

CARDIOMAG NEWSLETTER

Volume 5| Issue 42| 2024

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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

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ESTIMATION OF THE RISK OF DEVELOPING AN INCIDENT CARDIOVASCULAR EVENT AMONG YOUNG PATIENTS DIAGNOSED WITH OBSTRUCTIVE SLEEP APNEA

INTRODUCTION-Obstructive sleep apnea (OSA) is defined as recurrent episodes of apnea caused by upper airway blockage that occur during sleep. These events generate intermittent hypoxia, resulting in oxidative stress and increased free radical generation.¹ OSA was linked to a number of variables, such as obesity, male sex, and advanced age. It was known that the clinical and public health impact of OSA is rising in combination with the rising worldwide incidence of obesity and overweight. OSA in the elderly has been linked to a number of cardiovascular problems. It's unclear if young people with OSA are more likely to go on to have cardiovascular disease in the future. The purpose of the study was to determine the probability that young patients with OSA will experience an incident cardiovascular event.²



Cardiovascular disease

METHODS-This study was an observational cohort study where a total of 20240 patients with OSA were recruited. Three national Danish registries were linked for this investigation. The study identified all patients diagnosed with sleep apnea (ICD-10 code DG473*) and OSA (International Classification of Diseases, Tenth Revision [ICD-10] code DG4732) who were also receiving continuous positive airway pressure (CPAP) treatment (ZZ3915) between 2010 and 2018. The CPAP therapy code for individuals with sleep apnea (DG473*) was limited to six months prior to or following the date of diagnosis. The National Patient Register was searched for specific baseline features and comorbidities using primary and secondary ICD-10 as well as Anatomical Therapeutic Chemical codes. The main outcome was a composite outcome that included any cardiovascular event, incident cardiovascular risk factors, and overt cardiovascular system diseases (stroke, heart failure, ischemic heart disease, diabetes, atrial fibrillation, hypertension, and venous thromboembolism, among others). Hospital discharge diagnoses have to be the primary diagnosis code in order to guarantee the validity of the cardiovascular event as an outcome. As a secondary endpoint, all-cause mortality was examined. The constituents of the key composite end point underwent independent analysis. For individuals with and without OSA, the study calculated cardiovascular risk using time-to-event analysis.

RESULTS-The study results showed that both obesity (17.4% against 3.1%) and asthma (6.4% versus 2.5%) were detected in a larger percentage of female patients. A follow-up cardiovascular event occurred in 5283 out of the individuals with OSA. The control cohort consisted of 80314 individuals who were matched for both age and sex; 98.3% of the participants had five controls, whereas 1.7% had four controls. With a 1-year follow-up, an RR of 2.45 (95% CI, 2.32–2.59) indicated that 9.8% of patients with obstructive sleep apnea experienced a cardiovascular incident, compared to 4.0% of controls. At a 5-year follow-up,

there was a difference of 16.5% between the controls and 31.8% of obstructive sleep apnea patients who had any cardiovascular events (RR 1.96, 95% CI, 1.90–2.02) (Figure 1). Individual outcomes that were most common were diabetes and hypertension. After a year, incident hypertension occurred in 3.7% of controls and 8.3% of patients with OSA (RR, 2.28 [95% CI, 2.15–2.42]) for OSA patients compared to controls. The probability of incident hypertension at the 5-year follow-up

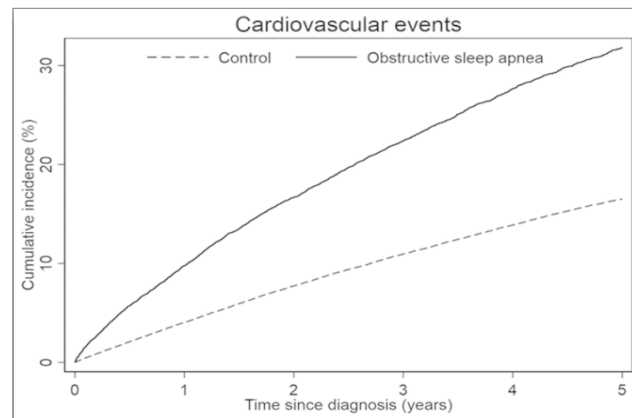


Figure 1. At a 5-year follow-up, the cumulative incidence of any cardiovascular event by obstructive sleep apnea status.

