

# The Frequency Of Left Anterior Descending Artery Disease: A P.I.M.S Experience\*

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## Summary:

## Objectives:

To describe the frequency of Left Anterior Descending Artery disease.

## Methods:

Analysis of Coronary angiography register at the Pakistan Institute of Medical Sciences enrolling 145 patients between May 1996 and September 1997.

## Results:

Analysis of 119 abnormal angiograms showed that LAD disease was prevalent in 108 out of 119 cases. LAD as a single vessel involved was present in 30 out of 108 cases, as part of double vessel in 34 out of 108, with exactly similar frequency in association with circumflex and right coronary artery disease, and as part of triple vessel in 44 out of 108 cases. Mean ages of presentation at angiography for single vessel disease were lower than that for double or triple vessel. 68 out of 108 affected LAD arteries had 90-100% stenosis, 11 had 65-89% stenosis, 12 had 50-65% and minor luminal irregularity was seen in 9 cases while 7 cases showed involvement of their major tributaries. Involvement of LAD was predominantly proximal.

## Conclusions:

LAD disease is seen in Pakistan at a higher frequency (90%) than reported from similar case series in the west (70%).

## Key words:

LAD, Left Anterior Descending Artery, Prevalence.

## Introduction:

The epidemiological and investigation data in the west indicate that coronary artery disease is commoner in the LAD than in the right coronary artery or the

circumflex<sup>1</sup>. Disease of the proximal LAD is a high risk lesion because the artery supplies 40 to 50% of the total left ventricular myocardium, thus occlusion of this site results in ischaemia in a large portion of myocardium jeopardising its territory.

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No data in Pakistan exists about the prevalence of LAD involvement, but there is reason to believe that the prevalence may be high as part of the spectrum of increased prevalence of coronary artery disease in our ethnic group, as studies in the west indicate. We attempted to analyse involvement of LAD in patients undergoing coronary angiography at our hospital.

### Subjects and Methods:

The office of the angiography department provided records of 145 patients who underwent coronary angiography between May 1996 and September 1997 representing the total number of people studied at the department since its inception in May 1996. The inclusion criteria involved, all coronary angiograms done between this period. 3 patients who had been studied as part of post PTCA/Stenting evaluations were excluded from this study. All 3 had undergone intervention for critical proximal LAD disease, 2 out of 3 also had Stents implanted, baseline angiograms of 2 out of 3 were included in this study. Finally 142 patients were enrolled, 3 out of which, and included were grafts studies. The percentage of normal and abnormal coronary angiograms was sought. Out of the abnormal coronary angiograms the number of studies with abnormal LAD's was noted. LAD was marked diseased if main LAD or one of its larger branches were involved.

LAD disease was variably classified firstly on the basis of whether it was the only vessel involved, or as part of double or triple vessel disease. Secondly on the basis of %age stenosis occurrence into <50% stenosis, 50-65%, 65-89% and 90-100% irrespective of the site of stenosis. Percentage stenosis was calculated by densitometric and geometric analysis both by the "stenosis analysis-automated" and "stenosis analysis-manual" techniques on the Dx-Hiline system, averaged and reported collectively by a system analyst, and two physicians.

LAD disease was also further subclassified accordingly to whether the proximal, mid or distal segments were involved or whether one of the larger branches was diseased. Proximal was defined as being within the first 2 cm of the origin of LAD, whereas mid was defined as the segment measuring 4 centimetres after the proximal segment. Significantly

critical distal disease, independent of proximal involvement was neither noted nor included. The difference between the mean ages of presentation for angiography between single, double and triple vessel disease was noted.

### Results:

142 coronary angiograms inclusive of 3 graft studies were analysed. Median age of presentation was 49.49 years, 27 patients were females. 23 angiographies were reported as normal, while 119 were abnormal. LAD disease was prevalent in 108 out of 119 abnormal cases (90.75%). Left anterior descending artery as single vessel disease in 30 out of 108, as part of double vessel disease in 34 out of 108, and as part of triple vessel disease in 44 out of 108 cases. Mean age of presentation for single vessel disease was 46.8 years, for double vessel disease 50.4 years and for triple vessel disease 65.13 years. Double vessel disease occurred with exactly similar frequency in association with Circumflex and Right coronary artery disease.

