Clinical Investigation

Coronary Artery Ectasia

in Egyptian Patients with Coronary Artery Disease

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We conducted a retrospective study of 45 Egyptian patients with coronary artery ectasia who underwent coronary bypass grafting at our institution between 1980 and 1995. We examined the anatomic distribution and type of coronary ectasia and its association with coronary risk factors in these patients, and evaluated the severity of their coronary artery disease. We compared these findings with those from a group of 230 Egyptian patients who did not have coronary ectasia. These patients also underwent coronary artery bypass grafting between 1980 and 1995 at our institution.

Obesity was present in 60% of the patients who had coronary artery ectasia, compared with 42% of patients who did not have ectasia (P <0.01). Coronary artery ectasia was not related to any coronary risk factors other than obesity. However, patients who had ectasia did have a higher rate of triple-vessel coronary artery disease than did patients without ectasia (82% vs 67%, P <0.05). Of the coronary vessels affected by ectasia, 43% were left anterior descending arteries. Diffuse disease was noted in 84% of all ectatic segments. We conclude that in this patient population, 2 conditions had a positive correlation with coronary ectasia: obesity and the severity of coronary artery disease. ***(Tex Heart Inst J 1997;24:349-52)***

Coronary artery ectasia, or aneurysm of the coronary artery, has been described as an isolated congenital lesion,[1] but also as a condition associated with coronary atherosclerosis,[2,3] congenital heart disease,[4] Ehlers-Danlos syndrome,[5] scleroderma,[6] polyarteritis nodosa,[7] Kawasaki syndrome,[8] syphilis,[9] and bacterial infections.[10] Coronary ectasia is an uncommon angiographic finding; the prevalence ranges from 0.3%[11] to 5%.[12] In contrast, a 16.4% prevalence of coronary ectasia was observed among the 275 Egyptian patients with coronary artery disease who underwent coronary artery bypass grafting at our institution between 1980 and 1995.[13]

Herein, we examine the association of coronary ectasia with coronary risk factors and the coronary angiographic findings in this subgroup of 45 patients. We discuss the anatomic distribution and degree of severity of coronary ectasia in the coronary arteries of these patients. We also compare these patients with another subgroup of our Egyptian patients (230) who did not have coronary ectasia.

Key words: *Angiography; atherosclerosis/complications; coronary aneurysm; coronary disease, etiology; coronary vessels; developing countries; dilatation, pathologic; Egypt; heart catheterization; risk factors*

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Patients and Methods

The demographic, clinical, angiographic, and surgical data from 290 Egyptian patients treated at our institution for coronary artery disease have been reported previously.[13] From that study, we chose a subgroup of 275 patients, whom we classified according to the presence of coronary ectasia (45 patients) or its absence (230 patients). In the coronary ectasia group, 43 were men and 2 were women. Their ages ranged from 37 to 72 years; 33 were younger than 60 years of age and 12 were older. Of the patients without coronary ectasia, 216 were men and 14 were women. Their ages ranged from 30 to 78 years; 166 were younger than 60 years of age and 64 were older. Coronary risk factors and angiographic data were compared between the groups.

We also determined the anatomic distribution and extent of ectasia in the coronary arterial tree. An ectatic segment was defined as one with a luminal diameter at least 50% greater than that of the adjacent segment.[14] Ectatic segments were classified as *localized* when they involved a discrete portion of the artery with an adjacent normal vessel within that segment and *diffuse* when the entire segment was ectatic with no normal vessel within that segment.[14]

Results

Obesity was the only coronary risk factor that showed a statistically significant correlation with coronary artery ectasia; 60% of patients who had ectasia were obese, compared with 42% of patients who did not have ectasia (P <0.01). There was no apparent correlation between ectasia and smoking, hypertension, hyperlipidemia, diabetes mellitus, or family history of coronary artery disease (Table I).

Patients who had ectasia also had a higher incidence of multiple-vessel coronary artery disease (82% vs 67%) and left main coronary artery stenosis (11% vs 5%) than did patients without ectasia; however, in neither case was the result statistically significant (Table II). Table III presents the anatomic distribution and type of ectasia noted in the coronary arteries (see also Figs. 1 and 2).

