Cardio Mag

Volume 1|Issue 07|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 role of sleep apnoea on right atrial structural remodeling in patients with with atrial fibrillation***
- ***Thrombosis of Left Anterior Descending Artery Aneurysm in a 9-Year Old Boy – A case report***
- ***Shirts Loaded with Body Sensors***

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 role of sleep apnoea on right atrial structural remodeling in patients with with atrial fibrillation

One of the most common cardiac rhythm disturbance encountered in clinical practice is Atrial fibrillation (AF) and is associated with decrease in quality of life and increased morbidity. Atrial structural and electrical remodeling in predisposing to AF. Sleep apnea is recognized as a potential risk factor for AF development . It is known that sleep apnea is associated with left atrial (LA) remodeling.

Sleep apnea is one of the major risk factors for AF recurrence after cardioversion and catheter ablation and LA volume is also closely associated with AF recurrence after catheter ablation. The ratio of right atrial (RA) volume index/LA volume index has been found to be a risk factor for AF recurrence .

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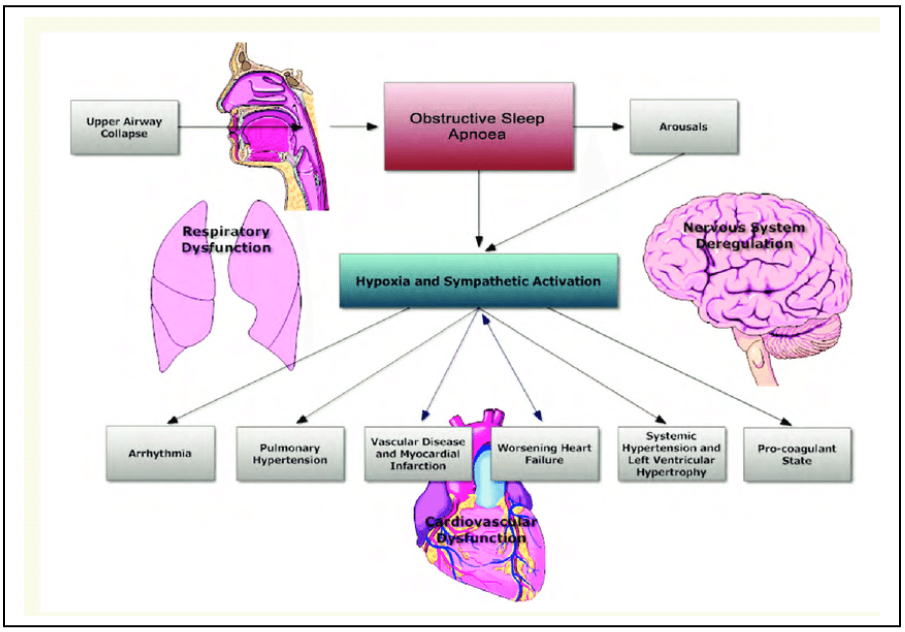
Aim of this study is to evaluate sleep apnea, atrial volume, and low- voltage zones for mapping in AF patients and to investigate the influence of sleep apnea on RA remodeling.[1]

Methods:

Patients were enrolled based on whether they received initial catheter ablation for symptomatic drug-refractory paroxysmal or nonparoxysmal AF.



Paroxysmal AF defined as AF that terminated spontaneously within 7 days of its onset, and non paroxysmal AF was defined as other types of persistent and longstanding AF.

Exclusion criteria included if Patients were detected with LA thrombus on transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE), if catheter ablation affects the severity of sleep apnea, if they were already using continuous positive airway pressure (CPAP) and oral appliance for treatment of sleep-disordered breathing, Patients with a history of cardiac surgery and if they could not receive sufficient examinations to obtain an appropriate value in the sleep study.

Sleep study results were evaluated using a portable sleep apnea test device. RA and LA volumes were determined by computed tomography (CT), and atrial structural remodeling was defined as atrial volume on CT > 110 mL according to previous reports.

