Case Report

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When Neck Pain Arises From Spinal Epidural Abscess: A Case Report

Urgent Message: Though atraumatic neck pain is a common condition in the urgent care setting, spinal epidural abscess is relatively uncommon and may present without classic symptoms, which makes it a challenging diagnosis to make. Early recognition, timely imaging, and thorough documentation are essential to prevent a devastating outcome and to mitigate medicolegal risk.

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Citation: Chu E, Martin L. When Neck Pain Arises From Spinal Epidural Abscess: A Case Report. *J Urgent Care Med*. 2025 19(11): 27-32

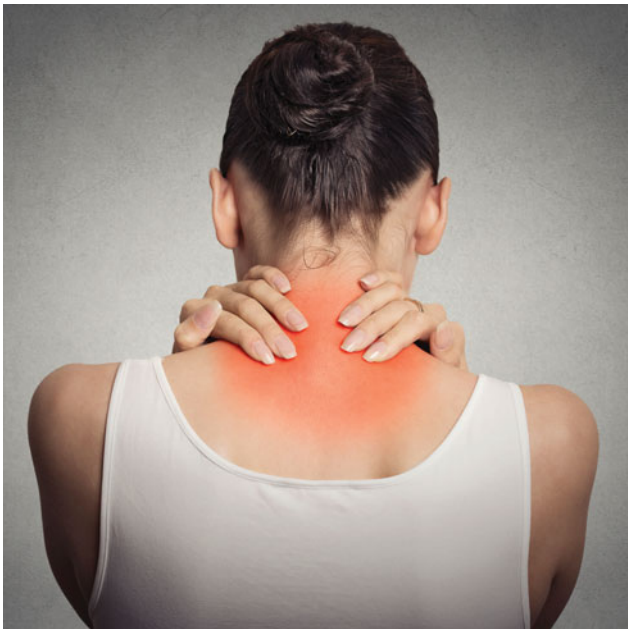
Key Words: Neck Pain, Spinal Infection, Cervical Epidural Abscess, Spinal Epidural Abscess, Medicolegal Risk, Anchoring Bias

Abstract

Introduction: Acute atraumatic neck pain is a common condition encountered in both the urgent care and emergency department (ED) settings. Neck pain may stem from various etiologies ranging from benign to life-threatening, such as a spinal epidural abscess (SEA), which can be easily missed if a patient does not present with the classic symptoms of the disease.

Presentation: A 30-year-old otherwise healthy female presented multiple times to an urgent care and primary care for worsening neck and upper back pain after recent drainage and antibiotic course for buttock abscess.

Physical Exam: The exam included initially normal vital signs. She was uncomfortable appearing with left neck tenderness and decreased range of motion with associated muscle spasm. The rest of her neurological examination was nonfocal.



Diagnosis: The patient ultimately presented to the ED with altered mental status and was found to have bacterial meningitis and septic emboli secondary to a spinal epidural abscess.

Conclusion: Missed or delayed diagnosis of SEA can lead to devastating outcomes. To improve patient safety

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and mitigate medicolegal risk, especially when evaluating severe or persistent neck pain, clinicians must maintain a high index of suspicion, obtain appropriate imaging, and document exam findings and clinical reasoning thoroughly.

Introduction

Neck pain is a common condition experienced in up to two-thirds of the global population.[1] The annual incidence of atraumatic neck pain is estimated to be approximately 10-21%.[2] In the urgent care center or emergency department (ED), atraumatic neck pain is a frequently encountered complaint.

Neck pain can stem from a variety of etiologies including mechanical, infectious, malignant, and inflammatory conditions.[1] While many neck pain presentations may resolve without intervention, the resolution of pain does not exclude the possibility of it being the initial presentation of a serious or emergent condition. In the urgent care setting, management of acute pain can be difficult due to the consideration of a broad differential diagnosis. A thorough history and physical exam are required to exclude causes that need immediate diagnosis, referral to the ED, and treatment to prevent permanent disability or severe illness, while considering the possibility of spinal epidural abscess (SEA).