TABLE I. Coronary Risk Factors in Patients with Ectasia (n=45) and Patients without Ectasia (n =230)

Coronary Risk Factor	No. of Patients with Ectasia (%)	No. of Patients without Ectasia (%)
Smoking	30 (67)	150 (65)
Hypertension	25 (56)	105 (46)
Obesity	27 (60)	97 (42)*
Diabetes mellitus	15 (33)	72 (31)
Hyperlipidemia	30 (67)	156 (68)
Family history of CAD	29 (64)	120 (52)

CAD = coronary artery disease

*P value <0.01

TABLE II. Results of Coronary Angiography in 45 Patients with Coronary Ectasia and 230 Patients without Ectasia

Variable	No. of Patients with Ectasia (%)	No. of Patients without Ectasia (%)
Left main coronary artery stenosis >50%	5 (11)	11 (5)
No. of stenosed vessels		
1	1 (2)	17 (7)
2	7 (16)	58 (25)
3 or more	37 (82)	155 (67)*

*P value <0.05

TABLE III. Anatomic Distribution and Type of Ectasia in 74 Coronary Arteries

Affected Vessel	No. of Segments	
	Diffuse (%)	Localized (%)
Left anterior descending coronary artery (n=32; 43%)	27 (84)	5 (16)
Circumflex coronary artery (n=19; 26%)	18 (95)	1 (5)
Right coronary artery (n=23; 31%)	17 (74)	6 (26)
Total (n=74; 100%)	62 (84)	12 (16)

Discussion

Coronary ectasia has been described as an uncommon manifestation of atherosclerosis.[15] Our recent study[13] revealed a high prevalence (16.4%) of coronary ectasia among Egyptian patients with coronary artery disease, compared with reports of 0.3% to 5% in other patient populations.[11,12] Hypertension[15] and hyperlipidemia[16] have been associated with coronary ectasia in other studies. However, in our patients, ectasia was unrelated to smoking, hypertension, hyperlipidemia, diabetes mellitus, or family history of coronary artery disease. The only significant difference was a higher percentage of obesity in the group of patients who had ectasia (60% vs 42%, P <0.01).

The distribution of ectatic coronary arteries varies among different studies. One study has shown a higher rate of ectasia in the right coronary artery;[17] others have shown a higher rate in the left coronary artery.[2,18] In these studies,[2,17,18] the origin of ectasia was congenital, mycotic-embolic, or atherosclerotic.

In our study, ectasia was more often located in the left anterior descending coronary artery (43%) than in the right coronary (31%) or circumflex (26%) arteries. In contrast to the other studies,[2,17,18] all our patients had coronary artery ectasia concomitant with coronary atherosclerosis, and the ectasia appeared to be acquired. Our observation that ectasia was more common in patients with triple-vessel disease suggests that stenosis and ectasia share some pathophysiologic mechanisms. In fact, thinning of the vascular media has been associated with advanced atherosclerosis. Glagov and co-authors[19] described compensatory dilatation in the coronary arteries at sites where plaques had begun to diminish the cross-sectional area of the lumen. The dilatation associated with atherosclerosis, however, was focal (post-stenotic) in its distribution. In our patients, the dilatation was diffuse in most (84%) of the ectatic vessels.

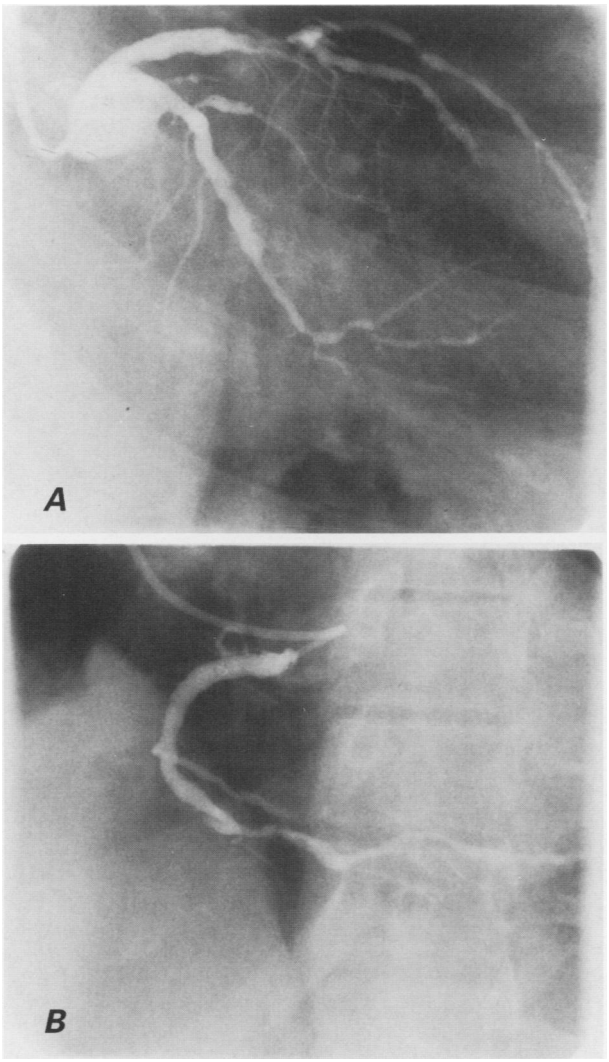

Fig. 1 *Coronary arteriograms showing segmental ectasia of* ***A****) the circumflex and proximal left anterior descending coronary arteries and* ***B****) the right coronary artery in the same patient.*

