



Case Report

# Ventral holocord spinal epidural abscess managed surgically in a critical setting

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## ABSTRACT

**Background:** Extensive epidural abscess is an uncommon entity which is increasing in the aging population. Its prevalence is also greater among those with diabetes mellitus and in those who are immunocompromised. Here, a 59-year-old female presented with a spinal epidural abscess (SEA) warranting operative intervention.

**Case Description:** A 59-year-old female with a history of diabetes and hypertension, presented with the acute onset of a high-grade fever, generalized back pain, and an evolving quadriparesis. Preliminary laboratory studies revealed elevated inflammatory markers. The magnetic resonance scan showed a ventral epidural abscess extending from C1-2 to the L5 level. She underwent urgent surgical decompression using a Nelaton catheter placed through an L4-L5 hemilaminectomy and threaded cephalad (40 cm); this resulted in a complete recovery.

**Conclusion:** This case study underscores a unique way of managing an anterior holospinal SEA extending from the C1-2 through the L5 spinal levels.

**Keywords:** Cervicolumbar, Critical, Hemilaminectomy, Holocord, Nelaton, Spinal epidural abscess, Ventral

## INTRODUCTION

Spinal epidural abscess (SEA) occurs in approximately 0.2–2 case/10,000 admissions.<sup>[2]</sup> The increasing rate for SEA is largely attributed to the aging population and their attendant comorbidities that include diabetes mellitus, intravenous drug abuse, and prior invasive spinal interventions.<sup>[7,8]</sup> SEA typically progresses through four phases – spinal ache (Phase 1), root pain (Phase 2), weakness (Phase 3), and paralysis (Phase 4).<sup>[3,9]</sup>

Treatment of SEA is a two-staged process that includes (1) antibiotics for treating the systemic manifestations versus (2) surgery with additional appropriate antibiotic therapy. Here, we report the case of a ventrally located SEA extending from the C1-2 through L5 level treated successfully utilizing a minimally invasive catheter technique (Nelaton catheter: 40 cm long) introduced through a hemilaminectomy at the L4-L5 level.

## CASE DESCRIPTION

A 59-year-old female with diabetes and hypertension presented with low back pain, electric shock-like sensations, and a progressive quadriparesis of 10 days duration. For the past 2 days, she had

a high-grade fever with chills. Her neurological examination revealed diffuse hyperreflexia 3–4+ accompanied by bilateral Hoffman's sign, clonus, and Babinski responses.

### Laboratory studies

Preliminary laboratory tests revealed markedly elevated C-reactive protein (CRP: 447 mg/l), a high erythrocytes sedimentation rate (ESR: 119 mm/h), an increased white blood cell count (WBC:  $25 \times 10^3/\mu\text{l}$ ), and abnormal serum urea level (11.69 mmol/l).

### Radiological studies

Magnetic resonance imaging (MRI) [Figure 1] revealed an extensive C1-2 through L5 anterior epidural abscess.

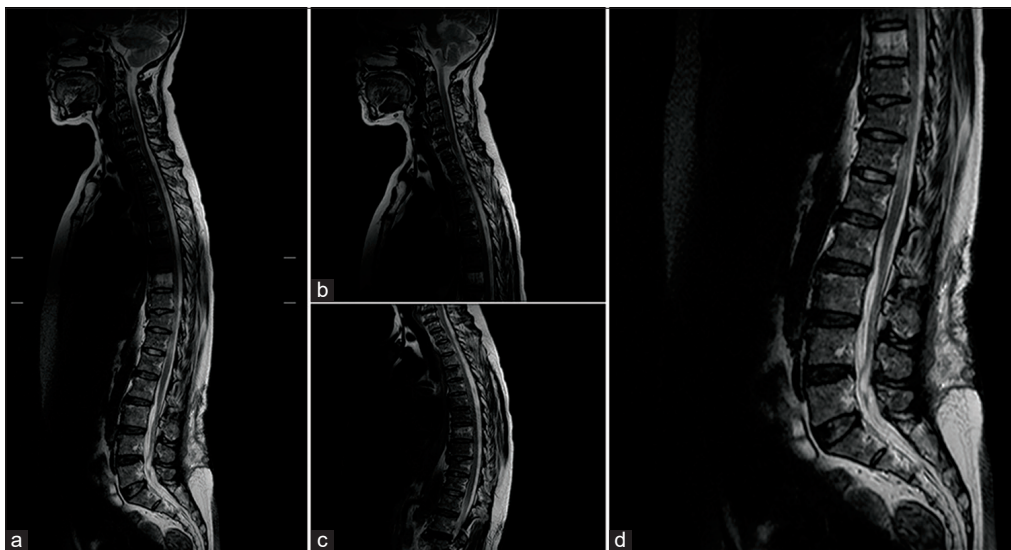
Postcontrast, there was diffuse meningeal enhancement with localization of fluid maximal in the lumbar region. In addition, a small abscess collection was noted in the right gluteal region.

### Treatment of SEA

At surgery, the right paraspinal abscess at the L4-5 level was filled with frank pus and was appropriately drained. Next, the patient underwent L4-5 right side hemilaminectomy allowing for drainage of pus from the ventral spinal canal; tilting the operating table (reverse Trendelenburg) further facilitated such drainage from more cephalad levels. Next, a Nelaton catheter (size 14 gauge and 40 cm long) was gently and gradually guided cephalad along the ventral



**Figure 1:** (a) Ventral holocord SEA (Spinal epidural abscess) T2W saggital image extending from C1-2 junction to L5 level. Pre-operative saggital view of SEA (b) Cervical (c) Dorsal (d) Lumbar.