Case Presentation

A 30-year-old female presented to an urgent care for neck and upper back pain. She reported no pertinent past medical history and did not take any daily medications. She was taking ibuprofen for her current pain and finishing a course of trimethoprim-sulfamethoxazole for a recent buttock abscess that she had an incision and drainage 5 days prior.

Visit 1: Urgent Care

Chief Complaint: 2 days of neck pain

The patient presented with 2 days of gradually worsening neck pain that started in the left periscapular region and spread to the left side of the neck and left arm. She had no other associated symptoms or inciting events. Her vital signs were within normal limits. On examination, she had a limited range of motion of her neck and was holding her cervical spine at rest in a left lateral position secondary to discomfort.

An x-ray of her cervical spine was obtained and interpreted as normal. She was diagnosed with torticollis and received a prescription for oxycodone and cyclobenzaprine prior to discharge.

Visit 2: Urgent Care

Chief Complaint: 4 days of neck pain, new stiffness

The patient presented two days after her initial visit to urgent care for worsening left-sided neck pain and stiffness with severely limited range of motion. She stated that she had been limited to over-the-counter pain medications as she lost her prescriptions on the way home from her last urgent care visit.

Vital signs were significant for mild tachycardia to 100 beats per minute (bpm) but were otherwise within normal limits. Her examination revealed a tender left trapezius muscle with palpable spasm and limited neck range of motion in all directions. She had good strength and sensation in her bilateral upper extremities.

She was diagnosed again with torticollis and received a prescription for oxycodone, cyclobenzaprine, and prednisone. She was instructed to follow up with a primary care physician (PCP).

Visit 3: Primary Care

Chief Complaint: 6 days of radiating neck pain, chills, and sweats

This patient followed up as instructed with her PCP 2 days after her second urgent care visit. At this visit, she continued to complain of persistent neck pain and stiffness, now radiating to her bilateral shoulders. She was also experiencing chills and sweats.

Her vital signs were significant for tachycardia to 107 bpm and hypertension of 147/104. The rest of her vital signs, including her temperature, were within normal limits. Her examination was significant for a well appearing female with tenderness over her left trapezius muscle. She had good strength and sensation of her upper and lower extremities.

A complete blood count (CBC) and computed tomography (CT) scan of neck with intravenous contrast were ordered and obtained later that day. Her CT imaging did not show any abnormalities within the neck. Her CBC demonstrated a leukocytosis of 15,000 with 78% neutrophils.

She was diagnosed with a musculoskeletal strain. Her leukocytosis was attributed to prednisone use. She was instructed to continue the prescriptions that she received at her prior urgent care visit.

Visit 4: Urgent Care

Chief Complaint: 7 days of radiating neck pain

The patient returned to a different urgent care for worsening neck and upper back pain. The pain was now present over both sides of neck, worse with turning her neck, and radiated into her bilateral upper extremities.

Vital signs were notable for tachycardia to 118 bpm, a temperature of 100.3°F (37.9°C), and a blood pressure of 137/88. Her examination revealed an uncomfortable appearing female with reported normal range of motion of her neck with tenderness along the paraspinous muscles of the neck bilaterally with palpable spasm. She continued to have good strength and sensation of her upper extremities.

She was treated with diazepam and ketorolac with improvement of her tenderness on repeat examination. The patient was discharged with a continued diagnosis of torticollis and was prescribed another short course of oxycodone. She was instructed to return to the ED for any worsening symptoms.

Visit 5: Emergency Department

Chief Complaint: Altered mental status, headache, 7 days of radiating neck pain

The patient was brought to the ED by ambulance for neck pain, headache, and altered mental status several hours after returning from her urgent care visit. Paramedics reported that they were called for neck and back pain, however on arrival, they noted the patient was confused. Her family reported to the paramedics that she had been complaining of a headache, nausea, and chills just prior to their arrival in addition to her neck and back pain. Her family also agreed that she seemed confused, which they attributed this to excessive use of prescription medications for pain control.

