Street in the year that the first meeting was held in 2000. In those days students were taken on full-time by the hospitals and studied out of working hours. These young full-time students don't know how easy they have it!
Fiona Hannon, who is chairing one of today's sessions, graduated whilst working in Beaumont Hospital, and says it was the best place to work ever!. In 2001 she moved to Cork University Hospital and stayed there until she joined Cardiac Services in 2004. 2006 saw her take time out and head for the U.S but she came right back home, as she is from Tralee, in December 2007 and commenced in the Bon Secours Hospital Tralee in January 2008 where she works with Dr. Louis Keary and Dr. Yvonne Smyth. She has completed the ASCST and MSCST exams, passed the BSE exam in 2001 and also sat and passed both IBHRE exams in Pacing and EP while in the States. She took the plunge in July this year and got married to a Kerryman!!!! So now I am Mrs. Mc Elligott!!!
From the same class Aisling O'Toole who is now Aisling Murphy, she got married in 2003 to George and now lives close to Letterkenny, Co Donegal. She works in Cardiac Investigations in Letterkenny General Hospital. She is a Donegal girl so she is happy to be home too. She has two kids, a little girl and a boy. She also worked in Beaumont Hospital as a student.
Suzie Forde, was working in the Mater Hospital when she started her course in Kevin Street but swapped one side of the Liffey for the other, taking up a post in St Vincent's Hospital before she graduated from Kevin Street. She continued to work there after her graduation, married Thomas and now has three children. She is now a full-time mom and has moved back to her native Galway. Also in St Vincent's at the same time was Lara Connolly but she soon spread her wings taking up a post in St James' Hospital before coming back to her roots

and took up a Chief I post in St Vincent's Private Hospital in Elm Park. She is married to Brendan.
Mark Russell, was a student in the Adelaide and Meath incorporating the National Children's Hospital (AMNCH) better known as Tallaght. He has been loyal to the centre which trained him (unlike all ye other mercenaries) and is still working away there, he has gained European Association of Echocardiography Accreditation and is presently considering taking the Heart Rhythm UK Accreditation Exam in February 2010.
Donal O'Dea is another of those working in Tallaght, however he was a student in St James Hospital under the tutelage of Gerard King and Noelle. He has gone on to gain IBHRE (NASPE) accreditation in Pacing and Defibrillation, one of a group "conscripted" to take the exam by Sharon Donohue in 2002. Donal is a Senior technician in Tallaght and also delivers some of the lectures in the final year of the new degree program in Clinical Measurement in the DIT.
Another of those "conscripts" taking on the IBHRE exam was Brendan Rogers. Brendan was working in Waterford Regional Hospital when he graduated and remained there until he took up his present position as Technical Consultant for German pacemaker and implantable defibrillator manufacturer Biotronik. "Vorsprung Durch Technik" Brendan!
We know that there are other people who graduated in 2000 but unfortunately our spies could not track you down despite our best efforts, if you are out there why not drop us a line. We would love to do a similar piece on other years, if you have info/names for people who graduated with you let us know by email to editor@isct.ie

What might a Cath Lab be like in 2020?



Its nearly 50 years since the performance of the first coronary angiogram, the basic principle has not changed much with the three dimensional cardiac structures still being represented in a two dimensional manner. Recognition of this has led to the development of 3D imaging techniques and development has been aimed at reduction in X-ray dose, 3D reconstruction and stent visualisation amongst others. In recent years the Cardiac Cath Lab has moved from treating ischaemic heart disease to also treating structural heart disease (SHD). The development of new techniques in this area is a result of recognising the need for there to be a middle ground between potentially suboptimal medical management and the surgical option. Development of these new techniques has also seen the need to develp newer imaging techniques which may give a more rounded picture than the traditional 2D imaging techniques of angiography and echocardiography.
Both CAD and SHD are being examined and visualised using newer imaging techniques such as cardiac MRI (being discussed today), CT (also on today's agenda) and 2 and 3D echocardiography. These newer imaging techniques presently maybe used as a static road map for the interventionalist however in the future we could see cardiac MRI images fused with traditional 2D angiography to make this roadmap a dynamic one. In addition we may see the addition of robot assisted catheter navigation and tracking to allow for accurate de-



vice placement and deployment. In this way device selection can be dome in a far more measured and systematic manner. While this may increase the success rate in PCI where such fusion technology would come inot its own would be in the likes of percutaneous valve replacement or repair where the course which equipment may have to take would on-clude cardiac circulation and vasculature, chambers, valves etc. It would also allow ac-curate measurement of the size and specific location of cardiac defects such as ASD's and would greatly facilitate the decision and the intervention.

