CASE REPORT

Adult tethered cord syndrome resembling plantar fasciitis and peripheral neuropathy

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SUMMARY

Adult tethered cord syndrome without spinal dysraphism is rare, and can present with subtle symptoms that could mimic other pathologies. As a result, timely diagnosis of this condition has proved to be a significant challenge. It is crucial for clinicians to be aware of adult tethered cord syndrome and its presenting symptoms in order to achieve early diagnosis and subsequent management. We present such a case with particular attention to the presenting history and examination. Following diagnosis, the patient underwent a laminectomy and cord untethering, resulting in significant improvement to his symptoms.

BACKGROUND

The diagnosis of adult tethered cord syndrome (TCS) has proved challenging. The rarity of this condition and the variation in the subtle symptoms has led to an 8-year delay between development of symptoms and diagnosis.¹ It is important for clinicians to be aware of presenting symptoms for adult TCS in order to achieve early diagnosis and subsequent surgical management, which is associated with a better outcome.

CASE PRESENTATION

A 19-year-old previously fit, healthy and active brick-laying student was referred for a neurology review with a 1-year history of progressively worsening bilateral heel pain, hypoaesthesia and ataxia.

He initially presented to his general practitioner (GP) with sensation of 'pins being stuck in both heels' on walking. The pain started on the left foot and spread to the right side over a couple of weeks. His GP diagnosed plantar fasciitis and managed it with non-steroidal anti-inflammatory drugs and arch supports, which initially helped his symptoms.

However, he progressively developed difficulty with his gait. He first noticed difficulty running. He described a sensation of 'walking with a flat foot' and his ankles turning in underneath him. Over the next few months he continued to deteriorate and developed difficulties with simple walking and balance. He also noticed hypoaesthesia in his feet, spreading proximally to below his knees.

Subsequently, he was referred for an orthopaedic opinion. During this consultation he appeared pale and further questioning revealed that he was a poor eater. An underlying vitamin deficiency with subsequent peripheral neuropathy was thought to be a

possible culprit. He was therefore referred for nerve conduction studies and a neurology opinion.

During his neurology consultation, only after direct questioning, he admitted to a 6-month history of urinary hesitancy and dribbling.

Examination

On inspection he had a left accessory nipple, and equal wasting of bilateral calf muscles. There were no leg length discrepancies, lumbosacral skin dimples, tufts of hair, scoliosis, excessive kyphosis, lordosis or any other abnormalities.

He walked with a high stepping gait, more prominent on the right side and demonstrated a positive Romberg's test. He had full range of movement of the spinal column. No joint abnormalities were detected.

His cranial nerves and upper limb neurological examinations were entirely normal. He had normal perianal sensation. His lower limb neurological examination is outlined in table 1.

INVESTIGATIONS

No abnormalities were present in his blood tests.

His nerve conduction studies and needle electromyography (EMG) showed well preserved postganglionic sensory response in both lower limbs. Motor studies showed normal peripheral motor conduction velocities with a generally preserved response amplitudes with the exception of a low amplitude response from right extensor digitorum brevis muscle. F responses in the lower limbs were globally absent. Needle EMG studies showed evidence of acute/subneuropathic changes in tibialis anterior bilaterally and right gastrocnemius, but right quadriceps was normal. In conclusion, these findings showed evidence of acute/subacute lower motor neuron changes distally in both lower limbs with preserved postganglionic sensory responses. This raises suspicion of possible cauda equina abnormality.

MRI of his spine showed a variant of tethered cord with a fatty component in the filum (figure 1A–C). There was deficiency of the S5 posterior elements where the cord was thought to be tethering. There was syrinx formation in the low-lying cord.

TREATMENT

The patient underwent an L5–S2 laminectomy, cord untethering and drainage of the syrinx with intraoperative neurophysiological monitoring (mainly tibial and pudendal nerves).

