CASE REPORT

Cervical epidural abscess following an *Escherichia coli* urinary tract infectionShane C O'Neill,¹ Joseph F Baker,² Prasad Ellanti,² Keith Synnott²

¹National Spinal Injuries Unit, Mater Misericordiae University Hospital, Dublin, Ireland
²Mater Misericordiae University Hospital, Dublin, Ireland

Correspondence to
 Dr Shane C O'Neill,
 shaneconeill@rcsi.ie

SUMMARY

A previously healthy 64-year-old man developed an *Escherichia coli* spinal epidural abscess (SEA) isolated to the cervical vertebrae posturinary tract infection 9 days previously. He subsequently underwent emergent surgical decompression followed by a prolonged course of intravenous antibiotics. He is symptom free at 1-year follow-up. SEA is an uncommon condition. Even with modern surgical techniques and antimicrobial agents, the mortality remains significant. Intravenous drug use, spinal procedures and medical conditions such as diabetes, Crohn's disease and chronic renal failure are all known risk factors for SEA and the majority of cases are associated with at least one of these risk factors. The case report highlights the importance of maintaining a high index of suspicion for this condition even in patients without established risk factors who present with red flag symptoms: back pain, fever and neurological deficit, as the consequences of a delayed diagnosis can be severe.

BACKGROUND

Spinal epidural abscesses (SEAs) are uncommon with an approximate incidence of 0.2–3/10 000 hospital admissions.^{1–2} Bacteria are responsible in a majority of cases, with Staphylococcal species being the most commonly isolated bacteria.³ They are often associated with intravenous drug misuse, previous spinal procedures or pre-existing medical conditions such as diabetes mellitus, obesity, chronic renal failure and Crohn's disease.^{1–5} SEA has a mortality of 16–18%^{2–3} and as such should be treated as a surgical emergency.

We report a case of a previously healthy individual with no known predisposing risk factors, who developed an isolated *Escherichia coli* cervical epidural abscess following a treated urinary tract infection (UTI). He presented with increasing pain and early signs of myelopathy and was managed successfully with emergent surgical decompression and intravenous antibiotics therapy.

CASE PRESENTATION

A 64-year-old White man, with a medical history of mild cervical degenerative disc disease, presented with an increasingly severe neck pain radiating to both shoulders. He had an increasingly poor balance when walking but had no fine motor deficits. Nine days previously the patient developed a UTI with associated fever and rigors, which was treated by his general practitioner with a 7-day course of coamoxiclav (625 mg, orally, three times a day). The urine culture taken in the community grew *E coli*. Two days after contracting the UTI,

the patient developed neck pain with associated muscle spasm and pain radiating down to both upper limbs in the C4 dermatome distribution. The symptoms progressively worsened and he attended the emergency department of another institution 6 days after the initial onset of urinary symptoms. No imaging was performed at this stage and he was prescribed analgesia and discharged with a diagnosis of 'muscle spasm'. As the symptoms failed to resolve, he attended the orthopaedic service. At this stage, he reported with severe cervical neck pain exacerbated by movement, with persistent fever, and pain during night. He had no headache or photophobia and denied any upper or lower extremity weakness or sensory disturbance.

INVESTIGATIONS

On physical examination, his temperature was 38.6°C and heart rate 105 bpm. The cervical spine was tender to palpation, pain was elicited on active movement and normal lordosis was lost. Power and sensation was normal bilaterally in the upper and lower extremities using the Medical Research Council grading system. The patient was diffusely hyper-reflexic and had an upgoing plantar response bilaterally. He had positive Hoffman's and inverted radial reflexes bilaterally and had a positive Romberg's test consistent with myelopathy. Serology showed a white cell count of $24.07 \times 10^9/L$ (neutrophil 95%) and C reactive protein of 79 mg/dL.

Plain X-rays of the cervical spine were unremarkable. An MRI of the cervical spine was performed—this revealed an epidural collection anterior to the cord causing compression at the level of C3–4 (figure 1). There was associated myelomalacia at the level of C4–5.