The interventional field moves forward by the invention of new devices, drugs, and biologic agents and also through the refinements and breakthroughs in imaging guidance that enable the interventionist to perform these new treatments. Unlike coronary interventions that use an over-the-wire pathway for devices in a confined branching vascular tree, many new inter-ventions require 3D visualization for navigation in the open space of cardiac chambers. The combination of state-of-the-art robot-assisted intervention, multimodality fusion, true 3D rendering, advanced navigation systems, and innovative therapy should offer patients the best chance for survival and improved quality of life.

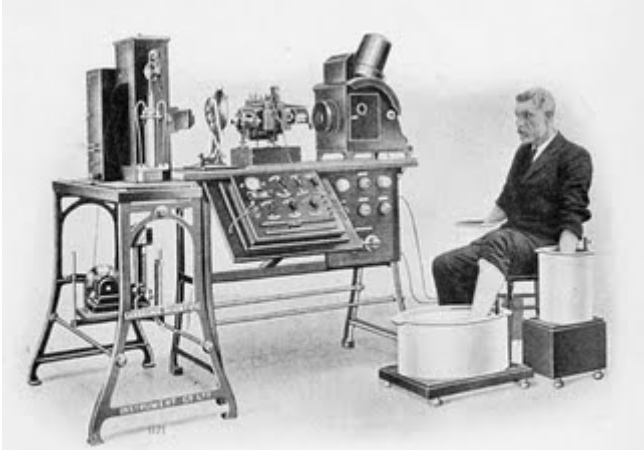
This all meas that the Cath Lab of 2020 could be a very different place, standard X-ray maybe fused with dynamic MRI imaging. CT or PET scanning could also play a role. Inter-ventional devices may be placed by either robotic devices or by automatic navigational sys-tems, perhaps hemodynamics will be measured by a totally different system to the current transducer. As these newer techniques are adopted, it is more than likely that these will be used more readily in Cardiac Cath labs and that the amount and type of info readily to hand may increase greatly.

Anyone else got any thoughts editor@isct.ie

Adapted from The Future Cardiac Catheterisation Laboratory, Chen et al, Cardiol Clin 27 (2009) 541–548

The yearly meeting of the Irish Cardiac Echo and Imaging Group will take place at lunchtime on Friday 9th Oct at the ICS

How many ECG leads do we need?



Photograph of a Complete Electrocardiograph, Showing the Manner in which the Electrodes are Attached to the Patient, In this Case the Hands and One Foot Being Immersed in Jars of Salt Solution

It is well known that the sensitivities of current **standard 12-lead ECG** criteria for detecting many cardiac diseases such as acute myocardial infarction (MI) and ventricular hypertrophy are poor. To increase the diagnostic ability of the ECG, many alternative lead systems have been proposed, but none has yet received general acceptance in the cardiology community. The first surface ECG recorded on humans was performed in 1887 by Waller, but the leads that were first used for diagnostic electrocardiography were three-limb leads introduced by Einthoven. In the earliest ECG recording systems, the patient's arms were inserted into jars of conducting solution, which were connected to a sensitive galvanometer. In the early years of ECG recordings, there was no standardization of placement of the precordial leads, making it difficult to compare studies. In 1938, the first standardization was made by the Cardiac Society of Great Britain and Ireland in conjunction with the American Heart Association.

In 1966, **Mason and Likar** introduced a system in which limb electrodes are instead placed on the torso. Studies have shown, however, that the electrical axis may change and that ECG findings indicating inferior or posterior infarcts are lost in 69% and 31% of patients, respectively, compared with findings in ECGs recorded with standard electrode placement.

It is well known that the sensitivity of current 12-lead ECG criteria is poor for detecting acute MI. Additional precordial lead sets have generated interest in increasing this sensitivity. Saetre and colleagues found that leads derived from electrodes placed in the left axilla and on the back could differentiate ECG changes that occurred during percutaneous coronary intervention of the first diagonal and left circumflex (LCX) arteries, respectively and studies have demonstrated that **posterior leads** are useful for identifying acute posterior MI not detected by the standard ECG. In another study, however, Zalenski and colleagues found that the accuracy of detecting ST-segment elevation in acute MI was improved only modestly by the addition of leads V7 to V9.

Right ventricular infarction rarely occurs in isolation but occur in more than 30% of cases of inferior left ventricular MI. Patients who have right ventricular infarct involvement have a worse prognosis, a significantly higher incidence of depressed right ventricular function, and a high risk of developing high-degree atrioventricular nodal block compared to infarcts with no right ventricular involvement. One method that can be used to observe the right ventricle better is to apply **right-sided leads**. ST deviations in the right chest leads V3R to V7R during transient balloon occlusion of the coronary arteries have been described. They found that ST elevation always evolved in leads V5R and V6R when the RCA was occluded and was 100% discriminative for RCA occlusion compared with occlusion of either of the two left coronary arteries.

