

CASE REPORT



# Spontaneous spinal epidural abscess in pregnancy: a case series

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**INTRODUCTION:** Spontaneous spinal epidural abscess (SEA) is a rare diagnosis; only eight cases have been reported during pregnancy. Diagnosis of SEA can be difficult, especially when the classic triad of fever, back pain, and neurologic deficits are not present. Early diagnosis and treatment are necessary to reduce potential morbidity and mortality.

**CASE PRESENTATIONS:** We report two separate cases of SEA in pregnancy and summarize the existing literature. Case 1: A 20-year-old G1P0 presented at 35-week gestation with low back pain and lower extremity (LE) weakness. Magnetic resonance imaging (MRI) revealed thoracic SEA. The patient underwent cesarian delivery followed by posterior thoracic laminectomy and fusion (T9–11), abscess decompression, and antibiotic therapy. Unfortunately, there was a recurrence of her infection requiring a second irrigation and debridement 1 month after index procedure. At final follow-up, the patient had complete neurologic recovery. Case 2: A 38-year-old G10P0 presented at 36-week gestation in labor with LE weakness and difficulty ambulating. After delivery, she had significant LE neurologic deficits. MRI demonstrated thoracic osteodiscitis with associated epidural abscess. She underwent thoracic laminectomy and fusion (T7–12), abscess decompression, and antibiotic therapy. Unfortunately, despite aggressive treatment, she has persistent LE neurologic deficits.

**DISCUSSION:** Pregnancy complicates the diagnosis and treatment strategies of SEA: back pain is very commonly underestimated, especially in the absence of fever and gross neurologic deficits. Prompt diagnosis and treatment are paramount to prevent neurologic decline and facilitate recovery. It is important to perform a focused physical exam noting motor strength, sensation, and reflexes. Coordinated management between the Emergency Department, OB-GYN, and spinal surgery team is required for best possible patient outcomes. Typically, management consists of aggressive surgical decompression and antibiotic therapy.

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## INTRODUCTION

Low back pain is common in full-term pregnancy, with nearly two-thirds of women experiencing back pain during gestation [1]. While typically benign and self-limiting, back pain very rarely can be harbinger for more serious conditions including spinal epidural abscess (SEA). In the absence of severe neurologic symptoms or fever, the diagnosis of SEA can easily be overlooked. Pregnancy results in alterations of immune system responsiveness [2]. While pregnancy was previously felt to be a globally immunocompromised state, newer evidence shows that only selective parts of cell-mediated immunity are affected. B-cell immunity and serum antibodies are still highly active, protecting the mother and fetus from infections [2, 3]. Therefore, there are typically other comorbidities that lead to SEA, although infection can rarely be spontaneous in nature.

SEA is a rare cause of low back pain in pregnancy. There are few reported cases of SEA occurring during pregnancy, majority of which are complications of epidural analgesia during labor and delivery [4, 5]. Studies previously had shown SEA to be the cause of 0.2–1.2 in 10,000 of all hospitalizations. Newer data suggest that SEA is increasing in prevalence, accounting for around 1 in 1000 hospitalizations, paralleling a rise in immunocompromised states and intravenous drug use [6]. As previously stated, SEA is most commonly the result of regional anesthesia in the peripartum period [4, 5]. Additional risk factors include intravenous drug use

(IVDU), diabetes mellitus, immunosuppression, and bacteremia [7, 8]. Only eight cases of epidural abscesses during pregnancy unrelated to spinal anesthesia have been reported in the literature, seven of which occurred in the spine and one of which was intracranial [3, 9–15]. All cases were treated with a combination of antibacterial and surgical therapy [3, 10–15] except one that was treated successfully with antibiotic therapy alone [3]. Here, we present two cases of SEA occurring in pregnancy, both of which were presumed to be due to hematogenous spread from a skin infection that occurred during gestation. Fortunately, both fetuses were delivered via cesarian section without complications and were healthy postnatally. We then present the additional cases and clinical features previously reported in the literature.

