Long-term (≤ 50 years) results of patients after mitral valve commissurotomy—a single-center experience

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Objective: Currently, in Middle Europe, closed and open mitral valve commissurotomy (MVC) is rarely done and has been replaced by catheter-based balloon procedures. Especially under these circumstances, data on the long-term outcomes after surgical interventions are important.

Methods: From 1955 to 1989, 268 patients (75 male and 193 female patients) with mostly rheumatic or infectious mitral stenoses underwent closed ($n = 151$) or open ($n = 117$) surgical procedures. The mean age at surgery was 41.2 ± 11.1 years; 19 patients (7.1%) died within the first 30 days after surgery.

Results: The 50-year follow-up was complete for 215 patients (80.2%). The survival rate at 10, 20, and 30 years after surgery was 80.2%, 58.6%, and 41.8%, respectively. The differences after closed and open MVC were nonsignificant. At the latest follow-up, 32 patients were alive and had a mean New York Heart Association functional classification of 2.7. The 10-, 20-, and 30-year freedom from reoperation rate was 93.2%, 82.9%, and 76.0% for the closed intervention group and 88.5%, 80.3%, and 78.7% for the open intervention groups. Again, the differences were nonsignificant. The main cause for reoperation was recurrent fibrosis of the mitral valve. Most patients ($n = 51$) received mechanical valves, 5 a bioprosthesis, and 8 repeat MVC. Four patients required a third intervention.

Conclusions: In Middle Europe, closed and open MVCs are now rarely performed, but the ultra-long-term results are excellent and serve as a standard for the now-established balloon valvuloplasty. MVCs remain an option for pregnant women. In third world clinical conditions, closed MVC remains a less expensive alternative. (*J Thorac Cardiovasc Surg* 2012;143:S96-8)

In Middle Europe, acute rheumatic disease, a leading cause of mitral stenosis, is now very rare, unlike in other parts of the world, such as Eastern Europe, Asia, South America, and Africa. Currently, European patients with mitral valve stenoses (eg, after inflammatory endocarditis) are treated with balloon valvuloplasty, typically performed by interventional cardiologists.

In our unit at the University of Munich, Rudolf Zenker began performing mitral valve commissurotomy (MVC) in the 1950s. The ultra-long-term results after surgical closed and open MVC are the purpose of our retrospective study.

MATERIALS AND METHODS

From August 1955 to September 1989, 268 patients with valvular mitral stenoses underwent MVC at our institution. Of these 268 patients, 151

(56.3%) were treated with closed and 117 (43.7%) with open procedures. In the mid-1970s, the closed procedure was replaced by open techniques. The main cause of disease was rheumatic fever, followed by endocarditis and rare congenital lesions. The mean age at surgery was 41.2 ± 11.1 years (range, 3 months to 67 years). Preoperatively, most of the patients were very sick and belonged to a New York Heart Association functional classification of III or IV.

The differences between the 2 groups—treated with closed and open techniques—were not statistically significant, except for their age at surgery: 38.4 ± 10.6 years versus 43.9 ± 11.3 years.

All patient charts were reviewed. If the late outcomes remained unknown, questionnaires were sent to the patients. When necessary, the patients, their physicians, or relatives were interviewed. If the outcome remained unknown, the local authorities were asked for help. The institutional review board of the University of Munich approved the present study.

The outcomes were identified in 215 (80.2%) of the 268 patients. The remaining living patients underwent clinical examinations, including echocardiograms and electrocardiograms.

Operative Techniques

In the early days, significant mitral valve stenosis was identified using physical signs, electrocardiographic changes, and type of valvular murmur on auscultation. Mitral valve calcifications and the left atrium size were assessed on the lateral chest radiograph and after a barium swallow. Closed MVC was performed using the classic method by way of a left anterolateral thoracotomy. The Tubbs dilator was inserted through the left ventricular apex. The surgeon's finger within the left atrium guided the instrument through the diseased valve.

In the mid-1970s, open MVC replaced the closed procedure using the heart–lung machine and techniques as described by Carpentier.¹ Open valvotomies were performed by way of a right anterolateral incision or median sternotomy.

