GENDER DIFFERENCE IN PRESENTATION, MANAGEMENT AND INHOSPITAL MORTALITY IN ST ELEVATION MYOCARDIAL INFARCTION IN A TERTIARY CARDIAC CENTER

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ABSTRACT

Background: Studies have shown that women are less likely to receive reperfusion therapy and have higher inhospital death in ST Elevation myocardial infarction(STEMI) as compared to men. This study aims to examine presentation, acute therapy, and inhopital mortality in women admitted with diagnosis of acute STEMI in a tertiary care cardiac center.

Methods: Patients admitted with diagnosis of acute STEMI from 1st June 2013 to 31st May 2015 were included in the study. Gender difference in baseline characterstics, comorbidities, prehospital delay, type of treatment received and inhospital death were measured. Variables that might have impact on inhospital deaths were analyzed on multivariate regression analysis to find out other variables adjusted effect of gender on inhospital deaths.

Results : Majority of the patients were men (Men 69% vs women 31%). Women were older, were more likely to be diabetics and smoker. Prehospital delay was more in women (women 22 hours vs men 12 hours, p value-0.02).About 46% of both men and women received reperfusion therapy. There was more inhospital mortality in women (women 13.5% vs men 6.5%, p value – 0.02). Women had more inhospital mortality even after adjustment with other covariables (OR = 3.110, 95% CI = 1.411-6.902, p value-0.005).

Conclusion : Women were more likely to be elderly, diabetics, smoker and presented later than men after symptoms onset. Women received reperfusion therapy similar to that of men. After adjustment with other covariates, women remained a significant variable to inhospital death.

***Key Words**: Gender difference, ST elevation myocardial infarction, prehospital delay, reperfusion therapy, inhospital mortality.*

INTRODUCTION

Coronary artery disease is the leading cause of death in both men and women worldwide.[1] Number of studies has shown that there is gender difference in presentation, management and outcome in acute coronary syndrome. [2-6] Some studies have shown that females are less likely to receive reperfusion therapy in ST Elevation myocardial infarction(STEMI) as compared to males.[2,3] Other studies report that women who present with acute myocardial infarction have worse in-hospital and long-term prognoses than men. [4-6] It is uncertain whether these differences reflect differences in base-line characteristics or pathophysiologic distinctions between men and women.[7]

Part of the difference in mortality between gender is accounted for by the older age of and higher prevalence of comorbidities in women.[5] Less frequent use of revascularization procedures in women also may account for some of the excess mortality. Findings from large database studies[6, 8-10] have indicated that women with acute myocardial infarction tend to undergo less aggressive hospital management than men. The aim of this study was to examine presentation, acute therapy, and inhopital mortality in women as compared to men admitted with diagnosis of acute STEMI in a tertiary care cardiac center.

METHODS

All admitted patients both male and female diagnosed as acute STEMI in Department of Cardiology, Manmohan Cardiothoracic Vascular and Transplant center(MCVTC), Kathmandu, were enrolled in the study. The study period was from 1st June 2013 to 31st May 2015. Acute STEMI was diagnosed on the basis of third universal definition of myocardial infarction.[11] STEMI was defined by characteristic symptoms of myocardial ischemia in association with persistent electrocardiographic (ECG) ST elevation and subsequent release of biomarkers of myocardial necrosis. ECG criteria for ST elevation : New ST elevation at the J point in at least 2 contiguous leads of ≥2 mm (0.2 mV) in men or ≥1.5 mm (0.15 mV) in women in leads V2–V3 and/or of ≥1 mm (0.1 mV) in other contiguous chest leads or the limb leads.[11] . Baseline demographic data and a complete clinical history were taken from each patient. Past medical history, drug history, smoking and alcohol intake history was taken. General and systemic examination of the patient was done. Comorbid conditions included hypertension, diabetes mellitus, renal dysfunction, dyslipidemia, stroke and smoking. Prehospital delay was defined as the time between onset of STEMI and hospital arrival. Killip class of each patient was recorded at presentation.[12]

Patients were tried to be treated under guidelines given by ACC/AHA in 2013.[13] Depending upon the time duration at which patients presented, there were three groups of patients: primary PCI, thrombolysis and conservative management. Primary PCI was performed in those patients presenting within 12 hours of symptoms onset, evidence of ongoing ischemia within 12-24 hours of symptoms onset and presenting in cardiogenic shock irrespective of duration of symptoms. If patients didn't give consent for PCI, then either thrombolysis was performed or was kept in conservative management. Thrombolysis was performed with streptokinase or tenecteplase in patients presenting within 12 hours and evidence of ongoing ischemia 12-24 hours of symptom onset. Patients presenting after 24 hours and not in cardiogenic shock were managed conservatively with medications.

