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Contents

LONG-TERM CLINICAL OUTCOMES AND PREDICTORS OF MORTALITY IN IMPLANTABLE CARDIOVERTER DEFIBRILLATOR RECIPIENTS IN NEW ZEALAND

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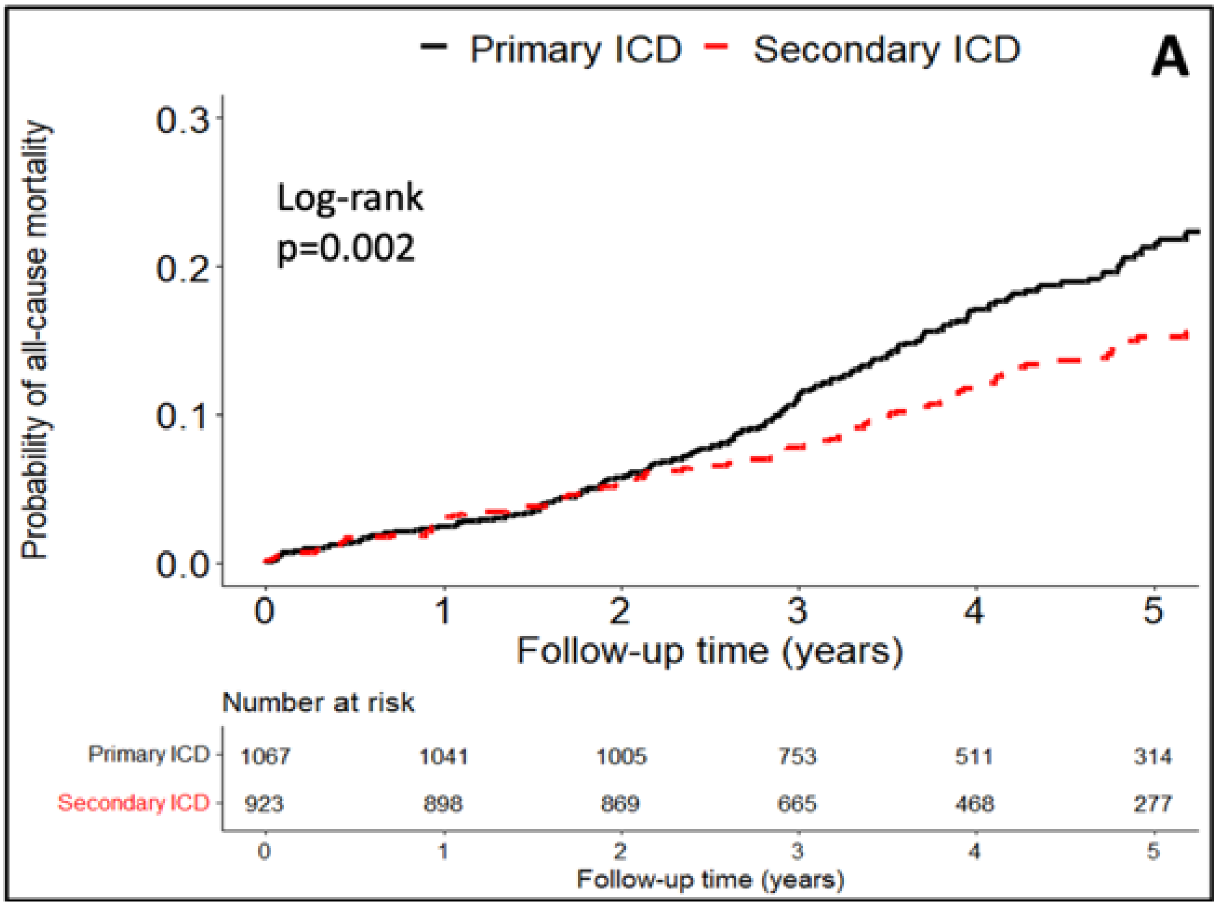
The long-term clinical outcomes of implantable cardioverter defibrillator (ICD) recipients across New Zealand were reported recently. The following article includes modified excerpts from the accepted manuscript to Heart, Lung and Circulation.

Our study compared the all-cause mortality of primary and secondary prevention ICD recipients in New Zealand and sought to identify predictors of mortality. All patients who received a primary or secondary prevention ICD in New Zealand between 2016 to 2020 were identified using a national registry for cardiac implantable electronic devices. Patients with infiltrative cardiomyopathies, congenital heart disease and channelopathies were excluded. The primary outcome was all-cause mortality. Secondary outcomes were cardiovascular (CVD) mortality, non-CVD mortality, heart failure hospitalisation and ventricular arrhythmia hospitalisation. Log-rank tests on Kaplan-Meier curves and four-year Kaplan-Meier event rates were reported. Cox regression multivariate analysis was performed to identify predictors of all-cause mortality.



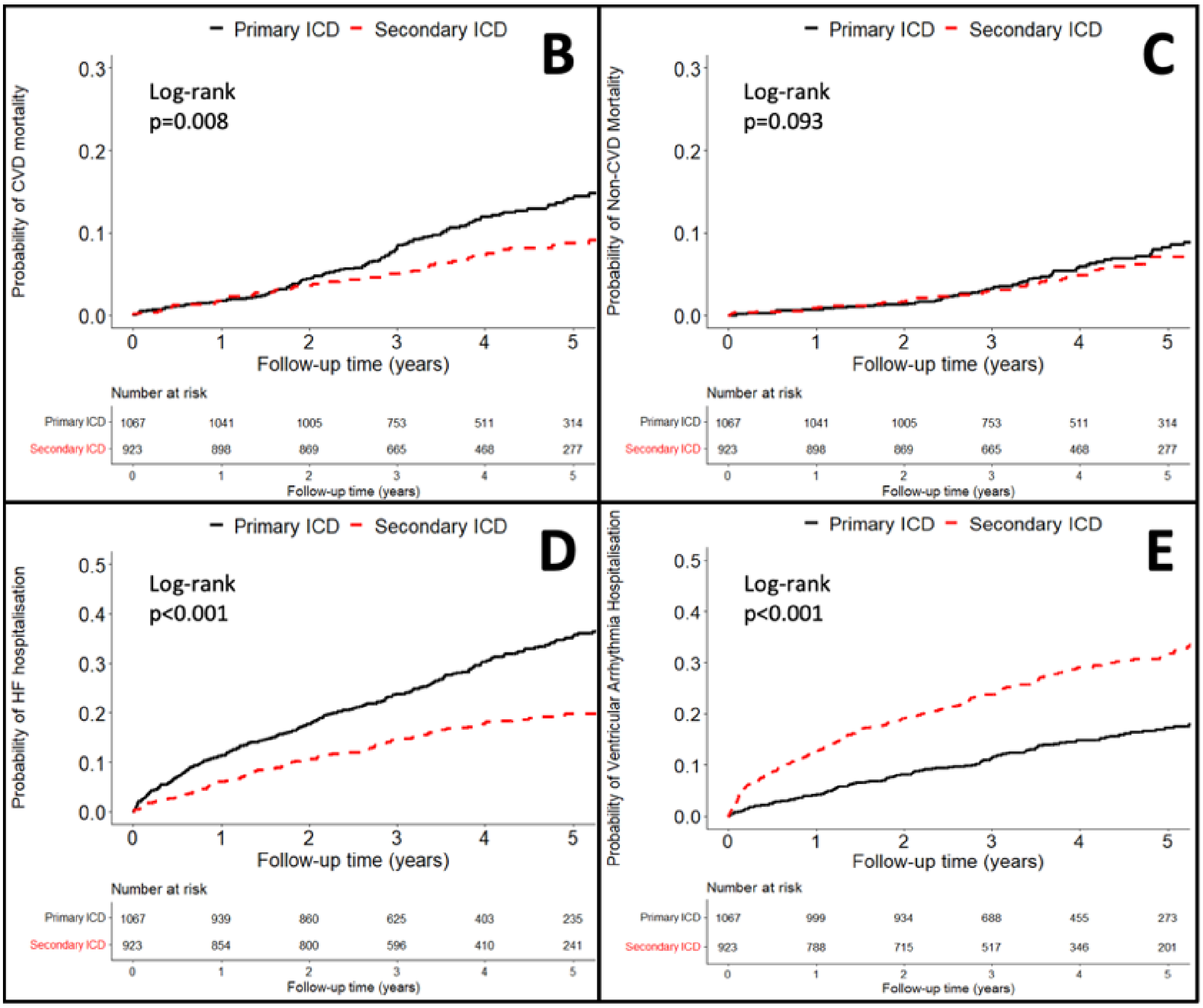


Figure 1. All-cause mortality (A), CVD mortality (B), non-CVD mortality (C), heart failure hospitalisation (D) and ventricular arrhythmia hospitalisation (E), by primary and secondary prevention implantable cardioverter defibrillator indications. Abbreviations: CVD, cardiovascular disease; HF, heart failure; ICD, implantable cardioverter defibrillator.

