To the Editor: Transoesophageal echocardiography (TEE) plays an important role in monitoring, guiding, and evaluating the surgical repair of congenital heart disease (CHD). However, the large size of the currently available TEE probes limits their application in pediatric cases, especially in small infants. Recently, a miniaturized micro-TEE probe compatible in neonates has been introduced for clinical use. However, limited experiences with micro-TEE have been reported. Here, we reported a special small infant case, whose mitral valve was damaged after balloon dilation for aortic valve stenosis (AS), the infant went on to receive surgical repair under micro-TEE guidance.

A 28-day-old male infant was admitted to Cardiac Care Unit, Children’s Hospital of Fudan University, with the chief complaint of anorexia and vomiting. Transthoracic echocardiography (TTE) (Philips/iE33, USA) revealed severe AS with the peak and mean pressure gradients of 81 mmHg and 33 mmHg, respectively, as well as cardiac dysfunction. Thirty-six days after birth, the infant received balloon dilation for AS. The catheter pathways were as follows: Right femoral vein → inferior vena cava → right atrium → atrial septal defect → left atrium → left ventricle → aorta, and right axillary artery → right subclavian artery → ascending aorta. A loop was established between the two pathways. The aortic annulus was 9.2 mm, and the pressure gradient was 37 mmHg measured by angiography. Four dilations were performed using the Cordis Dilation Catheter balloon (Cordis Corporation, Johnson and Johnson, USA) with a size of 7 mm × 20 mm at 14 atm. The pullback gradient across the aortic valve was reduced to 13 mmHg. However, 3 days after the procedure, follow-up TTE revealed severe mitral eccentric regurgitation. A mitral valve repair operation was then considered. Informed consent was obtained from his parents. Forty-one days after birth, the infant weighted 3.8 kg and received a surgical operation, which was guided and evaluated by intraoperative TEE with a microprobe (micro-TEE) (S8-3t; Philips Medical Systems, USA). Preoperative micro-TEE revealed a perforation in the anterior leaflet of the mitral valve with severe mitral eccentric regurgitation [Figure 1a and 1b], the junction of

**Figure 1:** Perforation in the mitral valve after balloon dilation for AS in a small infant was well-repaired with the guidance of micro-transesophageal echocardiography (TEE). (a) Mid-esophageal four-chamber view demonstrating the perforation in the anterior leaflet of the mitral valve (arrow); (b) Mid-esophageal four-chamber view with color Doppler demonstrating the severe mitral eccentric regurgitation (arrow) during the systolic phase by preoperative micro-TEE; (c) Mid-esophageal four-chamber view demonstrating the perforation in the mitral valve was well-repaired (arrow); (d) Mid-esophageal four-chamber view with color Doppler demonstrating mild mitral regurgitation (arrow) after mitral valve repair during the systolic phase by postoperative micro-TEE. LA: Left atrium; LV: Left ventricle; RV: Right ventricle.
the right coronary cusp and noncoronary cusp was fused, which resulted in AS. Both the mitral valve perforation and aortic valve fusion were confirmed by surgical exploration, which were either repaired or incised. Postoperative micro-TEE showed that the perforation was well-repaired [Figure 1c and 1d]. In addition, AS was also relieved. No TEE-related complications occurred during the perioperative period. A series of follow-up exams by TTE until 9 months after surgery suggested satisfactory results.

Currently, improved interventional and surgical techniques have allowed life-threatening critical CHD, including severe AS, to be treated timely in the neonatal period or in early infancy.[3] Although there have been more success and less complication reported, small infants with severe AS who receive balloon dilation are still at high risk due to their small-sized cardiovascular structure and vulnerable pathophysiologic conditions.[4] We reported a case of mitral valvular perforation after balloon dilation for AS. Fortunately, neonatal cardiac surgery can alleviate some catheter-related complications. Nevertheless, complex neonatal and infant surgeries are also high risk. However, intraoperative micro-TEE has been introduced to guide and evaluate the surgical procedure.[5] From our limited experiences, preoperative micro-TEE clearly showed the valvular problems, postoperative micro-TEE may also evaluate the surgical results. The micro-TEE appeared to be a promising imaging tool in the perioperative assessment of small infants who underwent cardiac surgery without severe complications related to the probe insertion or manipulation. Our preliminary experience of micro-TEE in cardiac valve operations adds to the evidence of effectiveness and safety with intraoperative micro-TEE in small infants.

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Received: 18-12-2014 Edited by: Xin Chen How to cite this article: Ma XJ, Huang GY, Zhang J. Microtransesophageal Echocardiography Guided Mitral Valve Repair After Balloon Dilation for Aortic Valve Stenosis in a Small Infant. Chin Med J 2015;128:1277-8. Source of Support: This study was supported by a grant from Shanghai Key Laboratory of Birth Defect (No. 13dz2260600). Conflict of Interest: None declared.