Cardio Mag

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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

- Cardiac rehabilitation in patients with heart failure: A Multicentre Prospective Cohort Study
- Co-relation of Fibrocytes with infarct size in ST elevated MI patients treated with primary percutaneous coronary intervention
- A Case Report of Device-Related Thrombus in patient with Atrial Fibrillation

*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

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Cardiac rehabilitation in patients with heart failure: A Multicentre Prospective Cohort Study

Introduction:

Cardiac rehabilitation program is highly recommended by heart failure guidelines for comprehensive disease management. Meta-analyses have highlighted the favourable effects of Cardiac rehabilitation in young patients who have Heart Failure with reduced left ventricular ejection fraction but there are limited evidence regarding the effects of Cardiac rehabilitation on the long-term prognosis of older patients or Heart Failure patients with preserved ejection fraction. Previous studies on Heart Failure patients with preserved ejection fraction reaveled that Cardiac rehabilitation increases exercise capacity, which is a surrogate measure of clinical events. A retrospective cohort study discussed the prognostic effects of Cardiac rehabilitation in both Heart Failure with reduced left ventricular ejection fraction and Heart Failure with preserved ejection fraction. According to that study, the effects of Cardiac rehabilitation were analysed in patients who underwent Cardiac rehabilitation at least once within 3 months after discharge, which is less than the recommended frequency of effective Cardiac rehabilitation, and the prognostic effects beyond 6 months remained uncertain.

Objective:

To examine the effects of Cardiac rehabilitation for 6 months on the prognosis of heart failure in a cohort that included older patients with Heart Failure with preserved ejection fraction

Method:

This study enrolled 2,876 hospitalized patients with acute heart failure or worsening chronic heart failure. Patients who underwent Cardiac rehabilitation once or more times weekly for 6 months after discharge were enrolled in the Cardiac rehabilitation group. The main study end point was a composite of all-cause mortality and heart failure re-hospitalization during follow-up period of 2 years. A propensity score matching was performed to compare the survival rates between the Cardiac rehabilitation and non-Cardiac rehabilitation groups. Of the total enrolled

patients, 313 underwent Cardiac rehabilitation for 6 months. After propensity score matching using confounding factors, 626 patients were included in the survival analysis. Cardiac rehabilitation was associated with a reduced risk of composite outcomes, all-cause mortality and heart failure rehospitalisation. Stata 15 software was used for Statistical analyses considering p value of <0.05 statistically significant.

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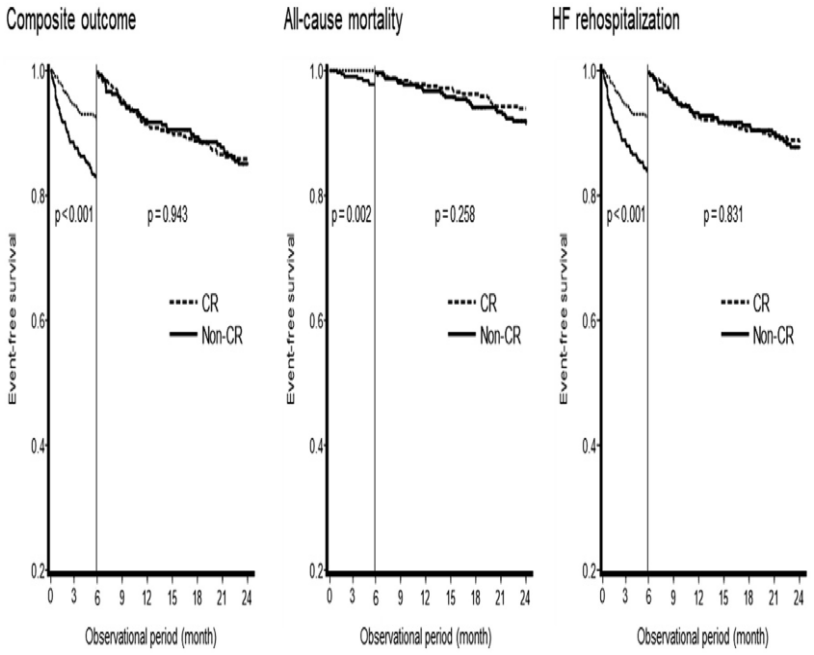
Results:

