

Morbi-Mortality of Coronary Surgery in Elderly Patients in Algeria

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Summary

Nearly 10% of the Algerian population (estimated at 44 millions) is aged over 70, and many of them have coronary heart disease. At the same time, life expectancy at the age of 70 still appears to be high.

Objective: To evaluate the results of coronary surgery in these patients.

Methodology: We compared 88 consecutive patients in their 70s who underwent isolated coronary artery bypass grafting between 2016 and 2019 with 165 patients aged 50 to 60. The two groups were matched for major risk factors. Patients were contacted by telephone and sent a quality of life questionnaire.

Results: Operative mortality was 2.3% in septuagenarians, compared with 1.2% in 50-60 year olds (*P* not significant). There was a higher incidence of low flow, postoperative acute renal failure and transfusion in patients in their seventies. Long-term survival (mean follow-up of 2.8 years) was higher in the 50- to 60-year-olds: 89.7% compared with 77.9% (*P*=0.025). We found four independent risk factors for increased long-term mortality: age, diabetes, history of stroke and postoperative blood transfusion.

Conclusion: For selected septuagenarians, isolated coronary surgery can be proposed, and the short- and medium-term results will be comparable to those in a younger population.

Keywords: Morbidity, Septuagenarians, Coronary Artery Bypass Grafting, Mortality.

Introduction

The number of people in their 70 years is on the increase in Algeria, with almost four million people aged 70 or over as at 1 January 2016. Coronary surgery in this age group is justified on the one hand because of the relatively long life expectancy of life expectancy of patients aged 70 (6.65 years for men, 8.66 years for women) and because 40% of them have symptomatic cardiovascular disease.

Thanks to major advances in surgical techniques and peri-operative management, a growing number of these patients are now being offered coronary surgery. However, these patients frequently have aortic atheroma [1], reduced tolerance to ischaemia [2] and often associated co-morbidities, all of which classically lead to greater morbidity than younger patients, with operative mortality rates of up to 11.5% according to studies [3].

Quality of life after the operation must also be taken into account in these patients: a longer recovery time after the operation and a frequent change of living environment in the event of a prolonged hospital stay can radically alter their lifestyle. The aim of this study was to analyse the short- and medium-term results of isolated coronary surgery in septuagenarians and to compare these results with those of a population aged between 50 and 60 who had undergone the same operation.

Materials and Methods

Population

We retrospectively included 88 consecutive patients aged 70 and over (group 1) and 165 patients aged 50 to 60 (group 2; controls) who underwent isolated coronary artery bypass graft surgery between May 2016 and December 2019. A ratio of two controls to one patient over 70 was chosen to increase the power of the study. For every 1s septuagenarian, we selected two patients aged

between 50 and 60 based on 7 matching factors: sex, history of lower limb arterial disease, stroke, and chronic obstructive pulmonary disease, technique (extracorporeal circulation (ECG) or beating heart), degree of urgency, and left ventricular ejection fraction (LVEF). Eleven cases had only one matched control.

Data Collection

We used the department's paper records to obtain patients' preoperative, perioperative and early postoperative data. We telephoned all patients (n=253) to find out about any cardiac events that had occurred since the operation and the treatments followed.

Definitions

Emergency surgery: Performed within 24 hours of cardiac catheterisation.

Semi-emergency surgery: Performed within five days of cardiac catheterisation. **Enzymatic postoperative infarction:** a MB-CPK level greater than 100 ug/L. **Electrical infarction:** appearance of a Q wave of necrosis on the postoperative ECG wave. **Low output:** cardiac index less than 2.5 Lmin/m after normothermia. **Neurological deficit:** definitive stroke.

Transient (<24 hours) Renal insufficiency: creatinine level greater than 200 mol/L. LVEF was most often assessed by trans-thoracic Doppler ultrasound. **Heart failure in follow-up:** oedema of the lower limbs, dyspnoea or atcd of pulmonary oedema.

Patient Selection

Surgery was decided only after medical and surgical discussion, L with preference for interventional cardiology in the elderly. In elderly patients, interventional cardiology was preferred; the existence of disabling defects, especially neurological ones, was considered a contraindication to surgery.

Operating Technique

All patients underwent median sternotomy. After the grafts had been harvested (left internal mammary artery, more or less right depending on the mortis defects, skeletonisation technique, internal saphenous vein), the patients were operated on under CEC or with a beating heart. Surgery under ECG is performed in moderate hypothermia (around 33 degrees), with myocardial protection provided by a cold blood cardioplegia solution. In the case of beating heart surgery, myocardial stabilisation is provided by an OctopusD stabiliser.

