



PROGRAMME BOOK

APHRS SUMMIT 2018

in conjunction with HKCC
Heart Rhythm Refresher Course

11 February 2018 | 08:30 - 16:35 | Salon 5-6, JW Marriott Hotel Hong Kong

Hosted by:



Asia Pacific Heart
Rhythm Society

Organized by:



Hong Kong College of
Cardiology



TABLE OF CONTENTS

Welcome Message	1
Local Organizing Committee	2
Faculty	2
Hong Kong College of Cardiology Council Members	3
Asia Pacific Heart Rhythm Society Board Members	3
Floor Plan	4
CME/CPD Accreditation	5
Scientific Programme	6
Abstracts	8
Acknowledgement	25



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WELCOME MESSAGE

It is our great pleasure and privilege to welcome you to the APHRS Summit 2018, held on 11 February 2018 in JW Marriott Hotel, Hong Kong. The Summit is jointly organized by Asia Pacific Heart Rhythm Society and Hong Kong College of Cardiology.

APHRS Summit 2018 is an annual meeting and had overwhelming responses in the past years. The meeting will present current and future management on atrial fibrillation, sudden cardiac death, VT, CIED updates and ICD advances. A group of experts in Asia Pacific will be invited and shared with us their experiences and insights, and the symposium will be a meeting point for both discussion and academic participation.

We would like to express our sincere gratitude to our international faculty, local organizing committee members, participants, secretariat staff, and our generous sponsors. We wish you a most enjoyable and rewarding experience in our one day conference.

A handwritten signature in black ink, appearing to read 'HFT'.

Hung-Fat TSE

Chairman of APHRS Summit 2018



LOCAL ORGANIZING COMMITTEE

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Jacky K CHAN

Ngai-Yin CHAN

Samuel YW CHENG

JoJo HAI

Kathy LF LEE

David CW SIU

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Singapore

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Amit VORA

India

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Cheuk-Man YU

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Sofian JOHAR

Brunei

Johnny HC YUEN

Hong Kong SAR

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Australia

Yoga YUNIADI

Indonesia

Young-Hoon KIM

Korea

Shu ZHANG

China



HONG KONG COLLEGE OF CARDIOLOGY COUNCIL MEMBERS

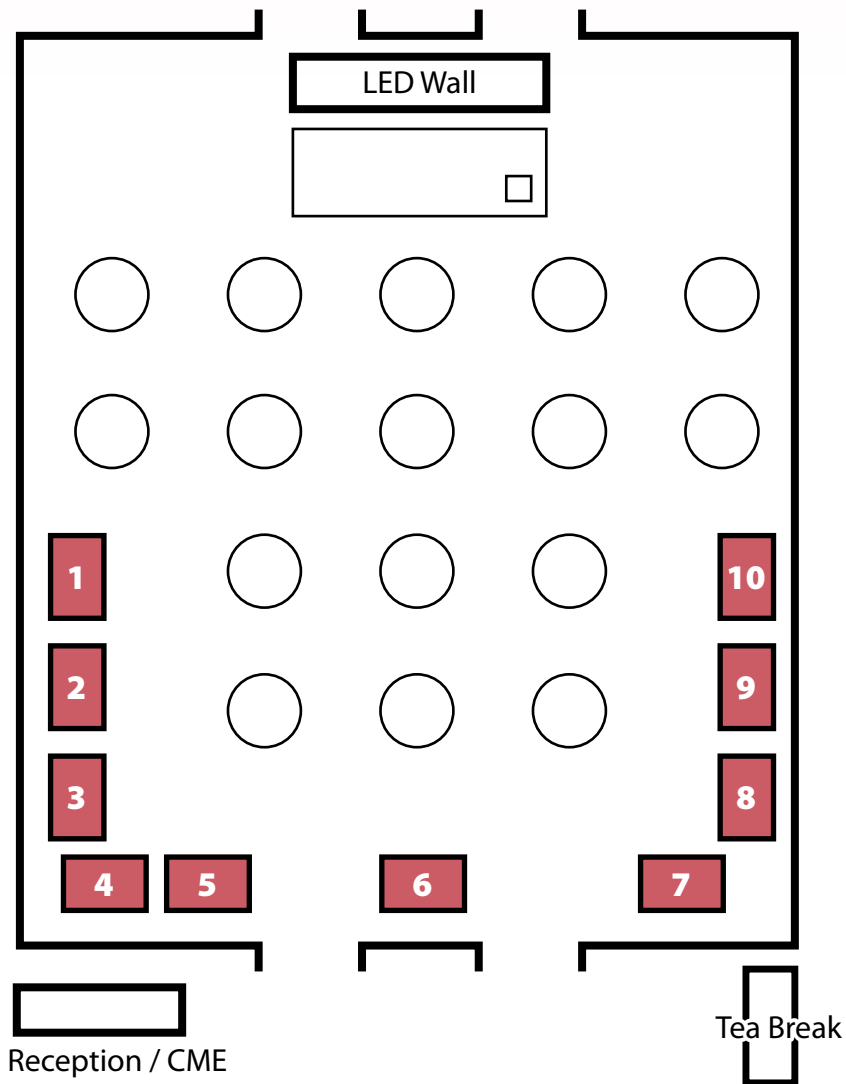
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ASIA PACIFIC HEART RHYTHM SOCIETY BOARD MEMBERS