The atrial substrate was evaluated by three-dimensional electro anatomical mapping.

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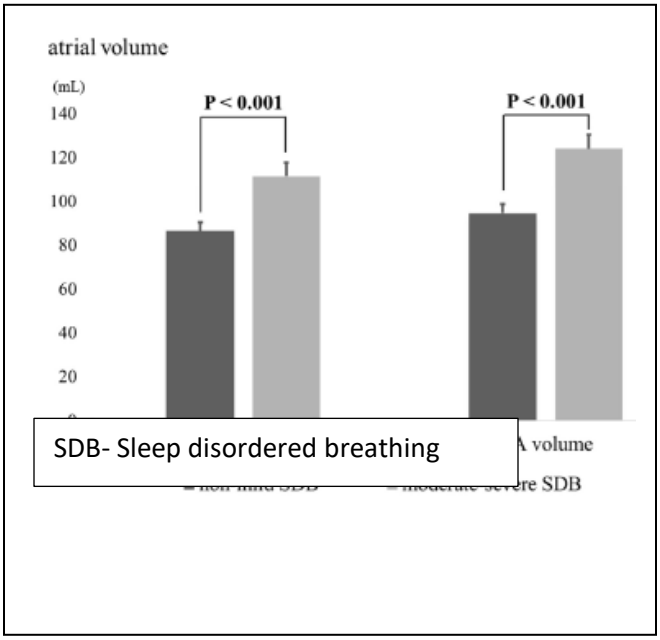
Results:

Total of 110 patients were analysed in the study.

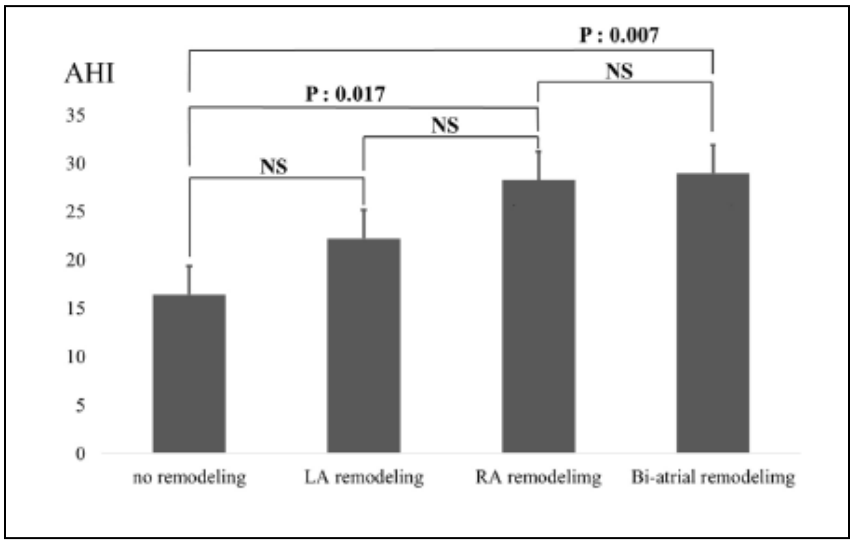
Patients were classified into four groups according to the presence of RA and/or LA enlargement. Among them 46 (42 %) had no dilatation, 8 (7 %) with LA dilatation, 21 (19 %) with RA dilatation, and 35 (32 %) with bi-atrial dilatation.

Significant differences in AF type, N-terminal pro B-type natriuretic peptide (NT-proBNP) levels, and apnea–hypopnea index (AHI) were observed in four groups.

AHI values correlated with NT-proBNP levels (r = 0.293, p = 0.002), left ventricular ejection fraction (r = -0.198, p = 0.044), LA volume (r = 0.370, p < 0.001), and RA volume (r = 0.465, p < 0.001) by univariate analysis.



Multiple regression analysis indicated that AHI was an independent predictor of increased RA volume, and LA was excluded as a multiple risk factor in AHI. AF type-adjusted AHI levels correlated with RA volume, and RA remodeling correlated with the percentage of LA low-voltage area.