The respective indications for beating heart and bypass surgery are defined elsewhere (4), but briefly, beating heart surgery is reserved for the most severely affected patients (low LVEF, calcified aorta), when the anatomical layout is favourable, and when arterial revascularisation is preferred, in order to avoid any aortic manipulation.

Statistical Analysis

Variables were compared using an unpaired Student's t test for quantitative data and an x-test for qualitative data. Survival curves were established using the Kaplan-e Meier method. Comparison of survival curves. The Log-rank test was used for observed survival in the two groups or for comparison with general data. B comparison with general population data. The significance threshold for all tests was P<0.05.

Results

The operative and postoperative characteristics are summarised in the respective.

Tables 1, 2 and 3 respectively. None of the bypasses performed with a beating heart required or conversion

TABEAU 1
Données préopératoires

Caractéristiques pré-opératoires	>70ans (n=88)	50-60 ans (n=165)	P
Age (ans)	73,1±2,4	56,1±2,8	<0,0001
Sexe féminin n°	29,6%	29,1%	ns
Artériopathie n°	22,7%	21,8%	ns
BPCO n°	7,9%	3,6%	ns
ATCD d'AVC n°	5,7%	63,4±14,4	0,9
FEVO moyenne %	60,2±15	54,5%	0,02
Tabac n°	35,2%	64,2%	ns
HTA n°	59,1%	29,7%	0,01
Diabète n°	14,8%	29,7%	<0,0001
Créatininémie(µmol/L)	124,6±43,5	102,2±29,4	ns
IDM récent (<48h) n°	5,7%	6,1%	ns
IDM ancien n°	31,8%	29,1%	n°
SCA n°	30,7%	21,8%	ns
FA n°	11,4%	7,3%	ns
ATCD d'angioplastie n°	9,2%	13,5%	ns
NYHA moyenne	1,40	1,31	ns
Euroscore moyen	7,3±2,1	3,4±1,9	<0,0001

BPCO bronchopneumopathie chronique obstructive,AVC accident vasculaire cérébral, FEVO fraction d'éjection ventriculaire gauche, HTA hypertension artérielle, IDM infarctus du myocarde, SCA syndrome coronarien aigü, FA fibrillation auriculaire.

TABEAU 2
Données opératoires

Données opératoires	>70 ans (n=88)	50-60 ans (n=165)	P
Degré d'urgence n°			
Réglé	82,9%	89,1%	ns
Semi-urgence	9,1%	4,2%	ns
Urgence	7,9%	6,7%	ns
Cœur battant n°	1,8%	2,4%	ns
Nombre moyen de pontages	3,1±1,1	3,1±1,1	ns
AMIG n°	97,7%	98,8%	ns
Saphènes n°	81,8%	55,2%	<0,0001
Durée CEC (min)	83,6±20,8	83,6±29,4	ns
Durée clampage aortique(min)	44,6±17,2	47,2±17,7	ns

AMIG artère mammaire interne gauche,CEC circulation extra-corporelle.

TABLEAU 3
Complications postopératoires

Suites opératoires	>70ans (n-88)	50-60 ans (n-165)	P
Durée d'intubation (h)	6.8+/-1.5	10.3+/-5.4	ns
Durée réa (j)	6.4+/-2.6	4.1+/-1.8	ns
Durée d'hospitalisation (j)	12.1	12.2	ns
IDM enzymatique n%	4.2%	5.3%	ns
Nécrose sur ECG n%	2.2%	2.4%	ns
Saignement (ml)	725+/-420	700+/-350	ns
Transfusion n%	50%	25.6%	<0.0001
Reprise pour saignement n%	4.6%	2.4%	ns
Bas débit n%	19.3%	9.7%	0.03
Passage en FA n%	29.4%	29.9%	ns
Sortie du service en FA n%	6.8%	1.8%	0.03
Troubles neurologiques n%	1.4%	0.6%	ns
Insuffisance rénale n%	7.9%	1.2%	0.005
Dialyse n%	1.1%	0.6%	ns
Dialyse n%	1.1%	0.6%	0.005
Créatininémie de sortie (µmol/L)	107.6+/-35.7	94.3+/-24	

Post-Operative Mortality

Two patients died in each group, all during the same hospital stay as their operation and before the thirtieth post-operative day. The mortality rate in the over-70s was 2.3%, compared with 1.2% in the 50-60 age group (ns).

