

# Minimally invasive mitral valve surgery in octogenarians—a brief report

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## Introduction

The prevalence of mitral valve (MV) disease is increasing, as is the interest in modern minimally invasive MV surgery (1,2). In concordance, the age of patients being referred for MV surgery is also increasing. This growing population of elderly patients deserves special consideration due to the inherent increased surgical risk with the presence of mostly significant co-morbidities (3).

The operative mortality for octogenarians who undergo MV surgery has been reported to be as high as 25% with poor long-term outcomes (3). Quality of life of octogenarians after MV surgery has been described as suboptimal and it is strongly related to the patients' preoperative condition (4). Especially in the era of increasing interest in transcatheter MV therapies, such as percutaneous edge-to-edge repair, the surgical community currently faces another challenge to offer a valuable, effective and safe treatment option for these "fragile" patients, one with a low operative risk and a virtually life-long durability (5-7).

Thus in the past, major efforts have been undertaken to minimize surgical trauma and operative risk. The minimally invasive operative approach was introduced around 15 years ago and has become the standard of care in many European and North American centres (8,9). Due to its less invasive nature, the minimally invasive approach in its current form can be anticipated to be especially valuable and suitable for these elderly and mostly fragile patients.

Our centre has gained increasing experience in minimally invasive MV surgery with a total of over 4,000 operations to date. Amongst these, a significant number of octogenarians have been operated on. We herein briefly present our single centre experience within the cohort of octogenarians who underwent minimally invasive MV surgery.

## Patients and setting

Out of 4,460 patients who underwent MV surgery by July 2013, the number of patients aged 80 and older has reached a total of 191 (4.3%) and forms the focus of this brief report. Mean age at the date of surgery was 82.6±1.9 years. The majority of patients were females (n=140, 73%). Mean left ventricular ejection fraction was 55%±18%. Preoperative severe co-morbidities in this cohort of 191 patients included previous cerebrovascular events in 17 patients (8.9%), active or subacute infective endocarditis in 6 patients (3.1%), and 13 patients (7%) had prior cardiac surgical procedures. The mean logistic EuroSCORE I for the entire cohort was 16±10. Only a very small number of patients (n=5, 2.6%) underwent non-elective minimal invasive MV surgery. The primary indication in the majority of patients was severe mitral regurgitation with the presence of symptoms.

## Methodology

All patients underwent our standard mini approach which has been described in detail elsewhere (8-10). In brief, a right lateral mini-thoracotomy is performed in the fourth intercostal space after femoral cannulation for cardio-pulmonary bypass. Video assistance is introduced via an additional port. The aorta is occluded with the Chitwood transthoracic aortic clamp and crystalloid cardioplegia used (11). An additional left atrial retractor is introduced parasternally to enable exposure of the MV after incision of the left atrium just below the interatrial groove. The operative field is continuously flushed with CO<sub>2</sub>, and administration of cardioplegia and de-airing after left atrial closure is performed using an aortic needle-vent cannula.

## Results

The majority of patients underwent successful MV repair

(n=139, 72%), however, MV replacement was necessary in 52 patients (28%). Mean annuloplasty ring and valve prosthetic size was  $29.7\pm 3.5$  mm with the St. Jude Epic prosthesis and the Carpentier-Edwards Physio Ring being the two most implanted devices. Additional tricuspid valve repair was performed in 47 patients (24%). Other concomitant procedures were surgery for atrial fibrillation in 57 patients (30%) and closure of an atrial septal defect in 14 patients (7%). Mean duration of surgery was  $180\pm 47$  min, with a mean cardiopulmonary bypass time of  $128\pm 38$  min, and a mean aortic clamp time of  $71\pm 28$  min in the entire cohort.

The intraoperative course was uneventful in the vast majority of patients. Conversion to sternotomy was indicated in three patients (1.6%) due to bleeding in two cases and acute aortic dissection in one patient. The postoperative course was complicated by symptomatic transitory psychotic syndrome in 14 patients (7%), sepsis in three patients (1.5%) and acute renal failure with the need for intermittent haemodialysis in 16 patients (8%). In-hospital mortality at 30-day was 3.1% for six patients. The cause of death was mainly related to low cardiac output syndrome. Patients were discharged from hospital after a hospital stay of  $17\pm 10$  days.

## Comments

Octogenarian patients with MV disease face an increased preoperative risk, especially due to significant co-morbidities. However, when surgery is performed in a reference centre using a minimally invasive operative approach, a high MV repair rate, a low rate of operative mortality, and an acceptable clinical outcome overall can be achieved in this “fragile” patient cohort.

Irrespective of the age of patients, the paradigm of MV repair over prosthetic valve replacement equally applies in the cohort of elderly patients. We were able to demonstrate this in a large two-centre experience propensity matched analysis. Significantly better long-term survival can be achieved with successful MV repair surgery (12). Thus, even in octogenarians, successful MV repair must be the goal. However, due to unique morphology of the MV in elderly patients, with an increasing amount of calcification, especially of the MV annulus, and additional MV stenosis, it is sometimes not possible to achieve successful MV repair. This is underlined by comparison to a younger population with a lower repair rate of only 72% as presented herein. In the case of additional calcification of the MV leaflets, a successful repair is almost impossible to perform. In such cases, we quickly change our operative strategy and perform prosthetic MV replacement.

The discussion of the optimal operative approach for elderly patients is of special interest since an increasing number of patients are undergoing transcatheter MV repair with the

Mitraclip system. It is anticipated that a significant number of elderly patients are not being referred for consideration of surgical treatment. Within our centre, every potential Mitraclip patient is reviewed within the respective heart team and in a substantial number of cases, the decision is made to perform minimally invasive MV surgery. In non-fragile patients with few co-morbidities and an active lifestyle, we recommend and perform minimally invasive MV surgery. This approach has been vindicated with the excellent results presented. Furthermore, it has previously been shown that the minimally invasive approach is not inferior to the conventional surgical approach using a full sternotomy especially with regards to operative results and long-term survival (13). In addition, a trend towards a lower operative mortality for the minimally invasive approach has been described previously (14). This approach yields an overall lower rate of transfusion and an overall faster recovery with shorter postoperative hospital stays (14). We therefore find the minimally invasive approach for the cohort of octogenarians, as described in this report, the treatment of choice.

Nevertheless, apart from the discussion with regards to the operative approach itself, it must be emphasized that this is not the only relevant parameter, which influences patient outcomes. The existing co-morbidities are the real burden in octogenarian patients, and indeed the influence of the overall quality of life and existing co-morbidities on the postoperative patient status has been clearly described (4). Quality of life can generally be accepted as improving after MV surgery of any kind. Several risk factors for long-term outcomes in elderly patients have been identified, including diabetes, chronic lung disease, presence of haemodialysis, low left ventricular ejection fraction, presence of infective endocarditis, and additional tricuspid valve surgery (7). Despite this, we are aware of the fact that, with performing a successful minimally invasive MV operation, both quality of life and the functional status can be improved.

## Clinical bottom-line

Our findings presented in this report as well as those of others clearly emphasise the need for adequate and also additional care in this special cohort of octogenarian patients.

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