Cardiac surgery in octogenarians: who, when and how?

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As the percentage of the ageing population increases so does the prevalence of coronary artery disease and of calcific degenerative valvular disease. Major advances have been made in surgical procedures, anaesthetic techniques, myocardial preservation and postoperative care. Thus, elderly patients with severe cardiac disease are more frequently referred for cardiac surgery[1]. Several reports have demonstrated that despite a higher incidence of in-hospital complications and mortality, as compared with younger patients, cardiac surgery can be performed in the elderly with acceptable risk, resulting in improved quality of life[2–6]. However, these patients usually have more advanced and diffuse cardiovascular disease with higher co-morbidity, such as cerebrovascular and peripheral vascular disease, diabetes, pulmonary and/or renal dysfunction, carrying a greater risk of significant disabling complications and prolonged hospital stay. Furthermore, biological ageing is quite heterogeneous and precise algorithms should be replaced by integrative individualized management. The most difficult aspects of decision making are choosing the appropriate timing of surgery and the necessity of whether or not to perform combined valve and coronary procedures.

The report of Kolh and associates in this issue[7] addresses the early and late outcome of 182 octogenarians submitted to cardiac surgery, with a mean follow-up of more than 3 years, providing 459 patient years of observation. Among the 182 octogenarians, 24 (13%) died during the hospital stay and 107 (59%) had one or more complications. Most patients recovered. Reoperation was required in 14 patients (8%). Only five patients (3%) developed stroke: ascending aortic atheromatous disease, as assessed during operation, was the single predictor of stroke. Urgent operation was performed in 33 patients (18%). Forty-five patients (25%) were in functional class III and 46 (also 25%) were in class IV. Independent predictors of early in-hospital mortality were duration of extracorporeal circulation, urgent operation and functional class IV. Independent predictors of late mortality were urgent surgery again and pre-operative myocardial infarction.

In this retrospective study, few patients underwent mitral valve repair or replacement. Seventy patients were submitted to isolated aortic valve replacement, 70 to isolated coronary artery bypass grafting and 30 had combined aortic valve replacement and coronary artery bypass grafting. Hospital mortality was relatively low in the patients submitted to a single operation (8.5% and 10%, respectively) but was much higher among patients with combined valve and coronary surgery (26.5%).

Although the results of this and other studies clearly indicate that surgery should not be denied to octogenarians on the basis of age only, several improvements could potentially reduce the short- and the long-term risks. Urgent surgery, a too long duration of extracorporeal circulation and delayed surgery until the patient is in functional class IV should be avoided as much as possible.

Aortic valve replacement

Among the 100 patients submitted to aortic valve replacement in the series of Kolh et al.[7], 31 were in class IV and 21 had an urgent procedure. The patients presented with a mean of 2.3 of the four classical
Concomitant surgical procedures

Combined coronary and valve surgery was associated with a threefold increase in mortality in the series of Kolh et al.\(^7\). Previous investigators have found that the performance of concomitant surgical procedures exposes elderly patients to higher early mortality\(^2,4,8\). Several recent series, however, have not found such a combined procedure to be a predictor of death\(^9,10\). Other studies found that only women had a higher risk with the combined procedure\(^11,12\). This could be explained by smaller arteries, more diffuse atherosclerosis and perhaps late referral associated with female gender. Women were also prominent among patients submitted to concomitant procedures in Kolh’s series. Concomitant revascularization obviously led to a longer duration of cardio-pulmonary bypass time (35 min more) and of mean aortic cross clamp time (17 min more). All coronary stenoses >50% were bypassed, whereas carotid endarterectomy was performed only in the presence of a carotid stenosis >80%. Should the cut-off point, for deciding to perform revascularization, be higher as suggested by the authors in their discussion? This remains a difficult question. Patients who have unrecognized and ungrafted coronary artery disease at the time of aortic valve replacement may be at high risk for a peri-operative myocardial infarction or death\(^13\). Functional evaluation of coronary stenoses by exercise or pharmacological stress testing should not be performed in such patients because of a significant risk of complications. Similarly, calculation of fractional flow reserve in the catheterization laboratory by the infusion of adenosine is not recommended in this setting. It is not reported by Kolh et al.\(^7\) whether some patients requiring concomitant procedures had primarily coronary artery disease and incidental findings of aortic valve disease. Combined surgery in such patients should only be done if valve stenosis is severe. Moderate stenosis (valve area >1 cm\(^2\)) should not be operated on, because it is associated with an excess mortality for unnecessary valve replacement\(^14\). The probability of an octogenarian progressing from moderate to severe aortic stenosis is, because of life expectancy, relatively low.

Coronary artery bypass

The experience of Kolh et al. is not different from that reported by other institutions in patients submitted to isolated bypass grafting\(^1,13,15\). In their series, 94% of patients had unstable angina but operation was considered to be urgent in only 13%; this discrepancy is somewhat unclear. No patient underwent minimally invasive surgery and the left internal mammary artery was used in only 45% of patients. Surgical revascularization should be performed in octogenarians if the patient remains symptomatic despite complete medical treatment. The choice between surgery and percutaneous procedures is not easy. The severity of co-morbidity, and the extent and severity of coronary artery disease should be considered. The results of randomized, controlled trials are not necessarily applicable in the elderly population. An 8.2% in-hospital mortality was observed after percutaneous coronary interventions in octogenarians treated in the same institution as Gach et al.\(^16\). Incomplete revascularization was an independent predictor of both in-hospital and 1-year mortality.
Hybrid procedures could be the most appropriate approach in some patients; one of the vessels—usually the left anterior descending artery—bypassed using a minimally invasive technique and other vessels treated by percutaneous coronary intervention in the catheterization laboratory. Registries involving prospectively collected data should certainly be helpful in determining whether this strategy decreases the complication rate in elderly patients.

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References