

Research Article

Prognostic Factors for Morbidity and Mortality in Redux Valve Surgery

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Abstract:

Objectives: Redux valve surgery is increasingly common in Algeria, and the aim of this study was to identify the risk factors for hospital morbidity and mortality in this type of surgery.

Method : 49 patients with a mean age of 51 years (20-67 years) and a sex ratio of 0.88 underwent redux valve surgery between January 2015 and december 2019. 79%), and in almost half of the cases (46%) the first operation was performed in our department; the most frequent reasons for repeat operations were mitral plasty dysfunction, expression of new valve damage and removal of mechanical prostheses due to infective endocarditis.

The Euroscore was used to predict operative risk.

Results: 80% of our patients were classified in the moderate risk group (score 3-5) with an expected mortality of between 2.90 and 2.94%. Our results show a mortality rate of 2.56% for these patients. The study of post-operative results revealed a number of cardiac complications (28.5% low output and 37% rhythm disorders), infectious complications (8% mediastinitis) and neurological complications (6%). The risk factors for operative mortality were multiple valve procedures ($p=0.03$), persistent atrial fibrillation or fibrillation that appeared postoperatively ($p=0.05$) and age over 70 ($p=0.04$).

Conclusion: Valvular redux surgery with a single-valve procedure has an operative morbi-mortality, actuarial survival and post-operative functional benefit that are entirely comparable to those of a primary intervention; whereas in redux surgery with a multi-valvular procedure, the operative morbi-mortality is significantly higher, but the actuarial survival and functional benefit are comparable to those of a primary intervention

Key words: valve surgery, reintervention, morbi-mortality.

Introduction:

Redux valvular pathology², i.e. the re-operation of a valve procedure performed several times previously for a valvular pathology, is constantly on the increase; a patient who has already been operated on once or several times represents 10% to 15% of the patients operated on in the department.

What remains true is that this is surgery with a high risk of morbidity and mortality (over 5%) not only because of the terrain (multiple defects), but also because of the heart valve (valve restenosis, prosthesis dysfunction, prosthesis disintertion due to endocarditis, thrombosis). What is changing, however, is the epidemiology of the patients we are dealing with, who are increasingly older and more often have one or more defects (diabetes, hypertension, rhythm disorders, RFI, etc.).

Material and Method:

This is a retrospective study of a series of 49 patients operated on from January 2015 to december 2019 in the cardiovascular department of the EHS MAOUCHE surgery. The sex ratio was 0.88 with a slight female predominance (23 men/26 women),

the average age was 51 years (extremes 20-67 years), 89.79% of the patients underwent scheduled surgery (only 05 patients underwent emergency surgery), and 46% underwent primary surgery in the department and 54% underwent primary surgery in other departments in Algeria or abroad. In this study, the inclusion criterion is to retain any reintervention after a primary valvular intervention; this is mainly a reintervention, but we have nevertheless recorded 04 cases of multiple reinterventions; the average time to reintervention is 12 years (extremes 21 days/26 years).

Increasingly, patients have one or more conditions that can lead to complications in the post-operative period, resulting in longer hospital stays; Nearly a third of patients have hypertension (28%) and/or DID (26%), and have had one or more episodes of left heart failure, OAP, or functional renal failure; more than half of the patients operated on had preoperative rhythm disorders such as AF (56%); finally, for this series of patients, the average NYHA stage is 3.2 \pm 0.9. As for the preoperative investigations, the mean cardiothoracic index was 58 \pm 5%, the ECG study showed 12% left bundle branch blocks, and the preoperative echocardiographic data showed a mean ejection fraction of 56 \pm 20% and a high mean

systolic pulmonary artery pressure of 58+/-15 mm Hg.

Results:

With regard to the causes of repeat operations, we have noted, in decreasing order of frequency, malfunction of the plastic (most often involving the mitral valve), expression of new valve damage (mainly tricuspid insufficiency neglected at the time of the first operation), followed by prosthesis removal (almost half of which was due to infectious endocarditis), prosthesis thrombosis (especially mitral) and finally malfunction of the prosthesis (especially mitral). Then come prosthesis disintertions (almost half of which are due to infectious endocarditis), prosthesis thrombosis (especially mitral thrombosis) and finally prosthesis dysfunction (especially aortic dysfunction). A detailed study of the causes of mitral plasty dysfunction shows that the procedure performed during the initial operation consisted, in descending order, of an open-heart commissurotomy, mitral plasty with insertion of a CARPENTIER ring, and finally a closed-heart ut commissurotomy; we also noted that the mean L times for reintervention (for each of the procedures performed during the initial operation) are very interesting, since they are all greater than 10 years.

