Cardio Mag

Volume 2|Issue 23|2021

Dear Doctor,
*Greetings from Micro Labs Limited. We are happy to bring you "**Cardio Mag**", which contains latest and interesting news in the field of Cardiology.*

This issue contains

- ***Assessment of Left ventricular stiffness by diastolic Wall strain in patients with pacemaker implantation.***
- ***Novel option for the management of Management of Coronary Ruptures during Percutaneous Coronary Interventions.***
- ***A novel device for snoring.***

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Looking forward to your valuable feedback.
Best Regards,
Medical Team, Micro Labs Limited

1. Assessment of Left ventricular stiffness by diastolic Wall strain in patients with pacemaker implantation.

Atrial tachyarrhythmias occur subclinically quite frequently in patients with pacemakers. Arrhythmias have been reported to be associated with an increased risk of thromboembolism. Atrial fibrillation (AF) Symptoms are variable with persistent AF are asymptomatic. Left ventricular (LV) diastolic dysfunction is potentially linked to AF. Asymptomatic AF is associated with thromboembolic risks.

With the development of Cardiac implantable electronic devices (CIED) most dual-chamber

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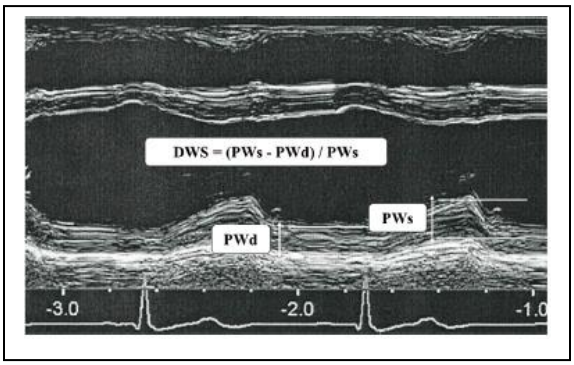
pacemakers have specific algorithms to detect atrial high-rate episodes (AHREs).
Current study aims to investigate the association of echocardiographic and clinical parameter with the occurrence of AHREs in patients with a dual-chamber pacemaker.

Methods:

150 patients implanted with a dual-chamber pacemaker for the indication of sinus node dysfunction (SND) or atrioventricular block (AVB) were included.



Patients above 18 years were included in the study. Clinical data assessed before pacemaker implantation.
12-lead electrocardiography (ECG) was done within 48 h prior to (during sinus rhythm) and after the implantation of the pacemaker (during right ventricular pacing).
Heart rate, PR interval, QRS duration, QTc (using Bazett's method), and QRS morphology (left bundle branch block / right bundle branch block / nonspecific intraventricular conduction delay) were assessed.
Transthoracic echocardiography (TTE) during sinus rhythm was done in all patients within one month prior to the implantation.
Blood pressure during TTE, left atrial (LA) volume index, E wave, deceleration time, E/e' ratio, LV diastolic diameter, LV ejection fraction (using Simpson's method), posterior wall diameter, the prevalence of LV hypertrophy, LV mass index, and DWS were assessed.
Diastolic wall strain (DWS) were assessed during sinus rhythm using transthoracic echocardiography before the PMI.
DWS was calculated from the M-mode echocardiographic measurement of the left ventricular (LV) posterior wall thickness at end-systole (PWs) and end-diastole (PWd), and DWS was defined as (PWs-PWd) / PWs.

Results:

Patients in the AHREs group had a higher rate of patients taking b-blocker / diuretics than patients in the non-AHREs group.
Even though not significant, patients in the AHREs group were taller, had elevated uric acid, higher brain natriuretic peptide, a higher proportion of males, and a higher rate of patients taking angiotensin receptor blocker than patients in the non-AHREs group

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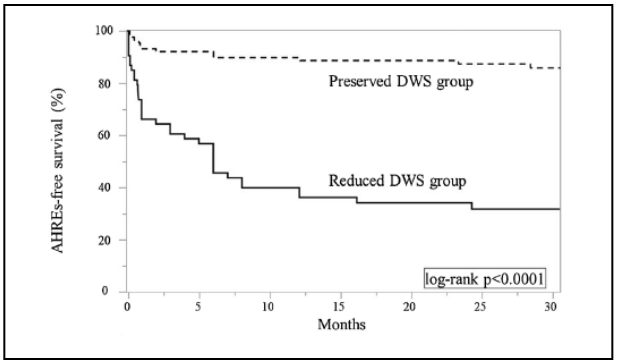
In the AHREs group, Patients had reduced DWS, larger LA volume index, elevated E/e' ratio, thicker LV posterior diameter, and higher prevalence of SND than patients in the non-AHREs group.