was 15.0% for controls and 27.3% for patients with OSA (RR, 1.84 [95% CI, 1.78–1.90]). After a year of follow-up, the patients with OSA had a 1.4% chance of developing diabetes, while the controls had a 0.2% risk (RR, 5.45 [95% CI, 4.54–6.55]). 6.8% of OSA patients and 1.4% of controls had diabetes at the 5-year follow-up, with a relative risk (RR) of 5.05 (95% CI, 4.60–5.54). The risk of the other cardiovascular events (heart failure, venous thromboembolism, ischemic heart disease, ischemic stroke, and atrial fibrillation) varied from 0.4% for heart failure to 1.7% for ischemic heart disease over the follow-up period. Following a 5-year follow-up, the comparable risk for controls was 0.1% for heart failure and 0.9% for ischemic heart disease. Both male and female patients with OSA had the greatest chance of experiencing any cardiovascular incident as compared to their controls in the sensitivity analysis that stratified based on sex. Following a 5-year period, cardiovascular events were reported by 37.4% of female patients (RR, 1.84 [95% CI, 1.74–1.96]) and 30.6% of male patients (RR, 2.02 [95% CI, 1.95–2.09]). Regardless of their level of obesity, individuals with OSA had the greatest chance of experiencing any cardiovascular incident when stratified based on obesity. 41.2% of patients with obesity and OSA experienced an incident after a 5-year follow-up, compared to 27.5% of obese controls (RR, 1.44 [95% CI, 1.18–1.77]). The percentages for those who did not have obesity were 16.5% and 31.4%, respectively (RR, 1.93 [95% CI, 1.87–1.99]). According to the age-stratified data, people between the ages of 46 and 50 had the highest chance of experiencing any cardiovascular events.

DISCUSSION—The current study showed that when stratified based on obesity, those with OSA had the highest likelihood of experiencing any cardiovascular incident.² Similar to this, Mitra AK et al. showed that OSA has been associated to several key risk factors for cardiovascular disease, including hypertension, overweight and obesity, diabetes, hyperlipidemia, and physical inactivity.³

CONCLUSION—The current study concluded that for young individuals diagnosed with OSA, there was a significant risk of having cardiovascular events in this large countrywide sample. Risk stratification and preventive techniques should be taken into consideration for

these individuals in order to stop the course of cardiovascular disease, the buildup of cardiovascular risk factors, and death.

For young patients diagnosed with obstructive sleep apnea, risk assessment and prevention strategies should be taken into consideration in order to prevent the progression of cardiovascular disease, the accumulation of cardiovascular risk factors, and mortality.

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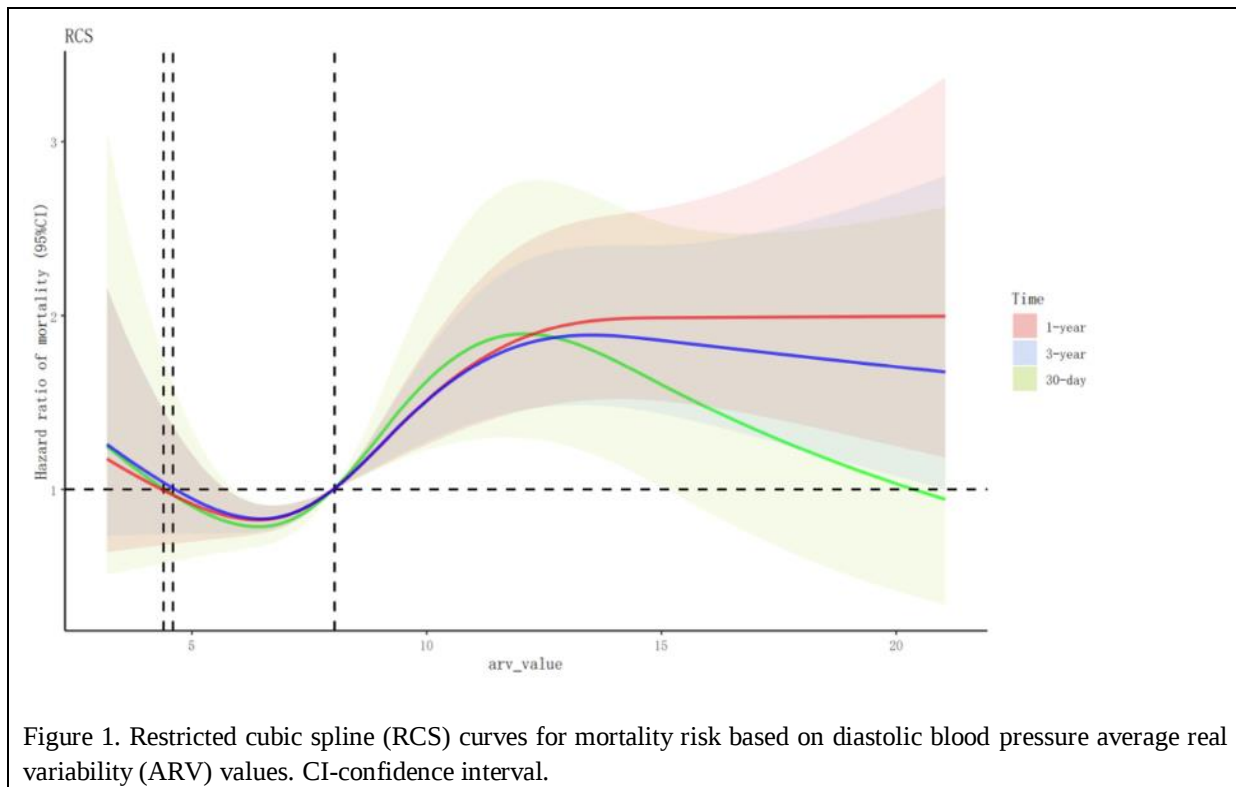
RELATIONSHIP BETWEEN MORTALITY IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION AND 24-HOUR BLOOD PRESSURE VARIABILITY

