

Percutaneous Reduction of Septal-to-Lateral Mitral Annular Distance to Increase Mitral Leaflet Coaptation Length: Preclinical Study Results

Objective: There are 2 effective percutaneous techniques to treat mitral regurgitation, one clipping mitral leaflets and one reducing the diameter of the mitral annulus. Isolated septal-lateral distance (SLD) reduction of the mitral annulus has emerged as a potential treatment strategy for acute and chronic ischemic mitral regurgitation (IMR) and the purpose of this study is to assess its in-vivo feasibility.

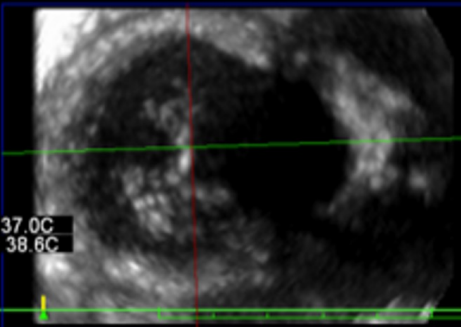
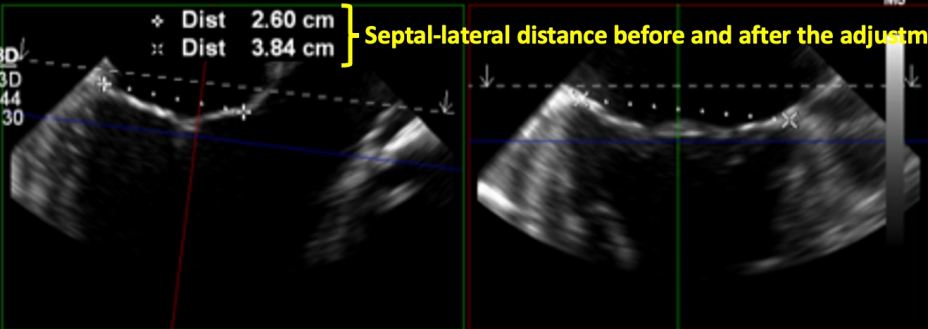
Methods: Device description. The device has 3 components: the saddle that is inserted into the coronary sinus; the plug that is positioned in the left ventricle outflow tract (LVOT) just below the commissure between non-coronary and left coronary leaflets of the aortic valve (aortic-mitral curtain); and the bridge that connects the saddle and the plug. Deployment technique. The aim is to shorten the SLD of the mitral annulus. Procedure was accomplished through venous access: (1) the saddle element was deployed in the lateral wall via the great cardiac vein; and (2) the plug was deployed in the aortic-mitral curtain through a trans-septal puncture of the interatrial septum. Experimental procedure. Adult healthy sheep received full sternotomy to access epicardium only to perform epi-cardiac ultrasound. In both femoral veins and right jugular 18Fr introducers were positioned to gain access the right atrium under fluoroscopy. A dedicated catheter holding a needle for transseptal puncture was advanced into the coronary sinus and pierced it toward the left atrium, above the mitral annulus at P2 level. Using over the wire technique, the saddle element was positioned into the coronary sinus and hold in place by the ePTFE bridge in the left atrium. A second catheter for transseptal puncture was inserted for crossing the interatrial septum and puncture the aortic-mitral curtain allowing a guidewire passing into the LVOT. The plug was deployed and hold by the ePTFE bridge. The 2 parts of the bridge are then joined under echocardiographic control to reduce the SLD and possibly increasing leaflet coaptation. Two echocardiographic parameters, the SLD and the MCL, were measured at the beginning of the procedure and after the device deployment. Results. 10 animals were treated and sacrificed at the end of the procedure. Mean duration of the procedure was 110 ± 81 min. SLD distance decreased from 3.8mm to 2.6mm (30%) and maximum increase MCL was 4mm (figure 1). Conclusion. This seems a promising technique for percutaneous treatment of IMR.

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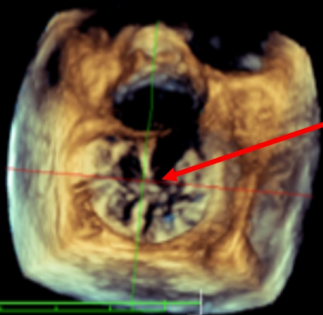
X8-2t
9Hz
6.2cm
Zoom 3D
2D / 3D
% 58 / 44
C 46 / 30
Gen

◇ Dist 2.60 cm
∴ Dist 3.84 cm

Septal-lateral distance before and after the adjustment



T PAT: 37.0C
T ETO: 38.6C
F# 3



Bridge

Zoom: 88%
Im: 1/4 Series: 1
Uncompressed

8/31/20, 3:48:26 PM
22 min, 28 sec / 1 hr, 45 min
Made In OsiriX