Long-Term Survival

There was a 5.1% loss to follow-up in our study. The mean duration of follow-up was 35.7 months, i.e. approximately three years, with extremes ranging from 0.5 years to 3.2 years. We found that 50- to 60-year-olds had significantly better medium-term (three-year) survival than 70-year-olds (89.7% versus 77.3% respectively (P=0.025), see Figure 1). The long-term survival of

septuagenarians who underwent surgery was significantly better than that of septuagenarians in the general Algerian population (Figure 2), whereas that of the 50-60 year-old cohort was no different (Figure 3). The causes of late death were often unknown. Most were sudden deaths of unproven cardiac origin. In addition, there were two deaths due to postoperative low flow, one death due to terminal colon cancer, one mesenteric necrosis and one acute pulmonary edema. We do not know the exact aetiology of the other late deaths. In a multivariate study using logistic regression, we have found four independent factors associated with a risk of excess late mortality: age over 70 (RRR=7.4; P=0.006), previous stroke (RRR=7.9; P=0.003), diabetes (RRR=7.1; P=0.007) and the need for a postoperative transfusion (RRR= 1.3; P=0.05).

Figure 1 :

Survie en fonction de l'âge

Survie cumulée (nombre de patients survivants par classe d'âge)

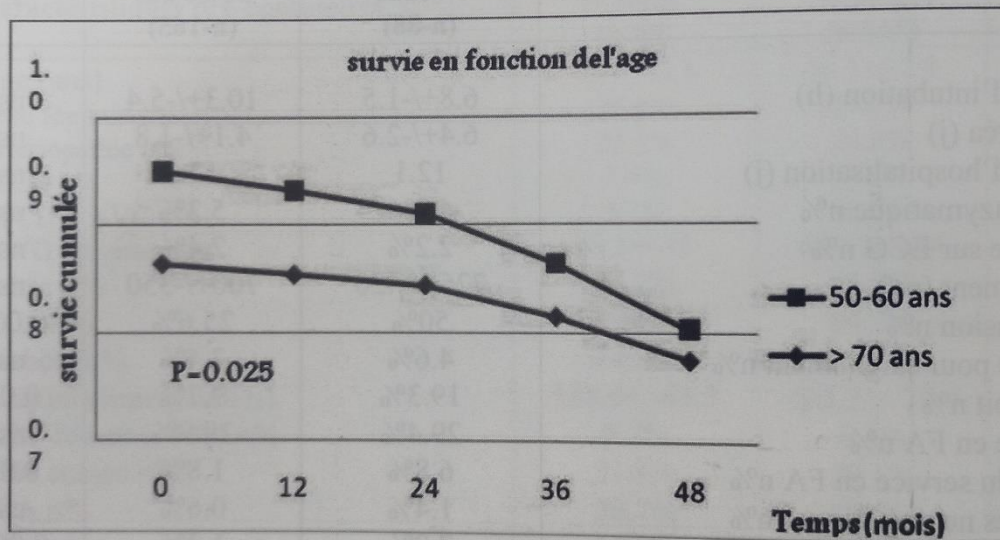


Figure 2 :

Comparaison entre la survie théorique et observée chez les patients de plus de 70 ans. Survie observée : survie dans notre étude. Survie théorique : survie de la population générale