There were 1990 patients, including 1067 (53.6%) primary prevention and 923 (46.4%) secondary prevention ICD recipients, with a mean follow-up of 4.0±1.5 years. The median age was 62 years, 29.6% were Māori or Pacific. The clinical outcomes in primary and secondary prevention ICD recipients are shown in Figure 1. At 4 years, all-cause mortality was higher in the primary prevention group compared to the secondary prevention group (17.1% vs 11.8%, p=0.002). This was due to a higher rate of CVD mortality (11.9% vs 7.3%, p=0.008), with no significant difference in non-CVD mortality (5.9% vs 4.8%, p=0.093). Compared to the secondary prevention group, the primary prevention group had more heart failure hospitalisations (30.2% vs 17.9%, p<0.001) but fewer ventricular arrhythmia hospitalisations (14.8% vs 29.0%, p<0.001).

Multivariate analysis for predictors of mortality in primary and secondary prevention ICD recipients is shown in Figure 2.

In patients with primary prevention ICD, the independent predictors of all-cause mortality were:

1. **Māori or Pacific ethnicity** (HR 2.12, *p*<0.001)
2. **Diabetes mellitus** (HR 1.42, *p*=0.034)
3. **Older age** (per 10-year increase HR 1.33, *p*=0.003)
4. **Lower eGFR** (per 10 ml/min/1.73m² decrease: HR 1.21, *p*<0.001)

In secondary prevention ICD recipients, independent predictors included:

1. **History of heart failure** (HR 1.75, *p*=0.005)
2. **Older age** (per 10-year increase HR 1.72, *p*<0.001)
3. **Māori or Pacific ethnicity** (HR 1.71, *p*=0.018)
4. **Lower eGFR** (per 10 ml/min/1.73m² decrease: HR 1.25, *p*<0.001)

Prior MI was not a significant predictor of mortality in either group.

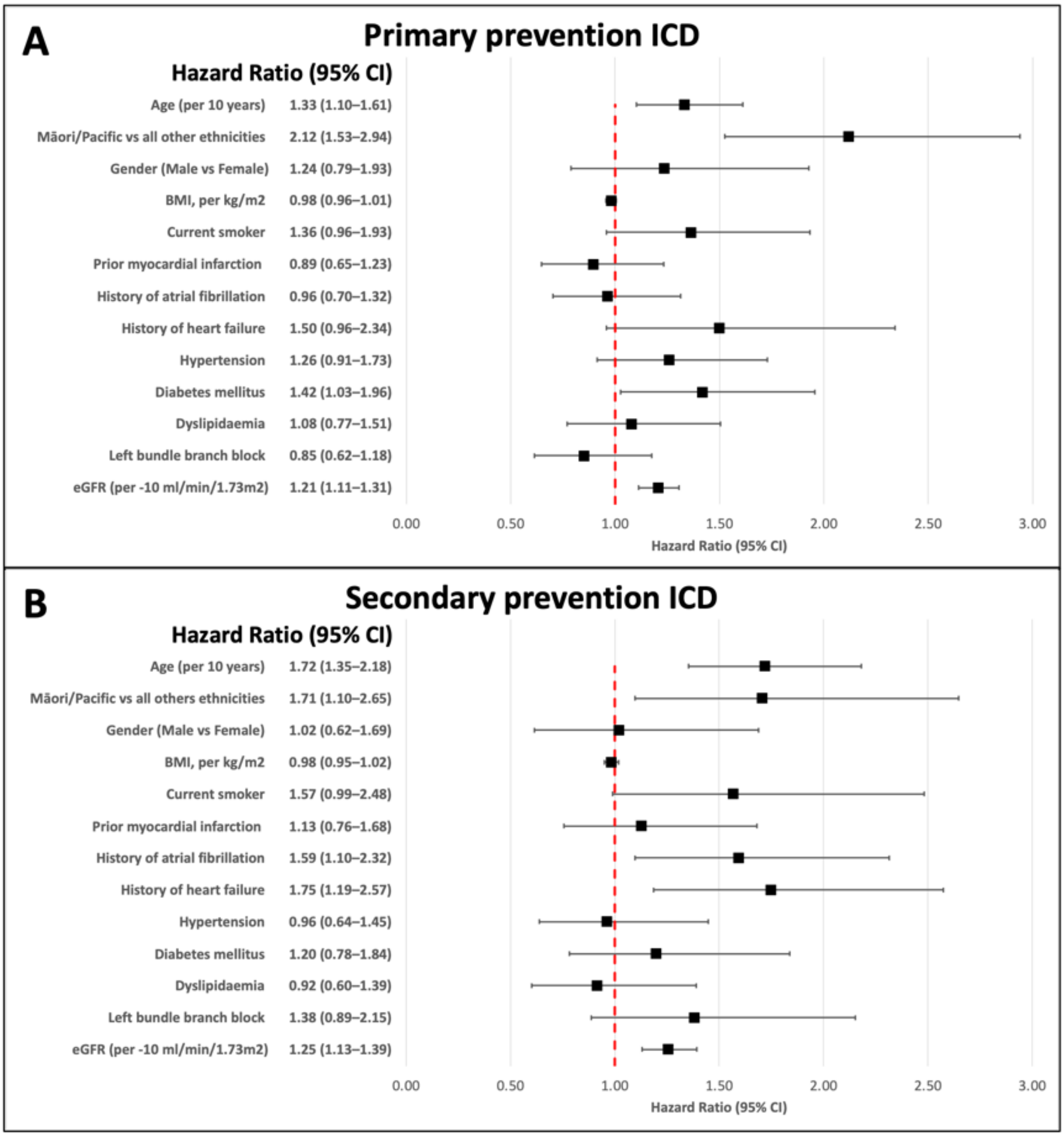


Figure 2. Multivariate Cox regression analysis of all-cause mortality in patients with primary or secondary prevention implantable cardioverter defibrillator. Abbreviations: BMI, body mass index; CI, confidence interval; eGFR, estimated glomerular filtration rate; ICD, implantable cardioverter defibrillator.

There was a higher all-cause mortality in the primary prevention ICD group compared to secondary prevention ICD group. This is discordant with findings from previous local and international data, which showed similar mortality between primary and secondary prevention ICD patients. As seen in our cohort and other studies, patients who receive a primary prevention ICD often have a higher clinical risk profile, with more comorbidities, more advanced heart failure and poorer left ventricular ejection fraction. In contrast, patients who receive a secondary prevention ICD are at a higher risk of suffering a life-threatening ventricular arrhythmia. While an ICD can mitigate the risk of sudden death from ventricular arrhythmias, it is unlikely to prevent mortality from other cardiac causes such as progressive left ventricular dysfunction or myocardial infarction; non-arrhythmic sudden death from pulmonary embolism or stroke; or non-cardiac conditions. The results of this study suggest we are selecting patients with a high clinical risk for primary prevention ICD implantation.

Older age is likely to encompass associated age-related comorbidity, while renal dysfunction, heart failure and diabetes mellitus are well documented predictors of adverse outcomes. Māori and Pacific people had twice the risk of all-cause mortality compared to all other ethnicities, which is consistent with prior reports of poorer outcomes in Māori and Pacific patients with acute coronary syndromes and heart failure. While there has been a significant increase in ICD implants in Māori and Pacific patients over the past two decades, this study shows that clinical outcomes for Māori and Pacific patients remain poorer than their European counterparts, despite receiving advanced device therapy. A separate study is underway to investigate the clinical characteristics and long-term clinical outcomes of Māori and Pacific ICD recipients compared to all other ethnicities, as well as attempt to identify predictors of mortality in these cohorts.

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TEAMWORK AND COLLABORATION: THE KEY TO SUCCESS IN DEVELOPMENT OF NOVEL ICD TECHNOLOGIES AT CHRISTCHURCH HOSPITAL

Written by: Dr Geoffrey Clare

Introduction

Christchurch Hospital, on New Zealand's South Island, has developed an international reputation as a leading centre for first-in-man and pilot trials of novel implanted cardiac devices and catheter based cardiac arrhythmia ablation technologies. In particular they have played a key role in the development of implantable cardioverter-defibrillator (ICD) systems that avoid utilising transvenous leads. Here, we will briefly review this history and explore the factors that have led to such a successful program.

