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Celebrating 35 Years of the AJNR

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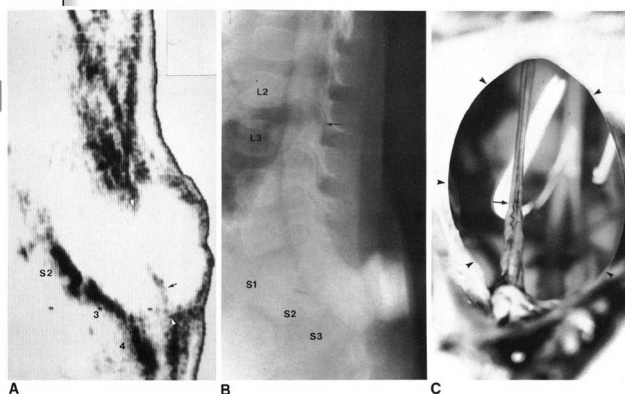
John Caffey Award

Sonography of the Caudal Spine and Back: Congenital Anomalies in Children

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David G. McLone²
Arnold Shkolnik¹

Articulated-arm, B-mode 3.5–5.0 MHz sonograms from 27 children with congenital anomalies of the caudal spine were analyzed retrospectively and correlated directly with patient appearance, preoperative myelograms, intraoperative photographs, and pathologic specimens to determine how effectively sonography could display the major pathologic features known to be present. Anterior spina bifida, posterior spina bifida, and (partial) sacral agenesis were displayed as focal absence of normal spinal echoes and distortions of the paraspinous/gluteal muscles. Subcutaneous anechoic spaces continuous with the spinal canal through a spina bifida identified the presence, site, and configuration of each meningocele present. Highly echogenic masses were easily discerned at the sites of 14 of 16 lipomas and at the solid fibroadipose portions of both sacrococcygeal teratomas. Echoes from the surface of the spinal cord and occasionally from the central canal identified abnormally low cord position in 16 of 17 cases and identified herniation of the cord (or filum) into a concurrent meningocele in seven of 10 cases. Sonographic display of an anechoic meningocele bordered by a lobular, highly echogenic, subcutaneous lipoma that inserted onto a low-lying or herniated spinal cord reliably identified lipomyelomeningocele. Despite limitations discussed in the text, initial experience suggests that sonography will be a useful method for screening patients for possible tethered spinal cord, lipomyelomeningocele, sacrococcygeal teratomas, and other anomalies of the caudal spinal axis.

In patients with myelodysplasia and other anomalies of the caudal spine, cranial sonography has been widely accepted for assessing concurrent intracranial pathology and for intraoperative placement of ventricular shunt catheters [1–3]. Renal sonography has proved equally valuable for detecting associated renal agenesis, renal ectopia, and hydronephrosis [4, 5]. Spinal sonography, however, has received relatively little attention, even though sonographic windows are provided by the incomplete ossification of the posterior elements in children under 1 year of age and by spina bifida [6–19].



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Sonography of Brain Tumors in Infants

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Cranial sonograms of six children with brain tumors (one newborn, four infants, and one 4-year-old child) are presented. In four, sonography showed a large tumor mass and displacement of adjacent structures. In two, the tumors were demonstrated as areas of abnormal brain parenchymal echogenicity without obvious mass effect. Two of the tumors were diffusely echogenic, one was primarily cystic, and three were of mixed echogenicity. Areas of cystic degeneration and calcification within the tumors were demonstrated. Correlation was made with cranial computed tomography (CT) in patients; in each case sonography accurately demonstrated the location and extent of the tumor. Since sonography is used as a screening procedure in infants with a large head or an abnormal neurologic examination, sonography may be the first examination to demonstrate the tumor mass. However, since the sonographic features are specific for neoplasms, further clarification of the process by CT should be recommended.

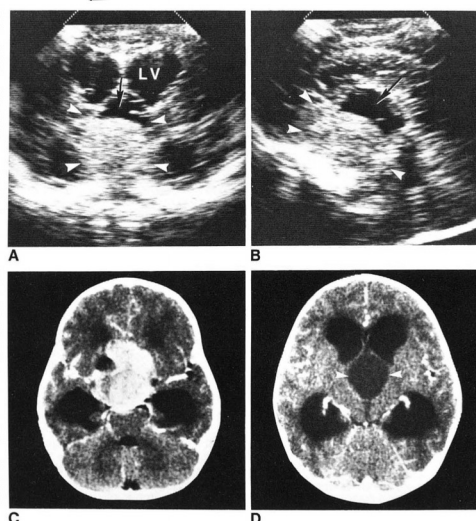
Sonography has become an important imaging method for the evaluation of infant head. Its value in the recognition and follow-up of patients with hydrocephalus and intracranial hemorrhage has been well established [1–6]. However, little information is available about the sonographic appearance of brain tumors [1, 2, 7]. We present our experience with brain tumors in six patients.

Materials and Methods

Of 1528 children who had cranial sonograms at Children's Hospital Medical Center, Cincinnati, from May 1978 to November 1982, six patients with histologically proven brain tumors were identified. Five patients were under 1 year of age and one patient was 4 years old when the diagnosis was made. Cranial sonograms were obtained with a static or in time scanner or both in axial, coronal, and sagittal planes. A 3.5 or 5.0 MHz transducer was used. In the five infants under 1 year old, the sonogram was obtained through the open sutures and fontanelles. In the 4-year-old child, sonography was possible because he had a large head due to increased intracranial pressure. Sonographic findings were compared with computed tomographic (CT) findings in all six patients. Five patients had plain films of the skull and three patients had brain angiography. The patients' charts were reviewed clinical information.

Results

Most patients presented with nonspecific symptoms of increased intracranial pressure. Sonographic and radiographic findings are summarized in table 1. There were four astrocytomas, one teratoma, and one ependymoma. In five of the children, the tumor was supratentorial. In four (cases 1, 3, 4, and 5), sonography showed a large tumor mass and displacement of adjacent structures (figs. 1, 3, and 4). In two (case 2 and 6), there were no mass effects, and sonography demonstrated changes in brain parenchymal echoes and architecture (figs. 2 and 6).



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