

# Association between Metabolic Syndrome and Acute Coronary Syndrome

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**Abstract:** *The metabolic syndrome is a configuration of cardiovascular risk factors centered around obesity, abnormal glucose metabolism, increase blood pressure and dyslipidemia. The prevalence of metabolic syndrome is obviously significant in high - risk populations, with a prevalence of 45 to 51 percent, but it's also worth noting that it's 24 percent in healthy people too. Present study was done to find out proportion of independent character of MetS in ACS and to conclude association between metabolic syndrome among acute coronary syndrome compare to general population.*

**Keywords:** Metabolic Syndrome, Acute Coronary Syndrome, dyslipidemia

## 1. Introduction

The metabolic syndrome (MetS) is a configuration of cardiovascular risk factors centered around obesity, abnormal glucose metabolism, increase in blood pressure and atherogenic dyslipidemia.<sup>1</sup>

The prevalence of metabolic syndrome is obviously significant in high - risk populations, with a prevalence of 45 to 51 percent, but it's also worth noting that it's 24 percent in healthy people too.<sup>2,3</sup>

The association of the MetS with increased risk of unfavorable cardiovascular outcomes, morbidity and mortality is well established.

However, controversy remains regarding independent character of this association as well as regarding the additional value of the MetS in the risk estimation on top of its individual components.

Present study was done to find out proportion of independent character of MetS in ACS and to conclude association between metabolic syndrome among acute coronary syndrome compare to general population.

### Objectives

- 1) Compare prevalence of the metabolic syndrome among Acute coronary syndrome patients with subject without Acute coronary syndrome.
- 2) Estimate the prevalence of individual components of the metabolic syndrome among Acute coronary syndrome patients.
- 3) To find out the relation between metabolic syndrome and acute coronary syndrome.

## 2. Methodology

- This case control study was conducted in the Department of Medicine in saraswathi institute of medical sciences.
- Purposive sampling was done to study 200 patients who were divided into 2 groups (100 in each) on the basis of inclusion and exclusion criteria.
- 100 proven cases of acute coronary syndrome were enrolled in group. For comparison group 2, we tried to

enroll 100 subjects (friends/ peers or relatives of ACS patients) with no evidence of ACS, who voluntarily want to participate in the study with similar characteristics in terms of basic characteristics like Age, Gender and BMI to avoid selection bias.

**Exclusion criteria for both groups:** Patient with age less than 18 years, valvular heart disease, malignancy, stroke, severe renal and hepatic impairment.

**Exclusion criteria for Group - 2:** subjects having Acute coronary Syndrome or likely to have ACS based on ECG, echocardiography.

**Analysis:** Continuous variables were compared through the Student's t - test and for the categorical variables the chi - square test. P value of less than 0.05 was considered as significant. The data was collected anonymously with confidentiality as the research was conducted in full accord with ethical principles.

### Metabolic syndrome diagnostic criteria

According to the NCEP: APTIII, Patients with three or more of the following five risk factors were defined as having MetS:<sup>5</sup>

- 1) Central obesity defined as waist circumference greater than established ethnicity specific values. Since the data regarding waist circumference were not available, for purposes of this analysis we used the accepted body mass index (BMI) above 30 as a criterion for classifying patients as obese.<sup>6</sup>
- 2) Low value of high - density lipoprotein (HDL) <50 mg/dL among women, and <40 mg/dL among men.
- 3) Elevated fasting plasma triglycerides (TG) ≥150 mg/dL, or specific treatment for this lipid abnormality.
- 4) Elevated systolic blood pressure ≥130 mm Hg, or diastolic value ≥85 mm Hg, or treatment of previously diagnosed hypertension.
- 5) Elevated fasting plasma glucose (FPG) ≥100 mg/dL or previously diagnosed diabetes mellitus.

## 3. Result

- 1) Present study included 100 cases (Group 1) of ACS and 100 subjects (Group 2) as comparison group without ACS.

- 2) Mean age of group is 54 years compare to 52 years in control group the difference in Age in both group is not statistically significant hence groups are comparable for study objectives.
- 3) Among cases male: female ratio is higher than control group though it is not statistically significant so gender bias is not present.
- 4) Mean BMI among case is 29 whereas 26 in control group though it seems higher BMI among cases though it is statistically insignificant and without any bias to compare with cases.

**Table 1:** Comparison basic characteristics of the study population (N=200)

Variable	Group 1 (n=100)	Group 2 (n=100)	Statistical analysis
Age (in years)			
<30	3	2	t= 1.3744 p= 0.3386
31 - 50	48	54	
51 - 70	49	44	
Mean±SD	54 ±10.72	52 ±9.84	
Gender			
Male	64	56	Chi sq. = 1.33 p= 0.2482
Female	36	44	
Male: Female	1.78: 1	1.27: 1	
BMI			
Obese (>30 BMI)	43	32	t= 2.1005 p= 0.07
Mean±SD (BMI)	29 ± 8.54	26 ± 4.21	

**Table 2:** Prevalence of Metabolic Syndrome in the Study Population (N=200)

Metabolic Syndrome	Group 1 (n=100)	Group 2 (n=100)	Statistical analysis
Yes	44	27	chi - square = 6.3107 p =.012 *
No	56	73	

The odds of presence of MetS in Acute coronary syndrome group was found 2 times higher (**Odds ratio= 2.12**) compare to subjects without ACS. Calculated **95% CI is 1.17 - 3.84** thus, odds of MetS among Acute coronary syndrome patients was found statistically significant.

**Table 3:** Distribution of Different Components of Metabolic Syndrome between Two Groups

Components of metabolic syndrome (+nt)	Group 1 (n=100)	Group 2 (n=100)	P value
HTN	44	25	Chi sq. = 7.98, p=0.004*
Obese (>30 BMI)	43	32	Chi sq. =2.58, p=0.108
Increased TG	58	33	Chi sq. = 12.60, p=0.003*
Low HDL	62	41	Chi sq. = 8.82, p=0.0029*
Impaired FBS	44	17	Chi sq. = 17.19, p=0.00003*

- Among the five components of metabolic syndrome, low HDL cholesterol was the more frequently seen in both groups (62% in - group - 1 and 41% in - group - 2). However The low HDL is more prevalent in Acute coronary syndrome group compare to control group and the difference is statistically significant at p <0.05.
- HTN (44% vs.25%), increased TG (58% vs.33%) and impaired FBS (43% vs.32%) were also significantly prevalent in - group 1 than group 2.

- Obesity was more common in diseased group though the difference was not statistically significant. That might be due to the selection criteria of comparison group where we try to avoid any selection bias for comparison

#### 4. Conclusion

- 1) Metabolic syndrome is highly prevalent in patients with acute Coronary syndrome. Among the five components of metabolic syndrome hypertension, increased TG, Dyslipidemia and impaired FBS are significantly prevalent in patients with acute coronary syndrome.
- 2) Dyslipidemia was identified as the most frequent component of metabolic syndrome.
- 3) All the components of metabolic syndrome namely obesity, hyperglycemia, hypertension and dyslipidemia are potentially modifiable and preventable.
- 4) Lifestyle modifications related to dietary habits and physical activities can decrease the incidence of metabolic syndrome and its consequences.

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