Her vital signs were notable for a temperature of 100.8 °F (38.2°C), tachycardia to 139 bpm, a respiratory rate of 30, and blood pressure of 122/57. Her examination was significant for an ill-appearing female who was awake and alert but disoriented with slowed speech. She had decreased range of motion of the neck secondary to pain. She was appreciably tachycardic and tachypneic. The rest of her examination was normal, and the rest of her neurologic exam was nonfocal.

Laboratory studies including CBC, complete metabolic panel, venous blood gas, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), blood cultures, and a urinalysis were ordered. CT imaging of her head and chest and cerebrospinal fluid (CSF) studies were also ordered. Her results were notable for a leukocytosis of 13.1, an acute kidney injury with a creatinine of 2.8, and an elevated ESR and CRP to 71 and 33, respectively. Her head CT was normal, and her chest CT findings were concerning for septic emboli. A lumbar puncture was performed, and CSF studies are consistent with bacterial meningitis. She was started on broad spectrum antibiotics and admitted to the intensive care unit (ICU) for management of meningitis and sepsis.

Diagnosis

Blood cultures returned positive for methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia the day following admission and magnetic resonance imaging (MRI) of her entire spine was consistent with SEA of the cervical spine. The patient ultimately developed severe acute respiratory distress syndrome with refractory hypoxemia, severe metabolic acidosis, and septic shock with multisystem organ failure. Unfortunately, soon after her admission to ICU, this patient suffered a cardiac arrest, and care was ultimately withdrawn due to her poor prognosis.

Discussion

Spinal Epidural Abscess Epidemiology and Pathophysiology

SEA is a rare pyogenic infection of the epidural space—the anatomical area between the outer membrane covering the spinal cord (the dura) and the vertebrae. The incidence is estimated to be about 0.2-2 per 10,000 hospital admissions, although this rate is likely increasing over the last few decades.[3,4] This rising incidence is thought to be due to increased spinal instrumentation, higher prevalence of risk factors including chronic disease and immunocompromised states, and an aging population more likely to develop comorbidities that increase susceptibility to SEA.[3,4,5] Most cases appear to occur in patients aged 30-60 years.[3]

The infection most commonly occurs in the thoracolumbar region rather than in the cervical region.[5,6] SEA can develop through several routes, such as hematogenous or contiguous spread. Approximately half of cases reach the epidural space from hematogenous spread from a distant site of infection, and about a third of cases occur through contiguous spread from nearby infections (eg, osteomyelitis from nearby vertebrae).[4] Other common ways SEAs develop are through direct introduction from spinal surgeries or procedures. In many cases however, the etiology is not identified.

Staphylococcus aureus, including both methicillin-sensitive and methicillin-resistant strains, is typically the most common pathogen associated with SEA and is found to be the cause in over 60% of cases.[4,5] Other common pathogens include *Streptococcus* species and gram-negative bacteria, such as *Escherichia coli*.[4,5,7]

Risk Factors

Risk factors for SEA include conditions that increase risk of infection and potential exposure to infectious pro-

cesses. Diabetes mellitus is the most common risk factor, however immunocompromised states, including HIV infection, alcohol use, and liver disease are all conditions associated with increased risk for SEA.[3,4] Individuals who are at higher risk for bacteremia are also predisposed to developing SEA. This includes those with a history of intravenous drug use and patients with end stage renal disease on dialysis. Furthermore, recent infections, such as skin abscess, are among the most frequently reported infections associated with SEA.[3] Direct inoculation of bacteria into the spinal region, such as from recent spinal procedures, trauma, or placement of hardware/devices, also increase the risk of SEA.[3,8]

Clinical Manifestations

The collection of purulent fluid in the epidural space can compress the spinal cord resulting in symptoms, such as localized pain, radicular pain, fever, weakness, sensory changes, and bowel/bladder dysfunction, and ultimately lead to devastating neurologic disability.[9] The classically taught triad of back pain, fever, and neurological deficits is only present in a minority of patients (around 8-13%), so the diagnosis should be carefully considered in patients even without all 3 of these classic findings.[9]