History

Michel Mirowski orchestrated the implant of the first fully implantable ICD in John Hopkins Hospital in Baltimore in 1980. (1) A 145cm^3 device was implanted abdominally with an intravascular electrode at the RA / SVC junction and another electrode attached over the apex of the heart. Fully transvenous ICD systems were developed over the next decade and became the standard of care for sudden cardiac death prevention. Yet complications can occur in up to 10% of implants and they predominantly relate to the insertion and manipulation of transvenous intracardiac leads with risks of pneumothorax, vascular injury, vein thrombosis, tricuspid valve injury, lead dislodgement, cardiac perforation and arrhythmia from myocardial contact or pacing. More feared are chronic transvenous lead complications such as infection or lead failure which can potentially necessitate lead extraction with the attendant risks of SVC or cardiac rupture. ICD leads inside the vasculature and the moving heart are subjected to constant mechanical stress and examples of poor long-term performance include high voltage conductor failures in the Medtronic Sprint Fidelis lead and insulation failure with externalised cables with the St Jude Riata lead.

Development and Limitations of the Subcutaneous ICD (S-ICD)

To circumvent these problems, it makes sense to consider placing the leads outside the heart and vasculature, particularly for younger ICD patients who may require a functioning ICD system for decades, and where pacing for bradyarrhythmia is unlikely to be required. Cameron Health, a medical technology development company based in California, designed a defibrillator with a parasternal subcutaneous defibrillator lead which sits entirely outside the heart. Auckland and Christchurch were involved in feasibility testing in the early 2000's with 4 different arrangements of coil electrode size / placement and generator placement tested before the optimal configuration of an 8cm parasternal coil electrode and a left lateral pulse generator was then tested in a further study in 2004-5. In both of these trials patients would have subcutaneous ICD systems implanted and defibrillation testing performed, and then the entire system explanted at procedure end. A pilot trial of patients undergoing the first permanent subcutaneous ICD implantation was performed in July 2008 with 4 of the 6 implants performed at Christchurch. This led onto a further trial of 55 patients in New Zealand and Europe between December 2008 and February 2009 with 15 of the implants performed at Christchurch. The seminal New England Journal of Medicine paper was published in 2010. (2) Christchurch contributed a further 13 patients to the Investigational Device Exemption study from 2010-11. (3) Regulatory approval and the release of the commercial S-ICD followed with Cameron Health purchased by Boston Scientific in 2012.

Over 150,000 patients worldwide have received an S-ICD, though the device still has limitations. The increased distance of the coil electrode from the heart requires a higher 80J energy delivery leading to a larger device size (59.5cm^3 for the current Boston Scientific Emblem) which can cause increased patient discomfort. It is unable to deliver antitachycardia pacing for ventricular tachycardia or provide back-up pacing support beyond limited post-shock pacing. Battery longevity is reduced compared to transvenous devices. The widely spaced electrodes make it more susceptible to external and myopotential noise and a screening template is employed to mitigate against a vulnerability to T-wave oversensing leading to inappropriate shocks. (4)

The Evolution Toward Extravascular ICDs (EV-ICDs)

Case reports emerged of retrosternal lead implantation. Medtronic proceeded to develop a system, known as the extravascular ICD (EV-ICD), where the lead is placed under the sternum. Here it is much closer to the ventricular myocardium providing an opportunity for effective sensing, pacing and defibrillation at lower outputs. The substernal space is composed predominantly of loose connective tissue and is absent of major blood vessels which theoretically makes it relatively safe and easy to access by a percutaneous technique. The system consists of a $33cm^3$ generator, essentially the same platform as a conventional transvenous ICD, that can deliver a 40J shock, an Epsilon shaped passive fixation lead with two linked 4cm defibrillation coils and multiple pace-sense vectors, and a dedicated atraumatic substernal tunnelling tool. Following cadaver studies, animal work, and 3-dimensional computer modelling, the first feasibility trial of 16 patients (Acute Sensing and Defibrillation trial) designed to assess defibrillation efficacy was performed in 2015, followed by the SPACE trial looking at the ability of the lead to collect pacing and sensing data. Christchurch became involved in 2016 with the ASD2 trial enrolling 10 of the 79 patients in an acute feasibility study in which the lead was successfully implanted in all patients with 81% defibrillation success at 30J across all induced VF episodes. (5) The system was explanted at the end of procedure.

Expanding Horizons: First-in-Human Implants, New Technologies, and the Role of Patients

The first worldwide full EV-ICD system implant took place in Christchurch Hospital in June 2018 and was one of 8 Christchurch system implants out of 21 patients in this first-in-human pilot study of chronic implants for which Dr Ian Crozier was the Principal Investigator. (6) Christchurch enrolled the first two patients in the worldwide pivotal study and went on to enrol 11 patients. (7) The Medtronic Aurora EV-ICD met regulatory approval for commercial release in 2023 with Christchurch performing the first Australasian implant in December that year. In the following 1.5 years the team has gone on to perform a further 18 commercial implants with the data being entered into the ENLIGHTEN study. Dr Crozier now serves as a Medtronic trainer and proctor for device implants around the world.

Figure 1. The Christchurch team following the implantation of the first commercial Medtronic Aurora EV-ICD in December 2023.

Christchurch's work in this area has not stopped here with recent implants performed of the Atacor extravascular ICD lead as part of the ASCEND EV clinical study. This involves a novel self-expanding ICD lead passed through a small parasternal incision and entering the mediastinum through an intercostal space. It is designed to be compatible with commercially available ICD pulse generators. The electrophysiology team at Christchurch has also had leading involvement in first-in-human trials of a left atrial pressure sensing monitor implanted on the inter-atrial septum (8), an oesophageal temperature monitoring technology for atrial fibrillation ablation (9), and the Apama Medical multi-electrode radiofrequency ablation catheter (10,11). Other work of the team includes contributing patients to early studies of a novel pulsed field ablation catheter, a miniaturised AED, and a novel temporary pacing system.

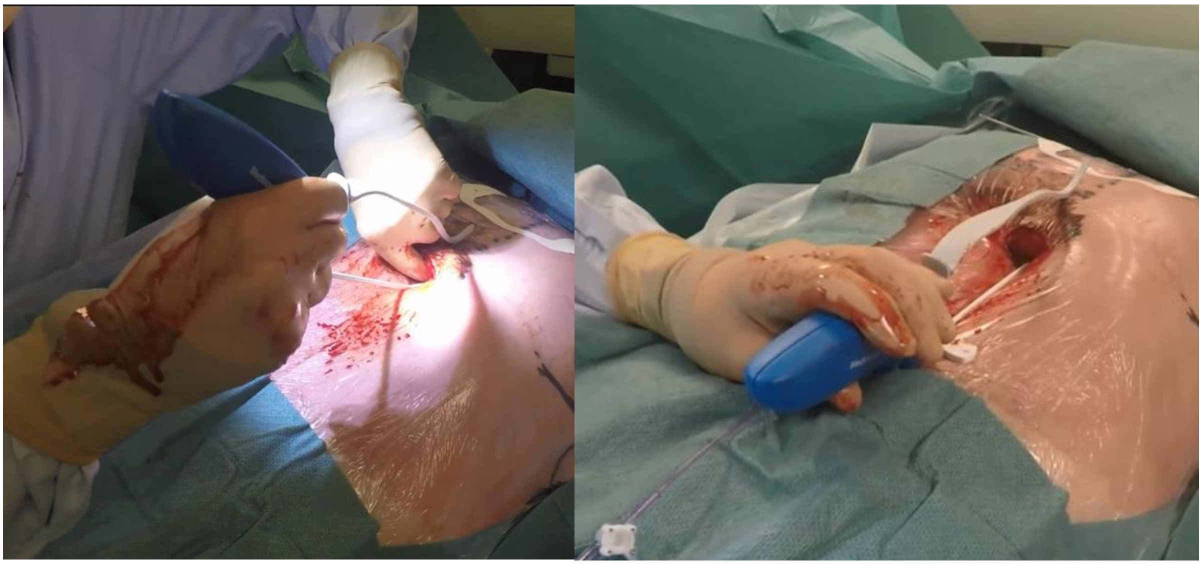

Figure 2. EV-ICD implantation at Christchurch Hospital. The redesigned tunnelling tool is introduced after blunt finger dissection into the mediastinal space through the rectus fascia and diaphragmatic attachments. The handle is then lowered to ensure the tip of the tunnelling tool is in contact with the posterior aspect of the sternum.

