Three-Dimensional Heart Printing for Planning of Septal Reduction Therapy in Patients with Hypertrophic Obstructive Cardiomyopathy

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Since hypertrophic obstructive cardiomyopathy complicated by intractable symptoms has heterogeneous phenotypic expressions, it is extremely important to tailor the therapy specifically for each patient. Therefore, a careful clinical evaluation including magnetic resonance and echocardiography should be performed prior to making decision about possible septal reduction therapy.¹

Clinical experience suggests that severe left ventricular obstruction might be present not only in the left ventricular

outflow tract, but also deeper in the mid-ventricular segment. Currently, we recommend surgical myectomy in all highly symptomatic patients with a mild septal thickness and long mitral leaflets, redundant chordae, significant papillary muscle abnormalities, and/or mid-ventricular cavity obstruction.¹ On the other hand, patients with less complex left ventricular

Fig. 1 Three-dimensional model of the heart with colored both the anterior mitral leaflet (pink) and hypertrophied basal septum (blue).

Fig. 2 The anterior mitral leaflet (pink) is lifted up; the basal septum (blue) narrows the left ventricular outflow tract with aortic valve in the background (asterix).

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pathology and septal thickness localized optimally only into the basal septum are better suited to alcohol septal ablation.¹

For better visualization of left ventricular pathology and to improve decision making about a type of septal reduction, a three-dimensional printing of the heart might be performed using data from cardiac computed tomography (CT) examination.^{2–4} (–**Figs. 1** and **2**) Additionally, different colors can delineate the area with maximal obstruction done by anterior mitral leaflet and hypertrophied basal septum. Such three-dimensional model might be a new source of information for heart teams in a process of planning the optimal reduction therapy.

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