Arrhythmia Alliance
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SHOWCASING SVT PIONEERS OF 2022

ARRHYTHMIA ALLIANCE HEALTHCARE PIONEERS REPORT

www.SVTpioneers.org

MISSION

Arrhythmia Alliance (A-A)— working together to improve the diagnosis, treatment, and quality of life for all those affected by arrhythmias.

A-A is a coalition of charities, patient groups, patients, carers, medical groups, and allied professionals. Although these groups remain independent, they work together under the A-A umbrella to promote timely and effective diagnosis and treatment of arrhythmias.

A-A provides support, information, education, and awareness to all those affected by or involved in the care of cardiac arrhythmias

FOREWARD

Supraventricular tachycardia (SVT) is a rapid increase in resting heart rate (above 100 beats per minute) that, as the name suggests, originates in the atria. In the USA, it has an approximate prevalence of 140 per 100,000 and an incidence of 73 per 100,000.[1] Furthermore, Go et al estimate "that at least 393,810 Americans experience symptomatic, sustained SVT". They add that the burden of SVT is "notably higher" in "older people, women, those of white or black race, and those with cardiovascular disease (coronary disease or heart failure) or major cardiovascular risk factors (chronic kidney disease, diabetes mellitus, or hypertension)".

The diagnosis of SVT can be difficult given the episodic nature of the condition — i.e., the need to record an EKG when an event occurs. Another challenge is that while medications (such as beta-blockers) and interventions (such as ablation) are available to reduce the frequency and duration of symptoms, people with SVT may continue to have episodes.

Additionally, because of finding the side-effects intolerable, some patients discontinue taking medication.[2]

To help address these challenges, Arrhythmia Alliance Publishes its *Healthcare Pioneers Report Showcasing SVT Pioneers*. The aim of the report is to provide case studies to inspire centers around the world to improve care and quality of life for people with SVT. Arrhythmia Alliance is proud to announce winners for 2022 from America, UK, Canada, Australia and Malaysia the winning case studies demonstrate innovative approaches to managing SVT. They include a new look at Wolff-Parkinson-White Syndrome, Zero fluoroscopy electrophysiological procedures for children with SVTs and Episodes of supraventricular tachycardia captured on an athlete's smartphone ECG.

Arrhythmia Alliance congratulates and acknowledges these centers of excellence for there examples of innovative work in managing SVT, for more information please visit www.heartrhythmalliance.org.

Trudie Lobban MBE
Founder and CEO,
Arrhythmia Alliance

Hugh Calkins, MD
Medical Director
& Board Member,
Arrhythmia Alliance

References
1. Go AS, Hlatky MA, Liu TI, *et al.* Contemporary burden and correlates of symptomatic paroxysmal supraventricular tachycardia. *J Am Heart Assoc* 2018; 7: e008759
2. Milestone Pharmaceuticals. Paroxysmal supraventricular tachycardia (PSVT). http://bit.ly/2ZTDezg (Date accessed: 26/02/21)

CONTENTS

A NEW LOOK AT WOLFF-PARKINSON-WHITE SYNDROME

DR SHUBHAYAN SANATANI, DR SUSAN P ETHERIDGE, DR IAN LAW • *BC Children's Hospital and Sunny Hill Health Centre, Vancouver Canada, & University of Iowa Stead Family Children's Hospital, University of Iowa Carver College of Medicine, USA, & University of Utah Health, USA*

INTRODUCTION

Supraventricular tachycardia (SVT), the most common arrhythmia of childhood often presents in the newborn period and can be difficult to treat. A decade ago, the Pediatric and Congenital Electrophysiology Society (PACES) published results of the first randomized control trial on the medical treatment of infant SVT. The study made important new discoveries, including that recurrence rates were lower than anticipated. More importantly, and the focus of this report, is the development of an international collaboration focused on pediatric SVT.

METHODS

Wolff-Parkinson-White (WPW) syndrome is associated with pediatric SVT and is different from other forms of SVT in that the underlying accessory pathway is evident on the resting electrocardiogram (ECG). The ability of this accessory pathway to conduct antegrade confers a small but important risk of sudden death due to rapid conduction of atrial fibrillation (AF) to the ventricle. Sudden cardiac death while rare, is front-loaded in the young. In order to conduct research amongst multiple sites, we developed a collaboration initially referred to as the International SVT Pediatric Interest group or ISPRINT. This group of PACES members has prioritized research in WPW toward better characterization of risk, since with catheter ablation, WPW is a curable disease.

After the death of his son from WPW, Paul Fischerkeller established a fund to promote research to improve the understanding of WPW in the young. PACES was awarded a grant and important data have emerged leading to a shift in the management of WPW in children.

RESULTS & CONCLUSIONS

In an initial manuscript, children with WPW who had experienced a life-threatening event (sudden death, arrest or clinically significant rapidly conducted AF) were compared to matched controls. Children with a life-threatening event were younger and less likely to have had previous symptoms or SVT. The life-threatening event was the sentinel symptom in 65%. Thus, an asymptomatic child with WPW is not safe. We also found that the electrophysiology study was imperfect at predicting risk.

Two pediatric WPW databases were combined to determine if intermittent conduction over an accessory pathway did, as previously thought, convey low risk. We identified 1589 patients of whom 244 (15%) had non-persistent pre-excitation. Non-persistent pre-excitation was associated with fewer high-risk features as determined by electrophysiology testing. However, of the 61 patients with a life-threatening event, 10% had non-persistent pre-excitation. Thus, non-persistent pre-excitation did not exclude the risk of a life-threatening event.

We are presently gathering prospective data on children with WPW from 20 international centers participating. Preliminary data suggest that 2.2% of children present with a life-threatening event and in many, the life-threatening event is the initial symptom. Events are more likely to occur with rest or activities of daily life rather than sports.

By coming together as an international community, collaboratively re-examining a well-known condition, we have added to our knowledge base, challenged dogmatic practices and will inform evidence-based guidelines.

