FREQUENCY AND ANGIOGRAPHIC CHARACTERISTICS OF CORONARY ARTERY ECTASIA INPATIENTS UNDERGOING CORONARY ANGIOGRAMS AT AFIC & NIHD

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ABSTRACT

Objective: To determine the frequency and angiographic characteristics of coronary artery ectasia in the patient population of AFIC and NIHD.

Study Design: Descriptive Study

Place and Duration of Study: Armed Forces Institute of Cardiology and National Institute of Heart Diseases, Rawalpindi from Jan 2007 to Dec 2011.

Patients and Methods: All coronary angiograms done during the period were included in the study. The reports of coronary angiograms of those patients who were diagnosed to have coronary artery ectasia were left circumflex artery reviewed to assess the distribution of ectasia in different coronary arteries. Concomitant significant coronary artery stenosis left ventricular (LV) systolic function and history of revascularization were also documented.

Results: Over the study period, a total of 41,459 patients underwent coronary angiograms. 548 (1.32%) patients were diagnosed to have coronary artery ectasia. Out of these 467 (85.21%) patients were males and 81 (14.78%) were females. Their mean age was 53.7 years. Left anterior descending (LAD) was the coronary artery, most commonly affected by ectasia followed by left circumflex artery (LCx) and Right coronary artery (RCA). Twenty three patients also had ectasia of left main stem. Four Hundred and three (73.54%) patients also had concomitant occlusive coronary artery disease and 19.52% patients had history of coronary revascularization either by percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG).

Conclusion: Coronary artery ectasia is not a benign disorder as it could present as acute coronary syndrome having its own morbidity and mortality.

Keywords: Coronary artery ectasia, Coronary angiograms.

INTRODUCTION

A vessel is considered to be ectatic, when its luminal diameter exceeds 1.5 times the adjacent normal segment. Discrete ectasia is defined when the ectatic segment is less than 1 cm in length and diffuse ectasia when it is more than or equal to 1 cm in length[1]. Coronary artery ectasia is considered as a variant of coronary atherosclerosis, also known as dilated coronopathy has an estimated incidence of 0.3 % - 4.9%[2,3]. Markis et al suggested that the presence of ectasia alone is as important as the presence of coronary artery stenosis and they found a mortality of 15% after seven years of diagnosis, which was approximately equivalent to the mortality rate of triple vessel coronary artery disease in patients who were treated medically at that time[4]. Coronary artery ectasia has been observed in association with connective tissue disorders like scleroderma[5], Ehlers-Danlos syndrome[6], polyarteritis nodosa[7], and Kawasaki disease[8].

A common factor to all these conditions is the weakening of the media with a diminution of its elastic elements in areas of marked atherosclerosis, which permits the dilatation of the vessel wall at the area of defective structure. Coronary artery ectasia may also occur during balloon angioplasty, following stent placement, brachytherapy and atherectomy. It has also been documented in about 3% of cases after drug eluting stent implantation[11].

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Current literature suggests that arteries with isolated ectasia are subject to slow flow with thrombus formation, vasospasm and may present as acute coronary syndrome.Treatment protocol is not available and the existing recommendations including the use of anticoagulants, antiplatelets and coronary vasodilatation are based on anecdotal reports[12].

PATIENTS AND METHODS

This descriptive study was conducted at Armed Forces Institute of Cardiology and National Institute of Heart Diseases (AFIC/NIHD) from Jan 2007 to Dec 2011. All coronary angiograms done during the study period were included in the study.Coronary artery ectasia was diagnosed when a segment of artery was more than 1.5 times the diameter of adjacent normal segments of artery.

The reports of coronary angiograms of those patients who were diagnosed as having coronary artey ectasia were further reviewed to assess the distribution of ectasia and its association to significant stenosis. Significant stenosis was defined as > 70% of obstruction of any of the three main coronary arteries. Left ventricular systolic function, previous history of coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI) was also documented.

Data was been analyzed using SPSS version 15. Mean and standard deviation were calculated for quantitative variables while frequency and percentages were calculated for qualitative variables.

RESULTS

During the study period,a total of 41459 patients underwent coronary angiograms for different clinical indications. Of these, 548 (1.32%) patients were diagnosed to have coronary artery ectasia. Out of these 467 (85.22%) patients were males and 81 (14.78%) were females. Their mean age was 53.7 years. One hundred and thirty eight (25.2%), 99 (18.1%) and 133 (24.3%) patients had coronary artery ectasia in left anterior descending (LAD), left circumflex (LCx) and right coronary artery (RCA) respectively. Ninety three (16.97%) patients had coronary artery ectasia in two coronary arteries and in 79 (14.42%) patients, all three coronary arteries were ectatic. Twenty three (4.20%) patients were found to have ectasia in left main stem and 6 (1.09%) patients had ectasia in left main stem (LMS) only without involving any other vessel (Table-1). Four hundred and three (73.54%) patients also had concomitant occlusive coronary artery disease (>70%) and 145 (26.46%) patients were having only ectatic vessels without having occlusive coronary artery disease. One hundred and seven (19.52%) patients also had history of PCI or CABG surgery. Left ventricular systolic function was also studied in these patients, 272 studied had good LV systolic function, 104 (18.98%) had fair function, 85 (15.51%) had moderate and 32 (5.84%) patients had poor LV systolic function while LV function was not studied in 55 (10.04%) patients.