Body surface potential mapping (BSPM) is a method that provides better coverage of the body surface potential distribution by performing recordings at multiple sites (24–240) on the body surface. This approach is not novel; in fact, the first example of a potential

map was published in 1889 by Waller [49], who performed 10 to 20 ECG recordings at various points on the surface of the human body. In studies criteria based on six features from three locations (mostly ST-T measurements) derived from 120-lead BSPM data yielded a specificity of 95% and sensitivity of 95% for diagnosing MI. The standard 12-lead ECG is known to have a low sensitivity for MI in the presence of LBBB, BSPM increases the sensitivity to 67%. The "potential" problems, pardon the pun, for BSPM include time and difficulty applying the increased number of electrodes although this has been overcome by the development of strips of electrodes. The large amount of information has proven difficult to interpret and classify although algorithms have been developed to aid this however it still remains a challenge and maybe preventing more widespread adoption within cardiology.
There is no single right answer to the question of how many leads are needed in clinical electrocardiography. This question must be answered in the context of the clinical problem to be solved. The standard 12-lead ECG is so well established that alternative lead systems must prove their advantage through well-conducted clinical studies to achieve clinical acceptance. Certain additional leads seem to add valuable information in specific
patient groups. The use of a large number of leads (such as in body surface potential mapping) may add clinically relevant information; however, it is still cumbersome, and its clinical advantage is yet to be proven. Reduced lead sets emulate the 12-lead ECG reasonably well and are especially advantageous in the emergency situation.
Adapetd from How many ECG leads do we need? Tragardh, Cardiol Clin 24 (2006) 317–330

Ten years of Clinical Physiology Meetings

This is the tenth year of the Clinical Physiology meeting at the Irish Cardiac Society and we thought it might be interesting to look back at what topics were discussed in the previous years.
The first meeting which we still have an agenda on the computer files from was in 2002 (did they even have computers before that). Joking aside, the organisers of the first such meeting were visionary, and the meeting still is the major meeting for those working in the field. We would like to think that the agendas are topical enough that it has become an integral part of the overall meeting and there are a number of physicians who attend talks on the day which is a testament to the speakers.
Galway was host in 2002, Barbara McDonald, from Antrim Area Hospital, opened the meeting with a talk on the use of contrast echo in detection of Patent Foramen Ovale using transthoracic echo. The whole area of PFOs remains topical with the development of percuataneous closure and the potential link between them and migraines. This was backed up by a talk by Lorraine Davidson, Royal Belfast Hospital for Sick Children, on Percutanous closure of ASD's. The paediatric agenda was completed with the surgical approaches to congenital heart disease addressed as Niall Ward took us on a tour through transposition of the great arteries and the Senning and Mustard operations. They obviously did have computers in 2002, as Catherine Dwyer discussed patient management systems in Cardiology, Gerard King got into dance mode with a talk entitled "Tissue and Twist" which looked at the mechanics of ventricular function, interestingly a recent article in the European Journal of Echocardiography on the same subject was entitled "Lets Twist"!
Today's venue Killarney hosted us in 2003 when there was an emphasis on implantable devices with talks on CRT from Geraldine McParland and ICD's from Ted Keelan and Ray Conboy from the Mater Hospital. This was around the time that the MADIT II trial results resulted in an increasing use of these devices in our heart failure patients and brought them

to the forefront of device therapy. One of today's topics Cardiac MRI was discussed by Dr Mark Harbisson, for those of you who were at that talk it will be interesting to see how things have developed. A brief review of the literature around that time sees that it was being talked about fur use in determining prognosis and in detecting acute coronary syndromes in the Emergency Room. Newer techniques in the more traditional imaging technique of echo filled the rest of the day with talks on Contrast Echo for LV opacification, tissue doppler imaging and Dobutamine Stress Echo. All these techniques are used in regular practice to a greater or lesser extent by most centres with tissue doppler imaging now a mainstay of an echo examination.

Derry in 2004 is probably best remembered for an sing-song in the lobby which lasted till about half five in the morning, however the non-social event was kicked off by Roisin O'Mahony who took us through some of the methods being used in her centre to stratify and identify people at risk of Sudden Cardiac Death, some of these including microvolt T wave alternans. Its true to say that even today the search for reliable identifiers is ongoing. Cardiac CT was also on the agenda, at that time ECG gating and movement artefact were some of the problems that made interpretation of coronary artery disease difficult. It will be interesting to see if these issues have been improved on in the years between. Tissue doppler imaging and its clinical applications and an overview of the National Strategy on Cardiology Information Systems also occupied the minds of the attendees. CRT was back on the agenda with a talk on echo techniques that might be used to select patients for CRT, rather than just QRS width.

