CARDIO ROUNDS NEWSLETTER

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IN THIS ISSUE

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you "Cardio rounds" which contains latest and interesting news in the field of Cardiology.

Evaluation of the relationship between MACE and vascular adhesion protein-1 (VAP-1) in patients with coronary heart disease

INTRODUCTION-Cardiovascular disease (CVD) is the main cause of death globally. Atherosclerosis is the pathological underpinning for these disorders and the subsequent production of arterial stenosis or thrombosis results in clinically significant acute cardiovascular events. Ongoing pathology study indicates that atherosclerosis is a persistent inflammatory reaction of the arterial wall in response to dyslipidemia and endothelial distress, involving leukocyte infiltration and activation of resident vascular cells. Endothelial cells must express adhesion molecules for immune cells to be recruited into atherosclerotic lesions. The AOC3 (amine oxidase copper-containing 3) gene encodes vascular adhesion protein 1 (VAP-1), an endothelial adhesion molecule that also functions as an amine oxidase. VAP-1's enzymatic activity is particularly susceptible to semicarbazide (SCZ) inhibition, placing it in the semicarbazide-sensitive amine oxidase (SSAO) family.[1] VAP-1, an endothelial cell molecule that induces inflammation, has been linked to many cardiovascular disorders. The clinical importance of circulating VAP-1 levels in patients with coronary heart disease (CHD) was understudied. The purpose of this cohort study was to examine the relationship between soluble VAP-1 level and major adverse cardiovascular events (MACE) incidence in CHD patients, as well as its relationship to both the clinical symptoms and coronary lesions of CHD.[2]

CORONARY HEART DISEASE

METHODS-This was a retrospective study conducted among 336 patients. The following are the inclusion criteria: (1) >18 years old; (2) coronary angiography was used to demonstrate that at least one major epicardial coronary artery had stenosis of 50% or more in diameter; (3) angina pectoris (AP) comprised both stable and unstable angina, which were diagnosed under the relevant 2023 AHA and ESC guidelines; (4) The fourth universal definition of myocardial infarction (MI) was satisfied by the diagnosis of acute myocardial infarction (AMI). Twenty AMI were classified as either non-ST-segment elevation myocardial infarction (NSTEMI) or ST-segment elevation myocardial infarction (STEMI). Enzyme-linked immunosorbent assay was used to quantify serum VAP-1 at the time of enrolment. The MACE that occurred was the study's main objective. Medical records or follow-up calls were used to evaluate and document the clinical signs and symptoms of CHD, including coronary stenosis. Regression analysis, curve fitting, and survival curve analysis were used to gather the pertinent data and confirm the validity of the conclusions.

RESULTS-The current study results showed that CHD patients had a mean age of 66.1 ± 11.9 years at baseline, and 77.6% of them were male. The tertiles of VAP-1 were used to divide these patients into three groups. The individuals in the group with the highest VAP-1 levels were more likely to be older and to have DM and HF as comorbidities. Patients in the Q3 group exhibited poorer LVEF, and greater levels of D dimer and NT-proBNP than those in the Q1 and Q2 groups. Interestingly, there was a positive correlation between the incidence of MACE

and the level of VAP-1 after a median follow-up of 30 months (IQR, 17–35) (P = 0.025) in CHD patients, the group with greater VAP-1 levels also had a shorter time to MACE and death. Following adjusting for potential confounders, individuals with CHD had a greater risk of MACE when their serum VAP-1 level was higher [(HR = 5.11, 95% CI = 1.02–25.59), (HR = 5.81, 95% CI = 1.16–29.11)]. Survival analysis and curve fitting results agreed with regression analysis findings. But across the board in the study population, there was no discernible correlation between VAP-1 and MACE [(HR = 5.11, 95% CI = 0.41–1.93), (HR = 1.17, 95% CI = 0.52–2.62). Additionally, there was no discernible relationship between the amount of VAP-1 and coronary stenosis or the clinical signs of congestive heart failure. Patients with blood VAP-1 in the highest tertile consistently had a significantly poorer rate of survival than individuals in other tertiles during a 30-month follow-up, according to Kaplan-Meier survival curves (P = 0.006, Figure 1).

