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Accuracy of Echocardiography in diagnosing Coronary Anatomy in Transposition of the Great Arteries - helping or confusing the surgeon?

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Objective: To determine the accuracy of echocardiography in diagnosing the coronary anatomy in neonates with d-transposition of the great arteries (dTGA) before arterial switch operation (ASO) and to evaluate the impact of a correct or incorrect echocardiographic diagnosis regarding the intra- and postoperative course after ASO.
Methods: In this single center observational study 131 neonates (72.5% male) with simple dTGA, diagnosed from 2004 to 2017 were enrolled. We compared coronary patterns found in preoperative echocardiography with intraoperative findings and evaluated the findings with parameters of the intra- and postoperative clinical course.
Results: 90 (68.7%) patients had a usual coronary anatomy (1LCx2R) and 41 (31.3%) patients showed coronary variants intraoperatively (1L2RCx n=18, single coronary artery n=7, intramural course n=5, others n=11). In children with usual coronary anatomy echocardiographic diagnosis was correct in 92.2% in contrast to 19.5% with coronary variants. Overall, echocardiographic diagnosis was correct in 68.7% (n=90). The incorrectly diagnosed patients were coronary variants in 83% (n=34). Incorrect diagnosed patients showed significantly longer duration of surgery (261 vs. 276 min, p=0.042) and extracorporal circulation time (ECC, 165 vs 178 min, p=0.026), whereas common parameters of the postoperative course (inotropic support, ventilator support, ICU and total hospital stay) were not significantly different in both groups. Of note, coronary variants itself showed a significantly longer duration of surgery (261 vs 295 min, p= 0.025), aortic cross clamp time (102.5 vs 122 min, p=0.004) and ECC time (166.5 vs 188 min, p=0.016) without differences in parameters of the postoperative course.
Conclusion: Accuracy of echocardiographic diagnosis of coronary anatomy is high in usual coronary pattern (1LCx2R, 92.2%) but low in coronary variants (19.5%). Incorrect diagnosis is associated with a longer intraoperative but not with a more complicated or longer postoperative course. Nevertheless, biasing the impact of a wrong echo diagnosis, a more difficult coronary transfer in coronary variants influences these factors as well. Surgical strategy was not fundamentally influenced by coronary anatomy as ASO could be performed in all children (100%) regardless of assumption of coronary variants or wrong diagnosis during preoperative echocardiography.