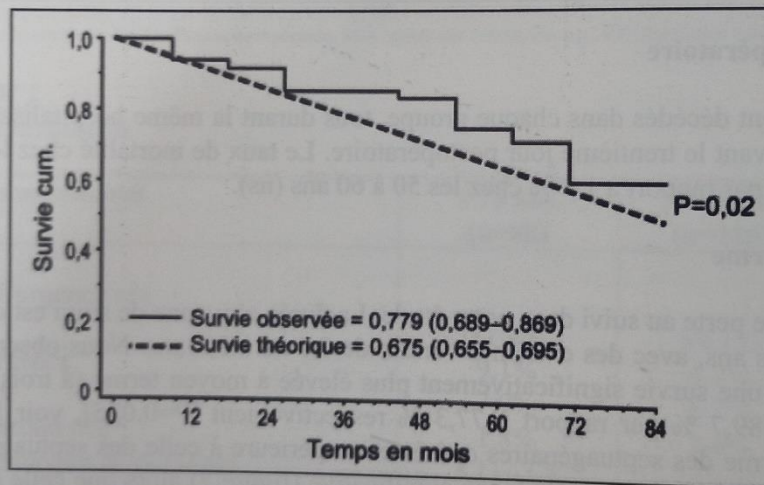
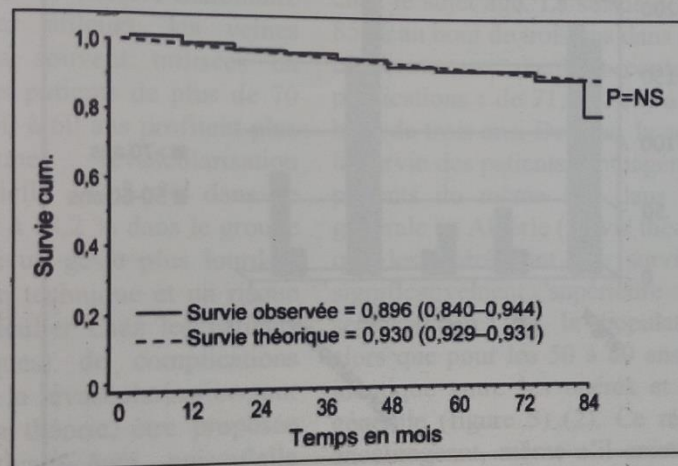


Figure 3 :

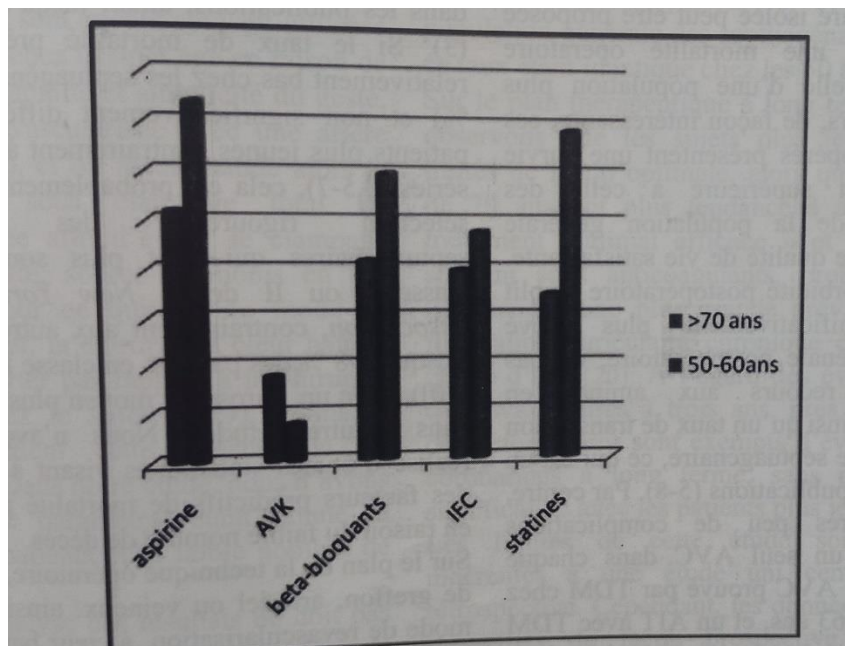
Comparaison entre la survie théorique et observée chez les 50–60 ans. Survie observée : survie dans notre étude. Survie théorique : survie de la population générale



Long-Term Quality of Life

The response rate to the quality of life questionnaire was 71%. Patients in their seventies have a lower physical capacity for exercise than younger patients. In terms of treatment, the treatments taken by patients over the long term are summarised in fig 04.

Long-term cardiovascular events (angina, recurrence of infarction, follow-up coronary angiography, angioplasty) are shown in fig 05, with 79.4% of patients in their seventies being free of long-term coronary events.



Discussion

The results of this study show that in selected patients in their seventies, isolated coronary surgery can be proposed and is associated with an operative mortality rate comparable to that of a younger population. Interestingly, these septuagenarians who undergo surgery have a significantly better survival rate than those in the septuagenarians in the general Algerian population and a satisfactory quality of life.

Analysis of postoperative morbidity shows a significantly higher rate of postoperative renal insufficiency, low flow and recourse to amines in the postoperative and a higher transfusion rate in septuagenarians, which is in line with the literature [5-8]. On the other hand, there were very few neurological complications (only one stroke in each group: a real stroke proven by CT scan in a patient aged a 63-year-old female patient, and a TIA with normal CT in a septuagenarian, both of whom underwent bypass surgery). Both of whom underwent bypass surgery). In

this case, there is probably a bias, because the patients calcified aorta, usually considered to be at risk of stroke, were operated on with a beating heart, which probably explains the low rate of postoperative stroke [9-10].

