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## Original Article

# Copresence of abdominal aortic aneurysm in symptomatic coronary artery disease patients

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## ABSTRACT

**Background/aims:** Prevalence of abdominal aortic aneurysm (AAA) has ethnic difference, and is more in coronary artery disease (CAD) patients. No Indian data are available on this. We aim to know the prevalence of AAA in symptomatic CAD patients in  $\geq 40$  years age group and compare it with the general population in North Western India.

**Methods:** 200 angiographically proven symptomatic CAD patients (88.5% men, mean age  $57.54 \pm 9.96$  years) and 200 age- and sex-matched healthy people (81.9% males, mean age  $57.16 \pm 10.05$  years),  $\geq 40$  years age, were screened for AAA by 2D echo study. CT aortography was done for confirmation in positive cases.

**Results:** AAA was present in 3.5% of CAD patients and 1% of age- and sex-matched healthy people  $\geq 40$  years. AAA was present in 7.4% of triple vessel disease (TVD) patients, 2.6% of double vessel disease (DVD) patients, and 1.4% of single vessel disease (SVD) patients. CAD patients presented with AAA at mean age of  $67.8 \pm 4.70$  years. The youngest patient with AAA in CAD group was of 58 years.

**Conclusions:** In North Western India, the prevalence of AAA is lesser, both in CAD group and in controls, as compared to western countries. Prevalence of AAA increases with increasing severity of CAD; hence AAA should be screened, particularly in TVD patients. CAD patients may be considered for earlier screening for AAA than the general population.

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## 1. Introduction

Abdominal aortic aneurysm (AAA) has propensity to expand and rupture.<sup>1</sup> They develop insidiously over several years, rarely causing symptoms, and are often detected by screening

or as incidental finding on imaging studies. The normal diameter of the abdominal aorta is approximately 2.0 cm (range 1.4–3.0 cm) in most individuals; a diameter greater than 3.0 cm is considered aneurysmal. The overall incidence of AAA is estimated to be 15–37 cases per 100,000 patient-years.<sup>2</sup> However, the prevalence increases dramatically with age.

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Screening studies show that AAA occurs in to 2–5% of men between the ages of 65 and 79.<sup>3-5</sup> It was reported by Madaric et al. that the prevalence of AAA was much higher (14.7%) in coronary artery disease (CAD) patients over 60 years of age.<sup>6</sup> AAA has geographical and ethnic variation in prevalence.<sup>7</sup> However, little information is available on the prevalence of AAA for Asian patients with CAD.<sup>8</sup> There are no Indian studies to address the same.

This study aimed to find the difference in frequency of AAA in symptomatic CAD patients and age- and sex-matched healthy people in the age group more than 40 years of age and to determine the association of AAA with severity of CAD.

## 2. Material and methods

This is an analytical observation cross-sectional study. It was conducted in Department of Cardiology at a tertiary care teaching institute, between April 2012 and October 2013. The test group consisted of 200 patients  $\geq 40$  years of age who underwent coronary angiography for ST elevation myocardial infarction (STEMI)/non-STEMI/unstable angina (USA) or chronic stable angina (CSAP) and had more than 50% lesion in at least one epicardial coronary artery. The control group included 200 age- and sex-matched people more than 40 years of age, who had no history of angina or angina equivalents in the past and had normal ECG. The attendants/relatives of the CAD patients consented for the study. The sample size required to verify the difference of 14.7% vs. 3.3% in proportion of AAA among CAD patients and controls was 118 in each of the groups at 95% confidence and 80% power.<sup>6</sup> This was rounded off to 200 people in each group. The institution's ethical committee permission was taken and informed consent of the patients was taken. Patient history was taken for hypertension, smoking, diabetes, tobacco, hernia, and family history of AAA. The abdominal aorta was viewed by echo study in longitudinal view for any segmental dilatation. The diameter of aorta at suprarenal and infrarenal segments was taken and largest diameter in any segment was noted. AAA was defined as abdominal aorta diameter greater than

30 mm. The patients in whom aorta was aneurysmal, CT aortography was done for confirmation and the maximal diameter of the aorta was noted. Echo study and CT measurements were done by single cardiologist and radiologist, respectively. AAA patients were advised smoking cessation, antihypertensives (preferably ACE inhibitors/AT II antagonists), diabetes control, statins, and regular follow-up for AAA size monitoring.

## 3. Calculation

Continuous data were expressed in the form of mean and standard deviation. Qualitative data were described as simple frequency with relative percentage. Quantitative data were expressed using descriptive statistics as mean, SD, range for continuous data and counts, or percentages for categorical data. Intergroup difference between case and control groups for continuous variables was evaluated by using independent t test while Chi-square test was performed to differentiate categorical variables. A *p* value  $< 0.05$  was considered statistically significant.

## 4. Results

Our study included patients from most parts of Rajasthan, Haryana, Punjab, Gujarat, Western UP, and Western MP. The baseline characteristics of cases and controls are shown in Table 1. The mean age was about 57 years in both the groups. More than 80% of people in the two groups were males. The prevalence of hypertension and diabetes was comparable in both groups. There were significantly more smokers and tobacco chewers in the CAD group. None of the people in the two study groups had hernia or family history of symptomatic AAA. The mean aortic diameter of the CAD patients was 19.1 mm and that of the control group was 18.4 mm. There was significant difference in the abdominal aortic diameter in single and multivessel disease ( $17.8 \pm 2.9$  mm vs.  $19.7 \pm 4.9$  mm, *p* = 0.0312). CT aortography was done in 7 CAD

**Table 1 – Clinical characteristics and abdominal aorta size of the study and control population.**

	CAD, n = 200 (%)	Control, n = 200 (%)	<i>p</i> value
Age (years)	57.8 $\pm$ 9.9	57.1 $\pm$ 10.1	0.495
Male	177 (88.5)	163 (81.9)	0.064
Hypertension	68 (34.0)	66 (33.2)	0.860
Diabetes	25 (12.5)	17 (8.5)	0.198
Smoking	159 (79.5)	105 (52.8)	$< 0.001$
Tobacco	106 (53.0)	59 (29.6)	$< 0.001$
<b>Abdominal aorta size (mm)</b>			
Mean diameter (mm)	19.1 $\pm$ 4.4	17.7 $\pm$ 2.5	$< 0.001$
Suprarenal aorta (mm)	19.1 $\pm$ 3.4	18.0 $\pm$ 2.1	0.098
Infrarenal aorta (mm)	19.1 $\pm$ 5.9	17.5 $\pm$ 3.4	0.003
Largest AA diameter (mm)	19.9 $\pm$ 5.8	18.4 $\pm$ 3.3	0.001
Single vessel dis. (mm) n = 70 (35%)	17.8 $\pm$ 2.9	–	0.032 b/w single and multivessel disease
Double vessel dis. (mm) n = 76 (38%)	19.7 $\pm$ 4.1	–	
Triple vessel dis. (mm) n = 54 (27%)	19.8 $\pm$ 5.9	–	
No. of cases with AAA (%)	7 (3.5)	2 (1.0)	0.032

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