Subgroup analysis showed similar Cardiac rehabilitation effects in patients with Heart failure with preserved ejection fraction (≥50%) and Heart failure with reduced ejection fraction (<40%). Landmark analysis highlighted that the Cardiac rehabilitation did not reduce the aforementioned end points beyond 6 months after discharge. Cardiac rehabilitation is a standard treatment for Heart failure despite the type of Heart failure. The most important finding of this multicentre prospective cohort study was that regular participation in Cardiac rehabilitation for 6 months after discharge was associated with a reduced incidence of clinical events. Our results strengthen available clinical evidence and indicate that CR is a standard HF treatment

Landmark analysis to examine the effects of cardiac rehabilitation on the study outcomes beyond 6 months after discharge



Conclusion:

This study concluded that Cardiac rehabilitation is a standard treatment for a broad range of patients with Heart failure. However, there can be further challenges affecting the long term prognostic effects of Cardiac rehabilitation

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Reference:

Adachi T, et al. Prognostic Effects of Cardiac Rehabilitation in Patients with Heart Failure (from a Multicentre Prospective Cohort Study). The American Journal of Cardiology. 2021 Nov 27.

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Co-relation of Fibrocytes with infarct size in ST elevated MI patients treated with primary percutaneous coronary intervention

Introduction:

In ST elevated MI patient treated with reperfusion therapy, the infarcted area initially contains infarcted tissue, oedema, swollen cardio myocytes, and variable areas of micro haemorrhage, after several weeks, inflammation starts resolving and the infarcted tissue gets replaced by extracellular matrix proteins that are then cross linked, forming the mature myocardial scar. The size of this fibrotic area, is a strong predictor of clinical outcomes which can be detected by late gadolinium enhancement on cardiac magnetic resonance imaging. Cardiac magnetic resonance imaging is a powerful tool to assess this process. Fibrocytes are bone marrow-derived progenitor cells that gets released into the bloodstream because of tissue injury and mediate tissue fibrosis and can be utilised as an easily measurable biomarker of fibrosis. As the concentration of circulating fibrocytes gets elevated in fibrotic heart diseases, it has been considered as home to the injured myocardium in patients with myocardial infraction. Thus, it is hypothesized that, in Patients with ST elevated MI, circulating fibrocyte levels correlate with infarct size on Cardiac magnetic resonance imaging at 6 months.

Objective:

This study aimed to analyse if fibrocytes correlate with infarct size in ST elevated MI patients treated with primary percutaneous coronary intervention

Methods:

This study was carried out following the principles of the Declaration of Helsinki and with approval of IRB and enrolled 19 patients presenting with ST elevated MI treated with primary PCI from 1st August 2014 to 30th September, 2019. Demographic data including age, gender, co-morbid factors, lab data, angiographic information, echocardiographic report and medications were gathered. Patients were treated with standard guideline-directed medical therapy as advised by the primary cardiologist. Of, total enrolled patients, 5 patients did not go for Cardiac magnetic resonance imaging due to claustrophobia (n = 1), COVID-19 restrictions (n = 1), and relocation (n = 3). Only, 14 patients completed peripheral blood sampling and Cardiac magnetic resonance imaging both at baseline and follow-up and were included in