## CASE 1

A 20-year-old Spanish-speaking primiparous female at 35-week gestation initially presented to the Emergency Department (ED) of our institution 4 days prior to admission with chief complaint of low back pain and contractions. A translator was used for the visit. She denied any history of fever, trauma, or IVDU. She received intravenous fluids and pain medications and it was determined that she was not in labor. Her pain improved and she was discharged that evening. In retrospect, the patient recalled some

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LE weakness although she was able to ambulate, attributing weakness to her pain. Four months prior, the patient had undergone incision and drainage of an axillary abscess in the same ED, although cultures had not been collected and symptoms had improved with a short course of oral antibiotics. While a Spanish translator was used, the language barrier could have led to missed information in the patient visit.

The patient returned to the ED 4 days later with severe low back and bilateral radiating leg pain with burning and paresthesias. Symptoms had begun approximately 24 h prior and rapidly progressed. In addition, the patient complained of significant weakness and swelling in the legs with inability to walk or stand. On exam, the patient had no motor function in the right LE and less than anti-gravity strength in the left LE. Sensation was absent below the right knee and sensation was diminished on the left; she reported diminished sensation to light touch in bilateral thighs (ASIA C spinal cord injury). She also was unable to urinate and foley catheter was placed; rectal tone was not documented. MRI without contrast ordered by the ED of the thoracic spine demonstrated a large epidural fluid collection along the posterior and right spinal canal from T8–12 with compression of the spinal cord and increased medullary T2 signal (Fig. 1). The patient was afebrile on presentation but given rapid deterioration and imaging showing a fluid collection in the spinal canal; it was suspected that she had developed a spontaneous epidural hematoma. Her initial labs demonstrated a white blood cell count (WBC) 13.1k cells/mL (third trimester normal value 5.6–16.9k/mL, [16]), 86% neutrophils. Urinalysis was negative and no inflammatory markers were drawn upon presentation.

After discussing the case with the OB-GYN team, the patient underwent an emergent C-section prior to spinal decompression in order to facilitate positioning, decrease anesthetic load to the infant, and avoid potential complications of acute blood loss in pregnancy. The newborn was delivered without any complications. After the C-section, the patient was turned supine and underwent a T9–T11 posterior thoracic decompression. Upon opening the spinal canal, purulence was noted and sent for culture. There was a dense epidural phlegmon with an adherent lining that was subsequently debrided. She underwent



**Fig. 1** Thoracic Spine MRI: T2 Sagittal MRI demonstrating large epidural fluid collection along the posterior and right spinal canal from T8–12 with compression of the spinal cord and increased medullary T2 signal.

noninstrumented fusion from T9–11. Quickly after decompression, intraoperative neuromonitoring demonstrated return of weak somatosensory evoked potentials. The patient was started on vancomycin and ceftriaxone antibiotic therapy. Postoperatively, the patient had improvement of her back and leg pain although she continued to have significant weakness similar to her preoperative exam. Intraoperative cultures returned positive for Methicillin-resistant *Staphylococcus aureus* (MRSA). Infectious disease was consulted and the patient was continued on vancomycin for a total of 8 weeks with a plan to transition to oral doxycycline for a total of 6 months. It was presumed that the patient had hematogenous spread of MRSA to her spine from the axillary abscess that had occurred 4 months earlier.