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Abbreviation and Acronym

MCV = mitral valve commissurotomy

Statistical Analysis

Kaplan-Meier long-term survival and freedom from reoperation curves were performed. Statistical significance was tested using log-rank statistics.² Probability values less than .05 were considered significant.

RESULTS

Early Mortality

Altogether 19 patients (7.1%) died within the first 30 days postoperatively (12 patients after closed and 7 after open MVC). Most ($n = 13$) died of insufficient relief of the stenosed valve. Two patients died of postoperative myocardial infarction and four of noncardiac causes. In the patients who underwent a closed procedure, mortality was due to excess commissurotomy in 9 and resulted in severe valvular incompetence and, ultimately, death.

Kaplan-Meier Survival Curve

The survival rate at 10, 20, and 30 years after surgery was 80.2%, 58.6%, and 41.8%, respectively. Dividing the survival curve into closed and open MVC groups, 82.1%, 64.9%, and 45.7% of the closed group and 77.8%, 50.3%, and 37.1% of the open group were alive after 10, 20, and 30 years (Figure 1). The differences between the 2 cohorts were nonsignificant ($P = .121$, log-rank test).

Altogether 32 of the operated patients were alive at the time of the present study; 13 underwent closed and 19 open interventions. Almost all patients ($n = 29$) had chronic

FIGURE 1. Kaplan-Meier survival curve after surgery, divided into closed and open mitral valve commissurotomy.

FIGURE 2. Intraoperative view (left anterolateral incision) of repeat closed mitral valve commissurotomy. Small felt cylinder attached to atrial appendage and Tubbs dilator positioned within the left ventricular apex.

atrial fibrillation. The mean New York Heart Association classification of the surviving patients was 2.7.

Reoperations

The freedom from reoperation rate also revealed non-significant differences between the closed and open MVCs. After 10, 20, and 30 years, 93.2%, 82.9%, and 76.0% patients who underwent closed and 88.5%, 80.3%, and 78.7% who underwent open MVCs required no additional interventions. In total, 51 patients had mechanical valves, 5 had biologic valve replacements, and 8 had repeat MVC (Figure 2). In 4 patients, a third intervention was necessary. Five survivors required no additional surgical treatment.

DISCUSSION

Mitral valve stenosis is an important pathologic feature after acute rheumatic fever—a condition that is none existent in current native Middle European population. The disease might, however, be present in immigrants (eg, from Eastern European, Asian, or African countries), where rheumatic fever is still endemic. There are of course other inflammatory causes leading to mitral stenosis.

For decades, surgical closed or open MVCs were the treatment of choice for these patients. Open procedures became the preferred method since the 1970s.³ In 1984, Inoue and colleagues⁴ introduced percutaneous balloon valvotomy that very soon virtually replaced any surgical interventions in Middle European countries. Comparing the results of surgical and interventional outcomes, it is difficult to prove any superiority of the various techniques. In a recent review of 7 prospective randomized and 5 case-controlled trials from 1966 to 2010, Hu and Zhao⁵ found no significant difference in respect to mortality ranging from 1 to 7 years. The pooling analysis, however, revealed a significantly greater occurrence of new-onset mitral regurgitation and

late repeat interventions because of restenosis after balloon valvuloplasty relative to patients undergoing surgical MCVs.

In developing countries, the cost could also be another consideration when comparing balloon devices with sterilization of mitral valve dilators.

The recent survey by Hu and Zhao⁵ once more confirmed that long-term follow-up after surgical MVC are necessary to compare these with the upcoming data after interventional balloon valvuloplasty. Our 10-, 20-, and 30-year survival rate of 82.1%, 64.9%, and 45.7% for closed MVCs and 77.8%, 50.3%, and 37.1% for open MVCs and the freedom from reoperation rate of 93.2%, 82.9%, and 76.0% and 88.5%, 80.3%, and 78.7%, respectively, could therefore serve as a standard. No differences were found when comparing the results of the open and closed procedures. These findings are interesting in the content of developing countries such as in Africa, in which open surgical commissurotomy is still a less-expensive life-saving option.

In Middle Europe, closed surgical procedures might still be indicated during pregnancy, because in such situations, x-rays should be totally avoided.⁶ Open MVC is indicated in the presence of a huge thrombus within the left atrium.

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