Vol 4, Issue 39, 2023

CARDIOMAG NEWSLETTER

Volume 4| Issue 39| 2023

IN THIS ISSUE

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

Assessment of cardiovascular disease risk by using the Framingham Risk Score and Globorisk Score in Patients with Newly Diagnosed Metabolic Syndrome

INTRODUCTION

Cardiovascular disease

Metabolic syndrome (MetS) is a major global health concern, as proven by several research connecting it to cardiovascular disease (CVD). According to earlier studies, up to 75% of non-communicable disease-related mortality in developing nations is attributable to CVD, placing a heavy load on morbidity and mortality.[1] CVD are the major cause of mortality around the world. By predicting CVD risk and then reducing CVD risk factors, CVD-related mortality might be minimized. A solid CVD risk prediction model and a nationally representative cardio metabolic profile are necessary to assess the number of persons at high risk for CVD.[2] The Framingham Risk Score (FRS) and Globorisk score are especially significant in this study since it focuses on newly diagnosed MetS patients. These scoring methods account for risk variables usually linked with MetS, such as blood pressure, cholesterol levels, and age, making them ideal for this research group.[1] This study aimed to assess cardiovascular disease risk by using the Framingham risk score and Globorisk Score in newly diagnosed metabolic syndrome patients.

METHODS

This was a community-based cross-sectional study conducted among 343 newly diagnosed cases of MetS with no physical disability, known illness, and not taking any regular medications. Individuals having a recent diagnosis of metastatic syndrome (MetS) between the ages of 30-74 were the inclusion criteria for this research study. Individuals' sociodemographic (age, gender, smoking status etc.) and clinical features (Waist circumference, hypertension, fasting plasma glucose, high density lipoprotein, triglycerides) were carefully documented. The main outcome was the 10-year risk for CVD using the FRS and Globorisk Score. The mean difference of the quantitative predictor variables with the FRS and Globorisk Score was determined using the One-Way ANOVA test. Additionally, a chi-square test was used to examine the relationship between the both risk scores and the predictive factors and the result, or 10-year CVD risks. To examine the link and inter-rater agreement between FRS and Globorisk scores, the kappa statistics and pearson's correlation test were also used.

RESULTS

The average age of the study participants included in the FRS was 46.60 (SD = 9.97) years, whereas the average age of the study participants included in the Globorisk score was 50.74

(SD = 8.15) years. 183 (60.2%) of the patients in the FRS and 135 (60.3%) of the patients in the Globorisk score were men. Only 74 (24.3%) of the participants in the FRS and 60 (26.8%) in the Globorisk score were current smokers. 59.2% of 304 patients were determined to be low risk by the FRS, while 20.4% were determined to be intermediate and high risk, respectively and 44.6% of 224 patients were categorized as low risk, 34.4% as moderate risk, and 21.0% as high risk using the Globorisk score (Figure 1). The two CVD risk scores showed a moderately positive correlation (r = 0.651, 95% CI 0.58-0.71) with one another. Age, gender, and current smoking have been identified by both risk scores as significant risk factors for predicting CVD in 10 years (P <0.05).