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Table 1 Lower limb neurological examination

	Right	Left
Tone	N	N
Power*		
Hip flexion	5/5	5/5
Hip extension	5/5	5/5
Knee flexion	5/5	5/5
Knee extension	5/5	5/5
Dorsiflexion	3/5	3/5
Plantarflexion	3/5	3/5
Inversion	2/5	2/5
Eversion	2/5	2/5
Sensation		
Pinprick	↓ L4,L5,S1	↓ L4,L5,S1
Soft touch	↓ L4,L5,S1	↓ L4,L5,S1
Vibration	N	N
Proprioception	N	N
Reflexes		
Knee	++	++
Ankle	+	+
Planters	Mute	Mute

*Assessed using Medical Research Council (MRC) Scale for muscle strength.
N=Normal, +=Hypoactive, ++=Normal, ↓=reduced.

OUTCOME AND FOLLOW-UP

His surgery was complicated by a cerebrospinal fluid (CSF) leak which was successfully repaired. Postoperatively he failed a period of trial without catheter and opted for intermittent self-catheterisation. There was significant improvement to his gait and sensory modalities. At 1 year follow-up his gait had normalised but he continued to require self-catheterisation.

DISCUSSION

We present a case of TCS presenting in late teenage years with no previous history of spinal dysraphism. Owing to its rare nature and subtle symptoms that could mimic other pathologies, as demonstrated by this case, the timely diagnosis of TCS in late teenage and adult years has proved to be a challenge. An average of 8 years between the development of symptoms and diagnosis has been reported.¹ Therefore, clinicians need to be

aware of the presenting features in order to achieve early diagnosis and surgery, which is associated with a better outcome.¹

Most commonly TCS presents during childhood with spinal dysraphism. Infrequently patients first present in their late teenage or adult years. Adult patients could be classified into two groups, those with spinal dysraphism and those without spinal dysraphism who develop subtle neurological symptoms in adulthood.²

Presentation of adult TCS differs to that of children. In late teenage and adult TCS pain in lower back or legs are the predominant symptoms.^{1 3 4} It is often sharp or burning in nature, does not follow a dermatomal pattern and is aggravated by activities causing spinal flexion and extension. Other common presenting symptoms that are present in approximately 70% of patients include weakness, altered sensation and bladder dysfunction.⁴ As demonstrated by our case, in order to localise the potential lesions and aid with differential diagnosis it is essential to actively ask for symptoms of bladder and bowel dysfunction in the presence of lower limb neurological symptoms, as the patient may not actively volunteer such information.

During examination particular attention should be paid to the presence of cutaneous stigmata of spinal dysraphism. These include subcutaneous lipomas, skin tags, vascular nevi, hairy patches and meningoceles, which are strong indicators of possible underlying tethered cord. Other clinical indicators such as muscle atrophy and foot deformities are present in 20% of patients.⁴

The investigation of choice is MRI of the spine that typically demonstrates a thickened, posteriorly displaced filum terminale (>2 mm). MRI often show a low-lying conus, below the mid L2 vertebral body.^{1 5}

Although prophylaxis surgery in the asymptomatic patient is controversial, in symptomatic patients early and aggressive surgical approach is recommended.^{1 3} Surgery will result in good outcome in 90% of patients. Significant improvement in pain and motor deficit occur in 80% and 60% of patients, respectively. However, sensory and urinary symptoms show fewer tendencies for improvement and remain unchanged in approximately 50% of patients.⁴ The most common surgical complication is CSF leakage followed by infection. It should be noted that 3.5% of patients will experience significant deterioration and 3.3–16% will require repeat detethering.^{1 4} Previous detethering surgery and duration of symptoms over 5 years are associated with less favourable prognoses.

Figure 1 Sagittal T2 (A and B) and (C)T1-weighted MRI showing tethering of the low-lying spinal cord with associated syrinx formation.

Learning points

- ▶ Tethered cord syndrome (TCS) can present in adulthood, even with no previous history of spinal dysraphism.
- ▶ Consider adult TCS as a differential diagnosis in patients presenting with sharp, non-dermatomal pain in the lower back or legs which might be associated with weakness, altered sensation or bladder dysfunction, in particular where cutaneous stigmata of spinal dysraphism are present.
- ▶ Cutaneous stigmata of spinal dysraphism include subcutaneous lipomas, skin tags, vascular nevi, hairy patches and meningoceles.
- ▶ In the presence of back pain or lower limb neurological symptoms the importance of actively seeking information about the patient's bladder and bowel status in order to aid with the localisation of potential lesion and differential diagnosis cannot be over emphasised.

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