Killarney seems to be a bit of a favourite of the ICS committee (are they like the IOC committee - easily bought!! Any potential slander is unintentional) and we returned in 2005 with talks from Donal O'Dea on how pacemaker clinics had become physiologist-led, there was a time when all pacemaker follow-up clinics were physician led (maybe they only had VVI in those days!). We also dicussed various strategies by which to tailor these devices for maximum patient benefit. Echo again was to the fore with talks on Exercise Echocardiography, an alternative to Dobutamine and potentially something that could be rolled out to all EST patients to improve sensitivity. Michael Sheehan took of his reps hat and spoke to us as a Echocardiographer about the new development of 3D transthoracic echo and its uses, this modality is being slowly adopted but will become more widespread as resolution improves. Percutaneous devices have been used for a number of years to close atrial septal defects, but Shirley Burrows from the Childrens Hospital in Crumlin took us throught the newer technique of VSD closure using percutaneous devices.

2006 saw talks on a Physiologist led Palpitations Clinic, Echo diagnosis of diastolic dysfunction, Fetal echocardiography and a new measurement of myocardial stiffness. Post lunch we all stretched and twisted as we entered the world of ergonomics, particularly in the world of echo. High defibrillation thresholds in ICDs and their management and a talk on body surface potential mapping finished off the day.

The picturesque setting of Hollywood, Co Down hosted us in 2007 with an early emphasis on Sudden Cardiac Death with Dr Ross Murphy taking us through some of the potential risk factors and methods for their identification. Cathal Breen then took us through some cases from the CRY screening clinic. The debate session looked at the optimal site for RV pacing, septal or apically, and those who work in the Cath Lab were able to compare and contrast the benefits of both IVUS and pressure wires with a talk on each.

Last year we headed west to Galway with talks on atrial fibrillation, ECG and how useful it can be in planning EP ablations and mapping procedures. Percutaneous techniques were to the fore with discussions around Percuatanous Aortic Valve Replacement and techniques for repair of Paravalvular leaks.

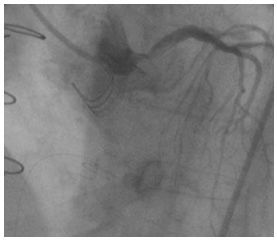
What will 2009 bring….lets see?

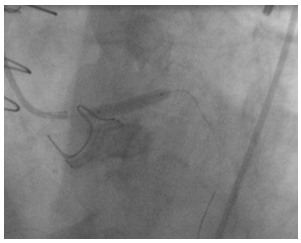
What's on in the main ICS meeting

The main sessions of the Irish Cardiac Society are open to us all and we have selected a couple that tweaked our interest. In the ***Electrophysiology session (Thurs 1830-19:10)*** a presentation from the Mater Hospital found that overall comprehension of ICD therapy by patients is poor despite pre-implant education. Of the patients who received a shock from their device, 64% felt they were poorly prepared. Interestingly 16% experienced a complication of device implantation with three quarters feeling they were not warned about this adequately. Another study from the group in the Mater which looked at data from their Cardiac Arrest Register has found that survival for out of hospital cardiac arrest (OHCA) has improved from 2.6% in 2003 to 11.25% in 2008, this despite the fact that ambulance response times have increased by over two minutes in this period. The investigators feel that this is down to improvements in pre-hospital care.

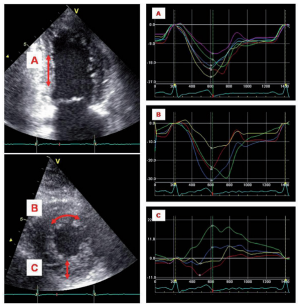
In the ***Interventional Cardiology session (Thurs 1830-2020)*** there is a report on 24 Irish patients who have received Percutaneous AVR. Their findings in terms of mortality (4%), procedure time (109=/143mins) and procedural success rate (95.8%) were similar to other international centres.

In the ***Ischemic Heart Disease session (Fri 1130-1230)*** there is a series report on 183 consecutive patients (mean age 69.8+/-10.1) undergoing stenting for left main stem disease. These patients were treated between 2003 and 2008 with over two thirds of patients having multivessel disease. Around 80% received drug eluting stents in leasiosn with were ostial in 9.9% of cases, in the LMS body in 37.5% and in the bi/trifurcation in 52.6%. The one year major adverse cardiac event rate was 42.4% at one year mainly driven by target vessel revascularisation (29.8%).





