Cardio Mag

Volume 1|Issue 10|2020

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

- ***Any Impact of Impact of left ventricular diastolic dysfunction on long term outcome in peripheral artery disease.***
- ***Hypervagotonic Nerve Stimulation –A case report***
- ***A new device to track COVID 19 -Biobutton***

Should you require any specific article or medical information, please feel free to contact us at ***medicalservices@microlabs.in***

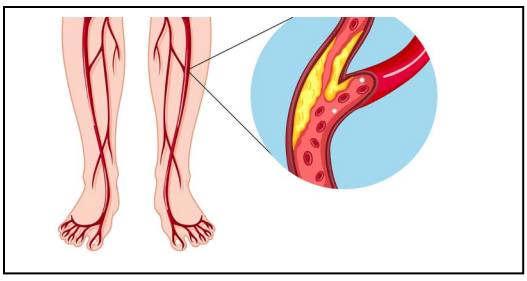
Looking forward to your valuable feedback.
Best Regards,
Medical Team, Micro Labs Limited

1. Any Impact of Impact of left ventricular diastolic dysfunction on long term outcome in peripheral artery disease.

Peripheral artery disease is associated with high risk of coronary artery disease (CAD) and cerebrovascular diseases (CVD). It is also risk for heart failure (HF).

Left ventricular (LV) systolic dysfunction, history of HF, and the presence of CAD is associated with an increased risk for cardiac events in patients with Peripheral artery disease.

Aim of the current study to asses if there is any impact of left ventricular diastolic dysfunction on outcomes in patients with peripheral artery disease.



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Methods:

Retrospective study of 160 patients with peripheral artery disease with preserved LV systolic function assessed by echocardiography (ejection fraction >50 %). Patients were divided into two groups on the basis of LV diastolic dysfunction, diagnosed based on the American Society of Echocardiography/ European Association of Cardiovascular Imaging guidelines.

Patients with ejection fraction (EF) <50 %, lack of echocardiography data , or moderate-to-severe valvular disease were excluded from study.

With Cumulative incidence of 3 years, primary endpoint was compared between peripheral artery disease of lower extremity, patients with LV diastolic dysfunction and those without.

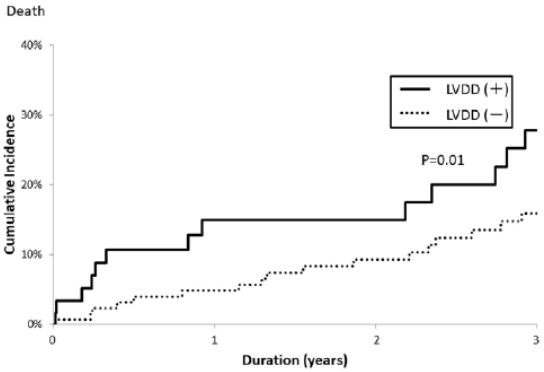
Primary endpoint was a composite of major adverse cardiac and cerebrovascular events (MACCE: death, hospitalization for heart failure, myocardial infarction, and stroke).

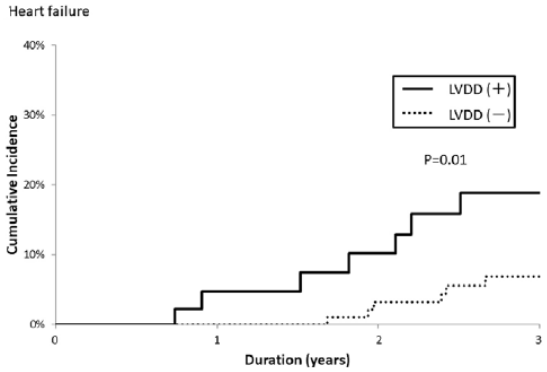
To determine whether LV diastolic dysfunction was independently associated with the MACCE, multivariate analysis was performed.

Results:

Baseline characteristics were comparable. Patients were observed for 30 months.

Primary endpoint occurred more frequently in patients with LV diastolic dysfunction than those without (35 % vs 23 %, p = 0.01) . Death (28 % vs 16 %, p = 0.01) and hospitalization for HF (19 % vs 7 %, p = 0.01) were significantly higher in patients with LV diastolic dysfunction than those without.





