

IMAGES IN CLINICAL RADIOLOGY



A male infant presenting with acute urinary retention

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A 3-month-old male infant was admitted to the emergency department for acute urinary retention. A voiding cystourethrogram was performed because urethral valves were suspected. After bladder catheterization, the plain radiograph prior to filling of the bladder showed an abnormal course of the urinary catheter tip together with focal absence and displacement of bowel gas out of the pelvis. Early contrast opacification of the bladder (Fig. A) demonstrated an abnormal cranial position of the lumen and an extrinsic impression on the bladder base, which became obscured after further distension of the bladder (Fig. B). These findings suggested presence of a pelvic mass, which was confirmed sonographically. CT and MRI were performed for better tumor delineation and tissue characterization. Both demonstrated a sharply delineated presacral soft tissue mass with homogeneous enhancement and DWI showed diffusion restriction. Sagittal T2-weighted image (Fig. C) nicely exhibits upward elevation of the bladder caused by a homogeneous presacral mass. Serum analysis showed increased neuron specific enolase and increased catecholamine metabolites were found in the urine. Tru-cut biopsy specimens confirmed neuroblastoma. CT and MIBG scan revealed no distant sites outside the pelvis while a bone scintigraphy ruled out bone metastases. The tumor was macroscopically completely removed by means of a median laparotomy, and the infant recovered well after therapy.

Comment

The two main differentials for a presacral solid mass in an infant are those of a sacrococcygeal teratoma (Altman type IV, i.e. presacral tumor without external extension) and of a pelvic neuroblastoma. Neuroblastoma is the most common extracranial solid tumor in infancy. It arises from neural crest cells and can therefore occur anywhere along the sympathetic chain, however only 5% arise in the pelvic region and urinary retention as presenting symptom is extremely rare. Increased catecholamine metabolites (vanillylmandelic acid [VMA] and homovanillic acid [HVA]) are almost invariably found in the urine.

The present case nicely illustrates the value of some imaging signs in conventional radiography. The abnormal distribution of bowel gas and the aberrant position of inserted devices are important signs in recognizing presence of an abdominal mass. This case also stresses the significance of acquiring early filling images during cystography, as findings may become obscured after complete distension of the bladder. Further evaluation of presacral masses depends on CT and MR. These are sometimes performed in combination to obtain superior delineation and improved depiction of various tissue types. The CT and MRI findings of a presacral mass without fatty and cystic components favor neuroblastoma over teratoma, since neuroblastomas do not contain fat. Furthermore neuroblastomas demonstrate in approximately 85% of cases foci of calcifications on CT, and this can be appreciated best on non-enhanced CT scans. On MRI, small neuroblastomas may be homogeneous in appearance with low signal intensity on T1- and high signal on T2-weighted images, and variable contrast enhancement. Larger tumors tend to show more heterogeneous intensities resulting from areas of hemorrhage and necrosis. Viable tumor of neuroblastoma demonstrates restricted water diffusion without exception on initial ADC (apparent diffusion coefficient) map prior to therapy, and DWI therefore has a great potential in the evaluation of early treatment responses in neuroblastoma.

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