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RESEARCH ARTICLE

FREQUENCY OF CORONARY ARTERY DISEASE IN VALVULAR AORTIC STENOSIS :EXPERIENCE OF THE CARDIOLOGY CENTER OF MOHAMED V MILITARY HOSPITAL ABOUT 148 CASES

D. Massimbo, S. Nikièma, S. Ahchouch, I. Asfalou and A. Benyass

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Abstract

Introduction: The risk factors for aortic stenosis have been shown to be similar to those for atherosclerosis. Thus, coronary disease is often found simultaneously in patients with aortic stenosis. Our work aims to determine the frequency of coronary disease in a Moroccan population with aortic stenosis while recalling the causes and the prognostic and therapeutic impacts of this association.

Materials and Methods: This is a retrospective study of 148 patients hospitalized at the cardiology center of the military hospital of Rabat over a period of 24 months, during which we analyzed clinical, electrocardiographic, echocardiographic and coronarographic data of the patients in order to evaluate the coronary involvement during aortic stenosis.

Results: The mean age of the population was 65 [57, 74] years, the sex ratio was 1.21. Smoking reported in 38.5% of patients was the main modifiable cardiovascular risk factor, followed by hypertension in 35.8% of patients. Dyspnea on exertion was the most frequent reason for consultation at 81%, 64% of which were at least NYHA functional class III, followed by angina, which represented 33% of the series. The aortic stenosis was tight in the majority (mean SAo: 0.8 cm^2) and the left ventricular ejection fraction was preserved overall. Coronary artery disease was associated with aortic stenosis in 24% of cases, with predominantly monotruncal involvement (53%) followed by tritruncal involvement (30%). 21.6% of these patients underwent coronary artery bypass grafting concomitantly with surgical replacement of the aortic valve.

Conclusion: The incidence of coronary artery disease associated with aortic stenosis is variable according to age. It is higher in European series because of aging. In our relatively younger population, it is lower but not negligible.

Introduction:-

Aortic stenosis and coronary artery disease (CAD) are common cardiovascular diseases, especially in developed countries, and their coexistence is frequent (1). Detection of coronary artery disease (CAD) in patients with aortic stenosis is difficult, because aortic stenosis may mask the symptoms of CAD. Safety and diagnostic reliability relies on coronary angiography (2).

Corresponding Author:- D. Massimbo

Given the aging of the population and the increase in the prevalence of degenerative aortic stenosis, the frequency of coronary artery disease associated with this valve disease is significant in developed countries. In the African literature, where rheumatic fever is endemic, there are few data concerning coronary disease during aortic stenosis. In this sense, our work proposes to determine the frequency of coronary involvement in a Moroccan population group with aortic stenosis while recalling the causes and the prognostic and therapeutic impacts of this association.

Materials and Methods:-

This study was carried out at the cardiology center of the Mohammed V military training hospital in Rabat. A total of 148 patients were enrolled. Patients aged over 18 years with aortic stenosis defined according to ESC recommendations were included. Exclusion criteria included: infective endocarditis, patients with prostheses, subvalvular and supravalvular aortic stenosis.

The primary objective was to study coronary involvement during aortic stenosis to further understand this association. Coronary disease was defined as stenosis of at least 50% of the lumen of the common trunk and 70% of the other epicardial arteries as assessed by angiography.

Statistical analysis was performed with SPSS software, version 18. The results are expressed as numbers (percentages) for qualitative variables, as mean +/- standard deviations for quantitative variables with symmetric distribution, and as median and quartiles for quantitative variables with asymmetric distribution.

The normality of the distribution of quantitative variables is verified by the Gauss histogram and the Kolmogorov-smirnovnormality test.

Qualitative variables are compared by the Chi-square test, quantitative variables with symmetric distribution by the Student's t-test and quantitative variables with asymmetric distribution by the Mann-Whitney test.

Results:-

Over a period of two years, we collected a total of 148 patients. The mean age of the population was 65 [57.2; 73.8] years (extremes 18-88), two thirds of whom were older than 60 years (Figure 1). The sex ratio was 1.21 with male predominance; aortic stenosis was more frequent in men.