DISCUSSION

The first case report by Bourgan 1912, who described the postmortem finding of a right coronary artery dilatation in a patient who died suddenly. Markis et al[4], provided the first prospective evaluation of the incidence of coronary artery ectasia. They found 30 patients having coronary artery ectasia in a study consisting of 2500 consecutive angiograms. Their work provided insight into the incidence, associated factors and clinical outcome over a short term follow up of 24 months. They found that patients with coronary artery ectasia but without occlusive coronary artery disease had a greater prevalence of hypertension, abnormal ECGs and previous myocardial infarction as compared to control group. They also found that mortality in these patients was equivalent to patients with Tripple Vessel Coronary Artery Disease treated medically at that time. They also demonstrated that patients who died and had coronary artery ectasia, histological changes of ecstatic vessels in these patients were identical to those found in atherosclerotic lesions (diffuse hyalinization and intimal medial damage). If the media was intact and uninvolved then there was

no consistent evidence of coronary artery ectasia. Swaye et al[3] regarded ectasia as modified form of coronary atherosclerosis and they suggested that coronary artery ectasia was closely related with myocardial ischemia. Some investigators[13,14] have documented the association of coronary artery ectasia with the presence of aneurysm in other vascular beds e.g ascending and abdominal aorta, popliteal arteries and pulmonary artery but other investigators[3] do not agree with this association.

Global enlargement of the coronary vascular tree occurs during pressure and volume over load associated with ventricular hypertrophic states such as athletic conditioning, hypertensive heart disease and dilated cardiomyopathy. On the other hand maladaptive coronary arterial remodeling occurs in patients with severe deconditioning, diabetes mellitus, after coronary artery bypass grafting and in some instances post intervention[15].

Perlman documented a large thrombosis in left anterior descending artery in a patient with triple vessel coronary artery ectasia but without significant stenosis. This patient was treated with warfarin and a repeat coronary angiogram three months later showed complete resolution of the thrombosis. The patient remained asymptomatic 40 months later and continued anticoagulant therapy. However, according to caro et al[16] the expected benefit of anticoagulation must be six times higher than the danger of hemorrhage. Kruger et al[17] demonstrated that development of myocardial ischemia depends on heart rate, therefore, a reasonable therapeutic approach is the administration of beta-blockers due to their negative chronotropic effect and reduction of myocardial oxygen consumption in the absence of vasodilatation. They also showed in their study that nitroglycerin is of no therapeutic benefit but leads to an aggravation of exercise induced myocardial ischemia by lowering the ischemic threshold. Life threatening complications e.g. heart chamber compression or fistula formation requires prompt surgical intervention. While some authors argue that coronary artery ectasia of at least 3-4 times the size of the original vessel diameter is an absolute indication for surgical intervention because of the propensity of complication such as compression, rupture or thrombosis[18] however according to Rath et al[19], in asymptomatic patients, the risk of surgical intervention should be balanced by any potential risks if the aneurysm is left alone.

Table-1: Coronary artery ectasia involving different coronary arteries of patients.

Coronary artery	Frequency (%)
Left mainstem (LMS)	06 (1.09%)
Left anterior descending (LAD)	138 (25.2%)
Left circumflex (LCX)	99 (18.1%)
Right coronary artery (RCA)	133 (24.3%)
LAD / LCX	32 (5.83%)
LAD / RCA	34 (6.20%)
LCX / RCA	27 (4.92%)
All three ecstatic vessels	79 (14.42%)

Since it was a retrospective study of coronary angiograms done at single centre having its own limitations. There is a need to do a large multicentre study to find true incidence/prevalence of coronary artery ectasia along with its association with different risk factors and its impact on morbidity and mortality in our population.

CONCLUSION

Coronary artery ectasia is relatively a rare disorder but these patients should not be considered as not having acute coronary syndrome simply because they don't have visualized, atherosclerotic narrowing of their coronary arteries. There is sufficient evidence to support that patients with dilated vessels may be predisposed to spontaneous dissection, thrombus formation, clinically significant arterial spasm leading to acute coronary syndrome and possibly sudden cardiac death. Hence, the suggestion of the "Slow-flow" phenomenon and in-situ thrombus formation even in the absence of obstructive coronary artery disease probably holds true and needs active treatment strategy.

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