The typical progression of SEA can be described in 4 stages as the infection progresses. Stage 1 is described as neck/back pain with possible associated fever. Pain is typically, but not exclusively, localized to the area of infected space and can span 3-4 vertebral spaces.[10] This is followed by stage 2, which is characterized by radicular irritation and present with radicular or radiating pain. Stage 3 is characterized by early neurological deficits such as weakness, sensory changes, and/or bladder or bowel incontinence. The fourth stage is comprised of late findings in SEA and characterized by paralysis and permanent neurological sequelae.[3,11]

SEA is notoriously difficult to diagnose and often missed. Not only is this a relatively rare condition, but its presentation can often be subtle and nonspecific, similar to many benign causes of neck pain. Over half of patients with SEA presented 2 or more times before receiving the diagnosis of SEA, and on average, these patients had 5-9 days of symptoms by time of diagnosis in the ED or hospital admission.[9] Altogether SEA is a diagnostic challenge for an urgent care provider, however, the early identification and treatment of SEA is paramount for a favorable outcome.

Laboratory Studies

While laboratory studies are rarely needed for the initial evaluation of atraumatic neck pain, they should be considered in patients for whom the clinician has suspicion for spinal infection, especially in patients for whom risk factors for SEA are present.

Studies including a CBC, ESR, and CRP can be obtained. Leukocytosis is not a very sensitive finding of SEA and may be absent in approximately 30% of spinal infection cases.[12,13] ESR and CRP may help guide further downstream testing depending on pretest probability as they are considered a more sensitive screen than a leukocytosis with a 94-100% sensitivity.[12] Normal inflammatory markers may make SEA more unlikely, whereas elevated markers may prompt emergent MRI imaging and therefore prevent diagnostic delay.[14] Two sets of blood cultures should always be obtained in suspected cases to help determine the causative pathogen as many cases have associated bacteremia.

Imaging

MRI with gadolinium contrast of the entire spine is the gold standard for the diagnosis of SEA since it has a greater than 90% sensitivity and specificity.[8,10] It is recommended that the entire spinal column be imaged due to the risk of skip lesions which may not be identified at time of evaluation if a spinal area is nontender, which can occur in up to 15% of cases.[15] If there is a clinical concern for SEA and appropriate imaging modalities such as MRI are not available, transfer or referral may be necessary to ensure prompt diagnosis. CT with intravenous contrast has a relatively high false negative rate and poor sensitivity.[6,9] The use of CT should only be considered if MRI cannot be obtained along with the understanding that a negative test cannot rule out the diagnosis. CT myelograms have similar sensitivities to MRI but are overall less preferred given the invasive nature and additional risk of infection. Plain films are not recommended for the initial work up as they have a poor sensitivity and specificity for SEA.[6]

Treatment

Empiric intravenous antibiotics should be initiated once the diagnosis is made or clinical suspicion is high. Antibiotic selection should treat the most likely causative organisms (*Staphylococcus aureus)* and can be tailored later during hospitalization after culture results are available. The inclusion of gram-negative coverage in the initial treatment, including pseudomonal coverage, will depend on patient-specific risk factors, including the risk of hospital-associated infection or intravenous drug use.[3,7]

Aside from antibiotics, patients with SEA will need emergent surgical evaluation by a neurosurgeon for

consideration of surgical decompression and drainage of the SEA to prevent severe and permanent neurologic sequelae.

Clinical Decision Making

The patient in this case presented with what initially seemed like an innocuous presentation that ultimately led to a devastating course of events that culminated in her death. The patient had a methicillin-resistant *Staphylococcus aureus* skin and soft tissue infection from the recently incised and drained abscess that was overlooked in many of her visits. This likely led to a hematogenous spread to the epidural space. She developed difficult to treat and persistent neck pain that continued to progress despite aggressive outpatient symptomatic treatment, followed by development of associated infectious (chills, sweats, fever) and neurologic symptoms (radicular pain followed by altered mentation). Despite multiple presentations for the same yet worsening complaint of neck pain, she continued to be discharged with incorrect benign musculoskeletal diagnoses.

