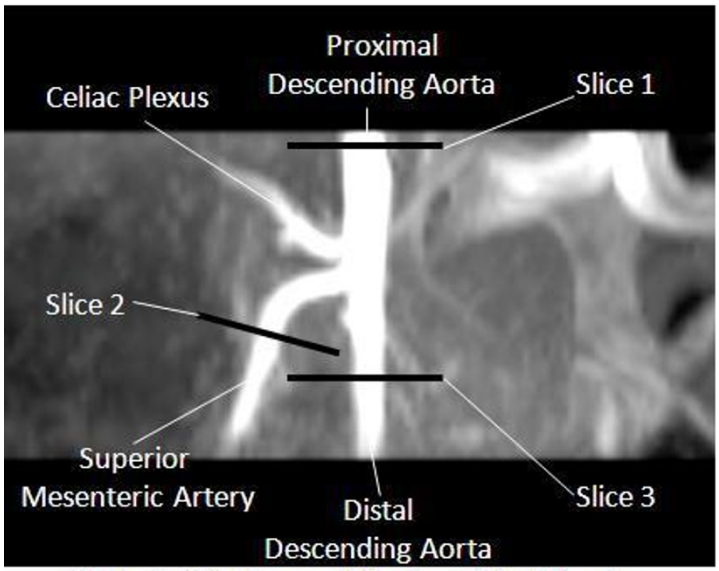
PHASE CONTRAST MAGNETIC RESONANCE ASSESSMENT OF VOLUME OF ABDOMINAL VISCERAL BLOOD FLOW IN NEWBORN INFANTS

K.M. Broadhouse, A.E. Finnemore, G. Durighel, A. McGuinness, D.J. Cox, A.N. Price, J.V. Hajnal, A.D. Edwards, A.M. Groves

Centre for the Developing Brain, Imperial College London and MR Clinical Sciences Centre, London, UK

Background: Episodes of intestinal ischaemia are likely to be central to the pathogenesis of necrotising enterocolitis. Echocardiographic techniques can estimate volume of superior mesenteric artery(SMA) flow[1], however these measures have not yet been validated. Phase Contrast Magnetic resonance(PCMR) techniques have been shown to provide repeatable quantifications of cardiac output and systemic perfusion in newborn infants[2]. The aim of this study was to assess the feasibility of performing PCMR assessments of abdominal visceral blood flow in newborn preterm infants.

Methods: Scans were performed on 7 infants with median(range) gestation 34(30.3-37.7) weeks, weight at scan 1833(790-2800)grams using a Philips 3.0T scanner. PCMR slices(resolution-0.6/0.6/4mm,TR/TE-5.9/3.1ms) were placed at the proximal SMA and on the descending aorta(DAo) proximal to the celiac plexus and distal to the renal arteries(Figure). Flow was quantified using in-built software(ViewForum) incorporating automated vessel-edge detection.



Abdominal Aortogram of Newborn Infant Showing Slice Placement for Abdominal Visceral Blood Flow Imaging

[sma]

Results: Intestinal flow was taken as SMA flow; visceral non-SMA(VnonSMA) flow was taken as proximal DAo - SMA - distal DAo (=celiac plexus plus inferior mesenteric and renal artery flow). Images were successfully obtained in all 7 infants. Median intestinal flow was 31.8(12.1-67.1)ml/kg/min, VnonSMA was 55.7(34.3-99)ml/kg/min.

Conclusions: PCMR assessment of volume of SMA and visceral non-SMA blood flow is feasible in newborn infants. Further study is required to assess repeatability and correlation with echocardiography.

References: 1-Van Bel, Ped Rad 1990;174:165-1692-Groves, Arch Dis Child Fetal Neonatal Ed. Epub 2010.