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	Shih-Ann CHEN	<i>Taiwan</i>
	Young-Hoon KIM	<i>Korea</i>
	Wee-Siong TEO	<i>Singapore</i>
	Shu ZHANG	<i>China</i>

FLOOR PLAN

Salon 5-6, JW Marriott Hotel Hong Kong



Exhibitor	Booth No	Exhibitor	Booth No
Abbott - St Jude Medical	8	Boston Scientific Hong Kong Ltd.	10
Bayer HealthCare	7	Daiichi Sankyo Hong Kong Limited.	3
Biosense Webster, Inc.	4	Medtronic Hong Kong Medical Limited	6
Biotronik Hong Kong Ltd	2	Pfizer Corporation Hong Kong Ltd.	9
Boehringer Ingelheim (HK) Ltd.	5	Sanofi-aventis Hong Kong Ltd.	1



CME/CPD ACCREDITATION

College / Programme	Maximum for Whole Function	CME / CPD Category	Other Conditions
Hong Kong College of Anaesthesiologists	7	Non-Ana Passive	
Hong Kong College of Community Medicine	6		
Hong Kong College of Family Physicians	5	Cat. 5.2	
Hong Kong College of Paediatricians	6	Cat. A	
Hong Kong College of Pathologists	7	PP	
Hong Kong College of Physicians	7		
College of Surgeons of Hong Kong	6	Passive	
MCHK CME Programme	5	Passive	Accredited by HKAM

SCIENTIFIC PROGRAMME

TIME	TOPICS	SPEAKERS
08:30-08:35	Opening speech by the chairman of organizing committee	Hung-Fat TSE
08:35-08:40	Address by the representative of APHRS	Wee-Siong TEO
Ventricular Tachycardia/SCD Chairpersons: Masayasu HIRAOKA, Andy WK CHAN		
08:40-08:55	Position statement: Pre-participation cardiovascular evaluation for athletic participants to prevent sudden death	Yoga YUNIADI
08:55-09:10	AHA / ACC / HRS 2017 guideline: Management of patients ventricular tachycardia and prevention of sudden cardiac death	Dean BODDINGTON
09:10-09:25	Mapping and ablation of idiopathic VT	Giselle GERVACIO
09:25-09:40	Management of electrical storm in J wave syndrome	Young-Hoon KIM
09:40-09:55	Catheter ablation of ventricular arrhythmia in patients with brugada syndrome	Tachapong NGARMUKOS
09:55-10:10	Diagnosis and management of arrhythmogenic cardiomyopathy	David CW SIU
10:10-10:30	Tea Break	
Atrial Fibrillation Chairpersons: Yung-Kwo LIN, Jojo HAI		
10:30-10:45	Consensus statement of catheter ablation of persistent atrial fibrillation on 2018	Shih-Ann CHEN
10:45-11:00	Consensus document: Screening and prevention of AF	Yong Seog OH
11:00-11:15	Periprocedural oral anticoagulant in AF patients for CIED implant and catheter ablation	Andrew MCGAVIGAN
11:15-11:30	Consensus document: Stroke prevention in AF	Chern-En CHIANG
11:30-11:45	Mapping and ablation of atrial tachyarrhythmias after AF ablation	Hui-Nam PAK
11:45-12:00	Substrate modification after CPVI for the treatment of non-paroxysmal atrial fibrillation	Ming Long CHEN



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TIME	TOPICS	SPEAKERS
12:15-13:30	Luncheon symposium: Anticoagulation in high risk population: clinical data, dosing instructions and daily practice Chairpersons: Jacky K CHAN, Yuk-Kong LAU	Hung-Fat TSE
HKCC Heart Rhythm Refresher Course		
CIED Update Chairpersons: DeJia HUANG, Kwok-Keung CHAN		
13:30-13:45	Consensus statement: CIED lead management and extraction	Wee-Siong TEO
13:45-14:00	Remote monitoring of patients with CIED	Chi-Keong CHING
14:00-14:15	CIED infection control	Ngai-Yin CHAN
14:15-14:30	Consensus document: Device-detected atrial tachyarrhythmias	Chu-Pak LAU
14:30-14:45	Device diagnostics for AF monitoring	Amit VORA
14:45-15:00	Leadless pacemaker	Kathy LF LEE
15:00-15:30	Tea Break	
CRT/ICD Chairpersons: Buncha SUNSANEWITAYAKUL, Johnny HC YUEN, Samuel YW CHENG		
15:30-15:45	Consensus statement: Optimal ICD programming and testing	Jojo HAI
15:45-16:00	His-bundle pacing: Where we are?	Joseph YS CHAN
16:00-16:15	CRT response: Considerations and strategies	Sofian JOHAR
16:15-16:30	Ventricular arrhythmias after implantation of left ventricular assist devices	Katherine FAN
16:30-16:35	Closing remarks	Chu-Pak LAU



