Original Article

Inhospital outcome and complications of percutaneous coronary intervention in acute coronary syndrome, Gender Differences

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Fac Med Baghdad 2008; V ol.50, No.4
Received Aug., 2008
Accepted Oct., 2008

Summary

Background: women with acute coronary syndrome have increased in-hospital morbidity & mortality as compared with men following percutaneous coronary intervention (PCI). It remains unclear if this difference secondary to the sex or other confounding variables.

Patients and Methods: We sought to examine the characteristics and outcomes of 71 consecutive women (49.2%) and men (50.7) undergoing PCI at The Iraqi Center of Heart Diseases from October 2005 to March 2006.

Results: There were significant differences in the baseline characteristics between both sexes. Women more frequently had SVD (single vessel desiease) (25.7% vs. 16.6%) and 2VD (37.1% vs. 16.6%) while Men were more frequently had 3VD (3 vessel disease) (66.6% vs. 31.4%) P value = 0.05. Women more frequently had LAD lesions (97.1% vs. 83.3%; P=0.05). Men had longer lesion length (13.60±7.75 vs. 12.42±5.12; P=0.03. The outcome of revascularization procedure reveal that the female cohort had a greater incidence of thrombosis (17.1% vs. 2.8% ; P=0.049) and myocardial ischemia (34.2% vs. 13.9%; P=0.044) during procedure and greater incidence of access site hematoma (31.4% vs. 2.7%; P=0.001), hypotension (25.7% vs. 5.6%; P=0.02), non-fatal MI (17.1% vs. 2.7%; P=0.044) and needed more repeated angiography and revascularization (17.1% vs. 5.5%; P=0.0049) during post procedural in-hospital period.

Conclusion: female gender is at greater risk for per procedural and post procedural in-hospital complication, these were not due to female sex itself, but because female have more co morbid diseases and risk factors with smaller body size and smaller blood vessels causing more risky PCI.

Keywords: Acute coronary syndrome (ACS) , precutaneous coronary intervention (PCI)

Introduction

Coronary artery disease CAD continues to be the leading cause of death in men and women. Despite the trend towards decreasing cardiac mortality in men, there has been an increase in death attributable to coronary artery disease in women (1-5, 8). Men have more attacks of coronary events than women but women have higher death rate (4, 6). Numerous reports have suggested female sex-specific increased morbidity and mortality following percutaneouse coronary intervention. These findings may have contributed to a difference in referral to cardiovascular diagnostic and therapeutic services for women. More recent studies have been conflicting regarding the influence of sex on outcome following PCI. In this analysis, we examined the characteristics and outcomes of women and men undergoing PCI at a single high-volume center over a 7-months period.

On average, coronary artery disease present 10 years later in life in women than in men, and the median age for myocardial ischemia in women approximately 20 years older, making coronary artery disease, a disease of older women.

The reason for that difference is not entirely clear, although the incidence of coronary artery disease in premenopausal women remain low suggesting that the endogenous hormone appear to play a protective role for younger, premenopausal women against ischemic heart disease(2,8, 9).The gonadal hormone do alter many patho physiological processes thought to be fundamental to the development of atherosclerosis, including thrombosis and inflammation, further, nuclear estrogen receptor are present in cardiac myocytes of both male and female, a potential explanation for gender differences (2,9,11). Large population of the myocardial ischemia has genes known to be relevant to the atherosclerosis pathophysiology. Genetic differences are manifested in the physiology of atherosclerosis including plaque component (more cellular and more fibrous tissue in women), endothelial function (estrogen-induced coronary vasodilatation) and hemostasis (higher fibrinogen and factor VII level in women) (2, 5).

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Patients and Methods:

We studied 71 (35 women and 36 men) consecutive patients undergoing PCI at Iraqi center of heart diseases between October 2005 and March 2006. Enrollment was limited to acute coronary syndrome patients jugged to be at high risk, i.e. those with at least one following factors: - prolonged ongoing chest pain > 20 minutes in last 48 hrs, resting angina with ST segmental changes (dynamic changes) at least 1 mm in at least 2 leads, angina with new left bundle branch block, angina with hypo tension, angina with pulmonary edema post – myocardial infarction angina, angina with diabetes mellitus, Prior history of peripheral vascular disease or cerebrovascular disease, age >70 years, angina with in 6 months of percutaneouse coronary intervention. All baseline demographics, procedural data, and outcomes data were prospectively collected. Procedural success was defined as a post-intervention residual stenosis of ≤ 50%, with a minimal decrease in stenosis of ≥ 20% and Thrombolysis in Myocardial Infarction flow (TIMI) grade 3.

All data were coded and entered by using computer with statistical package for social science SPSS version 10. Data were summarized by using number, percentage, mean & standard deviation. Association between discreet variable was measured by using chi-square and fissure exact test when appropriate. P – Value ≤ 0.05was considered as level of significance

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Results:

The study population consisted of 71 patients with 35 (49.2) females. Baseline characteristics are shown in (Table 1) the female cohort was older on average than the male cohort. In addition, there was a greater prevalence of diabetes mellitus, dyslipidemia, hypertension, peripheral vascular disease, and prior PCI among women. The rate of active tobacco use was higher among men. As expected, the mean body surface area was lower among females. The prevalence of prior MI was similar between the two sexes. On presentation, females were more likely to be receiving therapy with calcium antagonists.