ZERO FLUOROSCOPY ELECTROPHYSIOLOGICAL PROCEDURES FOR CHILDREN WITH SVTS: REDEFINING THE VALUE OF ELECTROANATOMICAL MAPPING AND INTRACARDIAC ULTRASOUND

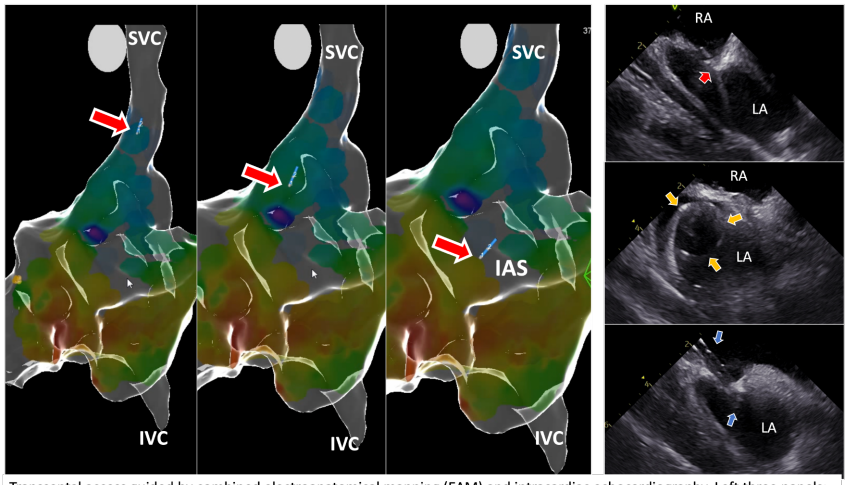
DR ARTHUR YUE, DR NORAH YAP, PHIL BANKS, DR SHANKAR SADAGOPAN
University Hospital Southampton, Southampton, Hampshire, UK

INTRODUCTION

Electrophysiological study and catheter ablation is the established treatment of choice for children and adolescents with symptomatic supraventricular tachycardias (SVTs). Catheter ablation has been performed with prolonged fluoroscopy guidance in paediatric registries, despite the development of electroanatomical mapping (EAM). This exposes children and cathlab staff to the harmful effects of radiation. Recently, zero fluoroscopy has become accepted practice in adults, with the use of EAM guidance of right heart procedures. Left heart procedures that necessitate transseptal access can be facilitated by intracardiac echocardiography (ICE). In UK paediatric centres, zero fluoroscopy procedures are rarely performed, particularly for transseptal access for left sided pathway ablations mainly because of technical challenges in displaying the transseptal needle location on EAM.

METHODS

We have performed a series of electrophysiological studies and catheter ablation for paediatric SVTs guided by EAM without the use of fluoroscopy. We have developed a solution to allow real-time display of the transseptal needle tip location by connecting a radiofrequency transseptal needle (NRG, Baylis) to EAM systems. This provides realistic anatomical guidance for left heart access and additional layer of safety when combined with the use of ICE for transseptal access.



Transseptal access guided by combined electroanatomical mapping (EAM) and intracardiac echocardiography. Left three panels: EAM of the right atrium (modified left lateral view). The transseptal needle tip location was represented by a moving icon on the EAM (red arrow) as it was steered from the superior vena cava (SVC) towards the interatrial septum (IAS). Right three panels: (top) transseptal needle tenting the IAS; (Middle) a guidewire was looped into the left atrium; (Bottom) a long fixed sheath (blue arrows) was then inserted into the left atrium to allow mapping and ablation in that chamber.

One hundred paediatric patients with SVT underwent fluoroless electrophysiological studies with or without catheter ablation in our centre. Mean age was 13 years (range 5 – 18 years). Sixteen patients underwent diagnostic studies only. The mechanisms of SVTs were accessory pathways in 46, AV nodal re-entry tachycardias in 37, and atrial tachycardias in 11. Eighty-four patients underwent catheter ablation of SVT. Fifteen patients underwent combined EAM and ICE guided transseptal access with needle tip display guidance for left sided accessory pathway ablations. The acute success rate for SVT ablation was 100% reaching standard endpoints for SVT ablation during the procedure. There were no complications.

RESULTS & CONCLUSIONS

Zero fluoroscopy electrophysiology procedures can be performed safely and effectively in a large cohort of paediatric patients with SVTs. Real time display of the transseptal needle on EAMs is feasible in providing additional guidance for transseptal access. We believe that our approach would provide reassurance for more centres to adopt a zero fluoroscopic approach to electrophysiological studies for children. This will not only prevent long term harm of radiation exposure to children and cathlab personnel, but also a real potential in further improving the safety of the ablation procedure.

REFINED, ALARA, ZERO 'ZIPPY' FLUOROLESS LANCASHIRE ELECTROPHYSIOLOGY SERIES - SVT COHORT (RAZZLE - SVT)

DR. ARUNA ARUJUNA[1,2], DR. SANJOY CHOWDHURY[1], DR. SCOTT GALL[1], DR. SHAJIL CHALIL[1], DR. KHALID ABOZGUIA[1]

1. Lancashire Cardiac Centre, Blackpool Victoria Hospital, Blackpool, Lancashire, UK

2. UK King's College London, School of Biomedical Engineering & Imaging Sciences, Strand, London, UK

INTRODUCTION

Utilisation of three-dimensional electroanatomic mapping systems have revolutionised catheter ablation of supraventricular arrhythmias by significantly reducing use of conventional fluoroscopy.

METHODS

We report a case of fluoroscopy-free catheter ablation of atrio-ventricular nodal re-entrant tachycardia (AVNRT) in a 58-year-old female, as a part of a series of thirty-five patients undergoing elective catheter ablation of supraventricular tachycardia (SVT) without use of fluoroscopy. These cases were selected based on operator and patient preference. The mapping systems utilised were Carto (Biosense Webster, USA), Ensite Precision (Abbott, USA) or Rhythmia (Boston Scientific).

