



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

-  ***Plasma branched-chain amino acid/aromatic amino acid ratio for predicting future cardiac events in cardiac failure.***
-  ***Surgical excision of Right Atrial Mass- A case report.***
-  ***Smart textile fabrics to monitor health.***

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.

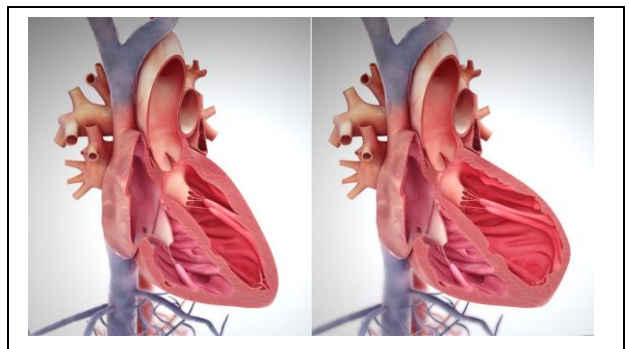
Best Regards,

Medical Team, Micro Labs Limited

1. Plasma branched-chain amino acid/aromatic amino acid ratio for predicting future cardiac events in cardiac failure.

Heart failure (HF) has high catabolism that promotes branched-chain amino acid (BCAA) catabolic activity in the heart and skeletal muscle and reduces protein synthesis in the liver. Subsequently plasma free aromatic amino acids (AAAs) are increased.

Objective of the current study is to evaluate prognostic value of the branched-chain amino acid / free aromatic amino acids ratio in patients with HF.¹



Methods:

A cohort study involving 140 patients hospitalized for worsening HF were included in the study. When



the patients got stabilised, fasting blood samples were taken to assess Plasma BCAA levels (i.e. total leucine, isoleucine, valine) and AAA levels (i.e. total tyrosine, phenylalanine).

Levels of albumin, aspartate transaminase, alanine aminotransferase, alkaline phosphatase, γ -glutamyl transpeptidase, total bilirubin, and cholinesterase were assessed.

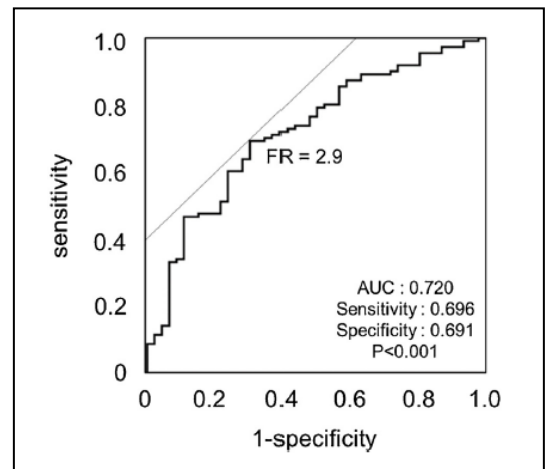
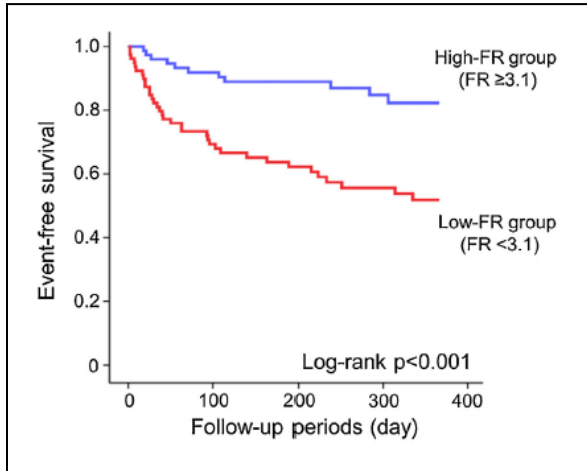
Patients were divided into two groups based on the median FR(Fischer's ratio) value of 3.1: a high-FR group ($FR \geq 3.1$) and a low-FR group ($FR < 3.1$).

Patients were followed up after discharge cardiac events and optimal medical therapy was provided based on the current HF treatment guidelines.

Results:

Compared with the high-FR group, low-FR patients were older, had more prior hospitalizations for HF, lower albumin and cholinesterase levels, and lower geriatric nutritional risk index (GNRI).

