

Particularities of Coronary Artery Disease in the Elderly in a Black African Country in the South of the Sahara (Senegal)

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Abstract

Due to the demographic progression of our societies and the increasing prevalence with age of coronary artery disease, we will increasingly face the treatment of acute coronary syndrome in elderly patients (> 70 years). Very little data has been published in Africa, particularly in the South of the Sahara. This series shows the severity of coronary lesions in subjects aged over 70 years admitted to the cardiology department of the Aristide Le Dantec hospital and the interest of the invasive strategy in this population.

Introduction: Coronary artery disease in the elderly is often more diffuse and severe. The objective of our study was to describe the results of coronary angiography and angioplasty in the elderly in Senegal.

Methodology: A monocentric, retrospective and descriptive study over a period of 39 months from 1 May 2013 to 31 July 2016 was carried out within the cardiology department of the teaching hospital: Aristide Le Dantec in Dakar. Were included all patients who had coronary angiography with a complete clinical record.

Results: A total of 380 records were collected during the study period. The prevalence of subjects over 70 years of age was 12.7% (n = 38). The mean age was 74.37 +/- 4.1 years. The sex ratio was 2.35 in favor of men. The main risk factors were hypertension (51%), sedentary lifestyle (46.8%) and diabetes (27.7%). The main indications were SCA ST + in 14 cases (29.8%) and the angina of effort in 11 cases (23.4%). Nearly half (51.1%) of the patients had angina pain at discharge. LV systolic dysfunction was noted in 21 patients (58.3%). Nine (19.1%) patients were able to benefit from thrombolysis. Coronary angiography was programmed in most of our patients (80.9%), the right femoral approach was preferred (70.2%). The average duration of the procedure was 66.24 min.

At the angiogram, a mean Syntax score was high in 4 patients (8.5%) in subjects over 70 years, with diffuse coronary involvement both in the proximal but also distal segments; And with many more coronary occlusions within this population group. Coronary angioplasty with stent placement was proposed in 13 patients (27.7%), with almost as many active stents as bare stents and good result And TIMI 3 streams in 84.6%. Very few incidents and complications related to angioplasty were noted.

Conclusion: Our work confirms the greater severity of coronary lesions in the elderly black African. Coronary angioplasty is achievable with a high success rate.

Keywords: Coronary Heart Disease; Elderly; Black Africa; Senegal; Coronary Angiography; Angioplasty; Dakar

Introduction

With the continuous increase in life expectancy at birth, the proportion of elderly people over 70 years of age has increased considerably in African countries. The coronary disease of the elderly is known to be very diffuse and more severe than that of the young subject (ref). So far, very little literature has been published in Africa, particularly in sub-Saharan Africa, in this ever-increasing population. Age is a risk factor in the development of coronary artery disease and the aging of the population generates an increase in the proportion of elderly coronary patients. Age is the most powerful independent factor of intra-hospital mortality and of medium-term morbidity and mortality in cases of myocardial infarction [1]. The advent of coronary angiography and coronary angioplasty has altered the prognosis of older coronary arteries. Through this retrospective study carried out at the Cardiology Department of the Aristide Le Dantec University Hospital in Dakar, Senegal, we wanted to study the peculiarities of coronary artery disease in patients over 70 years of age and more specifically the epidemiological profile of these elderly patients admitted in the catheterization room, indications, procedure of examination, results as well as angioplasty.

Patients and Methods

The cath lab of the teaching hospital Aristide Le Dantec began its activities on first of May 2013. This study took into account all coronary angiography procedures and coronary percutaneous angioplasty performed in our department in patients over 70 years of age over a period of 39 months between May 1st and 2013 and July 31st, 2016, were included. Clinical admission data, hospital outcomes and complications were collected from hospital records and patient records. Data on coronary

angiography and coronary angioplasty procedures were collected from a coronary angiography report. In addition, each film of coronary angiography and / or coronary angioplasty has been re-read exhaustively by 2 experienced operators.

An occlusive lesion is defined by a stenosis of more than 90% of the arterial lumen; a lesion is described as tight if the stenosis is between 70 and 90%, significant between 50 and 70%. The lesion is intermediate if the stenosis is 50% and not significant if the stenosis is less than 50%. Patients were classified according to the number of coronary arteries affected by monoton-cular (epicardial vessels), two-vessel (two epicardial vessels) and three-triccated (three epicardial vessels). Depending on the complexity the lesions were classified as type A, B (B1, B2) and C according to the ACC / AHA classification [2].