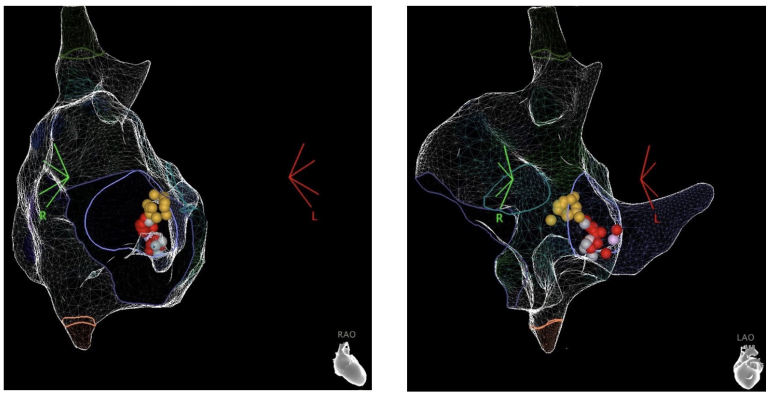
In this index case, Carto (Biosense Webster, USA) was utilised. Following local anaesthesia, we obtained ultrasound-guided right femoral venous access for placement of four venous sheaths. A decapolar catheter was utilised for delineating anatomical landmarks of inferior and superior vena cava, right atrium, tricuspid annulus and the coronary sinus. We then cannulated the coronary sinus using the decapolar catheter with further guidance from electrical signals, which remained as a stable reference point against map shifts. We then advanced a quadripolar catheter to gather additional right ventricular anatomical shell and subsequently placed it in the right ventricular apex. Another quadripolar catheter was placed in the high right atrial position and a CRD2 catheter was placed in His-bundle position and His-cloud location was elucidated using electrical signals without use of fluoroscopy.

A standard diagnostic electrophysiological study was carried out and diagnosis of typical AVNRT was confirmed in this case. An ablation catheter was placed over the anatomical location of the slow pathway for radio-frequency ablation with guidance from electro-anatomical mapping only. Post-ablation testing and monitoring were carried out as standard. All catheters were removed upon successful completion; haemostasis and standard post-procedure care followed.

RESULTS & CONCLUSIONS

The obvious advantage of a fluoroscopy-free approach is decreased radiation exposure to patient and staff, taking the principle of as low as reasonably achievable (ALARA) one step further. This is a particularly attractive proposition for younger patients, patients with relative contraindication for radiation, as well as being attractive to staff who can safely operate without requiring lead aprons and thus further reducing long-term likelihood of developing spinal orthopaedic concerns.

In conclusion, fluoroscopy-free or minimised fluoroscopy use in catheter ablation of SVT is safe, equally quick once past the learning curve and renders a good outcome whilst keeping radiation doses to as low as possible if not zero in comparison to our traditional fluoroscopy-based approach.



Typical right atrial geometry created using three-dimensional mapping system for catheter ablation of supraventricular tachyarrhythmia without fluoroscopy - right anterior oblique (RAO) and left anterior oblique (LAO) orientation. Superior and inferior vena cava locations are noted superiorly and inferiorly, respectively; tricuspid annulus shown in cut-out. Yellow dots represent location of His-cloud whilst red and pink dots represent areas of radio-frequency catheter ablation over slow pathway location.

CONVERGENT PROCEDURE - HYBRID ABLATION FOR THE TREATMENT OF PERSISTENT ATRIAL FIBRILLATION

PROF JASWINDER GILL, MR CHRISTOPHER BLAUTH, DR BRADLEY PORTER, MR PAOLO BOSCO, PROF ALDO RINALDI, DR NICK CHILD, DR NILANKA MANNAKKARA, PROF REZA RESAVI

Guy's and St Thomas' Hospitals, Westminster Bridge Road, London, UK & Kings College, Strand, London, UK

INTRODUCTION

Catheter ablation therapy for paroxysmal atrial fibrillation is well established. The results of catheter ablation for persistent (especially long standing persistent) atrial fibrillation are poor with only around 20% maintaining sinus rhythm long term. In 2012, we were the first unit in the UK to introduce the Convergent procedure for the treatment of persistent atrial fibrillation.

METHODS

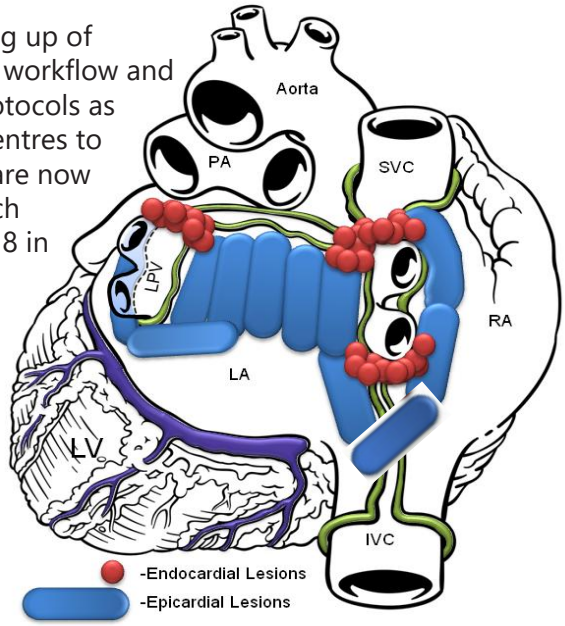
The Convergent procedure involves ablation lesions placed on the posterior wall of the left atrium by the surgeon, using a minimally invasive approach. This is then followed by the electrophysiologist ablating regions in the left and right atrium which are not easily accessible to the surgeon.

RESULTS

The results of treatment in the initial cohort were striking in that around 80% of patients maintained sinus rhythm over the first year, with an improvement in their symptoms and quality of life.

We were then involved in the design of a randomised controlled trial to test the efficacy of Convergent ablation in comparison to standard catheter ablation for the treatment of persistent atrial fibrillation. This study recruited over 4 years and we were the second highest contributors to the study. The results demonstrated that Convergent ablation was superior to catheter ablation for the treatment of persistent atrial fibrillation. Quality of life was assessed with a validated questionnaire and there were significant improvements in the patients treated by the Convergent procedure compared to the control group.

Over the last 5 years we have been active in making our colleagues aware of this modality of treatment for this difficult patient group and have helped in the setting up of these centres by sharing workflow and patient management protocols as well as attending their centres to proctor clinicans. There are now 3 centres in London which offer this procedure and 8 in the rest of the country.