The mean follow-up period was 200 days. Through analysis of Kaplan–Meier survival analysis showed that the cardiac event rate was significantly higher in the low-



FR group than in the high-FR group (log-rank test, $p < 0.001$).

Few Patients were seen with ischemic cardiomyopathy in low-FR group than high-FR group, ischemic cardiomyopathy is not a significant independent determinant of cardiac events in the univariate Cox proportional hazard regression model.

Discussion:

Amino acids including BCAAs and AAAs, decompose in non-hepatic tissues, such as skeletal muscle or the heart. Free BCAAs in blood are mobilized to inhibit skeletal muscle proteolysis, thereby reducing free BCAA concentrations in blood.

But free AAA concentrations are increased due to reduced protein synthesis from free AAAs in the liver and increased release of AAAs from muscle into blood. Consequently, FR (BCAAs/AAAs molar ratio) is reduced in HF patients

In current study, the HF patients with a low FR had worse outcomes than those with a high FR; and a



low FR was an independent prognostic predictor in HF patients.¹

Conclusion:

Analysis of branched-chain amino acid / free aromatic amino acids ratio might be useful for predicting future cardiac events in patients with HF.

Reference:

1) Hiraiwa H et al. Usefulness of the plasma branched-chain amino acid/Aromatic amino acid ratio for predicting future cardiac events in patients with heart failure. J Cardiol. 2020;75(6):689-696.

2. Surgical excision of Right Atrial Mass- A case report

Atrial masses are uncommon but subsequently develop into a major problem. Differential diagnoses are broad and include primary and secondary malignancy, benign neoplasms, thrombi, and infective foci.

Current is a case of right atrial mass complicating immunosuppression for lupus nephritis and haemodialysis via a tunnelled vascular access catheter.

Case presentation:

A 20-year-old female patient with lupus nephritis, treated with tacrolimus and rituximab, required haemodialysis via a tunnelled permanent vascular access catheter which was still in situ. Due to immunosuppression, Cryptococcus neoformans meningitis was diagnosed through lumbar puncture 8 months earlier.

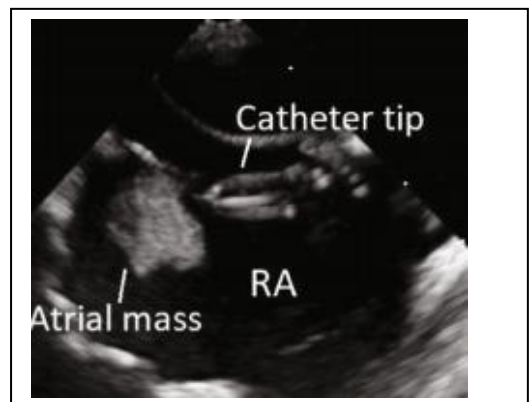
Initially treated with intravenous amphotericin and flucytosine and subsequently placed on oral fluconazole.

Transthoracic echocardiography demonstrated a large echogenic mass in the right atrium at the tip of the vascular access catheter.

Transoesophageal echocardiography confirmed an echogenic mass in the right atrium measuring 20 mm x 22 mm (see Figure 1) and a patent foramen ovale (PFO) with left to right shunt.

Differential diagnosis of atrial thrombus complicating vascular access, as well as an infective focus was considered.

Inflammatory markers and septic screening with blood





cultures were performed. C-reactive protein was 0.9 mg/L, and the neutrophil count was 9.5×10^9 . Three blood cultures were negative for bloodstream infection.

Ventilation perfusion scanning revealed segmental pulmonary emboli. Percutaneous catheter removal was deemed high risk due to potential embolisation. Anticoagulation with Apixaban was initiated for suspected atrial thrombus, and serial cardiac imaging was organised.

Removal of the vascular access catheter was planned after thrombus resolution, and the patient was discharged. After Four weeks, patient represented with lethargy and fevers to 39.4 degrees Celsius.

Elevated CRP of 157mg/L and neutrophils of 10.2×10^9 .

Empiric therapy with intravenous gentamicin and vancomycin was provided due to skin colonisation with methicillin-resistant *Staphylococcus aureus* was administered.