Staff members have been surveyed to find out the ingredients to such a successful program, and the themes of teamwork and collaboration stand out. First and foremost, we are incredibly indebted to our patients, without whom none of this would be possible. As described above, the initial feasibility studies involved implanting leads and devices and then explanting them at the end of the procedure. Our patients have generously consented to the risks of these novel procedures as well as permanent scars, and all for no direct material benefit to themselves. Arguably, with the first permanent implants, our patients may benefit from a device without transvenous leads which would not otherwise be available to them, but they have to put their faith in the medical team, and their trust in the development of a system that by definition has no longer term outcome data.

Leadership and Infrastructure

A research program needs a leader and Dr Ian Crozier's infectious enthusiasm has been the local driving force behind the initiation, design, organisation, recruitment, conduct and dissemination of these studies. His pre-eminence is highlighted by his invitation to present the results from the first 55 S-ICD implants as a late-breaker at the Heart Rhythm Society scientific meeting in 2009, and then also the EV-ICD pilot data as the Principal Investigator at the HRS late-breakers in 2019.

The ethical, regulatory and administrative tasks in these trials are immense. Fortunately, in New Zealand we have an environment conducive to this sort of research. Through repeated involvement in these trials Christchurch Hospital has been able to establish a group of permanently funded research co-ordinators to navigate the organisational complexities. It becomes a continuous loop. Industry funding allows research assistants. Their expertise develops during the study, processes of patient recruitment evolve, and the conduct of a successful trial makes the centre more attractive to other technology companies. Further invitations to collaborate ensue, tasks get easier and more streamlined from previous experience, and funding and expertise grows.

Industry Collaboration and Iterative Improvement

The conceptualisation, engineering and funding for these studies comes from industry and ultimately there are commercial imperatives. Christchurch Hospital is an entirely publicly funded hospital within the New Zealand health system and therefore it may seem an unlikely alliance yet collaboration with industry has been the key to success. The experience has been that for it to work well there has to be mutual co-operation and respectful negotiation with advice welcomed in both directions. Both the defibrillator system and the implant procedure will be iteratively improved over serial studies based on the experience from preceding cases. Product design engineers, algorithm scientists, procedural development and company field team members will often be present during the implant procedures and are actively seeking feedback from the clinicians. For example, following an adverse implant event at another centre, the Christchurch team including cardiothoracic surgeon David Shaw, advised on a technique of accessing the retrosternal space safely without the use of instruments, alongside making recommendations in reshaping the tunnelling to ensure continuous contact with the posterior sternum: ideas which were embraced by Medtronic and incorporated into the recommended implant procedure guidelines.

Multidisciplinary Collaboration

Successful implantation of a novel ICD is not the sole preserve of the operating cardiologist but requires engagement and collaboration of the entire wider cardiology team. Where possible, procedures are grouped together for efficiency and to accommodate the input of visiting staff from the industry sponsor who will have travelled to New Zealand from afar. In a busy public hospital blocking out these sessions requires the support of scheduling co-ordinators and service managers. The nursing staff looking after the patient before, during and after the procedure need to understand exactly what is being done to be able to fully care for and reassure their patient. Working with novel devices provides fantastic educational opportunities for our cardiac physiologists who become key components of the study team. This is not only at device implant, but especially true in the follow-up period where in the physiologist-run device follow-up clinics they are the first to pick-up on novel issues. Local examples from the EV-ICD program have included electromagnetic interference leading to an inappropriate device shock in a commercial spa-bath facility and p-wave oversensing during atrial tachycardia leading to device arrhythmia detection. Patient comfort with their device, sensing trends, and the tolerance of pacing are seen first and understood best by our physiologists.

Everyone is captivated by a novel procedure and there can be up to 25 people present in different capacities during implants. The EV-ICD implant procedure evolved during the studies to recommend the tunnelling tool be advanced in a true lateral fluoroscopy position and to repeatedly rotate back to anterior-posterior to check alignment. Christchurch's radiographers became key in co-ordinating what is an awkward fluoroscopy movement in a confined space, and the theatre nurses worked out optimal patient positioning to keep the left arm out of the way but still enable space for a left lateral pocket formation. At Christchurch Hospital the majority of day-to-day ablation and device work is done with cardiologist led sedation without anaesthetic presence. These procedures were done under general anaesthesia and allowed collaboration with our anaesthetic colleagues with issues such as patient positioning, the level of muscle paralysis, transoesophageal imaging, and negotiating the conduct of defibrillation testing. The benefits of this closer working relationship will transfer to our clinical practice with pulsed field ablation. EV-ICD implantation requires physician entry through the rectus fascia and diaphragmatic attachments into the mediastinal space where the nail-bed of the extended finger can make direct contact with the cardiac pulsations. Cardiac surgeons were instrumental in the development of this technique allowing physicians to get a literal feel for the anatomy during cardiac surgical procedures. The collaboration extends further as all the implant procedures are done with a cardiothoracic surgeon on standby, a process which naturally allows the surgeons to gain a greater understanding of the catheter laboratory working environment.

Conclusion

Christchurch is a busy hospital with an increasing clinical workload. Far from being disruptive, these trials of novel technologies bring enormous benefits. The Christchurch electrophysiologists have chosen to focus on first-in-human or pilot studies as they deliver a level of excitement and enthusiasm that allows the entire multidisciplinary team to come together and new partnerships to form. Everyone benefits from the learning opportunities that arise which can often be transferred back into all the other clinical procedures we conduct. Staff members from different disciplines accrue the opportunity to meaningfully present at conferences.

The centre becomes more attractive for fellows-in-training, physiologists and qualified cardiologists. When a study protocol is recruited to well, and completed successfully and safely, other companies will be more likely to seek our collaboration, and the whole program grows organically. Ultimately however it is our patients, again in whose trust and generosity we are implicitly dependent on, who stand to benefit from these procedures which have moved from feasibility studies to guideline endorsed therapies in just a few short years.

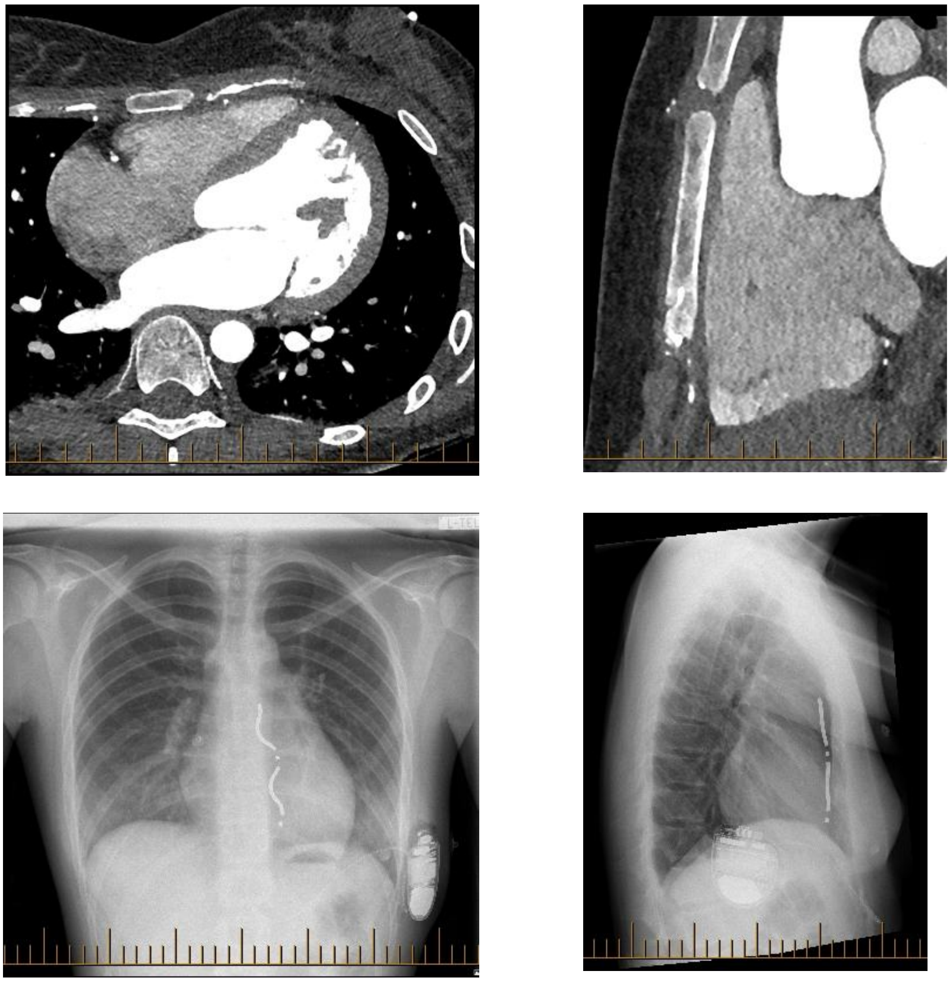

Figure 3. An 18 year old woman with a resuscitated VF arrest which was attributed to congenital long QT syndrome. Slices from her pre-procedure CT scan show close apposition of the sternum and the right ventricle and that the target area for the EV-ICD lead can often only be appreciated as a potential space. The PA and lateral chest radiographs show the final lead and device positions following successful implantation and defibrillation testing.

