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全容积三维超声定量评价右室流出道的可行性

Feasibility of measuring right ventricular outflow tract with full-volume three-dimensional echocardiography

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英文关键词:Echocardiography Right ventricular outflow tract

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中文摘要:

目的 评价从全容积三维超声心动图(FV3DE)数据库中截取的感兴趣区切面观测量右室流出道的可行性。方法 18例法洛四联症患儿纳入研究,年龄(3.2±4.5)岁。采用二维超声心动图(2DE)、FV3DE和心血管造影同时测量右室流出道。FV3DE采用漏斗部、肺动脉瓣环、肺动脉主干、左肺动脉或右肺动脉的横截面切面观进行测量。结果 漏斗部前后径的FV3DE和2DE测值差异无统计学意义(t=-0.865, P=0.399)。FV3DE显示漏斗部的前后径小于左右径(t=-13.968, P=0.000),提示法洛四联症漏斗部的横截面类似于椭圆形。肺动脉瓣环直径的FV3DE、2DE与心血管造影测值差异无统计学意义(P>0.05),且均与心血管造影测值良好相关(r=0.899和r=0.839)。左、右肺动脉直径的FV3DE、2DE与心血管造影测值差异无统计学意义(P>0.05),且均与心血管造影测值良好相关(左肺动脉:r=0.947和r=0.797;右肺动脉:r=0.987和r=0.831)。从FV3DE数据库中截取的切面观还可测量漏斗部、肺动脉瓣环、肺动脉主干以及左、右肺动脉的横截面积,分别为(61.9±33.0)mm^2、(64.9±32.5)mm^2、(65.4±25.9)mm^2、(34.9±17.1)mm^{2}和(40.2±21.0)mm^2。由FV3DE得到的肺动脉直径指数(PDI)和肺动脉截面积指数(PAI)与心血管造影的McGoon指数和Nakata指数均良好相关(r=0.877和r=0.983)。结论 从FV3DE数据库中截取的切面观测量右室流出道的比传统2DE切面观的测值更准确。由FV3DE得到的PDI和PAI是反映肺动脉发育状况的可信指标。

英文摘要:

Objective To evaluate the reliability of measuring right ventricular outflow tract (RVOT) with sectional imaging extracted from full-volume three-dimensional echocardiography (FV3DE) dataset. **Methods** Eighteen cases of tetralogy of Fallot (TOF) aged (3.2±4.5) years were recruited in the study. Two-dimensional echocardiography (2DE), FV3DE and angiography were used to measure RVOT. Measurements were fulfilled in the transverse sectional view of infundibulum, pulmonary valve annulus (PVA), main pulmonary artery (MPA), left pulmonary artery (LPA) or right pulmonary artery (RPA) extracted from FV3DE dataset. **Results** No significant difference was observed between FV3DE and 2DE in the anterior-posterior diameter of infundibulum (t=-0.865, P=0.399). Interestingly, smaller anterior-posterior diameter was revealed as compared with lateral diameter by FV3DE (t=-13.968, P=0.000), suggesting the morphology of infundibulum of TOF was not circular shape. No significant difference was observed between FV3DE, 2DE and angiography in measuring the diameter of PVA (P>0.05). PVA measured by FV3DE and 2DE both well correlated with angiography (r=0.899 and r=0.839, respectively). No significant difference was observed between FV3DE, 2DE and angiography in measuring LPA (P>0.05) and RPA (P>0.05). Both LPA and RPA measured by FV3DE and 2DE were well correlated with angiography (LPA: r=0.947 and r=0.797; RPA: r=0.987 and r=0.831, respectively). The sectional area of infundibulum, PVA, MPA, LPA and RPA measured by FV3DE was (61.9±33.0)mm^2, (64.9±32.5)mm^2, (65.4±25.9)mm^2, (34.9±17.1)mm^2 and (40.2±21.0)mm^2, respectively. The pulmonary diameter index (PDI) and the pulmonary area index (PAI) derived from FV3DE were well correlated with McGoon index and Nakata index derived from angiography (r=0.877 and r=0.983, respectively). **Conclusion** Sectional imaging extracted from FV3DE dataset provides a new methodology, which is more reliable and accurate in measuring RVOT as compared with 2DE. The indices reflecting pulmonary arterial development such as PDI and PAI derived from FV3DE are also credible.

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