Short Research Article

Acute coronary syndromes in women: angiographic features

Abstract :

Problematic and objectives : The incidence of coronary artery disease appears to be higher in men than in women. Nevertheless cardiovascular mortality is higher in women than in men. The objective of this study is to find if there are particular angiographic features that can explain this overmortality in women.

Methods : This is a retrospective descriptive and analytical study of 191 women with acute coronary syndrome who went through coronarography over a period of 5 years. We collected the angiographic findings that we analysed using the statistical software SPSS 0.2. Our results were then compared to the findings of the literature.

Results : In our study, the incidence of acute coronary syndrome in women was 4.4 times lower than in men. Menopause was the first cardiovascular risk factor and was found in 93.2% of our patients, followed by hypertension with a prevalence of 60.7%. 56.5% of our patients were diabetic. Dyslipidemia was found in 39.9% of our patients, smoking in 4.7%. All our patients underwent coronary angiography. The angiography was performed radially in 52% of the patients and femorally in 48% of the cases. It was normal with no significant lesions in 17% of cases. Atheromatous lesions dominated. 45% were mono-truncular, 28% were bi-truncular and 27% tritruncular.

Conclusion : Women generally have less extensive and less obstructive coronary disease. However, mortality is higher in women. A more careful approach to diagnosis and more invasive management is needed to reduce female mortality.

Key words :

Acute coronary syndrome, women, angiographic features

Introduction

Cardiovascular diseases are the leading cause of death among women and men. Although the incidence of coronary heart disease is higher in men than in women, cardiovascular mortality is higher in women than in men. (1-2) As a matter of fact, there are major differences between men and women concerning coronary artery disease. Women are described to have excessive vasoreactivity, and smaller vessel anatomy. (3)Therefore, the angiographic findings are quite different in coronary artery diseases. Our study aims to show the angiographic particularities of women diagnosed with acute coronary syndrome.

Methods

This is a retrospective descriptive and analytical study of 191 women with acute coronary syndrome in the department of cardiology B of Ibn Sina Hospital.

This study covers a 5-year period from January 2016 to December 2020 during which 843 patients were hospitalized for acute coronary syndrome, 191 of whom are women.

Data were collected from patient records and coronary angiography reports.

To standardise the collection of information, a standard form was drawn up for each file, using epidemiological, clinical, electrocardiographic and biological data,and echocardiographic data as well as angiographic and therapeutic data. Our series included

female patients who had undergone coronary angiography for acute coronary syndrome and had coronary angiography for acute coronary and having usable data.

The data collected was computerised using the statistical software SPSS 0.2.

Results

Characteristics of the population

In our study, the incidence of ACS in women was 4.4 times lower than in men. Women accounted for 22.6% of patients hospitalised for acute coronary syndrome. The average age of our female patients was 62 years with extremes between 31 and 100 years. 113 patients or 59.2% were between 60 and 74 years of age and 7.9% of our patients were young with an age below 45 years. Almost all of our patients (97.4%) had no social security coverage, only 5 patients had medical insurance.

Cardiovascular risk factors

Menopause was the first cardiovascular risk factor and was found in 93.2% of our patients, followed by hypertension with a prevalence of 60.7%. Only 57% of the hypertensive patients were balanced, 4.3% of them were not treated and 36.6% of all patients were on monotherapy with dual therapy in 16.8%. The average duration of hypertension was 7 years, with an incidental discovery in 2.1%. Three quarters of our postmenopausal patients were hypertensive. 56.5% of our patients were diabetic with an average duration of evolution of 10 years and an incidental discovery in 2% of women. 10% of patients had complicated diabetes with ND in 5.5% and RD in 2.7%. 51% of the diabetic patients were treated by oral antidiabetic and 30% by insulin with a combination of both in 6.3% of the patients. Diabetes was highly correlated with the number of coronary events with a p value of 0.004.

Dyslipidemia was found in 39.9% of our patients and 15% of them were not treated. Smoking with a prevalence of 4.7% was found in the youngest women. The average age of smoking patients was 50 years.

Table 1 : Cardiovascular risk factors

Cardiovascular risk factors	Number	Percentage
Menopause	178	93.2%
Hypertension	116	60.7%
Diabetes	108	56.5%
Age	75	39%
Dyslipiemia	59	30.9%
Smoking	9	4.7%

Angiographic features

All our patients underwent coronary angiography. The angiography was performed radially in 52% of the patients and femorally in 48% of the cases. It was normal with no significant lesions in 17% of cases. Atheromatous lesions dominated.