Smoking (current or former) reported in 38.5% of patients was the main modifiable cardiovascular risk factor, followed by hypertension which concerned 35.8% of patients. Diabetes and dyslipidemia accounted for 21% and 16.6% respectively (Figure 2).

Dyspnea on exertion was the most frequent reason for consultation at 81%, 64% of which were at least NYHA functional class III, followed by angina, which represented 33% of the series. Palpitations and syncope accounted for 21% and 16% respectively.

Aortic stenosis was tight in the majority (mean SAo: 0.8 cm^2) and left ventricular ejection fraction (LVEF) was preserved overall. The median LVEF was 60% with an interquartile range of 47 to 68%. Moderate to severe LV dysfunction was present in 31% of the population (Table 1).

In fact, aortic stenosis was rarely isolated. Coronary artery disease was associated in 24% of cases (Figure 3) with predominantly monotruncal involvement (53%) followed by tritruncal involvement (30%) (Figure 4). 21.6% of these patients underwent coronary artery bypass grafting concomitantly with surgical replacement of aortic valve (Table 2).

Discussion:-

The pathophysiological basis of degenerative aortic stenosis and epicardial coronary artery disease is atherosclerosis (3). The link is so close that aortic valve calcification has been proposed as a risk factor for coronary atherosclerosis. In fact, risk factors for aortic stenosis have been shown to be similar to atherosclerosis (4). Therefore, coronary artery disease is often found simultaneously in patients with aortic stenosis. It is not easy to distinguish between myocardial damage related to coronary artery disease and myocardial damage purely related to aortic stenosis.

Indeed, in the context of aortic stenosis, the clinical assessment of coronary artery disease is difficult. Studies (5, 6) have shown that angina pectoris has a low positive predictive value for coronary artery disease in patients with aortic stenosis. Indeed, less than 50% of patients with aortic stenosis and typical angina have significant coronary lesions. In the other cases, myocardial ischemia can be explained by left ventricular hypertrophy, which leads to increased oxygen requirements and changes in the coronary microcirculation (crushing of intramyocardial arterioles). The negative predictive value of angina pectoris is high. However, patients with aortic stenosis may have significant coronary involvement without chest pain. Non-invasive techniques (transesophageal ultrasound, coroscanner) also have limitations in reliably diagnosing coronary artery disease. Given these limitations, coronary angiography is the only means currently available to ensure reliable detection of coronary artery disease associated with aortic stenosis. It is recommended in patients with aortic stenosis who present with chest pain, objective signs of ischemia, decreased left ventricular systolic function, a history of coronary artery disease, or coronary risk factors including age (7). It is routinely performed in the preoperative evaluation of aortic stenosis in men older than 40 years and in women older than 50 years.

In our series, all patients had undergone coronary angiography.

The frequency of associated significant coronary artery disease was 24.3%, of which 52.7% had monotruncal lesions, 16.7% had bitruncal lesions, and 30.7% had tritruncal lesions. In the European literature, the prevalence of coronary artery disease associated with aortic stenosis increases with age. It is 30.2% in the age group [51-60], 41.2% in the age group [61-70], and 51.2% in subjects older than 71 years (8). Compared with the literature, the frequency of coronary involvement is lower in our series. In fact, our population with a mean age of 65 years is younger than the mean age reported in the literature.

Tables and Figures

Characteristics	***Patients N=148***
Demographics	
Age (years)	65[57,23 ; 73,75]
Sex	
Man	81(54,7)
Woman	67(45,3)
BMI (Kg/m2)	25,75[23,2 ; 28,7]
functional and physical signs	
Dyspnea	121 (81,2)
Stage dyspnea	
Stage II	44(36, 36)
Stage III	44(36,36)
Stage IV	33(27,27)
Chest pain	48 (33,1)
Syncope	24(16,2)
Palpitation	32(21,6)
Signs of left heart failure	10 (6,8)
Signs of right heart failure	18 (12,2)
VG parameters	
DTDVG mm	52,04±9,41
DTSVG mm	34,37±9,32
Mean FEVG :	60 [47,68]
Moderate LV dysfunction:	29%
Severe LV dysfunction	2%

Table 1:- clinicals and echocardiographics characteristics of patients.