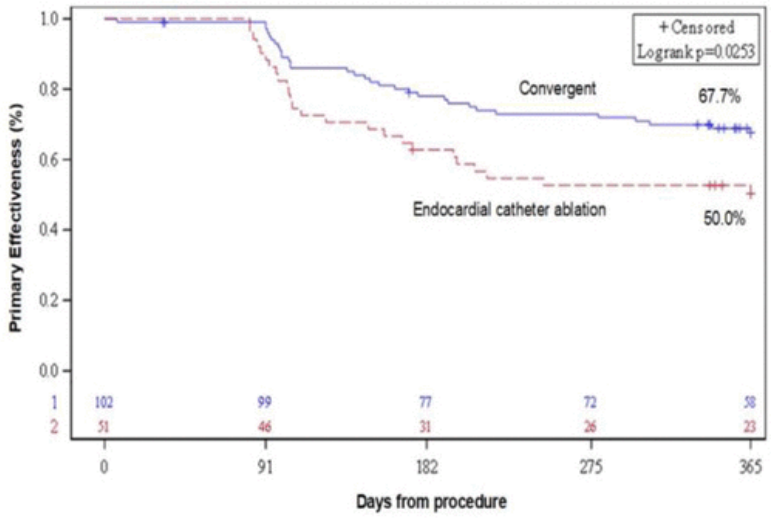


We continue to perform research to refine the procedure to improve outcomes and to enhance patient selection.

We have been able to treat patients who have failed multiple catheter ablation procedures for their arrhythmia and following the Convergent procedure, these patients have avoided the multiple admissions and medications which were previously part of their lives.

CONCLUSIONS

The introduction of the Convergent procedure has also been beneficial to our unit in that cardiothoracic surgeons and cardiologists talk together as a team to manage this difficult condition and the integration of working practices has helped both our units.



SUPRAVENTRICULAR TACHYCARDIA AND UTILITY OF THE REAL TIME MONITORING CENTER

M.A.M. AHMED MD, W.TARHUNI MD • *Canadian cardiac care, Department of Medicine University of Saskatchewan, SK, Canada, Windsor Cardiac Center, Windsor, Ontario, Canada*

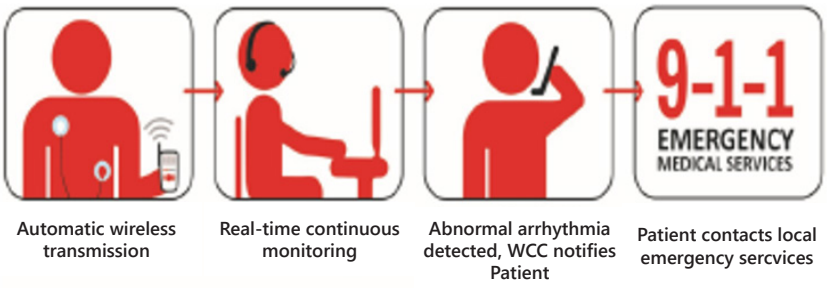


Fig 1. Work flow model for urgent cardiac arrhythmia protocol

INTRODUCTION

The utility of the various modalities Holter monitors is well established in the management of patient with cardiac arrhythmias through established specific guidelines. We present a case of supraventricular tachycardia (SVT) that was detected by our continuous monitoring center that emphasizes the role of such treatment models in the management of SVTs and of urgent arrhythmias in general.

METHODS

A 76-year-old male was hooked up to a loop monitor (cardio–phone, Braemer, Eagan MN, USA), an auto-trigger/patient activated cardiac monitor, as part of the investigation of episodic palpitation. He developed sudden onset palpitations detected by our central monitoring station through a cellular network transmission of the ECG. The workflow for our urgent arrhythmia detection system includes detection by our technicians, referral to your cardiologist and an urgent call to the patient to call Emergency Medical Services (EMS) [Figure 1]. The patient was called, and he confirmed that he had dizziness, sweating, jaw pain and palpitations. The ECG was received almost immediately, and a report was prepared by our technicians and relayed to one of our cardiologists for confirmation of the diagnosis and suggestion towards the management. The episode was of a narrow complex tachycardia [Figure 2]. EMS was called and the patient was sent to nearest emergency department.

RESULTS & CONCLUSIONS

The case outlines ways in which our center helped in early detection and prevention of adverse outcomes in cases of SVT. In cases of seriously ill SVT patient's emergency treatment can be expedited, and in less urgent cases earlier initiation of management plans can be instituted. Moreover, the detailed ECG of the arrhythmia often gives insights about the mechanisms of arrhythmia with symptom rhythm correlation as well. We are the only real time live cardiac monitoring centre in Canada and providing this service both nationally coast to coast in Canada as well as internationally.

REFERENCES

1. Steinberg JS, Varma N, Cygankiewicz I, Aziz P, Balsam P, BaranchukA, Cantillon DJ, Dilaveris P, Dubner SJ, El-Sherif N, Krol J, Kurpesa M, LaRovere MT, Lobodzinski SS, Locati ET, Mittal S, Olshansky B, PiotrowiczE, Saxon L, Stone PH, Tereshchenko L, Turitto G, Wimmer NJ, VerrierRL, Zareba W, Piotrowicz R .2017 ISHNE-HRS expert consensus statement on ambulatory ECG and external cardiac monitoring /telemetry. Heart Rhythm. 2017 Jul; 14(7): e55e96. Am J Cardiol.

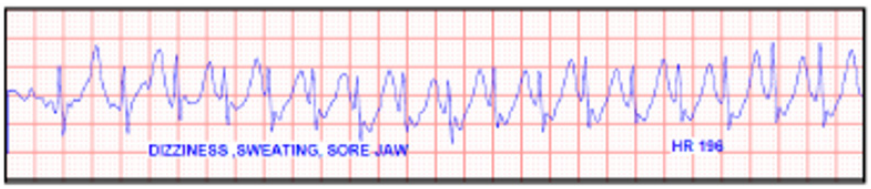


Fig 2. Onset of narrow complex tachycardia.