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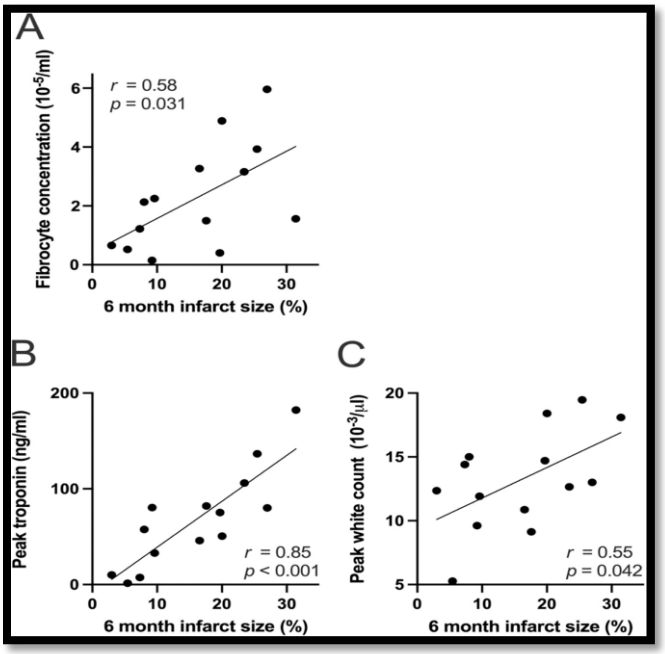
the analysis. No patients had to re-hospitalize or experienced major adverse cardiac events during the study period. SPSS or Prism software were used to analyse data. Continuous variables were summarized as median and interquartile range, and compared using the Mann-Whitney-u test. Correlations were assessed using Pearson's correlation coefficient with p value was less than 0.05.

Results:

The concentration of circulating fibrocytes 6 months after ST elevated MI had no relationship with the level of peak troponin I and peak WBC count or left ventricular function throughout the hospital stay, but positive correlation was observed with 6-month infarct size on Cardiac magnetic resonance imaging. Peak troponin I level and peak WBC count during the hospital stay both positively correlated with infarct size at 6 months, although left ventricular function did not. The presence of left anterior descending artery as a culprit for ST elevated MI also positively correlated with infarct size at 6 months. There was no correlation between the change in Ejection fraction and change in fibrocyte level over time.

Scatterplots showing correlations between fibrocyte levels and infarct size at 6 months (r = 0.58, p = 0.031) (panel A), peak troponin I level and infarct size (r = 0.85, p < 0.001) (panel B), and peak white blood cell count and infarct size (r = 0.55, p = 0.042) (panel C). LVEF = left ventricular ejection fraction



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Conclusions

In ST elevated Myocardial Infraction patients treated with primary percutaneous coronary intervention, circulating levels of fibrocytes at 6 months positively correlate with infarct size on CMR at 6 months. Larger studies require to conclude if circulating fibrocyte levels may be useful as a risk stratification tool, or as a target of response to therapy.

Reference:

Elzeneini M, et al. Circulating fibrocyte levels correlate with infarct size in patients with ST elevation myocardial infarction treated with primary percutaneous coronary intervention. American Heart Journal Plus: Cardiology Research and Practice. 2021 Dec 1;12:100071.

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A Case Report of Device-Related Thrombus in patient with Atrial Fibrillation

Introduction:

The incidence and prevalence of atrial fibrillation have been increasing gradually since last few years. With 75 years being the median age of patients with atrial fibrillation. Since the confirmation of a relationship between an electrocardiogram with atrial fibrillation and a clinical irregularly irregular pulse was published by a group of European physicians in 1909, there have been different attempts to find various methods to manage atrial fibrillation. Management in non-rheumatic atrial fibrillation patients with a CHA2DS2 − VASc score ≥ 2

includes of an antiarrhythmic agent oral anticoagulants like vitamin K antagonists, or direct oral anticoagulants via thrombin inhibition, or factor **Xa** inhibition. In patients having a history of CAD and planned PCI, dual antiplatelet therapy with aspirin and a P2Y12 receptor antagonist is considered to prevent risk of thrombotic ischemic events and stent

thrombosis. In patients for whom anticoagulation is contraindicated, the next likely choice includes device implantation to close off the left atrial appendage and this choice has

become a leading alternative option for therapeutic prevention of thromboembolism. This case report is of an elderly male patient with large device-related thrombus in his left atrium five months following placement of a watchman device.

