Percutaneous mitral balloon valvuloplasty. Difficult mitral valve crossing

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Introduction
Percutaneous mitral balloon valvuloplasty (PMBV) is the treatment of choice for significant mitral stenosis (MS). The inability to cross the mitral valve accounts for a non-negligible rate of unsuccessful PMBV. This may be caused by unfavorable septal puncture or extensive enlargement of the left atrium (LA), both resulting in insufficient support. Advanced valvular and subvalvular degeneration may further impede valve crossing.

Surprisingly, only a few reports focus on this problem. In a study by Feldman, failure to cross the mitral valve occurred in 1.7% of cases [1]. Cribier et al. reported the occurrence of this failure at 2.6% [2].

We present a case of a successful re-attempt of PMBV done with the support of a veno-arterial loop after an unsuccessful mitral valve crossing with an Inoue balloon in the first procedure.

Case report
A 38-year-old woman with significant MS, history of ischemic stroke, and hypertension was admitted for PMBV.

In echocardiography LA enlargement to 30.0 cm², thickening of mitral leaflets and subvalvular apparatus, fusion of posterior commissure were observed. Mitral valve area (MVA) was 0.8 cm² by the pressure half-time (PHT) formula. Trans-mitral gradient was 21.7/10.5 mm Hg maximum and mean, respectively. The standard PMBV with the Inoue balloon was initiated via the right femoral vein. Atrial septum puncture was performed under trans-esophageal echocardiography (TEE) guidance. In the case of LA enlargement the right atrium is pushed to the front. So, as in the typical place of puncture the ascending aorta might be present, we usually puncture the atrial septum slightly posteriorly. Then hemodynamic measurements were made. After having placed the balloon in the LA, all of the maneuvers aiming to cross the mitral valve orifice with the balloon failed. During the second approach, a modified PMBV technique was used with a transseptal veno-arterial loop serving as a rail for the balloon’s entry into the LV (Figure 1).

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Discussion
Various techniques have been proposed to enable the anterograde trans-septal or retrograde non-transseptal approach (Stefanadis technique) for balloon entry into the LV [3].
The veno-arterial loop technique is used in different strategies such as closure of paravalvular leaks, ventricular septal defects or the transcatheter mitral valve-in-ring (TVIR) procedure, to offer better delivery support. Ateş et al. presented probably the first use of a veno-arterial loop for a challenging mitral valve crossing [4]. Technically, the wire was directed in an anterograde fashion from the LA through the LV into the ascending and descending aorta using a multipurpose catheter. Finally the loop was completed by snaring the common iliac artery and pulling it out from the sheath [4]. Thus, no multi-snare loop was used here, unlike in our case.

Recently Nanjappa et al. reported the first series of three patients with difficult mitral valve crossings, where a veno-arterial loop was created and proved to be helpful [5]. In our opinion the crossing maneuver is safe and useful, but should be done gently.

Conclusions

A veno-arterial loop may be considered a bail-out technique in cases of a problematic crossing of the mitral valve orifice during PMBV.

Conflict of interest

The authors declare no conflict of interest.

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