Table 2 : Distribution by the nature of the lesion

Nature of the lesion	Prevalence
Atheroma	83%
Thrombotic	13%
Calcifications	12.6%
Spasm	2.3%
intramyocardial bridge	1.1%

Table 3 : Distribution by location of significant lesions

Localisation	Prevalence
Proximal left coronary artery	1.2%
Distal left coronary artery	5%
Left anterior descending artery I	25%
Left anterior descending artery II	32%
Left anterior descending artery III	16%
Circumflex artery I	14%
Circumflex artery II	15%
Circumflex artery III	10%
Right coronary artery I	11.5%
Right coronary artery II	18%
Right coronary artery III	6.2%
Diagonal branch I	10%
Diagonal branch II	2.5%
Diagonal branch III	0.6%
Left marginal artery I	13%
Left marginal artery II	2.5%
Posterior interventricular artery	4.3%
Bisector branch	1.2%
Staged lesion of the left anterior descending artery	1.2%
Staged lesion of the right coronary artery	2.5%
Staged lesion of the circumflex artery	2.5%

84

85

Figure 1 : Distribution according to the number of coronary lesions

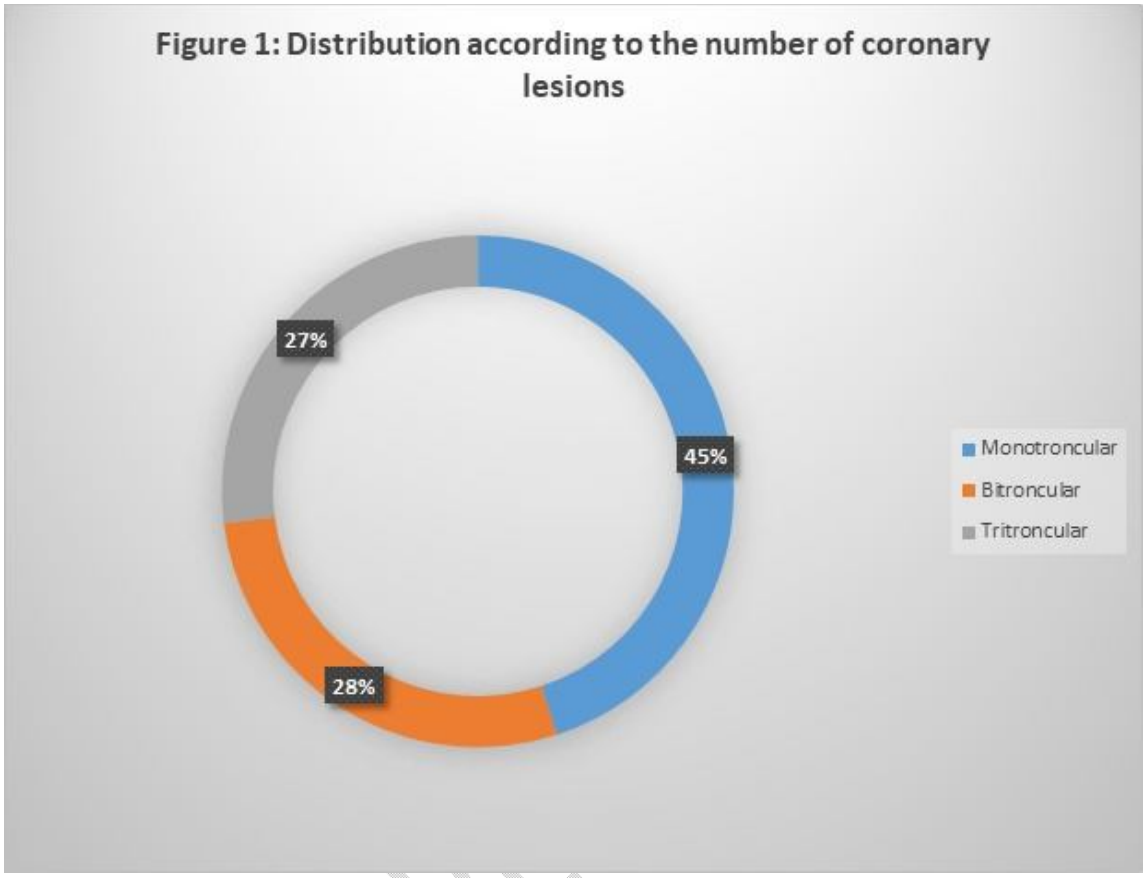
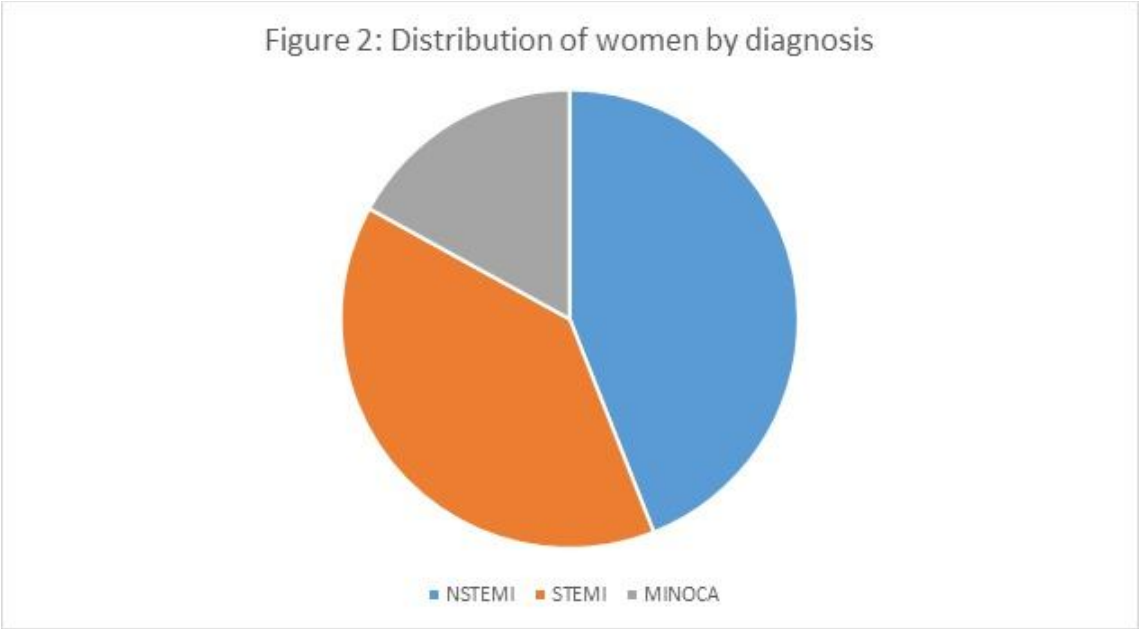