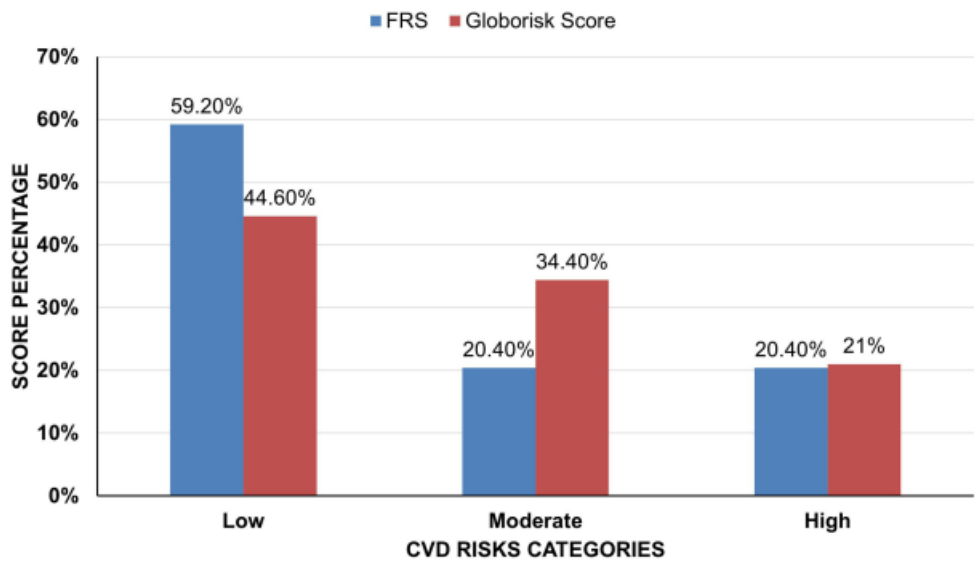

Figure 1. Classification of 10-year CVD risk using the Framingham and Globorisk Score

DISCUSSION

The current investigation found a strong relationship between many demographic (age, gender, smoking status etc) and clinical characteristics (Waist circumference, hypertension, fasting plasma glucose, high density lipoprotein, triglycerides) and the risk of developing CVD during a 10-year period, as evaluated by the FRS and Globorisk Score.[1] Jahangiry L et al. assessed the predictive value of FRS for estimating 10-year CVD risk in individuals with metabolic syndrome. There was a strong link between FRS risk scores and metabolic syndrome components such as high systolic blood pressure (SBP), diastolic blood pressure (DBP), waist circumference (WC), and Fasting serum glucose (FSG).[3]

CONCLUSION

This study concludes that nearly half of the newly diagnosed MetS patients had moderate-to-high CVD risk in 10 years, according to the results of both CVD risk scores. According to both the FRS and the Globorisk score, the risk of developing a CVD in newly diagnosed MetS patients within 10 years increases with age, male gender, and current smoking. In order to

reduce the risk of CVD events, it is strongly advised that MetS who are older, male, and smokers receive priority in healthy lifestyle counselling.

To lower cardiovascular risk stratification in the future, they must adhere strictly to the MetS therapeutic therapy and lifestyle changes. All MetS patients should also highly consider using these Cardiovascular disease prediction risk scores in healthcare settings.

REFERENCES

1.Adil SO, Uddin F, Musa KI, Khan Aet al. Risk Assessment for Cardiovascular Disease Using the Framingham Risk Score and Globorisk Score Among Newly Diagnosed Metabolic Syndrome Patients. International Journal of General Medicine. 2023; 16:4295-305.

2.Che Nawi CM, Omar MA, Keegan T, Yu YP, Musa KI. The ten-year risk prediction for Cardiovascular Disease for malaysian adults using the Laboratory-Based and Office-Based (Globorisk) Prediction Model. Medicina. 2022;58(5):656.

3.Jahangiry L, Farhangi MA, Rezaei F. Framingham risk score for estimation of 10-years of cardiovascular diseases risk in patients with metabolic syndrome. Journal of Health, Population and Nutrition. 2017;36:1-6.

Association between Mean Platelet Volume and mortality among Peritoneal Dialysis patients

INTRODUCTION

Platelets are important in haemostasis and thrombosis, and their function is influenced by a variety of factors, including platelet size. Mean platelet volume (MPV) is a platelet size metric that may be easily measured in a complete blood count test.[1] In comparison to hemodialysis (HD), peritoneal dialysis (PD) is a significant therapy option for individuals with chronic kidney disease (CKD) that may offer benefits in terms of cost, logistics, and clinical outcomes. Approximately 50% of these individuals' deaths and 33% of their hospital stays are attributable to cardiovascular disease (CVD).[2] In the general population, elevated MPV has been linked to an increased risk of significant adverse cardiovascular events and mortality in patients with acute coronary syndrome, as well as ischemic stroke and hypertension. Increased MPV in diabetic individuals has been associated with poor glycaemic control and a higher risk of diabetic complications. Cardiovascular morbidity and death are more likely to occur in hemodialysis patients, and MPV has been identified as a promising biomarker for predicting

difficulties in these individuals.[1] This study aimed to assess the relationship between MPV and cardiovascular and overall mortality in Peritoneal Dialysis (PD) patients.

