Abstract: **P109**

**4D CMR flow mapping and strain analysis of a muscular left ventricular diverticulum**

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**Topic(s):**
Cardiac Magnetic Resonance: Myocardium

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**Introduction**

Ventricular diverticulum is a rare congenital malformation that can occur in the left or right ventricle. It is usually diagnosed accidently in children and can be associated with other congenital anomalies. Left ventricular (LV) diverticulum is usually asymptomatic. Cardiac magnetic resonance (CMR) is one of the effective modalities in diagnosing this congenital malformation. Herewith, we are presenting a case of LV diverticulum and highlighting the role of 4D CMR flow and strain analysis in its morphology and blood flow pattern assessment.

**Case report**

An 18 years old male was referred to our institution for further evaluation of an accidently discovered left ventricular wall out pouching by echocardiography. CT coronary angiography was done, to exclude CAD, revealing normal coronaries. CMR with contrast was performed on 1.5 T scanner in order to study the morphologic and flow pattern of this congenital malformation and its kinetic features. CMR protocol included ECG gated steady state free precession 2, 4 chamber and short-axis cine images together with early and late gadolinium enhancement (LGE) images in the same orientation using a segmented inversion-recovery gradient-echo pulse sequence. 4D flow images were also acquired during the whole cardiac cycle. Cine images revealed a true left ventricular muscular out pouching showing synchronous contraction (Figure 1-A). LGE images showed no fibrosis confirming the diagnosis of muscular diverticulum (Figure 1-B). Strain analysis showed diverticular wall relative reduced strain in comparison to the rest of the myocardium (Figure 1-C). 4D CMR flow analysis using color coded streamlines over the cardiac cycle showed that the inflow blood almost stopped at the neck of LV diverticulum with a big vortex formed at the early diastole phase (Figure 1-D). There was a high velocity recoded at the LV diverticulum's neck (Figure 1-E).

**Discussion**

Ventricular diverticulum includes muscular and fibrous types. The muscular type is more common and is not prone to rupture, it consists of true muscle fibers that contracts synchronously. The treatment of a congenital left diverticulum is still undefined due to lack of guidelines. Recent advanced CMR techniques can highlight the potential risks of the LV diverticulum despite being contractile. In our case, based on 4D flow and strain analysis, this diverticulum is prone to be complicated by thrombus formation so anticoagulation therapy together with close follow up was recommended.

**Conclusion**

Advanced CMR techniques particularly 4D flow and strain analysis can demonstrate the potential risks of muscular diverticulum. This can help in guiding the management plan for these patients adding more value to CMR in such cases.
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