Intraspinal extension of paraspinal masses in infants: detection by sonography

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Abstract. Spinal sonography has been helpful in the study of congenital anomalies involving the spine in fetuses and infants. We have found this technique also to be useful in the detection of intraspinal extension of paraspinal masses.

Real-time sonography has been useful in the study of congenital malformations and dysraphic lesions of the spine such as tethered cord, myelomeningocele, meningocele, and lipoma [1–3]. The success of this technique in infants depends largely on the lack of ossification in the cartilaginous spinous processes; this allows an excellent and detailed view of the spinal canal and its contents in sagittal and transverse sections. The epidural space, spinal cord, subarachnoid space, and bony elements can be identified and differentiated from the paraspinal structures [1, 4].

Sonography of intraspinal tumors has been used mostly intraoperatively, or in some cases, postoperatively, after laminectomy [2, 5]. We have used this technique in the detection of intraspinal extension of paraspinal tumors in infants as was recently reported by Zieger [2]. We report two infants in whom sonography, as the first imaging study, demonstrated intraspinal extension of paraspinal masses.

Case report

Case 1

Diagnosis: Dumbbell Hemangioendothelioma. This 3830 g, full-term newborn boy was a product of a 37 week uncomplicated gestation. On routine physical examination, a lower abdominal mass was palpated, and the patient was transferred on his second day of life to Yale-New Haven Hospital. Facial petechiae and scrotal edema with ecchymosis was noted in association with a lower abdominal mass. The neurological examination was normal.

Plain radiographs of the abdomen showed an uncalcified, soft tissue mass occupying the pelvis and lower abdomen displacing the bowel superiorly. Abdominal and pelvic sonography demonstrated a

Fig. 1 a, b. Sagittal scans of the spinal canal of the lower lumbar (a) and lumbosacral (b) regions. The dura is circumferentially enveloped and displaced inward by abnormal epidural tissue which obliterates the subarachnoid space at lower levels.
large, solid, echogenic nodular mass, filling the entire pelvic cavity and extending superiorly into the lower abdomen. The mass encased the rectosigmoid colon, displaced the bladder and obstructed the right ureter resulting in severe hydronephrosis.

Spinal sonography in sagittal and transverse planes was then performed with the child prone demonstrating extension of the pelvic mass into the epidural space, at the lower lumbar, lumbosacral and upper sacral levels with extrinsic compression of the thecal sac (Fig. 1). Doppler sonography demonstrated high velocity arterial flow within the pelvic mass.

Computed tomography (CT) of the abdomen and pelvis confirmed the sonographic findings, and after intravenous contrast injection, the pelvic mass showed significant multinodular enhancement. Direct sagittal CT scans of the spine were suggestive of intraspinal mass extension (Fig. 2).

Magnetic resonance imaging (MRI) of the spine was performed and T1-weighted images were obtained that again showed the abdominopelvic mass along with findings consistent with intraspinal extension of the tumor at the lower lumbar level. At this point, neuroblastoma was the leading diagnosis. Bone marrow aspiration and biopsy were normal. An open biopsy of the abdominal mass was performed which was complicated by difficulty achieving hemostasis. During this procedure, abnormal vascularity was noted in and around the tumor. Histologic study revealed a benign vascular tumor classified as a hemangioendothelioma. Severe thrombocytopenia seen in conjunction with the hemangioendothelioma was consistent with the clinical features of Kasabach-Merritt Syndrome.

**Case 2**

**Diagnosis:** Malignant Rhabdoid Tumor. A two-month old female, shortly after birth, was noted to have a left posterior lower chest wall soft mass about 3 cm in diameter, initially thought to represent lipoma. At 9 weeks of age, the mass had become firmer and had increased in size. Ultrasound examination demonstrated a $5 \times 3 \times 3$ cm