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Image of the month

Unusual splitting of cord defying the Pang's classification

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A 2-year-old boy presented to us with history of inability to walk without support. There was no associated wasting or history of cuts and burns on lower limbs. He seemed unable to detect the urge to urinate or defecate. There was no history of deformity of feet, limbs or spine. On examination of spine, the spinous processes could not be felt in lumbar region. The power in lower limbs was 3–4/5. The sensations were preserved in bilateral lower limbs and deep tendon reflexes were diminished, there was no deformity of feet. Perianal sensations were intact and anal reflex and tone was also normal. The child was subjected to urodynamic testing, where compliance and bladder capacity was reported to be normal. Suspecting a diagnosis of tethered cord syndrome, a magnetic resonance imaging (MRI) of craniospinal axis was done. MRI revealed a split cord malformation at L3–4 levels with malformation of posterior elements of spine and low-lying cord at L4 level. A fibrocartilaginous septum was dividing the cord into two halves on MRI (Figs 1 and 2). An associated hydromyelia was present at D7 to L1 level. A radiological diagnosis of split cord malformation (SCM) type I with proximal hydrosyrinx was made and surgery was planned. During surgery the laminae of L2, 3 and 4 were found to be fused and malformed. The fused block of the laminae was defined and a laminectomy was performed around the spur in such a manner that the continuity of bony spur in between two cords was not disturbed. In presence of widened and fused laminae two underlying dural sheaths were expected, but a single dural tube was encountered with a hole passing a fibrocartilaginous spur from dorsal aspect of dura into canal. The dura was opened in midline unlike other cases of SCM type I (where two incisions are required over both dural tubes). On opening the dura the spur was not continuing anteriorly between two cords (Figs 3 and 4), but the cords were divided by a fibrous septum within a single dural tube. Few arachnoid adhesions which fixed the cord proximally and distally were divided and septum was excised. Dura and wound were closed in layers. The child had a smooth recovery and was discharged after 1 week. At follow-up of 2 months, he started walking with relatively less support. Power in lower limbs was 4/5. Now he can hold urine and feces for 3 to 4 hours.

The case presented here had a splitting of cord, not coinciding with any of the two types of Pang's classification [1]. This case didn't have a spur, which separated the dura into two halves, nor had intradural nonrigid fibrous septum to separate two cords within a single housing. Instead, there was one fibrocartilaginous spur passing through dorsal dura to divide the cord into

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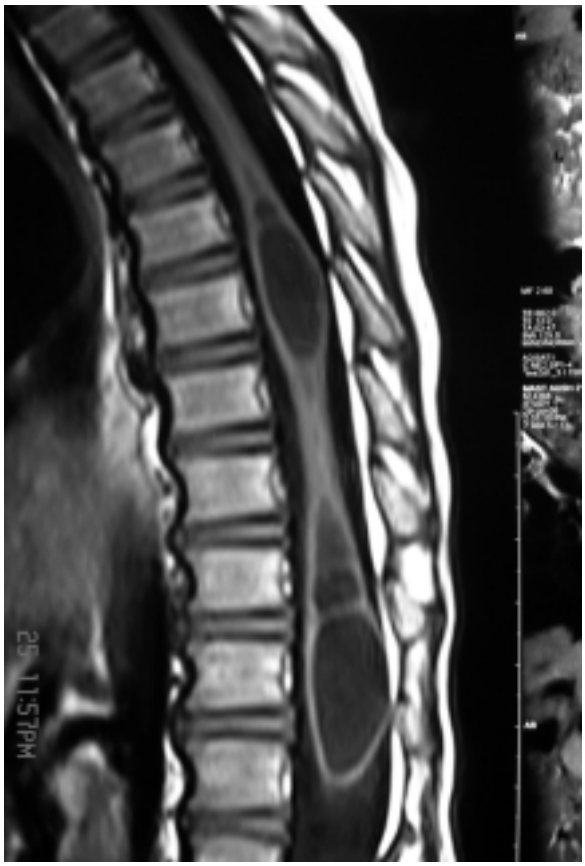

Fig. 1. MRI sagittal section showing proximal hydrosyrinx at D7 and L1 level and distal splitting of cord at L3–4 level.

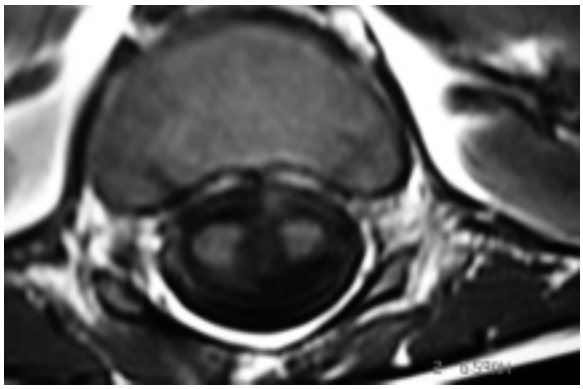

Fig. 2. MRI axial section showing two hemicords divided by a bony spur.

two halves. The spur was limited dorsally between two cords and it was not joining anteriorly with vertebral bodies. The posterior dural defect was also small, just enough to pass the spur. Hence, the SCM in this child was different from any other case of SCM, but most