EPISODES OF SUPRAVENTRICULAR TACHYCARDIA CAPTURED ON AN ATHLETE'S SMARTPHONE ECG

DR JESSICA J ORCHARD, JACOB JEWSON, MARK YOUNG, CHRIS SEMSARIAN, JANE FITZPATRICK, ANDRE LA GERCHE, JOHN W ORCHARD • *Charles Perkins Centre and Centenary Institute, Building 93, John Hopkins Drive, The University of Sydney, Sydney, NSW, Australia, SK, Canada, Windsor Cardiac Center, Windsor, Ontario, Canada*

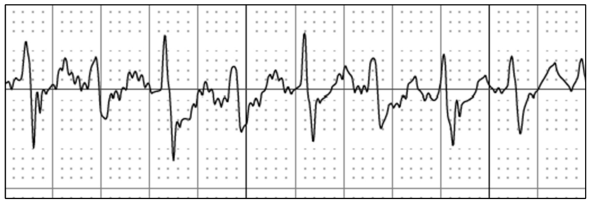
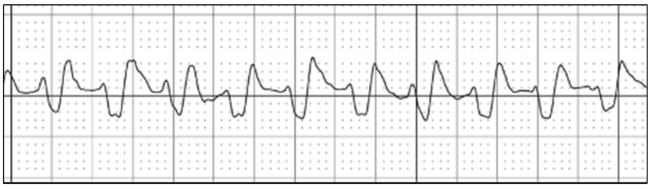


Figure (a): iECG trace showing a narrow-complex tachycardia at 206bpm



(b) wide-complex tachycardia at 196bpm

INTRODUCTION

Identifying and accurately diagnosing exercise-induced arrhythmias in athletes can be challenging. Symptoms may occur infrequently and in specific situations during high intensity exercise, where traditional monitors are ineffective or impractical. Smartphone ECG (iECG) devices are highly portable and can record an ECG trace without the need for bulky or invasive equipment.

METHODS

A 76-year-old male was hooked up to a an elite male cricketer aged 16 years experienced episodes of palpitations. These lasted 10-120 seconds, and occurred every 2 weeks over 9-12 months, usually between bouts of submaximal exercise at training.

Subsequent clinical examination showed sinus bradycardia. Blood pressure was normal, heart sounds dual (no murmur), chest examination clear with no peripheral oedema. Baseline electrocardiogram (ECG), echocardiogram, 24-hour and 3-day Holter monitor were normal.

The athlete purchased a smartphone single lead ECG (iECG) and captured a trace confirming paroxysmal supraventricular tachycardia (SVT) (206bpm) during an episode of symptoms.

The athlete had an electrophysiology study, which confirmed dual atrioventricular (AV) nodal pathways/AV junctional re-entrant tachycardia. The athlete had an ablation (slow pathway modification procedure), which was repeated 9 months later due to an incomplete response to the ablation. This deferred the need for medication which could impact exercise capacity.

At age 19, the athlete experienced symptoms on 2 occasions at maximal exertion levels. Both lasted 5 minutes, with an irregular arrhythmia and light-headedness, but no chest pain or shortness of breath. The athlete again recorded iECG traces, this time showing a wide complex tachycardia (196bpm), likely SVT with aberrancy. The athlete had a further electrophysiology study which showed persisting dual AV nodal pathway physiology but concurrently a left sided posteroseptal concealed bypass tract, requiring a third ablation.

RESULTS & CONCLUSIONS

The athlete has returned to elite sport after a brief period off.

This case demonstrates the utility of an iECG in capturing and diagnosing an exercise-induced arrhythmia. The athlete was able to capture the arrhythmias, which substantially aided in diagnosis and targeted treatment where traditional monitoring could not detect an abnormality. This case may give other clinicians and athletes confidence that smartphone ECG devices may place a useful role in reaching a diagnosis and guiding treatment.

A CASE OF REVERSIBLE ECTOPIC ATRIAL TACHYCARDIA-MEDIATED CARDIOMYOPATHY

DR KAMAL P. CHEEMA, DR WIN K. SHEN • *Mayo Clinic College of Medicine, Department of Cardiovascular Diseases, Mayo Clinic, Phoenix, Arizona, USA*

INTRODUCTION

A 60-year-old man presented to the Heart Rhythm clinic for persistent high heart rate of 120 bpm on routine exam. He was asymptomatic. He was started on Atenolol 50 mg twice daily by his primary physician. There was no significant change in his heart rate.

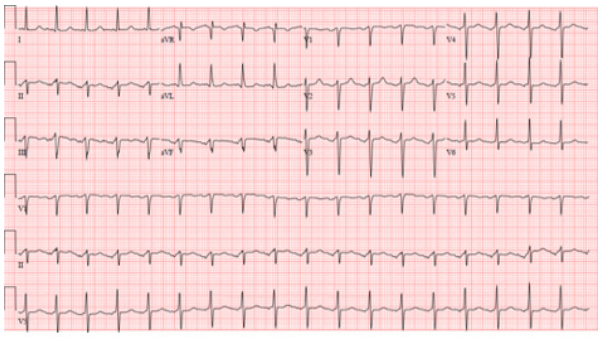


Figure 1. A baseline ECG shows a long RP narrow complex tachycardia at 110 bpm. P wave morphology shows biphasic in V1, negative in II, III, and AVF, positive in I and aVL. The P wave was notched with a duration of 140 msec.

METHODS

A 12-lead ECG at baseline is shown in **Figure 1**. The heart rate was 110 bpm with a long RP, short PR relationship. The differential diagnosis of a long RP tachycardia included atrial tachycardia (AT), permanent form of junctional tachycardia (PJRT), or atypical AVN reentrant tachycardia (AVNRT). An echo showed an ejection fraction of 46% with mild-moderate LV dilatation. He had no evidence of ischemic heart disease. A tachycardia induced cardiomyopathy was suspected. An electrophysiology study (EPS) and ablation was recommended.

An intracardiac recording at baseline during the persistent tachycardia with a cycle length of 540 milliseconds. Intracardiac activation pattern showed the earliest activation on the coronary sinus (CS) catheter 19,20 which was near the lateral tricuspid annulus. Programmed stimulation showed no evidence of dual AVN physiology or presence of accessory pathway. Spontaneous termination and initiation were observed several times as shown in **Figure 2**. Termination was always with V; initiation was without an AH jump. Ventricular programmed stimulation demonstrated VAAV response without VA linking. These observations were consistent with an automatic ectopic AT.