INTRODUCTION-Acute myocardial infarction (AMI) is a severe cardiovascular condition that causes significant morbidity and death. In AMI, ischemia and necrosis impact certain cardiomyocytes, resulting in a reduction in myocardial contractility, which was followed by an immediate proinflammatory response and elevated sympathetic tone. Meanwhile, excessive blood pressure variability (BPV) increases left ventricular workload, heart rate, myocardial oxygen demand, and promotes inflammation and endothelial dysfunction. As a result, a high BPV and its accompanying pathological consequences were likely to exacerbate the physiological function of the heart and influence the formation of acute cardiac problems in AMI patients.¹ The mortality rate among AMI patients has not decreased considerably in recent years. The correlation between blood pressure variability (BPV) and acute myocardial infarction (AMI) remains unclear. The aim of the study was to investigate the correlation between 24-hour BPV and death in AMI patients.²

METHODS-This was a retrospective cohort study and enrolled 1291 patients with AMI, including 475 females. The MIMIC-IV 2.0 database provided the patient's data. The following three factors were required for inclusion: (1) an AMI diagnosis; (2) age more than 18; and (3) a first ICU hospitalisation. Age, sex, race, length of stay in the intensive care unit, comorbidities, clinical conditions (hypertension, diabetes, acute heart failure, cardiogenic shock, cardiac arrest), first 24-hour blood pressure recordings after admission, and survival outcomes (all-cause mortality at 30 days, 1 year, and 3 years) were among the patient data extracted for this study from the MIMIC-IV 2.0 database. All disease diagnoses were categorised using the International Classification of Diseases, Ninth and Tenth Editions (ICD-

9 and ICD-10). In this investigation, average real variability (ARV) was used to evaluate BPV. The key outcome measures were 30-day, 1-year, and 3-year all-cause mortality rates.

RESULTS—Four groups of patients were created based on the diastolic blood pressure (DBP)-ARV characteristics. The 30-day, 1-year, and 3-year death rates across the four groups showed significant differences ($p = 0.02$, $p < 0.001$, and $p < 0.001$, respectively). Systolic blood pressure (SBP)-ARV could not predict AMI patient mortality after confounding factor adjustment ($p > 0.05$). However, the highest DBP-ARV was significantly linked to higher 30-day mortality (HR: 2.291, 95% CI 1.260-4.168), 1-year mortality (HR: 1.933, 95% CI 1.316-2.840), and 3-year mortality (HR: 1.743, 95% CI 1.235-2.461). The Kaplan-Meier graphs showed that patients in the highest ARV group had considerably poorer long-term survival probability than patients in other groups, irrespective of SBP or DBP. When DBP-ARV < 8.04 , RCS curves demonstrated that the mortality risk of patients with AMI initially declined and subsequently rose with an increase in ARV. When DBP-ARV > 8.04 , the 30-day mortality risk elevated and then reduced, while the 1- and 3-year death rates climbed and then stabilized with ARV rise (Figure 1).



