ECHOCARDIOGRAPHY-BASED MODALITIES TO ANALYZE DIASTOLIC CARDIAC FUNCTION

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Introduction:
In perioperative medicine, studies concerning diastolic heart failure have been hampered by the lack of specific monitoring tools. Pulsed Doppler-based interrogations of transmitral and pulmonary venous flow-velocity patterns have long been the primary approach to non-invasively evaluate diastolic function. However, none of the derived variables have a linear and unambiguous relationship to the severity of diastolic disease, e.g. they “pseudonormalize”. Particularly in the perioperative setting, when cardiac loading conditions are changing continuously, such indices are of limited value.

New Methods:
Tissue Doppler imaging (TDI) and Color Doppler M-mode echocardiography may offer a solution to this problem. TDI allows the quantification of mitral annular motion (MAM), i.e. the longitudinal displacement of the heart. The peak velocity of MAM during the rapid filling phase (Em or E’) is preload independent in diseased hearts and directly correlates with diastolic performance (J Appl Physiol 2001; 90:299). Color Doppler M-mode measures the propagation velocity of blood entering the left ventricle during diastole (Vp), which is also claimed to be a preload independent measure of diastolic function. (JACC 2000; 36:1664) The usefulness of these indices in the perioperative setting now remains to be established (e.g. angle dependency of Doppler measurements).

Conclusion:
In this lecture, we will discuss the physiological background, the practical application, as well as the usefulness and limitations of echo-based modalities to quantify diastolic performance. New indices may offer an opportunity to advance our knowledge on the role of diastolic cardiac failure and evaluate new treatment modalities in the perioperative setting.