METHODS

A total of 1322 patients were recruited in this study. Age, gender, and previous comorbidities including diabetes and premorbid CVD were recorded under the patients' demographic data. The end-stage renal disease (ESRD) etiology, body mass index (BMI), Charlson Comorbidity Index (CCI), hypertension, estimated glomerular filtration rate (eGFR), white blood cell count, platelet count, neutrophils, lymphocytes, haemoglobin, creatine, urea nitrogen, albumin, total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), phosphate, intact parathyroid hormone (iPTH), and antiplatelet drugs were among the principal clinical and biological parameters evaluated. Before PD therapy started, baseline data were gathered. Mortality from all causes and cardiovascular disease were the main outcomes. According to the cut-off value, which was established using maximally selected rank statistics, patients were separated into two groups. The Cox regression models were used to evaluate the mortality hazard ratio.

RESULTS

The current study results showed that the average age of the 1322 PD patients who were enrolled was 49.3 ± 14.5 years, 57.6% of them were men, and 18.8% of them had diabetes. Chronic glomerulonephritis, which affected 66.1% of this group, was the primary cause to ESRD, followed by diabetic nephropathy (14.7%) and hypertension (12.0%). 360 individuals passed away during a median follow-up of 50 months (IQR: 30-80); 167 of these deaths were related to cardiovascular illnesses. According to correlation analyses, MPV had a negative correlation with the NLR ($r=-0.072$, $p=0.009$), cholesterol ($r=-0.098$, $p<0.001$), platelet count ($r=-0.266$, $p<0.001$), and LDL-C ($r=-0.072$, $p<0.001$). All-cause and cardiovascular death rates were lower in the higher-MPV group than in the lower-MPV group, according to a survival analysis ($p<0.001$ and $p<0.001$, respectively) (Figure 1). A larger MPV was substantially linked to a hazard ratio of 0.77 for all-cause death and 0.75 for cardiovascular mortality after full adjustment (95% CI: 0.60-0.98, $p=0.036$). Age and MPV had a significant interaction, according to subgroup analysis ($p<0.001$). Only in patients under 60 years old had decreased MPV, linked to a higher death risk.

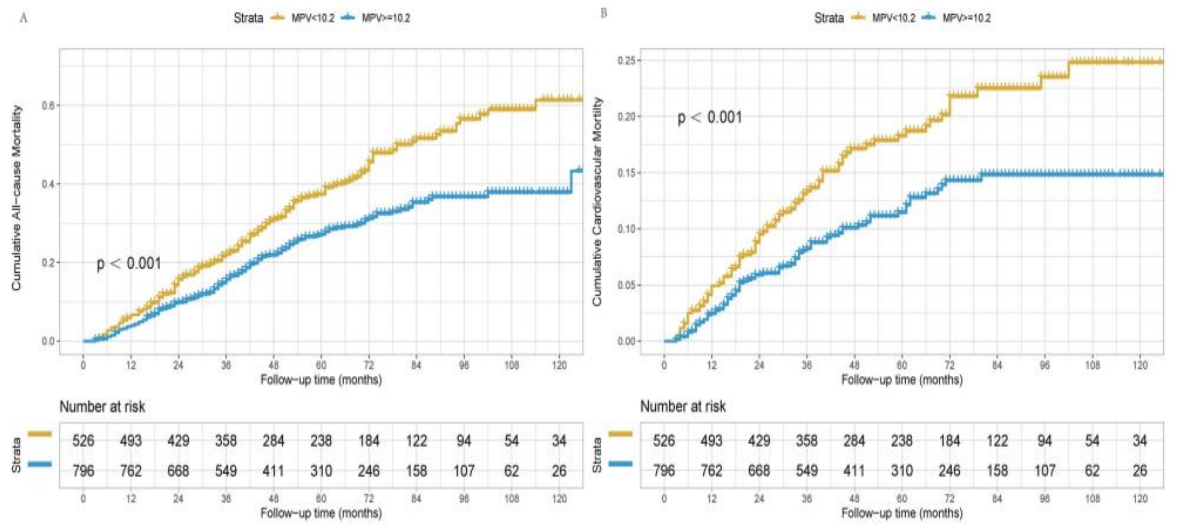

Figure 1. Patient survival curves Stratified by MPV (A) Cumulative all-cause mortality (B) Cumulative cardiovascular mortality

DISCUSSION

The current study showed that PD patients with greater MPV levels had a considerably reduced risk of cardiovascular and all-cause death than PD patients with lower MPV levels. Similar to this, Chen J et al. showed that in PD patients less than 60 years old, decreased MPV/PC level was an independent risk factor for all-cause and CV death.[3] Zhu Y et al. showed that increased MPV or platelet count linked to both cardiovascular death and all-cause death.[4]

CONCLUSION

This study concludes that PD patients who have high MPV have a lower risk of cardiovascular and all-cause mortality. This study finding add to the body of knowledge regarding the connection between MPV and cardiovascular and all-cause mortality, and they may be crucial for managing and treating PD patients.