Case Presentation:

A 75 year old male patient presented with a chief complaint of left sided numbness that

started 2 hours prior to arrival in the hospital. Patient had a past history of paroxysmal atrial fibrillation with **WATCHMAN FLX™** placement, CAD with 3 cardiac stents, hypertension, hyperlipidemia, bilateral carotid endarterectomies, recurrent TIA, and 2 prior cerebrovascular accidents. Patient experienced similar symptoms and was diagnosed with TIA 8 months earlier, since then he had been taking apixaban 5mg daily and clopidogrel 75mg daily following previous cardiac stenting. Transthoracic echocardiogram revealed an ejection fraction of 55-60% and a mildly dilated left atrium. The patient got discharged and was asked strictly to continue apixaban and clopidogrel. After a month,

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the patient got re-admitted to ER department with the chief complaints of acute onset right-sided weakness and numbness. A magnetic resonance imaging of the brain revealed the ischemic events in multiple territories, and a computed tomography angiogram of the neck vessels showed a focal left vertebral artery stenosis. After consultation with Neuro interventional radiologist, a stenting of the left vertebral artery was performed. Telemetry revealed atrial fibrillation with controlled ventricular response even after compliant with apixaban and clopidogrel. A platelet P2Y12 assay was advised to perform to check if any failure of therapy with clopidogrel, but showed negative. Patient was advised for transesophageal echocardiogram but was deferred to a later date due to patient convenient. At the time of discharge, apixaban was switched to rivaroxaban 20mg OD, and was advised to continue clopidogrel and to follow-up with his primary cardiologist. After a month, the patient was found to be in persistent atrial fibrillation during a follow up appointment with his cardiologist. When asked, the patient admitted of several mechanical falls in the past few months. It was then decided by the outpatient cardiologist that the patient would undergo implantation of a WATCHMAN FLX™ device for left atrial appendage closure under transesophageal echocardiogram guidance. The appendage of 22mm in diameter, showed no clot within its interior prior to device implantation. A 27mm device was then placed more distally following a partial recapture after an initial attempt placed the device somewhat proximal to the opening. The patient was then prescribed with aspirin 81mg OD, and was instructed to continue clopidogrel and rivaroxaban, and to return in OPD after 6 weeks for a repeat transesophageal echocardiogram. The patient had a repeat transesophageal echocardiogram which showed a normal sized left atrium and a well positioned WATCHMAN FLX™ without significant peridevice leak, after 2 months. No spontaneous echo contrast, new shunt, or evidence of thrombus was noted. The patient was advised to continue clopidogrel and aspirin OD, and to discontinue rivaroxaban, and to return back in OPD within 6 months. After 3 months , the patient presented to the ER department with the chief complaints of left-sided numbness. Laboratory value at the time of admission were: creatinine 1.2 mg/dL, calcium 8.6 mg/dL, rapid troponin 0.01 ng/ml, low-density lipoprotein 76.45 mg/dL, high density lipoprotein 26 mg/dL, haemoglobin 14.7 g/dL, and platelet count of 124 × 103/uL. As, Patients' symptoms were mimicking TIA, was advised for a transesophageal echocardiogram which showed a large thrombus measuring 2:5 × 1:5 cm at the mouth of the LAA that was adherent to and covered the entire top of the WATCHMAN FLX™ device. Rivaroxaban was re-started immediately. After two month, another transesophageal

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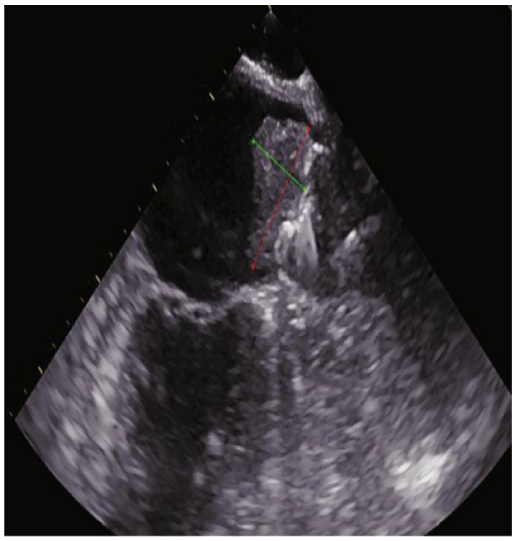
echocardiogram showed a moderate to severely dilated left atrium with WATCHMAN FLX™ device in the LAA and right atrium moderately dilated without evidence of thrombus. The patient was advised to continue rivaroxaban 20mg OD and to follow-up with the cardiologist.