Discussion:

Cardiovascular disease states associated with OSA include hypertension, swings in intrathoracic pressure causing an increase in LA volume and atrial stretch, autonomic changes, intermittent hypoxia and oxidative stress , and inflammation, these have been implicated as causes of fibrosis and hence are important mechanisms involved in chronic structural

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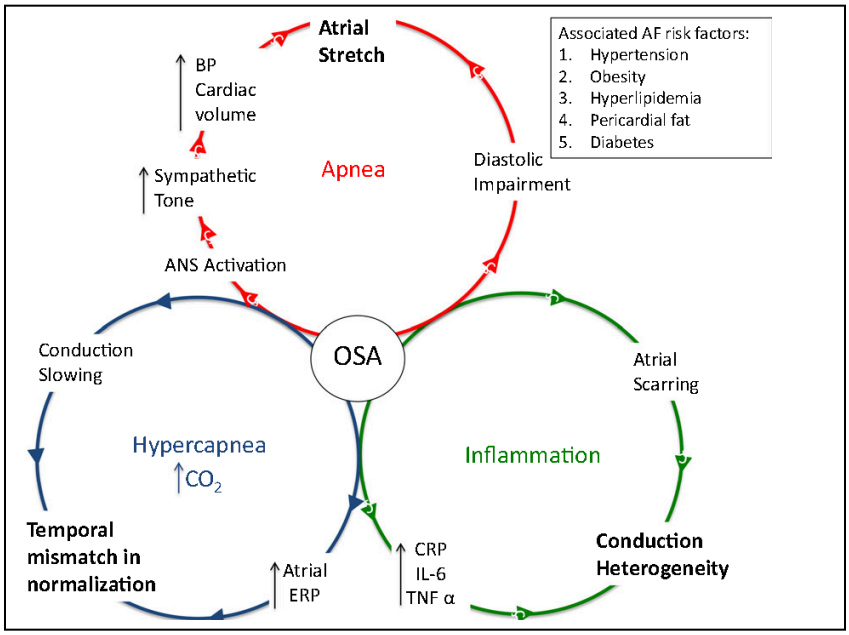
remodeling of the atrium. As compared with the LA, the RA is directly affected by the capacity load of sleep apnea.



In current study , structural remodeling of RA was seen in 51 % (N = 56) of RA remodeling and bi-atrial remodeling in AF patients; extent increased with increasing severity of sleep apnea.

Results also suggested that AHI was found to be an independent predictor of increased RA volume. RA structural remodeling may precede LA structural remodeling in sleep apnea patients with AF.

Extent of RA structural remodeling related to the severity of sleep apnea regardless of paroxysmal and nonparoxysmal AF. Findings suggest that there is a difference in RA and LA remodeling involved the development and maintenance of AF with sleep apnea.

Conclusion:

Sleep apnea is strongly associated with RA remodeling, and the extent of RA remodeling increases significantly with the severity of sleep apnea regardless of type of AF.

Reference:

1)Takagi T et al. The impact of sleep apnea on right atrial structural remodeling with atrial fibrillation. J Cardiol. 2020;75(6):665–672.

