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## Commentary: Going beyond the septum for complete repair of obstructive hypertrophic cardiomyopathy

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Structural abnormalities of the mitral valve (MV) are commonly seen in conjunction with hypertrophic cardiomyopathy (HCM).<sup>1</sup> Among them, anomalies of the papillary muscles (PMs), first described in 1969, are identified in 13% to 15.4% of patients with HCM.<sup>2-4</sup> Some authors advocate for surgical intervention on the PMs as an adjunct to septal myectomy.<sup>5</sup> However, there has not been organized knowledge or a systematic approach to this entity until Carvalho and colleagues<sup>6</sup> published their experience in this issue of the *Journal*.

The authors examined a subset of their patients who underwent myectomy (2.3% of the total experience) consisting of patients with anomalous PMs, defined as direct insertion of PMs into the anterior MV leaflet. The authors demonstrated that anomalous PMs are often associated with concomitant MV pathology requiring additional intervention and that anomalous PMs are often undiagnosed or unrecognized on preoperative or even intraoperative imaging, with just 11% of preoperative transthoracic echocardiograms and 27.4% of intraoperative transesophageal echocardiograms recognizing this pathology. Furthermore, the authors proposed a classification system with 3 distinct patterns of anomalous PM insertion, which further highlights the morphologic complexity of HCM and has important implications in management.

In the current era, transcatheter approaches are encroaching on the territory of the surgeon in the management of



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### CENTRAL MESSAGE

Repair of hypertrophic cardiomyopathy may require the surgeon to go beyond a septal myectomy; a systematic approach to anomalies of the mitral valve apparatus is imperative.

HCM. Although HCM may be a niche in surgery, mounting evidence on the important role of nonseptal anatomical causes of obstruction emphasizes the important role of surgical intervention to eliminate the gradient and ensure symptomatic relief for patients.<sup>1,4</sup>

Appropriate management of MV pathology during septal myectomy is critical to maintaining excellent outcomes, and in most cases of anomalous PMs, will require intraoperative recognition, given the low sensitivity of preoperative imaging. Our group has previously demonstrated that surgical expertise is an important factor in outcomes from septal myectomy, particularly as it relates to the MV.<sup>7</sup> The impact of MV procedures, especially MV replacement, during septal myectomy has been associated with increasing morbidity and mortality and should only be considered in experienced hands.<sup>8</sup>

We should not forget the principle of this operation: an isolated septal myectomy is (almost) always sufficient in eliminating left ventricular outflow tract obstruction and systolic anterior motion for obstructive HCM. However, recognition and correction of “HCM-associated mitral anomalies” has become an essential component of this operation, going hand-in-hand with septal myectomy. Whether MV repair is a separate procedure is up for debate and may be a mere technicality in the nomenclature. Perhaps “septal myectomy” may no longer be a sufficient term for this operation. It is rather “a repair of obstructive

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HCM” and, as such, it is inherently different from alcohol septal ablation.

Carvalho and colleagues from Mayo Clinic, which has an unparalleled track record of providing deep insights on HCM, contributed again by adding another layer of knowledge in this entity. Their experience with these patients is enviable, and in sharing their work in classifying the relevant surgical anatomy and refining surgical technique, they make surgical expertise accessible to the whole field.

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