

THE UROLOGICAL MANIFESTATIONS OF THE TETHERED SPINAL CORD*

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SUMMARY: Kavukçu S, Özaksoy D, Türkmen M, Kovanlıkaya İ, Köse G, Tavlı V. (Departments of Pediatrics and Radiology, Dokuz Eylül University Faculty of Medicine, İzmir, Turkey). The urological manifestations of the tethered spinal cord. Turk J Pediatr 1993; 35: 313-317.

The tethered cord is the fixation of the cord resulting in stretching as growth occurs. In this paper, three cases of tethered cord with symptoms related to the urinary tract were presented. In the first case, a 12-year-old girl presenting with abdominal pain and urinary incontinence had bilateral hydronephrosis and neurogenic bladder due to a tethered cord without having any other neuropathological manifestation. In the second case, an eight-year-old girl presented with enuresis and a mass in her back was found to have a lipomyomeningocele, hyperactive tendon reflexes in the lower limbs and pes cavus. Tethered cord associated with lipomyomeningocele caused a neurogenic bladder and bilateral hydronephrosis. In the third case, a seven-month-old girl presented with hydrocephalus as well as bilateral dilation of the renal pelvis, unilateral ureteral duplication and vesicoureteral reflux. A tethered cord was revealed in this patient, who had a meningomyelocele operation in the neonatal period. Renal function test in the first two cases were abnormal. *Key words: tethered spinal cord, bladder dysfunction.*

The tethered spinal cord is the fixation of the cord in a caudal location resulting in stretching and ischemia of the cord as growth occurs. Presenting symptoms and signs include motor and sensory deficit of the lower limbs, muscle atrophy, spastic gait, hypo- or hyperactive tendon reflexes, neurogenic bladder, urinary tract infections, stool soiling, scoliosis, pes cavus and talipes^{1,2}.

Three cases of tethered spinal cord were referred to our clinic with initial symptoms related to the urinary system.

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Case Reports

Case 1

A 12-year-old girl presenting with abdominal pain and urinary incontinence showed no abnormalities on her physical examination. Urine analysis revealed pyuria and bacteriuria. Urine density was 1005; BUN: 50 mg/dl; serum creatinine: 2 mg/dl; endogenous creatinine clearance: 65 ml/min/1.73 m². Bilateral hydronephrosis and neurogenic bladder were present. The diagnosis of tethered cord was made using magnetic resonance (MR) imaging. In the sagittal T₁ weighted images, the caudal spinal cord seemed thinner and the dural sac terminated at the S₁ level, fatty tissue filled the rest of the canal (Fig. 1).

