obstructive HCM patients even after surgical myectomy.⁴ As advised by the authors, these patients need close surveillance and possible device implantation.

The study by Tang and colleagues³ demonstrates again that septal myectomy is very effective in treating LVOT obstruction associated with HCM and may have additional benefits of reversing ventricular and atrial chamber remodeling, but continued progression of myocardial fibrosis is of concern. However, adjunctive medical therapy appears to be on the horizon. Mavacamten (MYK-461), a reversible inhibitor of cardiac-specific myosin, has been shown to suppress development of ventricular hypertrophy, cardiomyocyte disarray, and attenuate hypertrophic and profibrotic gene expression in mice with HCM.⁵ Early clinical trials reveal promising results.^{6,7} Much remains to be learned, but it appears that surgical myectomy and innovative pharmacotherapy may offer the best hope to completely treat the heart of stone.

See Article page 1828.

Commentary: Left heart remodeling with septal myectomy: Fibrosis is a relative but not absolute concern

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In this issue of the *Journal*, Tang and colleagues¹ provide surgeons with important perspectives beyond septal

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Check for updates

Is myocardial fibrosis unstoppable, like the flow of the river?

CENTRAL MESSAGE

Septal myectomy may stop the progression of myocardial fibrosis, but it does not prompt regression of fibrotic segments.

thickness and left ventricular outflow tract gradient for obstructive hypertrophic cardiomyopathy (HCM). They analyzed the anatomic and functional changes of the left heart after septal myectomy (SM) by retrospectively reviewing imaging studies obtained before and after surgery. Their results corroborate previously published data: decreased left ventricular outflow tract gradient, left atrial diameter, left ventricular ejection fraction, and wall thickness after SM.¹⁻³

Postoperative cardiac magnetic resonance imaging, performed in 57 of 507 patients (8.9%), provides further insights. In particular, it showed that the degree of left ventricular late gadolinium enhancement (LGE) increased from $15.2\% \pm 9.6\%$ to 18.6% ($9.6\%-31.2\%$) after SM ($P = .009$). The data may be concerning, because greater LGE has been associated with worse outcomes in the HCM population,⁴ further LGE expression, and postmyectomy sudden cardiac death.⁵⁻⁷ The central message of the article of Tang and colleagues¹ is that “septal myectomy did not halt the progression of left ventricular myocardial fibrosis.” When calculated from the presented data, however, the actual change in LGE mass appears to be clinically minimal (31.1 g before the operation vs 33.2 g after the operation). The significant “increase” in percentage may simply indicate that viable myocardium regressed whereas fibrotic segments did not, resulting in a relative increase in the mass of the fibrotic segment. In other words, SM may stop the progression of myocardial fibrosis, but it does not prompt regression of fibrotic segments.

Left ventricular hypertrophy, left ventricular outflow tract gradient, LGE mass, and left atrial diameter are all risk factors for sudden cardiac death, as highlighted by societal guidelines.⁸⁻¹⁰ The influence of these parameters on SM-induced left heart remodeling is currently unknown. Septal myectomy may halt progression of left ventricular fibrosis, thereby improving outcomes for patients with minimal preexisting fibrosis and for those with fibrosis limited to the resectable septum. Cardiac magnetic resonance may also allow comparative analysis with alcohol septal ablation, which induces iatrogenic myocardial fibrosis. Although increased risk of ventricular arrhythmia is a theoretical concern, comparative studies between SM and alcohol septal ablation counterintuitively inform that midterm risks of sudden cardiac death and mortality are similar for both procedures. Assessment of myocardial fibrosis with cardiac magnetic resonance after SM and alcohol septal ablation and its association with midterm to long-term outcomes may therefore provide another important perspective in this never-ending comparison.

In addition, further studies should evaluate whether the effects of myectomy on left atrial remodeling translate into reduced rates of atrial fibrillation (AF). Obstructive HCM can be very symptomatic in patients with AF, and such patients may be exposed to a higher risk of cardiac mortality than patients with HCM who do not have AF.¹¹ The success rate of catheter ablation for AF in patients

with HCM is lower than in patients without HCM.¹² There is an emerging need to identify whether SM (with or without Cox-maze procedure) should be considered earlier in the management of patients with obstructive HCM and AF.

Overall, the survival benefit of SM in obstructive HCM is not well established. The data presented by Tang and colleagues¹ offer an important foundation for hypotheses and provide unique opportunities for surgical science.

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