The operative mortality rate varies in the literature, ranging up to 11.5 [3]. While the early mortality rate is relatively low in patients in their seventies 2.3 significantly different from younger patients, unlike in other series-series [(3,5-7)], this is probably due to the rigorous Heart Association class I or II.

Association class I or II, unlike other series (up to 98% of patients in class III or IV [20]), with a lower mean Euroscore than in other studies. We did not statistical studies aimed at finding factors predictive of early mortality, due to the low number of deaths. In terms of operative technique, the type of graft (arterial or venous) and the mode of revascularisation (cardiac or non-revascular) were important factors. revascularisation, beating heart or not, are also important factors.

As far as the graft is concerned, the survival benefits of an internal mammary artery have been clearly demonstrated, including in elderly patients [13], and our attitude is in line with the recommendations, since in our series most patients (around 98%, regardless of age group) were revascularised using the left internal mammary artery.

In addition, saphenous veins are more frequently used as a in patients over 70 years of age, while patients between 50 and 60 years of age benefit more arterial revascularisation (44.8% in group 2 compared with group 2 compared with 18.2% in group 1). However, despite the fact that the procedure is technically more time-consuming procedure and a higher risk (particularly in obese and diabetic patients) of local infectious complications, all-arterial revascularisation arterial revascularisation should, in theory, be offered more to elderly patients, since it limits the need to manipulate the aorta. In fact, it has been clearly demonstrated that the number of cerebral emboli measured by trans-cranial Doppler (HITS) is directly proportional to the number of aortic manipulations [14]. performing arterial revascularisation with a beating heart using the technique without manipulation of the aorta [15].

In reality, the saphenous veins are still often used in elderly patients because the procedure is quicker and simpler, (the LMCA being revascularised with a mammary artery [13]), and in this case reimplantation under total clamping of the saphenous bypass in order to avoid lateral clamping of the aorta clamping of the aorta, a source of emboli in cases of atheroma. In terms of the mode of revascularisation, beating heart surgery appears to be the preferred method compared with surgery under bypass graft surgery in the elderly [9], although others have questioned this finding question this finding [16].

In our study, we did not evaluate this parameter, given the selection of patients and the small number of patients. selection of patients

and the low number of deaths However, analysis of the results should not be limited to an analysis of the morbidity and morbidity and mortality, given the complexity of this type of surgery and the slowness of post-operative rehabilitation, particularly at this age. Analysis of long-term survival and quality of life must be integrated into any approach to analysing the quality of care provided to patients. quality of care in elderly patients. Long-term survival, at 85% at the end of three years in our series, is in line with the results reported in the literature. 71.2% [3] to 87% [17-19] after three years. Furthermore, comparison of patients in their seventies with patients of the same age in the general population in population in Algeria (theoretical survival) shows that patients who have undergone surgery have a three-year survival significantly higher than that of the 5 septuagenarians in the general population, whereas for the 50 to 60 age group, survival is identical between patients undergoing surgery and the general population population (Figure 3) [2].

This is a very encouraging result, even if there is obviously a selection bias. selection bias, as the septuagenarians who underwent the operation were probably in better than septuagenarians in the general population. In terms of long-term quality of life, "the state of health >> of septuagenarians is identical to that of the 50- to 60-year-olds. Moreover, 95.6% of septuagenarian patients in our study live at home (a higher rate than for the general population of septuagenarians), This rate was identical for patients aged 50 to 60. In terms of long-term treatment, we younger subjects are treated optimally, whereas those over 70 years of age are more likely to have the <<minimum effective treatment> and are more often on anticoagulants, probably due to a greater prevalence of chronic atrial fibrillation in this age group. Atrial fibrillation in this age group [20]. With regard to cardiovascular events at three years, nearly 80% of octogenarians are free of long-term coronary events, with no significant difference from younger patients.

The limitations of this study are those inherent in a uni-centric, retrospective study. However, the data were collected prospectively. The other limit is the rate of incomplete return of questionnaires. Finally, the patient's assessment of their state of health and the definition of heart failure are partly subjective.

Conclusion

Despite a higher rate of renal insufficiency, low flow and postoperative transfusions compared with patients in their sixties, patients in their seventies who can benefit from coronary. It would be interesting to carry out a comparative study with an additional group of septuagenarian patients treated with coronary angioplasty.

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