Peritoneal dialysis patients who have high Mean Platelet Volume have a lower risk of cardiovascular and all-cause mortality.

REFERENCES

1. Jiang W, Chen Y, Yan C, Ma Y, et al. Mean platelet volume may predict all-cause and cardiovascular mortality among incident peritoneal dialysis patients. Renal Failure. 2023;45(2):2261541.

2. Truyts C, Custodio M, Pecoit-Filho R, Moraes TP, Jorgetti V. Cardiovascular mortality in peritoneal dialysis: the impact of mineral disorders. Brazilian Journal of Nephrology. 2021;43:182-90.

3. Chen J, Zhong Z, Li J, Yu J, et al. Effect of Mean Platelet Volume to Platelet Count Ratio on Mortality in Peritoneal Dialysis. Mediators of Inflammation. 2022; 2022:6922809.

4. Zhu Y, Peng F, Chen Y, Chen W, et al. Mean platelet volume/platelet count ratio and mortality in patients on peritoneal dialysis. Clinical Nephrology. 2018;90(3):205-211.

Correlation between the atherogenic index of plasma and adverse long-term prognosis among chronic coronary syndrome patients

INTRODUCTION

Coronary artery disease (CAD) is the leading cause of death from cardiovascular diseases, accounting for 244.11 million individuals worldwide. It also poses a large public health burden. According to the American College of Cardiovascular Diseases' 2016 data, it is predicted that by the year 2030, about 18% of adults would have chronic coronary syndromes（CCS), raising serious concerns for people's general wellbeing. In order to prevent or manage the condition, it is essential to develop significant biomarkers linked to CCS for early detection, risk assessment, and specific interventions. A recently discovered biomarker known as the Atherogenic Index of Plasma (AIP) that is connected to lipid metabolism has shown to have strong predictive potential in people with cardiovascular disease.[1] The ratio between the amount of triglyceride (TG) and high-density lipoprotein cholesterol (HDL-C) is used to construct the atherogenic index of plasma (AIP), which is a measure of the features and severity of abnormal lipid metabolism. As an alternative for small, dense low-density lipoprotein (sdLDL) in determining plasma atherogenicity, it has also been frequently employed.[2] Its effect on chronic coronary syndrome (CCS) have not yet been fully studied. The objective of the current study was to investigate any potential links between patient AIP levels and long-term clinical outcomes in diagnosed CCS patients.

METHODS

This was a single-center retrospective observational study and included 404 participants with a diagnosis of CCS who had coronary angiography. High-density lipoprotein cholesterol and triglycerides were used to calculate the AIP index. AIP is calculated mathematically from log (TG/HDL-C) and is based on the base 10 logarithms of the ratio of the TG level to HDL-C level in molar concentration (mmol/L). The AIP values of each patient were then used to create major adverse cardiovascular events (MACE) and non-MACE groups as well as quartile groups (Q1: < -0.064; Q2: -0.064–0.130; Q3: 0.130–0.328; Q4: > 0.328). The main clinical outcomes in this study were major adverse cardiovascular events (MACE), which refers to cardiovascular death, ischemia-driven revascularization, nonfatal myocardial infarction (MI), heart failure, and nonfatal stroke. MACE were monitored during each patient's follow-up period. To investigate the connection between AIP and MACE, Cox regression analysis and Kaplan-Meier curve analysis were used. Additionally, the ideal AIP cut-off value for clinical MACE prediction was determined using ROC analysis.