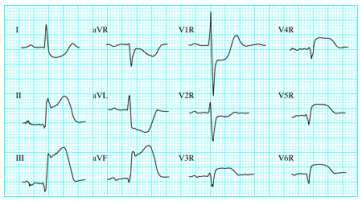
The ***Cardiac Imaging session (Fri 1400-1530)*** has an emphasis on MRI and CT. Dr Rory O'Hanlon who is now based at the Royal Brompton Hospital will present work which looked the using MRI to quantify myocardial thickening, perfusion and fibrosis using cardiac MRI. Myocardial fibrosis is known to be an important trigger of malignant arrhythmic events. They found that areas of maximal wall thickness coincided with areas of maximal perfusion defect making these areas potentially at risk of fibrosis, however their finding some areas of fibrosis were not associated with a perfusion defect suggests that other factors may contribute.



Echocardiography is routinely used to monitor cardiac function in patients receiving potentially cardio-toxic chemotherapy. A study from St James Hospital looked at the echo derived strain patterns of asymptomatic patients up to 6 years post treatment with these agents. Despite normal EF's the chemotherapy group had reduced E/A ratios, reduced global e', Sm and strain. This suggests that subclinical abnormalities are present in patients treated with these agents up to 6

years after treatment.

Saturday sees the ***Acute Coronary Syndromes session (Sat 930-11)***. One of the posters may be of particular interest, looking at the feasibility of a 24/7 Primary PCI service. In this study from the Mater Hospital, 80 patients with STEMI were brought directly to the Cardiac Cath Lab. Median door to balloon time was 85 minutes (45-120) with 33% of cases presenting out of hours. 23 of the 80 patients required intra-aortic balloon pump and the median length of stay in hospital was 6 (4-8) days. Mortality in patients with Killip Class I-III(system used to stratify patients suffering from an MI based on signs of heart failure, pulmonary oedema, shock etc) was 4% at 30 days whereas in class IV it was 41.7%. Interestingly this did not increase at six months but suggests that patients suffering from cardiogenic shock have significantly worse outcomes.



The ***Heart Failure session*** will bring the meeting to a close ***(Sat 1200-1300)*** with a talk by Dr Teresa McDonagh on the new ESC Guidelines for Heart Failure Management. One of the posters in this session demonstrates how echo guided optimisation of AV and VV delay timings in patients with CRT also improve measures of interventricular dyssynchrony such as Aortic pre-ejection interval, and also tissue doppler derived measures.

Assessment of RV function by echo

RV dysfunction has been associated with increased morbidity and mortality in patients with congenital heart disease, valvular disease, coronary artery disease, pulmonary hypertension, and heart failure. Conventional 2-dimensional (2D) determination of RV function is often qualitative but newer techniques such as TDI, strain and even 3D may add to traditional assessments.

Normally, the right ventricle is located anterior in the thoracic cavity in relation to the left ventricle, with echocardiographic assessment possible in the 3 traditional acoustic windows (parasternal, apical, and subcostal). The right ventricle is anatomically subdivided into the inflow tract, the infundibulum (outflow tract), and the apex.

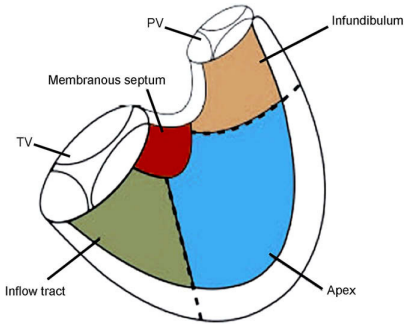


Fig 1. Three anatomical regions of the RV

Commonly used methods for calculating diameters, areas, and volumes of the LV are difficult to implement for the right ventricle and are typically not performed. Because of the complex morphology of the right ventricle, no single view or imaging plane will provide enough information to adequately evaluate RV structure and function.

RV free wall assessment is best performed from the apical and subcostal 4-chamber views. Guidelines from the American Society of Echocardiography recommend the use of the subcostal 4-chamber view for measurements of RV free wall thickness. Measurements of RV chamber dimensions should include the diameters above

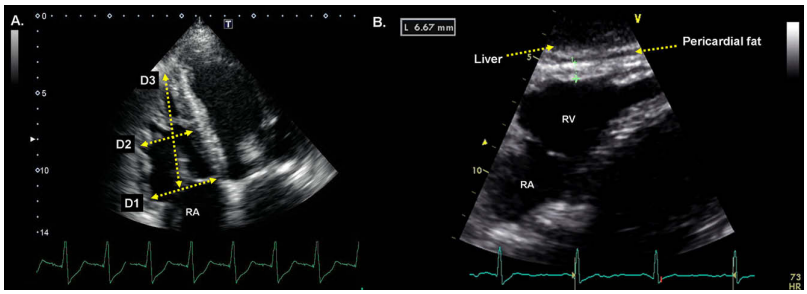


Fig 2 Recommended measurements of RV internal dimensions and wall thickness

the tricuspid valve (TV) annulus and in the mid-RV cavity, as well as the distance from the TV annulus to the RV apex.