The primary success of coronary angioplasty was defined as residual stenosis <50% and TIMI 3 (Thrombolysis in Myocardial Infarction). By convention, arterial reperfusion was defined by the TIMI grades established in the first clinical trials of thrombolysis in myocardial infarction. The data were analyzed using the software SPSS 20.0 software. A value of $p < 0.05$ is considered statistically significant.

Results

During the study period, 380 acts of coronary angiography were performed in the center. Of these, 12.7% of coronary angiography occurred in 38 patients aged over 75 years. Patient characteristics and clinical data are detailed in Table 1. The mean age of patients was 74.37 years (range: 71 to 89 years), with a male predominance (70.2%). The prevalence of hypertension

was high (51.1%) and diabetes (27.7%). The sedentary rate was 46.8%.

The initial symptomatology leading to hospitalization was chest pain in more than half of the cases (51.1%). The main indication was coronary syndromes with a

persistent ST segment elevation (STEMI) offset (29.8%), followed by exercise angina (23.4%). Thrombolysis was performed in 9 patients (19.1%). At echocardiography, the average ejection fraction was impaired in the 21 elderly patients (58.3%).

Variables	Patients over 70 years old N (%)	Patients under 70 years old N (%)	P value
Men	33 (70,2%)	255 (76,6%)	NS
Women	14 (29,8%)	78 (23,4%)	NS
Sex ratio (H/F)	2,35	3,26	NS
Average age (ans)	74,37	57,51	NS
Cardio-Vascular Risk Factors			
High blood pressure	24 (51,1%)	157 (47,1%)	NS
Dyslipidemia	7 (14,9%)	64 (19,2%)	NS
Over weight	14 (29,8%)	82 (24,6%)	NS
Diabetes	13 (27,7%)	102 (30,6%)	NS
Smoking	8 (17%)	85 (25,5%)	NS
Sedentariness	22 (46,8%)	98 (29,4%)	0,02
Heredity	3 (6,4%)	39 (11,7%)	NS
Known with coronary disease	10 (21,2%)	87 (26,1%)	NS
Onset Symptoms			
Chest pain	24 (51,1%)	137 (41,1%)	NS
Dyspnea	3 (6,4%)	18 (5,4%)	NS
Asymptomatic	20 (42,6%)	175 (52,6%)	NS
Reduce dejection fraction	21 (58,3%)	85 (36,3%)	0,02
Indications for Angiography			
STEMI	14 (29,8%)	90 (27%)	NS
NON STEMI	3 (6,4%)	11 (3,3%)	NS
Unstable angina	9 (19,1%)	73 (21,9%)	NS
Stable angina	11 (23,4%)	78 (23,4%)	NS
Myocardial infraction	7 (14,9%)	56 (16,8%)	NS
Other	3 (6,4%)	25 (7,5%)	NS
Fibrinolysis	9 (19,1%)	42 (12,7%)	NS

Table1: Characteristics and clinical data of the population.
STEMI : ST segment persistant elevation myocardial infraction

Coronary angiography was programmed in most of our patients (80.9%), the right femoral approach was preferred (70.2%). The average duration of the procedure was 66.24 min. At the angiography, a mean Syntax score

was high in 4 patients (8.5%) in subjects over 70 years, with diffuse coronary involvement both in the proximal but also distal segments; And with many more coronary occlusions within this population category (Table 2).