DISCUSSION—The current study showed that DBP-ARV was a significant risk factor for increased mortality in patients with AMI.² Similar to this study, Hassan AKM et al. showed that systolic and diastolic BPV duration of the daytime and night-time interval (SD_{dn}) were the only independent predictors of in-hospital major adverse cardiovascular events (MACEs) in patients with ACS, including those with or without ST-segment elevation myocardial infarction and hypertension. A receiver operating characteristic curve analysis revealed that SBP- SD_{dn} has the highest specificity (98.4%) for predicting MACEs in hospitals, with a sensitivity of 47.3% at a threshold of 12.6 mmHg.³

CONCLUSION-The current study concluded that this investigation shed light on the connection between BPV and mortality risks in AMI patients. To further understand the underlying processes of BPV and to assess the predictive usefulness of short- and long-term BPV for cardiovascular events and mortality risk, more clinical research was required. Additionally, the association between long-term BPV and prognosis in patients with AMI has to be explored.

If a patient's DBP or ARV was higher or lower within the first 24 hours in the intensive care unit, they might be at a higher risk of both short- and long-term mortality.

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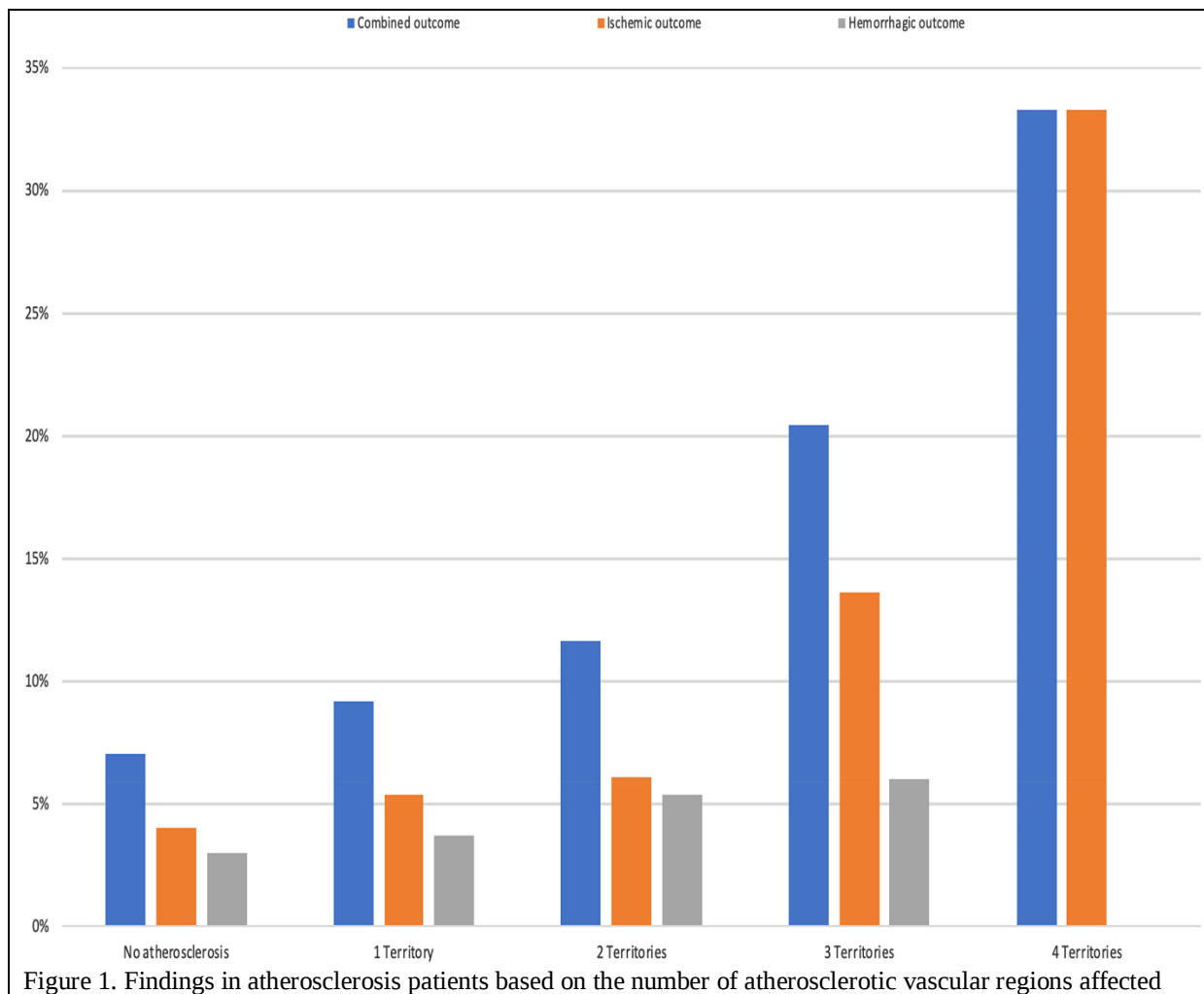
EFFECT OF ATHEROSCLEROTIC VASCULAR DISEASE BURDEN ON THE RISK OF VASCULAR EVENTS IN PATIENTS WITH RECENT ISCHEMIC STROKE AND ATRIAL FIBRILLATION

