

A DOUBLE-CENTER RETROSPECTIVE 5 YEARS SURVEY OF 385 CABG CASES COMPARING GENDER CHARACTERISTICS

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Abstract - Coronary artery disease is one of the leading causes of morbidity and mortality especially in the industrialized societies. This retrospective study was carried out on 385 patients who were referred to Shariati and Janaran Hospitals from 1992 till 1997 and who underwent coronary artery bypass grafting. The objective was to obtain a descriptive analysis of the important factors in this population and to draw a comparison between the two genders and to draw genders regarding these variables. The data were obtained from patients' files, angiography and operation notes; 82.9% of the study population were of male. The mean age of women was higher than men by 2.2 years. The most common risk factors among the male gender were found to be smoking, hyperlipidemia, hypercholesterolemia and hypertension. Except for smoking which was omitted in women, all other risk factors showed a comparative low prevalence in this gender. Most patients (93.37%) fell in group II and III of functional class as per NYHA classification and the most frequent signs and symptoms on admission being chest pain (81.5%) and dyspnea (11.2%). The affected vessels in order of frequency were the left anterior descending, the right coronary and the circumflex arteries respectively. The average number of grafts utilized were 3 in the entire population. Overall mortality recorded was 2.1%.

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Key words: Coronary artery disease, coronary bypass graft, functional class, ischemic heart disease, left anterior descending artery, right coronary artery

INTRODUCTION

Coronary artery disease (CAD) is explicitly due to atherosclerosis and is one of the most important and common diseases of this age, especially in developed countries where it stands as the second most common cause of death, the first being road accidents (1). CAD brings in its wage, social, psychological and economic problems (2). All of these have led to widespread studies and global research to unveil the different

aspects of the disease. Medical management comes first. However, if medical therapy fails to control the disease, the next option is surgery which is aimed at improving the quality of life and increasing life expectancy. It seems that most patients derive benefit from coronary artery bypass grafting (CABG) compared to medical treatment. Incidence of the disease is lower in premenopausal women than men of the same age, but after menopause the incidence equals in women and men. There is no difference in the prevalence between the two sexes of identical age (3). Literature review shows that the risk of operative mortality in women has been higher than men, and the explanation forwarded for this difference centers around variables such as difference of average age, obesity and operative techniques between the two genders (4).

MATERIALS AND METHODS

A descriptive retrospective survey was carried out on patients who had undergone CABG in two hospitals in Tehran over a 5 year period between 1992 till 1997. A lot of 385 patients were included in this study and a database of this population was obtained from the patients and the records of catheterism wards covering numerous variables and risk factors such as age, gender, weight, height, blood group, presence of HBs Ag in serum, functional class, vessels involved, type of surgery and risk factors like diabetes mellitus, smoking, hypertension, hyperlipidemia and obesity. The database was analyzed by using statistical program for social sciences (SPSS) for Windows version 6.2.

RESULTS

Out of all the patients, 319 (82.9%) were male, 66 (17.1%) were female and one was single. Distribution of patients in different age groups is depicted in Table 1. Most women (73.4%) fell

Table 1. Averages of numeric variable

Variable	Men	Women	Total
Weight(kg)	72.68	64.09	71.16
Height(cm)	167.14	153.23	164.67
Age(yr)	53.2	55.4	53.6
EF(%)	48.2	50	48.5
Minimum temperature(°c)	28.5	28.8	28.5
CPB time(min)	94.8	85.7	93.2
Aortic clamp time(min)	54	50	54
ICU stay duration(day)	2	1.5	1.9

Table 2. Patients characteristics

Variable	Men(n)	Men(%)	Women(n)	Women(%)	Total(n)	Total(%)
LMA grafting	271	94.1	51	91.1	322	93.6
HBS Antigen	5	1.8	1	1.6	6	1.7
Smoking	115	44.1	5	11.6	120	39.4
MI history	55	36.7	12	38.7	77	37
Family history	24	18	4	16	28	7.7
Mortality	8	2.5	-	-	8	2.1
Hypertention	90	35.2	25	50	115	37.6
Obesity	202	68	54	84.4	256	70.9
Hypercholesterolemia	107	37.5	40	65.5	147	42.5
Hypertriglyceridemia	105	38	29	50	134	41.1

within the age range of 50-75 yrs which is compatible with the postmenopausal period, whereas (59.9%) of the total patients were in 50-75 yrs group (Fig. 1). Regarding the patients' functional class as per NYHA classification, 140 patients (58.8%) had FC II and then classes III, I and IV in order of decreasing prevalence (Fig. 2). Out of the male population, 115 patients (44.1%) were smokers, whereas only 11.6% of the women

had the smoking habit, 65.5% of women had hypercholesterolemia against 37.5% of the men and hypertriglyceridemia was 50% in the former and 38% in the latter (Table 2).