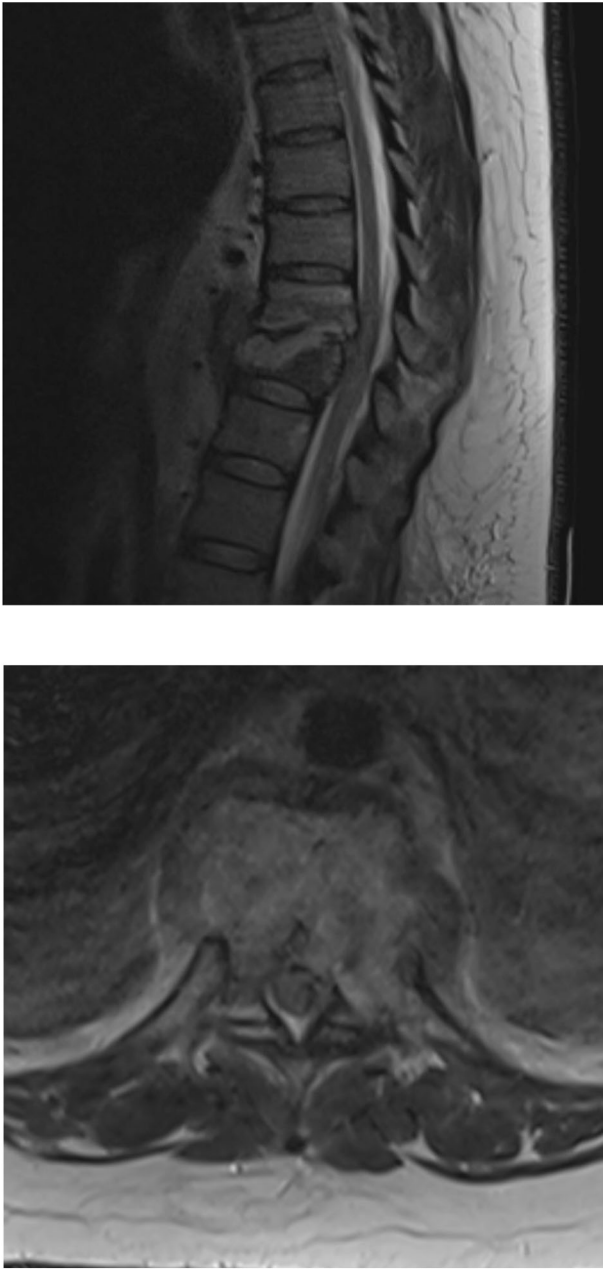
She was discharged to inpatient rehab at our institution for 2 weeks. After 2 weeks in rehab (total of three weeks post-operatively), the patient had return of all sensation in bilateral lower extremities. The foley catheter was removed and intermittent catheterization was begun. She gradually had return of voluntary control of bowel and bladder over the next 3 weeks. Her right LE had a good return of the motor function (4/5 strength) throughout and left LE had 4+/5 strength or greater throughout. She was able to ambulate with a rolling walker. She was discharged to home able to spontaneously void.

Unfortunately, the patient returned to the clinic approximately 2 weeks later with drainage from her thoracic incision. Due to numerous factors including language barriers and orders from other providers, the patient had stopped taking her antibiotics. She was seen at an outside clinic with a rash and was told to stop taking the vancomycin. Her neurologic exam was unchanged from discharge. She was admitted and underwent urgent irrigation and debridement of the thoracic wound. Intraoperative cultures of MRSA were susceptible to ceftriaxone, which she was transitioned to secondary to vancomycin intolerance. She followed an excellent postoperative course and had full 5/5 strength and normal sensation in bilateral lower extremities 8 months out from the index surgery (ASIA A). She completed antibiotic therapy. At final follow-up, she was walking with a normal gait without an assistive device and had no issues with bowel or bladder function. AP and lateral thoracic films demonstrated a well-healed thoracic fusion.

## CASE II

A 38-year-old female at 34-week gestation initially presented to the ED of our institution 13 days prior to admission with a chief complaint of low back pain and bilateral radicular leg pain and numbness. She denied any history of fever, trauma, or IVDU. She was seen by both ED and OB-GYN physicians and discharged with a diagnosis of chronic low back pain with bilateral sciatica. Three days later she was evaluated again in the ED with similar complaints. Routine lab work demonstrated a WBC of 11k/mL, which is within the normal reference range during the third trimester of pregnancy (normal value 5.6–16.9k/mL, [16]). Additionally, the patient was afebrile during both ED visits. Symptoms again improved with muscle relaxants and she was discharged with the same diagnosis. Of note, the patient had a history of morbid obesity, type II Diabetes mellitus, and recurrent skin furuncles. Approximately 4 months into pregnancy, she had developed a chest wall abscess and underwent incision and drainage in the ED. She received a short course of oral antibiotics and rapidly improved.

