Cardio Mag

Volume 1|Issue 13|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

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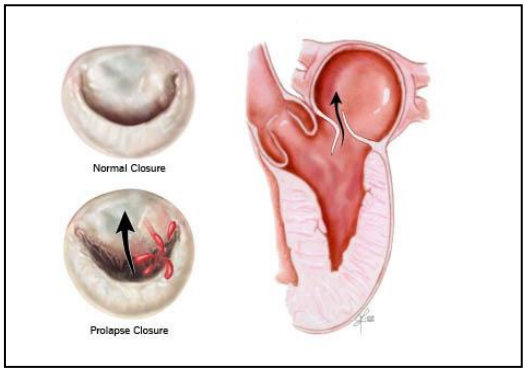
Looking forward to your valuable feedback.
Best Regards,
Medical Team, Micro Labs Limited

1. Efficacy of Positron Emission Tomography vs Magnetic Resonance Imaging in Mitral Valve Prolapse



Patients with mitral valve prolapse(MVP) may develop ventricular arrhythmias (VA) at a young age, prior to any symptoms of myocardial dysfunction or symptoms.

Cardiac magnetic resonance imaging (MRI) has been described as a consistent feature of MVP-related sustained VA to diagnose Left ventricular (LV) fibrosis. Repetitive traction by excess leaflet motion is the stress stimulus that prompts activation of fibroblasts and recruitment of inflammatory cells, which leads to myocardial fibrosis patients with significant degenerative mitral regurgitation (MR) owing to MVP and a history of ventricular ectopics

Myocardial fibrosis can also be detected by integrated fluorine 18– labeled fluorodeoxyglucose (18F-

FDG) positron emission tomography (PET) and MRI (hybrid PET/MRI), an imaging modality that allows for simultaneous detection and quantification of functional, anatomic, and metabolic information.

Aim of the current study is to evaluate the burden and distribution of fluorine 18–labeled (18F) fluorodeoxyglucose (FDG) uptake and late gadolinium enhancement (LGE) in patients with degenerative MVP with ventricular ectopy.

Methods:

A Prospective observational study of 30 patients with MVP and significant primary degenerative MR referred for mitral valve repair and underwent hybrid positron emission tomography/magnetic resonance imaging (PET/MRI).

Patients were included according to American College of Cardiology guidelines for severe primary MR and assigned in 1 of 3 indications for surgery:

class I: clinical symptoms and LV ejection fraction less than 60% and LV end-systolic dimension greater than 40mm

class IIa: asymptomatic with new onset of atrial fibrillation or/ and pulmonary hypertension (pulmonary artery systolic pressure greater than 50 mm Hg)

class IIb: early surgery, assigned to patients with severe MR without any of the 4 objective class I or IIa indications.

Ventricular arrhythmias were categorized as Ventricular arrhythmias were categorized as either (n = 20) or minor (n = 10) according to the Lown and Wolf classification either complex.

Patients underwent cardiac 18 FDG-PET and MRI with late gadolinium enhancement (LGE) imaging on a hybrid PET/MRI system, 20 Patients were categorized into 5 groups:

(1) PET positive and MRI positive (PET+/MRI+) when a pattern of increased focal or focal-on-diffuse 18F-FDG uptake coexisted with a pattern of LGE (Figure 1)

(2) PET+ and MRI negative (MRI−) if there was increased focal or focal-on diffuse 18F-FDG uptake without underlying LGE

(3) PET negative (PET−)/MRI+

(4) PET−/MRI−

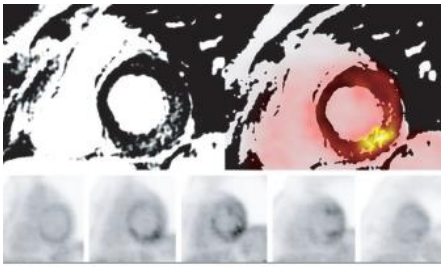
(5) physiologic 18 F-FDG uptake

Results:

It is not clear whether there is association between the severity of VAs and the burden of FDG uptake or LGE in patients with MVP with severe MR.