ABSTRACTS

Position statement: Pre-participation cardiovascular evaluation for athletic participants to prevent sudden death

Yoga YUNIADI

Universitas Indonesia, and National Cardiovascular Center Harapan Kita, Jakarta

Sport-related sudden cardiac death (SCD) is not rare, it counts for 1.21/100,000 person-year and 1.9/100,000 person-year among general population and athletes respectively. The risk of sport-related SCD is not limited to competitive athlete but to leisure sport as well. Hypertrophic cardiomyopathy is the most common cause of SCD in young competitive athlete. Cycling is the type of sport that attributable to SCD at the most. Dynamic exercise results in higher increase of VO₂, heart rate, lung perfusion, stroke volume, and blood pressure as compare to static exercise.

Twelve element recommendations of AHA in pre-participation screening of competitive athlete mainly based on personal and family medical history, and physical examination. There is pro and cons on routine ECG examination during pre-participation screening. However, as ECG largely available and inexpensive, it would preferable to have routine ECG. Some common ECG changes in well-trained human must be recognized to avoid unnecessary screen out of potential athletes. Corrado et al, showed that pre-participation screening decrease SCD by 89% in young competitive athletes (p, 0.001).

So, pre-participation screening is needed to identify cardiac diseases clinically silent that may be associated with cardiac arrest/sudden cardiac death in relation with exercise training, competitive or even leisure sport participation

Keywords: sport, pre-participation screening.



ABSTRACTS

AHA / ACC / HRS 2017 guideline: Management of patients ventricular tachycardia and prevention of sudden cardiac death

Dean BODDINGTON

Tauranga and Waikato Public Hospitals, New Zealand

Background: Practice guidelines provide recommendations to clinicians dealing with patients who have or are at risk of developing cardiovascular disease. Guidelines have been developed by organisations in different parts of the world which have impact on regional practice but collaboration between organisations has also led to development of practice guidelines that have global impact. These guidelines, which are based on systematic methods to evaluate and classify evidence, provide a cornerstone for quality cardiovascular care.

Aim: The purpose of this review is to look at these most recent practice guidelines approved for publication by the ACC, the AHA and the HRS; and endorsed by the HFSA. These guidelines focus on practice in the USA but do also have global significance. The guidelines are comprehensive and cannot fully be covered in a short time frame so we will focus on new recommendations and highlights and look at the relevance in the APHRS region and context.

Guideline Overview: The AHA/ACC Task Force on Clinical Practice Guidelines have presented an updated and comprehensive guideline for ventricular arrhythmia and sudden cardiac death. This guideline heralds the introduction of an evolved format of presenting guideline recommendations and associated text called the “modular knowledge chunk format”. The evidence review committee have provided up to date recommendations on all aspects of ventricular arrhythmia, from ventricular ectopics through ventricular tachycardia to sudden cardiac death, in a clear and concise manner with all references provided. The new format is easy to follow and makes for quick reading and provides excellent flow diagrams for clinical application. The guideline in addition sought to answer two issues that have not previously been covered in guidelines. The first is the question of what to do with asymptomatic Brugada patients and what is the relevance of programmed ventricular stimulation and other arrhythmia endpoints. The second issue addressed is the use of primary prophylactic ICD implantation in older patients and those with significant comorbidities.

Clinical Implementation: This updated guideline on ventricular arrhythmia and sudden cardiac death has provided some fresh insights and new recommendations. There are excellent, user friendly flow charts and recommendations on all aspects from diagnosis through to medication, device and ablation therapies. This is a must read for all clinicians working in the field involving such patients and will act as a valuable reference point.