**Figure 2:** (a) Post-operative T2W MR imaging at 1-month interval showing resolution of the SEA, saggital view of (b) Cervical (c) Dorsal (d) Lumbar level hemilaminectomy.

epidural space. This allowed for further washout of pus and accompanying infectious debris. Once instilled irrigation drained clear fluid, the catheter was then withdrawn, and the wound was closed. Over the next 4 postoperative months, the patient improved dramatically as did the inflammatory markers.

#### Antibiotic regimen

Intraoperative cultures of the ventral pus and blood culture yielded *Streptococcus pneumoniae*. It was appropriately treated with ceftriaxone (2 g once a day) and vancomycin (1 g twice a day) for 6 weeks intravenously, followed by oral cefuroxime (500 mg twice a day) for an additional 6 weeks on discharge. An incidental finding was an infection involving the right knee requiring arthroscopic washout at both 1 week and 3 weeks after the spine surgery.

#### Postoperative course

The 1-month postoperative MRI [Figure 2] showed complete resolution of the ventral epidural collection. Her neurological examination and inflammatory markers returned to normal by the 4<sup>th</sup> postoperative month as depicted in the infographic - Appendix 1.

## DISCUSSION

#### Location of SEA

SEA most typically appear in the lumbar level (48%) followed by thoracic (31%) and then cervical (21%) levels.<sup>[4]</sup> In this case, the SEA was unusual as it extended ventrally all the way from the C1-2 through the L5 level.

#### Five similar holocord SEAs

Five similar cases of holocord SEA have previously been reported. One study included three pockets of SEA located at C7-T5 ventrally, and T5-11, and L1-5 dorsally.<sup>[7]</sup> Three additional cases reported dorsally located abscess; one extending from the foramen magnum to T12 with psoas abscesses and two with extensive cervicolumbar abscesses.<sup>[10,12,13]</sup> The fifth case was part of a retrospective study of 68 patients with SEA; this case extended dorsally from cervical through the lumbar region.<sup>[6]</sup>

#### Operative techniques for holocord SEA

Different techniques for treating holocord SEA are described ranging from; open decompression/late closure, multilevel decompression, limited decompression (one-level laminectomy or hemilaminectomy with Fogarty embolectomy catheter use), percutaneous CT-guided needle aspiration, and limited laminectomies (e.g., using a silicon catheter epidurally).<sup>[1,5,7,9,11-14]</sup> Here, through a right L4-L5 hemilaminectomy, the extensive epidural abscess was successfully drained using a 40 cm Nelaton catheter (size 14). This technique avoided the morbidity of performing multiple level laminectomies.

## CONCLUSION

In this case, we utilized a Nelaton catheter (size 14; 40 cm long) introduced through a right-sided L4-L5 hemilaminectomy to successfully drain a holocord ventral SEA extending from the C1-C2 through the L5.

## Declaration of patient consent

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

## Financial support and sponsorship

Nil.

## Conflicts of interest

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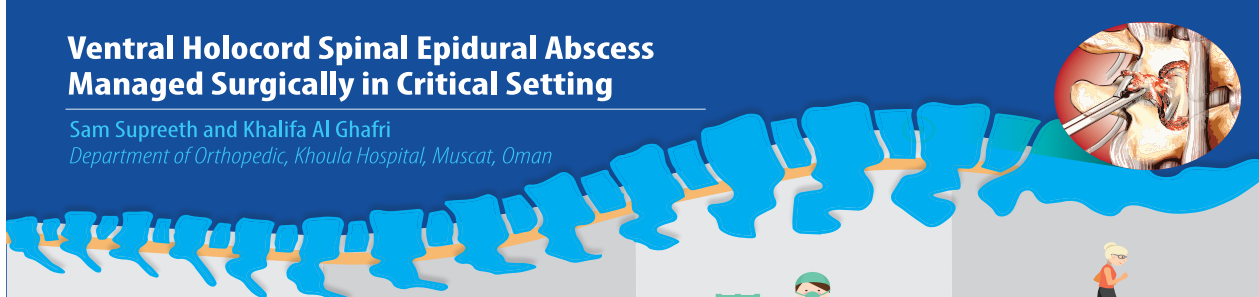
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## APPENDIX 1

### Ventral Holocord Spinal Epidural Abscess Managed Surgically in Critical Setting

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#### PATIENT COMPLAINS

59 year lady with history of Diabetes and Hypertension presented to Emergency Department

- Quadriplegia with UMN signs  
1 DAY
- High grade fever with chills  
2 DAY
- Lower back and neck pain.  
10 DAY

#### INVESTIGATIONS

##### BLOOD INVESTIGATION

1. Elevated WBC 25x10<sup>3</sup> microliter
2. Elevated CRP 447 mg/l
3. Elevated ESR 119 mm/hr

##### MRI

Extensive ventral epidural abscess from C1-2 junction to L5. Few cases of dorsal spinal holocord reported in literature and none of ventral holocord

#### TREATMENT

- L4-5 right hemilaminectomy done
- Reverse tredlenburg position
- Nelaton's 14 gauge catheter used to drain
- Culture Streptococcus pneumoniae
- ##### ANTIBIOTICS

  - Ceftriaxone + Vancomycin IV 6 weeks
  - Cefuroxime oral 6 weeks

#### RESULT

Fully recovered post operatively and asymptomatic at 6 months follow-up. MRI at 1 month interval shows complete resolution

##### THOUGHTS

1. SEA incidence 0.2-2/10000 admission
2. Common in elderly and prior surgery
3. Untreated SEA cause rapid, irreversible neurological damage

##### PROS & CONS

- Minimally invasive, Reduced morbidity, Reduced blood loss, Reduced spinal instability, Full neurological recovery
- Blind procedure, Incomplete drainage, Chances of Dural tear