The outcome variable was death during index hospital admission.

STATISTICAL ANALYSIS

Statistical analysis was performed with SPSS version 20. For demographic profile, frequency and percentage distribution were obtained for each variable. Data were expressed as mean±SD for continuous variables and as percentage for categorical variables. For continuous variables, differences between groups were compared with independent t-test. The frequencies of categorial variables in 2 populations were compared by chi-square test and by calculating the odds ratios (OR) and 95% confidence intervals (CI). Variables influencing inhospital mortality were assessed first with the aid of univariate regression analysis. Multivariable logistic-regression model was used to determine, after adjusting

for base-line differences, the effect of sex on the rates of mortality.

RESULTS

Characteristics	Men (n=246, 69%) n(%)/mean±sd	Women (n=111, 31%) n(%)/mean±sd	p value
Age	56.9 ±11 years	63±12 years	0.001
>60 years	91(37%)	63(56.7%)	0.001
Median duration of presentation	12 hours	22 hours	
Presentation <12 hours	127(51%)	38(34%)	0.02
Hypertension	146(59%)	63(56%)	0.308
Diabetes	64(26%)	47(42%)	0.007
Dyslipidemia	126(51%)	57(51%)	0.98
Renal dysfunction	24(9%)	9(8%)	0.6
Smoking	86(35%)	57(51%)	0.03
Killip class >I at presentation	83(33%)	36(32.4%)	0.8
Management			0.9
Primary PCI	65(26.4%)	30(27%)	
Thrombolysis	49(20%)	22(19.8%)	
Conservative management	132(53.6%)	59(53.1%)	
Inhospital deaths	16(6.5%)	15(13.5%)	0.029

Table 1: Baseline characteristics, management and mortality of patients

Baseline Characterstics

A total of 356 patients were enrolled in the study**.** More than two third of the patients were men (69% vs 31%). Mean age of women were about 6 years more than that of men (63 vs 56.9 yrs).Smoking and history of diabetes were more prevalent in women.

Prehospital delay

Both men and women had long prehospital delay. Median duration of presentation to hospital after symptoms onset was 10 hours more in women. More than fifty percent of men presented within 12 hours of symptoms onset while only one third of women presented within 12 hours of symptom onset.

Management

Overall less than fifty percent of patients received reperfusion therapy. Reperfusion was similar in both men and women (men 46.4%, women 46.8%). Both groups received primary PCI equally (men 26.4%, women 27%). Among patients who presented within 12 hours, the rate of reperfusion therapy was similar in both groups.(Men 87%, women 90%).

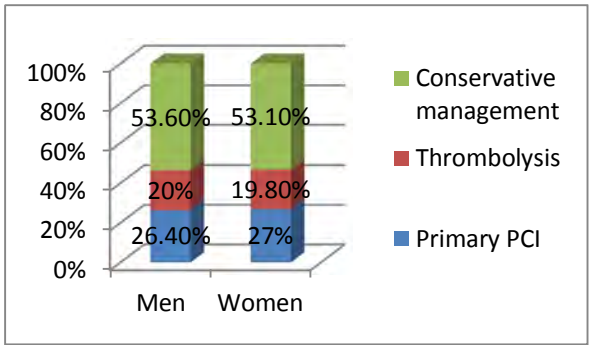

Fig 1: Management of patients

Inhospital mortality

Overall inhospital death was 8.7%. Inhospital death was more than two times in women than in men(13.5% vs 6.5%, p value-0.02). Besides sex, nine other variables (duration of presentation > 12hours, age>60 years, hypertension, diabetes, dyslipidemia, renal dysfunction, smoking, killip class at presentation>I and lack of reperfucion therapy) were assessed in univariate analysis with outcome as inhospital death. Women, DOP >12 hours, age >60 years and Killip

class at presentation >I were variables that have significant effect on inhospital deaths. After adjusting these variables in multivariate analysis, women were still a significant variable that have impact in inhospital death (p value 0.005). Beside women, only Killip class > I had adjusted significant impact on inhospital death.