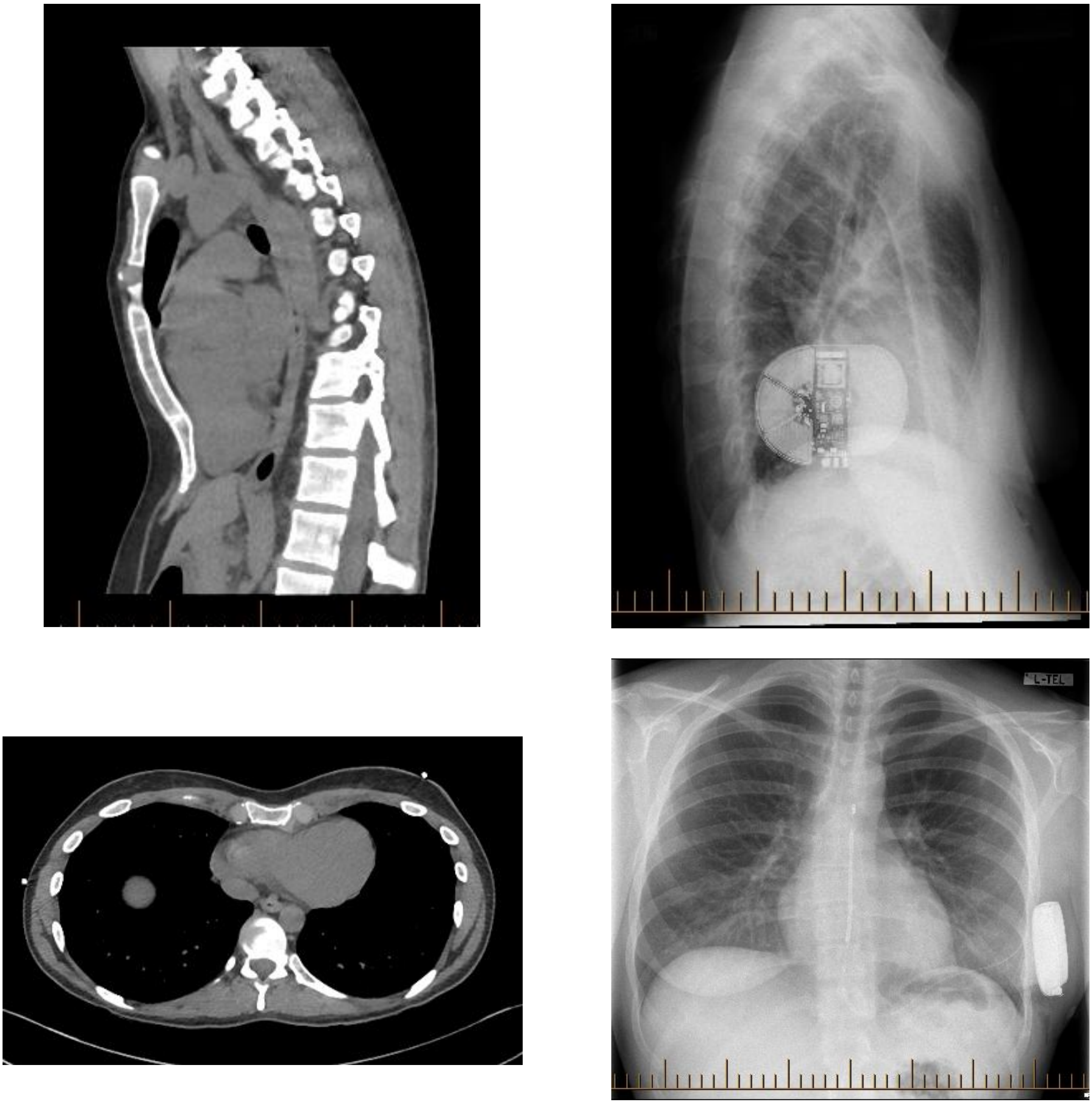

Figure 4. A 26-year-old woman was indicated for an ICD following an idiopathic VF arrest. Due to her young age and lack of need for brady-pacing it was desirable to avoid a transvenous lead. An EV-ICD was considered but pre-procedure CT scan highlighted her significant pectus excavatum which was felt to preclude safe retrosternal tunnelling due to an increased risk of cardiac injury. A S-ICD was implanted (Boston Scientific Emblem A219) with the chest radiographs illustrating the larger size of this device.