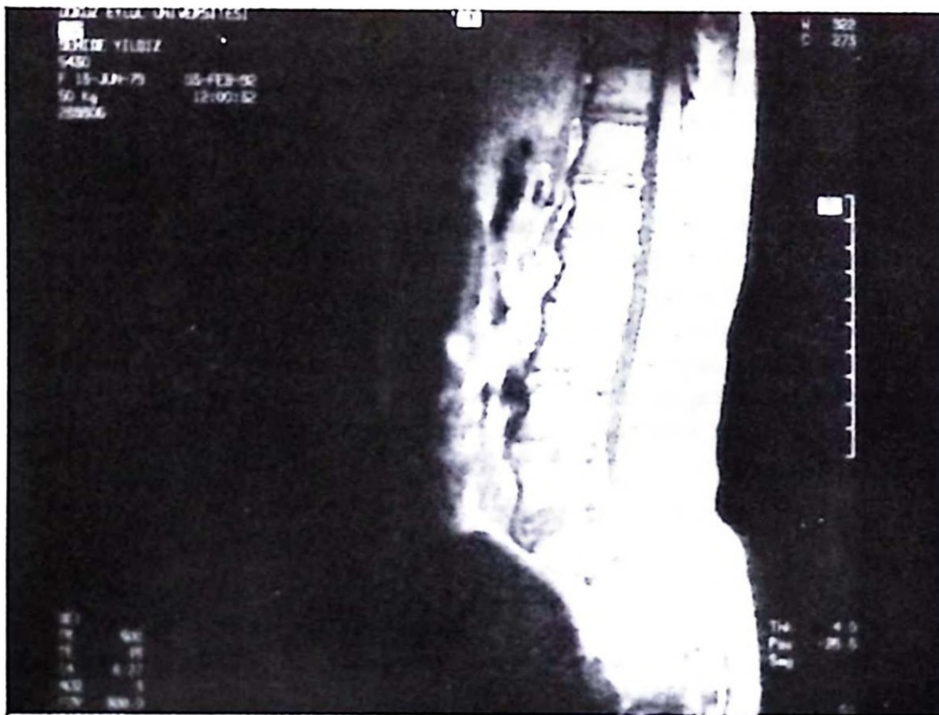


Fig. 1: In the sagittal T₁ weighted MR images, caudal spinal cord seemed thinner and dural sac terminated at S₁ level, fatty tissue filled the rest of the canal. (SE, TR 500, TE 15)

Case 2

An eight-year-old girl presented with fever, enuresis, malaise and masses in her back and abdomen. Physical examination revealed a cystic mass in the left lower abdominal region, a lipomyomeningocele in the lumbosacral region, hyperactive tendon reflexes in the lower limbs, hypotonic anal reflex and pes cavus. Urine analysis showed pyuria and bacteriuria. Urine density was 1010; BUN: 60 mg/dl; serum creatinine: 3.9 mg/dl; endogenous creatinine clearance: 50 ml/min/1.73 m². There was left-sided, fourth-degree vesicoureteral reflux with bilateral hydronephrosis and neurogenic bladder. Her sagittal T₁ weighted MR images showed lipomyomeningocele, which displaced the conus and its neural attachments downward (Fig. 2).

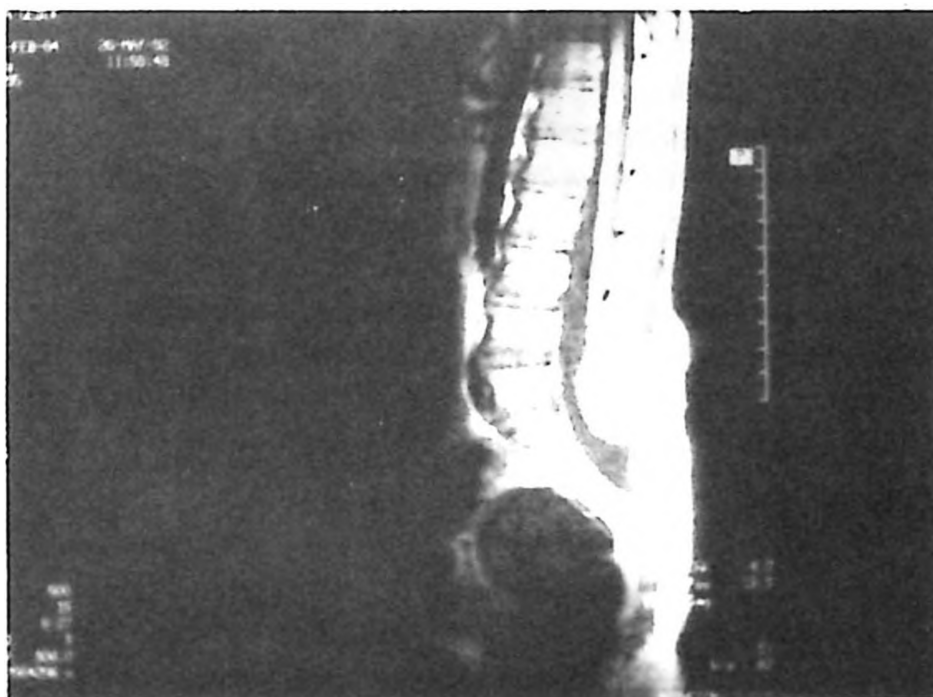


Fig. 2: Sagittal T₁ weighted MR imaging showed lipomyomeningocele which displaced the conus and its neural attachments downward. (SE, TR 500, TE 15)

