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Assessing the Impact of Metabolic Syndrome on Angiographic Severity in Coronary Artery Disease: A SYNTAX Score - Based Comparative Study

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Abstract: ***This study investigates the relationship between metabolic syndrome MS and the severity of coronary artery disease CAD using the SYNTAX score. Over an 8 - month period, 500 individuals exhibiting symptoms of CAD were retrospectively observed. Patients were divided into two groups based on the presence of metabolic syndrome. The study found that patients with metabolic syndrome had significantly higher SYNTAX scores, indicating more severe CAD. The results suggest that preventive measures against metabolic syndrome could be effective in managing CAD severity.***

Keywords: Metabolic Syndrome, Coronary Artery Disease, SYNTAX Score, Angiographic Severity, Preventive Measures

1. Introduction

Heart - related issues are more likely to arise in those with metabolic syndrome. Obesity, insulin resistance, physical inactivity, and genetic factors are all significant risk factors for the metabolic syndrome. Atherogenicdyslipidemia, high blood pressure, and increased plasma glucose are the most widely acknowledged metabolic risk factors. These traits are also present in proinflammatory and prothrombotic states in these individuals. The number of metabolic syndrome markers is more effective at predicting cardiac risk than metabolic syndrome alone is at predicting CAD severity. In this investigation, the severity of angiographic CAD in individuals with metabolic syndrome will be evaluated.

2. Materials and Methods

This retrospective observational study was done from November 2021 to June 2022, in Chengalpattu medical college. Totally 500 patients were enrolled in the study who had clinical features, ECG, Echo findings of coronary artery disease and underwent angiogram. patients are divided into 2 groups according to the absence and presence of metabolic syndrome.
Metabolic syndrome (MS): Those who had 3 or more of these 5 components

- (Large waist circumference (male>102, female >88cm),
- high blood pressure >130/85 mmHg,
- fasting blood sugar >100mg/dl,
- fasting triglycerides > 150mg/dl,
- fasting HDL (<40mg/dl male, <50mg/dl female)

are classified as having metabolic syndrome as per the NCEP ATP III definition.

Exclusion criteria:
Positive family history of coronary artery disease, prior CABG to PTCA, current smoker or ex - smoker were excluded from the study. Waist circumference was measured at the level of iliac crest with a flexible tape. Blood pressure was measured thrice in sitting position, average reading was taken. Fasting blood was collected to measure sugar, triglyceride and HDL levels.

Angiographic assessment:
The angiographic assessment was done by SYNTAX [Synergy between PCI with TAXUS and Cardiac Surgery] score, which includes account the number, location, functional impact and the complexity of lesions. A lesion is defined as a significant lesion when it causes reduction in luminal diameter by 50% or more by visual assessment in vessels. Less severe lesions are not included in the SYNTAX score.

SYNTAX score is classified into
Low risk (score ≤22)
Intermediate risk (23 – 32)
High risk (≥33).

Statistical analyses:
After being entered into a Microsoft Excel data sheet, the data is then analysed using the SPSS 22 edition software. Frequencies and proportions are used to represent categorical data. The Fischer's exact test or the chi - square test are used to determine the relevance of qualitative data. Standard deviation and mean are used to represent continuous data. After taking into account all statistical testing guidelines, a p value (the likelihood that the result is true) of 0.05 was determined to be statistically significant.

3. Results

The metabolic score (0–5) was determined. Scores of 3 were considered to be free of the metabolic syndrome. Metabolic syndrome was defined as having a score below 3.

