# [mDixon ECG-gated 3-dimensional cardiovascular magnetic resonance angiography in patients with congenital cardiovascular disease.](https://www.ncbi.nlm.nih.gov/pubmed/31391061)

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**Take Home Points:**

* modified Dixon (mDixon) 3D cardiovascular magnetic resonance angiography (CMRA) demonstrates reduced artefact burden and better delineation of head and neck vessels as well as pulmonary veins compared to conventional 3D balanced steady state free precession CMRA.
* mDixon acquisitions might help improving diagnostics in pediatric and adult congenital heart disease patients.



**Comment from Dr. Inga Voges (Kiel, Germany), section editor of Pediatric Cardiology Journal Watch:** This is a very interesting retrospective cardiovascular magnetic resonance imaging study comparing conventional contrast-enhanced cardiovascular magnetic resonance angiography (CE-CMRA) and non-contrast angiographic techniques (1. conventional 3D balanced steady state free precession CMRA; 3D bSSFP and 2. modified Dixon CMRA; mDixon). As reported by the authors, Dixon-based methods are less susceptible to field inhomogeneities.

24 cardiovascular magnetic resonance (CMR) scans were included. Each patient underwent CE-CMRA followed by 3D bSSFP and mDixon acquisitions. The water images of the mDixon sequence were used for the final analysis.

CMR studies were reviewed by two independent observers who assessed the overall image quality and compared the contrast-to-noise ratio (CNR) and signal-to-noise ratio (SNR) in the myocardium and blood pool. Furthermore, vascular measurements on multiplanar reformatted images were performed and the scan time was recorded. CE-CMRA data were not included in the analysis of SNR, CNR, vascular measurements and scanning time.

The authors found that the image quality of the water images of the mDixon sequence were comparable and for some structures better compared to 3DSSFP images. Bland-Altman analysis revealed acceptable agreement for image quality scores between all three techniques. mDixon images were better in depicting the entire field of view compared to 3D bSSFP and CE-CMRA and demonstrated a better vessel wall sharpness whereas 3D bSSFP images allowed a better intracardiac anatomy and myocardium-blood pool definition. There was no difference for CNR and SNR between 3D bSSFP and mDixon acquisitions. Artefact burden was less in mDixon compared to 3D bSSFP and CE-CMRA. Eight different vessel cross-sectional diameters were measured on 3D bSSFP and mDixon sequences and the analysis showed less than 10% measurement difference between both techniques (Table 3). The scanning time for 3D SSFP and mDixon acquisitions was comparable.

In general, this nice study demonstrates that mDixon might be a superior to the conventionally used 3D SSFP sequence as it also offers an excellent depiction of the cardiovascular anatomy even in complex anatomies with the advantage of reduced artefact burden.