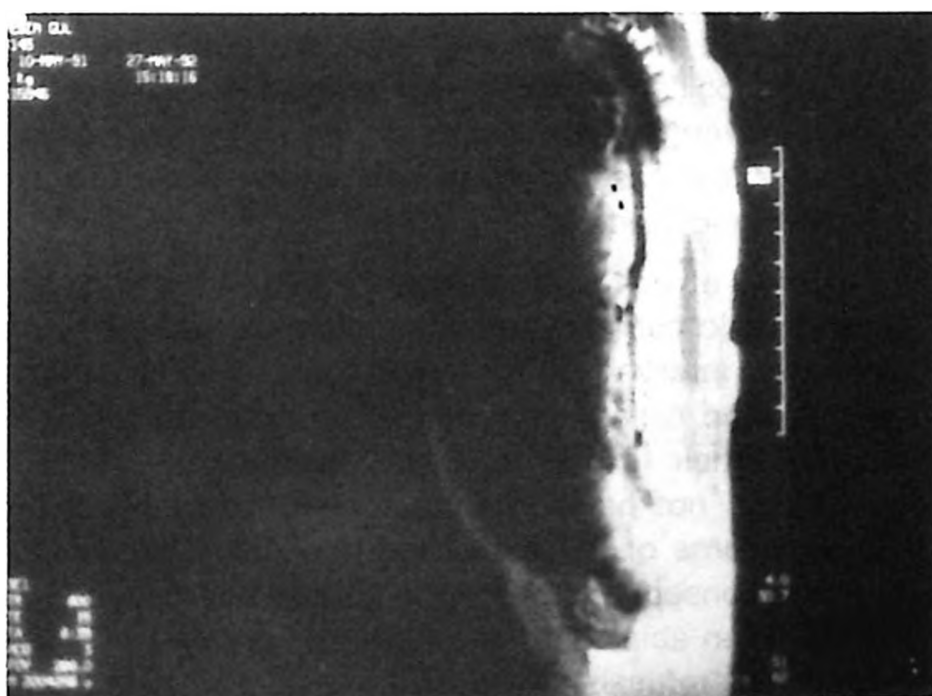


Fig. 3: Sagittal T₁ weighted MR imaging revealed a thin, elongated spinal cord terminating with a lipoma and cervical-thoracic syringomyelia. (SE, TR 500, TE 15)

Case 3

This seven-month-old girl presented with recurring fevers. In her history, the patient had a myelomeningocele and was operated on as a newborn. On her physical examination, she had hydrocephalus and her lower limbs were hypotonic with hypoactive tendon reflexes. Kidney function was within normal limits. She had bacteriuria and pyuria. There was unilateral ureter duplication, bilateral dilation of the renal pelvis, and unilateral ureter with vesicoureteral reflux. Sagittal T₁ weighted MR imaging revealed a thin, elongated spinal cord terminating with a lipoma. The thickness of filum terminale at S₁ level was more than 2 mm in repeated sections. Moreover, cervical and thoracic syringomyelia was present (Fig. 3).

Discussion

Magnetic resonance imaging is proven to be safe and valuable in the diagnosis of intrinsic spinal cord disease¹. Children with tethered spinal cord present in many different ways. About 20% of patients with cord tethering will have a neurogenic bladder and may present to the pediatrician or urologist with recurrent urinary infections, enuresis or an other disturbance of micturition; often neurological abnormalities or deformity in the legs suggest the diagnosis, but tethering can be responsible for a neurogenic bladder without any other manifestations³. The first case is an example of an initial presentation with only neurogenic bladder, and no accompanying neurological manifestations. The other two cases presented with both urinary and neurological symptoms. Neuropathic bladder was identified using ultrasonography, excretory pyelogram and cystourethrogram in the second and third cases. In the first case, a urodynamic study was used in the further assessment of neurogenic bladder.

In general, the outcome of early neurosurgical intervention is excellent for the resolution of nephropathic complications secondary to tethered spinal cord⁴⁻⁶. Therefore, neurosurgical intervention for the first case was considered to be too late. The first and second cases are receiving intermittent catheterization and systemic antibiotics in their follow-up. In the second case, the extirpation of lipomyomeningocele has not helped in the prevention of bladder dysfunction progression. The symptoms of the third case may either be due to congenital neuropathology or the consequence of neurosurgical extirpation in the neonatal period. We have not been able to do any further intervention on the third case because of her parents' refusal.

In our experience, as the patient grows older, obstructive nephropathy becomes more prominent. This fact emphasizes the importance of early diagnosis and intervention. In conclusion, tethered spinal cord should be considered in all patients presenting with only bladder dysfunction and no accompanying neurolo-

gical symptoms in order to facilitate early intervention so that the progression of obstructive uropathy or nephropathy can be minimized.

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