85 % of patients exhibited focal or focal-on-diffuse uptake of 18F-FDG (PET+). 5% of patients had LGE but no FDG uptake (PET−/MRI+), and 5% had neither FDG uptake nor LGE (PET−/MRI−).

The FDG uptake coexisted with areas of LGE (PET/MRI positive) in 70 % of patients. Of the 5 asymptomatic patients with normal ventricular



FDG Uptake

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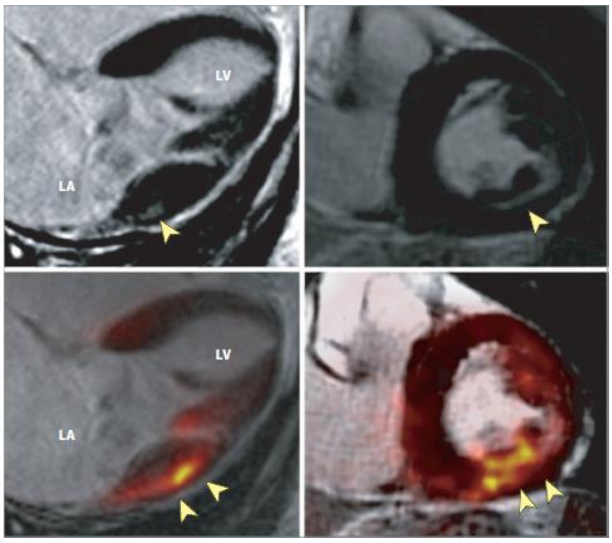
indices and absence of any surgical indications, all were PET/MRI positive.



Concomitant FDG uptake and late gadolinium enhancement

Most commonly involved FDG+ segments were basal-mid inferolateral and basal-mid anterolateral segments, while basal-mid inferolateral segments were most frequent LGE+ locations.

Higher mean (SD) LGE burden in patients with complex-VAs (5.9%) compared with those patients with m-VAs (3.3%)).

A less FDG uptake in the Complex-VA cohort compared with the minor-VA cohort (mean [SD] maximum standard uptake value, 3.5 vs 7 was noted and maximum tissue-to background ratio, 2 vs 4 respectively.

Discussion:

Increased FDG uptake has been shown to detect presence of myocardial inflammation is associated with higher rates of malignant Vas.

In current study, 85% of patients with MVP, severe degenerative MR, and ventricular ectopy exhibited myocardial FDG uptake (PET+), a potential surrogate marker of myocardial inflammation.

FDG uptake segments frequently 70% coexisted with areas of myocardial fibrosis (LGE+), even in asymptomatic patients with normal LV function and dimensions.

Conclusion:

Novel association exists between degenerative MVP and FDG uptake, can be a potential surrogate marker for myocardial inflammation and/or ischemia.

References:

Miller MA et al. Hybrid Positron Emission Tomography/Magnetic Resonance Imaging in Arrhythmic Mitral Valve Prolapse [published online ahead of print, 2020 May 27]. JAMA Cardiol. 2020; E1-E6.

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2. Reemergence of Percutaneous Balloon Pericardiotomy- A case report

Pericardial effusions remain a major health risk that can be life-threatening. These patients undergo emergency pericardial fluid aspiration mostly through catheter-based pericardiocentesis and sometimes through surgical aspiration and pericardial window creation.

Percutaneous Balloon Pericardiotomy (PBP) procedure is a reemerging older procedure; it is a nonsurgical technique that helps in preventing reaccumulation of pericardial effusion.

Done percutaneously in the Cath suite avoiding sedation and anaesthesia required for surgical window creation.

Current is a case study of pericardial effusion adopting Percutaneous Balloon Pericardiotomy.

Case presentation:

A 40-year-old male diagnosed with stage IV adenocarcinoma of unknown primary, with lung and liver metastasis, presented with a worsening of shortness of breath.

Trans thoracic echocardiography showed a large pericardial effusion pending tamponade, he underwent emergency pericardiocentesis with 1 L of haemorrhagic fluid drained, the drain was left in place for 36 hours then stopped, and the patient was discharged home after 36 hours.