ABSTRACTS

Management of electrical storm in patients with J wave syndrome

Young-Hoon KIM

Cardiovascular Center, Arrhythmia Center, Korea University Medical Center, South Korea

Early repolarization (ER) is manifested as J wave elevation on ECG and known as a sign of good health and people with ER are usually very healthy, until they die suddenly. It still remains to be determined who are at risk of sudden cardiac death in people showing J wave elevation. J wave syndrome includes Brugada syndrome (BS) and ER syndrome (ERS) and there is an overlap between BS and ERS in genetic, clinical, electrophysiological, and pharmacological characteristics. In ERS, J waves are seen in inferior (II, III, aVF) or lateral leads (V4, V5, V6), while in BS they are best seen in right precordial leads (V1-V3). The appearance or accentuation of J wave is now recognized to predispose to the development of arrhythmogenesis when associated with other cardiac disorders, such as ischemia, heart failure, and hypothermia. The J wave might predict prognosis of cardiac events in various heart diseases, and the appearance of a new J wave during acute ischemia seems to be a messenger of VF. Disappearance of J wave after antiarrhythmic drugs (AADs) is predicting its response and prevention of ventricular fibrillation (VF) or ventricular tachycardia (VT), in contrast, its augmentation preceded VF/VT. Notching of the terminal portion of the QRS complex was the predominant morphology associated with a risk of VF.

The proposed mechanism of VF and VT storms is faster Ito current in the epicardium than in the endocardium resulting in electrical gradient that forms the substrate for phase 2 re-entry. Prevention of Ito current with quinidine supports this mechanism. Morphological features of benign variety of J wave syndrome and malignant/proarrhythmic variety have now been fairly well characterized.

Prominent J wave often observed in hypothermic patients (<32°C), known as Osborn wave, camel-hump sign or late delta wave, and positive deflections occurred at the J point, of which amplitude inversely related to body temperature.

Individuals resuscitated from VF definitely need an implantable cardiac defibrillator (ICD) but in others there is no consensus regarding therapy. Role of electrophysiology study to provoke VT/VF is not yet well defined. Radiofrequency ablation (RFCA) of epicardial substrate in right ventricle in BS is known as one of effective therapy, especially in patients refractory to AADs or electrical storm. However, role of RFCA in ERS is not yet established, despite the fact that low-voltage fractionated electrogram activity and high-frequency late potentials are observed in the LV of patients with ERS.

I shall discuss some interesting cases of ERS presented with electrical storm and treated with epicardial ablation, targeted discrete electrical potentials of the left ventricle provoked by cold saline instillation into pericardial sac or intravenous isoproterenol.

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ABSTRACTS

Consensus document: Stroke prevention in AF

Chern-En CHIANG

Taipei Veterans General Hospital and National Yang-Ming University, Taiwan

Atrial fibrillation (AF) is the most common sustained arrhythmia, causing a 2-fold increase in mortality and a 5-fold increase in stroke. The Asian population is rapidly aging, and in 2050, the estimated population with AF will reach 72 million, of whom 2.9 million may suffer from AF-associated stroke. Therefore, stroke prevention in AF is an urgent issue in Asia. Many innovative advances in the management of AF-associated stroke have emerged recently, including new scoring systems for predicting stroke and bleeding risks, the development of non-vitamin K antagonist oral anticoagulants (NOACs), knowledge of their special benefits in Asians, and new techniques. The Asia Pacific Heart Rhythm Society (APHRS) aimed to update the available information, and appointed the Practice Guideline sub-committee to write a consensus statement regarding stroke prevention in AF. The Practice Guidelines sub-committee members comprehensively reviewed updated information on stroke prevention in AF, emphasizing data on NOACs from the Asia Pacific region, and summarized them in this 2017 Consensus of the Asia Pacific Heart Rhythm Society on Stroke Prevention in AF. This consensus includes details of the updated recommendations, along with their background and rationale, focusing on data from the Asia Pacific region. We hope this consensus can be a practical tool for cardiologists, neurologists, geriatricians, and general practitioners in this region. We fully realize that there are gaps, unaddressed questions, and many areas of uncertainty and debate in the current knowledge of AF, and the physician's decision remains the most important factor in the management of AF.



ABSTRACTS

Mapping and ablation of atrial tachyarrhythmias after AF ablation

Hui-Nam PAK

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Seoul, Republic of Korea*

Aims: Although electrically reconnected pulmonary veins (PV) are the main mechanism of atrial fibrillation (AF) recurrence, PV isolation (PVI) is well-preserved in certain patients who undergo a repeat procedure. We explored the association between PV reconnection and clinical outcomes after a second ablation.

Methods: This observational cohort study included 143 patients (79.0% male, 56.1 ± 10.0 years old, 65.0% paroxysmal AF) who underwent a second procedure. PVI was well-maintained in 52 patients (PVP- group, 36.4%), although the remaining 91 patients showed PV reconnection (PVP+ group). After confirming PVI, we mapped non-PV triggers and conducted trigger ablation or additional linear ablation at redo-procedures.