INTRODUCTION-Atrial fibrillation (AF) is the most prevalent cardiac arrhythmia, with a 5-fold higher risk of thromboembolic stroke and a 2-fold risk of all-cause death. AF is commonly associated with atherosclerotic vascular disease (ASVD), and the two disorders share a number of vascular risk factors such as hypertension, diabetes, obesity, and heart failure. Patients with AF were more likely to suffer coronary artery disease (CAD) than healthy individuals with normal sinus rhythm. Individuals with AF were more likely to develop peripheral artery disease (PAD), which increases their risk of stroke, cardiovascular events, and death.¹ Recurrent vascular events were more common in patients with atrial fibrillation (AF) and ischemic stroke (IS). In individuals who have had an ischemic stroke and AF during the last 90 days, this study assessed the effect of the burden of atherosclerotic vascular disease in various vascular areas on the risk of vascular events.²

METHODS-This was a prospective observational study and included 2148 patients with IS and AF from the International RAF network in a prospective 90-day follow-up. Atherosclerotic vascular disease was identified by at least one of the following: Symptomatic ischemic heart disease, symptomatic peripheral artery disease, internal carotid stenosis $\geq 50\%$, or the presence of plaques in the aorta. The primary outcome was a composite of stroke, transient ischemic attack, systemic embolism, cerebral bleeding, and major extra cranial bleeding within 90 days post-acute stroke. Patients were categorized into 5 groups based on the number of affected

atherosclerotic vascular territories, with those with no atherosclerotic vascular disease as the reference.

RESULTS—The current study results showed that atherosclerosis affected 744 people (34.6%). A higher baseline NIHSS-score at admission, diabetes mellitus, hypertension, prior stroke/TIA, congestive heart failure, current smoking, and leukoaraiosis were all more common in older patients with AVD. Following the index stroke, patients without atherosclerosis were more likely to be prescribed oral anticoagulant medication. Patients with AVD were treated as follows: 441 (20.5%) patients received acute revascularization (rt-PA or mechanical thrombectomy, or both) less frequently than patients who received oral anticoagulation therapy (76.6%, $P < 0.001$), and statins were more frequently given as pretreatment at admission (35.2%, $P < 0.001$) and aspirin after the index event (16.1%, $P < 0.001$). Following an acute stroke, NOACs were used to treat 344 patients with AVD (46.2%): 126 (36.6%) received rivaroxaban, 119 (34.5%) received Apixaban, and 99 (28.7%) received Dabigatran. The findings of the univariate analysis for the AVD-related variables. The following factors were substantially linked to atherosclerosis: history of stroke/TIA 237, hypertension 652, hyperlipidemia 342, and male sex 407. Variables that were independently correlated with AVD on multivariate analysis. The combined result was noted in 97 (6.9%) no-AVD patients and 77 (10.3%) AVD patients throughout a 90-day follow-up period (HR 1.22, 95% CI: 0.87-1.92). 33 (11.3%), 26 (14.7%), 26 (15.8%) and 35 (9.7%) patients with AVD had a history of ischemic heart disease with symptoms, PAD, aortic plaques, and carotid stenosis. For all groups, there was overlap in the Kaplan Meier Curve for the combined outcomes in patients with and without AVD. Compared to patients without AVD, those with AVD affecting three or four vascular areas showed a significantly higher risk of composite vascular outcomes in the multivariable analysis. In particular, the hazard ratio (HR) was 2.80 (95% CI: 1.20–6.53) for three territories involved and 6.81 (95% CI: 1.02–36.24) for four territories (Figure 1). Furthermore, when three territories were involved (HR 2.88, 95% CI: 1.04–7.95), and much more so when four territories were involved (HR 7.76, 95% CI: 1.22–49.23), the risk for ischemic outcomes increased dramatically.