Complication rates did not differ between the non-AHREs group and the AHREs group (9.3% vs. 6.0%, respectively, p = 0.7517).

At 12-month follow-up period, percentages of atrial pacing (29 ± 29% vs. 33 ± 35%, p = 0.4804) and ventricular pacing (54 ± 45% vs. 49 ± 45%, p = 0.4637) were similar between the non-AHREs group and AHREs group, respectively.

The time from implant to the first AHRE was 5.9 ± 10.1 months.



Discussion:

Delay in diagnosis is seen in asymptomatic AF which can result in ischemic stroke or heart failure. Detection of clinical AF early and timely initiation of anticoagulant therapy are essential for management of patients with asymptomatic AF.

Current study showed that AHREs were only associated with DWS, which is a contributing factor in subtle diastolic dysfunction, on multivariable analysis.

In Patients with reduced DWS (<0.33) had a higher risk of incidence of AHREs. Patients progressed to persistent AHREs during the follow-up period had lower DWS than patients with paroxysmal AHREs or without AHREs.

Conclusion:

Stiffness of Left ventricle assessed by DWS was associated with atrial high-rate episodes in patients with a dual-chamber pacemaker. DWS is a useful predictor of AHREs in patients with a pacemaker.

Reference:

Kishima H et al. Left ventricular stiffness assessed by diastolic Wall strain predicts asymptomatic atrial high-rate episodes in patients with pacemaker implantation. J Cardiol. 2021 Feb;77(2):195-200.

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2. Novel option for the management of Management of Coronary Ruptures during Percutaneous Coronary Interventions.

Coronary rupture is a potentially fatal complication of PCI. It is a rare complication with more prevalence in females and patients with hypertension, previous coronary artery bypass grafting, and those admitted with NSTEMI.

Most common cause of these perforations are wire tip induced.

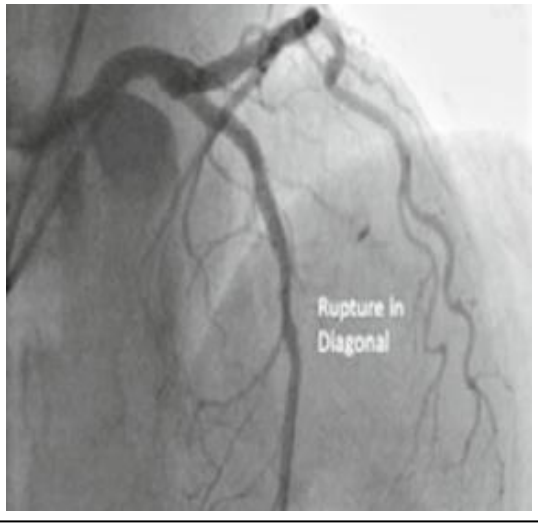
Current is a case of Coronary rupture treated with a novel therapy discussed herewith.

Case presentation:

A 52-year-old female presented with increased intensity of exertional retrosternal chest pain. She had exertional chest pain from a few days before and experienced a more severe form of pain from 3 hours before admission with slight exertion.

Pain was compressive nature without radiation and was accompanied by diaphoresis.

On physical examination, patient had a blood pressure of 135/85mmHg, a heart rate of 86 beats/minute, and a respiratory rate of 20/minute.



Patient had a history of controlled hypertension from 10 years before. She was a smoker for 15 years. No history of cardiac disease or diabetes mellitus was present.

ECG revealed ST-segment depression in anterior and lateral precordial leads. On laboratory testing, she had troponin I elevated to five folds of the normal upper limit.

With diagnosis of non-ST-segment elevation myocardial infarction (NSTEMI) and due to the refractory angina after the event, she underwent diagnostic coronary angiography which revealed two-vessel diseases with significant stenosis in left anterior descending- (LAD-) diagonal bifurcation and proximal right coronary artery (RCA) and a low SYNTAX score.

Hence patient was planned to undergo stage percutaneous coronary intervention (PCI) on LAD-

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diagonal bifurcation and then proximal RCA.

Provisional stenting and after wiring both branches predilation in both vessels and finally, provisional stenting in LAD with postdilation, and final proximal optimization technique (POT) was done.

