Spinal Epidural Abscess due to Klebsiella Pneumoniae

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Introduction :

The epidural space is the area between the dura mater and the vertebral wall. It contains fat as well as arteries and a venous plexus. Spinal epidural abscess (SEA) is a rare but important suppurative infection of the central nervous system (1). Bacteria can gain access to the epidural space hematogenously, by direct extension from infected contiguous tissue (such as a vertebral body or psoas muscle), or by direct inoculation into the spinal canal (1). Injection drug use, dental abscess, infected catheters, alcoholism, diabetes, HIV infection, tattooing, and infective endocarditis are all risk factors for SEA.

SEA of the thoracic and lumbar spine is commonly caused by *Staphylococcus aureus* (63%)(5). *Klebsiella pneumoniae* is reportedly the cause of around 1% of all SEA. Here, we present a patient with perianal abscess COVID-19 pneumonia, found to have SEA in the upper and lower cervical spine caused by *Klebsiella pneumoniae*.

Case Description:

A 52-year-old male with a history of diabetes, obesity, and alcoholism presented with perianal pain. On presentation, he was febrile (102.6°F), tachycardic, tachypneic, normotensive, and had an oxygen saturation of 87% in room air. Physical exam revealed neck pain, shoulder pain, and perianal tenderness with normal rectal tone. He had no neurological deficits.

The patient's laboratory values were significant for elevated WBC (12.6 K/uL), CRP (36 mg/dL), and ESR (95 mm/hr). SARS-COV2 PCR test was positive. The CT pulmonary angiogram showed bilateral pulmonary infiltrates with no pulmonary embolism, consistent with COVID-19 pneumonia. A pelvic CT revealed a 5 cm perianal abscess without intra-pelvic extension. A CT of the cervical spine (*Figure 1*) showed retropharyngeal empyema extending from C2 to C5.

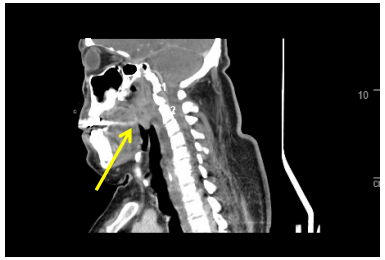

Figure 1: CT of cervical spine with contrast showing retropharyngeal empyema (yellow arrow) from C2 to C5.

Clinical Course:

- Remdesivir was started, but steroids were stopped due to active bacterial infection.
- The perianal abscess was drained and IV piperacillin/tazobactam was initiated.
- Wound cultures grew *K. pneumoniae*, *Klebsiella ozoaenae*, and *Streptococcus agalactiae* while blood cultures grew *K. pneumoniae.*
- On day 3, the patient had worsening headache and neck tenderness without neurological deficits.
- A repeat blood culture continued to grow *K. pneumoniae*.
- A repeat pelvic CT showed a decrease in the size of the perianal abscess without fluid collection.
- However, an MRI of the spine (*Figure 2A*) showed epidural empyema, spinal canal stenosis, and compression of the cervical and thoracic spinal cord with posterior empyema extending from C1 to L2.
- Invasive intervention was not recommended due to lack of neurological deficits and vancomycin was given.
- He was discharged on day 12 with IV cefepime and metronidazole for six more weeks.
- An MRI 3-months after discharge showed resolution of the epidural abscess, and an MRI 6-months later showed no evidence of enhancing fluid collection or abscess (*Figure 2B*).

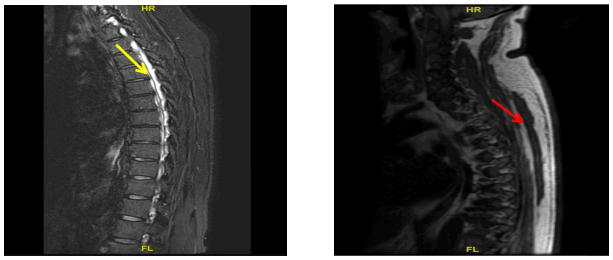

Figure 2: MRI of the spine showing **(A)** epidural empyema (yellow arrow), spinal stenosis, and compression of the cervical and thoracic spinal cord with posterior empyema extending from C1 to L2. **(B)** 6-months later, empyema resolved (red arrow), showing no evidence of enhancing fluid collection or abscess.

Discussion:

This is a rare case of *K. pneumoniae* bacteremia and perianal abscess secondary to SEA of the cervical, thoracic, and lumbar spine with the absence of osteomyelitis or spondylodiscitis. The initial symptoms could have been attributed to COVID-19, however the elevated ESR and CRP should have triggered evaluation for SEA when coupled with back pain. Patients who present with SEA often have a delayed diagnosis, with neurological deficits present in 50% of cases.

- Tracking the response to medical therapy through ESR and CRP was helpful in the course of management.
- Conservative management (antibiotics, frequent neurological examinations, and serial MRIs) is preferred for patients without neurological deficits and an identified microbiological agent.
  - A conservative medical approach may be appropriate in:
    - patients who have no risk factors for poor outcomes (i.e, advanced age, diabetes mellitus, bacteremia, white blood cell counts >12,500 cell/L, and methicillin-resistant *S. aureus* infection).
    - known infective organism
    - absence of neurologic deficit or cord compression on MRI.
    - Patients who refuse to undergo surgery
    - or who are high risk for surgeries.
- SEA resulting in a complete spinal cord injury for greater than 48 hours with no evidence of an ascending spinal lesion: Surgery should be performed as early as possible and within 24 to 36 hours of onset of paralysis (1-4).
- The first line of antibiotic treatment is vancomycin plus ceftriaxone (2 g IV every 12 hours). An alternative to ceftriaxone are:
  - cefotaxime (2 g IV every 6 hours)
  - cefepime (2 g IV every 8 hours)
  - ceftazidime (2 g IV every 8 hours)
  - Or meropenem (2 g IV every 8 hours) is preferable when *Pseudomonas aeruginosa* is considered a possible pathogen.

Our patient's history of diabetes and alcoholism with COVID-19 co-infection increased his risk of superimposed bacterial infection. SEA should be considered when patients have back pain, elevated proinflammatory markers, and fever, despite the absence of neurological symptoms.

Conclusion:

- Physicians should always consider the diagnosis of SEA the presence of triad symptoms of **fever, neurological symptoms, and back pain.**
- Keep in mind that an epidural abscess in COVID-19 patients with *Klebseilla Pneumoniae* as the causative organism can involve the cervical and thoracic spine, unlike the classical epidural abscess that prefer the lumbar spine.

REFERENCES:
1.https://www.uptodate.com/contents/spinal-epidural-abscess?search=spinal%20epidural%20abscess&source=search_result&selectedTitle=1~119&usage_type=default&display_rank=1#H4218599811
2.Patel AR, Alton TB, Bransford RJ, Lee MJ, Bellabarba CB, Chapman JR. Spinal epidural abscesses: risk factors, medical versus surgical management, a retrospective review of 128 cases. Spine J. 2014;14(2):326-330. doi:10.1016/j.spinee.2013.10.046
3.Darouiche RO. Spinal epidural abscess. *N Engl J Med*. 2006;355(19):2012-2020. doi:10.1056/NEJMra055111
4.Rigamonti D, Liem L, Sampath P, et al. Spinal epidural abscess: contemporary trends in etiology, evaluation, and management. Surg Neurol. 1999;52(2):189-197. doi:10.1016/s0090-3019(99)00055-5
5. Lasker BR, Harter DH. Cervical epidural abscess. Neurology. 1987;37(11):1747-1753. doi:10.1212/wnl.37.11.1747