SHORT COMMUNICATION

Accelerated Atherosclerosis: A Clinical Report

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ABSTRACT

Aim: The present study was conducted to determine the major risk factors for accelerated atherosclerosis.

Materials and methods: Patients between 50 and 70 years who had documented evidence of atherosclerotic vascular disease at three or more than three arterial sites in a short span of time were included in this study.

Results: Majority (83%) had diabetes for over 15 years mostly with poor control and most common dyslipidemia was low high-density lipoprotein (HDL). Evidence of coronary artery disease (CAD) was noted in all cases. Next common site for atherosclerosis was observed in carotid and lower limb arteries. Three amputation were done which showed evidence of inflammatory arthritis.

Conclusion: Accelerated atherosclerosis is an important complication of long-standing uncontrolled diabetes. Dyslipidemia characterized by low HDL and other inflammatory arthritic conditions also contribute to accelerated atherosclerosis.

Clinical significance: Intermittent claudication or pain in leg in long-standing diabetic cases particularly associated with CAD should arouse suspicion of peripheral arterial diseases. Early detection and management of peripheral arterial disease can save the involved limb from amputation.

Keywords: Accelerated atherosclerosis, Amputation, Cerebrovascular disease, Coronary artery disease, Diabetes mellitus, Intermittent claudication, Peripheral artery disease.

INTRODUCTION

Coronary artery disease has assumed epidemic proportion in India and has become more aggressive and premature in its occurrence.[1] Its clinical presentation is rapidly changing and we see more often cases with accelerated atherosclerosis involving coronaries, cerebrovascular and peripheral arteries in a short span of time.[2] Recently, we came across number of such cases at a relatively early age where three or more than three vascular beds were involved. The term "accelerated atherosclerosis" has been used in experimental reports[3,4] and sometimes in clinical situations.[5,6] As this has far-reaching clinical and prognostic implication, we decided to share this short clinical experience for wider dissemination.

MATERIALS AND METHODS

This is a prospective observational study of cases who presented with accelerated atherosclerosis with clinical evidence of atherosclerotic vascular lesions at three or more than three sites. The study comprises of six cases between age group 55 and 70 years. Subjects more than 70 years of age have not been included in this study. Data regarding age, sex, family history, known disease of subjects, tobacco details, body mass index, blood pressure, glycosylated hemoglobin (HbA1c), lipid profile, chest X-ray, carotid Doppler, peripheral Doppler, and computed tomography (CT) brain of each subject were recorded. Obesity was defined as per criteria described in Nature review.[7] Hypertension as per Eighth Joint National Committee criteria,[8] control of diabetes (HbA1c 8%) as per American Diabetes Association,[9] and carotid and peripheral Doppler were performed using a 7 MHz transducer as per American Society of Echocardiography guidelines,[10] and CT brain based on American College of Radiography guidelines.[11]

Statistical methods: Collected data were presented as mean, median, and standard derivation using MS Office Excel.

RESULTS

Mean age of study cases is 65.5 ± 5.25 years. Half of our cases were used to oral tobacco (Table 1). Lone female case though 68 years old had diabetes for as long as almost 28 years.

Table 1: Demographic profile in accelerated atherosclerosis

Total number of subjects	6
Male:female	5:1
Mean age (years)	65.5 ± 5.25
Current smoker	Nil
Oral tobacco	2 (M-2) (33.3)
Both (smoking + SLT)	1 (M-1) (16.6)

M: Male; SLT: Smokeless tobacco; All values are mean ± standard deviation or actual value with percentage in parenthesis

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Table 2: Clinicobiochemical profile in accelerated atherosclerosis

Mean BMI (kg/m^2)	24.78 ± 3.59
Obesity	4 (66.6)
HTN	5 (83.3)
HTN duration (years)	11.2 ± 7.9
T2DM	5 (83.3)
T2DM duration (years)	18.8 ± 5.77
HTN + T2DM	4 (66.6)
Uncontrolled diabetes	4 (80)
Mean HDL (mg/dL)	34.7 ± 4.11

BMI: Body mass index; HTN: Hypertension; All values are mean ± standard deviation or actual value with percentage in parenthesis

Table 3: Imaging profile in accelerated atherosclerosis

Aortic calcification (CXR)	1 (16.6)
Plaque in carotid (Doppler)	
Unilateral	Nil
Bilateral	4 (66.6)
Plaque in peripheries (Doppler)	
Upper limb	Nil
Lower limb	3 (50)
Both upper and lower limb	1 (16.6)
Number of amputations	3 (50)
CAD (CAG)	6 (100)
Evidence of cerebrovascular disease (CT)	2 (33.3)
CKD (US abdomen)	3 (50)
Rheumatoid arthritis	1 (16.6)
Psoriasis	1 (16.6)
Ankylosing spondylitis	1 (16.6)

