CASE REPORT

Cauda equina syndrome: the importance of complete multidisciplinary team management

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SUMMARY

A 44-year-old lady with a history of lumbar back pain presented to the emergency department complaining of severe back pain radiating to her buttocks. Positive examination findings were a loss of sensation in the perianal area and 348 ml of retained urine. An urgent MRI showed compression of the cauda equina by a herniated disc. The patient was operated upon that evening, having a lumbar 5/sacral 1 decompression and sequestrectomy. During follow-up, the patient was reviewed by a consultant spinal surgeon, a urologist and our cauda equina nurse at every appointment, as per the cauda equina pathway specifically designed and implemented by our spinal unit. This report shows the complex nature of cauda equina syndrome and broad functional deficit patients can suffer from. It shows the benefits of prompt diagnosis and surgery, together with intensive, multidisciplinary follow-up and treatment, all of which are possible by a specially created, cauda equina protocol.

BACKGROUND

Cauda equina syndrome (CES) is an uncommon but potentially devastating condition caused by compression of the cauda equina in the spinal canal.^{1–4} Although primarily a spinal or neurosurgical disease, the patient pathway from primary to tertiary care encompasses the whole range of subspecialties, from general practitioners and emergency department staff, to orthopaedic surgeons.

It is a condition that may present with vague symptoms, which can easily be missed or misinterpreted.^{4–6} Patients may present late after not noticing subtle symptoms or signs, while doctors may also not be privy to these.¹ These delays may be compounded by a lack of MRI out of hours in certain hospitals.⁷ This has resulted in many patients with CES having a delayed diagnosis, thus experiencing permanent dysfunction of their bowel, bladder or sexual function.^{1 4 8–11} In the modern era, litigation has ensued in these cases, with payouts reaching as high as £500 000.^{1 12 13}

Owing to the high morbidity caused by CES, it is vital that patients suspected to have this condition are investigated and treated appropriately and efficiently.^{1 7 14 15} However, this report will explain the treatment of CES that goes far beyond the operating room, and requires true multidisciplinary team (MDT) input.

Our centre has recently created expected standards of care for patients with CES. Hence, this report will detail one patient's journey from the emergency department through to follow-up after discharge

from the hospital. It is hoped that this will show how a fully engaged MDT can improve patients' care and reduce the morbidity from this syndrome.

CASE PRESENTATION

A 44-year-old lady with a 5-year history of lumbar back pain presented to the emergency department. She complained of a change in the nature of her pain for the past 48 h. She described the back pain now radiating into both buttocks, which she had not previously experienced. She also complained of difficulty passing urine, with hesitancy but no incontinence. She had not opened her bowels that day. She had no significant medical or surgical history apart from her chronic back pain.

On examination, this patient was found to have no weakness in either leg (5/5 power in the lumbar 2–sacral 1 (L2–S1) myotomes using the Medical Research Council Power Scale¹⁶). She was found to have normal lower limb reflexes and full sensation to pinprick bilaterally in the L1–S1 dermatomes. A digital rectal examination revealed a loss of sensation in the perianal area (S3, S4 and S5) with normal anal tone and positive anal reflex (anal wink⁴). The bulbocavernosus reflex was not tested. A postvoid bladder scan revealed 348 ml of retained urine.

After review by the spinal team, the patient was transferred to the dedicated spinal unit assessment bed for further investigation.

INVESTIGATIONS

Blood indices such as haemoglobin, urea and electrolytes, and C reactive protein were within normal ranges.

This patient had an MRI performed on the day of admission. The MRI showed a medially herniated disc at the level of L5/S1, causing significant compression of the cauda equina (figures 1 and 2).