Results: The proportion of females was higher ($p=0.030$), and redo-ablation timing after the de novo procedure was later ($p=0.039$) in the PVP- group than in the PVP+ group. Additional linear ablations were more likely to be performed in the PVP- group (90.4% vs. 61.5%, $p<0.001$). During the 18.4 ± 10.2 month follow-up after the redo-ablation, the PVP+ group showed a lower clinical recurrence rate than the PVP- group (log-rank $p=0.011$). The number of reconnected PVs was independently associated with a lower recurrence of AF after the redo-ablation in the total study population (HR 0.56, 95% CI 0.34–0.95, $p=0.032$), particularly for patients with paroxysmal AF (HR 0.41, 95% CI 0.19–0.87, $p=0.021$).

Conclusions: Among patients who underwent redo-AF ablation, those with more PV reconnections showed better clinical outcomes than those with fewer PV reconnections. The mechanism of AF recurrence might be different in patients with lower numbers of PV reconnections during redo-procedures.

Keywords: Atrial fibrillation, Redo-ablation, Catheter ablation, Pulmonary vein potential



ABSTRACTS

Substrate modification after CPVI for the treatment of non-paroxysmal atrial fibrillation

Ming Long CHEN

The First Affiliated Hospital of Nanjing Medical University, China

Laboratory studies, histology studies, image studies and the clinical studies all prove the positive correlation between atrial fibrillation and atrial fibrosis from different perspectives. Atrial fibrosis, by separating myocardial cell coupling, diminishing conduction velocity and promoting anisotropic conduction, produce the substrate to sustain atrial fibrillation (AF). These fibrotic areas can be translated into signal abnormalities (low voltage and complex electrogram), and be depicted by electroanatomic high density map. Ablation targeting these areas after circumferential pulmonary vein isolation as the additional substrate modification strategy has proved its beneficial results. However, the unified methodology regarding the scar definition, the mapping rhythm (AF or sinus rhythm) and the modification endpoint is yet to be negotiated. Large-scale clinical trials, long-term follow-up results are needed to prove its contribution to the overall success rate of AF ablation.

Keywords: atrial fibrillation; atrial fibrosis; low voltage zone; homogenization; catheter ablation



ABSTRACTS

Luncheon symposium: Anticoagulation in high risk population: clinical data, dosing instructions and daily practice

Hung-Fat TSE

Queen Mary Hospital, Hong Kong SAR

Atrial fibrillation (AF) is the most common abnormal cardiac arrhythmia in clinical practice, is associated with increased morbidity and mortality, and increases with older age, hypertension, diabetes mellitus, and heart failure. Of note, the presence of these medical conditions are independently associated with increased risk of stroke. The introduction of non-vitamin K antagonist oral anticoagulants (NOACs) has been a major advance in stroke prevention in patients with AF. Given that, patients have more comorbidities are often more susceptible to bleeding, which makes decisions on anticoagulation challenging in this vulnerable population. The objective of this lecture is to present a concise overview of the management of AF, with reference to the latest evidence-based approach from various clinical data as well as the international AF management guideline. Further, this lecture would also discuss the practical consideration, especially in dosing regimen which physicians might come across in their daily practice.



ABSTRACTS

Consensus statement: CIED lead management and extraction

Wee-Siong TEO

National Heart Centre, Singapore

Pacemakers, defibrillators and Cardiac Resynchronization Therapy cardiovascular implantable electronic devices (CIED) including leads are now increasingly complex and used longer due to better survival of patients. The rapidly aging population together with the increased implantation of devices in the Asia Pacific region will result in an increasing need for management of complications associated with these device therapies.

With time, a small proportion of devices may develop complications such as lead failures or infection which will necessitate the extraction and reimplantation of these devices.

As the procedure of lead extraction can be complicated by a small risk of mortality, it is important that the indication for lead extraction should be carefully selected. Previous guidelines were published almost a decade ago (1) and this had been updated by the recently published 2017 HRS expert consensus statement on cardiovascular implantable electronic device lead management and extraction (2).

The document discusses in detail the diagnostic approach to suspected lead failure and lead recalls or advisories. The compelling indication for lead extraction is CIED infection. Preprocedure transesophageal echocardiography is recommended in patients with suspected systemic CIED infection to evaluate the absence or size, character, and potential embolic risk of identified vegetations. Complete device and lead removal is recommended in all patients with definite CIED system infection. Appropriate antibiotic therapy based on the cultures and sensitivity will be needed. Other indications for extraction of nonfunctional leads and other indications are discussed. For these indications, a careful discussion between the patient and the doctor on the risk benefit of lead extraction versus abandonment should be discussed.

Importantly there is a need for lead extraction centres in the Asia Pacific region due to the increased need for these services. The document suggests optimal periprocedural management and extraction tools to be used. It also suggests optimal facilities, equipment and training of personnel involved in lead extraction.