TREATMENT

The patient underwent emergency anterior cervical discectomy, fusion and instrumentation of C3–4. A small collection of pus was drained from both sides of the posterior longitudinal ligament at the level of C3/4. Samples were taken for microbiology (three culture swabs, fluid aspirate and disc material) and the area was thoroughly cleaned. Empiric therapy consisting of vancomycin (1 g, intravenous, q12 h) was initiated. Cultures from the removed cervical discs and epidural fluid grew *E coli* sensitive to ceftriaxone, piperacillin/tazobactam and coamoxiclav. Blood cultures taken on admission later grew *E coli*. Urine cultures at the time of presentation to our unit exhibited no growth; however, as previously stated, *E coli*-positive urine cultures were obtained in the community at onset of urinary symptoms.

CrossMark

To cite: O'Neill SC, Baker JF, Ellanti P, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-202078

Figure 1 MRI of the cervical spine showing epidural abscess causing cord compression at the level of C3/4.

OUTCOME AND FOLLOW-UP

The patient was immobilised in a Miami-J collar as is the senior surgeon's preference following an anterior cervical decompression and fusion and he had an uneventful postoperative course. A minivac drain remained in situ for 24 h postsurgery. Following decompression, systemic features resolved within 12 h and pain within 24. Inflammatory markers normalised by day 9. He was discharged on day 10 with a 6-week course of ceftriaxone (2 g, intravenous, once a day). Postoperative MRI revealed no residual epidural collection or cord compression (figure 2). At a 3-month follow-up, the patient's neck pain had completely resolved and his inflammatory markers had remained normal after 6 weeks free of antibiotics. He had no significant residual neurological impairment. He remained symptom-free at 1 year follow-up.

DISCUSSION

While extremely rare, there have been cases of SEA described in the literature caused by *E coli* following UTI^{6–8}; however,

Figure 2 Postoperative MRI of the cervical spine with no evidence of residual epidural collection or osteomyelitis.

these patients have all had coexisting risk factors such as diabetes and obesity, while one patient without known risk factors had a spontaneous SEA isolated to the lumbar spine.⁹ To our knowledge, this is the first case described of a spontaneous, isolated cervical epidural abscess caused by *E coli* following a UTI in a previously healthy individual with no coexisting risk factors.

SEA was first described in 1761 by the Giovanni Battista Morgagni¹⁰ in the preantibiotic era and was associated with poor outcome. Despite the advances in antimicrobial therapy and modern surgery the mortality remains significant at 16–18%.^{2–3} There is also a significant morbidity associated with SEA, with 52% of patients who survive suffering some degree of lasting neurological deficit.³ This neurological deficit can take the form of incomplete or complete paralysis. It can also comprise ongoing sensory disturbance or pain.³ A number of risk factors for SEA have been identified. Intravenous drug use and conditions which may lead to immunosuppression such as diabetes mellitus, Crohn's disease, obesity, chronic renal failure and alcohol abuse have all been associated with SEA.^{1–5} Any form of spinal procedure or coexisting source of infection may also lead to SEA.⁵ The epidural space may be inoculated by the haematogenous route, contiguous spread from an adjoining source of infection or by iatrogenic contamination.¹

The thoracic spine is the most common anatomic location of SEA with the cervical spine being the least common site of occurrence.³ It has been postulated that the reason for the decreased incidence in the cervical spine is due to the paucity of epidural space at this level.¹¹ *Staphylococcus aureus* is the most commonly isolated bacterium.^{1–3–12} Gram-negative bacteria are much less common and *E coli* accounts for only 2–4% of SEAs.^{3–9}

A recent meta-analysis showed that the three most common presenting symptoms are back pain, fever and neurological deficit.³ However, this triad of symptoms rarely occur together,⁴ which may contribute to the delay in diagnosis which occurs in 50–75% of cases.^{13–14} This is significant as it has been shown that a delay in diagnosis and initiation of treatment results in worse outcomes.¹⁴ MRI with and without gadolinium enhancement is the radiological investigation of choice for diagnosis of SEA with reports of 95% sensitivity.¹

The mainstay of treatment for SEA has been urgent surgical decompression, debridement and washout followed by a prolonged course of intravenous antibiotics tailored to the sensitivity of the bacterium isolated.^{4–13} Surgery may involve a laminectomy and washout at the affected level followed by instrumentation and/or fusion if bony stability is compromised. In this case, we report that an anterior decompression, thorough washout and instrumentation were performed as dictated by the anterior location of the epidural collection. However, there is growing evidence that in certain situations, it may be appropriate to manage SEA conservatively with antibiotics, with careful monitoring of clinical and neurological status and inflammatory markers along with a regular radiographic evaluation.^{15–16}