RESULTS

The current study showed that 144 patients (35.6%) out of 404 had diabetic mellitus (DM). A total of 88 patients (21.8%) experienced MACE after a median follow-up of 35 months, including 7 (1.7%) cardiovascular deaths, 29 (7.2%) Ischemia-driven revascularizations, 5 (1.2%) nonfatal myocardial infarction (MI), 27 (6.7%) heart failure, and 20 (5.0%) nonfatal strokes. Patients in the Q4 group who had higher AIP levels also tended to be more hyperlipidemic, diabetic, and had higher BMIs. The Q4 group's blood parameters, such as TG, total cholesterol (TC), remnant-C, non-HDL, haemoglobin A1c (Hb1AC), haemoglobin (Hb), alanine aminotransferase (ALT), and fasting blood glucose (FBG), were considerably greater than those of the Q1, Q2, and Q3 groups, but HDL-C decreased as AIP values increased. Notably, patients in the Q4 group had a substantially greater incidence of MACE than patients in the Q1, Q2, and Q3 groups who had lower AIP values (31.7% vs. 16.8%, 15.7%, and 23.0%, respectively; P=0.023). According to the Kaplan Meier curves, patients in the Q4 group had a higher probability of developing MACE than those in the other groups (log-rank P=0.014). According to the results of the multivariate Cox regression analysis, people in the Q4 group had a 7.892-fold higher risk of MACE than people in the Q1 group (adjusted HR, 7.892; 95% CI 1.818-34.269; P=0.006). The findings demonstrated a greater correlation between the risk of MACE and AIP in younger, male, hypertensive, high-sensitivity C-reactive protein (hs-CRP<10), and non-diabetic CCS individuals. Additionally, AIP has strong correlations with age (r = -0.193; p = 0.021), FBG (r = 0.206; p = 0.015), TC (r = 0.288; p<0.001), low-density lipoprotein cholesterol (LDL-C) (r = 0.220; p = 0.009), HDL-C (r = -0.640; p<0.001), and TG in CCS patients with DM, (r=0.948; p<0.001). The ROC curve study also identified an ideal AIP cut-off value of 0.24 for clinical MACE prediction in CCS patients (Figure 1).

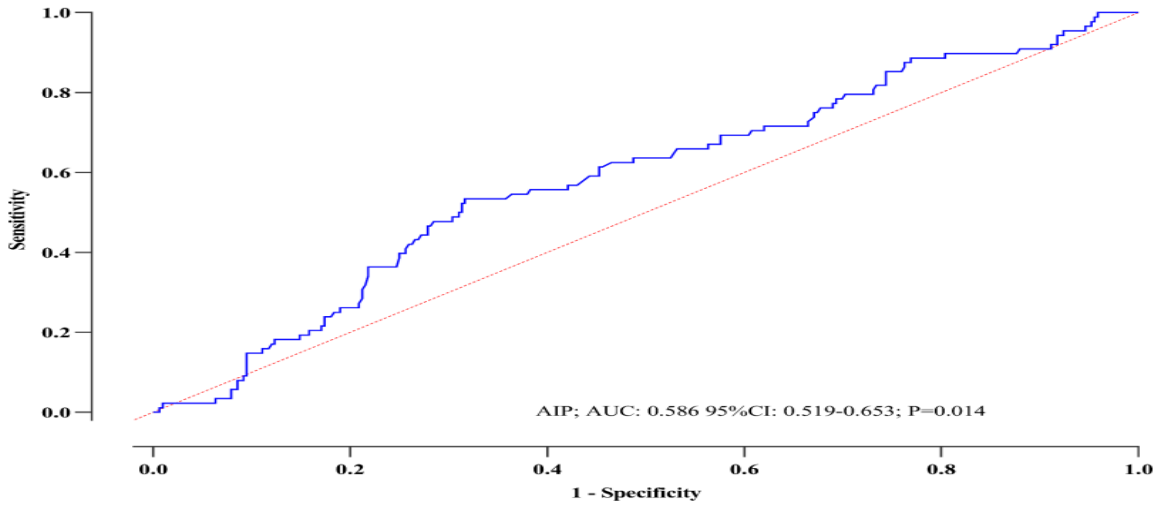

Figure 1. Analysis of the receiver operating characteristics for the AIP's capability of predicting MACE in the study population. **AUC** area under the curve, **AIP** atherogenic index of plasma, **CI** confidence interval

DISCUSSION

The current study showed that in individuals with CCS, elevated AIP level was observed to be independently related with a higher risk of MACE.[1] Similar to this, Hang F et.al showed that among elderly non-diabetic hypertensive patients, an independent and favorable correlation between high AIP and risk of MACEs.[2] The prognosis of diabetic individuals with high AIP levels included higher MACEs and was unaffected by LDL-C levels.[3] For CCS patients, AIP has become a substantial independent risk indicator for predicting the likelihood of MACE.[1] Among older persons with non-diabetic hypertension, the value of AIP was a reliable indicator of cardiovascular prognosis.[2]

CONCLUSION

This study concludes that increased AIP is closely associated with higher risk in CCS patients. The ideal cut-off value for AIP, an independent predictor of MACE in CCS, is 0.24. This study data also demonstrated the critical therapeutic importance of AIP in the context of CCS early risk prediction and preventive interventions.