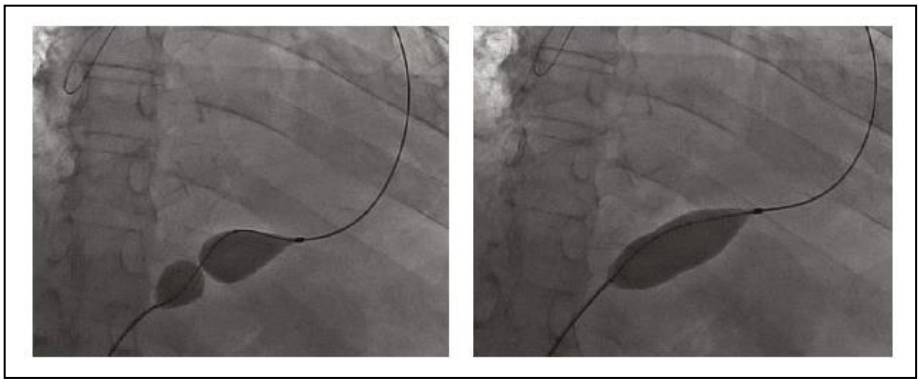
Exudative fluid was shown in analysis but no malignant cells.

After Three months, the patient presented again with a worsening shortness of breath and respiratory distress.

Transthoracic echocardiogram (TTE) showed a reaccumulation of large 2.6cm concentric pericardial effusion, with no evidence of tamponade.

Due to severe respiratory distress , surgical pericardial window was denied by the surgical team .The patient underwent PBP. A drain was left for 24 hours after which the patient was discharged home. Subsequent visits and TTE evaluation at 3 and 6 months revealed no more pericardial effusion accumulation.

Procedure: Under local anaesthesia, pericardiocentesis was performed using the classic subxiphoid approach; after aspiration of 700 cc of haemorrhagic fluid utilizing a pigtail catheter, a stiff wire exchange was performed. Under fluoroguidance, a 2:0 ∗ 20mm balloon, was placed at the pericardial edge; the balloon was inflated twice until the balloon waist disappeared and a drain was left in place for 24 hours after the procedure.



In procedure echocardiography

showed intact cardiac champers. Follow-up CXR and TTE after 24 hours showed a mild increase in the left pleural effusion with no pericardial effusion.

Discussion:

Optimal management of pericardial effusion with tamponade is controversial. Pericardiocentesis with drainage is considered to be one of the mostly used nonsurgical treatment modalities, can be accompanied by the installation of chemotherapeutic or sclerosing agents within the pericardial cavity. PBP (Percutaneous Balloon Pericardiotomy) is less invasive method than the surgical windowing with lower recurrence rates of effusion when compared with pericardiocentesis and sclerosing agents' instillation.

As it is done under local anaesthesia, can be a preferred treatment modality in malignant pericardial effusions where the patients are extremely sick to undergo surgical pericardial window.

PBP involves the creation of a localized window or stoma between the small pericardial cavity and the spacier left pleural cavity using a percutaneous balloon-dilating catheter. Aim is to create a channel between the two cavities in an attempt to prevent the reaccumulation of fluid within the constraint pericardium.

PBP is effective modality of treatment in patients presenting with recurrent moderate to large pericardial effusions secondary to a variety of inflammatory or noninflammatory disorders. PBP procedure is as safe as pericardiocentesis but extra caution is to be considered upon placing and inflating the pericardioplasty balloon to avoid cardiac chamber injury.

Conclusion:

Percutaneous Balloon Pericardiotomy is efficacious and safe in the treatment of pericardial effusion.

Reference:

Aquel R et al. Case Report Percutaneous Balloon Pericardiotomy (PBP) Revisited: A Case Report and Review of Literature. Case Reports in Cardiology. 2020; 8121763: 1- 3 pages.