RV fractional area change represents a ‘‘surrogate’’ measurement of RV EF and is expressed as a percentage change in the RV chamber area from end-diastole to end-systole, rather than changes in volume (Figure 3). The RVFAC is calculated as follows: (End diastolic area-end systolic area)/end diastolic area. This measurement is the one which correlates best with cardiac MRI measures of RVEF.

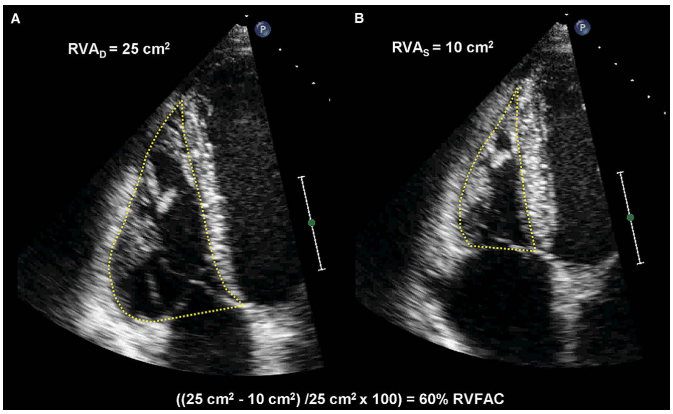


Fig 3 Measurement of RV fractional area change - a surrogate for RV ejection fraction

A quick and easy method to quantatively assess RV function is by the measurement of Tricuspid Annular Plane Systolic Excursion or TAPSE for short, referred to as tricuspid Annular Motion by some authors. With the M-mode cursor aligned through the anterior tricuspid annulus in the apical 4-chamber view, longitudinal displacement of the annulus toward the apex during systole can be recorded. This should be done with the annulus zoomed and during a breath hold as respiration can exaggerate cardiac motion. Normal values are quoted as 15-20mm of systolic displacement.

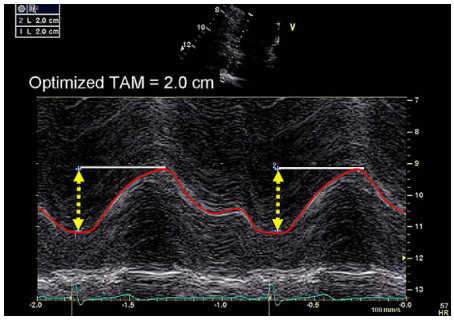


Fig 3 Measurement of TAPSE

Tissue Doppler Imaging (TDI) and Strain Imaging are newer techniques which have been used to assess RV function. DTI and SI are relatively easy to obtain from the tricuspid annulus and RV free wall. TDI tracings of the TV annulus reveal 5 characteristic segements. (1) the isovolumetric contraction waveform occurs in early systole and can be displayed above or below the zero baseline; (2) the systolic (S’) peak waveform occurs during RV mechanical systole (PV opening to closure time), after ICT, and is always displayed above the zero baseline; (3) the isolvolumetric relaxation waveform occurs in early diastole (end of the T wave on electrocardiography [ECG]) and can be displayed above or below the zero baseline; (4) the early diastolic (E’) waveform occurs during peak RV relaxation (after IRT) and is always displayed below the zero baseline; and (5) the peak late diastolic (A’) waveform represents atrial contraction and is always displayed below the zero baseline (just after the P wave on ECG). Normal S’ wave velocities quoted for the basal free wall are 11cm/s.

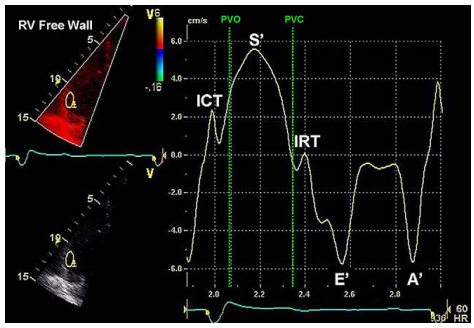


Fig 4 TDI trace of the TV annulus

The assessment of RV function by echocardiography is an area that is undergoing much research, as the development and implementation of new modalities are now readily available. Sonographers should become familiar with both traditional and newer, quantitative techniques such as 3D, DTI, and SI for more comprehensive assessments of RV function.