Increased atherogenic index of plasma (AIP) is closely associated with higher risk in chronic coronary syndromes (CCS) patients.

REFERENCES

1.Alifu J, Xiang L, Zhang W, Qi P, et al. Association between the atherogenic index of plasma and adverse long-term prognosis in patients diagnosed with chronic coronary syndrome. Cardiovascular Diabetology. 2023;22(1):1-3.

2.Hang F, Chen J, Wang Z, Zheng K, Wu Y. Association between the atherogenic index of plasma and major adverse cardiovascular events among non-diabetic hypertensive older adults. Lipids in Health and Disease. 2022;21(1):1-7.

3.Qin Z, Zhou K, Li Y, Cheng W, et al. The atherogenic index of plasma plays an important role in predicting the prognosis of type 2 diabetic subjects undergoing percutaneous coronary intervention: results from an observational cohort study in China. Cardiovascular diabetology. 2020;19:23.

Case report on Quadruple Valve Replacement in Carcinoid Heart Disease

INTRODUCTION

Carcinoid tumours, a rare subtype of neuroendocrine tumours, can cause carcinoid heart disease (CHD) by releasing vasoactive chemicals like serotonin, histamine, bradykinins, prostaglandins, and tachykinins. The typical symptoms of carcinoid syndrome, such as skin flushing, bronchospasm, and gastrointestinal hypermotility, are also brought on by these vasoactive chemicals. In CHD, these compounds cause the right-side heart valves to develop fibrous tissue, which leads to heart failure.[1] Valve replacement might enhance functional capacity and may enable more aggressive treatment of hepatic metastases in individual with

significant tricuspid and pulmonary valve regurgitation and heart failure symptoms.[2] This case report aimed to present a case on Quadruple valve replacement in carcinoid heart disease.

CASE PRESENTATION

A 64-year-old female patient had a history of cecal carcinoid tumor, hemicolectomy, and severe tricuspid regurgitation, admitted with the complaints of dizziness and chest pain. The patient's heart rate was 70 beats per minute, breathing rate was 18 breaths per minute, and blood pressure was 104/71 mmHg, according to clinical data. According to test results, prerenal azotemia was likely caused by a decline in cardiac output. A transesophageal echocardiogram (TEE) and chest computed tomography (CT) revealed a severely dilated right ventricle, 4+ tricuspid regurgitation (Figure 1), pulmonic regurgitation caused by restriction and retraction of the right-sided leaflets, and significant thickening of the left-sided leaflets with 3+ mitral regurgitation and aortic insufficiency. Surgery was the preferred course of action due to the degree of heart involvement. Under bypass, the surgical process entailed replacing each of the four valves. Through a left atrial transseptal incision, a porcine bioprosthesis was used to replace the mitral valve. The tricuspid valve was removed and replaced with a pericardial tissue valve through an incision in the right atrium. Following a comparable replacement treatment for the pulmonic valve, the right ventricular outflow tract (RVOT) was rebuilt. A pericardial tissue valve was used to replace the aortic valve following an aortotomy. Precise incisions, valve visualisation, replacement, and closure were necessary for each stage. The focus of postoperative treatment was on monitoring vital signs, treating discomfort, and keeping an eye out for problems. The patient went home on the sixth postoperative day. The result of the tests revealed normalized levels of blood urea nitrogen (BUN), creatinine, and red blood cell (RBC), haemoglobin (Hgb), and haematocrit (Hct) compared to the time of admission. She showed great functional status, significant improvement in heart failure symptoms, and no ascites at her one-month check-up. Eight months after her operation, she was still in stable condition and has not experienced any cardiovascular issues.