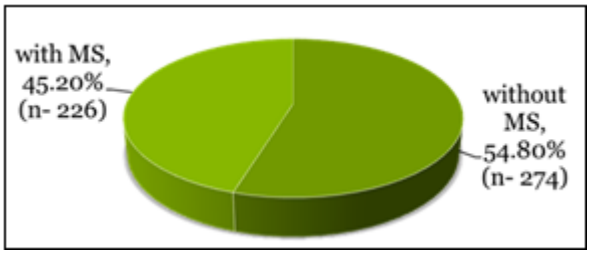
Among the 500 patients selected for study, 54.8% (n = 274) had no metabolic syndrome, and 45.2% (n = 226) had metabolic syndrome. Males were 64% (n = 175) without metabolic syndrome and 61% (n = 138) without metabolic syndrome. The mean age in those without metabolic syndrome was 61.0 10.8, and in those with metabolic syndrome it was 56 10.4 (p 0.002). In the category of metabolic syndrome, the mean age was noticeably lower.

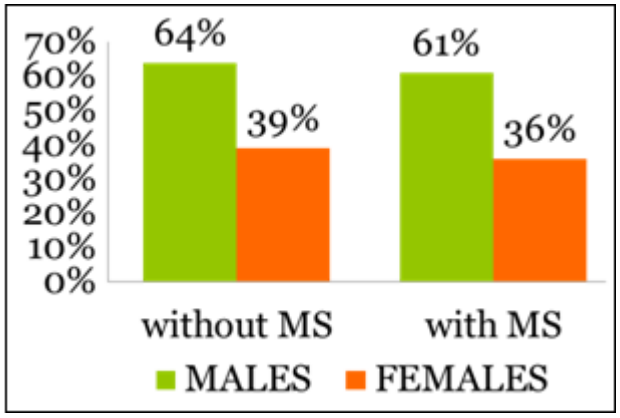
Table 1displays the clinical and biochemical nature of the study group.

Table 2 demonstrates the prevalence of metabolic syndrome indicators and their ratings.

Metabolic syndrome individuals' clinical and biological characteristics

	Absent MS (n=274)	Using MS (n=226)	p value
Age (yrs)	61.0±10.8	61.0±10.4	0.984
Male	175 (64%)	135 (60%)	0.371
WC for male (cm)	96±5	109±7	<0.001
WC for females (cm)	81±6	95±7	<0.001
Hypertension	81 (30%)	174 (78%)	<0.002
High FBG	59 (21%)	110 (49%)	<0.001
TG	101.4±42.5	166.8±49.9	<0.002
HDL	47.1±14.5	39.0±8.1	<0.001
Smoking	117 (43%)	106 (47%)	0.401





Clinical traits and the prevalence of several metabolic syndrome markers based on the metabolic score

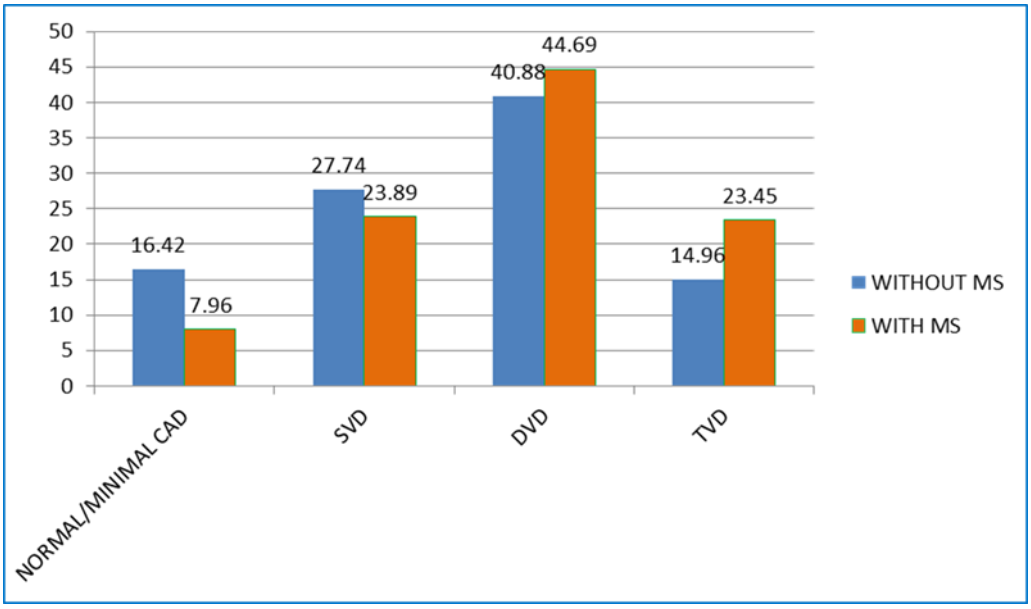
MS score	0 (n=31)	1 (n=97)	2 (n=146)	3 (n=118)	4 (n=87)	5 (n=21)
Low HDL	0 (0%)	33 (35%)	99 (68%)	95 (81%)	78 (90%)	21 (100%)
High TG	0 (0%)	24 (25%)	67 (47%)	76 (65%)	77 (89%)	21 (100%)
High FBG	0 (0%)	22 (23%)	59 (41%)	81 (69%)	70 (81%)	21 (100%)
High BP	0 (0%)	14 (13%)	44 (31%)	64 (54%)	68 (78%)	21 (100%)
High WC	0 (0%)	4 (4%)	23 (16%)	38 (33%)	55 (63%)	21 (100%)
Age	63±13	62±8	58±11	54±10	56±10	52±8
Male	22 (74%)	61 (63%)	90 (62%)	70 (60%)	55 (64%)	11 (52%)
Smoking	14 (45%)	60 (62%)	81 (56%)	66 (56%)	40 (47%)	12 (59%)