No significant differences between the two groups in myocardial infarction (3 % vs 3 %, p = 0.73) and stroke (3 % vs 3 %, p = 0.55) was seen.

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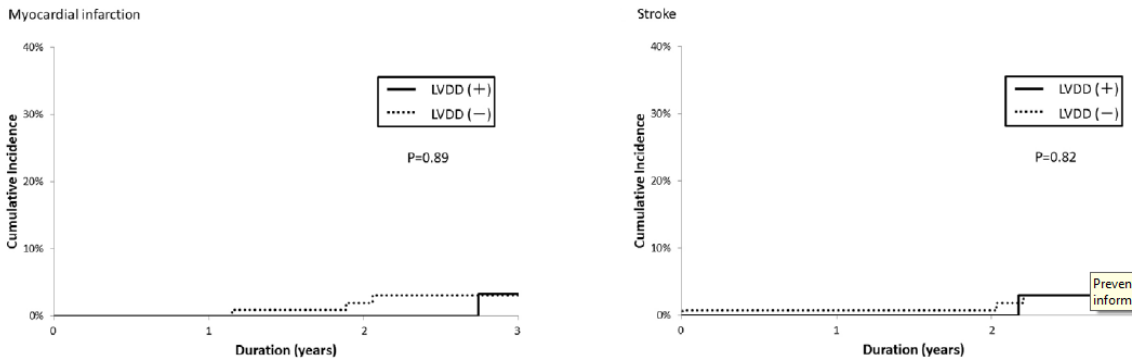
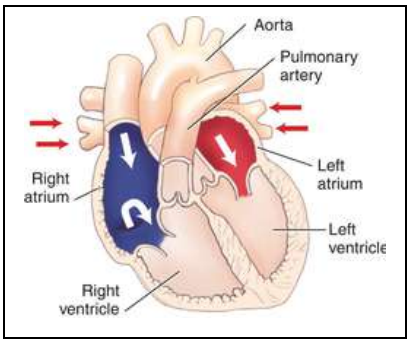


LV diastolic dysfunction (HR = 1.96, 95 % CI 1.09–3.55, p = 0.03) and critical limb ischemia (HR = 2.52, 95 % CI 1.24–5.10, p = 0.01) were independent predictors for MACCE, as assessed by multivariate analysis.

Discussion:

Peripheral artery disease (PAD) is often accompanied by heart failure with preserved ejection fraction (HFpEF). Left ventricular (LV) diastolic dysfunction is related to HFpEF. studies have reported that HF and LV diastolic dysfunction as poor prognostic factors in patients with Peripheral artery disease.

Inflammation and oxidative stress leads to LV diastolic dysfunction, which are induced by several atherosclerotic factors. LV diastolic dysfunction is associated with increased arterial stiffness and advanced atherosclerosis.



Arterial stiffness increases LV afterload and central pulse pressure, causing myocyte hypertrophy and sub endocardial ischemia that may impair myocardial relaxation and promote myocardial fibrosis.

Treatment for Medication therapy for patients with Peripheral artery disease is to reduce the risk of cardiovascular events includes antiplatelet , Angiotensin- converting enzyme inhibitors or angiotensin receptor blockers effective to reduce cardiovascular events in patients with PAD, including patients with chronic limb ischemia.

Endovascular treatment (EVT) for patients with Peripheral artery disease has been previously reported to confer cardiorenal protection. EVT for patients with PAD reduces the carotid augmentation index and brachial and central blood pressure in patients with PAD. A recent study reported that EVT for patients with PAD reduces blood pressure and may improve long-term prognosis.[1]

Conclusion:

LV diastolic dysfunction increases the risk for major cardiovascular and cerebrovascular events in patients with Peripheral artery disease.

Reference:

1) Yanaka K et al. Impact of left ventricular diastolic dysfunction on long-term outcome in patients with lower extremity artery disease.J Cardiol 2020 ; 1-6.