DISCUSSION-The current study showed that there was a considerable elevated risk of combined vascular and ischemic events in patients with AVD covering three or four territory. On the other hand, there does not seem to be a relationship between the level of atherosclerotic involvement and bleeding consequences. This suggested that ischemic rather than hemorrhagic events were predominantly responsible for the higher risk in the combined patient group.² The current study results were in coincides with Park et al. that found a dose-dependent increase in the incidence of major adverse vascular events (MACE) and all-cause death in stroke patients with concurrent AVD. The study found that extracranial stenosis was highly prevalent.¹

CONCLUSION-The current study concluded that in patients who have had a recent stroke and AF, AVD was a prognostic indication, especially if three or four territory were involved. An increased risk of combined and ischemic events was strongly correlated with the degree of vascular territory involvement.

An increased risk of combined and ischemic events was strongly correlated with the degree of vascular territory involvement.

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CASE REPORT ON CROHN'S DISEASE WITH RIGHT ATRIAL THROMBOSIS

INTRODUCTION-Crohn's disease (CD) is an inflammatory bowel disease that causes chronic inflammation of any region of the gastrointestinal tract. It has a progressive and destructive course and is becoming more common worldwide. Crohn's disease is thought to be caused by a dysregulated immune system, an altered microbiome, genetic vulnerability, and environmental factors, but the exact etiology was unknown.¹ Clinical signs include diarrhea, bloody stools with mucus or pus, abdominal distension, abdominal pain, and other indications. The prolonged and chronic nature of CD can result in a number of consequences that have a major negative influence on the quality of life for patients. The blood of patients with CD was hypercoagulable, and they are vulnerable to thromboembolic illnesses, which can be fatal. Inflammatory bowel illness has been linked to an increased risk of venous thromboembolism in multiple studies. The coagulation-anticoagulation system, platelets, fibrinolytic system, vascular endothelial dysfunction, and the actions of therapeutic drugs were all involved in the pathophysiology. The aim of this case report was to present a rare case of a female patient of age 15, who had active CD and a right atrial thrombus.

CASE PRESENTATION-A female patient of age 15, was admitted for her prescribed course of treatment after presenting with recurrent mouth ulcers for more than three years. The patient experienced perianal and vulvar ulcers that were suggestive of Behçet's illness in addition to idiopathic mouth ulcers that began more than three years ago. After starting treatment, the ulcers sporadically continued. The patient had deteriorating oral and periodontal ulcers and sporadic upper abdomen pain a year ago. She was admitted to the hospital more than nine months ago for more testing, which included a small intestinal endoscopy. CD was found and there were lesions in both the colon and the end of the ileum. She later received six infliximab treatments, but she stopped taking the drug on her own initiative and started having anal and minor abdominal pain. Her symptoms improved after she started taking her medicine once more. For a follow-up colonoscopy examination, she was presently admitted. Additionally, her ventricular myocardium had previously not compacted. There have been yellowish loose stools during the patient's bowel movements once every one to two days since

the onset of symptoms; otherwise, no particular abnormalities in stool features were seen. On the first day of admission, a comparison enema was done to evaluate the intestinal wall thickening and the existence of stenosis in the lower digestive system. Following saline solution infusion via the rectal canal, there was no sign of local luminal constriction in the large intestine. The walls of the ileocecal area, terminal ileum, and ascending colon exhibit uneven thickness that was distinguished by unique layering. Notably, the submucosal layer—which can be as thick as 0.6 cm—has improved echogenicity. There was a noticeable thickening in the soft tissues surrounding the anus on both sides; despite the reduced echogenicity, the area still seems rather uniform. Moreover, punctate blood flow signals within these thicker intestinal walls were visible using colour Doppler flow imaging. Transthoracic echocardiography was done to evaluate heart

