



البحث الثالث

(بحث مشترك منشور دولي مشتق من رسالة علمية)

عنوان البحث:

دور الاشعه المقطعيه على القلب في تقييم أمراض القلب الخلقية الوعائية مقابل أمراض القلب الخلقية عند الأطفال
Role of Cardiac CT in Evaluating Vascular versus Cardiac Congenital Heart Diseases in Children

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ABSTRACT

Background: CHD is the most common birth anomaly worldwide and it has a significantly increasing prevalence rate. Traditional evaluation for assessment depends on ECHO and conventional angiography. Recent technological advances in MDCT, is increasingly used for non-invasive evaluation. The aim of this study was to evaluate the value of MDCT in assessment of vascular and cardiac CHD in pediatrics as a non-invasive preoperative planning method and to compare its results with those of ECHO.

Aim of Study: To assess the role of cardiac CT in the evaluation vascular versus cardiac congenital heart diseases in children. **Material and Methods:** This single center prospective study included 50 children up to 12 years-old from both sexes with a clinical suspicion to have CHD and referred to perform ECHO and then MDCT examination for further evaluation before surgery. The study was conducted in radiology department Fayoom University, after referral from the pediatric cardiology clinic.

Results: This study included 50 children, whom are known to have CHD by ECHO and referred to perform MDCT examination for further evaluation before surgery. Among the 50 children in the study; we encountered 273 anomalies in total, which further specified into 23 different types of CHD. The diagnostic sensitivity, specificity, KAPPA and p-values for both ECHO and MDCT, and ROC was performed according to AUC values of 2 methods. We compared sensitivity and specificity for ECHO and MDCT in the diagnosis of different congenital cardiovascular malformations with higher sensitivity of about 100% for ECHO in the detection of cardiac structure and heart-vascular connection malformations, but higher sensitivity for MDCT of about 100% for detection of vascular malformations. For cardiac structures malformation, both ECHO and MDCT are considered as good positive, but bad negative tests with sensitivity more than 92%, but specificity only 50%. The AUC value of ECHO was slightly larger than that of MDCT for cardiac structures malformations (75% vs. 71.4%) and for heart-vascular connection malformation (100% vs. 98.6%), but slightly smaller for ECHO than that of MDCT for vascular malformations (96.6% vs. 100%). The KAPPA value of ECHO was also slightly larger than that of MDCT for cardiac structures malformations (0.627 vs. 0.45) and for heart-vascular connection malformation and (1 vs. 0.951), but much smaller than that of MDCT for vascular malformations (0.545 vs. 1).

Conclusions: The diagnostic sensitivity of both MDCT and ECHO for CHD is generally high with slightly higher sensitivity for ECHO. Each has its own advantages and disadvantages.



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Overall ECHO is better than MDCT in the diagnosis of the cardiac structures anomalies, especially for atrial septal anomalies as PFO, ASD and ASA. Both are accurate in the diagnosis of heart-vascular malformations, including: DORV and TGA. On the other hand, MDCT provides higher sensitivity in the anatomic structural details for vascular malformations, Aortic pseudo-coarctation, Aortic arch anomalies, peripheral pulmonary stenosis, abnormal systemic venous drainage and tracing of MAPCAs. Thus, we recommend ECHO in the diagnosis of cardiac structures malformations, whereas MDCT is better for vascular malformations.

Key Words: MDCT – ECHO – Cardiac – Complex – CHD – Pediatrics.

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