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PLATELET INDICES IN CORONARY ARTERY DISEASE WITH PRE-DIABETES"

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***ABSTRACT**--One of the most common cause of death world over is Coronary artery disease and it comprises a major public health problem in this decade. Increased platelet agglutination in association with other risk factors increase the proabibility of development of myocardial ischemia. In diabetic patients, the mean platelet volume is increased when comparison was done with subjects who are normal.However, this relationship between Mean plaetelet volume and pre-diabetes is not evakuated properly (1-2).*

***Keywords**--Platelet Volume Indices, Coronary Artery Disease*

I. OBJECTIVES

1. To study the correlation of PVI values with other risk factors of CAD, including Pre-diabetes, type 2 Diabetes mellitus, hypertension, smoking, family history of CAD and high BMI.

2. To establish a relationship between the severity of CAD on angiography with PVI in patients.

II. METHODOLOGY

Setting:

The study will be conducted in the Medicine Department, at AVBRH, a tertiary care teaching hospital situated in the rural area of Wardha District. The study will be undertaken after approval from institute ethical committee (applied for).

Patients:

We will prospectively enroll all consecutive patients > 18 years of age regardless of gender or ethnicity who undergo Coronary angiogram/angiography at AVBRH, Sawangi.

III. THIS WILL BE A CROSS SECTIONAL STUDY DESIGN

Inclusion criteria:

All patients more than 18 years of age, undergoing angiography in cardiology unit of Medicine Department at AVBRH, Sawangi who have given written consent will be added in the study.

***Exclusion criteria**:*

Patients < 18 years of age, with thrombocytopenia, with Liver or renal disease, having malignancy, with hereditary disorders of large platelets and on anticoagulants previously will be excluded from the study.

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IV. METHODS

Detailed history and examination of the patients will be undertaken. Family history and previous history of CAD, history of chest pain, H/O smoking and Alcohol intake, medication history will be taken. Assessment of pre-existing comorbidities in patient if any will be enquired by H/O hypertension, Diabetes Mellitus, cancer, chronic kidney disease and chronic liver disease. Physical examination will include- weight, height, BMI- Calculated as weight (kg)/ height (m^2), Waist circumference and Waist/Hip ratio. [1]As per WHO, measurement of waist circumference should be made at midpoint between margin of last palpable rib and top of iliac crest at minimal respiration in erect position. As per NCEP ATP III normal reference for waist circumference is <90cm in asian men and <80cm in asian women. Hip circumference is to be measured at level of greater trochanters (widest portion of hips). As per WHO, the cut off for Waist hip. Ratio for men and women is >0.90 in men and >0.85 in women.

ECG changes if any will be recorded for all the patients. Blood samples will be collected the day before angiography for blood lipids: high-density and low-density cholesterol, triglycerides, total cholesterol; Complete blood count- platelet count and indices - MPV, PDW & PCT. HbA1c will be done for all the patients. Fasting blood glucose will be recorded for all the patients and patients will be defined into following categories as per WHO criteria for Diabetes 2019: Diabetes if Fasting blood glucose>126mg/dl* and Pre-diabetes if Fasting blood glucose from 100-125mg/dl**

*WHO criteria 2019: Diabetes: FBG>126mg per dl, 2hr post glucose>200mg/dl

**WHO criteria 2019: Pre-diabetes: FBG-110-125mg/dl (impaired fasting glucose), 2h post glucose-140-199mg/dl (impaired glucose tolerance).

As all patients will be undergoing coronary angiogram, the indication of CAG will be recorded for everyone and patients will be divided as per angiography findings into: Normal Coronaries (<50% stenosis in coronary arteries) and CAD (>50% stenosis in coronary arteries). Severity of coronary artery disease will be decided as per degree of stenosis (>70% stenosis in atleast one artery) and the amount of vessels involved (Single, Double and triple vessel disease).

[2]MPV is defined the volume of the average circulating platelet and it is measured in femtoliters. The MPV value will vary based on the technique by which the MPV is measured (ie, it is instrument-specific). In addition to that, a patient's true platelet distribution may not fit a log-normal distribution. Hence the manufacturers specify a defined range of MPV within their algorithms. Thus, we must refer to the laboratory's reference for the particular study population.

The normal range for platelet volume has yet to be adequately determined. Studies have shown that the MPV values are different for different races[19]. Studies measuring MPV in sodium citrate in normal subjects. suggest a approximately normal range of 4.5 – 8.5 fl with a mean of 6.5 fl. The day to day variation in MPV is small (CV =2.1%). The range of expected values for MPV in our laboratory is 6-10 fL.

V. SAMPLE SIZE AND STATISTICAL ANALYSIS

Sample size formula with designed error of margin:n = (Z alpha/2 square X P (1-P))/d squareWhere, Z alpha/2 is the level of significance at 5% =1.96P= Prevalence of pre-diabetes=12.8%So sample size is 172 patients.The data which will be collected will be assessed by IBM, SPSS (IBM Corp., Statistics for Windows, version 23.0.

VI. DISCUSSION

Present Study wishes to establish a correlation between platelet volume indices and Pre-diabetes, type 2 Diabetes mellitus, hypertension, smoking, family history of CAD and high BMI. And establish a relationship between the severity of CAD on angiography with PVI in patients.in a recent study, published in the journal of Coronary artery disease, in April 2019, a total of 491 patients who underwent Coronary angiography for chest pain were included. The sunjects were divided into subjects who had Coronary artery disease and those who did not have it. Patients with CAD in angiography had higher MPV and MPV was established as an independent risk factor of CAD for patients with angina. This study proposed the use of MPV as a non-invasive marker of CAD on angiography, which may ultimately reduce unnecessary invasive testing. A study by Shimodaira et al,showed that mean platelet volume in patients with prediabetes was more than that in normal subjects, and was positively associated with Fasting plasma glucose levels in prediabetic and normal subjects.In a study done in Haryana by Pujani et al, PVIs were compared among patients with and without type 2 DM. All indices were elevated in patients with HbA1c>7%.

With the above literature in view, we attempt to establish a relationship between MPV and Coronary artery disease in our subset of population in India and to correlate it with the severity of CAD on angiography. We would also study the relationship between Mean platelet volume and other risk factors of CAD- especially diabetes and pre-diabetes. A number of related studies in this region were explored for additional information relevant to geographic context (4-25). Some articles related to other related non-communicable entities(26-44) and sociocultural aspects (45-64) were reviewed.

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