CAUSES OF CES

- ▶ Degenerative: disc herniation
- ▶ Trauma: fracture of vertebrae
- ▶ Infection: abscess
- ▶ Iatrogenic: postoperative, postradiation and spinal anaesthesia
- ▶ Neoplastic: metastases, ependymoma, schwannoma and meningioma
- ▶ Vascular: haematoma and autoimmune vasculitis

TREATMENT

The patient was operated upon that evening (figure 3). A central intralaminar approach was

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Figure 1 T2-weighted MRI. Sagittal view of the lumbar spine showing L5/S1 disc prolapse.

used at the L5/S1 interspace. A hemilaminotomy of L5 was performed. The ligamentum flavum was then removed. The S1 lamina was undercut and an adequate width decompression was performed providing adequate exposure of the dural sac. Adequate decompression allowed careful exposure of the sequestered fragment of the L5/S1 disc. The sequestered fragment was carefully removed from the region of the shoulder of the S1 nerve root. Following the removal of this fragment, the S1 root could be carefully retracted, allowing exposure of the disc, from which some remaining fragments were removed by extending the annulotomy.

Figure 2 T2-weighted MRI. Axial view showing L5/S1 disc prolapse.

Figure 3 Mobile intensifier image showing intraoperative L5/S1 position of disc removal.

Postoperatively, the patient had immediate relief of her buttock pain, with normal power in both legs and a positive catheter tug (indicating bladder trigone sensitivity¹). It was at this stage that the remaining members of the MDT started to make efforts to reduce this lady's morbidity.

The MDT, consisting of nursing staff, specialist nurses (SpNs), physiotherapists, occupational therapists and doctors, reviewed this patient's needs on a daily basis at their multidisciplinary meeting.

On the first morning postoperatively, the cauda equina SpN assessed the patient's bowel and bladder function. The patient failed a trial without a catheter and so this was reinserted. A bowel regime consisting of daily enemas and regular oral laxatives was prescribed. The physiotherapists worked daily to improve the general strength of the patient.

At 1 week postoperatively, the patient's wound was healing well and she was mobilising independently without the need of aids. She had been discharged by the physiotherapists. Neurologically, she had 5/5 graded power in the L2–S1 myotomes bilaterally. Sensation to pinprick was normal bilaterally in the L1–S1 dermatomes, with normal reflexes in the lower limbs. On digital rectal examination, the patient had a positive anal reflex and normal anal tone. However, she did still suffer from reduced sensation in the perianal region. She had successfully had her catheter removed and bowels open.

She was subsequently discharged from the hospital and given the contact details of our cauda equina SpN, whom she could contact if she had any problem in the 6 weeks before her first follow-up clinic appointment. The patient did not feel the need to contact our SpN in this period.

OUTCOME AND FOLLOW-UP

At 6 weeks post discharge, the patient was reviewed in the cauda equina clinic. This is a specially created combined clinic, where cauda equina patients are simultaneously reviewed by a spinal consultant, a urology consultant and an SpN.

At this visit, the patient complained of her chronic back pain continuing as before. She had had no faecal incontinence, but was suffering from constipation. Her main problem at this first visit, however, was of urinary stress and urge incontinence, which was not present preoperatively. She had started wearing pads for this.

The patient was examined by the three healthcare professionals. The patient's neurological status was unchanged from time of discharge, with normal power, sensation and reflexes apart from reduced sensation in the S3, S4 and S5 dermatomes. After a joint discussion between themselves and the patient, a plan was decided. Laxatives were prescribed for the patient and she was also referred for urodynamic tests, and subsequently physiotherapy to learn pelvic floor exercises to combat her incontinence.

At this patient's latest follow-up, some 18 months postsurgery, she is almost back to her premorbid state. She has had regular physiotherapy in the hospital to strengthen her pelvic floor and has tailored her laxatives. She has full continence and no longer wears pads. She is considering a referral to the local sexual dysfunction clinic, due to a continuing reduction in sensation, which is also available via our cauda equina protocol. She still experiences back pain but realises this as a chronic problem. There has been no clinical need for further imaging postoperatively.