References

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ABSTRACTS

Remote monitoring of patients with CIED

Chi-Keong CHING

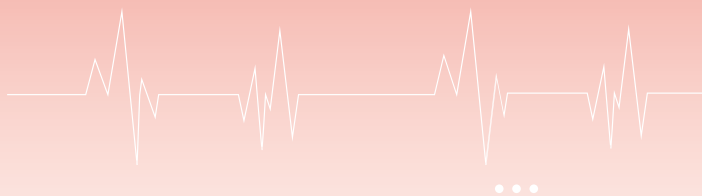
National Heart Centre, Singapore

Advances in technology have allowed the remote transmission of data from cardiac implantable electronic devices (CIED). Remote access to device diagnostics has been shown to improve patient safety in comparison to ambulatory conventional monitoring due to earlier detection of arrhythmias or device malfunction.(1-4) It has also significantly reduced the number of in-office visits, workload of healthcare providers and healthcare costs to patients.(5,6) In addition, patient compliance to scheduled remote monitoring evaluation is superior compared to in-office checks.(5) Home monitoring is relatively new in Southeast Asia, with pickup rates increasing over recent years.

We report our experience with home monitoring and describe patient compliance to scheduled remote monitoring transmissions as well as physician, patient and healthcare workers' experiences with remote monitoring. In Singapore, distance from CIED monitoring centres is much less of a barrier in comparison to larger countries. Hence, our study (7) was also an examination of patients' opinions regarding remote monitoring in a situation where geographical distance is less of a barrier toward office device monitoring.

References

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ABSTRACTS

CIED infection control

Ngai-Yin CHAN

Princess Margaret Hospital, Hong Kong SAR

Infection of cardiac implantable electronic device (CIED) has the following presentations: (1) local inflammatory changes of the generator-pocket site, (2) cutaneous erosion with percutaneous exposure of generator and/or leads, (3) right-sided or left-sided endocarditis and (4) pyrexia of unknown origin¹. However, fever and other signs of systemic toxicity are frequently absent. Patients may merely present with vague symptoms like malaise, fatigue, anorexia and decrease in functional capacity. The incidence of CIED infection ranges from 0.6 to 3.6% and it increases with the complexity of CIED procedures². More importantly, the standardized adjusted mortality at one year reported in one study for patients with CIED infection ranges from 27-35% depending on the complexity of CIED implantation³. Risk factors of CIED infection can be categorized into patient (diabetes, heart failure, renal dysfunction and the use of long-term oral anticoagulation and steroid increase risk of CIED infection), procedural (device replacement, multiple implantable leads, transvenous temporary pacing, early re-intervention and fever within 24 hours before implantation increase risk of CIED infection), physician (low level of experience increase risk of CIED infection) and microbiological factors (Staphylococcus aureus bacteraemia increases risk of CIED infection)¹.

In general, complete device and lead removal is recommended for CIED infection by the guidelines and expert opinion¹. However, there have been successful case reports on adoption of a conservative approach without extracting the leads in patients who are frail elderly, with multiple comorbidities and limited life expectancy and the risk of lead extraction is high⁴. Blood cultures and transesophageal echocardiography are important investigations in managing CIED infection. In addition, 1-6 weeks of antibiotic therapy is recommended depending on the clinical settings.¹ Re-implantation of new device is in general recommended to be performed 3-14 days after the blood culture has become negative. On the other hand, contralateral side to the site of infection has been advocated conventionally. However, with the emergence new technology of subcutaneous implantable cardioverter-defibrillator and leadless cardiac pacemaker, for which, intravenous lead implantation becomes unnecessary, data on the role of these devices in the management of CIED infection is eagerly awaited⁵.

Prevention of CIED infection is of crucial importance. Intravenous cefazolin compared with placebo given immediately before the procedure has been shown to reduce the risk of CIED infection⁶. Chlorhexidine-alcohol compared with Povidone-iodine has been shown to reduce the risk of surgical site infection⁷. In general, it is believed that reducing pocket hematoma can decrease the risk of CIED infection. Data has been accumulating on the potential of an absorbable antibiotic envelope to reduce CIED infection. A multicentre, large-scale randomized-controlled study (WRAP-IT) on the use of absorbable antibiotic envelope in on-going and the results of which may impact clinical practice on prevention of CIED infection⁸.

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ABSTRACTS

Consensus document: Device-detected atrial tachyarrhythmias

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Atrial fibrillation (AF) frequently develops in patients with implanted cardiac electronic devices (CIEDs), ranging from 26-68%¹⁻⁷. Detection of AF using CIEDs enables early diagnosis of AF and oral anticoagulant therapy (OAC) for stroke prevention. This consensus document⁸ developed by the European Heart Rhythm Association in 2017 and endorsed by the Asian Pacific Heart Rhythm Society addresses the definition, epidemiology, clinical implications and recommendation for OAC in these patients with device-detected subclinical AF.