Table (1): Baseline clinical characteristics

Variable	Women (n=35) %	Men (n=36) %	P value
Median age (yr)	62:11±8.14	56.97±9.04	0.01
BSA, m^2	1.74±0.154	1.89±0.158	0.01
Hypertension	(31) 88.6%	(20) 55.6%	0.005
Diabetes	(20) 57.14%	(12) 33.33%	0.005
Current smoker	(2) 5.7%	(17) 47.2%	0.001
Hyperlipidemia	(19) 54.3%	(4) 11.1%	0.001
Family history	(0) 0.00%	(0) 0.00%	
PVD	(10) 28.5%	(3) 8.3%	0.03
CVA	(0) 0.00%	(0) 0.00%	
Prior MI	(25) 71.4%	(22) 61.1%	0.25
Prior PCI	(15) 43.85%	(7) 19.44%	0.03
Prior CABG	(0) 0.00%	(0) 0.00%	
Aspirin	(29) 82.9%	(31) 86.1%	0.47
Thenopyridin	(6) 17.1%	(5) 13.9%	0.47
Statin	(22) 62.9%	(18) 50.0%	0.1
B-blocker	(25) 71.4%	(21) 58.3%	0.18
CCB	(18) 51.4%	10 (27.8%)	0.036
ACE inhibitors	(19) 54.3%	(16) 44.4%	0.27
ARBS	(1) 2.9%	(0) 0.0%	0.49
ECG changes	(20) 57.1%	(18) 50.0%	0.35

Per procedural complications are described in table (2). Women were more frequently had increased incidence of myocardial ischemia (34.2% vs. 13.9%; p=0.04) and thrombus formation (17.1% vs. 2.8%; p=0.049) as compared with men.

Table (2): Per procedural complications

Variable	Women (n=35)		Men (n=36)		p-value
MI	10	28.6%	14	38.9%	0.2
Myocardial ischemia	12	34.2%	5	13.9%	0.044
Thrombosis	6	17.1%	1	2.8%	0.049
Dissection	8	22.8%	3	8.33%	0.2
Death	0	0.0%	0	0.0%	-
AVC	0	0.0%	0	0.0%	-

Post-procedural complications are described in table (3) The female cohort have greater incidence of post-procedural hematoma and vascular access complications (31.4% vs. 2.7%; p=0.001), women experienced more prevalence of hypotension during early time after procedure as compared with men (25.7% vs. 5.6%; p=0.02), non-fatal myocardial infarction was significantly more in female gender (17.1% vs. 2.7%; p=0.04) so that needed more repeated angiography than men (17.1% vs. 5.5%; p=0.05).

Table (3): Post-procedural in-hospital complications

Variable	Women (n=35)		Men (n=36)		p-value
Hypotension	9	25.7%	2	5.6%	0.02
Hematoma & bleeding	11	31.4%	1	2.7%	0.001
New CHF	0	0.00%	0	0.00%	
CPR & intubation	0	0.00%	0	0.00%	
Death	0	0.00%	0	0.00%	
Stroke	0	0.00%	0	0.00%	
CABG	0	0.00%	0	0.00%	
Non-fatal MI	6	17.1%	1	2.7%	0.44
Repeated angiography & revascularization	6	17.1%	2	5.5%	0.049

Discussion:

As is consistent with previous studies, women usually present at an older age, smaller BSA and with significantly more comorbidities than men.(1,3,6,7,9).Outcome of revascularization procedure: The per procedural complications in term of myocardial ischemia and thrombus formation were more prevalent in women as compared with men. The diabetes mellitus, hyperlipidemia, smaller blood vessels and underuse of GP IIb/IIIa inhibitors are independent predictors for these complications during procedure of revascularization. These results are comparable with that mentioned in previous studies. (3,7,14,15)

The post-procedural in hospital complications. Women had more prevalence of hypotension at early time after procedure. . Hematoma and other vascular complications at the access site in our study continue to be higher incidence in the women. The older age of women at time of revascularization, the smaller size blood vessels of women (measures of body size used as a surrogate) higher doses of heparin during and after procedure due to higher incidence of periprocedural thrombosis in women, the prolonged use of anticoagulant along with more risk profile and female gender were independent predictors for the vascular complications. Most of the previous studies in this subject support our results.(1,6,12) the prevalence of non-fatal myocardial infarction was higher in women as compared with men that is why we needed significantly higher repeated angiography and revascularization in female gender. The older age of women, smaller blood vessel, more comorbidities in terms of diabetes, hyperlipidemia and hypertension, more thrombus formation during the procedure of revascularization and underuse of GP IIb/IIIa inhibitor during post-procedural in hospital period may be the contributing causes consist with RITA 3 trial, TACTICS-TIMI 18 trial and FRISC II trial and other studies (3, 7, 11, 14, 15,16) The mortality rate, emergency CABG were higher in female gender after PCI in most of previous studies while not reported in our study. This may be due to small study population. Limitations of the study include: The number of studied populations was small, and All the patient's data were collected from single tertiary center and the results may not be applicable to the general population.

Conclusion

Women with acute coronary syndrome presented for Percutaneouse revascularization of coronary arteries at the later age with less body size. Female gender is at greater risk for per procedural and post procedural complications.Female gender per se was not an independent risk factor, but women have more risk factors that confer higher risk in women who undergo PCI.

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