Original Article

Study of relation between Body Mass Index(BMI) and Angiographically severity of Coronary Artery Disease

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Abstract

Background: Increased body mass index (BMI) is known to be related to ischaemic heart disease (IHD) in populations where many are overweight (BMI ? 25 kg/m2) or obese (BMI ? 30). Substantial uncertainty remains, however, about the relationship between BMI and severity of Coronary artery disease. **Methods and Results:** Total 152 patients undergoing coronary angiography for clinical indication (eg; stable angina, unstable angina, STEMI, NSTEMI). Among them 88.15% male and 11.84% female.6.57% were under weight, 69.07% were normal weight, 20.39% were over weight and 3.94% were obese or morbid obese. Normal & minimal coronary artery disease more common in under weight & normal weight patient(60% in underweight patient, 21.88% in normal weight patient compare to 16.12% in over weight & obese person). Tripple Vessel disease are more common in over weight and obese person (45.16% in over weight and 50% in obese person compare to 10% in under weight and 33.33% in normal weight person).Conclusion:In patients with established Ischemic heart disease, Increase BMI was associated with increase number of coronary lesion (doable and tripple vessel disease more common in over weight and obese person).

Key words= BMI (Body Mass index), CAD (Coronary artery disease)

Introduction

Obesity is defined by the AHA as a major risk factor for CHD[1]. Obesity is associated with insulin resistance, hyperinsulinemia, type 2 diabetes, hypertension, low HDL-C, hypertriglyceridemia, small dense LDL, inflammation and elevated CRP, thrombosis, diastolic dysfunction, and LVH.[1] In women, obesity contributes independently from physical inactivity to the development of CHD[2]. Obesity accelerates the progression of coronary atherosclerosis in adolescent and young adult men[3] and it is associated with an increase in cardiovascular and all-cause mortality.[1] Body mass index (BMI) has been adopted widely as a measure of adiposity. BMI is calculated as weight (kg)/height squared (m2) and is estimated as [weight (pounds)/height (inches)2] x 704.5. Normal weight is defined as a BMI of 18.5 to 24.9, overweight is defined as a BMI of 25 to 29.9, and obesity is defined as a BMI 30.

The number of overweight and obese adults in the Bangladesh has increased dramatically over the

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past few decades. BMI correlates with total body fat content. Abdominal obesity adds to the health risks of obesity, and waist circumference correlates positively with abdominal fat content. In univariate analysis, many observational studies have found obesity strongly and positively correlated with the risk of CHD. In multivariate analysis-when controlling statistically for risk factors such as hypertension, diabetes, and dyslipidemia-obesity is not usually found to be an independent risk factor. This reflects the fact that many of the adverse consequences of obesity are mediated through resultant metabolic risk factors acting as pathogenetic links in the causal pathway. Nevertheless, some large prospective observational studies of long duration indicate that obesity is independently related to coronary and cardiovascular mortality in men and women. Weight loss improves insulin sensitivity and glucose disposal, reduces HbA1c in patients with type 2 diabetes, reduces blood pressure and triglycerides, produces a modest reduction in LDL-C, and increases HDL-

Methods

All subjects were recruited prospectively in a cardiac catheterization laboratory at the Khwaja Yunus Ali medical college hospital... The study group consisted of 152 consecutive patients ,who were undergoing coronary angiography for clinical indications (chest pain on exertion,ETT positive, STEMI, NSTEMl.) from january 2007-december 2010.The exclusion criteria were valvular heart disease, congenital heart disease,advanced CKD .

Results

Total 152 patients undergoing coronary angiography for clinical indication (eg; stable angina,unstable angina, STEMI, NSTEMl). Among them 88.15% male and 11.84% female.6.57% were under weight,69.07% were normal weight, 20.39% were over weight and 3.94% were obese or morbid obese. Normal & minimal coronary artery disease more common in under weight & normal weight patient(60% in underweight patient, 21.88% in normal weight patient compare to 16.12% in over weight & obese person). Tripple Vessel disease ware more common in over weight and obese person (45.16% in over weight and 50% in obese person compare to 10% in under weight and 33.33% in normal weight person.)
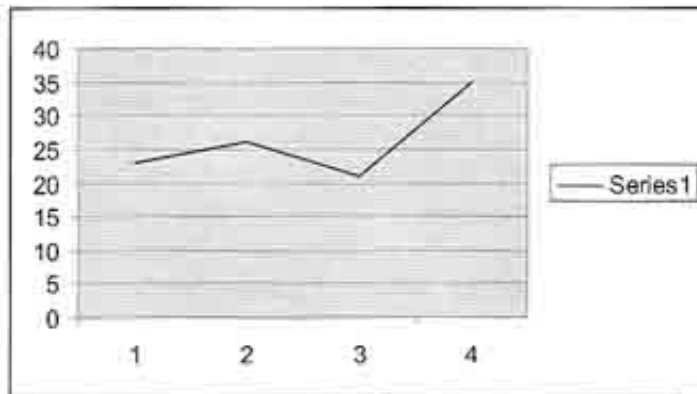
Table-1-Pattern of Coronary artery disease of Under weight Patient(BMI <18.5)