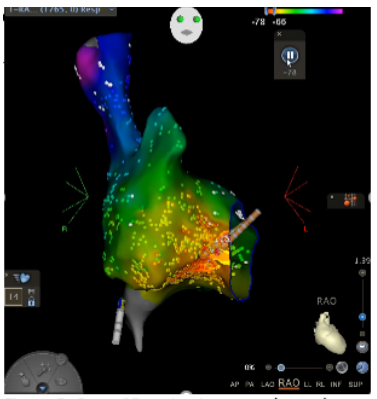


Figure 3. Carto 3D activation map showed a centrifugal activation with the earliest activation localized to the inferior-lateral tricuspid annulus.

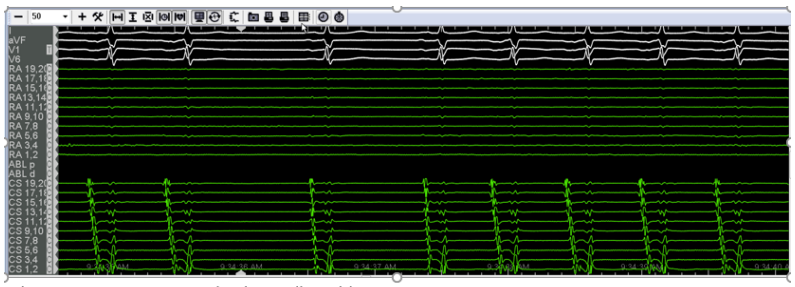


Figure 2. Spontaneous termination ending with a V; spontaneous initiation without a PR jump

A CARTO 3D mapping during AT is shown in **Figure 3**. The earliest activation was noted near the inferior-lateral tricuspid annulus. The local electrogram was 35 msec preceding the onset of surface P wave. The tachycardia was terminated in less than 3 seconds after starting the radiofrequency delivery (50 watts, 65 degrees) as shown in **Figure 4**. Programmed stimulation, with and without isoproterenol, demonstrated no inducible atrial arrhythmias. An echo three months following the ablation showed normalization of LV size and EF to 61%. Holter monitor showed no recurrent atrial arrhythmias at 12-month follow up.

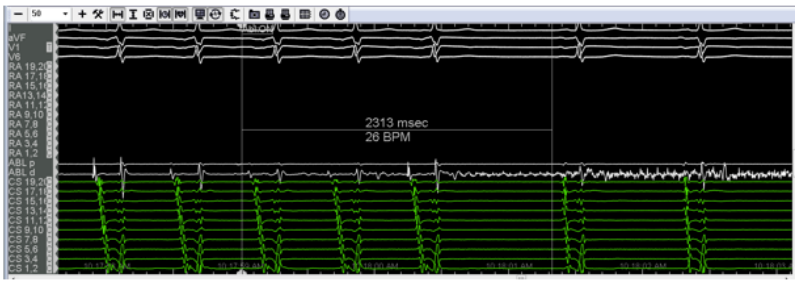


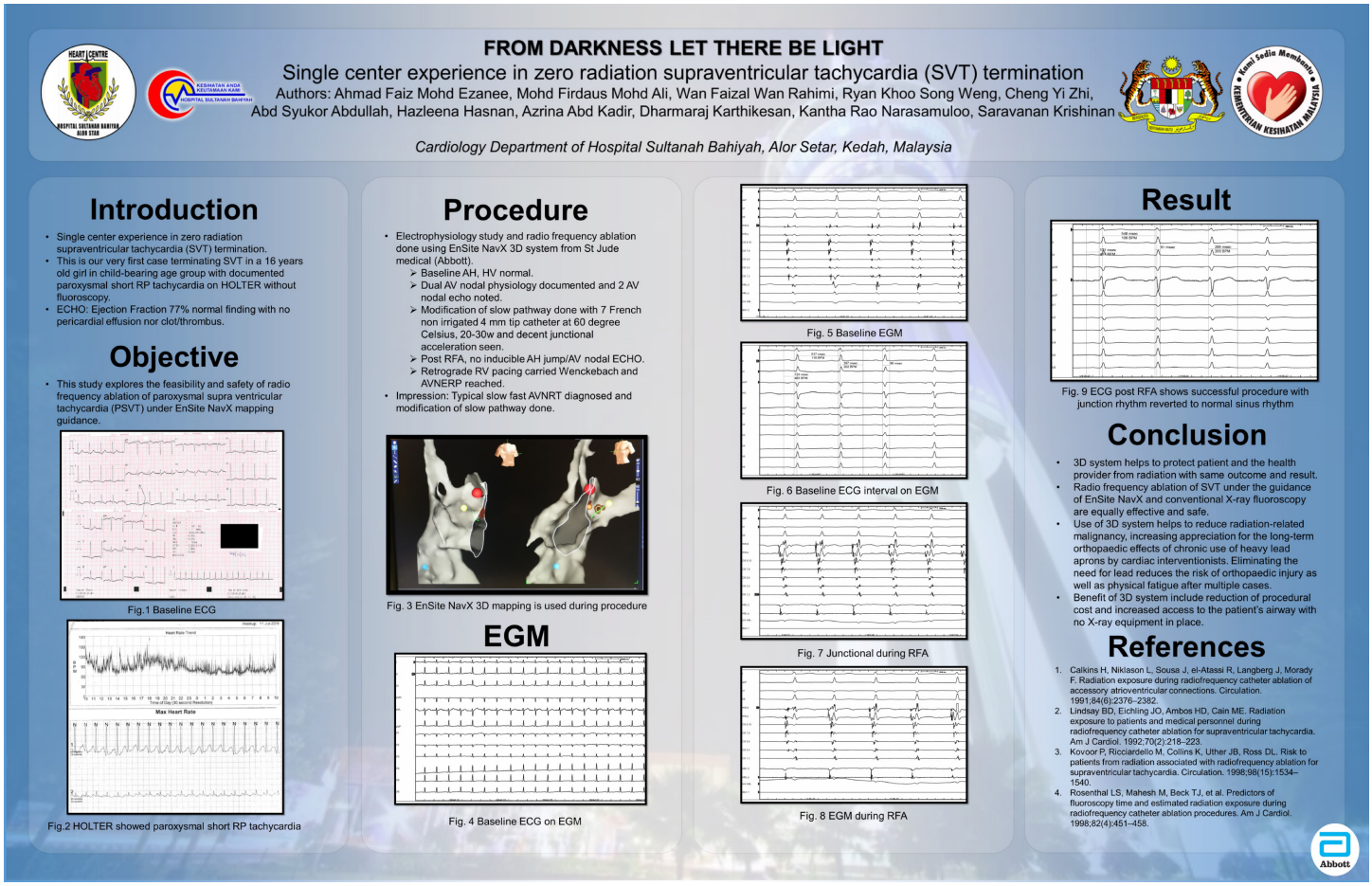
Figure 4. Ablation catheter was positioned at the inferior-lateral tricuspid annulus where local electrogram was 35 msec preceding the onset of P wave on the surface lead. Tachycardia was terminated in less than 3 seconds after radiofrequency energy (50 watts, 65 degrees) was turned on.