Variables	Patients over 70 years old N (%)	Patients under 70 years old N (%)	P value
Planned angiography	38 (80,9%)	303 (91%)	NS
Primary angioplasty	1 (2,1%)	0 (0%)	NS
Delayed angioplasty	8 (17%)	22 (6,6%)	0,006
Rescue angioplasty	0 (0%)	5 (1,5%)	0,02
Procedure Pathways			
Right radial artery	23,4%	31,5%	NS
Right femoral artery	70,2%	62,2%	NS
Left femoral artery	0%	0,6	NS
Femoral artery after unsucceeded radial	6,4%	5,7%	NS
Right dominant circulation	30 (63,8%)	212 (63,7%)	NS
Bisector artery	6 (13,3%)	32 (10,1%)	NS
Lesion \geq 50%	6 (12,8%)	21 (6,4%)	0,05
Lesion \geq 50 % proximal IVA	21 (44,6%)	95 (28,7%)	0,02
Lesion \geq 50% middle IVA	12 (25,5%)	85 (25,6%)	NS
Lesion \geq 50% distal IVA	5 (10,6%)	22 (6,6%)	NS
Lesion \geq 50% proximal circonflexe artery	14 (29,8%)	66 (19,8%)	0,0001
Lesion \geq 50% distal circonflexe artery	9 (19,4%)	42 (12,6%)	0,05
Lesion \geq 50% proximal right coronary artery	9 (19,5%)	54 (16,3%)	NS
Lesion \geq 50% middle right coronary artery	19 (41,3%)	74 (22,3%)	0,05
Lesion \geq 50% distal right coronary artery	6 (13%)	18 (5,4%)	0,02
Poximal IVA occlusion	7 (14,9%)	29 (8,8%)	0,02
Proximal circonflexe occlusion	10 (21,3%)	19 (5,7%)	0,000
Proximal right coronary occlusion	2 (4,3%)	19 (5,7%)	NS
A lesion	3 (6,4%)	30 (9%)	NS
B1B2 Lesion	19 (40,4%)	122 (36,6%)	NS
C Lesion	10 (21%)	50 (15%)	NS
Syntax Score \geq 22	4 (8,5%)	10 (3%)	0,001
Monotron cular lesion	5 (14,3%)	105 (46,9%)	0,001
Bitron cular lesion	17 (48,6%)	67 (29,9%)	0,001
Tritron cular lesion	13 (37,1%)	52 (23,2%)	0,001
DAP* Average cumulative (cGy.cm2)	8123	8258	0,013
Duration of the average procedure (minutes)	66,24	60,31	NS

Table 2: Coronarography data.

DAP : Dose Area Product

Coronary angioplasty with stent placement was proposed in 13 patients (27.7%), with almost as many active stents as bare stents and a good result and TIMI 3

flux in 84.6% (Table 3). Very few incidents were reported during the procedure and very few complications related to the angioplasty procedure, including coronary dissection followed by the death of a patient.

Variables	Patients over 70 years old N (%)	Patients under 70 years old N (%)	P value
Angioplasty	13 (27,7%)	77 (23,1%)	NS
Bare Stent	7 (14,9%)	45 (13,5%)	NS
Active Stent	8 (17%)	43 (12,9%)	NS
Succesfull Angioplasty	11 (84,6%)	73 (94,8%)	NS
Procedure's Complications			
Coronary dissection	1 (2,1%)	1 (0,3%)	0,00
Stroke	0 (0%)	1 (0,3%)	0,00
Cardiogenicchock	1 (2,1%)	0 (0%)	0,00
Death	1 (2,1%)	0 (0%)	0,00
Procedure's Incidents			
Angina	3 (6,4%)	7 (2,1%)	0,09
Vagalreaction	0 (0%)	5 (1,5%)	NS
Ventriculartachycardia	0 (0%)	2 (0,6%)	NS
Other	2 (4,3%)	2 (0,6%)	NS

Table 3: Angioplasty data.
NS : Non Significant

Discussion

The prevalence of hospitalized patients for coronary angiography is increasing in sub-Saharan Africa in the space of a few decades (coronafic). This is justified by the epidemiological transition in the developing countries, marked by the emergence of cardiovascular diseases, which have already reached the weight of infectious and nutritional diseases [3]. Rapid urbanization of tropical regions, steady progression of cardiovascular risk factors and deficiencies in preventive medicine explain these observations [4].

The use of coronary angioplasty and angioplasty is less often planned in the elderly. This study has shown that coronary angiography can prove useful in elderly patients, and that it allows us to propose, in almost a third of cases, coronary angioplasty with a high success rate, correct feasibility, but at the cost of complications Smaller but slightly more frequent compared to young subjects. Patients over 70 years of age represented 12.7% of all coronary angiography patients period of study. The main indications of coronary angiography in these subjects are

acute coronary syndrome (ACS) and angina of effort. In the series of Kanwar et al. [5], 79% of 90 years old patients with coronary artery disease had ACS, 56% had unstable angina, and 23% had MI. It is during ACS that the usefulness of the invasive approach seems the most obvious [6]. However, patients aged over 70 years proposed for coronary angiography are generally very selected.