WC – waist circumference

Table 2. shows that in people with the metabolic syndrome, low HDL (%) was the most common component, and then higher TGL (%). Low HDL was more prevalent in people without metabolic syndrome, similar to the group with the condition.

Coronary artery disease severity:

Normal epicardial coronaries or minimal CAD was seen in 16.42% (n - 45) in without MS Vs 7.96% (n - 18) in with MS. Single vessel disease (SVD) was seen in 27.74% (n - 76) in without MS Vs 23.89% (n - 54) in with MS, Double vessel disease (DVD) was seen in 40.88% (n - 113) in without MS Vs 44.69% (n - 101) in with MS, Triple vessel disease (TVD) was seen in 14.96% (n - 41) in without MS Vs 23.45% (N - 53) in with MS. P value =0.005 as per chi square test.: metabolic syndrome patients had increasing number of coronary arteries involved, compared to those who do not have metabolic syndrome

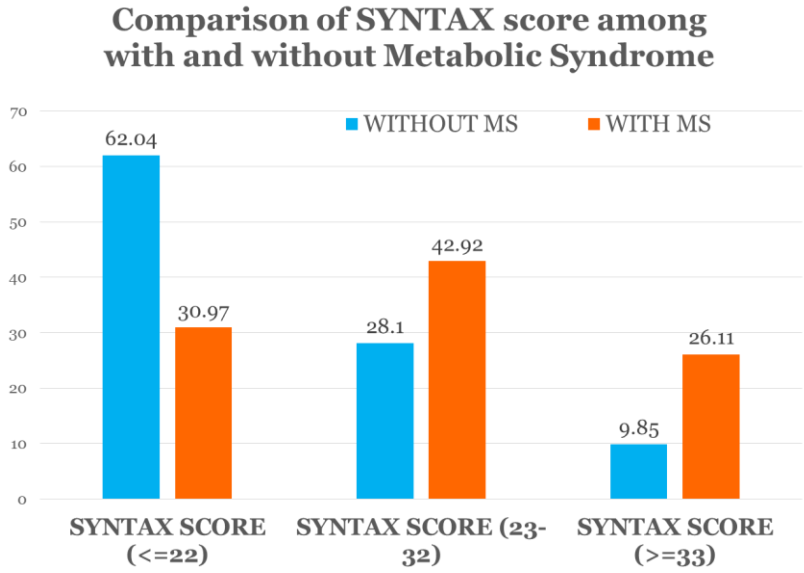


Patterns of angiography in patients with and without metabolic syndrome

	Absent MS	using MS	Total
Normal or minimal	45 (16.42%)	18 (7.96%)	63 (12.60%)
SVD	76 (27.74%)	54 (23.89%)	130 (26.0%)
DVD	113 (40.88%)	101 (44.69%)	213 (42.60%)
TVD	41 (14.96%)	53 (23.45%)	94 (18.8%)