Ten days after initial presentation, the patient returned to the ED in active labor at 36-week gestation. Of note, she did collapse in the parking lot of the hospital due to bilateral LE weakness. After evaluation by the OB-GYN team, she underwent an urgent C-section due to the non-reassuring fetal heart rate. She was given a spinal epidural for pain control. The newborn was delivered without any complications.



**Fig. 2 Thoracic Spine MRI: T2 sagittal and axial MRI with contrast of the thoracic spine demonstrating osteodiscitis, endplate erosion at T9–10, mild focal kyphosis, and associated mild epidural abscess. Mild to moderate canal stenosis.**

Twenty-four hours after her C-section, the patient did not have return of motor or sensory function to her preoperative status and developed new-onset urinary retention requiring catheterization. She was only able to slightly wiggle her toes although strength grading was not documented (ASIA C spinal cord injury). Urgent MRI of the thoracic spine demonstrated osteodiscitis with endplate erosion at T9–10 and mild focal kyphosis at this level and associated mild epidural abscess versus phlegmon. There was associated mild-to-moderate spinal canal stenosis on MRI (Fig. 2). It was suspected that the patient had sustained a spinal cord stroke caused by the infection and arterial disruption given the severity of her neurologic deficits in the absence of severe compression. The patient underwent emergent T9–10 laminectomy, irrigation and debridement of the epidural infection, and

T7–12 instrumented thoracic fusion due to preoperative kyphosis. She was empirically treated with daptomycin and ceftriaxone. Both blood and intraoperative cultures were positive for Methicillin-sensitive *Staphylococcus aureus* (MSSA). Infectious disease was consulted and the patient was placed on 8 weeks of IV ceftriaxone followed by a total of 6 months of oral cephalexin suppressive therapy. This patient had a slower recovery of neurologic function despite aggressive treatment. One month postoperatively, she began having a weak motor function of the left LE, although she had no anti-gravity function. She was transitioned from foley catheter to intermittent catheterization. The right LE had a flicker of distal motor function. She was most recently seen approximately 3 months postoperatively. Her left LE only has anti-gravity (3/5 strength) motor function in the quadriceps with the rest of the muscle groups being 2/5 strength. The right LE had 4/5 strength in the quadriceps with only a flicker in distal motor groups. She continued to have decreased sensation bilateral lower extremities, with the most severe loss distally (ASIA C). She still lacks voluntary bowel and bladder control, requiring catheterization.

## DISCUSSION

A literature search of PubMed for keywords “epidural abscess” and “pregnancy” resulted in the identification of eight case reports of epidural abscess unrelated to regional anesthesia, seven of which were SEA and one an intracranial epidural abscess. The clinical features of these cases are shown in Fig. 1 [3, 10–15]. As discussed, SEA is a rare diagnosis accounting for 0.2–10 in 10,000 hospitalizations [6]. The frequency of these infections is increasing, likely due to increasing rates of intravenous drug use, diabetes mellitus, and immunosuppression [7, 8]. The cases presented in Table 1 include IVDU and distant infections as risk factors.

Back pain, a common symptom in SEA, is exceptionally common in pregnancy [1]. The diagnosis of SEA can be difficult, especially when the patient is afebrile and no overt neurologic symptoms are present. Recent studies have shown that the classic triad of low back pain, fever, and neurologic symptoms of weakness or paresthesias is rarely present [17]. A focused neurologic exam is frequently overlooked if the gross motor function is intact. This can lead to delays in the diagnosis and treatment if subtle findings are missed. As the infection progresses, resultant neurologic injury occurs due to compression of the spinal cord or vascular occlusion causing ischemia. Risk factors or concerning signs and symptoms should prompt further imaging with gadolinium-enhanced MRI. This includes patients with risk factors as mentioned previously, back pain and fever, elevated inflammatory markers, and/or neurologic deficits [6]. In both the cases presented, the patients presented with risk factors and significant back pain, although neither were febrile nor had neurologic changes at initial presentation.