Variables	OR	95% CI of OR	p value
Female Sex	2.24	1.06-4.725	0.02
Duration of presentation >12 hours	2.243	1.002-5.019	0.04
Age > 60 years	2.605	1.209-5.016	0.015
Hypertension	1.12	0.734-1.709	0.598
Diabetes Mellitus	1.369	0.939-1.994	0.102
Dyslipidemia	1.564	0.735-3.320	0.245
Renal dysfunction	2.047	0.729-5.747	0.174
Smoking	1.671	0.758-3.499	0.173
Killip Class>I	4.886	2.219-10.578	0.001
Lack of reperfusion therapy	0.984	0.640-1.513	0.9

Table 2: Univariate analysis of different variables on inhospital mortality.

Variables	OR	95% CI of OR	p value
Female sex	3.110	1.411-6.902	0.005
Killip class >I	5.515	2.46-12.36	0.001

Table 3: After multivariate analysis of effects of different variables on inhospital mortality

DISCUSSION

More than two third of the patients were men. It was similar to a registry in Germany, Heer T. found that men were predominant (70%) than women.[6] Men were also predominant in studies conducted in Nepal. In Kathmandu, men were 82%,[14] in Pokhara 51.7%[15] and in the Western Nepal ACS registry 62.3%.[16] Women were about 6 years older than men. This finding was also similar to other studies internationally and in Nepal.[4],[6,15-17]

In accordance to other studies[4],[6,17-18] diabetes was more common in women. But in study conducted in Pokhara, Parajuli M found that diabetes was more common in men (15% vs 10%). Overall smoking was highly prevalent(40%) in our study in both gender. It is similar to other studies where it varied from 55-80% .[4,14-16] In contrast to other studies,[4,15]smoking was more prevalent in women as compared to men (51% vs 35%, p value 0.03). This shows higher prevalence of smoking in women with STEMI and as this is one of the major risk facor for CAD, every effort should be applied so as to help quit smoking. Besides these, there were no significant difference in hypertension, dyslipidemia, renal dysfunction and Killip Class>1 at presentation between men and women.

The median prehospital delay was 16 hours. Only half of the men and one third of the women presented within 12 hours of symptoms onset. This is quite high as compared to other studies. The median PHT is 3.5 hours in the USA and 2.5 hours in the United Kingdom, but 4.4 hours in South Korea and 4.5 hours in Japan[19] and in India 5.3 hours.[20] The median prehospital delay in our study was even more in women (22 hours vs 12 hours, p value 0.02). The outcome of treatment is directly dependent upon the early reperfusion therapy, longer prehospital delay have poorer outcome.[13] The cause of longer prehospital delay should be studied moreover in women so as to decrease prehospital delay and to achieve better outcome.

With regard to reperfusion treatment, only 46.6% of the patients received reperfusion therapy overall. Women received reperfusion therapy equally to men in our study (46.8% vs 46.4%). Primary PCI(27% vs 26.4%)and thrombolysis(19.8% vs 20%) was also similar. This is in contrast to other studies

where women were less likely than men to undergo intravenous thrombolysis and invasive cardiac reperfusion procedures.[6,22] In MITRA registry 48.6% of women received reperfusion therapy as compared to 62.5% of men. [6] This study shows that women received reperfusion therapy equal to men.

Consistent with most previous investigations, [6,22-23] women in our study had a higher risk for hospital death after STEMI than men(13.5% vs 6.5%, p value 0.02). The Global Utilization of Streptokinase and t-PA for Occluded Coronary Arteries-I (GUSTO-I) angiographic study found gender to be an independent predictor of 30-day mortality after adjustment for clinical variables.[24] In the Myocardial Infarction Triage and Intervention Trial (MITI) registry, Kudenchuk PJ found that female gender independently predicted almost a doubling of hospital mortality.[25] After adjusting for age and in combination with other variables, including clinical risk factors and acute reperfusion strategies, we still found a gender difference in hospital mortality, with higher mortality rates in women.(p value - 0.005). The cause of increased mortality in women can be attributed to older age, more comorbid conditions and delayed presentation to hospital.

LIMITATIONS

The data represents from only one center in Nepal, so its results cannot be generalized to rest of country. Many of the patients were referred from other hospitals which might be the reason for longer prehospital delay. Patients who expired in emergency room and who were not admitted were not included in the study.

CONCLUSION

More than two third of the patients were men. Women were likely to be diabetic and smokers. Women presented to hospital significantly later than men after symptom onset. Women received reperfusion therapy similar to that of men. Inhospital mortality was more in women. Women and Killip class at presentation >I were significant predictor of inhospital death after adjustment with other variables.

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