Obesity and Coronary Artery Disease

Medical Science

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ABSTRACT *Obesity has been considered one of the most important causative factor for the development of coronary artery disease. Obesity has several effects on endocrine functions contributing to insulin resistance and development of metabolic syndrome. The aim of this study was to identify and correlate whether obesity itself or metabolic effects and comorbidies associated with obesity plays an important role in the coronary artery disease.*

INTRODUCTION:

The global increase in coronary artery disease has been attributed to continued improvement in the economic conditions with urbanizations, with changes in diet, activity levels, and behaviour such as smoking. Major risk factors are sedentary lifestyle, cigarette smoking, hypertension, high LDL levels, low HDL levels, diabetes mellitus, obesity, family history of premature CHD and insulin resistance. Obesity is an independent risk factor for coronary artery disease.

AIMS AND OBJECTIVES:

1) To study the coronary angiography profile in obese patients
2) To determine severity of coronary arterial atherosclerosis angiographically in obese patients
3) To correlate the lipid profile with severity of angiographic changes in obese patients
4) To study severity of coronary angiography finding with various classes of obesity

MATERIALS AND METHODS:

A group of 50 patients with obesity (BMI>30) who underwent CAG at tertiary care center were included in our study. All patients were interviewed, examined and evaluated to chart their clinical profile. Detailed history was taken with measurement of BMI, waist-hip ratio, lipid profile, 2Decho reports along with routine blood investigations. Coronary angiography was performed and degree of occlusion in terms of percentage of narrowing of the luminal diameter was noted.

RESULTS:

1. AGE DISTRIBUTION:

AGE	NO OF PATIENTS
25-40	9(18%)
41-50	20(40%)
51-60	21(42%)

2. SEX DISTRIBUTION :

SEX	NO. OF PATIENTS IN PRESENT STUDY
MALE	35(70%)
FEMALE	15(30%)

3. BODY MASS INDEX AND ITS COMPARISONS:

BMI	NO. OF PATIENTS
30 - 34.9	34
35 - 39.9	16

4. RISK FACTOR COMPARISONS:

RISK FACTOR	NO OF PATIENTS	%
DIABETES	19	38%
HYPERTENSION	34	68%
DYSLIPIDEMIA	32	64%
NONE	0	0%

5. ANGIOGRAPHIC FINDINGS IN OBESE PATIENTS:

VESSEL INVOLVEMENT	OBESITY CLASSES	
CAG	OBESITY CLASS 1	OBESITY CLASS 2
NORMAL/INSIGNIFICANT CAD	14.71%	6.25%
SVD	44.12%	43.75%
DVD	23.53%	31.25%
TVD	11.76%	12.50%
LMCA	5.88%	6.25%

6. LIPID PROFILE COMPARISON:

LIPID	PRESENT STUDY		BRENNER ET AL	
	AVERAGE	SD	AVERAGE	SD
LDL	156.88	32.87	128	39
HDL	35.22	11.36	43	11

7. DUKE JEOPARDY SCORE:

DUKE SCORE	PRESENT STUDY		NIRAJ ET AL	
	OBESE CLASS 1	OBESE CLASS 2	OBESE CLASS 1	OBESE CLASS 2
0	6.00%	6.00%	6.30%	5.40%
2	38.00%	38.00%	40.30%	38.70%

DUKE SCORE	PRESENT STUDY		NIRAJ ET AL	
	OBESE CLASS 1	OBESE CLASS 2	OBESE CLASS 1	OBESE CLASS 2
4	29.00%	31.00%	30.60%	33.30%
6	12.00%	13.00%	11.70%	12.90%
8	3.00%	6.00%	2.90%	7.50%
10	6.00%	0.00%	1.50%	1.10%
12	6.00%	6.00%	6.80%	1.10%

8. SEVERITY OF VESSEL INVOLVEMENT:

CAG FINDINGS	PRESENT STUDY		NIRAJ ET AL	
	OBESE CLASS 1	OBESE CLASS 2	OBESE CLASS 1	OBESE CLASS 2
NORMAL	14.71%	6.25%	6.30%	5.40%
SVD	44.12%	43.75%	46.10%	41.90%
DVD	23.53%	31.25%	28.60%	35.50%
TVD	11.76%	12.50%	12.10%	15.40%
LMCA	5.88%	6.25%	7.80%	2.20%

SUMMARY: The average age in the present study was 48.74 years. Obesity has been found to have a paradoxically lower level of correlation with Duke Jeopardy score and severe lesions. Cardiovascular risk factors like diabetes, hypertension, and dyslipidemia are found to be associated with patients with obesity having coronary atherosclerosis. Even among the risk factors, hypertension leads, followed by dyslipidemia and lastly diabetes. Although all the three risk factors have been independently associated with coronary artery disease, obese patients have often been found to have one of these. Vascular preference is in the favour of single vessel disease being more common than the rest. Next is double vessel disease and lastly triple vessel disease and LMCA disease.LAD is the most commonly involved epicardial artery followed by LCX, RCA and LMCA in that order.LDL values vary significantly from Brener et al study, while HDL values are similar. The study has not documented "obesity paradox", however the obese patients have been found to be subjected to coronary angiography earlier than their non-obese counter- parts.

CONCLUSION:

"More the BMI, more the coronary artery disease or severity of stenosis" is false. This fact favours the principle of obesity paradox. Thus obesity can be considered as an independent risk factor for coronary artery disease due to its consequences like hypertension, diabetes and dyslipidemia but not solely on the basis of BMI.

REFERENCE

1) WHO EC. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies The Lancet. January 10, 2004;363:157-63 | 2) WHO C. Obesity: preventing and managing the global epidemic: Chapter 4 2000. | 3) AshutoshNiraj MD, M.S., JyotiranjanPradahan, M.D., HeshamFakhry, M.D., VikasVeeranna, M.D., LuisAfonso, M.D. Severity of Coronary Artery Disease in Obese Patients Undergoing Coronary Angiography: "Obesity Paradox" Revisited. Clinical Cardiology. 2007;30:391 | 4)S.P. Singh PS. Round the table -Coronary Heart Disease: The Changing Scenario. Indian Journal of preventive and social medicine. 2003; Vol34 (no 1 & 2). | 5) A. Angel BSM, M SC, MD, FRCP; D.A.K. Roncari, MD, PH D, FACP, FRCP. Medical complications of Obesity. CMA Journal. December 23, 1978; Vol119 | 6) HB Hubert MF, PM McNamara, WP Castelli. Obesity as an independent risk factor for cardiovascular disease: a 26- year follow-up of participants in the Framingham Heart Study. Circulation. 1983;Vol 67:968-77. | 7) Maxine A. Papadakis MSJM, MD. Current Medical Diagnosis and Treatment Maxine A. Papadakis MSJM, MD, editor.; 2009. |