Chi - square value = 12.9054, p - value=0.005

SYNTAX score: in patients without MS between 0 - 22 is seen in 52.04% (n - 170) Vs 30.97% (n - 70) in patients with MS, 23 - 32 score in 28.10% (n - 77) in without MS Vs 42.92% (n - 97) in patients with MS, more than 33 score in 9.85% (n - 27) in patients without MS Vs 26.11% (n - 59) in patients with MS. p value <0.001 as per chi square test. The group with metabolic syndrome had a considerably high SYNTAX Score.



Metabolic syndrome and syntax score in patients

SYNTAX score	Without MS	With MS	Total
<21	170 (52.04%)	70 (30.97%)	240 (48.0%)
22 – 23	77 (28.10%)	97 (42.92%)	174 (34.8%)
>24	27 (9.85%)	59 (26.11%)	86 (17.2%)

Chi - square value = 51.7413, p - value <0.001

4. Discussion

In the present investigation, we compared individuals with coronary artery disease who had metabolic syndrome to those who did not in terms of the severity of the angiography. The investigation comprised patients who had been admitted with acute coronary syndrome, chronic coronary syndrome, or unstable angina.500 patients were analyzed, and 45.2% had metabolic syndrome while 54.8% did not. Between the two groups, there were no appreciable variations in smoking or gender. In the area of metabolic syndrome, the mean age was noticeably low. Increased body mass index and high fasting plasma sugar were common metabolic markers in the Jong - youn Kim et al investigation. In the study conducted by Miri et al, low HDL and high waist circumference were more frequent. In our study Low HDL and high TGL were more frequent and

higher waist circumference was least common. So patients with low waist circumference were also affected by coronary artery disease. Various scores were used to address the austerity of coronary artery disease like Gensini score, SYNTAX score and Friesinger index (FR). Among these SYNTAX Score was applied in our study and the angiographic burden of coronary artery disease was identified. Those with 1 or 2 metabolic scores had minimal CAD or single vessel disease and low SYNTAX score. In the metabolic syndrome group, multivessel involvement was more prevalent. Additionally, the metabolic syndrome group had a high SYNTAX score.

5. Conclusion

With regard to those who have coronary artery disease, our study found a substantial correlation between metabolic scores and angiographic severity. Low HDL, higher TGL, and higher fasting blood sugar were more prevalent among the metabolic score's parameters. So early identification of constituents of metabolic syndrome and correcting it, helps in reducing the burden of angiographically severe coronary artery disease.

References

[1] Reza miri, amirsajjadieh. relationship between metabolic syndrome and angiographic severity of coronary artery disease. ARYAatheroscler 2016; volume 12; issue 5.
[2] Jong younkim, hee sun mun. impact of metabolic syndrome and its individual components on the presence and severity of angiographic coronary artery disease. Yonsei med j http// www.eymj. org volume 51, number5, September 2010
[3] Ashwal a jayaram, krishnandanayak. lipid profile parameters and coronary artery disease in young patients undergoing diagnostic angiography. Jayaram et al. international journal of cardiovascular practice. july 2019, volume 4, issue 3 (7480)
[4] Ming hui gui, yang ling. Department of endocrinology and metabolism, shanghai zhongshan hospital, fudan university, shanghai 200032, chinese medical journal, march 20, 2017, volume 130, issue 6.
[5] Amir ahmadi, Jonathon leipsic, Gudrun feuchtner. Is metabolic syndrome predictive of prevalence, extent and risk of coronary artery disease beyond its components? results from multinational coronary CT angiography evaluation for clinical outcome: an international multicentre registry (CONFIRM). PLOS one, doi 10.1371/ journal. pone.0118998. march 3.2015.