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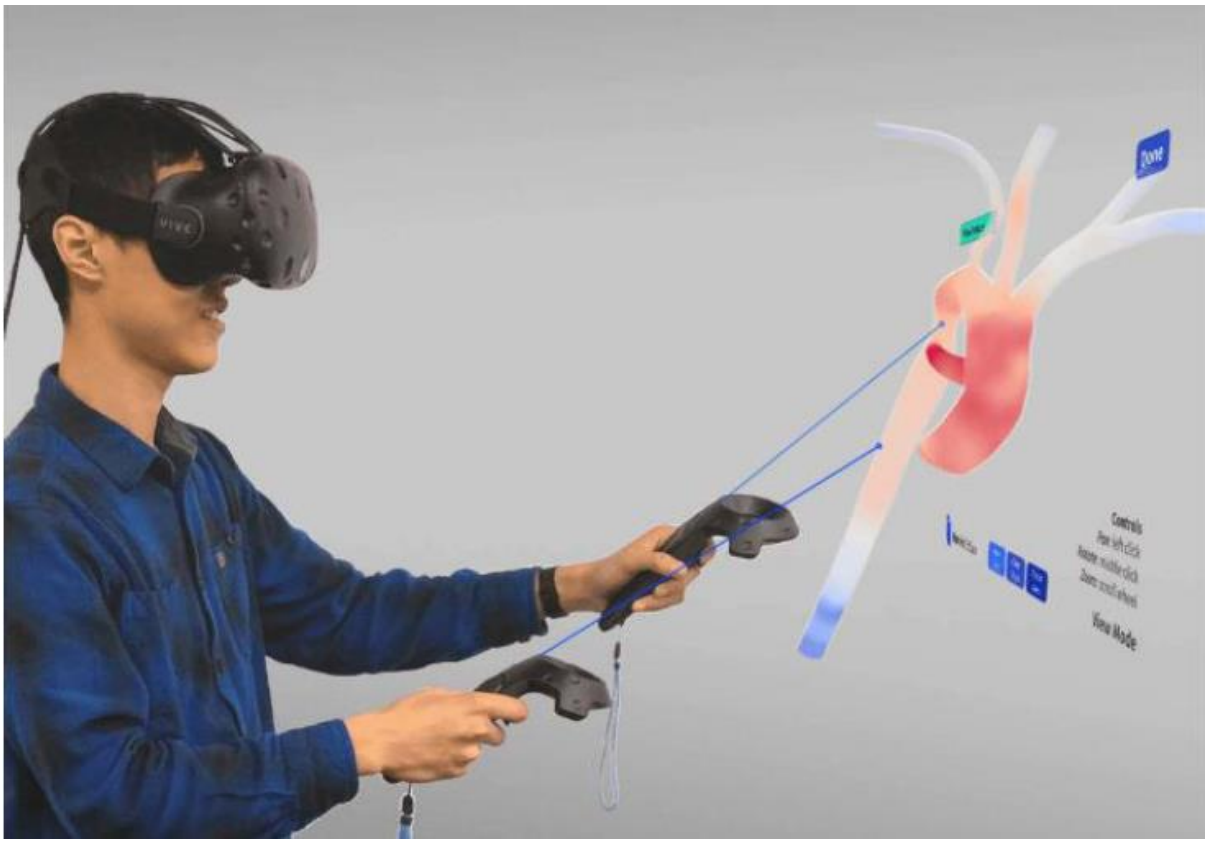
IN FOCUS

