Sun et al. Journal of Cardiovascular Magnetic Resonance 2015, 17(Suppl 1):P44
http://www.jcmr-online.com/content/17/S1/P44

Journal of Cardiovascular Magnetic Resonance

POSTER PRESENTATION Open Access

Comparison of great artery dimensions in 3-D dual-phase SSFP, compared with 3D CE-MRA and phase-contrast imaging (magnitude image)

Aimin Sun[2], Srinivas Ananth Narayan[1*], Gerald F Greil[1], Tarique Hussain[2], Kuberan Pushparajah[2], Aaron Bell[1], Sujeev Mathur[1], Reza Razavi[1]

From 18th Annual SCMR Scientific Sessions
Nice, France. 4-7 February 2015

Background

The dimensions of great vessels are measured in different methods in different institutes. The purpose of this study was to evaluate the benefits of 3D dual phase steady-state free-precession(3D-DP SSFP)for measuring great arteries dimension, compared with 3D contrast-enhanced magnetic resonance angiography (3D CE-MRA) and 2D phase contrast imaging (Magnitude image) (2DPC-MI), in order to find which was the most suitable and reproducible technique for follow-up.

Methods

29 patients with repaired Tetralogy of Fallot or complete transposition of the great arteries after arterial switch operation (mean age 6.5yrs; range 6m to 25yrs) were included in the study. Cross-sectional diameter and area measurements were taken of the ascending aorta (Ao), main pulmonary (MPA) and branch pulmonary arteries (BPA) by using 3D DP SSFP, 3D CE-MRA and magnitude image of 2DPC-MI. Image quality was scored by a five-point scale (0 = invisible to 4 = excellent). Statistical comparison between 3D DP SSFP and other two techniques (2DPC-MI and 3D CE-MRA) was performed by using paired-t tests and Intraclass correlation coefficient.

Results

All great artery cross-sectional measurements were significantly ($P < 0.001$) greater in systole than in diastole. Measurements (diameter and area) of great arteries were greatest for 2DPC-MI, followed by 3D SSFP in systole and 3D CE-MRA, and smallest for 3D DP SSFP in

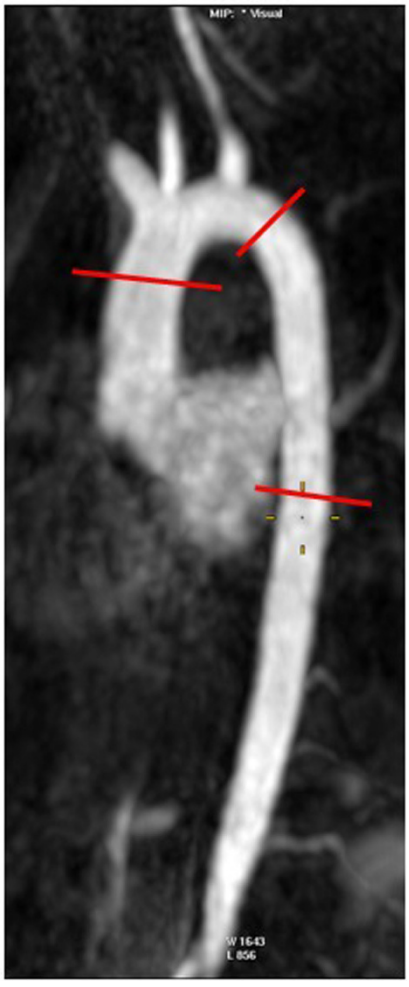

Figure 1

[1]Paediatric Cardiology, Evelina London Children's Hospital, Harrow, UK
Full list of author information is available at the end of the article

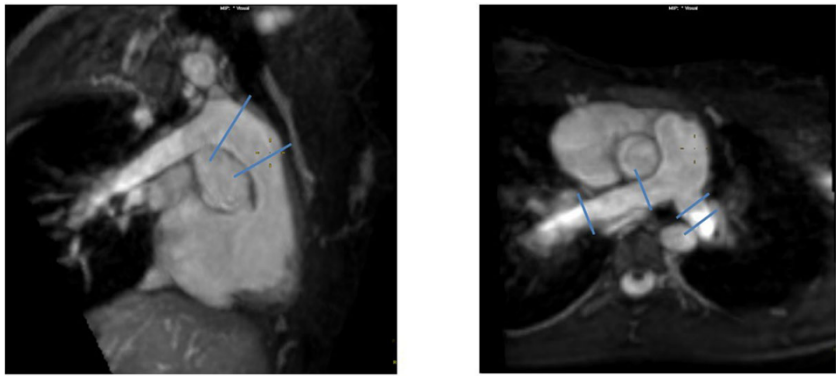

Figure 2

diastole. There was no significant difference of aortic measurements between 3D DP SSFP in systole and 3D CE-MRA, but significance was observed between 3D DP SSFP in systole and 2D PC-MI ($P < 0.05$). The measurements of MPA and BPA showed no significant difference for 3D DP SSFP in systole compared to other two techniques. Intra-observer agreement of aortic measurements was uniformly >0.95, with 2DPC-MI being the best, followed closely by 3D DP SSFP in systole, and 3D CE-MRA being the worst. The average image quality of 3D DP SSFP and 2DPC-MI were ≥3. But the image quality was significantly poorer for 3D CE-MRA compared to other two techniques ($P < 0.001$).

Conclusions

All Ao and PA cross-sectional measurements were significantly ($P < 0.001$) greater in systole than in diastole. Measurements of Ao and PA were greatest for 2DPC-MI, followed by 3D SSFP in systole and 3D CE-MRA, and smallest for 3D DP SSFP in diastole. There was no significant difference of aortic measurements between 3D DP SSFP in systole and 3D CE-MRA, but significance was observed between 3D DP SSFP in systole and 2D PC-MI ($P < 0.05$). The measurements of MPA and BPAs showed no significant difference for 3D DP SSFP in systole compared to other two techniques. Intra-observer agreement of Ao measurements was uniformly >0.95, with 2D PC-MI being the best, followed closely by 3D DP SSFP in systole, and 3D CE-MRA being the worst. The image quality of 3D DP SSFP and 2D PC-MI scored≥3. But the image quality was significantly poorer for 3D CE-MRA compared to other two techniques ($P < 0.001$).

Funding

The first author recieved an educational grant from Philips Healthcare.

Authors' details
[1]Paediatric Cardiology, Evelina London Children's Hospital, Harrow, UK. [2]Diagnostic Imaging, Shanghai Children's Medical Centre, Shanghai, China.

Published: 3 February 2015

doi:10.1186/1532-429X-17-S1-P44
Cite this article as: Sun *et al.*: Comparison of great artery dimensions in 3-D dual-phase SSFP, compared with 3D CE-MRA and phase-contrast imaging (magnitude image). *Journal of Cardiovascular Magnetic Resonance* 2015 **17**(Suppl 1):P44.