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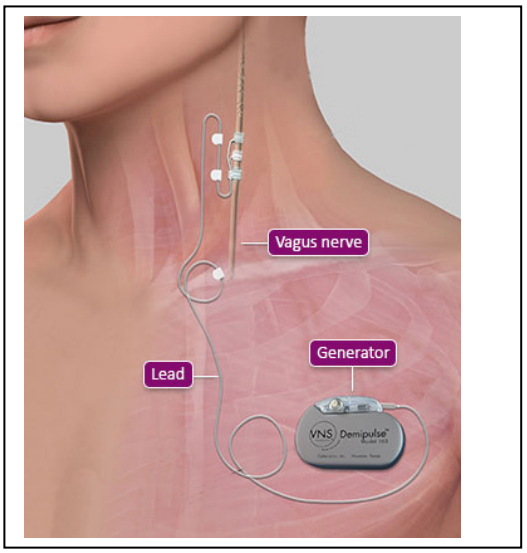
2. Hypervagotonic Nerve Stimulation –A case report

Vagal nerve stimulation devices are used to treat refractory epilepsy .It is approved by the US FDA. The current implantable treatment device consists of a small battery-powered stimulator that requires battery removal and replacement approximately every 6 years.

A fine wire electrode extends from the device and is typically wrapped around the left cervical vagus. Right vagus can be used in circumstances where approaching the left vagus is inadvisable . As right vagus innervates the sinoatrial node, stimulating on the right is best done with ECG monitoring.



The device can be turned on for 30–90 seconds to provide a brief stimulus to the vagus. After device is implanted, it is programmed by a physician.

Below is a case presentation of AV block associated with VNS device treated for refractory epilepsy not responding to drugs.[1]

Case presentation:

A 40-year-old woman with no known cardiac disease presents with of new-onset lightheadedness, dizziness, and syncope. Her symptoms have become more frequent over the past few months. Exertion does not worsen her symptoms, and they occur randomly throughout the day.

Patient had a past history of seizures since 16 years of age and had underwent right temporal lobectomy for seizures resistant to antiepileptic drug therapy.

Subsequent to surgery , she continued to have breakthrough seizures on lamotrigine and lacosamide. An electroencephalogram showed left anterior temporal sharp discharges as well as polyspike wave discharges.

Due to recurrent seizures despite surgical and pharmacological therapy, a vagal nerve stimulator (VNS) was implanted on the left pectoral site to modulate seizure foci. This was successful in controlling her seizures by activating vagal nerve stimulation with the onset of aura.

After 4 years of being seizure-free, post-VNS implant, patient presented with recurrent episodes of syncope and near-syncope without tonic-clonic movements.

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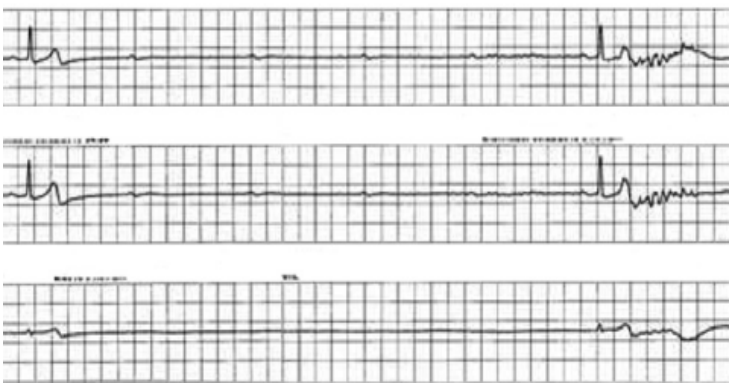
Patient was investigated. Repeat electroencephalogram did not reveal any new epileptiform abnormalities correlating with patient's syncopal episodes.

Vagal Nerve Stimulant delivered periodic impulses for a 30-s duration with an intervening period of no impulse delivered for 5 min throughout a 24- h period. The programmed output was a 1.5 milliamps (mA), magnet output of 1.75 mA, with a pulse width of 500 ms and a signal frequency of 30 Hz for the past 2 years, which effectively controlled her seizures.

Baseline electrocardiogram showed normal sinus rhythm with no conduction abnormalities. On continuous 24-h rhythm monitoring, no tachyarrhythmias or bradyarrhythmias were detected.



The patient still had recurrent syncopal and near-syncopal episodes. Ambulatory cardiac telemetry monitor caught multiple 6.8-s pauses correlating with the syncopal and near-syncopal episodes. The findings suggested marked hypervagotonic response with atrioventricular (AV) block leading to syncopal episodes.