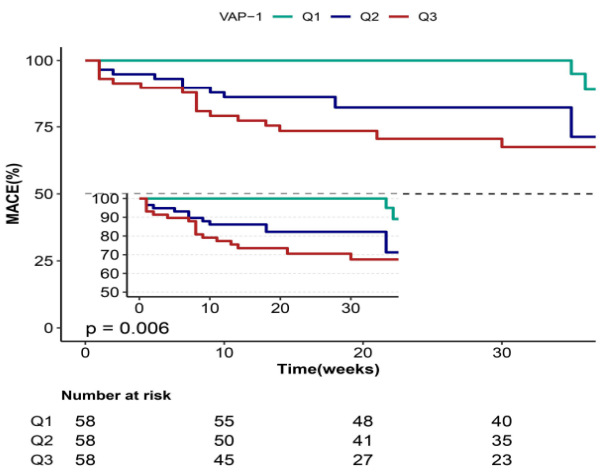

Figure 1. Kaplan–Meier survival curves for MACE of patients with CHD.

DISCUSSION-The current study showed that MACE rates were found to be strongly correlated with elevated levels of soluble VAP-1 in patients with congestive heart failure.[2] Similar to this study, Aalto K et al. showed that soluble VAP-1 was linked to a higher chance of MACE and MACE mortality.[3]

CONCLUSION-This study concluded that in individuals with congestive heart failure, elevated VAP-1 levels may substantially raise the risk of MACE.

A greater risk of adverse cardiovascular outcomes exists for CHD patients with elevated serum levels of VAP-1.

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Relationship between bone fracture and myocardial infarction occurrence during long-term follow-up

INTRODUCTION-Myocardial infarction is an acute coronary syndrome induced by a pathogenic event in the presence of myocardial ischemia, resulting in significant cardiac insult and injury.[1] Myocardial infarction has a global incidence of 1.5 to 2.3 per 1000 person-years, with a higher prevalence among young and middle-aged individuals. Like myocardial infarction, osteoporotic fractures are more common as people get older. Although bone fracture and myocardial infarction involve different organ systems, they are linked via the interaction of bones and blood vessels. Although fundamental study suggests a relationship between fractures and heart attacks involving bones and arteries, population studies have not offered conclusive proof. So, this study aimed to examine the relationship between bone fractures and myocardial infarctions in a natural population over time.[2]

METHODS-This was a prospective cohort study comprised of 13,196 adult participants who had previously suffered a bone fracture. The baseline study was conducted between 1997 and 2009, and the results were monitored until 2015. Records pertaining to myocardial infarction and bone fractures were kept started from 1997. The study examined the relationship between myocardial infarction incidents and bone fractures in individuals 18 years of age and older during the baseline study in surveys conducted from 1997 to 2009, and monitored the results until survey 2015. The main outcome of this study was myocardial infarction, and data were collected from the baseline year (which was not included) until 2015. In particular, out of the individuals, 433 had myocardial infarctions, and 104 of those happened before 1997. In addition to other variables, the associations between myocardial infarction and bone fracture were evaluated using univariate and multivariate Cox regression models.

RESULTS- A total of 329 incident cases of myocardial infarction were found between 1997 and 2015. Participants with a history of bone fractures were more likely to be male, have hypertension, diabetes, smoking, and drinking behaviours, as well as higher rates of myocardial infarction, age, and BMI. A history of bone fracture was linked to a higher incidence risk of myocardial infarction in the general population in both univariate and multivariate Cox regression analysis (HR=2.56, 95% CI 1.83–3.53, P<0.001 for the crude model, and HR=1.43, 95% CI 1.02–1.99, P=0.036 for the multivariate model). Three age groups of participants were identified: <40, 40–60, and ≥60 years. The incidence of myocardial infarction was 0.5%, 4.1%, and 13.6% (P<0.001) in these groups, whereas the fracture rates were 3.3%, 7.6%, and 12.3% (P<0.001) (Figure 1). In the stratified analysis, bone fracture was significantly associated with an increased risk of incident myocardial infarction in subjects ≥50 years of age (HR=1.80, 95% CI 1.23–2.63, P=0.003), but not with an increased risk in subjects <50 years of age (HR=0.71, 95% CI 0.34–1.47, P=0.356). An increased risk of incident myocardial infarction was also linked to older age (HR=1.09, 95% CI 1.08-1.10, P<0.001) and greater BMI (HR=1.05, 95% CI 1.03-1.07, P<0.001) in the analysis of variables on incident myocardial infarction. A history

of hypertension was also linked to a higher chance of incident myocardial infarction (HR=1.59, 95% CI 1.22-2.09, P<0.001).