Figure 2 : Distribution of women by diagnosis



Discussion

As in men, atheroma is the primary cause of coronary heart disease, especially acute coronary heart disease in women. While acute coronary syndrome is most often caused by atherosclerotic plaque rupture, there is a significant amount of plaque erosion in women. (4-5) Women presenting with acute coronary syndrome have less extensive coronary artery disease than men as evidenced by fewer and more focal nonculprit lesions, and fewer vessels with angiographic nonculprit lesions. This is corroborated not only by coronarography but also by IVUS(6). The majority of our patients had atheromatous lesions (87%). Moreover, acute coronary syndromes without significant stenosis occur more often in women than in men. (7) 17% of our patients had MINOCA. Berger JS. And al showed that women had a higher incidence of non-obstructive disease than men 15% vs. 8%. (8) As a matter of fact, Spontaneous coronary artery dissection, a rare cause of acute coronary syndrome, is seen in 90% of cases in women of about 50 years of age without risk factors. In addition, coronary

spasm is more common in women, especially smokers. (9) The measurement of coronary flow reserve shows abnormal vasoreactivity in women with anginal syndromes without significant lesions at the coronary angiography. (10) Another peculiarity of women is that fewer trunks are affected, with a lesser tendency for tritruncular involvement. Among our patients, 45% were mono-truncular, 28% were bi-truncular and 27% tritruncular. Berger JS. And al found less frequent tritruncal damage 23% vs. 26%. This was corroborated by the PROSPECT study. (4) In summary, it was found that women have fewer significant lesions on coronary angiography, that they have a lower number of affected trunks, and that the atheromatous lesion is less extensive in women. In spite of this, mortality from acute coronary syndrome is higher in women than in men. This difference in mortality can reach a factor of 1.5, especially in young women. (11-12) This could be explained by the existence of other significant differences including delayed diagnosis due to atypical symptoms, a lower rate of invasive reperfusion and a delayed reperfusion, a greater effect of cardiovascular risk factors. (13-14)

Conclusion :

Coronary artery disease in women and men could be considered as two different entities in terms of both clinical and angiographic differences. Women generally have less extensive and less obstructive coronary disease. However, mortality is higher in women. A more careful approach to diagnosis and more invasive management is needed to reduce female mortality.

References :

1) Duda-Pyszny D, Trzeciak P, Gąsior M. Coronary artery disease in women. Kardiochir Torakochirurgia Pol. 2018;15(1):44-48. doi:10.5114/kitp.2018.74675

2) Nanette K Wenger, Clinical characteristics of coronary heart disease in women: emphasis on gender differences, Cardiovascular Research, Volume 53, Issue 3, February 2002, Pages 558–567, https://doi.org/10.1016/S0008-6363(01)00511-9

3) Impact of gender on short-term and long-term all-cause mortality in patients with non-ST-segment elevation acute coronary syndromes: a meta-analysis Yushu Wang1 and al, Intern Emerg Med DOI 10.1007/s11739-017-1684-y, 2017

4)] Gulati M, Cooper-DeHoff RM, McClure C, Johnson D, Shaw LJ, Handberg EM, et al. Adverse cardiovascular outcomes in women with nonobstructive coronary artery disease. A report from the Women's Ischemia Syndrome Evaluation Study and the St James Women take Heart Project. Arch Intern Med. 2009;169:843-50

5) Arant CB, Wessel TR, Ridker PM, Olson MB, Reis SE, Johnson DB, et al. Multimarker approach predicts adverse cardiovascular events in women evaluated for suspected ischemia: a report from the NHLBI-sponsored WISE-study. Clin Cardiol. 2009;32:244-50.

6) Lansky AJ, Ng VG, Maehara A, et al. Gender and the extent of coronary atherosclerosis, plaque composition, and clinical outcomes in acute coronary syndromes. JACC Cardiovasc Imaging 2012 ; 5(3 Suppl.) : S62- 72.)

7) Bugiardini R, Bairey Merz CN. Angina with 'normal' coronary arteries: a changing philosophy. JAMA. 2005;293:477-84.)

8) Berger JS, Elliott L, Gallup D, et al. Sex differences in mortality following acute coronary syndromes. Jama 2009 ; 302 : 874-82.)

9) Saw J, Aymong E, Sedlak T, Buller ChE, Starovoytov A, Ricci D, Robinson S et al. Spontaneous Coronary Artery Dissection: Association With Predisposing Arteriopathies and Precipitating Stressors and Cardiovascular Outcomes. Circ Cardiovasc Interv. 2014;7:645-55.)

10) Pepine CJ, Anderson RD, Sharaf BL, Reis SE, Smith KM, Handberg EM, et al. Coronary microvascular reactivity to adenosine predicts adverse outcome in women evaluated for suspected ischemia. Results from the National Heart, Lung and Blood Institute WISE Women's Ischemia Syndrome Evaluation) Study. J Am Coll Cardiol. 2010;55:2825-32

11) Champney KP, Frederick PD, Bueno H, et al. The joint contribution of sex, age and type of myocardial infarction on hospital mortality following acute myocardial infarction. Heart 2009 ; 95 : 895-9.

12) Vaccarino V, Krumholz HM, Yarzebski J, Gore JM, Goldberg RJ. Sex differences in 2-year mortality after hospital discharge for myocardial infarction. Ann Intern Med 2001 ; 134 : 173-81.

13) Benamer H, Bataille S, Tafflet M, Jabre M et al. Longer Pre-hospital Delays and Higher Mortality and in Women with STEMI: the e-MUST registry. Eurointervention. 2016;12(5):e542-9

14) Simon T. FAST-MI: differences entre les hommes et les femmes Annal Cardiol Angiol. 2013; 62:221-6.

Tables and figures

Table 1 : Cardiovascular risk factors

Table 2 : Distribution by the nature of the lesion

Table 3: Distribution by location of significant lesions

Figure 1 : Distribution according to the number of coronary lesions

Figure 2 : Distribution of women by diagnosis