Subsequent final POT, the patient developed severe refractory chest pain and ST-segment changes due to closure of the jailed diagonal artery, decision was made to perform rewiring and balloon opening of the occluded diagonal.

After rewiring and ballooning the diagonal, an iatrogenic rupture was noted in the diagonal artery caused by the wire.

Step -wise actions for treatment and management of this rupture including prolonged balloon inflation and serial echocardiographic evaluations were started. After three episodes of prolonged balloon inflations using 2 × 20 mm balloon, perforation seemed to be sealed and there was no more leakage.

The echocardiographic evaluation showed mild to moderate pericardial effusion, and termination the procedure.

After Four hours, she had low blood pressure and paradoxical pulse. Serial echocardiography, showed a right atrium and right ventricle collapse in favour of tamponade.

Patient was quickly taken to the catheterization laboratory. After drainage of the blood from the pericardium and pigtail insertion , reevaluation of the ruptured vessel with angiography found out that the leakage was persistent.

Repeated diagonal wiring and prolonged balloon inflation were done again with no much improvement , and it was decided to manage the rupture more aggressively.

Options were to deploy a stent graft in the main LAD vessel or try to occlude the diagonal using coils or polyvinyl alcohol (PVA) or standard glue material. All these materials and methods have their costs and pitfalls, hence a novel product was used for sealing the rupture.

This product is a form of Gel foam commonly used by ear, nose, and throat (ENT) surgeons (Spongostan). It is easy to use, and its preparation takes under two minutes.

First product was dissolved with standard contrast, and then, the injection was made through a microcatheter tip.

After injection, complete sealing of the ruptured vessel was achieved. The patient was then shifted to the CCU.

After 1 day, pigtail was removed, the repeated echocardiography showed no pericardial effusion.

Repeated angiography was done the next day which showed complete restoration of flow in the diagonal artery and no leakage.

After three years procedure, patient had no angina symptoms and was doing well.

Discussion:

Coronary perforation is one of potentially fatal complication of PCI. It also has a higher incidence during complex procedures like bifurcation stenting, very tortuous or heavily calcified vessels, use of atheroablation devices, or CTO procedures.

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In current case , wire-induced coronary rupture happened during bifurcation stenting in a female patient with history of hypertension admitted for NSTEMI. Due to failed conservative management, the patient was treated with a novel product for sealing and treatment of the rupture.

Conclusion:

Coronary rupture is a serious complication, use of novel product like spongostan helps in improved outcomes.

Reference:

Hashemi A et al. Novel Product for the Management of Coronary Ruptures Happening during Percutaneous Coronary Interventions Case Reports in Cardiology. 2021; 6688338: 1-6 pages.

IN FOCUS

3. A novel device for snoring

Obstructive sleep apnea (OSA) affects millions of people. Many technologies helps to manage and sometimes treat the condition, including continuous positive airway pressure (CPAP) devices. Most patients end up receiving therapies that don't treat the underlying causes of poor breathing during sleep.

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The FDA has approved a news device that makes muscles around the tongue strong in order to reduce snoring and help alleviate OSA.

The device has a mouthpiece with four electrodes that are positioned around the tongue. The electrodes deliver electrical muscle stimulation, similar to transcutaneous electrical nerve stimulation (TENS), but to the area around the lower tongue. Strengthened muscles end up preventing the closing of the airway, allowing for the free movement of air in and out of the lungs.

Duration of treatment takes twenty minutes a day for a period of six weeks, with weekly sessions thereafter.

This cannot be used for people with pacemakers, all kinds of dental implants, for people with OSA with an Apnea-Hypopnea Index of 15 or higher.

A latest study assessed the safety and effectiveness of the device in 115 patients with snoring, including 48 patients with snoring and mild sleep apnea. All patients used the device for 20 minutes, once a day for 6 weeks, then discontinued use for 2 weeks before they were reassessed. Overall, the percent of time spent snoring at levels louder than 40dB was reduced by more than 20% in 87 out of the 115 patients.

In a 48-patient subset with snoring and mild OSA, the average AHI reduced by 48%, from 10.21 to 5.27, in 41 out of 48 patients. The most common adverse events observed were excessive salivation, tongue or tooth discomfort, tongue tingling, dental filling sensitivity, metallic taste, gagging and tight jaw.

Reference:

Available at: https://www.medgadget.com/2021/02/neuromuscular-tongue-stimulator-for-snoring-authorized-by-fda.html. Accessed on 22-02-2021.