A study of the causes of mitral prosthetic valve thrombosis revealed an early thrombosis at D19 post-operatively due to a lack of anti-coagulation (patient operated on in an emergency with PAO and low to severe flow). As regards surgical technique, the approach was always an iterative median sternotomy, with careful release of adhesions, and extracorporeal circulation was introduced after arteriovenous cannulation, which was usually conventional. (femoral-femoral arteriovenous cannulation is reserved for multiple reoperations), the average duration of ECS is 70+/-14 minutes, the average duration of aortic clamping is 54+/-15 minutes, and myocardial protection is achieved by antegrade injection of cold blood cardioplegic solution. Removal from extracorporeal circulation proved difficult in almost a third of cases, since we had to deal with severe low flow, which necessitated the use of inotropic drugs and even circulatory assistance. As far as surgical technique is concerned, the approach is always an iterative median sternotomy, with cautious release of adhesions. Extracorporeal circulation was set up after arteriovenous cannulation, usually conventional (arteriovenous cannulation reserved for the femorofemoral is used for multiple repeat operations), the average duration of bypass surgery was 70+/-14 minutes, the average duration of aortic clamping was 54+/-15 minutes, and myocardial protection was provided by antegrade injection of cold blood cardioplegic solution. Removal from extracorporeal circulation proved difficult in almost a third of cases, since we had to deal with severe low flow which necessitated the use of inotropic drugs and even circulatory assistance. i : e t e A study of the surgical procedures performed revealed that, in addition to the prosthetic valve replacement or valve plasty that prompted the re-operation, we performed combined B surgery (combining aortic valve replacement and replacement of the ascending aorta), or associated procedures (resection of the aortic sub-valvular

membrane, closure of a VSD, enlargement of the aortic annulus, etc.). However, this type of surgery remains difficult, and we have had S to deplore a number of intra-operative incidents such as wounds to the roof of the left atrium, the superior or inferior vena cava, or the mitral annulus; these wounds have been repaired without incident, apart from an increase in operating time.

The post-operative results showed a number of cardiac complications (28.5% low flow, one patient died, 37% rhythm disorders, 2 complete atrioventricular blocks that had to be fitted with braces), infectious complications (8% mediastinitis, 2 patients 5 died) and neurological complications (6%, 1 fatal massive stroke).

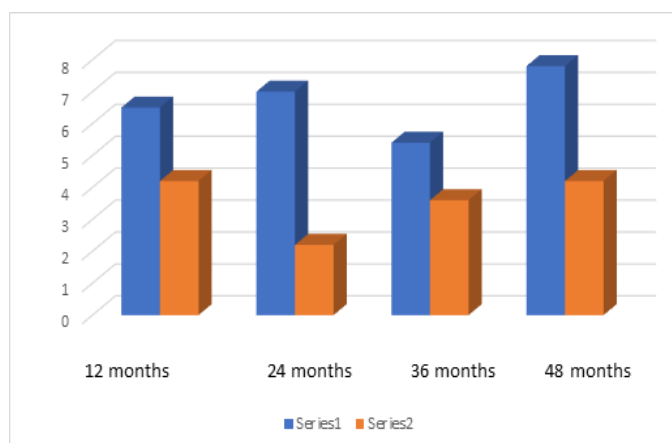
Discussion:

Pre-operative risk prediction is possible and must be done by statistical determination of risk factors and by the use of n Es scores (Euroscore, Care score, PARSONNET score, etc.) which have been widely validated by numerous studies throughout the world. Statistical determination of the risk factors for the occurrence of postoperative mediastinitis has