Transesophageal echocardiogram measuring a large thrombus within the left atrium atop an implanted WATCHMAN FLX™ device.



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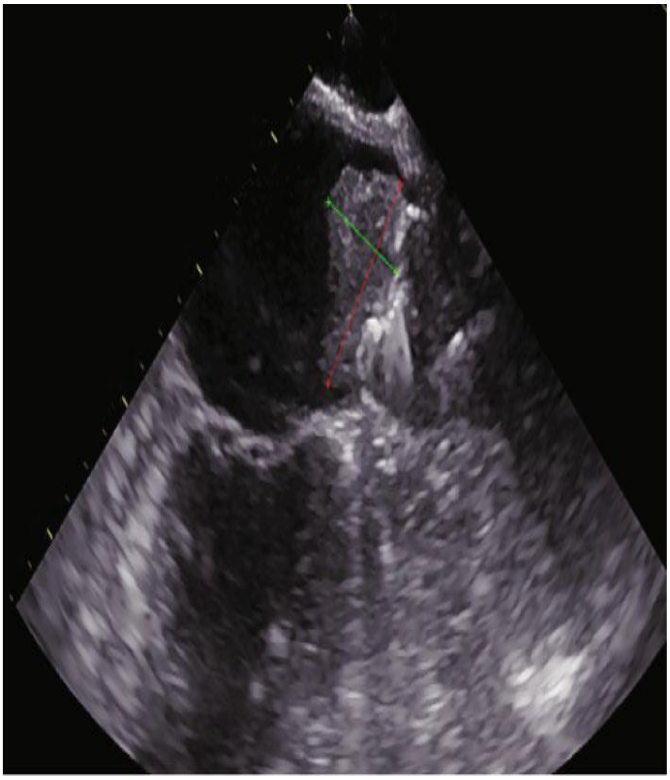
Transesophageal echocardiogram indicating a large thrombus located at the opening of the left atrial appendage covering an implanted WATCHMAN FLX™ device.



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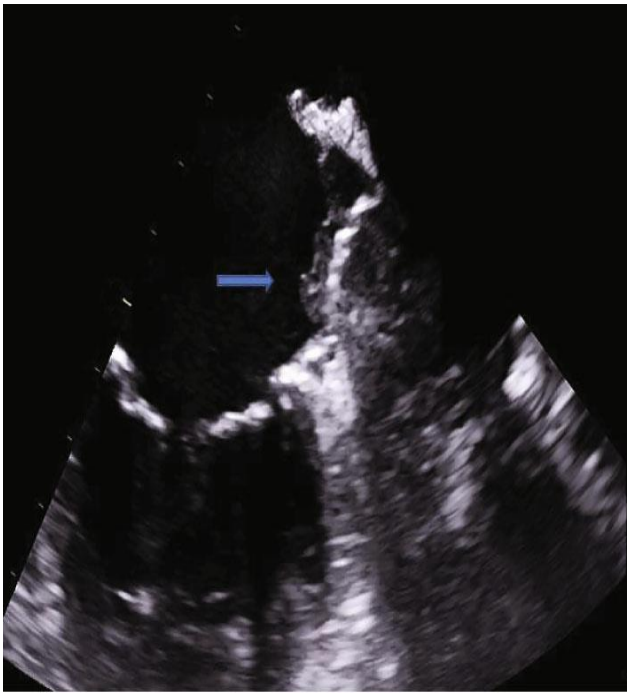
Repeat transesophageal echocardiogram showing a decrease in clot formation on a WATCHMAN FLX™ device within the left atrial appendage.



Conclusion:

Although the incidence of device related thrombosis is relatively low, it does have a significant impact on high-risk patients. Choice and duration of anticoagulant and antiplatelet drugs should be tailored for high-risk patients. Management options should continue to be studied for therapeutic benefit in streamlining post procedural therapy and improve future outcomes in the uses of left atrial appendage occlusion devices, as well as continual thrombus prevention.

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Reference:

Lawani O, Baptista E. Large Device-Related Thrombus Detected following Symptoms of Transient Ischemic Attack. Case Reports in Cardiology. 2021 Nov 23;2021.