	Number	Percentage
Normal & Minimal Coronary artery disease	6	60%
Single Vessel Disease (SVD)	2	20%
Double Vessel Disease (DVD)	1	10%
Tripple Vessel Disease (TVD)	1	10%
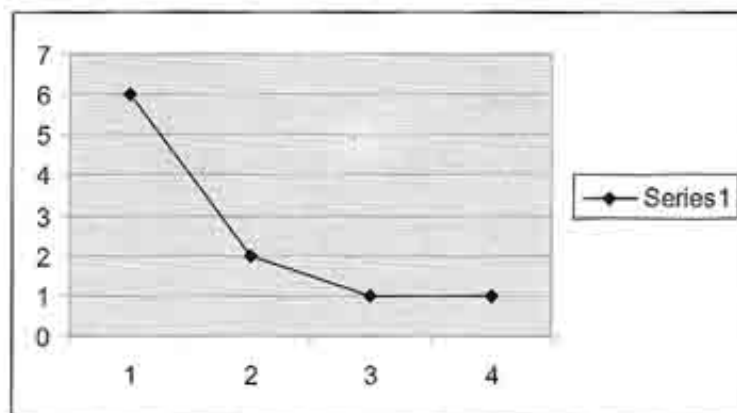
Table-2-Pattern of Coronary artery disease of Normal weight Patient(BMI 18.5 -24.9)

	Number	Percentage
Normal & Minimal Coronary artery disease	23	21.88%
Single Vessel Disease (SVD)	26	24.88%
Double Vessel Disease (DVD)	21	20%
Tripple Vessel Disease (TVD)	35	33.33%

Table-3-Pattern of Coronary artery disease of Over weight Patient (BMI 25-29.9)

	Number	Percentage
Normal & Minimal Coronary artery disease	5	16.12%
Single Vessel Disease (SVD)	4	12.09%
Double Vessel Disease (DVD)	8	25.80%
Tripple Vessel Disease (TVD)	14	45.16%
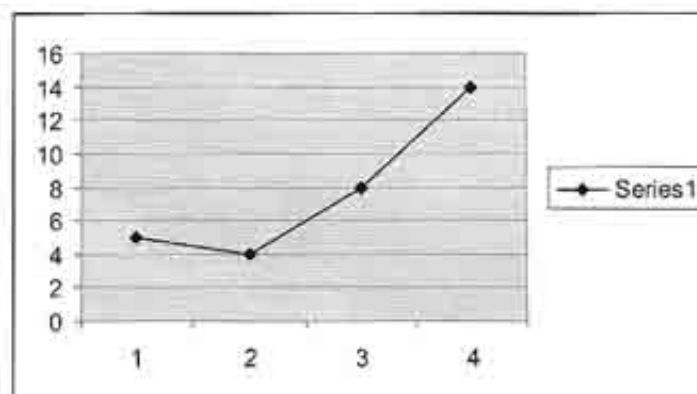
Table-4-Pattern of Coronary artery disease of Obese & morbid obese Patient (BMI > 30)

	Number	Percentage
Normal & Minimal Coronary artery disease	1	16.12%
Single Vessel Disease (SVD)	1	16.12%
Double Vessel Disease (DVD)	2	16.12%
Tripple Vessel Disease (TVD)	2	50%
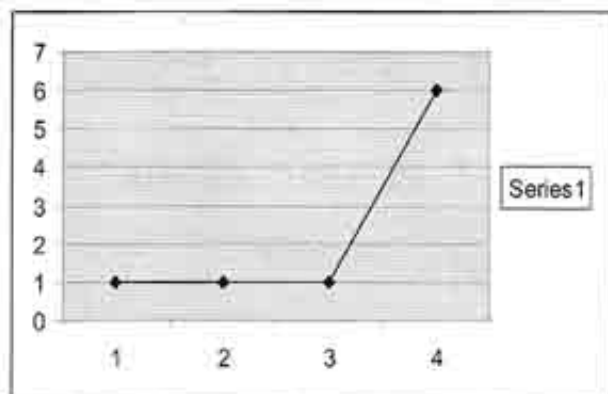
Discussion

The novel and important finding of the present study was that increased BMI was associated with severity of coronary artery disease. Double and tripple vessel disease were more common in over weight and obese patient.. The positive relation between BMI and the risk of acute coronary events was present even in the range of normal or only mildly elevated BMI.

Obesity is part of the metabolic syndrome (which also includes hypertension, dyslipidemia, insulin resistance, and systemic inflammation) and causes a clustering of these risk factors..

The mechanisms underlying the association between increased BMI and CAD severity (as found in the present study) were essentially unknown. Some theoretical explanations should be considered. Obesity, acting through hyperlipidemia and inflammation,[4] may increase vulnerability of the atheromatous plaque to rupture. However, in our study, the effect of BMI on the risk of unstable CAD was independent of plasma lipid levels and CRP. Obesity has also been associated with increased expression of tissue factor,[5] enhanced platelet activation,[6] and elevated plasminogen activator inhibitor-1 (PAI-1),[7] and may hence affect the initiation and progression of intraluminal thrombosis after coronary plaque rupture. Finally, obesity may be associated with cardiac hypertrophy[8] and may impair coronary flow reserve, increasing the likelihood of myocardial ischemia. Alternatively, hitherto unidentified and novel obesity-dependent mechanisms may contribute to the observed association between BMI and risk for CAD instability. Understanding these mechanisms may provide opportunities for new and targeted therapeutic strategies.

Study Limitations

The present study was limited by a number of factors.First retrospective analyzed can be inherently biased.Second, our sample size was small necessitanting caution in the interpretation of our finding.Third other modifible risk factors (Diabetes mellitus, Dyslipaedimea, Hypertension) were not include in this study

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