Seventy - eight patients (23%) were diabetic, 61.5% of whom were under control with oral hypoglycemic drugs and 12.8% received insulin injections. The remaining 25.6% received no medication for diabetes (Fig 3).

History of myocardial infarction was present in 38.7% of women and 36.7% of men, and a family history of CAD was observed in 18% of men and 16% of women (Table 2). Patients' weight ranged between 45 to 101 kg with 60-69 kg group as most prevalent. The height ranged between 141 - 193 cm with 150-159 cm and 160-169 cm groups as most prevalent in women and men respectively. Summaries of mean weight and height for both genders is depicted (Table 1). The most common concurrent diseases were peptic ulcer (1/8%) and bronchial asthma (1%). Six patients (1.7%) were positive for HBs Ag in their sera (Tables 2 and 3).

Table 3. Patients Characteristics

Variable	n	%
Arrhythmia (post operative)	23	6
Bleeding (post operative)	8	2.1
Renal failure (post operative)	7	1.8
Peptic ulcer (coincident)	7	1.8
Asthma (coincident)	4	1

Distribution of patients in different blood groups and Rh categories were determined and the most prevalent groups were A positive (32.9%) and O positive (27.2%) and the least prevalent AB negative (1-2%).

Ejection fraction of the patients ranged between 28-85% with 55.8% of the patients having an ejection fraction of 35-50%. The average ejection fraction for both sexes are shown separately and the distribution of patients in

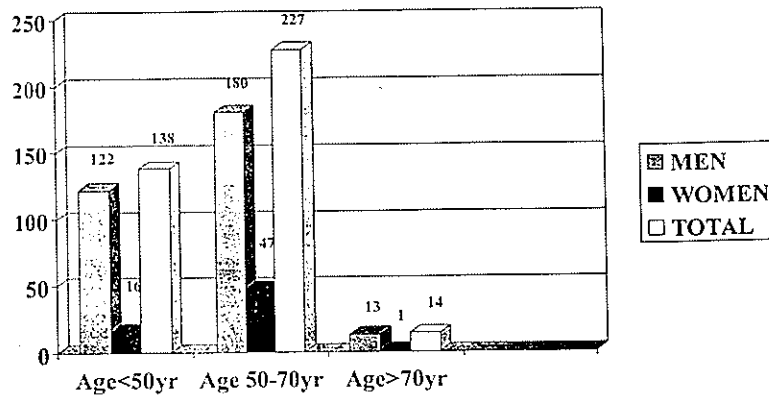


Fig. 1. Numbers of patients by age

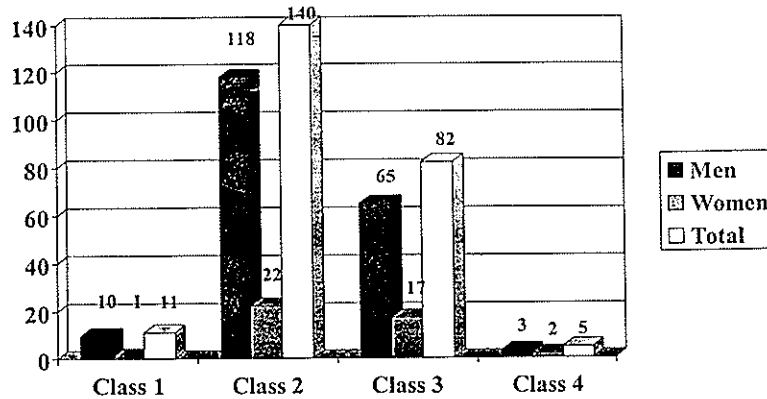


Fig. 2. Numbers of patients by functional class

different groups of ejection fraction is depicted (Fig. 4).

