



USE OF 4DCT TO SIMULATE THE EFFICACY OF PTPV IN A PREMATURE INFANT COMPLICATED BY DORV

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History and physical:

Cyanotic congenital heart disease often requires palliative procedures such as SP shunt, PDA stent and RVOT stent in the early postnatal period. PTPV can also be an option in neonate with prohibitive risk of surgery or stent. To predict the efficacy of PTPV, detailed information of valve and RVOT is required, especially in patient with complex anatomy of RVOT such as DORV. Four-dimensional recognition of morphology of valve and RVOT could provide critical insight to operators, however, it is sometimes difficult to be obtained only by transthoracic echocardiography.

Imaging:

A premature female newborn, gestational age of 33 weeks and birth weight of 1174 g, was diagnosed DORV with doubly-committed VSD and side-by-side great arteries. 2DE obviously showed valvular pulmonary stenosis with small annulus (4.5 mm). At 47 days of her age and weight 1760g, she became symptomatic with significant cyanosis with suspicion of infundibular stenosis despite the initial diagnosis of doubly-committed VSD. A contrast-enhanced CT was performed as preoperative evaluation of SP shunt and the anatomy of coronary artery for following RVOT reconstruction in the future. However, considering the risk of SP shunt due to her prematurity and low body weight, we tried to explore the possibility of PTPV using diverted CT data. CT data was supplemented the movement in the time axis direction with PhyZiodynamics of Ziostation2, then animated the lumen of the pulmonary artery and the RVOT. From the 4D image, pulmonary valve and narrow annulus without infundibular stenosis was clearly visualized, and we speculated that PTPV with appropriate balloon could improve hypoxemia by releasing valvular stenosis, as well as residual annulus narrowing still could control pulmonary blood flow to prevent over circulation. PTPV was performed with TMP-PED 6 mm/2 cm. The oxygen saturation increased from 80% to 98%



without pulmonary congestion. She was able to wean from the ventilator, and finally, wait for SP shunt until 75 days of her age and adequate body weight, 2.3 kg.

Discussion:

4DCT can be used to evaluate any cross section, and it was possible to evaluate the degree of infundibular stenosis three-dimensionally. On the other hands, CT should not be recommended as a first-line examination from the viewpoint of radiation exposure, and the image data acquired as a preoperative study, was used to evaluate intracardiac structure.

Conclusion:

Evaluation of infundibular stenosis by 4DCT helped prediction of the efficacy of PTPV.

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