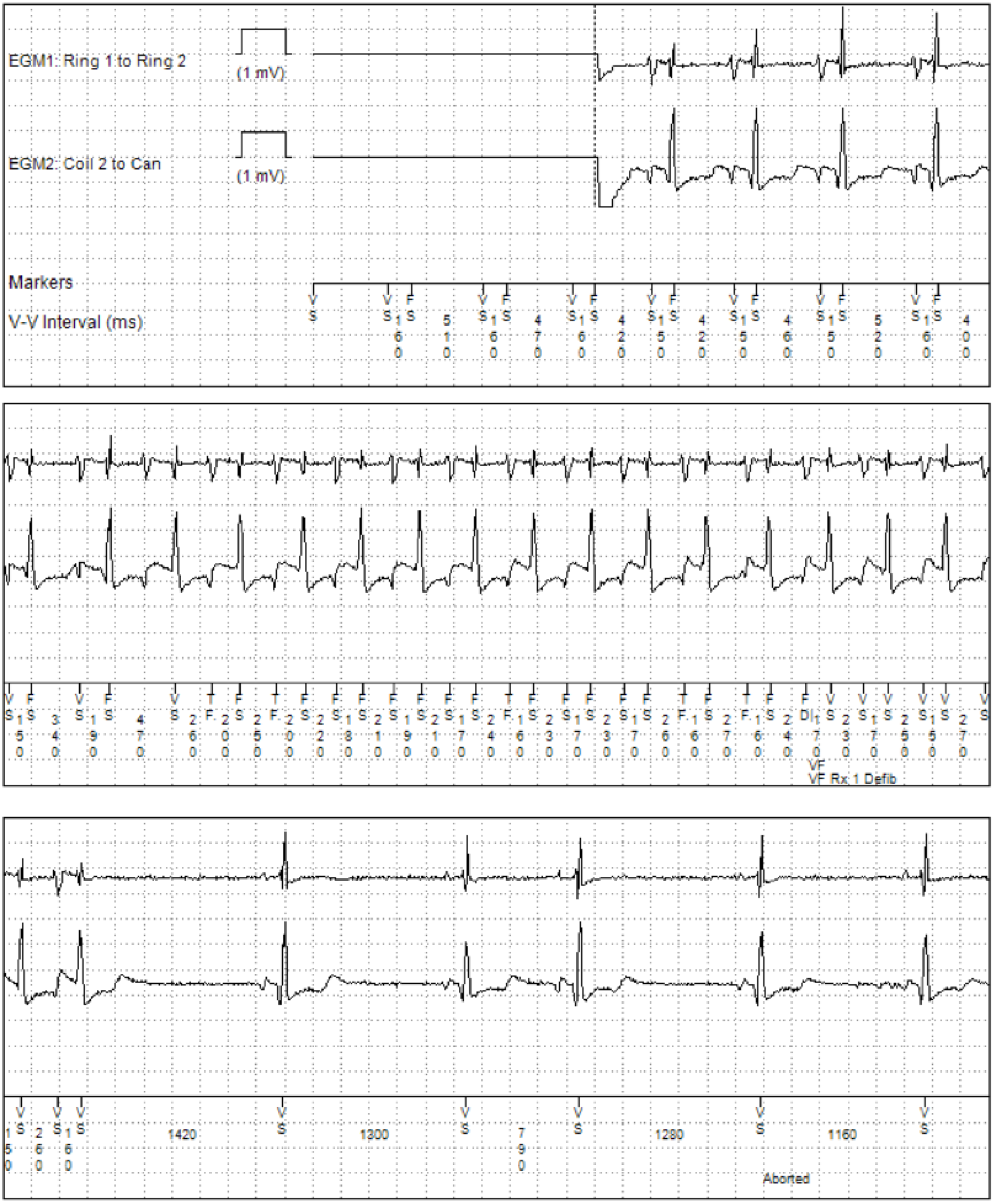

Figure 5. 36-year-old woman with a primary prevention EV-IVD for hypertrophic cardiomyopathy. Pre-procedure CT scan identified a large right atrial appendage but the lead was successfully implanted with negligible p waves. The figure shows the subsequent detection and charging of the device for ectopic focal atrial tachycardia which resulted in a much larger sensed p wave in the programmed ring 1 to ring 2 sensing configuration. Fortunately, the arrhythmia terminated spontaneously before a shock was delivered with small near-field p waves seen on the subsequent sinus beats.

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GETTING TO KNOW: DR LIM CHUN YIH PAUL

APHRS Young EP Committee Chair 2025
The Heart Specialist Clinic / The National Heart Centre Singapore

Why did you choose to enter medicine and above all, prefer to specialize in Electrophysiology?

My grandfather was afflicted with prostate cancer and was in very much pain when he developed bone metastasis. At that point of time there was a young physician who showed much kindness to him during the palliative period of his disease and I was inspired by how this human touch seemed to reassure and comfort my grandfather despite him knowing his poor prognosis.

As I understood myself more through the course of my training, I realized that I needed to build up from first principles before a concept made sense, and this was very much in-keeping with the nature of electrophysiology. Electrophysiology also appealed to me because it needed some thinking through to understand and interpret, and my nature is to ponder a little before I make a decision or diagnosis.

What do you regard as the most significant development in Electrophysiology in the recent past?

Pulse field ablation has been revolutionary in atrial fibrillation ablation, with increased safety profile and with current catheters, extrapulmonary ablation has become much easier. Even though current results have yet to show superiority compared to thermal ablation methods, pulse field ablation holds much promise in due course as more catheter options become available.

If you could have an alternative career, what would it be and why?

I'd take on any job that will allow me to work entirely from home as then I'd be able to spend more time with the family.

Who has inspired you the most in your life and why?

I have been greatly inspired by a mentor physician that I used to work with in the public sector. He inspired me to continually strive to be the best doctor that I can achieve, in terms of keeping up to date in our rapidly progressing field of medicine and also in terms of giving the best care that we can accord to our patients. He would display kindness and a great amount of patience towards his patients no matter how busy he was and this is something that I my best try to do too.

What advice would you give to your younger self?

I'd ask myself to be more daring, spontaneous and not be so concerned about making mistakes as one learns from mistakes and you never know till you try.

What are your thoughts about some of the emerging technologies, and the way they will shape the future care of arrhythmia patients?

Artificial intelligence is poised to transform the way arrhythmia patients are managed, from improved diagnostics, rapidity to diagnosis, personalized medication, improved risk prediction models and preventative medicine. But as AI takes over more tasks, we must still uphold the medical ethics of conduct and maintain the human touch which are paramount to the practice of medicine.

What are your hobbies and interests outside of medicine?

Photography is one of the interests I have outside of medicine. I've amassed a fair bit of photographic equipment. But age has caught on and I find carrying tens of kilograms of camera gear more and more of a burden, and they are lying untouched in the dry cabinet. Alas most of my photographs nowadays are taken with mobile phone cameras out of convenience, though it does make you think more about how to make the shot different and unique since the background blur effects may not be as good.

What is a funny thing that has happened to you recently?

I was just sitting down and talking to my 9-year-old daughter and asking her about how her test went and how she thought she would do. She gave me an irritated look and told me flatly “One cannot predict the future”. I thought it was hilarious that my little girl was giving me words of wisdom, but there was some truth in it about embracing the current and not worrying too much about the uncertain future.

What is your best life advice, motto or favorite quote?

Respect is earned and does not necessarily come with seniority.

THE ELECTROPHYSIOLOGY TEAM OF THE LABAID CARDIAC HOSPITAL, DHAKA, BANGLADESH

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Hospital Overview

Labaid Cardiac Hospital is located in the capital city Dhaka in Bangladesh. Bangladesh is one of the densely populated countries in the Southeast Asia. The estimated total population of Bangladesh in 2025 is around 175.7 million making it the 8th most population country in the world. The Dhaka Metropolitan Area population in 2025 is about 24.65 million. Labaid Hospital comprises of the Cardiology and Medicine, Electrophysiology and Pacing, Cardiovascular Surgery departments.

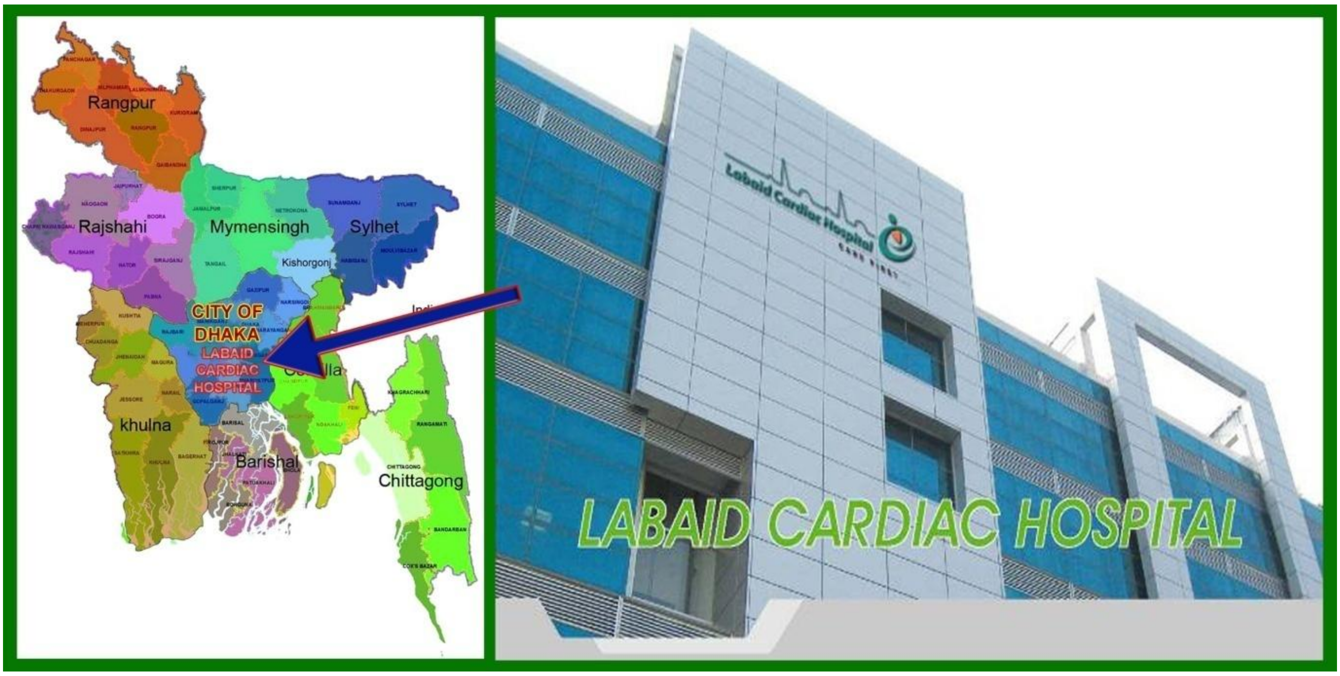

Figure 1a. Map of Bangladesh showing location of Labaid Cardiac Hospital in the Capital City of Dhaka (Left)
Figure 1b. Labaid Cardiac Hospital, Dhaka

Department of Cardiac Electrophysiology and Pacing

The Electrophysiology (EP) section was founded on 13 July 2004. The size of the EP Cathlab is 1056 sq ft. Our team comprises of 3 senior physicians and 6 junior doctors. Two of our senior consultants have short term EP training from abroad. Technicians are locally trained by different workshops headed by foreign experts. Our EP machine belongs to GE system and RFA machine is Stockert from Biosense Webster. We have irrigation systems for RFA. Labaid EP Lab has no 3D Electroanatomic color mapping system.