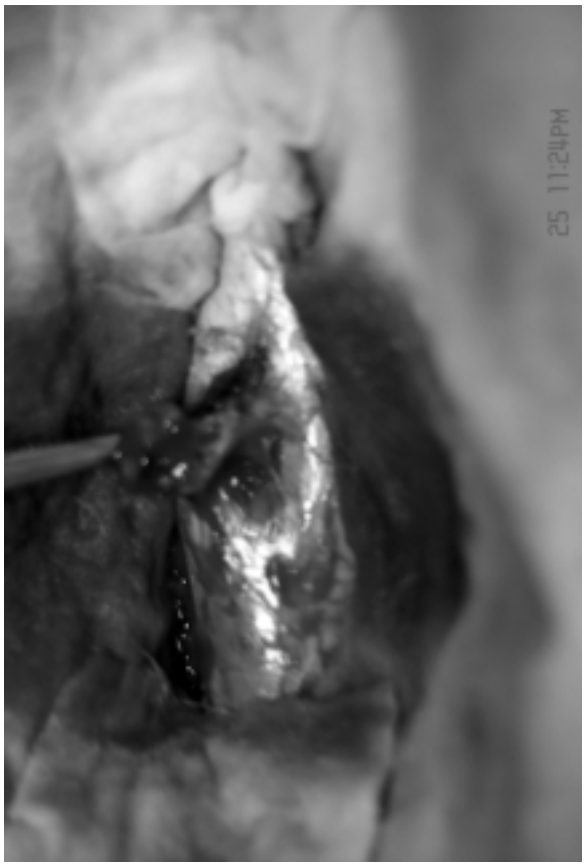

Fig. 3. Intraoperative photograph showing a fibrocartilaginous spur penetrating the dorsal dura.

probably it can be grouped with Pang's type I. Very few cases of such unique splitting of cord are reported in literature [2,3]. Hence the splitting of cord in this case was neither classical of Pang's type I (cord splitting into two halves by bony spur, when two cords lie in two separate dural tubes) nor of type II (splitting of cord into two halves by fibrous septum, both cords present in single dural tube) but it was a mixed picture of both. Mahapatra et al. [4] had classified SCMs into further subtypes depending on the location of bony spur septum in relation to the two halves of cords: Ia, a bone spur in the center with an equally duplicated cord above and below the spur; Ib, a bone spur at the superior pole with no space above it and a large duplicated cord lower down; Ic, a bone spur of the lower pole with a large duplicated cord above; and Id, a bone spur straddling the bifurcation with no space above or below the spur. Type II SCM is characterized by a fibrous or membranous spur causing the split and leading to two hemicords in a single dural sleeve, and type III is characterized by a combined membranous-bone

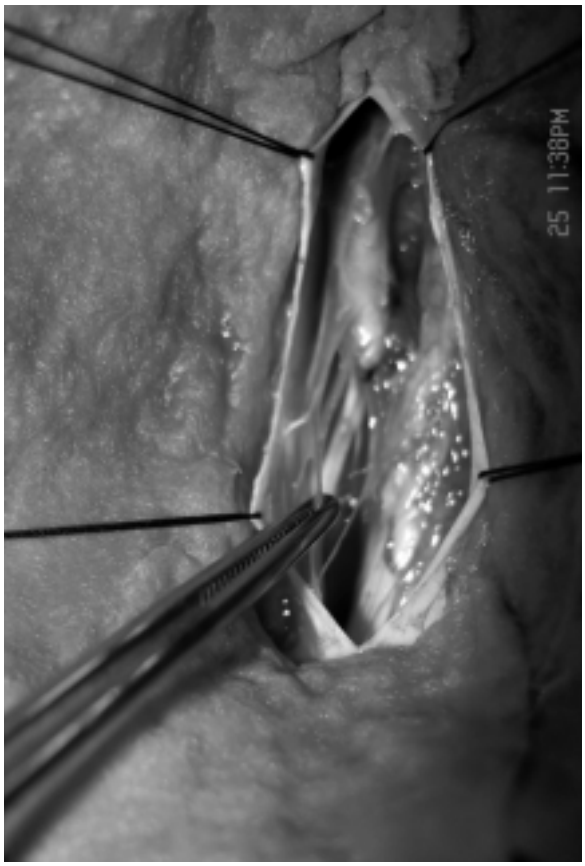

Fig. 4. Intraoperative photograph with two asymmetrical hemicords housed in single dural tube. Note the arachnoids adhesions (shown by forcep) fixing the cord.

spur in the same patient. Type IV is a composite SCM characterized by two splits seen separated by a normal neural arch in between. The present case does not fit clearly into the above classification.

The mechanism proposed by Chandra et al. [3] to explain dorsally situated bony spur as in our case is as follows: It is possible that when the cells of the meninx primitive were migrating between the two hemicords, a larger than normal cell population may have gotten disconnected from the ventrally situated endomesenchymal tract and passed on to accumulate dorsally. This probably stimulated the formation of a dorsally located bony spur. This case may be thus viewed as an isolated embryological aberration [2,3].

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