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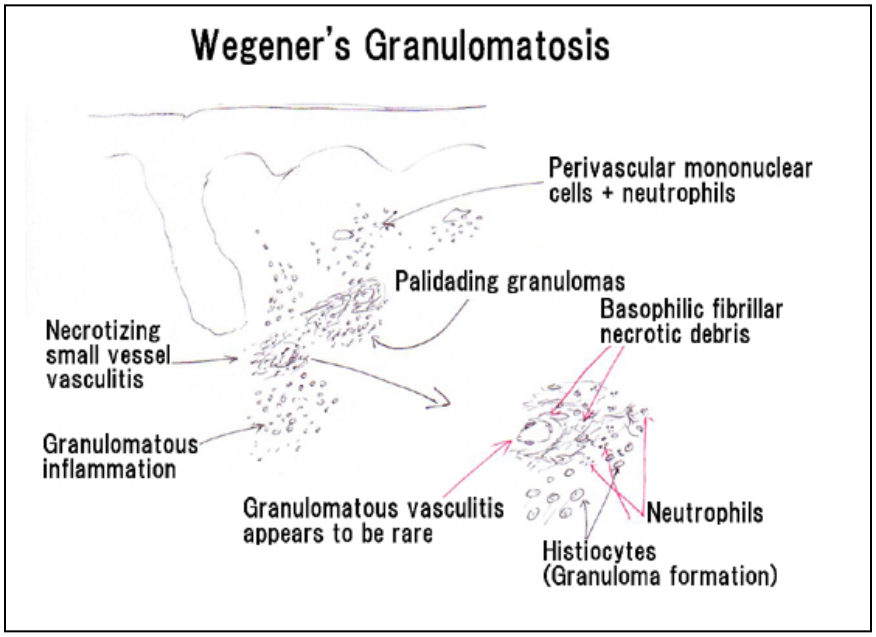
2. Thrombosis of Left Anterior Descending Artery Aneurysm in a 9-Year Old Boy with Granulomatosis – A case report

Wegener's granulomatosis is a vasculitis of small and medium sized vessels is traditionally believed to mainly affect respiratory tract with additional focal kidney involvements, its organ involvements are severe and could be fatal in case remain untreated.[1]



Case presentation:

A 9 year old boy presented with persistent fever associated with upper respiratory infection symptoms and lower limb pain. In another center, he was treated with antibiotic as bacterial pneumonia with poor clinical response. Subsequently, antituberculosis regimen was initiated for the mycobacterium and cavitary pulmonary lesion on radiographic studies.

He had an episode of perforated otitis media with effusion (OME) with additional mastoiditis receiving ventilation tube for treatment. He had antibiotic-resistant sinusitis for 2 months requiring surgical treatment. By this point, the diagnosing team focused on immunologic work up;

no arthritis in the lower extremity examination, but due to the difference in lower limb size, an evaluation for thrombosis was performed that was suggestive of deep vein thrombosis (DVT). prolonged fever and increased inflammatory markers such as elevated erythrocyte sedimentation rate (ESR = 105), C-reactive protein (CRP = 95), leukocytosis (WBC = 17,600), and thrombocytosis (Plt = 635,000).

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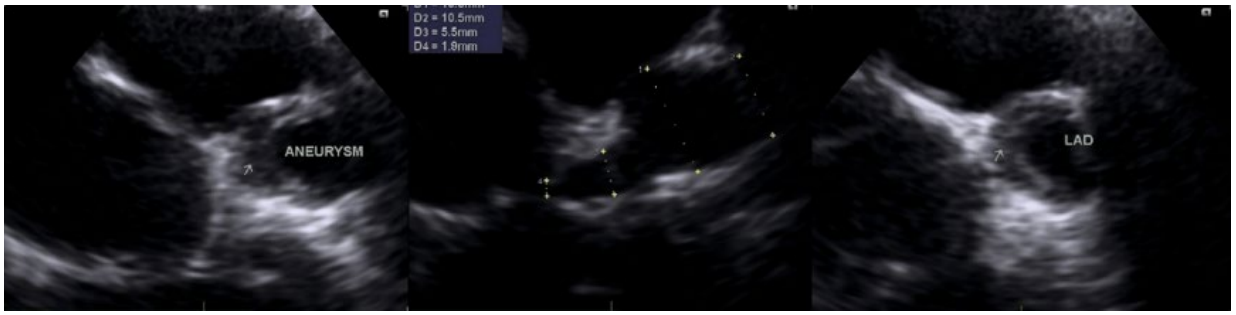
Transthoracic echocardiography performed showing diffuse ectasia and dilation with huge aneurysm in the left anterior descending artery (LAD) with the size of 12 mm as shown in Figure.