Qualitative variables are expressed in numbers (percentage). The distribution of quantitative variables is verified by the Kolmogorov Smirnov test. They are expressed as:

1. Mean +/- standard deviation for variables with symmetric distribution.
2. Median [quartiles] for variables with asymmetric distribution.

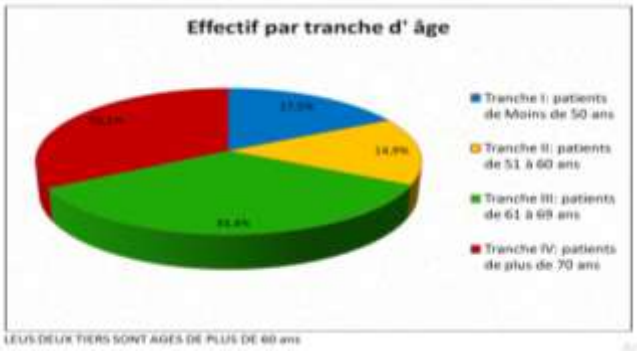

Figure 1:- Distribution of the population by age group.

Characteristics	***Effectif (n=148)***
Indication	
Surveillance	10(8,8)
Replacement by mechanical prosthesis	90(60,8)
Bioprosthesis replacement	48 (32,4)
Coronary artery bypass surgery	
Yes	32(21,6)
No	116(78,4)

Table 2:- Management of Coronary Disease In Aortic Stenosis.

Conclusion:-

The incidence of coronary artery disease associated with aortic stenosis is variable with age. It is higher in European series because of aging. In our relatively younger population, it is lower but not negligible. The treatment consists essentially of coronary artery bypass surgery associated with replacement of the aortic valve by prosthesis.

Aknowledge:-

My sincere thanks to all my respected teachers for their guidance. I am thankful to all the patients who made this study possible.

Conflicts of Interest:-

None

References:-

1. **Kodali** and al (2012) Coronary artery disease and aortic stenosis in the era of catheter-based aortic valve replacement: old questions, new paradigms: the evolving role of percutaneous coronary intervention in the treatment of patients with aortic stenosis. Drawing 2012 , 125 , 975-977. [Google Scholar]
2. **Giuseppe Di Gioia** and al (2021) Pathophysiology, Diagnosis, and Treatment of Patients with Concomitant Severe Aortic Stenosis and Coronary Artery Disease: A Closer Look to the Unresolved Perplexity J Clin Med 2021 Apr 11;10(8):1617.doi: 10.3390/jcm10081617.
3. **Kang H.** Zheng and al (2020), « Pathophysiology of Aortic Stenosis and Future Perspectives for Medical Therapy », *Cardiology Clinics* 38, n° 1 (février 2020): 1-12, https://doi.org/10.1016/j.ccl.2019.09.010.
4. **B. F. Stewart and al** (1997), « Clinical Factors Associated with Calcific Aortic Valve Disease. Cardiovascular Health Study », *Journal of the American College of Cardiology* 29, n° 3 (1 mars 1997): 630-34, https://doi.org/10.1016/s0735-1097 (96)00563-3.
5. **A. Vandeplas et al (1988),** « Frequency of Angina Pectoris and Coronary Artery Disease in Severe Isolated Valvular Aortic Stenosis », *The American Journal of Cardiology* 62, n° 1 (1 juillet 1988): 117-20, https://doi.org/10.1016/0002-9149 (88)91375-6.

6. **A. H. Rapp and al. (2001),** « Prevalence of Coronary Artery Disease in Patients with Aortic Stenosis with and without Angina Pectoris », *The American Journal of Cardiology* 87, n° 10 (15 mai 2001): 1216-17; A7, https://doi.org/10.1016/s0002-9149 (01)01501-6.
7. **Helmut Baumgartner and al** (2017), « 2017 ESC EACTS Guidelines for the Management of Valvular Heart Disease », *European Heart Journal* 38, n° 36 (21 2017): 2739-91, https://doi.org/10.1093/eurheartj/ehx391.
8. **P. kvidal and al (2000)** « Observed and relative survival after aortic valve replacement. J Am CollCardiol 2000 Mar 1;35(3):747-56. doi: 10.1016/s0735-1097(99)00584-7.