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Atherosclerosis of Coronary And Renal Artery Disease In Diabetes Mellitus

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Abstract

Atherosclerosis is a systemic disease. Although asymmetries in arterial involvement in atherosclerosis may occur, disease usually proceeds in parallel in various organ systems. From a clinical perspective , knowing the prevalence of renal artery involvement in patients with the evidence of atherosclerosis in other organs is important because this knowledge may be incorporated into diagnostic algorithms**.** This study was aimed to determine the presence of atherosclerotic renal artery disease in diabetes mellitus with coronary artery disease. A total of 173 coronary artery disease patients were purposively selected for the study .Fasting blood sugar level was estimated. Coronary angiograms were performed by standard percutaneous femoral artery cannulation (Judkins Technique).Selective right and left judkins catheter and hand dye injection were used for opacification of renal arteries. Of the 173 study subjects, 143 (diabetic 73) were male and 22 (diabetic 15) were female. Among the diabetic 15 patients had renal artery stenosis and only 7 patients had renal artery stenosis in the non diabetic group. Strength of link between significant renal artery stenosis were strongly correlated (r=0.233, and p, 0.001). Knowledge on the clinical evolution and on the cardiovascular squeal of atherosclerotic renal disease has made substantial progress in recent years**.** Atherosclerotic renal artery disease is present in significant proportion of diabetic patients undergoing cardiac catheterization for suspected coronary artery disease in comparisons to their non diabetic counter parts.

Keywords : Atherosclerosis, Diabetes mellitis, renal artery stenosis

Introduction

Diabetes is one of the most common metabolic disorders, and with our ageing , sedentary lifestyle ,increasingly obese population , the number of affected individuals will continue to rise. This will have major implications for cardiological practice since much of the excess morbidity and mortality among diabetic patients is attributable to acclerated atherogenesis[1].Atherosclerosis is a chronic inflammatory, fibroproliferative disease fueled by lipids. It affects primarily the intima of medium sized and large arteries, resulting in intimal thickening and may lead to luminal narrowing and inadequate blood supply [2].

Three large epidemiological studies have shaped current understanding of the natural history of diabetic heart disease. The Framingham study showed that diabetes increase the relative risk of coronary heart disease by 66% in men and 20% in women followed up to 20 years, after controlling for the effects of age, smoking, blood pressure, and cholesterol [3]. Diabetes significantly increases a person's risk of cardiovascular events. In diabetic patients compared with people without diabetes, coronary artery disease (CAD) often silent, more advanced at diagnosis, an associated with an unfavorable prognosis[4]. Atherosclerosis accounts for 90% of renal artery stenosis (RAS), where as fibromuscular dysplasia result in RAS in only 10% of cases. The incidence of atherosclerotic RAS increases with age and is more common in patients who have occlusive disease in other vascular territories. Of 196 unselected patients who presented with diabetes and hypertension and who underwent coronary angiography, renal angiography revealed 18% patients had RAS.50% [5].

Atherosclerotic renal artery disease(ARAS) and atherosclerotic vascular disease elsewhere including coronary artery disease (CAD) commonly co exists The prevalence of RADF in patients with CAD is about 11-12% [6,7].

Methods

This prospective observational study was carried out in the department of Cardiology, Bangabandhu Sheikh Mujib Medical University from January 2005 to January 2997. A total of 173 patients were selected and assigned into one of the two groups- control group included non diabetic patients with ischemic heart disease(IHD) who underwent coronary angiography(CAG) and renal angiography (RAG) having coronary artery disease (CAD), and study group included diabetic patients with IHD who underwent CAG and RAG having CAD.

The patients undergoing CAG without CAD and those unwilling to undergo the procedure were excluded from the study. Detailed clinical history, examination and informed

consents were taken. ECG, Chest X ray fasting blood sugar, urea, creatinine were evaluated. CAG and Rag were performed by the interventional cardiologist by standard Judkins technique.

By CAG, the extent of disease was classified as single vessel, double vessel, triple vessel, left main. Significant lesion was considered >50% for the left main coronary artery stenosis and >70% reduction of diameter for rest of the coronary arteries [8].

