

**Patients and Methods:** Conventional greyscale imaging, CDI and 'power' Doppler were performed in 20 healthy term infants (38–42 weeks) and in 30 pre-term infants (25–38 weeks). Parental consent was obtained in all cases. Sagittal and coronal images were obtained using a small footprint 7 MHz curved array probe with 5 MHz Doppler. Colour gain and filtration settings were optimized on an individual basis.

**Findings:** Power Doppler was able to demonstrate the cerebral vasculature more clearly than CDI in every case. There were no significant differences observed between the term and normal pre-term infants. Nine of the pre-term infants showed abnormalities consistent with haemorrhagic or ischaemic lesions within the brain. In each case there was a broad increase in power Doppler signals in the adjacent brain parenchyma which made their presence more obvious.

**Conclusion:** Power Doppler ultrasound of the brain provided more information than conventional CDI in both term and pre-term infants. No significant differences were observed between healthy infants in the two groups. Preliminary observations suggest that power Doppler may have a role in improved detection of haemorrhagic or ischaemic brain lesions.

**A system to enhance the ultrasound detection of renal scarring**  
Barry B.P.; Hall N.; Broderick N.J.; Somers J.M. *University Hospital, Queens Medical Centre, Nottingham NG7 2UH, UK*

**Purpose:** A system for defining renal scarring on Ultrasound is proposed and prospectively compared against DMSA scintigraphy. It is postulated that the role of Ultrasound can be significantly enhanced using this method.

**Materials and Methods:** 122 children with urinary tract infection were determined to have renal scarring on Ultrasound by one of two paediatric radiologists using the following criteria: (1) proximity of the sinus echo to the cortical surface; (2) irregularity of outline not corresponding to normal lobular architecture; (3) loss of normal pyramidal anatomy; (4) loss of capsular echo. In addition 187 children with ultrasound normal kidneys were included as a control group. All children subsequently underwent DMSA scintigraphy by another radiologist, blinded to the ultrasound findings. Divided renal volumes were calculated for comparison with DMSA divided function.

**Results:** Ultrasound—positive predictive value for scarring 93.4%; negative predictive value for scarring 87.0%; accuracy 89.6%; correlation coefficient of volume V function = 0.84.

**Conclusion:** Ultrasound detection of renal scarring is greatly improved using this method. Ultrasound derived divided renal volume compares well with DMSA divided function.

#### **The use of ultrasound in the diagnosis of neonatal renal vein thrombosis**

Hibbert J.; Howlett D.C.; Greenwood K.L.; MacDonald L.M.; Saunders A.J.S. *Department of Radiology, Guy's Hospital, 2nd Floor, Guy's Tower, Guy's and St. Thomas' NHS Trust, St. Thomas' Street, London, SE1 9RT, UK*

**Purpose:** A series of neonates were studied with a combination of grey-scale and colour Doppler ultrasound (US) to demonstrate the sequential ultrasound findings of renal vein thrombosis (RVT).

**Materials and Methods:** Nine neonates with clinically suspected RVT were examined with US using a Diasonics DSI RF/6 MHz transducer or Acuson 128XP/5–7.5 MHz transducers. The neonates ranged from 2 to 15 days of age at the time of the first scan. Follow-up US examinations were performed if possible up to a year post-presentation. US criteria for the diagnosis of RVT included an increase in size and echogenicity of the kidney, prominent echopoor medullary pyramids, echogenic intermedullary (IM) streaks and direct visualisation of thrombus in the renal vein and/or IVC.

**Results:** The complications of prematurity were the major causative factor for RVT identified. The RVT was bilateral in four cases, right-sided in three and left-sided in two. In the first week of the illness the affected kidney was enlarged with echopoor medullary pyramids and prominent echogenic IM streaks were identified. Later in the process as the kidney parenchyma became more heterogeneous the IM streaks were progressively less well seen. Thrombus was identified in the affected renal vein and IVC in all cases. Three neonates died in the acute phase of RVT. Renal function recovered in one child at a year, but renal atrophy was observed in the other cases. Colour Doppler US was performed in four cases acutely and showed absent intrarenal and renal venous flow.

**Discussion:** RVT commences in interlobular and arcuate veins and spreads to the interlobar (intermedullary) and the main renal veins. The interlobar and interlobular thrombus appears as highly echogenic streaks on US. Gray-scale US provides an accurate and accessible means of identifying neonates with RVT. The technique can identify focal IM streaks characteristic of the early phase of the condition. Colour Doppler US may provide limited additional information.

#### **Renal scarring in children with urinary tract infection: comparison of power Doppler ultrasound with isotope DMSA scintigraphy**

Sissons G.R.J.<sup>a</sup>; Padmakumar B.<sup>b</sup>; Wright A.<sup>a</sup>; Evans-Jones L.G.<sup>b</sup> <sup>a</sup>*Department of Radiology, Countess of Chester Hospital, Liverpool Road, Chester CH2 1BQ, UK*

<sup>b</sup>*Department of Paediatrics, Countess of Chester Hospital, Liverpool Road, Chester CH2 1BQ, UK*

**Introduction:** 'Power' Doppler ultrasound is a technical development of colour Doppler imaging that allows the non-invasive depiction of blood flow in small vessels. Its role in clinical practice remains to be established. DMSA scintigraphy is recognised as the most reliable means of detection of renal cortical scarring in children with reflux nephropathy. However it involves the use of ionising radiation and requires an intravenous injection. In this study the results of 'power' Doppler in children with urinary tract infection were compared with isotope renal DMSA scanning.

**Patients and Methods:** With parental consent, 36 children (age 3 months–14 years, mean 4.1 years) undergoing renal DMSA scanning also had 'power' Doppler ultrasound performed. 'Power' Doppler studies were carried out with 5 or 7 MHz curved array probes with 5 MHz Doppler. Optimal gain settings and filtration were determined on an individual basis

and longitudinal and transverse views of the kidneys obtained. Any alterations in the vascular patterns in the renal cortices were documented. Renal isotope scans were performed 2 h after the injection of 8–80 MBq of Tc-99 m DMSA. Posterior and both posterior oblique images were obtained. Each study was interpreted blindly by either of the two radiologists.

*Results:* Of the 36 children who completed both studies, 23 had normal DMSA and 'power' Doppler studies. The DMSA scans showed cortical scarring in ten children. In only four patients were these detected on 'power' Doppler (sensitivity 40%). In three of these the areas of scarring were clearly visible

on the greyscale image obtained concurrently. Four children showed abnormalities on power Doppler which had no correlate on the DMSA studies; one of these showed an abnormality in the contralateral kidney to a scintigraphic defect shown on the DMSA scan.

*Conclusion:* This preliminary study of 36 patients suggests that 'power' Doppler ultrasound lacks sensitivity (40%) in the detection of renal cortical scarring in children with urinary tract infection; it confers little advantage over conventional greyscale imaging. Its use cannot be recommended as an alternative to isotope renal DMSA scintigraphy.