According to angiographic findings 70.9% of patients showed a triple vessel involvement. Prevalence of significant involvement (narrowing > 50%) was obtained for single vessels as left anterior descending (LAD) > circumflex (Cx) for men and LAD > Cx > right coronary artery (RCA) for women. Significant involvement of left main coronary artery (LMCA) was seen in 8.8% of men and 7.6% of women (Figs. 5 and 6).

The number grafts ranged between 1 and 6 number 3 being most prevalent both in men (49.4%) and women (51.6%). All patients who received only one graft, received it from left internal mammary artery. Categorization of patients per type of graft is shown in Table 2.

The most commonly consumed drugs during the preoperative period were beta-blockers (55.3%), nitrates (47.7%) and antiplatelets (31.2%), (Fig 7). Clinical manifestations and prevalence of chest pain are shown in figure 8.

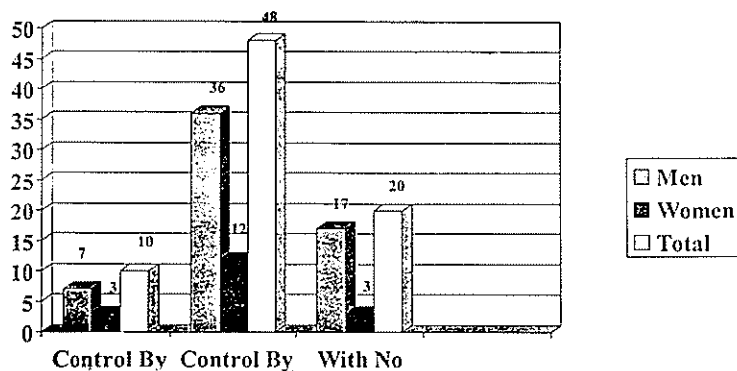


Fig. 3. Numbers of patients with diabetes mellitus

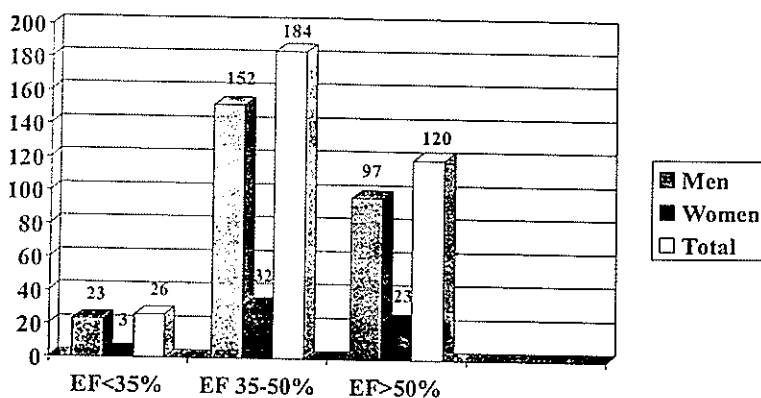


Fig. 4. Numbers of patients with ejection fraction

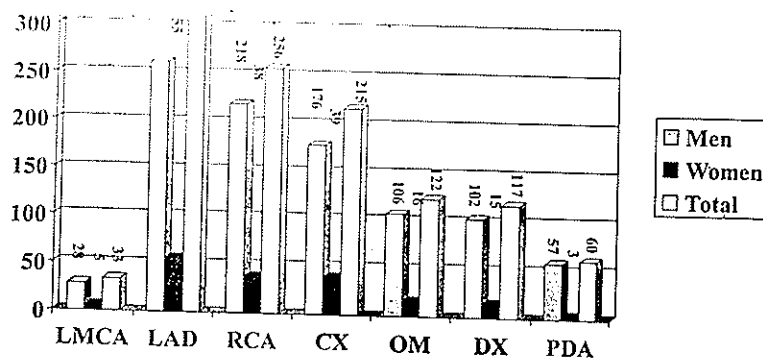


Fig. 5. Prevalence of significant involvement of coronary arteries

Survey of CABG Cases

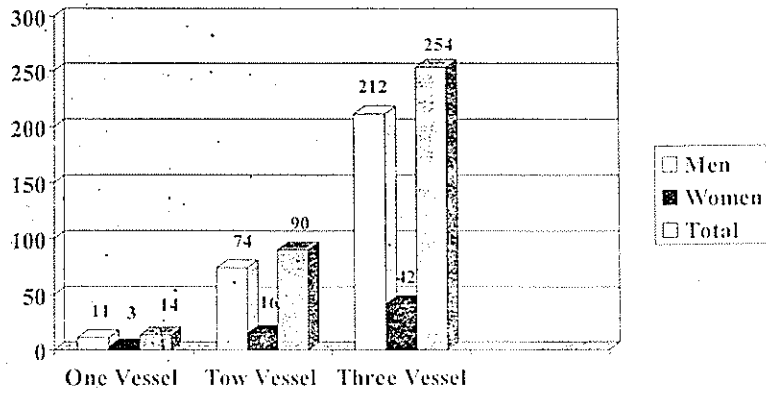


Fig. 6. Numbers of patients with vessel diseases

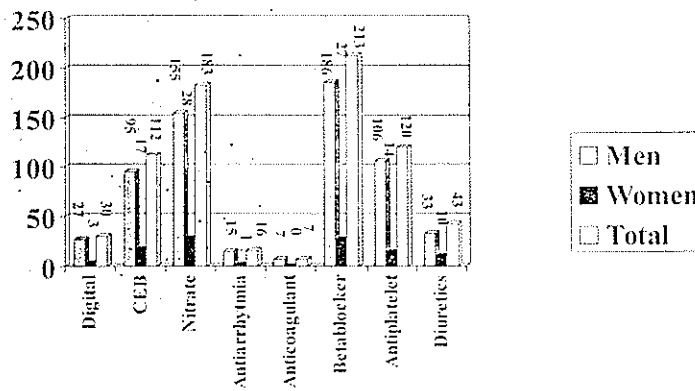


Fig. 7. Numbers of patients and type of drugs

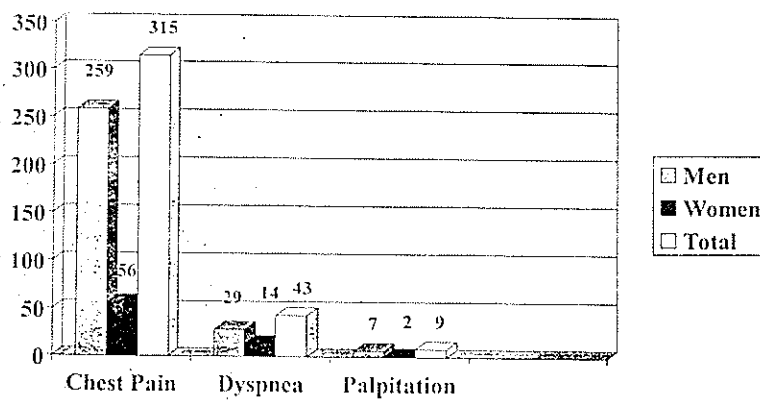


Fig. 8. Numbers of patients and clinical manifestation

Aortic clamp ranged between 16 to 190 minutes with a greater average observed in men (Table 1).