In 2024, 239 different types of arrhythmias (SVT, VT) were ablated. Among 239 cases, 137 were atrioventricular nodal reentry tachycardias (AVNRT), 90 were atrioventricular reentry tachycardias (AVRT), 7 were ventricular Tachycardias (VT). 118 different types of devices were implanted and generator replaced including cardiac resynchronized therapy (CRT), and conduction system pacing (CSP). The number of EP cases are increasing day by day. Complex cases are often referred to our hospital from other centres.

In 2024, our EP department was involved with epidemiological study for atrial fibrillation in Bangladesh in collaboration with Sydney, Australia. Research shows that the burden of atrial fibrillation in the Asia-Pacific region is changing.[4] Prevalence of AFib in the Bangladeshi population is 4.1 %, whereas the world standard is 1.5 to 5.5%. AFib burden in Bangladesh is 9%, world standard is 5% to 11%.[2] At present, our EP lab is not involved in research work.

Figure 2. Working Electrophysiology Laboratory of Labaid Cardiac Hospital

Figure 3. EP Lab during a complex procedure

Figure 4. Analysis of intra cardiac ECG on the monitor during induced tachycardia

Figure 5. Permanent pacemaker implantation due to Atrial Fibrillation with bradycardia and long pause

Case Example 1: Successful RFA of high-risk Right mid-septal WPW pathway

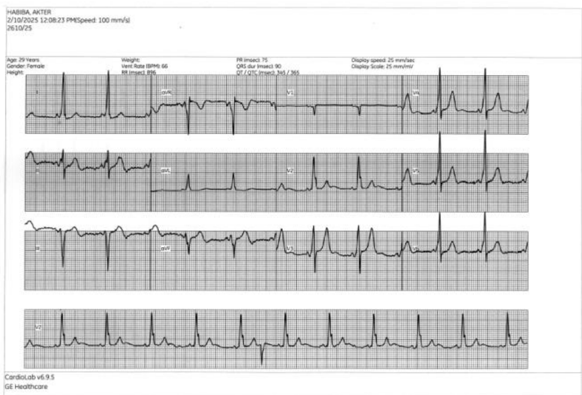

Figure 6. Showing sinus rhythm ECG of right mid-septal pathway

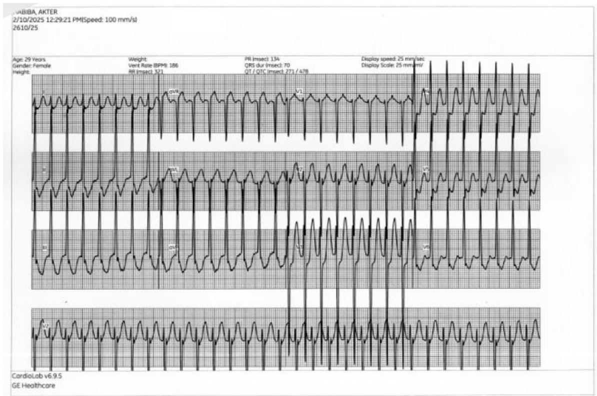

Figure 7. Orthodromic tachycardia from right mid-septal pathway

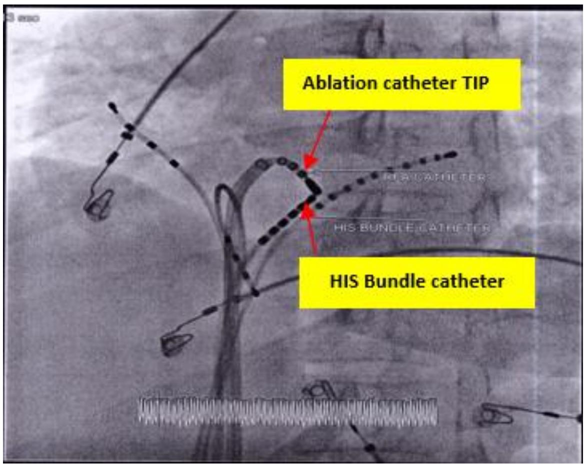

Figure 8. Ablation catheter touching HIS bundle catheter

Figure 9. Mapping and ablation of right mid-septal pathway. Mid-septal pathway gone; sinus rhythm appeared

Case Example 2: Successful RFA of Left Posterior Fascicular (IL-VT) ablation

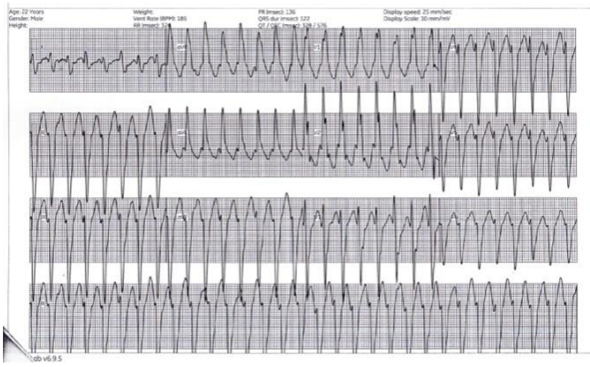

Figure 10. Surface ECG showing posterior fascicular VT (ILVT)

Figure 11. Cathlab induced ILVT

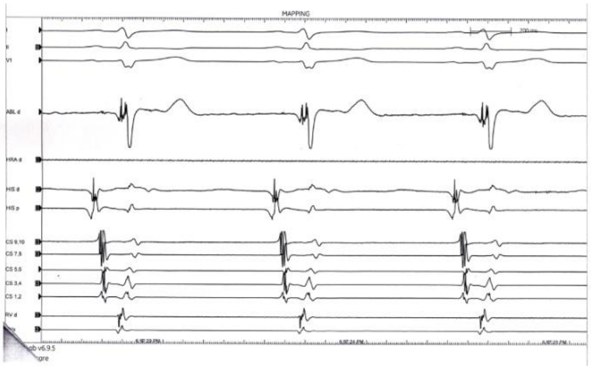

Figure 12. Mapping showing Purkinje potential of posterior fascicular VT (ILVT)

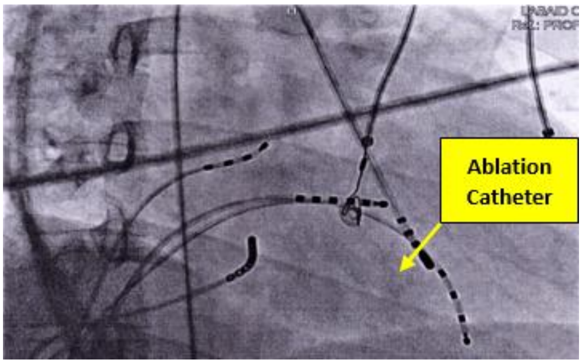

Figure 13. Location of ablation catheter at posterior septum in LV cavity for ILVT ablation.

Case Example 3: Successful implant of LOT CRT-P due to Pacing induced cardiomyopathy (PICM) and Atrial Fibrillation (Upgrading from dual chamber)

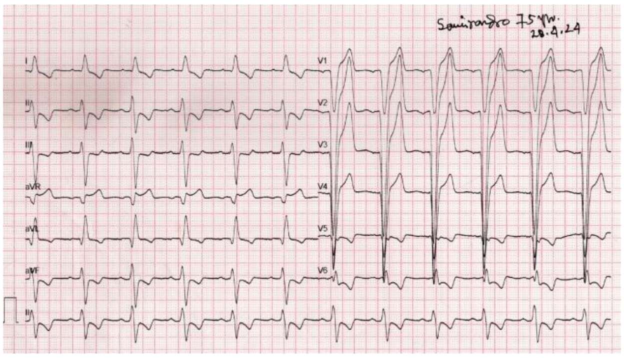

Figure 14. ECG after dual chamber RV pacing (Post PICM), wide complex with LBBB morphology