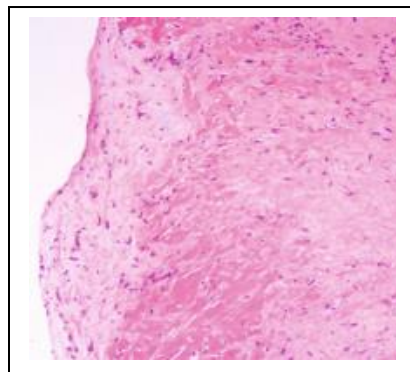
Blood cultures were positive for *Stenotrophomonas maltophilia*, and a diagnosis of line-associated bacteraemia was made, broad-spectrum antimicrobials with intravenous trimethoprim-sulfamethoxazole and cefepime were administered.

Regular therapeutic oral fluconazole was continued. Rapid clinical response to antimicrobial therapy was seen with defervescence within 24 hours.

Despite anticoagulation, Repeat transthoracic echocardiogram showed no interval change in the right atrial mass despite anticoagulation.

Endovascular removal and thrombolysis were deemed high risk due to potential for embolisation. A decision was taken for open surgical thrombectomy, PFO closure, and vascular catheter removal.

Magnetic resonance imaging (MRI) was negative for ischaemic stroke prior to on-pump cardiothoracic surgery. Surgery was performed with no postoperative complications, and she was discharged seven days later. Histology demonstrated organised thrombus with no evidence of abscess, granuloma, endocarditis, or myxoma.



Discussion:

Right atrial mass is rare occurs due to tumor, thrombi, and vegetations. Primary atrial mural endocarditis is rare with staphylococcus species, streptococci species, aspergillus, and candida. Secondary infection complicating myxoma has also been reported with similar bacterial pathogens. Patients chosen for anticoagulation, six months of therapy appears reasonable with serial imaging, close follow-up, and careful monitoring for infective, embolic, and cardiac sequela.

Conclusion: A case of right atrial thrombus were successfully managed surgically.

Reference:

Ferrera D et al. Surgical Management of Right Atrial Mass Associated with a Vascular Access Catheter. Case Reports in Cardiology. 2020; 4590147: 1-3 pages.



3. Smart textile fabrics to monitor health.

Mechanical sensing is a key functionality in soft electronics intended for applications in health monitoring, human–machine interactions and soft robotics. Current methods typically use intricate networks of sensors specific to one type of deformation and one point in space, which limits their sensing capabilities. An alternative approach to distributed sensing is electrical reflectometry, but it is challenging to build the necessary transmission lines out of soft materials.¹

Special textile threads has been designed to detect slight variations in how a fabric is stretched, the pressures that are applied to it, and even the torque that twists it. This can be used in clothing and even bed sheets to continuously monitor people’s breathing and heart rates, body movement, and other parameters that is useful in medicine and healthcare.



Near perfection, at a micrometer resolution, is necessary for these lines to be able to provide accurate results regarding how they are flexed, twisted, and pushed on.

Cardio Mag

Volume 1 | Issue 14 | 2020



To use the fibers to simultaneously measure a number of parameters, a separate device sends an electric current through the novel fibers and the returning signals are constantly analyzed and recorded to determine where the fiber is malformed and how.²

New fibers are flexible and can be integrated with existing textiles, all the additional electronics that power and sense the fibers.

Reference:

1) Leber A et al. Soft and stretchable liquid metal transmission lines as distributed probes of multimodal deformations. Nature Electronic. 2020: 1-11.

2) Available at: <https://www.medgadget.com/2020/06/smart-textile-fibers-to-measure-wearers-health.html>. Accessed on 16-06-2020



This scientific input is prepared from the Department of Medical Services, an initiative of M/s Micro Labs Limited under the aegis of Micro Knowledge Academy. The information contained herein is for education purpose only. The content is developed by compiling information from various authentic and published literatures. Although great care has been taken to assure the accuracy of the publication, M/s Micro Labs Limited shall not be responsible or in any way liable for any inaccuracy, errors, or omissions resulting from negligence or otherwise howsoever or any consequences arising there from. In spite of best efforts, the information in this publication may become outdated over time. M/s Micro Labs Limited shall not be responsible in any manner whatsoever, for any action taken, opinions expressed, advice rendered or accepted, any direct, incidental, special or consequential loss and damage caused on the basis of any material or information presented in this publication / update