Adapted from: Assessment of the Right Ventricle by Echocardiography: A Primer for Cardiac Sonographers. Horton et al Journal of the American Society of Echocardiography Volume 22 Number 7

ICST Committee Update

So what have the ISCT been up to since we had our last AGM in Galway. Well, there have been a number of positive developments in a number of areas.
The achievement of producing a publication such as is a major one with a substantial amount of time being invested by the editors. Remember it is your journal we are always looking for news and articles to go into each edition. Has someone in your department got accreditation in some area, have they got married, we would like to know so that we can let people who may have worked with them previously know via NewsPulse. If there are areas you would like to see an article on or even if you want to write one yourself or want t submit a case study please don't be shy, email us on editor@isct.ie.
This year, through the work of Sharon Donohue, Third Year Clinical Tutor, in DIT, has seen the introduction of independent practical assessments of third year degree students. This process involves examination by three people experienced in the field and is probably a more thorough examination that the old ASCST practical as the student must perform an ECG recognised standards and then are presented with some sample ECG's to interpret before finishing off with some questions regarding other investigations such as EST and echo. This was the first year and some candidates did fail but their performance in the repeat assessments was markedly improved and all were finally successful. This assessment will hopefully become Phase I of an Irish based accreditation exam to replace the ASCST The external assessors of the degree program are very keen that a similar assessment be put in place for final year students and as a committee we hope to work towards this in the coming year with recognition of an Irish based professional qualification. Sincere thanks must be given to all the assessors who give up their time to allow them to happen.
The website has been active with updates and people being emailed when updates happen. Vacancies can be advertised free of charge for hospitals although a charge does apply for agencies, simply send the text of your advert to editor@isct.ie and we will have it up in a couple of days. Again we are happy to accept case reports articles for inclusion on the website.
The website was also used to facilitate online registration for the Clinical Physiology meeting with many people taking up the chance to pre-register. This years meeting has also seen some newer faces come to the fore in terms of chairing sessions which is great to see. If you wish to be come involved at any level, do not hesitate to contact us.
The society has gained recognition at HSE level with the ISCT being invited to send a representative to a workshop on the establishment of a Health and Social Care Professionals Education, Training and Development Advisory Group. Their initial report is available in the resources section of the website. This report concentrates on the first twelve professions who are being lined up for state registration.
Unfortunately not much progress has been made on state registration since last year but hopefully we can make headway in the coming year. There were some aspects of our job which were referred to the Labour court a number of years ago and now that the degree program has become more established an independent arbitrator has been appointed to review our profession under sections such as career structure, title, standards and training and development. As a committee we have sent him communication asking to meet with him so that we can give as large an overview of our profession as possible. If anyone has any thoughts on any of these areas we want to hear from you.
In preparation for our meeting with him and also for the Training and Development workshop Orlagh Harrington has been surveying departments to enquire as to the level of qualifi-

cation and accreditation people have achieved. The aim of this survey is to demonstrate the fact that as a profession we are highly and more importantly specifically qualified. You might ask you department head whether they have taken part in the survey and if they have not they can email the society at editor@isct.ie and we will send them out the survey.
This year will see the first elections to the committee in a number of years. As is often the case we are not swamped with volunteering candidates, so the elections should not be too contentious but there are happily two new additions have put themselves forward. The candidates are

Chairperson Anthony Ryan. Anthony is Chief in Sligo General Hospital and has was one of the founders of the society and produced newsletters manually, before the era of email. Anthony is very experienced and is part of our vocational group within IMPACT and is stepping back up to the committee following nomination by a number of people

Secretary Paul Nolan, Chief in University Hospital Galway and has been on the committee for the last couple of years

Treasurer Sally Johnston is based in Portiuncula Hospital, Ballinasloe and is an experienced treasurer and committee member from her time in Northern Ireland.

Ordinary Members Lynette O'Sullivan is Chief in the Mater Hospital and is one of the most experienced technicians in the country, graduating from Kevin St in 1974. She was also one of the founder members of the ISCT and is also on the committee of the IICMS. She has seen and taken part in the development of the degree program and in the development of a 24/7 cardiovascular on-call service at her centre.

Eoin Sheehy, Letterkenny Hospital is a new nominee. He trained in St Vincent's Hos pital but will be able to give valuable insight to the committee on the pressures and de mands of working amongst a smaller team.