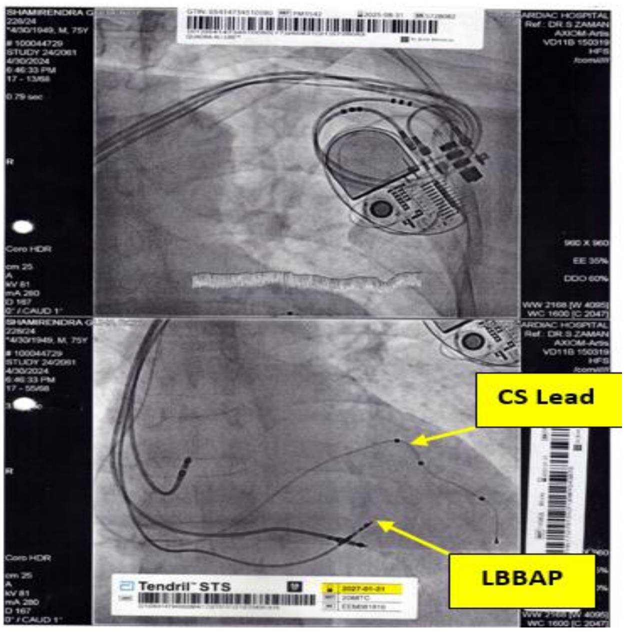

Figure 15. LOT CRT-P showing LV lead in CS and Lead in Left bundle area pacing (LBBAP)

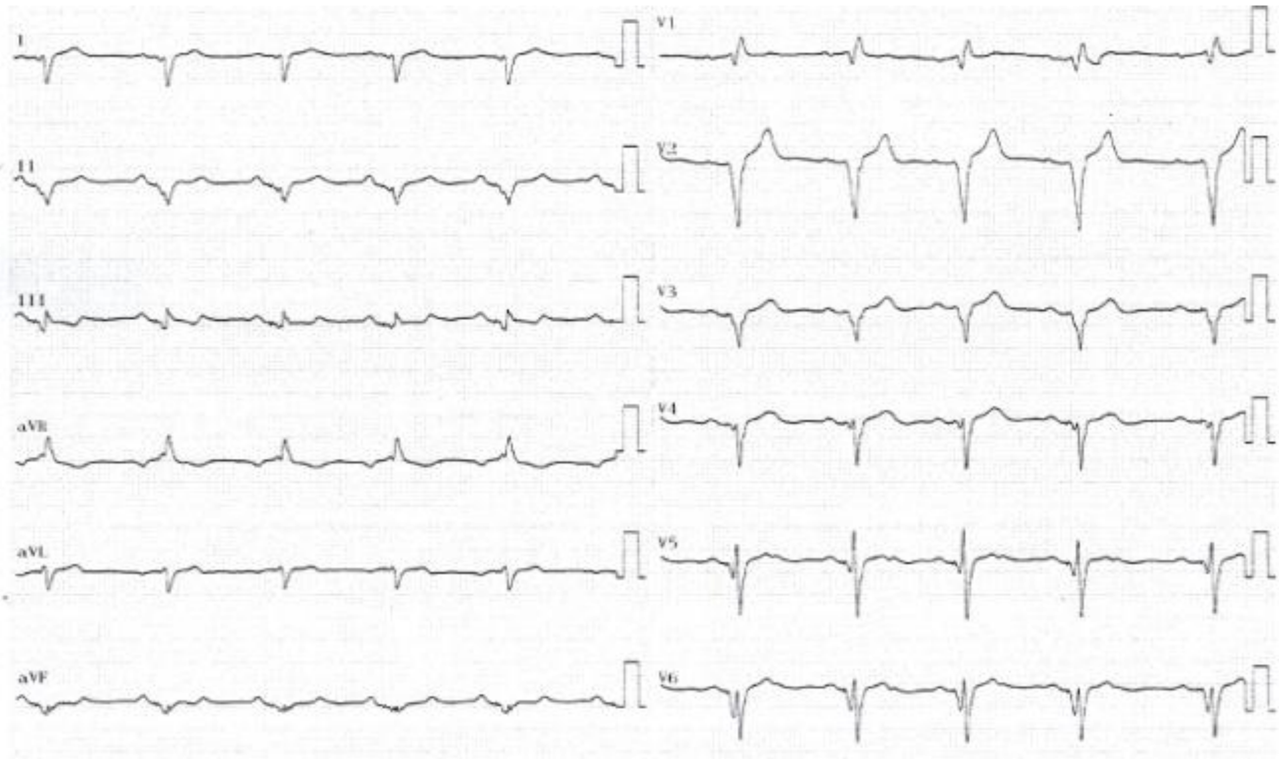

Figure 16. Narrow Complex ECG after Successful LOT CRT-P implant

Note:

1. Echo before dual chamber pacing due to 2:1 AV block, LV cavity was normal and LVEF was 54%
2. Echo after PICM – 75mm / 64mm / 30% on 23/05/2024
3. Echo after LOT CRT-P – 52mm / 32mm / 35% on 28/01/2025
4. Programming due to AF DDT (Triggered) mode used.

Training

Labaid EP lab currently has limitations on offering comprehensive training to others, as it has no 3D electroanatomic color mapping system. Despite this, physicians and technicians from across the country are still receiving training in the department. Research and clinical fellows are welcome in this department. Bangladesh Medical and Dental Council (BMDC) registration is required for hands-on experience.

Academic Activity

The Labaid Electrophysiology team performs and conducts clinical cases. The result of activities has been published in many of the prestigious journals both locally and internationally. Articles accepted and published are shown in reference[1,2,3]. Articles accepted abroad are shown in reference[4,5]. Additionally, a paper accepted at various APHRS meetings was presented as a poster, as shown in reference[6].

Hospital Information

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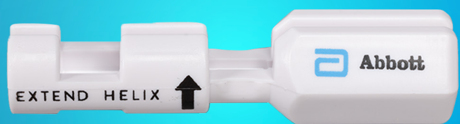

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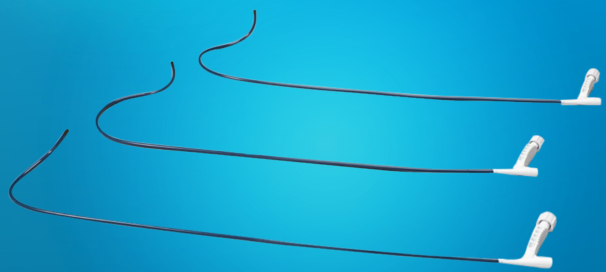

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Brief Summary: Prior to using these devices, please review the Instructions for Use for a complete listing of indications, contraindications, warnings, precautions, potential adverse events and directions for use.

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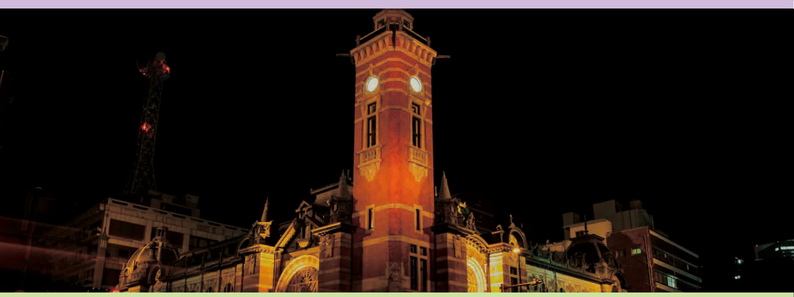
AUGUST 2025 Registration opens

Plenary Session

Speakers
Josep Brugada, Roderick Tung , Young-Hoon Kim

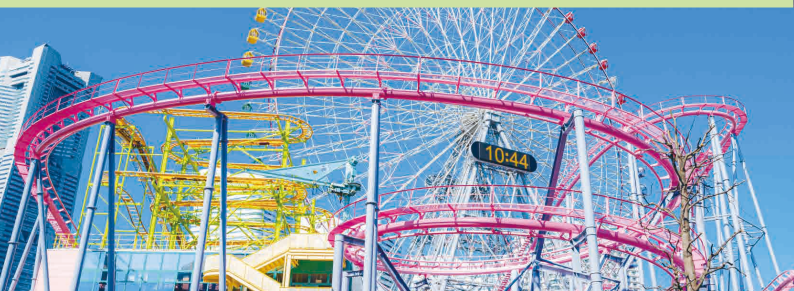


Simultaneous Publication

Possible candidates from:
Selected abstracts for Late breaking session
Selected abstracts for APHRS's YIA session
High-scoring general abstracts

Competition & Award

ECG tracing Competition
EGM tracing Competition
CIED tracing Competition
YIA (Young Investigator Award)



Scheduled Sessions

Emerging Leaders Summit 2025
Joint Symposiums (with HRS,EHRA,JAHRS,WSA)
Women in EP
JOA (Journal of Arrhythmia) session