



Case Report

Spinal epidural abscess due to acute pyelonephritis

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ABSTRACT

Background: Spinal epidural abscesses are rare and are misdiagnosed in up to 75% of cases. Fever, back pain, and neurological deficits are part of the classical triad. Here, the authors report a patient with a L2–L5 spinal epidural abscess with the left paravertebral extension attributed to acute pyelonephritis.

Case Description: A 54-year-old female presented with persistent low back pain and lower extremity weakness accompanied by paresthesias. Previously, she had been hospitalized with the left acute pyelonephritis. The lumbosacral MRI documented a T12/L5 anterior epidural abscess with ring enhancement on the contrast study; the maximum diameter of the abscess at the L2–L3 level contributed to severe cauda equina compression. She underwent a L2/L4 decompressive laminectomy with drainage of the intraspinal/extradural and paravertebral components. Intraoperative microbiological sampling grew *Staphylococcus aureus* for which she then received targeted antibiotic therapy. Fifteen days later, she was walking adequately when discharged.

Conclusion: Thoracolumbar epidural abscesses are rare. They must be considered among the differential diagnoses when patients present with acute back pain, fever, and new neurological deficits following prior treatment for acute pyelonephritis.

Keywords: Abscess, Batson’s plexus, Epidural, Pyelonephritis, Pyogenic bacteria

INTRODUCTION

Spinal epidural abscesses (SEAs) are rare and are misdiagnosed in up to 75% of cases.^[2,7] They are typically hematogenous in origin.^[4,5] The typical presenting triad for SEA includes fever, pain, and the onset of new neurological dysfunction.^[1,13] Most SEA originate anteriorly from inflammatory changes in the vertebral bodies and disks that then extend into the spinal canal. Pyelonephritis may contribute to SEA, as organisms can spread hematogenously through the major venous epidural network connected with Batson’s plexus.^[3,8] Here, the authors report a 54-year-old female who, following acute pyelonephritis, developed an intraspinal/epidural L2–L5 SEA with the left paravertebral extension.

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CASE REPORT

Clinical history

A 54-year-old female was previously hospitalized with acute pyelonephritis for 3 weeks. She was now admitted after about 1 week with persistent lumbar pain (visual analog scale score of 8 / 10) and the onset of a spastic paraparesis (4 / 5 BMRC) without sphincter dysfunction. The lumbar CT scan showed left paravertebral and epidural collections extending from T12 to L5. The lumbosacral MRI documented a T12/L5 anterior epidural hypointense lesion with ring enhancement; the maximum AP diameter was 1.2 cm at the L2–L3 where it caused severe cauda equina compression [Figure 1].

Surgery and postoperative course

The patient underwent a L2/L4 decompressive laminectomy with drainage of the intraspinal/extradural and paravertebral SEA; at surgery, a ventral extradural frankly purulent

collection identified. After drainage, local vancomycin powder was applied. Postoperatively, within 15 days, she was pain free, had no residual neurological deficits, and was discharged home. One week postoperative, lumbar MRI documented adequate canal decompression with complete abscess drainage [Figure 2].

Pathogen

Staphylococcus aureus was the organism isolated from surgery. The patient, therefore, underwent targeted antibiotic therapy with daptomycin, meropenem, and teicoplanin until serum inflammatory values returned to normal.

DISCUSSION

There are a few select reports attributing SEA to pyelonephritis.^[6,9,10,11] Several studies discussed a lumbar SEA occurring in patients following episodes of severe pyelonephritis [Table 1].^[6] Kim and Noh, additionally,

Table 1: Patient's demographics regarding literature review on lumbar spinal epidural abscess secondary to acute pyelonephritis.

Author, year	Patient	Symptoms	Previous disease	Neurological examination	Abscess location	Treatment
Da Silva et al., 2015 ^[6]	Male, 64 years/old	Lower back pain, fever	Hypertension, diabetes, alcohol consumption	Normal	Paravertebral muscles, epidural in whole cauda equina	Antibiotics, drainage of paravertebral abscess
Kim and Noh, 2016 ^[9]	Male, 62 years old	Left flank pain, fever, pollakiuria	Diabetes	Normal	Epidural L4–L5, paraspinal L3–S2	Antibiotics, drainage of paravertebral abscess
Liu et al., 2007 ^[11]	Female, 62 years old	Fevers, dysuria, flank pain	Cervical discopathy, chronic hepatitis C (interferon therapy)	Normal	C3–C4 osteomyelitis with small epidural abscess, paraspinal abscess	Antibiotics
Kim et al., 2021 ^[10]	Female, 56 years old	Lower back and flanks pain, fever	Acute hepatitis, osteoarthritis	Lower limbs motor weakness	Epidural L2–L3, intradural L3–S1 with arachnoiditis	Surgery (laminectomy) and antibiotics