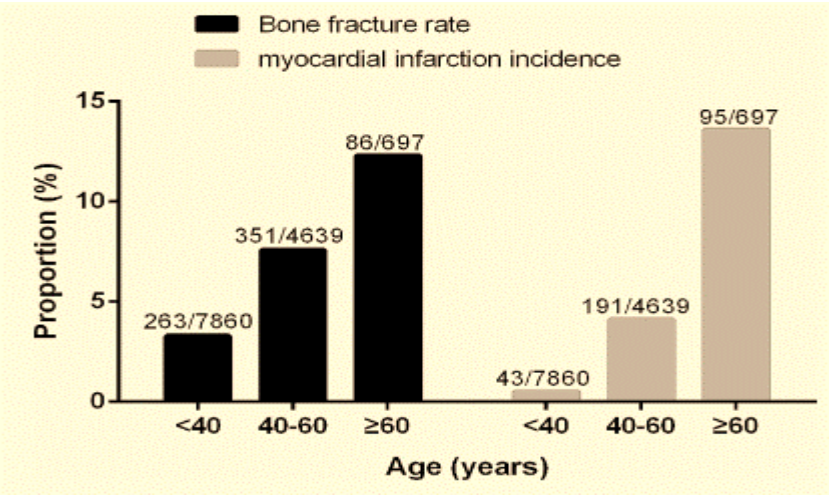

Figure 1. Baseline rates of bone fractures and myocardial infarction occurrences among age groups (total number of fractures or incident MI was displayed)

DISCUSSION-The current study showed a strong correlation between a history of bone fracture and a higher risk of myocardial infarction incidence.[2] Similar to this, Kwon YE et al. showed that in hemodialysis patients, but not in pre-dialysis individuals with chronic kidney disease (also in a high-risk population), vertebral fractures (but not femoral or fractures at other locations) were linked with myocardial infarction.[3]

CONCLUSION-The current study concluded that fractures and myocardial infarction risk were more likely to be significantly associated in high-risk populations, especially in the elderly or those with chronic kidney disease. There is evidence that aging and chronic renal disease are risk factors for osteoporosis.

During long-term follow-up, bone fractures may be linked to an elevated risk of acute myocardial infarction in the older population.

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Correlation between contrast-associated acute kidney injury and the systemic inflammatory response index in patients undergoing elective percutaneous coronary intervention

INTRODUCTION-The clinical outcomes are negatively impacted by contrast-associated acute kidney damage (CA-AKI), which was linked to higher mortality rates both in the short and long term, as well as major adverse cardiac events (MACE) in patients after percutaneous coronary intervention (PCI).[1] The Systemic Inflammatory Response Index (SIRI) is a new inflammatory marker that was intended to represent the systemic inflammatory response. It was produced from counts of peripheral blood cells, such as neutrophils, monocytes, and lymphocytes. According to recent studies, there was a strong correlation between SIRI levels and the onset and progression of cardiovascular illnesses. Studies on the connection between SIRI levels and the prevalence of CA-AKI in PCI patients are limited nevertheless. Thus, the goal of the current study was to find out how predictive SIRI was for the development of CA-AKI in patients having elective PCI.[2]

METHODS-This was a retrospective study that included a total of 5685 participants. Patients receiving elective PCI were consecutively enrolled; these included patients with stable angina, chronic stable coronary artery disease, and patients diagnosed with acute myocardial infarction after the therapeutic window or without prompt emergency PCI. Using an electronic medical record database, all demographic, clinical, laboratory, and angiographic data were gathered. Venous blood samples were taken either the morning after admission or the day of admission in order to acquire the experimental data. The concentration of SCr was measured both during the surgery and two days later. Expert interventional cardiologists carried out every PCI procedure utilizing non-ionic, low-osmolality contrast agents (Ultrafist or Iopamiiron, both 370 mg I/mL). Throughout the perioperative period, patients received an intravenous drip of saline solution at a continuous infusion rate of 1 mL/kg/h (0.5 mL/kg/h for patients with heart failure). An increase in SCr from baseline of 50% or 0.3 mg/dl within 48 hours of contrast exposure was considered CA-AKI.

RESULTS-The AUC values of SIRI to predict CA-AKI were 0.620 [95% confidence interval (CI):0.590–0.651, p <0.001], as indicated by the receiver operating characteristic curve. Based on the ideal cut-off value, patients were split into two groups: low SIRI (SIRI <1.39) and high SIRI (SIRI >1.39). About 352 patients (6.1%) experienced CA-AKI. A nonlinear association between SIRI and CA-AKI risk was found in the logistical regression analysis using a restricted cubic spline curve (P for non-linearity <0.001, Figure 1). After controlling for sociodemographic factors, high SIRI values were substantially correlated with CA-AKI in Model 1 (high SIRI group VS low SIRI group: odds ratio (OR)=2.260, 95% CI: 1.813–2.819, p < 0.001). The link between SIRI and CA-AKI was shown to be significant in Model 2, even after the comorbidities and contrast dose were further corrected (high SIRI group VS low SIRI group: OR = 2.147, 95% CI: 1.719–2.681, p <0.001). After accounting for the acute myocardial infarction in Model 3, comparable outcomes were also noted (high SIRI VS low SIRI: OR = 1.580, 95% CI: 1.253–1.993, p < 0.001). A substantial interaction between eGFR and the association between SIRI and CA-AKI was observed. Based on eGFR values,

subsequent analyses were stratified. The findings showed a significant positive connection between SIRI and CA-AKI, but only in those whose eGFR was more than 60 mL/min/1.73 m2. A median follow-up of 2.8 years revealed 448 deaths, or 7.8% of the total. increased SIRI levels were associated with increased cumulative mortality, as demonstrated by the Kaplan-Meier curve. Furthermore, multivariate Cox regression models adjusted for age >75 years, gender, diabetes, hypertension, anemia, history of myocardial infarction, eGFR, contrast volume >150 mL, and acute myocardial infarction revealed a strong correlation between higher values of SIRI and long-term mortality [Hazard ratio (HR)=1.400,95%CI: 1.164-1.684; p < 0.001].

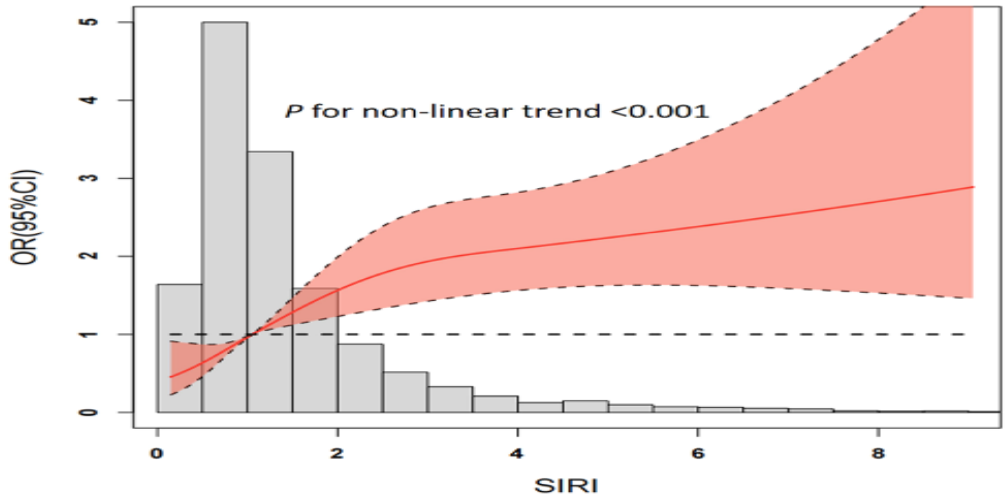

Figure 1. A restricted cubic spline curve using logistic regression to correlate Ca-aKi with SiRi score.

DISCUSSION-The current study showed that in patients receiving elective PCI, high levels of SIRI were independent predictors of long-term mortality and CA-AKI.[1] Similar to this study, Han et al. showed that in ACS patients having PCI, SIRI levels could be utilized as an independent predictor of the probability of MACE.[3]

CONCLUSION-The current study concluded that high preoperative SIRI levels in patients receiving elective PCI may be linked to long-term mortality and the emergence of CA-AKI. SIRI is an easy-to-use, affordable, and widely accessible inflammatory index that can be used to predict contrast-related renal problems in high-risk patient groups through risk stratification.

In patients receiving elective PCI, high levels of SIRI are independent indicators of long-term mortality and CA-AKI.

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Case report on transthyretin amyloid cardiomyopathy with a rare transthyretin mutation (p.D58Y)

INTRODUCTION- The extracellular accumulation of misfolded proteins in various organs causes a rare group of illnesses known as systemic amyloidosis. A prevalent feature of amyloidosis is the accumulation of cardiac amyloid, leading to infiltrative/restrictive cardiomyopathy and serving as a significant indicator of survival. It might be found when examining a patient who is presenting with other organ involvement, or it might be the disease's presenting feature. The majority of instances of cardiac amyloidosis are either acquired monoclonal immunoglobulin light chain (AL) type or transthyretin type (TTR), which can be inherited in younger people or acquired in older patients.[1] Mutations in the TTR gene cause hereditary transthyretin amyloid (ATTRv) cardiomyopathy (CM). TTR mutations contribute to the dissociation and destabilization of the TTR tetramer, which in turn causes an excessive build-up of insoluble amyloid fibrils in the heart and ultimately cardiac failure. This case report describes a case of transthyretin mutation pD58Y in a patient, along with comprehensive details on cardiac amyloidosis, including for the first time transthoracic echocardiography, cardiac magnetic resonance, and SPECT imaging. The purpose of this case report was to improve knowledge about ATTR phenotypes and genotypes.[2]

CASE PRESENTATION

During a medical examination, a 55-year-old man who had previously been in good health had an unintentional decrease in his ejection fraction (EF). He was then prescribed anticardiac remodeling medications. The patient experienced syncope while climbing ten days before being admitted. His greatest systolic blood pressure of 158 mmHg was recorded eight years ago throughout his history of hypertension. He also had a cholecystectomy a year earlier and had chronic diarrhea for some years without being checked out. Old inferior and interior wall myocardial infarction was seen on the ECG. NT-proBNP was determined to be considerably elevated in laboratory testing at 4,050.0 pg/ml (with a threshold value of 125 pg/ml). Myocardial enzymes, a biochemical examination, and a complete blood count were all normal. Diffuse hypertrophy of the left ventricular wall and a "ground-glass" increase of myocardial echogenicity were seen on transthoracic echocardiography. The interventricular septum's basal, middle, and apical segments measured 24, 22, and 21 mm in thickness, respectively. The segments for the inferior wall have equivalent thicknesses of 24, 18, and 22 mm, in that order. Furthermore, there was a decrease in the contractility function, with an estimated 43% LVEF. With a 38% right ventricular fractional area change, the right ventricle's wall motion was typical. In addition, diastolic dysfunction (stage III) and bi-atrial hypertrophy were noted. Furthermore, the tricuspid, mitral, and aortic valves were all determined to have mild to moderate insufficiency. The coronary artery was found to be normal with coronary arteriography. Furthermore, a dynamic ECG revealed that the patient experienced just 625

ventricular premature beats in 24 hours rather than any fast or chronic arrhythmia. The heart rate ranged from 62 bpm (minimum) to 93 bpm (maximum). Furthermore, there were no discernible abnormalities on the craniocerebral MRI or MRA. Then, in light of his widespread hypertrophy and decreased EF value, cardiac magnetic resonance imaging was utilized to assess cardiomyopathy. The left ventricular walls' subendocardial perfusion was found to be reduced by first-pass perfusion imaging. The left ventricle showed diffuse granular enhancement on delayed enhancement magnetic resonance imaging, primarily under the endocardium (Figure 1). Following that, 99mTc-PYP scintigraphy was used for SPECT imaging. A substantial increase in cardiac uptake over bone was observed in the results (SQA grade 3), suggesting a potential transthyretin amyloid build-up. After doing a genetic examination of the TTR, it was discovered that the Chinese population had pD58Y due to an uncommon mutation called NM_000371.4 c.172G>T (chr18:31592998-31592998, human genome 38). This patient was at stage II (NT-proBNP, >3,000 pg/ml) based on the revised British ATTRm prognostic staging scores, which suggest a median survival time of about 46.7 months. Tafamidis is the patient's current medication, and they have routine follow-ups.

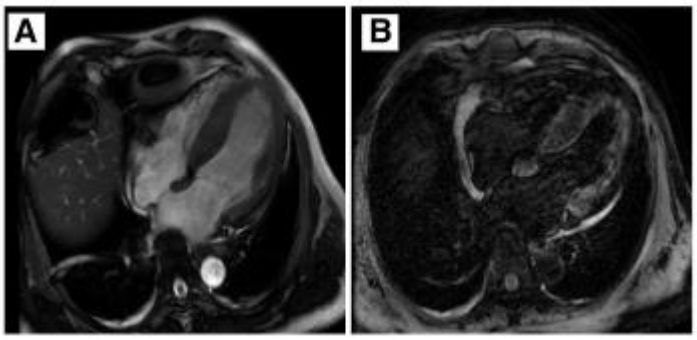

Figure 1. (A, B) Cine and Late gadolinium-enhanced MRI

DISCUSSION-This case report details an uncommon mutation in transthyretin, p.D58Y, in a Chinese patient and presents comprehensive CA data for the first time.[2] According to Jang et al., p.D58A was the most common TTR mutation in patients, reporting 4 p.D58A patients among 7 mutations. They discovered that Asp58Ala had a greater prevalence of gastrointestinal involvement and older disease onset ages.[3]

CONCLUSION-This case study reported a unique instance of a patient with transthyretin mutation p.D58Y in this study and, for the first time, included comprehensive CA data.

The purpose of presenting this p.D58Y ATTR instance is to improve knowledge regarding ATTR genotypes and manifestations.

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