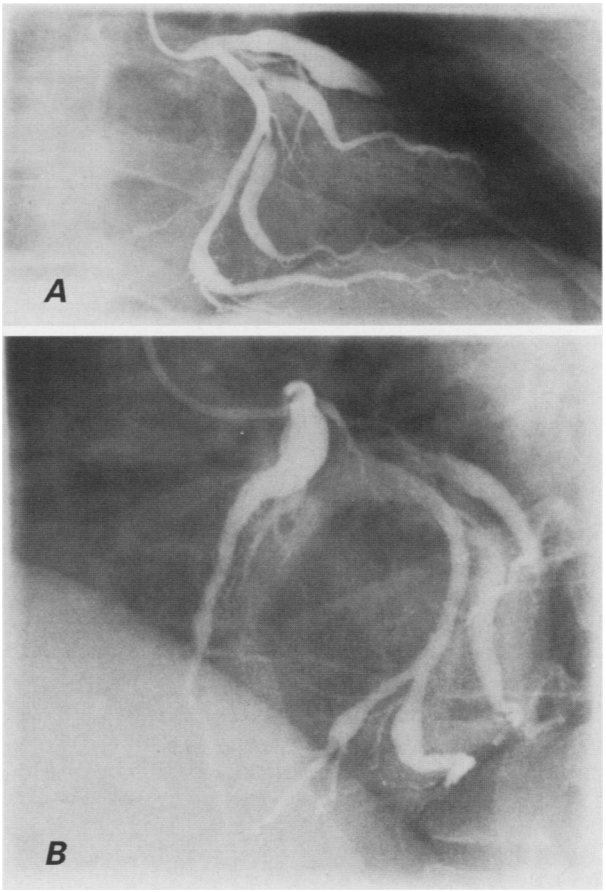

Fig. 2 ***A*** *and* ***B****) Coronary arteriograms from 1 patient showing diffuse ectasia of the left coronary artery and its branches (circumflex, left anterior descending, diagonal, and obtuse marginal arteries).*

Kawasaki disease was 1st described in Japan, where thousands of cases have since been reported. This multisystem disease is being recognized with increasing frequency in other developed countries.[20,21] Kryzer and colleagues[22] reported that 15% to 26% of affected children may develop coronary artery ectasia or aneurysm. Vizcaino-Alarcon and coworkers[23] reported the association of coronary aneurysm or ectasia in 5 of their 16 patients. Cullen's group[24] also reported the presence of coronary ectasia in 2 of 13 patients. In a larger study by Calvo-Rey and associates,[25] 9 of 38 patients with Kawasaki disease had concomitant coronary ectasia.

Aging itself may produce diffuse dilatation of the coronary arteries and the aorta.[26] In our patients, however, there was no significant difference in age distribution between groups with and without ectasia. Furthermore, most of the patients (73%) with ectasia were younger than 60 years of age. In addition to the possibility that interaction of connective tissue elements with lipoprotein particles may weaken the structure of the arterial wall, active lysis of elastin or collagen may also be involved in the process of ectasia.[27,28] Obesity is associated with an abnormal lipoprotein metabolism.[29] Moreover, there is a positive and significant correlation between serum elastase activity and body mass index.[30] Some studies[31,32] have emphasized the inflammatory nature of the atheroma and postulated a direct link between foam cells and weakening of the connective tissue in the arterial wall. These cells elaborate collagenase and elastase activities in response to the inflammatory response and may contribute to vascular ectasia in the presence of atherosclerosis.

Befeler and coauthors[17] reported 16 cases of coronary ectasia, 10 of which underwent surgical management with no operative mortality. Similarly, none of our patients with coronary ectasia died in the hospital after coronary artery bypass grafting. However, the long-term prognosis of coronary ectasia among these patients is unknown. One study[14] reported a

15% mortality rate after a 2-year follow-up in patients with ectasia. Another[12] found no difference in 5-year survival rates between patients with aneurysmal and nonaneurysmal coronary disease. In our study, ectasia was associated with obesity and with severe atherosclerosis, and the presence of either of these factors alone would be predictive of a higher rate of mortality. Such varying results among these clinical studies emphasize the need for further follow-up of these patients to reveal the long-term clinical significance of coronary artery ectasia.

The high percentage of ectasia among Egyptian patients with coronary artery disease may be the result of an exaggerated remodeling process of the coronary arteries in response to atherosclerosis. Our observations indicate that obesity may play an important role in the genesis of coronary artery ectasia.

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