Figure 1: Preoperative sagittal T1-WI with contrast enhancement (a), sagittal T2-WI (b), and axial T2-WI (c) MRI showed a T12/L5 anterior epidural hypointensity with ring enhancement on T1-WI sequences after gadolinium administration, with a maximum diameter of 1.2 cm at L2–L3 causing severe cauda equina compression.



Figure 2: Postoperative sagittal T1-WI with gadolinium administration (a) and sagittal T2-WI (b) MRI documented an adequate decompression with complete abscess drainage.

highlighted the occurrence of SEA due to acute pyelonephritis caused by *S. aureus*.^[9] Ogoshi *et al.* discussed coexisting cervical (C1–C2: with extension into the oropharyngeal region) and lumbar (L4–L5: muscle structures-iliopsoas-piriformis) SEA due to pyelonephritis attributed to methicillin-resistant *S. aureus*.^[12] Liu *et al.* described a cervical SEA spondylitis after acute pyelonephritis due to *Escherichia coli* bacteremia following interferon treatment.^[11]

CONCLUSION

SEA may occur due to hematogenous extension of bacteria attributed to prior pyelonephritis. Here, a 54-year-old female, following pyelonephritis 4 weeks ago, presented with low back pain and a paraparesis attribute to a CT/MR documented T12/L5 anterior SEA successfully treated with an L2–L4 laminectomy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Ameer MA, Knorr TL, Mesfin FB. Spinal epidural abscess. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2021.
2. Bond A, Manian FA. Spinal epidural abscess: A review with special emphasis on earlier diagnosis. *Biomed Res Int* 2016;2016:1614328.
3. Carpenter K, Decater T, Iwanaga J, Maulucci CM, Bui CJ, Dumont AS, *et al.* Revisiting the vertebral venous plexus—a comprehensive review of the literature. *World Neurosurg* 2021;145:381-95.
4. Chao D, Nanda A. Spinal epidural abscess: A diagnostic challenge. *Am Fam Physician* 2002;65:1341-6.
5. Curry WT Jr., Hoh BL, Amin-Hanjani S, Eskandar EN. Spinal epidural abscess: Clinical presentation, management, and outcome. *Surg Neurol* 2005;63:364-71.
6. da Silva CN, Safadi AP, de Azevedo Silva AB, Lanzieri PG. Epidural abscess in a diabetic patient with complicated pyelonephritis: Case report and literature review. *Med Case Stud* 2016;7:1-4.
7. Davis DP, Salazar A, Chan TC, Vilke GM. Prospective evaluation of a clinical decision guideline to diagnose spinal epidural abscess in patients who present to the emergency department with spine pain. *J Neurosurg Spine* 2011;14:765-70.
8. Heller MT, Haarer KA, Thomas E, Thaete F. Acute conditions affecting the perinephric space: Imaging anatomy, pathways of disease spread, and differential diagnosis. *Emerg Radiol* 2012;19:245-54.
9. Kim DH, Noh SH. Spinal epidural and subarachnoid abscess due to acute pyelonephritis in a 56-year-old woman: A case report and literature review. *Nerve* 2021;7:114-6.
10. Kim MJ, Koo HM, Lee WJ, Choi JH, Choi MN, Park SY, *et al.* Development of epidural and paraspinal abscesses after insufficient evaluation and treatment of acute pyelonephritis caused by *Staphylococcus aureus*. *Korean J Fam Med* 2016;37:299-302.
11. Liu JH, Lin PW, Liu YL, Liao PY. Cervical spinal osteomyelitis with epidural abscess: A rare complication after interferon therapy following acute pyelonephritis. *Nephrology (Carlton)* 2007;12:418-9.
12. Ogoshi T, Yoshimiya M, Ichibakase H, Kimura T, Kameoka M, Yoshioka H, *et al.* Spinal epidural abscess in patients with sepsis who experienced significant improvements after complete paralysis: Two case reports. *Open J Emerg Med* 2020;8:84014.
13. Sendi P, Bregenzer T, Zimmerli W. Spinal epidural abscess in clinical practice. *QJM* 2008;101:1-12.

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