CKD: Chronic kidney disease; CXR: Chest x-ray; CAG: Coronary angiography; US: Ultrasound; All values are mean ± standard deviation or actual value with percentage in parenthesis

Five patients (83.3%) had hypertension and 4 patients (66.6%) had both diabetes and hypertension. Four patients (66.6%) had obesity. Almost all diabetic cases had been suffering with diabetes for over 15 years; 80% of diabetics had poor control of diabetes (HbA1c > 8%). The mean HDL was 34.7 ± 4.11 mg/dL (Table 2).

Documented coronary atherosclerosis was seen in all six cases; next common site for atherosclerosis was observed in carotid and peripheral arteries in lower limbs (Fig. 1). Evidence of aortic atherosclerosis in the form of aortic calcification was observed in one case (Table 3). Two cases presented with symptoms of vascular ischemia. Of these, one underwent lower limb amputation, whereas another needed amputation of left index finger and later left 5th toe amputation. Three cases had chronic kidney disease and three showed evidence of inflammatory arthritis.

DISCUSSION

Our study addresses the clinical concept of "accelerated atherosclerosis," a term used currently not unoften. It is worthwhile to note that cases of accelerated atherosclerosis involving coronary arteries, cerebrovascular tree, and
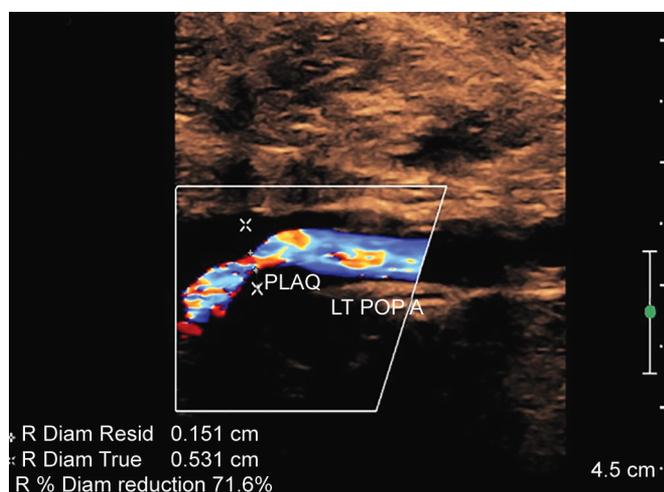

Fig. 1: Doppler study of a 68-year-old male postcoronary artery bypass grafting, known hypertension, and known diabetes of 17 years' duration. Left popliteal artery showing plaque with 71.6% luminal reduction

peripheral arteries are more commonly seen these days. As evident in our small study, type II diabetes mellitus appears to be the key factor behind accelerated atherosclerosis. It is well known that atherosclerotic involvement of coronary, cerebrovascular, and large diameter peripheral arteries, such as carotids and/or arteries of extremities is due to macrovascular complication of diabetes.[12,13] It would be prudent to mention here that clinicians more often than not are preoccupied with microvascular complications of diabetes at the expense of macrovascular involvement of peripheral vessels.

Moreover, the causes of accelerated atherosclerosis need to be worked out in each case. In our study, uncontrolled long-standing type II diabetes mellitus (T2DM) has been associated with accelerated atherosclerosis. The second important cause was dyslipidemia characterized by low HDL.[14] Diabetes along with hypertension increases the speed and extent of inflammation. Despite this, there are other clinical conditions associated with high inflammatory state like rheumatoid arthritis,[6] systemic lupus erythematosus[15], ankylosing spondylitis,[16] psoriasis,[17] human immunodeficiency virus,[18] and Tangier's disease.[19] Rapid involvement of limb vessels leads to dreaded complication of peripheral gangrene, which may result in amputation as happened in three of our subjects. Surprisingly, only 2 (33.3%) of our patients were tobacco users. One was smoker and the second was smoker as well as oral tobacco user. This low incidence could be due to small sample size in this study.

CONCLUSION

Diabetics are particularly prone to accelerated atherosclerosis. Besides coronary arteries, other arteries, especially

those of limbs, may get involved at an early stage and progress rapidly. Therefore, clinicians must look for signs of limb ischemia in these patients as a routine. Early detection and treatment of limb ischemia may help in reducing incidence of amputations.

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