In the work of Bagnall et al. [7] based on the ACS and GRACE registers, it was noted that the increase in the rate of invasive procedures over time benefited patients aged less than 65 years even though there was a significant increase in the use of invasive procedures Coronary angiography and angioplasty in elderly subjects. In our series, the femoral pathway was the most used for coronary angiography and coronary angioplasty. The difficulties of retrograde catheterization were more frequent in the radial than in the femoral, and sometimes led to a conversion to the femoral tract.

To the best of our knowledge, there are no studies comparing the radial to the femoral pathway in black African elderly subjects. In a randomized study comparing

the two pathways in patients over 75 years of age, the duration of the procedures was not different and the conversion rate of the radial pathway to the femoral pathway was 9% [8]. In almost all published series, the femoral pathway was exclusive [6] or predominant (> 80%) [5,9,10,11] as was the case in our series. Only a French study reports the majority use of the radial pathway in a population of more than 85 years, mainly male [12]. Recent recommendations consistently suggest the radial pathway even in elderly subjects [13], at the cost of vascular loop difficulties, in order to reduce the frequent hemorrhagic complications at this age in a risky pharmacological environment. However, the radical approach is growing rapidly in our center, particularly with the arrival of young angio plastic surgeons trained in French centers.

In angiography, our study shows that approximately half of the patients have at least two or more coronary lesions, more than one-third had three coronary lesions, and also more severe occlusive lesions in subjects over 70 years old showing the severity of coronary involvement. This is found in the APPROACH study [14], where 45% of subjects aged less than 80 years have bi-troncular lesions. This proportion is approximately 60% for patients over 80 years old.

Proximal truncus involvement was more predominant in subjects over 70 years of age, and reached the downstream bed, showing diffuse coronary involvement of these elderly subjects. On the other hand, this anatomical severity does not translate into the level of management by angioplasty or the management remains mainly minimalist with less systematic angioplasty of all significant coronary lesions.

However, our center is one of the first centers of cardiac catheterization in West Africa, which began our activities recently in 2013 and we were limited by the availability of the stents in particular active but also by their cost in a low-income African population. The cardiac clinic at the Aristide Le Dantec university hospital in Dakar is a small center, but the first results of angioplasty are very encouraging.

The angioplasty in our series was mainly performed by an active stent (nearly 17%), the proportion of bare stents is about 14.9%, it remains lower than that found in the literature. In the PAPI registry, 35% of patients between the ages of 75 and 80 years had an active stent, 21% in patients between the ages of 80 and 85, and 13% in patients aged over 85 years.

In the ACS sub-group of the PAPI registry, 23% of patients had an active stent. Overall in the registers, the percentage of active stents in the elderly is reduced compared to younger patients, given the fragility of the patients, the high anemia and renal insufficiency and the greater risk of hemorrhagic risk. However, age alone should not be an obstacle to the placement of an active stent. It is a bundle of arguments with co morbidities and an assessment of the hemorrhagic risk of the patient that should lead to the decision.

An invasive strategy, therefore, has a net benefit in this population category.

In addition, our study shows that elderly patients treated invasively do not have more complications and procedural incidents than young people. Thus, if coronary angiography is indicated, it is technically feasible in the elderly and does not lead to more complications, in particular hemorrhagic complications than exclusive medical treatment [15].

In the same work, the benefit on mortality when using invasive procedures appears to be clearer in patients over 75 years of age. This better benefit in the elderly has already been shown in the study Tactics TIMI 18 [16]. A recent study of acute coronary syndrome in the elderly, based on the ACOS registry [17], showed that hospital mortality was 12.5% in the medical treatment group, compared with 6% in the group that benefited from an invasive strategy. An invasive strategy therefore has a net benefit in this population category, yet it benefits less from this strategy, probably because of an over-estimation of the hemorrhagic risk and an underestimation of the ischemic risk.

Conclusion

Our study shows the severity and spread of coronary disease in black African subjects over 70 years old. Their management should not differ from the younger one in terms of invasive strategy and use of angioplasty even in our low-income countries recently equipped with cardiac catheterization room. Coronary angioplasty is feasible with a high success rate, at the cost of an acceptable level of local and general complications.

The radial pathway is preferred because it is likely to limit hemorrhagic complications at the point of frequent punctures at this age. The extreme age of patients is not a contraindication per se to invasive strategy.

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