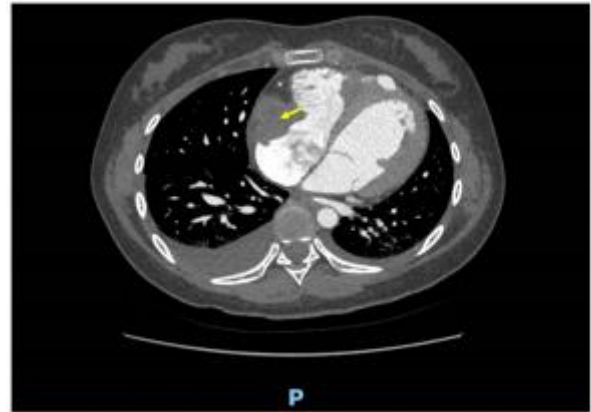


Figure 1. The right atrial appendage and tricuspid valve chordae tendineae have a well-defined soft tissue density lesion measuring approximately 30 mm × 34 mm × 32 mm (anteroposterior diameter × transverse diameter × cranio-caudal diameter). Contrast-enhanced imaging showed no noticeable enhancement.

function because the patient had a history of non-compaction of the ventricular myocardium. During the third day of hospitalization, a low echogenicity, irregularly shaped mass measuring roughly 43 mm by 26 mm and connected to the right atrial wall was discovered by TTE. The mass was located next to the tricuspid annulus and had a broad base that measured approximately 35 mm. After injecting the contrast agent (Sonovue) intravenously, the mass did not show any noticeable improvement. It was hypothesized that there was a thrombus in the right atrial appendage based on ultrasound observations. An enhanced cardiac CT scan performed on the fourth day of hospitalization showed a well-defined oblong soft tissue density shadow within the right atrium and its appendage, measuring about 30 mm × 34 mm × 32 mm (anteroposterior diameter × transverse diameter × cranio-caudal diameter). There was a suspicion of thrombus formation since the density of the shadow was around 30 Hounsfield units and there was no discernible improvement following the injection of contrast agent (Figure 1).

An accelerated ventricular escape rhythm, sinus bradycardia, ST alterations, sporadic atrial and ventricular premature beats, and no noticeable anomalies in heart rate variability were all seen on a dynamic ECG. After admission, there may be a right atrial thrombus present, as shown by cardiac ultrasonography and CT enhancement findings, which points to a serious scenario. With an intravenous heparin infusion at a rate of 18U/kg/h, anticoagulant therapy should be started right then and there. After being transferred to the cardiovascular department, the patient's condition worsens to the point where maintenance treatment with intravenous injection of heparin sodium at a dose of 100U/Kg/h, along with urokinase for thrombolysis, becomes necessary. At the same time, routine follow-up cardiac ultrasounds were planned to track clot changes, and oral warfarin administration as an anticoagulant was started to dynamically monitor the child's coagulation function and haematological changes during thrombolysis. After seven days, a follow-up echocardiography shows a progressive decrease

in the size of the clot, which clears up completely after twenty days and permits discharge under observation.

DISCUSSION-The current study showed that blood tests for CD patients show a prothrombotic state, which may exacerbate the illness and raise the risk of thromboembolic events. It was essential to consider this when diagnosing and treating CD.² Similar to this study, Rahman M et al. showed that when making a differential diagnosis of intracardiac masses in individuals with procoagulant diseases like Crohn's disease, right atrial thrombus should be carefully taken into account. In this particular situation, the pathology's clinical and echocardiographic aspects might not be typical.³

CONCLUSION-The current study concluded that individuals diagnosed with CD demonstrated a prothrombotic state in their blood, which may increase the risk of thromboembolic disorders and worsen the condition. Therefore, taking this into account was crucial for diagnosing and treating CD. Because ultrasound examination can evaluate cardiovascular complications such as thrombosis in addition to intestinal lesions and gastrointestinal complications like strictures, obstructions, fistulas, perianal abscesses, cellulitis, and anal fistulas, it was the preferred modality for follow-up in patients with CD.

Ultrasound examination was the primary tool for follow-up evaluation in CD patients due to its ability to detect gastrointestinal and cardiovascular issues early.

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