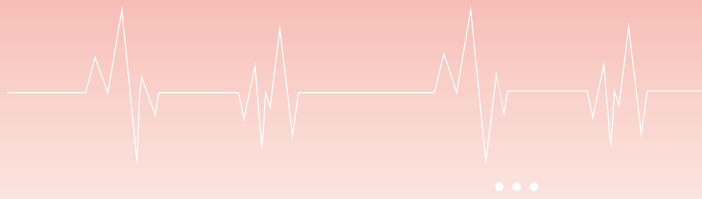
Atrial high rate events (AHRE) are defined as atrial events over 190 bpm detected by the atrial lead of a CIED. When AHRE over 6 minutes are detected in an asymptomatic patient without a prior history of AF, such events are termed subclinical AF (SCAF). ECG recorded (either with conventional 12-lead or rhythm strip ECG or inserted cardiac monitor) without prior AF symptoms or diagnosis are termed silent or asymptomatic AF. A diagnosis of silent AF is often made when an AF related complication such as stroke or heart failure occurs.

AHRE > 5-6 minutes occur in about 20% of patients in the first year after pacemaker implantation. Only 17-21% of these are correlated with symptoms. The patient risk profiles and outcome of symptomatic vs asymptomatic AHRE are similar. In the ASSERT study⁷, SCAF occurred in 10.1% of patients within 3 months of device implant in hypertensive subjects over 65 years. The consensus document therefore recommends review the presence of AHRE and stored electrograms in CIEDs, with judicious programming to achieve appropriate AHRE detection.

Several studies have examined the natural history of AHREs in pacemaker and ICD recipients. SCAF is a predictor of future clinical AF. In the MOST² and ASSERT⁶ study, clinical AF occurred at an odds ratio (OR) of 5.9 and 5.8 in patients with SCAF compared to those who did not. SCAF is also a predictor of future thromboembolic events (TE), with OR ranging from 2.2 to 5.3. Two factors appear to determine the occurrence of TE: the duration of SCAF and the underlying risk for stroke based on the CHA2DS2-VASc score.

The duration of SCAF that significantly increased TE risk was > 5.5 h in the TREND and > 17.7 h in the ASSERT study with an average CHADS2 score of about 2 in both studies. Thus the consensus document recommends OAC when SCAF occurs > 5.5 h in patients with CHA2DAS2-VASc score ≥ 2 . Interestingly, there is no good correlation between the onset of SCAF with subsequent TE. In the TRENDS study⁹, only less than 1/3 of patients with TE event had one or more episodes of SCAF within 1 month of the event. A lack of temporal relationship was also observed in the ASSERT study¹⁰. Initiation of, and discontinuation of, OAC (mainly warfarin) in a therapeutic trial of TE prophylaxis is based on SCAF failed to achieve significance¹¹. Thus SCAF may represent an early marker (and perpetuator) of an underlying atrial disease that lead to TE events.

The risk factors for TE in AF, the CHA2DS2-VASc score plays a significant role in the presence of AHRE. Botto et al¹² relates the TE risk in 568 patients with a prior history of AF with SCAF. AHRE > 24h increases TE risk if CHA2DS2-VASc ≥ 1 , and AHRE ≥ 5 mins will increase stroke risk if CHA2DS2-VASc ≥ 2 . In the population without prior AF, the absolute risk for TE is significantly lower compared to those in the clinical AF¹³, but nevertheless much higher than those patients without SCAF. For instance, at a CHA2DS2-VASc score of 2.0 in the ASSERT study, when SCAF was detected, the TE risk was 1.29% vs 0.7% compared to those without, but still lower than the quoted 4% annual risk in the general population with clinical AF.



Based on these evidences, the consensus document recommends the following:

1. Assessment of patient's stroke risk using the CHA2DS2-VASc score is recommended
2. No antithrombotic therapy for any patients with CHA2DS2-VASc score of 0 in males or 1 in females, irrespective of AHRE, is recommended
3. For patients with two additional CHA2DS2-VASc risk factors (i.e. ≥ 2 in males, ≥ 3 in females), OAC is recommended for AF burden $> 5.5\text{h/day}$ (if there are no contraindications). Lower duration may merit OAC if multiple risk factors are present.
4. For effective stroke prevention in patients with CHA2DS2-VASc score ≥ 2 , oral anticoagulation, whether with well controlled vitamin K antagonist (VKA) with a time in therapeutic range $> 70\%$, or with a non-VKA oral anticoagulant (NOAC, either dabigatran, rivaroxaban, apixaban or edoxaban) is recommended

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ABSTRACTS

Leadless pacemaker

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Pacemaker technology has developed tremendously in the past decades. It has evolved from a bulky external device to a totally implantable system. Recently, it has undergone further miniaturization as a single component device that is implanted directly inside the right ventricle without attachment to a pacing lead. A conventional pacing system composes of one or more transvenous leads for sensing and pacing, and a subcutaneously implanted pulse generator. These components are also responsible for most of the risks and complications associated with pacemaker implantation. To name a few, those include pneumothorax, hemothorax, pocket hematoma, lead dislodgement acutely, and lead fracture, pocket erosion, system infection, and potential need for extraction chronically.