Renal arteriography was reviewed by a single observer blinded to the clinical information. The severity of renal artery stenosis was classified into three grades- 3050% narrowing(mild), 50-70%(significant lesion) and >70%(highly significant) [9].

Statistical Analysis

Data were expressed in frequency, percentage, mean and standard deviations as applicable. Analysis were done by Student's "t" test, chi square test, Z test and Spearman's rank co relation coefficient as applicable .All data were analyzed by using SPSS(version 12.0) . p value < 0.05 were considered as statistically significant..

Results

The mean of study population were 55.8±8.6 years and 53.1±10.9 years in diabetic and non diabetic group respectively. Sex distribution, hypertension, hyperlipidemia, smoking habit and family history of ischemic heart disease significantly did not differ in the study sub groups.

Table I.Risk factors of the patients

	DM (n=99) No.(%)	NDM (n=74) No.(%)	p value
Hypertension	45(45.5)	39(52.7)	0.345
Hyperlipidemia	48(48.5)	27(36.5)	0.155
Smoking	42(42.4)	36(48.6)	0.415
Family history of IHD	23(23.2)	25(33.8)	0.125

Table II Distribution of subjects by coronary artery disease in DM and NDM patients:

Significant CAD	DM (n=99) No.(%)	NDM (n=74) No.(%)	p value
Single vessel disease	27(27.3)	40(54.1)	0.001
Double vessel disease	43(43.4)	24(32.4)	0.141
Tipple vessel disease	28(28.3)	9(12.2)	0.011
Left main disease	4(4.0)	4(5.4)	0.471

DM: diabetes mellitus group
NDM Non Diabetes mellitus group

Table III Relationship between the number of coronary arteries with significant stenosis and the severity of RAS

	Number of coronary artery branches 1 No(%)	2 No(%)	3 No(%)	Total
No RAS	63(41.7)	57(37.7)	29(19.2)	151(87.3)
40-<50%	2(50)	1(25)	1(25)	4(2.3)
≥50-<70%	1(16.7)	4(66.7)	2(33.3)	6(3.5)
≥70%	1(8.3)	5(41.7)	5(41.7)	12(6.9)

Spearman's rank correlation coefficient is 0.119,p<0.001

The strength of the link between the number of coronary branch with stenosis and RAS grade were statistically significant .The severity of RAS was related to the number of coronary branches with significant stenosis.

Discussions

Harding et al and Vetrov et al. observed the prevalence of RS in patients undergoing routine cardiac catheterization in the range of 11-23%. In large cohort of patients' age, severity of coronary artery disease (CAD), Congestive heart failure, female gender and peripheral vascular disease (PVD) were risk factors associated with RAS. The presence or absence of significant RAS may serve as a prognostic marker. Recently, in a cohort of 3987 patients undergoing abdominal aortography immediately following coronary angiography, the presence of significant RAS (in this study defined as >75% narrowing in the luminal diameter) was a strong independent predictor of mortality[9,10,11]. An angiographically significant RAS was defined by a narrowing of the lumen >50% , a high grade RAS was defined as narrowing >70% [10].

In this study, of the 173 study subjects, age ranged from 36 to 75 years in diabetic group and 30-92 years in non diabetic group. Risk factors including hypertension, hyperlipidemia, smoking , family history of IHD were almost identical between the sub groups. We found that the number of coronary branches with stenosis significantly (p<0.001) related with RAS grade. On the other hand severity of ARAS was significantly (p<0.05) related to the severity of coronary artery stenosis in DM and NDM patients in this study. Regarding the number of coronary arteries with significant stenosis and the atherosclerotic renal artery disease ARAS grade, Zhang et al. have shown the severity of ARAS was related to the number of coronary branches with significant stenosis[13]. So our finding has consistency with the previous findings.

Conclusion

Severity of RAS significantly correlates with the severity of atherosclerotic coronary artery disease.In an era od expand-

ing diagnostic technology, renewed scientific interest in clinical findings may produce a refreshing reanalysis of the diagnostic and prognostic pathways of complex disease.

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