As there was no other clinical signs in favour of Kawasaki disease other than prolonged fever, due to the high inflammatory markers and age of patient and the possibility of atypical neglected atypical Kawasaki disease or other rare vasculitis.

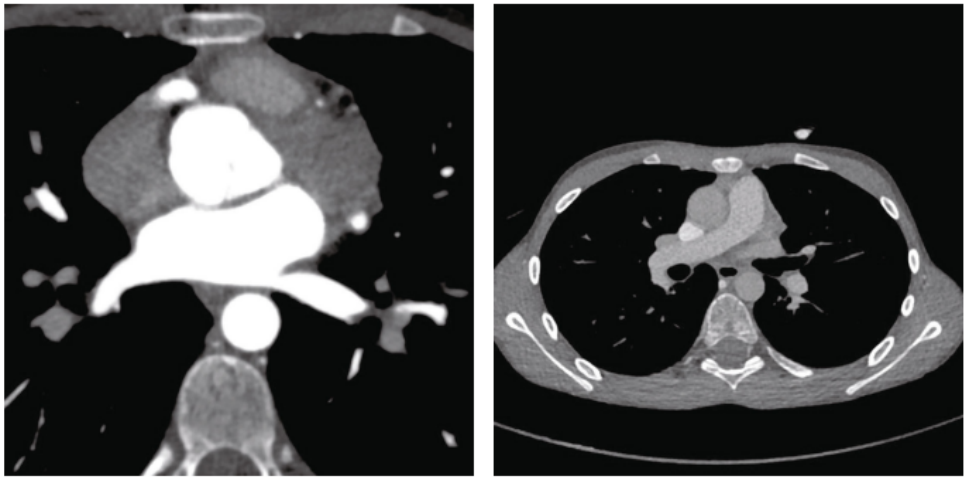


FIGURE . (a) High-resolution, ECG-synchronized computed tomography of the heart with attention to the coronary arteries showed left main coronary ectasia (4.2 mm), fusiform aneurysmal dilation measured 19 mm length, and14 mm transverse diameter with partial thrombosis in the lumen measured 17 × 10 mm in proximal segment of left anterior descending artery (LAD) and aneurysmal dilatation in proximalpart of left circumflex (LCX) in 5 mm diameter. (b) A cavity formation in the left lung apex measure 36 × 27 × 21 mm and some fibrotic and atelectatic bands in bases of both lung.

Positive findings include antinuclear antibody (ANA) with titer of 1/640 and coarse speckled pattern in indirect immune fluorescent assay (IIF) and antineutrophil cytoplasmic antibodies (ANCAs) with perinuclear pattern.

An assessment for antiphospholipid antibodies and antiphospholipid syndrome was performed, which was negative. Serum immunoglobulins, complements, and nitro blue tetrazolium were normal.

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With history of Severe upper airway infection, pulmonary cavitary lesion, saddle nose, elevated ESR and CRP, positive ANA and ANCA with perinuclear pattern (P-ANCA), granulomatosis with polyangitis (Wegener granulomatosis) was diagnosed for this patient.
Initially treated with methylprednisolone pulse (30mg/kg/day for 3 days/monthly) and cyclophosphamide pulse 750mg/m^2/monthly for 6-month duration. Oral prednisolone (1/mg/kg/day) and Mycophenolate mofetil (1,200mg/m^2/day). An additional aspirin (5mg/kg) plus warfarin (0.1mg/kg) was administered to prevent further thrombotic events by maintaining the INR level at the range of 2-3.
Follow up, transthoracic and transesophageal echocardiographic evaluation, large circular non organized thrombosis occupying the majority of the aneurysm was noted that was confirmed by CT angiography despite the anticoagulation prophylaxis.
To target the thrombosis, high dose of methylprednisolone and 10 mg/kg of heparin were applied initially, then warfarin was added subsequently to maintain INR level at 3-4.