Out of 108 LADs affected in terms of percentage stenosis, 68 out of 108 patients had 90-100% stenosis, 11 had 65-89% stenosis, 12 had 50-65% stenosis, minor wall irregularity defined as <50% discrete stenosis was found in 9 patients. In 7 cases studied the diagonal branch only was involved, and in 1 case the Septal branch was involved. When branches of LAD were included only significantly large proximal branches were taken into account.

Left main stem involvement was seen in 4 out of 119 cases, 3 out of 4 being non critical and in 1 out of 119 was critical, the vessel had been bypassed by LIMA.

In terms of site of stenosis, ostial stenosis was seen in 10 out 108 cases, proximal in 41 out of 108 cases and mid in 56 cases. Significant distal disease independent of proximal disease was not seen. Analysis of the 11 out of 119 angiograms in which the LAD was not affected showed isolated circumflex involvement in 2 out of 11 cases, isolated RCA involvement in 4 out of 11 cases (with 2 out of 4 being critical PDA stenosis only), and in 5 cases disease of the circumflex and RCA coexisted.

**Discussion:**

The body of evidence regarding the prevalence of coronary artery disease amongst people of South East Asia, (which brings Pakistanis, Bangladeshis and Indians under one umbrella as the same ethnic group) comes largely from studies in the west, showing that the prevalence and the frequency of CAD is very high amongst the people of South Asian extraction living in the west<sup>2,3</sup>. Similar studies in Asian immigrants to the UK have shown that not only is the frequency high but they also have a higher mortality from CAD as compared to native Caucasians.<sup>4</sup> Studies on expatriate Indians and Pakistanis in the USA have confirmed the same.<sup>5</sup> In addition, of all the ethnic groups studied Indians not only have the highest rate of CAD, but its onset is generally early and its course malignant in terms of angiographic progression of disease.<sup>6</sup> In addition to prevalence rates, narrowing of sex difference in coronary risk among South Asians has been reported from the world over, some of the immunity of women for CAD is lost in the South Asian population.<sup>7,8,9,10</sup> On the other hand the prevalence of these disorders in South Asia is less well established and no substantial effort has been made to estimate their occurrence in Pakistan.

What perplexes the situation further is the fact that the incidence of classical risk factors in this population is low, and the conventional risk factors alone cannot explain the cause of all the higher prevalence of CAD in this population.<sup>11,12</sup> However surveys abroad show that the prevalence of DM is much higher than other ethnic groups and the syndrome of insulin resistance and central obesity is predominant amongst them.<sup>13-19</sup>

Recently there has been a focus on defining the role of hemostatic factors,<sup>20-25</sup> lipid subfractions,<sup>26-31</sup> infection,<sup>32-35</sup> and trace elements<sup>36</sup> in the pathogenesis of the excess CAD in South Asians. South Asians have also shown to have significantly smaller coronary arteries as compared to the native Caucasians living in the west.<sup>4</sup> This observation has important therapeutic implications regarding coronary intervention in this

ethnic group already suffering from excess mortality from CAD.

Analysis of pattern of CAD in the west shows that disease of the LAD is more common than in the circumflex or RCA<sup>1</sup>. A similar case series from the west has also shown LAD to be the most common vessel involved (71.8%)<sup>9</sup>. Our study shows occurrence of LAD disease in 90% of the cases studied.

**Conclusion:**

LAD disease is significantly more prevalent in Pakistan than it is in the west. Ethnic and geographical differences in the pattern of the coronary artery disease can have serious prognostic and therapeutic implications for a population such as South Asia experiencing a high prevalence of coronary artery disease.

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