Currently available leadless pacemakers are self-contained right ventricular single chamber rate responsive pacing devices that can be implanted with specially designed delivery catheters and secured by unique anchoring systems using a femoral percutaneous approach. Clinical studies of leadless pacemakers have demonstrated that they can be implanted successfully with little complications. There remain a number of issues to be addressed, for example, long term safety, device retrieval, and end of service strategy. Although long term follow-up and outcome data are needed before the role of leadless pacing can be fully established, such technology appears to be the future direction of development. There are ongoing efforts and research to expand the utilization of leadless technology to dual chamber pacing, integration with implantable cardioverter-defibrillator for anti-tachycardia pacing, and left ventricular endocardial pacing for cardiac resynchronization therapy.

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ABSTRACTS

Consensus statement: Optimal ICD programming and testing

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Implantable cardioverter-defibrillator (ICD) therapy is clearly an effective therapy for selected patients in definable populations. The benefits and risks of ICD therapy are directly impacted by programming and surgical decisions. This flexibility is both a great strength and a weakness, for which there has been no prior official discussion or guidance.

The «2015 HRS/EHRA/APHRS/SOLAECE expert consensus statement on optimal implantable cardioverter-defibrillator programming and testing» is the first consensus of the 4 continental electrophysiology societies that there are 4 important clinical issues for which there are sufficient ICD clinical and trial data to provide evidence-based expert guidance. The consensus systematically describes the greater than 80% (83%-100%, mean 96%) required consensus achieved for each recommendation by official balloting in regard to the programming of (1) bradycardia mode and rate, (2) tachycardia detection, (3) tachycardia therapy, and (4) the intraprocedural testing of defibrillation efficacy.

The consensus fills the gap of ICD/CRT-D programming, and gives a comprehensive and systematic guidance for the standardized programming. The consensus is just a start, we look forward to having more sufficient data to guide ICD/CRT-D programming.



ABSTRACTS

His-bundle pacing: Where we are?

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Studies have shown right ventricular pacing induced dyssynchrony can have deleterious effect in susceptible individuals. Depolarization of the ventricles through the His–Purkinje system induces normal synchronous activation and therefore avoids dyssynchrony induced by right ventricular pacing. Investigators have shown permanent His-bundle pacing is associated with improvement in exercise capacity, preserved ventricular synchrony and left ventricular ejection fraction compared to right ventricular pacing. It has also been demonstrated that His-bundle pacing can significantly shorten the QRS duration and even “normalized” the conduction defect in patient with heart failure and bundle branch block suggesting there presence of different conduction property along longitudinal level of the bundle branch conduction system. His-bundle pacing, hence is an attractive alternative to cardiac resynchronization therapy for patient with conduction delay and heart failure.

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ABSTRACTS

CRT response: Considerations and strategies

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Cardiac resynchronisation therapy (CRT) has become a mainstream treatment for the management of patients with congestive cardiac failure. The standard indications for CRT include LV systolic dysfunction ($LVEF \leq 35\%$), prolonged QRS duration ($\geq 120\text{ms}$) and heart failure symptoms despite optimal medical therapy. However approximately one-third of patients do not derive symptomatic benefit. The factors involved in the lack of benefit revolve around patient selection, patient-specific LV lead placement, optimal programming of the device and follow-up care. The lecture will review these issues and discuss methods to potentially improve response rates.



ABSTRACTS

Ventricular arrhythmias after implantation of left ventricular assist devices

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Mechanical ventricular assist devices (VADs) have been shown to improve outcomes in patients with advanced heart failure as bridge to heart transplantation (BTT) and as destination therapy (DT). Complications including device malfunction, infection, organ dysfunction, bleeding, arrhythmias, and cerebrovascular events. Ventricular arrhythmias (VA) are common among patients with VADs accounting for 25-40% and are associated with worse outcomes. There are wide variety of signs and symptoms upon presentation mainly driven by the fact that the right ventricle (RV) is not supported by the device. Deterioration of RV function can result in palpitations, decompensated heart failure, syncope or sudden cardiac death. A common presenting sign of VAs is decrease in VAD flow. The mechanisms responsible for VAs can be divided into five main categories: mechanical dysfunction, increased left ventricular end-diastolic pressure, ischemia, metabolic/drugs and scar related reentry tachycardia. Determination of the mechanism of VA is essential to ensure the greatest likelihood of successful treatment. Management of VAs included conservative management (such as optimization of intravascular volume status and VAD speed adjustment), medical therapy with antiarrhythmic agents, implantable cardioverter defibrillators and catheter ablations.



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