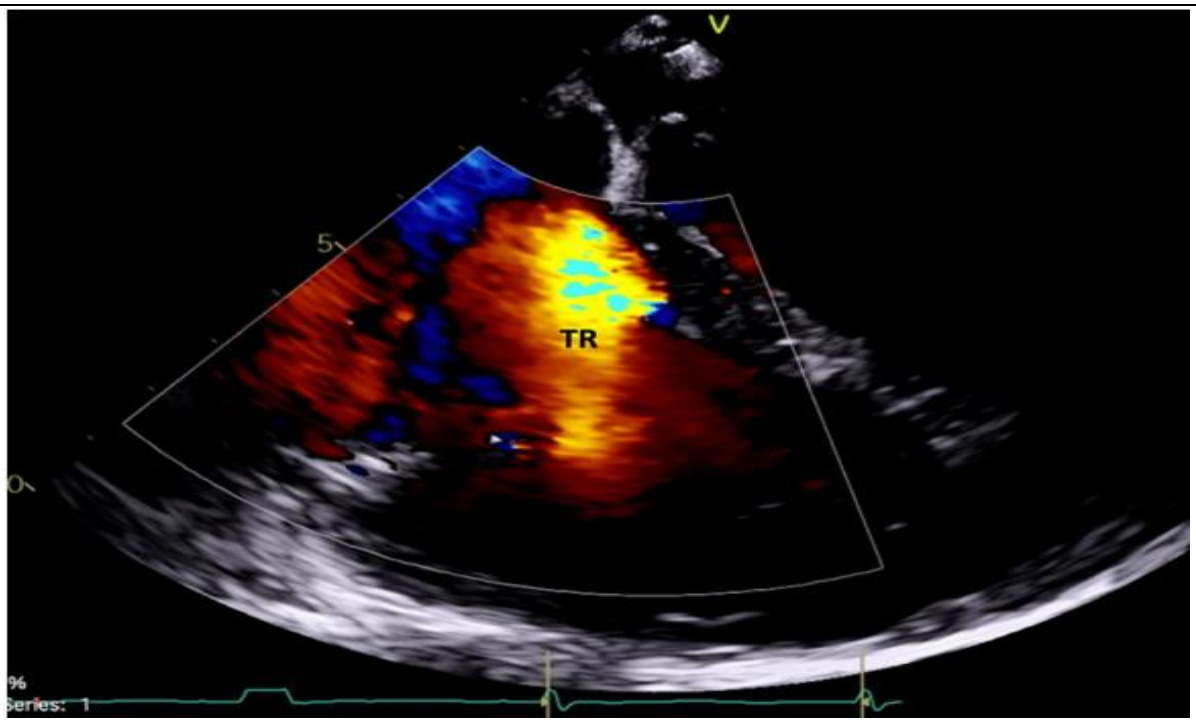

Figure 1. Severe TR on echocardiogram before valve repair. TR: tricuspid regurgitation

DISCUSSION

This case report showed that a transesophageal echocardiogram (TEE) and chest computed tomography (CT) revealed a severely dilated right ventricle, 4+ tricuspid regurgitation, pulmonic regurgitation caused by restriction and retraction of the right-sided leaflets, and significant thickening of the left-sided leaflets with 3+ mitral regurgitation and aortic insufficiency.[1] Similar to this, preoperative transthoracic echocardiogram, apical 4-chamber view, showed thickened tricuspid leaflets and tricuspid regurgitation in 70-year old male patient.[3]

CONCLUSION

This report concludes that eight months after the quadruple valve replacement, the patient's condition is still stable, and there are no cardiovascular complications to report. This rare instance of left-sided CHD with successful quadruple valve replacement sheds light on possibly unidentified causes and supports valve replacement as a viable therapeutic approach.

The management of carcinoid heart disease (CHD) affecting all four valves can be accomplished with quadruple valve replacement

REFERENCES

1. Beyer M, Kasarla R, Shoap S, Beyer E. Quadruple Valve Replacement in Carcinoid Heart Disease: A Case Report. Cureus. 2023 Sep 19;15(9):e45547.

2. Nguyen A, Schaff HV, Abel MD, Luis SA, et al. Improving outcome of valve replacement for carcinoid heart disease. The Journal of thoracic and cardiovascular surgery. 2019;158(1):99-107.

3. Albåge A, Alström U, Forsblad J, Welin S. Quadruple bioprosthetic valve replacement in a patient with severe carcinoid heart disease. Case Reports. 2020;2(2):271-76.