

## To Add or Not to Add Mitral Valve Surgery to Septal Myectomy in HOCM Patients



In the largest single-center experience of surgical treatment for hypertrophic obstructive cardiomyopathy (HOCM), Hong et al. (1) describe the results of 174 HOCM patients in whom myectomy was combined with mitral valve surgery (MVS). In the same period, an additional 1,819 HOCM patients underwent myectomy alone as this was the preferred surgical strategy of the authors. Mitral valve surgery was indicated because of pre- or perioperatively diagnosed intrinsic mitral valve disease or in a very small percentage of patients because redundant leaflet was thought to contribute to left ventricular outflow tract obstruction.

The authors must be congratulated for their outstanding long-term results in these patients after myectomy plus MVS. More precisely, in these patients they achieved a survival rate that was similar to that of the age- and sex-matched general U.S. population.

To our surprise, this remarkably good result was not the conclusion of the paper. Instead, the authors unexpectedly concluded that “In most patients with HOCM, mitral regurgitation related to systolic anterior motion of the mitral valve is relieved through adequate myectomy. Concomitant MVS is rarely necessary unless intrinsic mitral valve disease is present” (2).

This statement is based solely on the observation that, after isolated myectomy (in 1,819 patients), mitral valve regurgitation (MR) grade  $\geq 3$  decreased from 54.3% pre-operatively to 1.7% at transthoracic echocardiography obtained before discharge.

In our opinion, unless data are presented that show that the survival of HOCM patients after isolated myectomy is similar to that of the general population, this conclusion cannot be drawn and is not based on the data presented. In fact, from the data one could conclude that myectomy plus MVS is so effective in the long-term (even in the more difficult HOCM patients) that myectomy should (almost) always be combined with MVS to achieve good relief of left ventricular outflow tract obstruction and thus survival. Indeed, it is our practice to add anterior leaflet extension not to specifically treat systolic anterior motion but to maximally relieve left ventricular outflow tract obstruction (2). Using this

technique in 98 HOCM patients, we have reported long-term relief of symptoms and survival similar to the those of the general population (3).

Additionally, we believe that MR grade  $< 3$  at discharge echo does not prove that systolic anterior motion will not appear during exercise nor that there is good relief of left ventricular outflow tract obstruction (remember that almost one-half of the patients had MR grade  $< 3$  pre-operatively). Data should at least include the gradient over the left ventricular outflow tract and grade of mitral regurgitation during exercise echocardiography at long-term follow-up.

\*Jolanda Kluin, MD, PhD  
Arthur A.M. Wilde, MD, PhD  
Yigal Pinto, MD, PhD  
Lex A. van Herwerden, MD, PhD

\*Department of Cardiothoracic Surgery  
Academic Medical Center  
Meibergdreef 9  
1105AZ, Amsterdam, the Netherlands  
E-mail: [j.kluin@amc.nl](mailto:j.kluin@amc.nl)  
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### REPLY: To Add or Not to Add Mitral Valve Surgery to Septal Myectomy in HOCM Patients



Dr. Kluin and colleagues question whether the good late survival of patients who had septal myectomy should have been emphasized in our conclusion (1).

Perhaps, but the fact that survival of patients after transaortic septal myectomy is similar to survival of the general population has been highlighted in multiple previous publications from our clinic (1-3). Although that finding in our paper is confirmatory, we do not consider it novel. What is new in our study is the documentation that, among patients with hypertrophic obstructive cardiomyopathy (HOCM) and no intrinsic mitral valve disease undergoing transaortic myectomy, direct intervention in the mitral valve is rarely necessary. Mitral valve procedures were

performed in addition to myectomy in only 3.9% of patients with no intrinsic valve disease identified on preoperative transthoracic echocardiography. Equally important is the finding of improved late survival of patients who undergo myectomy and mitral valve repair compared to those who undergo myectomy and mitral valve replacement. Prosthetic replacement should not be the default procedure when mitral surgery is necessary in HOCM.

Although we do not have late exercise echocardiographic data, we know from experience with more than 3,000 surgical patients that adequate extended septal myectomy relieves left ventricular outflow tract obstruction and improves mitral valve regurgitation as documented by intraoperative and early postoperative Doppler echocardiograms as well as direct pressure measurements which are performed routinely (4). Late recurrence of symptoms associated with outflow tract obstruction has developed in only 1% of patients, and in this group as well as a much larger cohort referred to us from other centers with recurrent symptoms after unsuccessful initial operation, left ventricular outflow tract obstruction and SAM-mediated mitral regurgitation can be corrected at reoperation by adequate extended septal myectomy (5).

\*Hartzell V. Schaff, MD  
Joon Hwa Hong, MD, PhD  
Rick A. Nishimura, MD  
Martin D. Abel, MD  
Joseph A. Dearani, MD  
Steve R. Ommen, MD

\*Department of Cardiovascular Surgery  
Mayo Clinic  
200 First Street SouthWest  
Rochester, Minnesota 55905  
E-mail: [schaff@mayo.edu](mailto:schaff@mayo.edu)

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## Cardiopulmonary Exercise Testing Versus 6-Min Walk Test as Clinically Meaningful Endpoints in HF Trials



We read with interest the review by Ferreira et al. (1) about the use of clinically meaningful endpoints in heart failure (HF) trials, such as natriuretic peptides, the 6-min walking distance (6MWD) test, and quality of life. However, we would like to point out an important aspect in relationship to cardiopulmonary exercise testing (CPX) in the diagnostic workup of HF patients.

Basically, 2 methods for defining the extent of exercise limitation, the 6MWD (2) and CPX tests (3) are currently used in daily clinical practice. The 2 testing modalities are consistently different. The 6MWD test is a measure of distance, which is considered submaximal and perhaps more closely approximates the capacity to perform activities of daily living. Its clinical appeal also lies in the fact that it can be performed by almost all patients without the need for sophisticated equipment. Nonetheless, it does not allow for a thorough investigation of the pathogenetic mechanisms involved in dyspnea and fatigue sensation (2). The CPX test requires a maximal effort and provides a direct measurement of oxygen consumption along with a series of measured and derived respiratory variables with a robust body of evidence supporting its prognostic ability (3).

Cardiopulmonary exercise testing is used to non-invasively identify impaired aerobic capacity and anaerobic threshold in patients with HF and reduced ejection fraction, which in turn provides important information regarding the patients' functional capacity and severity of the underlying HF. It has been featured in numerous clinical trials as a means of measuring drug or device efficacy and is widely used clinically as a measurement to help guide decisions regarding the suitability of patients for heart transplantation (3). The question is whether this additional evidence may restrain clinicians from performing a CPX test better than a 6MWD test, obviously opting for cost effectiveness and avoiding some complexity related to a CPX test.