RESULTS & CONCLUSIONS

In this case of incessant AT, the patient had no symptoms. Tachycardia-mediated cardiomyopathy occurs more frequently in these asymptomatic patients. The broad differential diagnosis for long RP tachycardia includes AT, PJRT, or atypical AVNRT. The P wave morphology and P wave duration on the ECG is suggestive of an ectopic AT. Findings from EPS are suggestive of an automatic mechanism. Ablation is the treatment of choice in a patient with AT-mediated cardiomyopathy and is reversible as demonstrated by follow up testing.

"FROM DARKNESS LET THERE BE LIGHT" SVT: ZERO-FLUORO

AHMAD FAIZ MOHD EZANEE, KANTHA RAO NARASAMULOO, SARAVANAN KRISHINAN, MOHD FIRDAUS MOHD ALI, WAN FAIZAL WAN RAHIMI, RYAN KHOO SONG WENG, CHENG YI ZHI, ABD SYUKUR ABDULLAH, HAZLEENA HASNAN, AZRINA ABD KADIR, DHARMARAJ KARTHIKESAN • *Hospital Sultanah Bahiyah, Kedah, Malaysia*



INTRODUCTION

Single centre experience in zero radiation supraventricular tachycardia (SVT) termination.

This is our very first case terminating SVT in a 16 year old girl in child-bearing age group with documented paroxysmal short RP tachycardia on HOLTER without fluoroscopy.

ECHO: Ejection Fraction 77% normal finding with no pericardial effusion nor clot/thrombus.

METHODS

This study explores the feasibility and safety of radio frequency ablation of paroxysmal supraventricular tachycardia (PSVT) under EnSite NavX mapping guidance.

Electrophysiology study and radio frequency ablation done using Ensite NavX 3D system from St Jude Medical (Abbott).

Baseline AH, HV normal.

Dual AV nodal physiology documented and 2 AV nodal ECHO noted.

Modification of slow pathway done with 7 French non-irrigated 4 mm tip catheter at 60 degree Celcius, 20-30W and decent junctional acceleration seen.

Post RFA, no inducible AH jump/AV nodal ECHO.

Retrograde RV pacing carried Wenckebach and AVNERP reached.

RESULTS & CONCLUSIONS

3D system helps to protect patient and the health provider from radiation.

Radio frequency ablation of SVT under the guidance of EnSite NavX and conventional X-ray fluoroscopy are equally effective and safe.

THE 2022 SVT PIONEERS CENTERS OF EXCELLENCE

The following centers are acknowledged as a supraventricular tachycardia (SVT) Center of Excellence. As evidenced by the case studies that have been submitted, and that have been published in this report, each Center takes an innovative approach to managing SVT. Their work can be used to inspire other centers to improve care and quality of life for people with SVT.

ASIA

KEDAH, MALAYSIA

"From darkness let there be light"
SVT: Zero-Fluoro

Hospital Sultanah Bahiyah, Kedah, Malaysia

Ahmad Faiz Mohd Ezanee, Kantha Rao Narasamuloo, Saravanan Krishinan, Mohd Firdaus Mohd Ali, Wan Faizal Wan Rahimi, Ryan Khoo Song Weng, Cheng Yi Zhi, Abd Syukur Abdullah, Hazleena Hasnan, Azrina Abd Kadir, Dharmaraj Karthikesan

hsbas.moh.gov.my

AUSTRALIA

SYDNEY

Episodes of supraventricular tachycardia captured on an athlete's smartphone ECG

Charles Perkins Centre and Centenary Institute, Building 93, John Hopkins Drive, The University of Sydney, Sydney, NSW, Australia

Dr Jessica J Orchard, Jacob Jewson, Mark Young, Chris Semsarian, Jane Fitzpatrick, Andre La Gerche, John W Orchard

www.centenary.org.au

CANADA

ONTARIO

Supraventricular tachycardia and utility of the real time monitoring center

Canadian cardiac care, Department of Medicine University of Saskatchewan, SK, Canada, Windsor Cardiac Center, Windsor, Ontario, Canada

M.A.M. Ahmed MD, W.Tarhuni MD

Canadiancardiaccare.ca
Windsorcardiaccentre.ca

VANCOUVER

A New Look at Wolff-Parkinson-White Syndrome

BC Childrens Hospital and Sunny Hill Health Centre, Vancouver Canada, University of Iowa Stead Family Children's Hospital University of Iowa Carver College of Medicine, USA, University of Utah Health, USA

Dr Shubhayan Sanatani, Dr Susan P Etheridge, Dr Ian Law

www.bcchildrens.ca

UK

HAMPSHIRE

Zero fluoroscopy electrophysiological procedures for children with SVTs: redefining the value of electroanatomical mapping and intracardiac ultrasound

University Hospital Southampton, Southampton, Hampshire, UK

Dr Arthur Yue, Dr Norah Yap, Phil Banks, Dr Shankar Sadagopan

www.uhs.nhs.uk

LANCASHIRE

Refined, ALARA, Zero 'Zippy' Fluoroless Lancashire Electrophysiology series - SVT Cohort (RAZZLE - SVT)

1. Lancashire Cardiac Centre, Blackpool Victoria Hospital, Blackpool, Lancashire, UK
2. UK King's College London, School of Biomedical Engineering & Imaging Sciences, Strand, London, UK

