

Safety and Clinical Utility of Cardiovascular Magnetic Resonance in Neonates with Congenital Heart Disease

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Introduction

Cardiovascular magnetic resonance (CMR) is an established advanced diagnostic modality in adult with congenital heart disease (CHD). CMR is being increasingly used also in young children with complex CHD, as complement to echocardiography. We sought to evaluate the indications, safety and clinical impact of CMR performed in neonates with CHD.

Methods

Clinical records and imaging reports of all patients younger than 1 month, undergoing CMR between 2002 and 2010 were retrospectively reviewed for diagnosis, indication for CMR, complications and impact on clinical management. In all cases CMR was performed as second-line diagnostic examination complementing echocardiography.

Results

Seventy-eight CMR examinations were performed in 77 neonates. Mean age was 7 ± 8 days, weight 3064 ± 633 g. Diagnosis included aortic arch anomalies in 23 children, pulmonary atresia/multicentric lung perfusion in 16, complex CHD with single ventricle in 13, complex CHD with two ventricles in 10, pulmonary vein anomalies in 8, tetralogy of Fallot in 2, tumour in 2 and 4 others. Correspondingly main indication for CMR was assessment of the aorta in 26 cases, pulmonary arteries in 21, pulmonary veins in 15, complex congenital heart disease in 8, myocardium in 3, ventricular size in 3, and two others. Mean scanning time was 30 ± 12 min. The neonatal intensive care team performed anaesthesia with mechanical ventilation in 57 cases, anaesthesiology staff in 21. No significant complications occurred during examination. In two patients in critical condition breath-holding was avoided and the images acquired during free breathing. CMR findings had a major impact on further clinical management in 67/77 (87%) of the patients. The information obtained was crucial for following cardiac surgery in 54 cases, for catheter-guided intervention in 4; palliative care was decided in 9 neonates. In 7 children suspected diagnosis was confirmed and in other 4 ruled out.

Conclusions

CMR can be effectively and safely performed in neonates with CHD, at time of first diagnosis even in critically ill patients. The information obtained has a major clinical impact on further management and obviates other invasive and potentially harmful examinations.