Cardiopulmonary bypass time ranged between 24 to 190 minutes with a greater average in men (Table 1). Duration of ICU stay was longer in men than women and the range was between 1 to 18 days. Minimum temperature during operation ranged between 22 to 38°C with a little greater average observed in women (Table 1). Overall mortality recorded until the end of follow up was 2.1% in the entire population (Table 2).

DISCUSSION

The signs and symptoms of ischemic heart disease are attributed to decreased myocardial tissue hemoperfusion which itself is often caused by atherosclerosis in the vessels resulting in narrowing of the lumen. Conditions that predispose to atherosclerosis include male sex, advanced age, family history of premature atherosclerosis, cigarette smoking, hyperlipidemia, hypertension, diabetes mellitus and obesity. Based on other studies, the most important risk factors comprise of hypercholesterolemia, hypertension, cigarette smoking that precipitate coronary artery disease (5, 6). It seems that older age plays a complicated role in CAD, since many of the above mentioned risk factors such as hypertension, hyperlipidemia and hyperglycemia show a greater prevalence in higher age. Regarding sex, men are more commonly affected by CAD and undergo surgery (male/female proportion=4/1), (5, 7), which is in conformity with our results. Estrogen has a protective effect against atherosclerosis which acts through elevation of serum HDL and a reduction of serum LDL levels. Deprivation of this preventive effect causes a rapid increase in the incidence of the disease in postmenopausal women, which conforms with other studies (8) and was found in our survey as well. A more riskful background is needed in women to cause ischemic heart disease and the prevalence of major risk factors in women