VNS parameters were reduced to a current output of 1.25 mA and magnet output of 1.5 mA.
No further syncopal episodes or AV block was observed at the lower VNS output; however, after 2 weeks, her prodromal seizure symptoms reappeared.
As cardio inhibition was noted with reappearance of prodromal seizure symptoms, a pacemaker implant was recommended to allow the safe reprogramming of higher output from the VNS for seizure control as well as to alleviate cardio-inhibition.
After pacemaker implantation, the current output strength was set back to an optimal setting of 1.5 mA and the magnet output of 1.75 mA. The pacemaker's programme of AV delay was initially kept short to enable constant ventricular pacing due to the severity of symptom recurrences, VNS outputs were adjusted under constant telemetry monitoring.
Patient tolerated settings well, with no further heart block was seen.

Discussion:

For ancillary treatment of patients with medically refractory epilepsy, VNS devices is approved by the U.S. Food and Drug Administration. VNS device is implanted in the left pectoral site, and it provides high-frequency electrical stimulation to the left vagus nerve.

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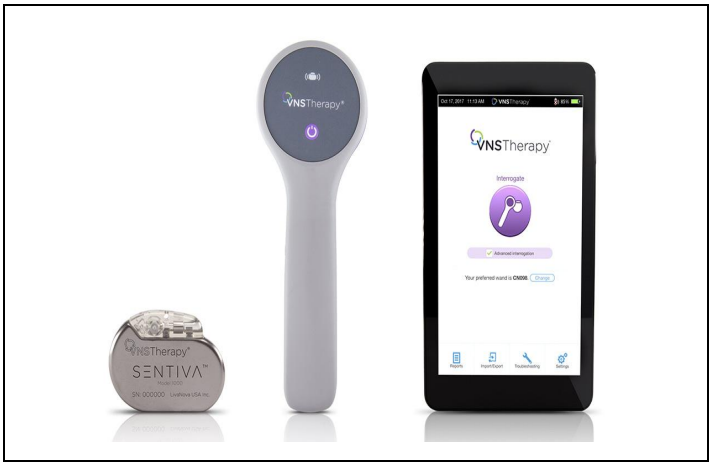
Right vagus nerve has a greater effect on the sinoatrial node, whereas the left vagus nerve has a greater effect on the AV node .

Usual side effects of the VNS are shortness of breath, hoarse voice, pain, nausea, and headaches.



Current case presented with life-threatening side effect of VNS on the cardiac conduction system involving the AV nodes after VNS implantation. Treatment for this is either to decrease the current output or stop the VNS altogether.

As reducing the VNS output, resulted in prodromal seizures, permanent pacemaker was inserted to alleviate cardiac symptoms and to keep and neurological symptoms under control.
Patient was followed up for 6 years, had no further seizures or syncopal episodes.[1]

Conclusion:

A case of AV block secondary to vagus nerve stimulation was successfully managed with permanent pacemaker.

Reference:

1) Jaglan A et al. A Tale of Fits and Faint. A Case of Hypervagotonic Nerve StimulationJ Am Coll Cardiol Case Rep. 2020; 1-3

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IN FOCUS

3. A new device to track COVID 19 -Biobutton

A company got FDA clearance for BioButton device that helps in tracking symptoms of COVID-19 in potential patients.

BioButton is a device around size of a large coin and, with accompanying applications and triage

dashboards, it can be used to track many people at the same time. This device tracks the person's temperature, respiration and heart rate at rest, the position of the body, sleep activity, as well as the activity state at any given time, all for a continuous 90 days. The BioButton is a single-use device, it can be disposed of after three months.

With this device people can be tracked to spot any early signs of the development of COVID-19 and to monitor those already infected. Clinicians working with COVID patients would find useful for themselves, people who are starting to return to work can take advantage of the BioButton to help them, if they develop symptoms they can know early enough to prevent spreading it to others.
The device shares its readings with a centralized dashboard using HIPAA-compliant protocols to ensure privacy. Analytic algorithms crunch the data can spot unusual events and trends that can point to the rise and development of the disease.

Reference:
Available at :https://www.medgadget.com/2020/05/biobutton-to-help-track-covid-ensure-safe-return-to-work.html. Accessed on 12-05-2020