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Short Communication

Percutaneous Endocardial Septal Radiofrequency Ablation Guided by Intracardiac Echocardiography for the Treatment of Hypertrophic Obstructive Cardiomyopathy

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ABSTRACT

Hypertrophic Obstructive Cardiomyopathy (HOCM) accounts for approximately two-thirds of hypertrophic cardiomyopathy which is the leading cause of sudden cardiac death in young people. With the advent of three-dimensional intracardiac echocardiography percutaneous endocardial septal radiofrequency ablation has become a viable treatment option for HOCM.

Keywords: Hypertrophic obstructive cardiomyopathy; Percutaneous endocardial septal radiofrequency ablation; Left ventricular outflow tract pressure gradient

DESCRIPTION

Hypertrophic Cardiomyopathy (HCM) is the leading cause of sudden cardiac death in young people [1], particularly HOCM which accounts for approximately two-thirds of HCM. The diagnostic criteria for HOCM are as follows: 1. A wall thickness ≥ 15 mm in one or more left ventricular myocardial segments; 2. The Left Ventricular Outflow Tract Pressure Gradient (LVOTPG) is ≥ 30 mmHg at rest or ≥ 50 mmHg under provocative conditions such as exercise or Valsalva [2]; 3. Exclusion of other organic heart diseases such as hypertensive heart disease. With the advent of three-dimensional Intracardiac Echocardiography (ICE), Percutaneous Endocardial Septal radiofrequency Ablation (PESA) has become a viable treatment option for HOCM [3].

Since 2022, our center has treated 20 HOCM patients using this procedure. A six-month post-operative follow-up revealed that although the interventricular septal thickness did not significantly decrease in most patients, their LVOTPG was markedly reduced and clinical symptoms were significantly alleviated [4]. The core technique of this procedure involves two key steps: First, mapping the obstructive area of the interventricular septum and the conduction bundles using a catheter under the guidance of ICE combined with a three-dimensional mapping system; second, performing radiofrequency ablation in the obstructive area while avoiding the conduction bundles, *via* either the retrograde transfemoral arterial approach or atrial septal puncture. This represents the advantage of PESA over alternative surgical treatments for HOCM, including septal myectomy, transcatheter alcohol septal ablation and percutaneous intramyocardial septal radiofrequency ablation.

Based on our center's experience, the patient selection criteria for this procedure are as follows: 1. HOCM patients presenting with symptoms such as chest tightness, chest pain, or syncope after physical activity; 2. LVOTPG ≥ 50 mmHg under provocative conditions (exercise or Valsalva); 3. Hypertrophy of the basal and middle segments of the interventricular septum, with the exclusion of obstruction caused by papillary muscle hypertrophy [5]. We use LVOTPG ≥ 50 mmHg under provocative conditions as a inclusion criteria for patients undergoing PESA. This is because, according to our experience, the therapeutic effect of PESA is inversely proportional to LVOTPG. During the operation, the ablation endpoint is defined as a 50% reduction in LVOTPG. After the procedure, it is recommended to routinely administer glucocorticoids intravenously to resolve edema. Additionally, a temporary right ventricular apical pacing lead should be retained and can be removed after 2-3 days of observation if no atrioventricular block occurs.

Surgical treatment should be combined with pharmacotherapy. Since 2022, in addition to beta-blockers and non-dihydropyridine calcium channel blockers, the U.S. Food and

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Drug Administration (FDA) has approved mavacamten for the treatment of HOCM [6]. As a cardiac myosin inhibitor, this drug taken for more than 12 weeks can effectively reduce the LVOTPG [7].

CONCLUSION

Therefore, we recommend that symptomatic HCOM patients who meet the indications for PESA may undergo the procedure firstly, followed by long-term oral administration of medications including mavacamten. Symptom relief may be faster with this combined treatment.

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