DISCUSSION

CES is a rare condition. The incidence quoted in the literature varies from 1 in 33 000 to 7 in 100 000 in a recent North American study.^{17 18} A review in Slovenia found an annual incidence of CES secondary to disc herniation of 1.8 per million population.¹⁹ It is a condition characterised by compression of the lumbar and sacral nerve roots, the cauda equina, in the spinal canal.^{1-4 20} This is typically from a herniated lumbar disc protruding into the canal, usually at L4/L5 or L5/S1.^{1 8 17 19-22} Many other causes of this condition have been documented, such as spinal fractures, neoplasms, infections and spinal anaesthesia.^{1 23-25}

The compression of these nerve roots results in 'saddle anaesthesia' and 'sphincter disturbance'.^{1 4 8 20} There are two main clinical categories of CES: CES with established urinary retention, as seen in this case report, or incomplete CES with difficulty urinating or a loss of desire to urinate, but no retention.^{1 8 9 20} These symptoms may or may not be on a background of previous sciatica.^{1 4}

This case report has shown an example of a patient presenting with cauda equina and its successful management. The author's view is that this successful management is based upon two integral factors. Firstly, we have introduced protocols for investigating and treating suspected cauda equina patients with the availability of urgent MRIs and theatre space, 24 h a day. Secondly, we use an experienced MDT during admission and we have created a multidisciplinary clinic for follow-up (box 1).

The MDT treatment

Operative

The usual treatment for CES secondary to a herniated disc is lumbar decompression and removal of the disc fragments (sequestrectomy) or whole disc (discectomy).^{1 2 4 20 26} Although surgery is required, the ideal timeframe within which to operate is unknown. However, the widely held view is that surgery within 48 h of onset of symptoms will produce a better outcome, and therefore, in our unit, this is what we aim for.^{1 2 4 5}

Preoperatively, it was important to counsel the patient appropriately.^{1 13} The patient was informed that there was potential for improvement in her current symptoms, but the primary aim was to avoid progression to complete loss of bladder, bowel or

Box 1 The patient pathway

- ▶ Urgent referral to the spinal team for patients with suspected cauda equina syndrome. Transfer to spinal unit.
- ▶ Urgent MRI available 24 h a day.
- ▶ Surgery to be performed within 48 h onset of symptoms.
- ▶ Daily postoperative review by the multidisciplinary team: doctors, nurses, physiotherapists and occupational therapists.
- ▶ Availability of neurological rehabilitation bed if needed.
- ▶ A 6-week follow-up in cauda equina clinic, consisting of a review by a consultant spinal surgeon, a urologist and a specialist nurse.
- ▶ Regular audit of this pathway.

sexual function. It was explained that the surgery would not resolve her back pain.

Postoperative

It is unfortunate that because of the high litigation costs in misdiagnosis, and the subsequent delays in treatment, the focus in research articles has often been on diagnosis and time to surgery.^{1 2 12 13} However, in addition to surgery, an important area of treatment that is rarely mentioned is the use of the MDT to improve functional outcome.

As shown in this case report, our MDT consists of a multitude of healthcare workers, each bringing their own expertise to a segment of the patient's needs. These professionals meet on a daily basis to discuss each patient on the unit.

This spinal unit is also fortunate to have the availability of a specialist neurological rehabilitation unit at a nearby campus. Patients can be referred for this by their doctors, and transferred there once fit for discharge from the acute hospital.

After discharge, the combined clinic gives the availability of treatment plans from spinal and urology consultants and a cauda equina SpN. These professionals can also refer patients for MRIs, urodynamics, physiotherapy, colorectal clinics and sexual dysfunction clinics. The importance of such a comprehensive, tailored care plan available in a one-stop clinic must not be underestimated.

Of course, in the National Health Service, such care does not always run smoothly, and the protocols and MDT suffer from this as much as every department. Availability of adequate numbers of staff or rehabilitation beds can result in frustrating delays to patient progression. However, the overall aim of our unit's care is to strive to treat all aspects of a patient suffering from a multidimensional condition. We feel this case report shows how our MDT's methods have had a positive impact on patient's care during admission and follow-up.

Learning points

- ▶ Cauda equina syndrome is a condition characterised by compression of the lumbar and sacral nerve roots, the cauda equina, in the spinal canal.
- ▶ Symptoms include perianal numbness and urinary retention. Back pain and sciatica may not always be a feature.
- ▶ Urgent diagnosis and expedited treatment is important.
- ▶ Patients may suffer from long-term continence, reduced mobility and psychological issues. A multidisciplinary approach is the key.

Competing interests None.

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