Understanding septal morphology in hypertrophic cardiomyopathy – alternative vision

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Conflict of interest: none declared.

Article word count: 500

Central Picture: Anatomical and surgical topography of interventricular septum with abnormal muscle bundles

We really appreciate the effort of the authors [1] to propose the nomenclature of the interventricular septum (IVS) morphology to be used in surgical treatment of hypertrophic obstructive cardiomyopathy (HOCM), both for the purpose of training and for uniformity in expert assessment of various HOCM phenotypes. At the same time, we would like to comment on several key points outlined in the article.

In HOCM nomenclature it is generally agreed to divide left ventricle (LV) in three zones across its long axis. The proposed margins of the zones are questioned. The length of zone 1 is correlated to the length of the anterior mitral valve leaflet which varies largely across its segments. The length of zone 2 is described as equal to the length of the chords. In HOCM, however, chords are often fibrotic and shortened [2], which exacerbates systolic anterior motion and contributes to...
the left ventricle outflow tract (LVOT) obstruction. Moreover, length of the chords varies significantly depending on pupillary muscles anatomy and positioning. Zone 3 corresponds to the rest of IVS, again depending on papillary muscle length. According to this nomenclature, cases of HOCM with isolated LV narrowing at the level of papillary muscles, which are often associated with apical aneurysms, fall into apical category however actually they are midventricular. Another consideration is that area of Zone 3 is unproportionally bigger than corresponding areas of Zones 1 and 2.

In HOCM nomenclature we would emphasize the prevalence of combined basal-midventricular form, which accounted for 60.2% cases in our register [3].

The proposed anatomical topography from the surgeon’s view with clock orientation lacks accuracy in providing mapping across the entire IVS length, being limited to immediate subaortic area.

In our practice we routinely use the anatomical and surgical classification of the IVS [4]. It divides IVS across its long axis into three anatomical zones of equal length (basal, midventricular and apical) (Fig. 1). Each zone is in turn divided into three further segments across IVS short axis by lines originating from the commissure between the aortic valve right and non-coronary cusps, the nadir of the right coronary cusp, the commissure between the right and left coronary cusps, and going towards LV apex.

Simple and clear division of the IVS into 9 segments that are nearly equal in size is invaluable in precise assessment of the IVS and abnormal muscle bundles (AMBs) morphology, aids in classification of various HOCM phenotypes during septal myectomy planning.

Having had an extensive experience in HOCM surgery using 3D modelling [3-5], we deem it appropriate to include LV AMBs into the HOCM nomenclature. 81.6% of patients in our series had AMBs that contributed to the obstruction. Majority of them were fused with IVS and originated from the basal zone [3].
We believe that 3D modeling is highly beneficial in HOCM surgery, especially in the mapping of IVS and AMBs excision zone as it provides a personalised approach with surgery planning based on thorough analysis of IVS spatial morphology, facilitates assessment of HOCM phenotypes [3-5].

References:


Figure Legends:

Anatomical and surgical topography of interventricular septum with abnormal muscle bundles
IVS anatomical and surgical segments:

IA - basal-posterior  IB - middle-posterior  IC - apico-posterior
IIA - basal-central  IIB - middle-central  IIC - apico-central
IIIA - basal-anterior  IIIB - middle-anterior  IIIC - apico-anterior

ALAMB - anterolateral abnormal muscle bundles
IVS anatomical zones:
A - basal
B - middle
C - apical

IVS surgical regions:
I - posterior
II - central
III - anterior

IVS anatomical and surgical segments:
IA - basal-posterior
IIB - middle-posterior
IC - apico-posterior
IIB - basal-central
IIC - middle-central
IIC - apico-central
IIIA - basal-anterior
IIIB - middle-anterior
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