is higher (8,9), as also revealed in our study. Quitting or even decreasing smoking greatly reduces the risk of CAD. Literature review shows that men who smoke one packet of cigarette have a 3.05 fold increased risk to develop ischemic heart disease and an increase in mortality by 70% (10, 11).

In the present study, prevalence of smoking in our patients, specially women is less compared to similar studies elsewhere (5).

Prospective studies have shown that diabetes mellitus is an important and independent risk factor especially in women (9) showing more prevalence and creating a greater risk of CAD in women than in men. Diabetes mellitus acts as a triggering factor in operative mortality of CABG since it leads to silent myocardial infarction, postoperative arrhythmia and respiratory failure. Adequate and proper follow up of these complications may reduce the operative mortality of diabetic patients. In conformity with such studies, our survey shows a greater incidence of diabetes in women and a difference between the two sexes regarding prevalence of diabetes.

Similar to others studies, our survey reveals that a history of myocardial infarction and a family history of CAD are approximately equal in both sexes (12).

Most patients in our study had a preoperative functional class of II and III. In men, classes I and II were more prevalent than women but classes III and IV were more prevalent in women which is in conformity with other studies (5). The most prevalent signs or symptoms at admission were chest pain and dyspnea in our study that were comparable to other studies (5). Initial treatment of ischemic heart disease is medical, where the goal is correcting the imbalance between myocardial oxygen demand and tissue perfusion either by reducing the demand and/or increasing the perfusion. The most frequently used drug groups are nitrates, beta blockers and calcium channel blockers (13, 14) which is also found in our study.

In cases of angina refractory to medical therapy or when adverse side effects of these treatment modalities cannot be tolerated and sessions are not amenable to PTCA or if severe CAD signified by significant involvement of LMCA, triple vessel disease with impaired left ventricular function are present, CABG is indicated (15). Like other studies (5), LMCA involvement was equal in both sexes. The most frequently significant involvement is seen in LAD and the least in posterior descending artery (PDA) (8). Triple vessel involvement is the most common condition (5) necessitating CABG. All these findings were confirmed by our study.

Average number of three grafts on coronary arteries has been reported by some studies (5) as revealed in our study (3.01 in men and 2.9 in women). Generally, women are less likely to receive internal mammary artery (IMA) grafting by some surveys (5). This underutilization may be due to higher frequency of diabetes mellitus and its effects on peripheral arteries, smaller size or inefficient flow of IMA, higher age of women and technical differences in surgery of female patients (12). IMA grafting shows a better perfusion in long term follow up resulting in a reduction of late complications (5, 12). The same study shows that mortality rates for women who had received IMA grafting is still higher than men with the same conditions (3.3% in women and 1.9% in men). In the present study, utilization of IMA for grafting was equal in both sexes (94.1% of men and 91.1% of women) and 93.6% of the entire population received IMA graft which is higher compared to a similar study in which it was performed in 73% of the cases (5).

Arrhythmia is the most common postoperative complication, in our study. Mortality rate (intra and postoperative) was recorded as 2.1% which is lower than other studies (5).

Our study revealed a lower average of age in the population of patients compared with similar surveys from other countries. This difference is most likely due to a lower life expectancy in our

society. Lower rate of cigarette addiction especially in the women as observed in our society, may be due to some taboos in our culture which strongly regard this habit as highly abominable for women, resulting in the denial of this habit by the women. According to our results, impaired left ventricular function (ejection fraction < 50%) is more prevalent compared to studies conducted abroad. Despite the prevalence of this condition, mortality rate and ICU stay are lower in our survey which may be due to the lower age observed in our patients. However, because of the small sample size, we advocate that these results should be further confirmed by a wide-spread multicenter study focussing on the mortality rates in the two genders.

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