In Percutaneous Transluminal Septal Myocardial Ablation for Hypertrophic Obstructive Cardiomyopathy, It Is Not the Speed of Intracoronary Alcohol Injection But the Amount of Alcohol Injected That Determines the Resultant Infarct Size

To the Editor:

In the Clinician Update on percutaneous transluminal septal myocardial ablation (PTSMA) for hypertrophic obstructive cardiomyopathy (HOCM), Kimmelstiel and Maron presented a successfully treated patient with maintenance of benefit 6 months later. The authors emphasized the importance of using smaller amounts of alcohol and injecting it more slowly into the first septal branch of the left anterior descending coronary artery to create more limited areas of myocardial infarction.

According to the experimental study reported recently by my colleagues in China and me, the size of the iatrogenic myocardial infarct is directly related to the amount of intracoronary alcohol injection during PTSMA but has no relation to its speed of injection. This study was carried out in pigs. It found significant differences in myocardial infarct size with different amounts of alcohol injected but no apparent differences in myocardial infarct size with different speeds of alcohol injection. These findings have obvious clinical implications, because it is much simpler to control the amount than the speed of intracoronary alcohol injections in the cardiac catheterization laboratory.

As Kimmelstiel and Maron mentioned, PTSMA is a promising therapeutic modality for HOCM. But they also underscored that, even in experienced hands, PTSMA may incur morbidity and mortality. Therefore, knowledge that the amount, rather than the speed, of intracoronary alcohol injection determines the size of the induced myocardial infarction (and therefore indirectly the morbidity and mortality of the procedure) should help guide the interventionists in the cardiac catheterization laboratories.

According to Kimmelstiel and Maron, there have been an estimated 3000 PTSMA procedures performed worldwide in the last 5 years. In China, 119 patients with HOCM were successfully treated in one center, and >400 PTSMA procedures have now been performed without any mortality (Zhang WW, Li ZQ, personal communication). Considering that the first case of HOCM in China was diagnosed in 1973, China certainly has made great progress in this field in the past three decades.

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Response

We would like to thank Dr Cheng for his comments regarding our recent Clinician Update concerning percutaneous transluminal septal myocardial ablation (PTSMA) for the treatment of patients with hypertrophic cardiomyopathy (HCM) with obstruction. Dr Cheng notes that we “emphasized the importance of using smaller amounts of alcohol and injecting it more slowly into the first septal branch of the left anterior descending coronary artery to create more limited areas of myocardial infarction.” He goes on to cite experimental observations in pigs that he and colleagues have reported, noting that experimental infarct size was related to the volume, but not the speed at which alcohol was injected into coronary arteries. Dr Cheng goes on to advise that in the catheterization laboratory, it is easier to control the amount rather than the speed of intracoronary alcohol injection.

We agree that smaller volumes of an infused toxic agent (in this case intra-arterial alcohol injected during PTSMA) will eventuate in smaller infarct size. Furthermore, given the uncertainty regarding potential long-term consequences of the PTSMA-induced intramyocardial septal scar, we advocate creation of the smallest area of myocardial necrosis, which leads to the desired hemodynamic effect. Indeed, the application of myocardial contrast echocardiography as an adjunct to localizing the optimal septal vessel on which to intervene has led to reductions in infarct size and significant decrease in the requirement for permanent pacemaker implantation for PTSMA-induced complete heart block. Also, in patients, a slower rate of alcohol injection has been documented to reduce the incidence of high-grade atrioventricular heart block by infusion rates of ~1 mL/min, as opposed to bolus administration. Therefore, interventionists performing PTSMA need to be judicious in both the amount and the rate at which they inject alcohol when performing PTSMA in appropriate patients with obstructive HCM.

We would also like to congratulate Dr Cheng and his colleagues for the progress that they have achieved in diagnosing and treating patients afflicted with HCM in China. However, we are concerned that Dr Cheng did not mention surgical septal myectomy as part of the treatment armamentarium for obstructive HCM in China. As we noted in our piece, septal myectomy has a 45-year track record of success in treating severely symptomatic, drug-refractory patients with HCM and obstruction and remains the gold standard intervention for this patient subset as stated in the recent American College of Cardiology/European Society of Cardiology clinical consensus document. We still believe that this procedure should be considered the metric to which other therapies are compared.

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