Discussion:

Kawasaki disease (KD) is a vasculitis of medium-sized vessels. Majority of cases occurs in children under 5 years of age. The cardiac complication is coronary artery involvement, present in 20% of cases, resulting in myocardial infarction and aneurysm formation.

KD is considered as the possible cause of acute coronary syndromes in young adults, particularly when aneurysms are found.
Cardiac complications of GPA include pericarditis, coronary arteritis, aortic regurgitation, aortic valvular lesions simulating endocarditis, heart block, and aneurysm.
In the current study, GPA was diagnosed for patient based on history of severe upper airway infection, saddle nose, ANCA and PANCA positivity, and cavitary pulmonary lesion. Thrombosis occurred within the enlarged space, 8 months after salicylate administration which required high-dose methylprednisolone application for three subsequent days, 10 mg/kg of heparin, and warfarin maintenance therapy to reach INR level of 3.
Thrombosis at the echocardiographic study was reduced by 10 days following mixed anticoagulation therapy and resolved 3 months later.

KD and polyarteritis nodosa (PAN) are the systemic vasculitis that more often present coronary artery aneurysms. [1]

Conclusion:

Coronary aneurysms and vascular thrombosis are rare presentations of Granulomatosis with polyangiitis (GPA) is considered as differential diagnosis of prolong fever and coronary aneurysms in adolescents.

Reference:

1)Moghadam EA et al. Case Report Giant Thrombosis at Left Anterior Descending Artery Aneurysm in a 10-Year Old Boy with Granulomatosis with Polyangiitis. Case Reports in Cardiology. 2020 ; 3417910: 1- 5 pages.

3. Shirts Loaded with Body Sensors

New shirts are being created and embedded with tiny electronic sensors capable of measuring the heart and respiration rates, temperature, and movement.

Other vital signs also can be added by utilizing additional sensor types. The technology helps physicians to monitor their patients closely throughout the day, potentially including 12-lead ECG capabilities that can comprehensively detect a wide variety of cardiovascular conditions.

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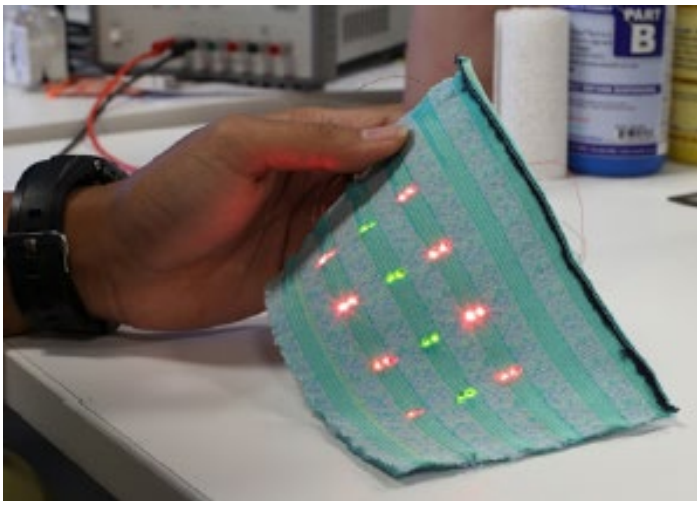

team used a polyester shirt as the base into which to integrate their sensors, stretchiness and ability to reduce perspiration from the body. sensors are flexible strips covered with epoxy that are woven into the shirt so that the strips still make contact with bare skin.

The shirts are machine washable and the sensors can be easily removed from the fabric and moved to another clothing item without being damaged.

prototype has 30 temperature sensors, as well as an accelerometer that detects heart rate, breathing, and the wearer's movements. The data are sent to a central electronic unit on the shirt that can wirelessly transmit its readings to a smartphone or other device and also serves as a charging point for the integrated batteries.

Reference:
Available at : https://www.medgadget.com/2020/04/mits-comfortable-shirts-loaded-with-body-sensors.html. Accessed on 25-04-2020.

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