In summary, SEA is a rare diagnosis with potential significant long-term sequelae if not treated in a prompt fashion. New onset or exacerbation of neck pain in the clinical setting of recent known UTI would serve as a 'red flag'. This case highlights the necessity to maintain a high index of suspicion for SEA in patients who present with neck pain and fever even in individuals without established risk factors.

Learning points

- ▶ Cervical spinal epidural abscess following urinary tract infection is rare.
- ▶ Important to maintain a high index of suspicion for this condition, even without established risk factors.
- ▶ Red flag symptoms: back pain, fever and neurological deficit.
- ▶ Mortality (18%) and morbidity (52%) remain high.

Contributors SCO wrote the manuscript. JFB contributed to the treatment and overall editorial process. PE contributed to the discussion and overall editorial process. KS edited the manuscript and contributed to the case report.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Avilucea FR, Patel AA. Epidural infection: is it really an abscess? *Surg Neurol Int* 2012;3(Suppl 5):S370–6.
- 2 Baker AS, Ojemann RG, Swartz MN, *et al.* Spinal epidural abscess. *N Engl J Med* 1975;293:463–8.
- 3 Reihsaus E, Waldbaur H, Seeling W. Spinal epidural abscess: a meta-analysis of 915 patients. *Neurosurg Rev* 2000;23:175–204.
- 4 Curry WT Jr, Hoh BL, Amin-Hanjani S, *et al.* Spinal epidural abscess: clinical presentation, management, and outcome. *Surg Neurol* 2005;63:364–71.
- 5 Ellanti P, Morris S. Spontaneous spinal epidural abscess. *Ir Med J* 2011;104:281–2.
- 6 Hendlisz A, Rypens F, Gay F, *et al.* Spinal epidural abscess after endoscopic treatment for chronic pancreatitis. *Pancreas* 1995;10:204–6.
- 7 Sawamura Y, Kinomoto H, Mabuchi S, *et al.* [A case of spinal epidural abscess extending over twenty-one vertebral levels from cervical through lumbar spines]. *No Shinkei Geka* 1983;11:299–303.
- 8 Wessling H, de las Heras P. Cervicothoracolumbar spinal epidural abscess with tetraparesis. Good recovery after non-surgical treatment with antibiotics and dexamethasone. Case report and review of the literature. *Neurocirugia (Astur)* 2003;14:529–33.
- 9 Huang CR, Lu CH, Chuang YC, *et al.* Clinical characteristics and therapeutic outcome of Gram-negative bacterial spinal epidural abscess in adults. *J Clin Neurosci* 2011;18:213–17.
- 10 Morgagni G (1967) De sedibus et causis morborum (Venedig 1761). Ausgewählt, übertragen, eingelassen und mit Erkenntnissen versehen von Markwart Michler. Huber, Bern: 1968.
- 11 Dandy WE. Abscesses and inflammatory tumors in the spinal epidural space (so-called pachymeningitis externa). *Arch Surg* 1926;13:477–94.
- 12 Hlavin ML, Kaminski HJ, Ross JS, *et al.* Spinal epidural abscess: a ten-year perspective. *Neurosurgery* 1990;27:177–84.
- 13 Danner RL, Hartman BJ. Update on spinal epidural abscess: 35 cases and review of the literature. *Rev Infect Dis* 1987;9:265–74.
- 14 Davis DP, Wold RM, Patel RJ, *et al.* The clinical presentation and impact of diagnostic delays on emergency department patients with spinal epidural abscess. *J Emerg Med* 2004;26:285–91.
- 15 Savage K, Holtom PD, Zalavras CG. Spinal epidural abscess: early clinical outcome in patients treated medically. *Clin Orthop Relat Res* 2005;439:56–60.
- 16 Siddiq F, Chowfin A, Tight R, *et al.* Medical vs surgical management of spinal epidural abscess. *Arch Intern Med* 2004;164:2409–12.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow