

Diffusion Factors of Coronary Artery Disease: A Comparative Study of 130 Patients

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Abstract

Original Research Article

Multivessel coronary artery disease is usually defined by the presence of angiographic stenosis over 50% in at least two of the three epicardic coronary trunks. This multivessel lesion is associated with pejorative prognosis, particularly in case of proximal anterior interventricular artery (proximal LAD) stenosis and/or left ventricular dysfunction [1]. The aim of our study is to compare the epidemiological, clinical and angiographic particularities of multivessel coronary patients with single vessel patients in order to suggest the different predictive factors of coronary lesion diffusion and to identify high risk patients in need of special attention and new therapeutic strategies. We conducted a transversal and descriptive study on over 130 patients, between January 2016 to January 2017, at the catheterization laboratory in the cardiology and vascular diseases department of university hospital Mohamed 6 in Marrakech. The prevalence of multivessel coronary artery disease was 40%+/-4%. In a bivariate analysis only age, diabetes and smoking were predictive of multivessel lesions. A multidisciplinary approach resting on clinical and angiographic scores is actually the cornerstone in the decision-making process to provide medical management of multivessel coronary lesions.

Keywords: Multivessel coronary artery disease, predictive factors, Diffusion, atherosclerotic, diabetes.

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INTRODUCTION

Multivessel coronary artery disease is usually defined as the presence of angiographic stenosis over 50% in at least two of three epicardic coronary trunks. This multivessel lesion is associated to a pejorative prognosis, especially in case of proximal LAD and/or left ventricular dysfunction [1]. Patients presenting with multivessel lesions are known to be older, having more comorbidities, cumulating multiple cardiovascular risks. The diffused and aggressive atherosclerotic lesions expose to myocardial ischemia [2]. Patients usually have a left ventricular dysfunction, and it darkens the prognosis.

The purpose of our study is to compare the epidemiological, clinical and angiographic particularities of multivessel coronary patients with single vessel patients in order to suggest the different predictive factors of coronary lesion diffusion and to identify high risk patients in need of special attention and new therapeutic strategies.

MATERIAL AND METHODS

We conducted a transversal and descriptive study on over 130 patients, between January 2016 to January 2017, at the catheterization laboratory in the cardiology and vascular diseases department of university hospital Mohamed 6 in Marrakech.

We had integrated all patients explored with coronarography, including these criteria's: typical or atypical angina, dilated cardiomyopathy etiology examination, and post myocardial infarction examination. Therefore, we have excluded, valvular heart patients undergoing preoperative coronary angiography.

RESULTS

a) Epidemiology

The prevalence of multivessel coronary artery disease was 40%+/- 4%.

The age average of multivessel population was 62+/- 8 years with a male predominance of 63%.

Table-1: Diffusion of coronary lesions according to age

| | Multivessel lesions | single vessel lesions | P value |
|----------------------|---------------------|-----------------------|---------|
| Average age in years | 62+/-8 | 58+/-9 | 0.05 |

Table-2: distribution according to sex

| Sex | Multivessel lesions | single vessel lesions |
|--------|---------------------|-----------------------|
| Male | 33(63%) | 31(70,5%) |
| Female | 19(37%) | 13(29,5%) |
| Total | 52(100%) | 44(100%) |

b) Cardiovascular risk factors

The cardiovascular risk factors was dominated with diabetes (65,4%), smoking(61,5%), high blood

pressure(60%), and obesity in 60%. 63,5% of patients had more than 3 cardiovascular risk factors.

Table-3: Diffusion of coronary lesions according to cardiovascular risk factors

| | Multivessel lesions | single vessel lesions | P value |
|---------------------|---------------------|-----------------------|---------|
| High-blood pressure | 31 (60%) | 22 (50%) | NS |
| Diabetes | 34 (65, 40%) | 19 (43, 2%) | 0.029 |
| Smoking | 32 (61, 50%) | 17 (38, 6%) | 0,025 |
| Dyslipidaemia | 24 (46, 20%) | 19 (43, 2%) | Ns |
| Obesity | 31 (60%) | 22 (50%) | Ns |
| Menopause | 19 (37%) | 12 (27, 3%) | Ns |
| >3 CvxF | 33 (63, 50%) | 20 (45, 5%) | Ns |

c) Comorbidities

19, 2 % of patients having renal failure have multivessel lesions vs 9.1% of single vessels, this difference are not significant.

13.5% of patients presenting with anaemia were multivessel vs 4, 5% of single vessels, with a non-significant statistic difference.

5.8 % of patients that were followed for a chronic obstructive pulmonary disease had presented multivessel coronary lesion vs 6.8% of single vessels.

Table-4: Distribution of comorbidities in the 2 groups of patients

| | Multivessel lesions | single vessel lesions | P value |
|---------------------------------------|---------------------|-----------------------|---------|
| Renal failure | 19,2% | 9,1% | NS |
| Anaemia | 13,5% | 4,5% | NS |
| Chronic obstructive pulmonary disease | 5,8% | 6,8% | NS |

d) Clinical presentation

The multivessel status was discovered after chronic coronary syndrome in 83% of cases. Dyspnea was associated in 67, 3% of cases and in 15,4% of cases.

vessels (52.73 % +/- 9.5% vs 49 % +/- 11.8% in multivessels; p value non-significant)

47.1% of patients having e LVEF < 50% have presented multivessel lesions vs 26.8% of single vessels , this difference was statistically significant (p= 0,047)

e) Transthoracic echocardiography findings

The echocardiography found a preserved left ventricular systolic function (LVEF>50%) in single

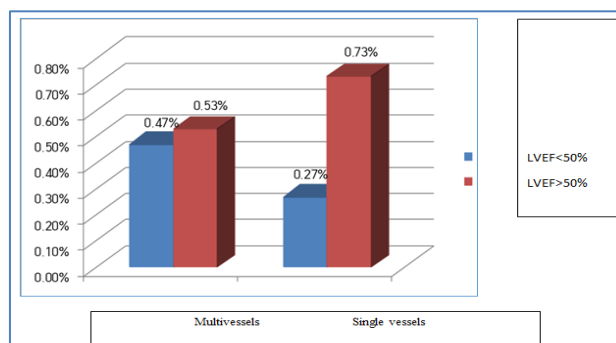


Fig-1: A graphic comparing LVEF in the 2 groups of patients according to LVEF

We noticed a kinetic disorder in 70.6% of patients having multivessel lesions vs 59, 1% in single vessels group. Moreover, complications such as

ischaemic mitral regurgitation was present in 33.3% multivessels vs 20,5 % in single vessels, left ventricular dilatation was found in 7,7%.

Table -5: Echocardiography findings

| | Multivessel group | Single vessel group |
|----------------------|-------------------|---------------------|
| LVEF | 49+/-11,8% | 52,73+/_9,5% |
| Kinetic disorder | 33,3% | 20,5% |
| Mitral regurgitation | 70,6% | 59,1% |

f) Angiography findings

The coronary status evaluation findings were triple vessel lesions predominance in 31% of patients and two vessel lesions in 9% of cases. The lesions of left anterior descending artery was found in both groups, however it was present in 94,2% of the multivessel group In which 63,5% were in mild segment vs 72,7% of single vessels. Followed by, right coronary artery lesions in 86, 5% vs 25% of single vessels and circumflex artery in 71,2% vs 15,9% in single vessels cases.

Type B/C lesions were found in 47% of cases with high proportion of calcifications up to (50%) in multivessels vs 20.5% in single vessels group. We found in multivessels long lesions in (65,4%), chronic occlusions (79%) vs respectively 29,5% and, 14,5% in single vessels group.

g) Therapeutic management

After coronary angiography, only medical treatment was started in 7.7% in cases. Angioplasty procedure was indicated in 42, 3% with Drug-eluting stent in 59%. In 28,8% of cases the revascularization was surgical using CAB graft.

Table-6: Comparing therapeutic management in both groups

| | Multivessel group | single vessel group |
|--------------------------------|-------------------|---------------------|
| Medical strategy alone | 7,7% | 18,2% |
| Medical treatment +angioplasty | 42,3% | 77,3% |
| Medical treatment + CABG | 28,8% | 4,5% |

DISCUSSION

The extension of lesions is an important prognosis factor in coronary patients; causing specific problems in term of revascularization, due to the number of sites to treat. The epidemiological studies demonstrated that multi vessel CAD patients had high risk of mortality in comparison with single vessel patients, with an increased mortality risk if associated to left ventricular dysfunction [3, 4]; thus, they must be identified for therapeutic implications. Clinical parameters and non-invasive examination could predict the patients at risk of diffuse coronary artery disease.

Predictive elements of multi vessel coronary artery disease

Age

In our study, the average of our multi vessel coronary artery disease patients age was 62+/- 8 years vs 58+/_9 years in single vessel patients, with a significant statistic difference (p=0,05) ; this result is similar to most published studies.

Cardiovascular risk factors

In our study, diabetes and smoking are the main risk factors related to multi vessel lesions, compared to single vessels (65,4%, 61,5%, versus 43,2%, 38,6% with a significant p value) the different risk factors of atherosclerosis have low predictive value of multivessel coronary artery disease[5]. However

other studies, found that the inherited genetic susceptibility of coronary artery disease was the risk factor independently of others, and had the highest predictive value 62% of multivessel coronary artery disease [6].

LVEF

In our study 47, 1% of multivessel patients had a LVEF <50% versus 26, 8% of single vessel patients, this difference was statistically significant (p=0,047), we concluded that a low LVEF is associated to a multivessel coronary artery disease.

Others

Other parameters were evaluated in other studies, particularly, residual angina, myocardial ischemia tests such as exercise stress test and myocardial scintigraphy. These studies concluded that patients with residual angina had more multivessel lesions than asymptomatic patients in 79% versus 45% [7]. Whereas in others, residual angina had no predictive value of multivessel coronary artery disease [8, 9]. In review of literature, negative maximal exercise stress test is highly predictive of the absence of multi vessel coronary artery disease [6, 10, 11].

CONCLUSION

Multivessel coronary artery disease constitutes a particular entity in terms of their anatomy, physiopathology, clinical expression, angiographic status and the therapeutic management.

The Multivessel coronary artery disease of our study is characterized by: Advanced age, aggressive and diffuse atherosclerotic lesions, the association with comorbidities, and a high cardiovascular risk score, a higher rate of diabetic patients, and stable angina as a dominant clinical feature. A severe angiographic assessment with higher proportion of calcifications, type B2/C lesions, long lesions and chronic occlusions.

The therapeutic management was based on different techniques of myocardial revascularization. The diffusion of coronary lesions is an important prognostic factor. The identification of the predictive elements of multivessel lesions makes it possible to identify a subgroup of high risk patients, who can benefit from special attention and new therapeutic strategies. Only age, diabetes and smoking seem to be predictive of multivessel involvement in our study.

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