The most common mechanism of spread for SEA is via hematogenous spread and the most commonly isolated pathogens are *S. aureus*, *Pseudomonas spp*, and *Escherichia coli* [18]. In both of the cases presented, the pathogen was *S. aureus* (MRSA and MSSA) and presumed to have spread hematogenously to the spine from axillary and chest wall abscesses, respectively.

The optimal treatment of SEA is controversial. The treatment strategy is based on multiple factors including patient age, organism isolated and associated resistance, neurologic deficits, comorbidities, and laboratory studies. The majority of the literature supports prompt surgical decompression and antibiotic therapy if there are neurologic deficits. In contrast, there is increasing evidence that in patients without comorbidities and no neurologic deficits, a trial of antibiotic therapy alone with close observation may be reasonable [10]. This has shown to be successful in the setting of pregnancy [3]. Both the cases

**Table 1.** Clinical features of epidural abscesses in pregnancy reported in the literature [3, 10–15].

	Case I	Case II	Case III (13, Hunter)	Case IV (14, Van Winter)	Case V (15, Lampen)	Case VI (12, Connealy)	Case VII (16, Burton)	Case VIII (17 Singh)	Case IX (3 Nakano)
Age of mother (yrs)	20	38	27	27	25	29	30	29	21
Weeks of gestation at diagnosis	35	34	30	22	20	28	22	34	22
Risk factors	Axillary abscess	Diabetes mellitus, chest wall abscess	IVDU	IVDU	None	MRSA cellulitis	IVDU	Necrotizing fasciitis	None
Presenting symptoms	Back pain, paraplegia	Back pain, paraplegia, LE paresthesias, urinary retention	Fever, back pain, paraplegia, urinary retention	Fever, chest pain, paraplegia, urinary retention	Back pain, paraplegia	Fever, neck pain, headache	Lumbar pain, urinary retention	Back pain, LE paresthesias, urinary retention	Fever, headache, neck pain
Spinal region (vertebral levels)	Thoracic spine (T8–T12)	Thoracic (T9–10)	Lumbar (L3–5)	Thoracic (T1–6)	Thoracic (T1–2)	Cervical/thoracic (C2–T1)	Holocord involvement (foramen magnum-sacrum)	Thoracic/lumbar (T11–L1)	Cervical (C2–3)
Pathogen isolated	MRSA	MSSA	MSSA	MSSA	<i>Strep. milleri</i>	MRSA	None detected	MSSA	None detected
Treatment	Laminectomy & fusion, antibiotics (VCM, CTRX)	Laminectomy & fusion, antibiotics (CTRX)	Laminectomy antibiotics (GM, methicillin)	Antibiotics (nafcillin) laminectomy	Antibiotics (CTRX) laminectomy	Antibiotics (VCM) laminectomy	Antibiotics (cloxacillin, VCM) laminectomy	Antibiotics (TAZ) piperacillin laminectomy	Antibiotics (CTRX) $\beta$
Clinical outcome	Complete recovery	Partial recovery	Complete recovery	Partial recovery	Complete recovery	Complete recovery	Partial recovery	Partial recovery	Complete recovery

presented underwent emergent surgical decompression combined with antibiotic therapy.

Pregnancy complicates both the diagnosis and treatment strategies of SEA. Prompt diagnosis and treatment are paramount to prevent further neurologic decline and facilitate recovery. Coordinated management between the ED, OB-GYN, and the spinal surgery team is required for the best possible patient outcomes.

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## AUTHOR CONTRIBUTIONS

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## COMPETING INTERESTS

The authors declare no competing interests.

## ADDITIONAL INFORMATION

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