3. Assessment of Personalized Blood Flow through Virtual Reality Interface.



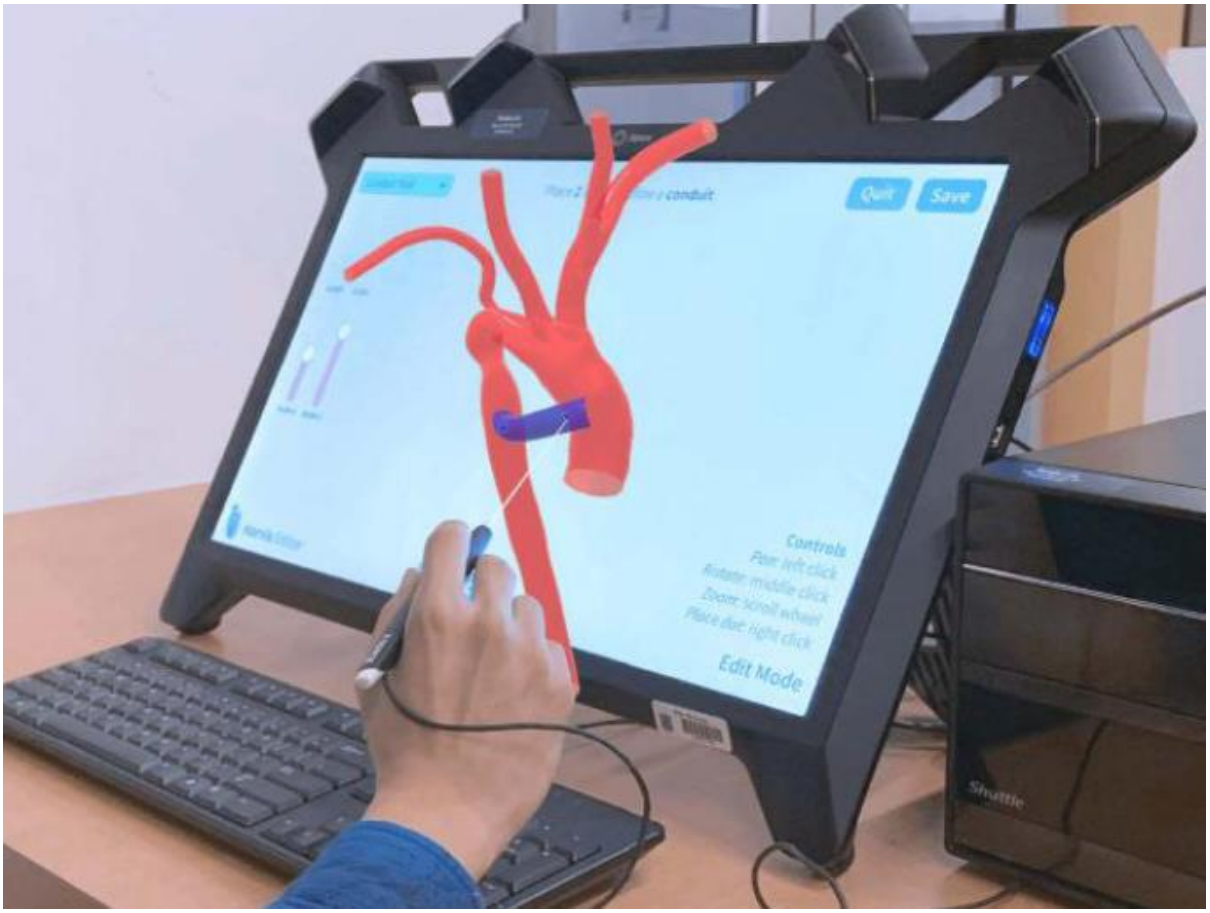
Researchers have developed a fluid dynamics simulator that can create a model of blood flow within the body, including the motion of individual blood cells.

Virtual reality (VR) devices are increasingly prevalent in clinical and biomedical research and enable unique and powerful visual experiences.

Description of device:

Core acts as a central hub for the workflow. Core provides an interface for managing simulation workflow. The simulation software reads an input file for specifying specific run parameters, such as inlet positions, flow velocity, fluid density.

Initially pursued to create a highly usable interface for cardiovascular simulation. As a tool, it provides a simple and interactive for leveraging a powerful CFD framework. Study results showed it is an effective tool for cardiovascular visualization.



This is a computational platform for interacting with massively parallel vascular flow simulations.

- This integrated platform includes support for visualization with 2D and VR displays.
- A comparative user study of 2D and VR devices for hemodynamic models.
- 2D and fully immersive VR demonstrate higher accuracy for vascular interventions than semi-immersive VR.

This can be used to make treatment decisions in stent placement to emulate common vascular 168 procedures such as stent and conduit placement and to produce a well-formed, closed mesh for simulation.

Reference:

1)Available at : https://www.medgadget.com/2020/05/personalized-blood-flow-modeling-benefits-from-virtual-reality-interface.html. Accessed on 03-06-2020.

2) Shi H et al. Harvis: an interactive virtual reality tool for hemodynamic modification and simulation. Journal of Computational Science. 2020 May 7:101091.

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