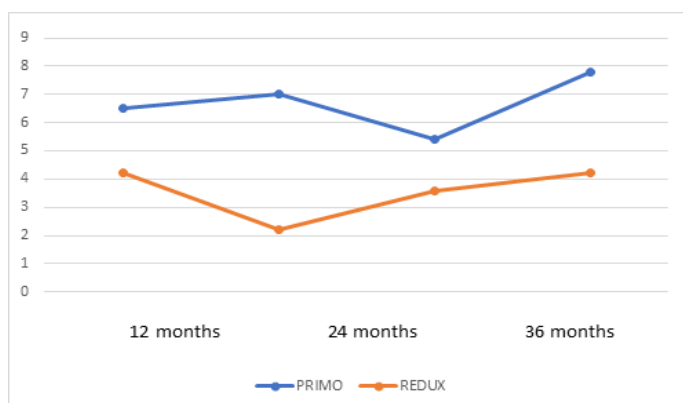
statistically significant risk factors were obesity (p=0.03), insulin-dependent diabetes (p=0.025) and the duration of the operation (p=0.05).

Statistical determination of the risk factors for operative mortality revealed, in univariate analysis, multiple valve procedures (p=0.03), persistent or postoperative atrial fibrillation (p=0.05) and age over 70 years (p=0.04) as statistically significant risk factors. Multivariate analysis found no statistically significant factors for operative mortality. In this study, we used the euroscore to predict the risk of operative mortality. This score, validated by numerous studies and easy to use, determines a direct probability of expected mortality.

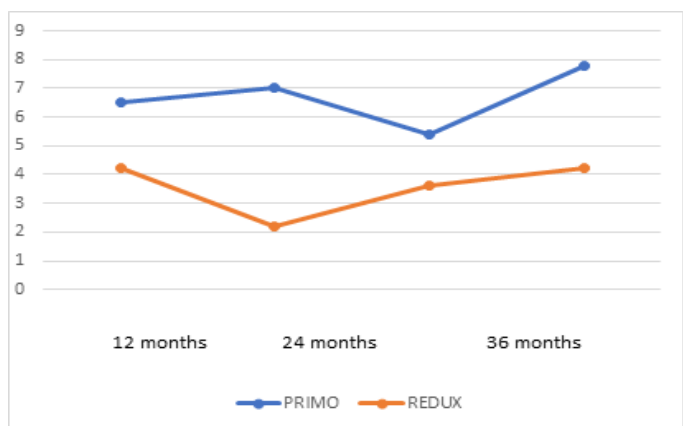
80% of our patients are classified in the moderate risk group (score 3-5) with an expected mortality of between 2.90 and 2.94%. Our results show a mortality rate of 2.56% for these patients. The remaining 20% were classified in the high-risk group (score greater than 6), with an expected mortality of between 10.93 and 11.54%. Our results show a mortality rate for these patients of just over 15%. In terms of functional status post-operatively, the study clearly demonstrated a definite functional benefit, since while the majority of patients were classified as NYHA stages III and IV pre-operatively, almost all were classified as stages I and II post-operatively.



As for the improvement in LVEF, over an average period of 18 months we reviewed all the surviving patients, and the study of the results showed an average improvement in LVEF of 18+/-13%; the average LVEF rose from 56+/-20% pre-operatively to 63+/-12% post-operatively, which means that 73% of the surviving patients recovered at least 5 points of LVEF at the end of the operative period. A study of the actuarial survival curve at 3 years for patients who underwent re-intervention with a single-valve procedure and for patients who underwent a single-valve procedure as a primary intervention is entirely comparable.



The comparison of the actuarial survival curve at 3 years for patients who underwent re-intervention with a multi-valve procedure with that for patients who underwent a multi-valve procedure as a primary procedure shows significant differences.



Conclusion:

Valvular redux surgery with a single-valve procedure has an operative morbidity/mortality, actuarial survival and post-operative functional benefit that are entirely comparable to those of a primary procedure; whereas in redux surgery with a multi-valvular procedure, the operative morbidity/mortality is much higher, but the actuarial survival and functional benefit are comparable to those of a primary procedure. Finally, in order to improve the results in terms of operative morbidity and mortality, it is imperative that surgical management should be carried out early, before deterioration in functional status (NYHA) and ventricular function (LVEF), co-morbidities should be assessed and mortality risks determined using scores, and above all, medical follow-up of patients with mechanical valve prostheses should be improved.

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