Cases such as this demonstrate the importance of both diagnostic consideration and proper evaluation of patients with what at first seem like common, benign complaints. The consideration of spinal infections in patients, particularly with severe or atypical neck pain and/or significant risk factors, should be routine and well-documented. This can prevent potentially devastating outcomes. Although SEA is classically difficult to diagnose, there are several important learning points.

- **Anchoring bias:** It is likely the providers in this case fell into the trap of anchoring bias and diagnostic momentum—when an initial, and possibly premature, diagnosis is carried forward through subsequent encounters. This bias reduces the likelihood of alternative diagnoses to be considered or pursued. Avoiding this bias is critical in instances of patients who have repeat presentations, especially if returning for unresolved or worsening symptoms. In this case, the patient was repeatedly diagnosed with torticollis or muscle strain. Although acute muscle spasms and strain can cause significant pain, resolution of the muscle spasms should have addressed her pain. Persistent pain requiring multiple prescription pain medications is not expected and should have raised questions to her providers regarding her prior diagnosis.
- **New or worsening symptoms:** A patient who is presenting multiple times to a clinical care setting with new or worsening symptoms should prompt consideration of a wider differential and question previously completed workups. Particularly in cases in which a patient is diagnosed with a benign or self-limited process (in this case, torticollis) that does not follow its expected course, it should serve as an indication that a more serious process may be present. This should prompt consideration of a wider differential diagnosis and potentially broader work up.
- **Unexplained tachycardia:** The patient became gradually more tachycardic with each visit. This did not appear to be appreciated on each provider's physical exam or assessment. The documentation offered no alternate explanation regarding the etiology of tachycardia such as pain, fever, or dehydration. Abnormal vital signs, particularly tachycardia, are associated with death within 7 days of emergency department discharge, so special consideration should be taken when discharging patients with unexplained abnormal vital signs.[16]
- **Wrong imaging:** The patient had both plain films and a CT scan of her cervical spine. These likely provided false reassurance to her providers that the patient had a benign etiology of her neck pain. SEA, among other serious and potentially debilitating diagnoses, including spinal osteomyelitis or discitis, are not reliably visualized through these imaging modalities. A complete differential diagnosis needs to be considered to determine appropriate imaging (in this case, MRI spine with contrast). If these rare but serious diagnoses are not considered during the initial evaluation, the likelihood of downstream effects such as missed or delayed diagnosis, permanent disability, and potentially death are much higher.

Legal Outcome

The case had a devastating outcome and led to litigation. The patient's family filed a malpractice lawsuit against the clinicians who treated the patient in the last few visits prior to arriving to the ED. The patient never exhibited signs of the classic triad for SEA in any of her visits which unfortunately led to a delayed diagnosis. Moreover, each clinician was working within the confines of the information they had at the time to explain their current suspicions. Multiple repeat visits, a careful review of the clinical timeline, clinical documentation (including the physical exam findings and re-evaluations), diagnostic testing, and expert statements were all important components to the legal case. The case was ultimately resolved in favor of the plaintiff.

Ethics Statement

Demographics and some details of the case were changed to protect patient anonymity and confidentiality with consideration for the patient's death.

Takeaway Points

- SEA can present rarely and subtly but is a critical diagnosis to consider. Suspect SEA in patients who have the appropriate risk factors and presentation.
- Vital signs are vital for a reason. Any abnormalities should be addressed by the clinician, especially in the setting of a patient being discharged without any attempt of correction or clear explanation.
- Always pause to reassess a patient's repeat presentation from a new perspective to avoid anchoring bias or perpetuation of a diagnosis. ■

Manuscript submitted April 27, 2025; accepted June 9, 2025.

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