Dr. Aruna Arujuna[1,2], Dr. Sanjoy Chowdhury[1], Dr. Scott Gall[1], Dr. Shajil Chalil[1], Dr. Khalid Abozguia[1]

www.bfwh.nhs.uk

LONDON

Convergent procedure - hybrid ablation for the treatment of persistent atrial fibrillation

Guy's and St Thomas' Hospitals, Westminster Bridge Road, London, UK & Kings College, Strand, London, UK

Prof Jaswinder Gill, Mr Christopher Blauth, Dr Bradley Porter, Mr Paolo Bosco, Prof Aldo Rinaldi, Dr Nick Child, Dr Nilanka Mannakkara, Prof Reza Resavi

www.guysandstthomas.nhs.uk

US

PHOENIX

A Case of Reversible Ectopic Atrial Tachycardia-Mediated Cardiomyopathy

Mayo Clinic College of Medicine, Department of Cardiovascular Diseases, Mayo Clinic, Phoenix, Arizona, USA

Dr Kamal P. Cheema, Dr Win K. Shen

askmayoexpert.mayoclinic.org

PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA (PSVT)

WHAT IS PSVT?

PSVT is a condition characterized by episodes of a very fast heart rate that originate in an area of the heart above the ventricles. Paroxysmal means from time to time.

BACKGROUND

The heart has four chambers – two upper chambers (referred to as the atria) and two lower chambers (referred to as the ventricles). Normally the chambers contract in a coordinated way, starting with an electrical signal originating at the sinoatrial node (SAN). This signal moves the atria causing them to contract and empty blood into the lower ventricles. The signal passes through the atrio-ventricular node (AVN) and down to the ventricles, which then contract and move blood into the arterial system of the body.

In PSVT, an abnormal electrical pathway causes the heart to beat much faster than normal, up to as high as 250 beats per minute (a normal heart rate is 60-100 beats per minute). These episodes can be short-lived for just a few minutes, or last several hours.

CAUSES

There are two types of PSVT that account for roughly 90% of cases; AV node re-entrant tachycardia (AVNRT) and Wolff-Parkinson-White syndrome (WPW). Both of these are re-entrant tachycardias. However, Wolff-Parkinson-White syndrome (WPW) is likely to be more common in children. These arrhythmias can be exacerbated by some environmental factors, including dehydration, alcohol intake, caffeine intake and non-cardiac illness.

SYMPTOMS

Symptoms are intermittent, starting and stopping suddenly with little or no warning. Chest tightness, palpitations (awareness of the heartbeat), shortness of breath, dizziness and fainting are most commonly experienced.

INVESTIGATIONS

If you think you are suffering from PSVT, a doctor will examine you and will feel your pulse to measure your heart rate.

An electrocardiogram (EKG) will be done to gather more information about your heart rate and rhythm. Electrophysiology studies (EPS) may be done to give an accurate diagnosis and treatment options. This involves more invasive investigations including inserting a catheter containing small flexable wires into a blood vessel in your groin and threading it up to your heart. The heart's rate and rhythm can then be evaluated more accurately.

Since PSVT occurs intermittently, the abnormal heart rate may not be captured on a standard EKG recording. Therefore a monitor may be worn at home for 24/48/72 hours, or even longer, to try to get an accurate diagnosis.

TREATMENT

Treatment for PVST are as aggressive as symptoms demand. If PVST occurs very infrequently, it may be that no treatment is needed. There are self-help maneuvers that can be done to try to terminate an episode of PSVT

- Valsalva maneuver involves holding your breath and straining at the same time, as if you were trying to have a bowel movement
- Coughing
- Cold water
- Avoid smoking, caffeine (and other stimulants)

There are several available treatments that can restore normal rhythm. These include electrical cardioversion (a controlled electric shock is delivered to try and reset the heart into a normal rhythm) and chemical cardioversion through administration of medications, such as adenosine.

For people with more regularly occurring episodes of PSVT, treatment options include medications such as flecainide or propafenone, cardiac ablation, pacemakers, and/or surgery. See treatment options for arrhythmias booklet for more information on these procedures.

PROGNOSIS

PSVT itself is not usually life threatening, but if present with other heart disorders or disease, it can lead to congestive heart failure or angina.

GLOSSARY

Ambulatory EKG/ECG monitoring A longer-term wearable heart monitor that allows the tracking and analyzing of the heart rhythm during normal activity over a period of 24 hours to two weeks

Arrhythmias Heart rhythm disorders. For example, the heart rate is too slow/fast and/or the heart rhythm is irregular.

Atria The two upper chambers of the heart.

Atrial fibrillation An irregular heart rhythm.

Atrioventricular (AV) node Part of the electrical pathway located between the atria and the ventricles.

AV-nodal re-entrant tachycardia (AVNRT) The most common form of supraventricular tachycardia (SVT). It occurs when a re-entrant circuit forms within or just next to the atrioventricular node.

Catheter ablation The use of catheters to deliver energy into the heart to destroy abnormal tissues that may lead to arrhythmias.

Electrocardiogram (EKG/ECG) A non-invasive test that records the heart's rhythm and rate.

Electrophysiologist A cardiologist who specializes in the electrical aspects of the heart — i.e., the heart's rhythm

Supraventricular tachycardia (also known as paroxysmal supraventricular tachycardia) An abnormally fast heart rate (resting heart rate above 100 beats per minute) that arises from the upper chambers of the heart (the atria).

Ventricular septal defect (VSD) A congenital condition in which there is a hole (defect) in the wall (septum) that separates the heart's lower chambers (ventricles), allowing blood to pass from the left to the right side of the heart.

Wolff-Parkinson-White syndrome A congenital condition in which there is an additional electrical pathway that directly connects the atria to the ventricles, bypassing the atrioventricular (AV) node. It can cause SVT.

Arrhythmia Alliance
www.heartrhythmalliance.org

Working together to improve the diagnosis, treatment and quality of life for all those affected by arrhythmias.

Founder
Trudie Lobban MBE FRCP (Edin)

UK Registered charity:
1107496

US Registered non-profit organization:
501(c)(3)

E: info@heartrhythmalliance.org (UK)
info-us@heartrhythmalliance.org (US)

T: +44 (0) 1789 867 502 (UK)
+1 (843) 415 1886 (US)

www.SVTpioneers.org