Sharon Donohue, Clinical Tutor in DIT has worked in a number of centres in Ireland and now in her clinical tutor role plays a key role in the development of training path ways for these students.

Anita Deane, Lorraine McMahon and Anita Deane from Sligo are part of the new young breed of technicians demonstrating an appetite for accreditation with NASPE and HRUK accreditation already under the belts for some of them. They share one of the positions on the committee and are happy to continue with the same arrangement.

Orlagh Harrington has worked in a number of centres both here, in the UK and in the USA. She also worked in industry for a number of years. She has gained accreditation Echo accreditation in the US and is now working as part of an innovative pilot project providing local access to echocardiography on the HSE West area, primarily for Heart Failure patients.

Anne-Marie Galligan is Chief in the South Infirmary in Cork and has a very keen int erest in education and training within our profession. Her main areas of interest are in EP and devices

Brain Teasers - Answers on next page

Question 1

True or false, In assessing Tricuspid Regurgitation:

a) Pulmonary systolic pressure (PAP) can be calculated using the formula PAP = 4 x (Peak TR Velocity)2

b) Presence of proximal flow acceleration indicates mild TR

c) Accurate assessment of TR velocity should only be made from the apical view

d) In very severe ('free') TR, the calculation of pulmonary pressure is invalid

Question 2

What is the cause of the bradycardia above

a) Sinus bradycardia

b) Non-conducted atrial bigeminy

c) 2:1 heart block

Question 3

The most appropriate SVT discriminator for chronic AF is:

a) Sudden onset

b) Interval stability

c) Probability density function

d) PR logic

Question 4

What's the cause of the pause above

a) Sino-atrial block type two

b) Second degree AV block type I

c) Second degree AV bock type II

d) Non-conducted atrial premature complexes

Brain Teasers - how many did you get right

Question 1
In assessing Tricuspid Regurgitation:
a) Pulmonary systolic pressure (PAP) can be calculated using the formula PAP = 4 x (Peak TR Velocity)2, ***this is false, PAP can be calculated by 4x(peak TR Velocity)2 <u>PLUS</u> right atrial pressure***
b) Presence of proximal flow acceleration indicates mild TR, ***again false PISA on aortic and mitral valve generally indicates at least moderate regurgitation***
c) Accurate assessment of TR velocity should only be made from the apical view, ***again false, in fact as many views as possible should be used with the RV inflow and parasternal short axis views being particularly useful***
d) In very severe ('free') TR, the calculation of pulmonary pressure is invalid, ***this is true***

Question 2

What is the cause of the bradycardia above
a) Sinus bradycardia
b) Non-conducted atrial bigeminy
c) 2:1 heart block
Non-conducted atrial bigeminy is correct. Every other P wave (↓) occurs prematurely that fails to conduct to the ventricles because it occurs during the refractory period of the conduction system. It is not 2:1 AV block because the P waves do not occur regularly. It is not sinus bradycardia because there is an extra P wave between the QRSs

Question 3
The most appropriate SVT discriminator for chronic AF is:
a) Sudden onset, ***false sudden onset which looks at how quickly the rhythm within typically a VT zone starts, will be unable to differentiate between AF and VT as both should be rapid onset***
b) Interval stability, ***this is the best answer, stability looks at the regularity of the rhythm again typically within a VT zone, the majority of VTs are regular (or stable) with the interval varying by less than 40ms. Atrial fibrillation will vary by more than this althought AF can become more regularised at higher rates***
c) Probability density function, ***to the best of our knowledge this is not even an SVT discriminator. If anyone actually knows what is is email us editor@isct.ie***
d) PR logic, ***debatable one this, PR logic is Medtronic's dual chamber discrimination algorithm, it uses stability but also regularity. Medtronic might claim that it is better that stability alone. Why not visit their stand and ask them***

Question 4

What's the cause of the pause above

a) Sino-atrial block type two
b) Second degree AV block type I
c) Second degree AV bock type II
d) Non-conducted atrial premature complexes

The correct answer is Sinoatrial (SA) block, type II

In this tracing, there are pauses in the middle of a regular rhythm. However, there are no extra P waves during the pauses -- an indication that this is not AV block. The pause is exactly twice the length of the shorter cycle, indicating regularly firing sinus impulses that fail to conduct to the atrium at times; therefore, this is SA block. Because the pause is twice the shorter cycle, it is type II.

If the pause was less than twice the shorter cycle, it would mean there was a progressive lengthening of SA conduction time before the block, indicating type I. If the ventricular rate gradually slows down before the pause and gradually speeds up after the pause, the rhythm is sinus arrhythmia, not SA block. Thus, whether the change in RR intervals occurs abruptly or gradually is an important observation to make