SPINAL EPIDURAL ABSCESS ET CAUSA STAPHYLOCOCCUS PSEUDINTERMEDIUS: A RARE CASE REPORT

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Abstract

Background: Spinal epidural abscess (SEA) is a rare disease, difficult to detect, high defect rate, and can be life-threatening. It is characterized by accumulation of pus in the epidural space causing suppression of the spinal cord and spinal roots. This study will describe a case of a 35-year-old man with SEA in Indonesia.

Case presentation: A 35-year-old male with pain in the lumbar region 1, radicular pain according to thoracic dermatome 10, flaccid inferior paraplegia, hypoesthesia as high as thoracic dermatome 10, and retention of alvi et uri due to SEA caused by *Staphylococcus pseudintermedius* confirmed by-abscess culture. Management of this patient was through an operation, debridement, and administration of antibiotic.

Conclusion: This patient was diagnosed with SEA from anamnesis, physical examination, laboratory finding, and radiology finding. This case is rarely found and is a big problem for neurologists due to the difficulty of early diagnosis.

Keywords: Radiating Pain, Spinal Epidural Abscess, *Staphylococcus pseudintermedius*

Introduction

Spinal epidural abscess (SEA) is a rare and life-threatening disease, characterized by accumulation of pus in the epidural space, causing suppression of the spinal cord and spinal roots (1-4). The incidence of this disease is 2-8 cases per 10,000 patients (1, 2, 5). The increased use of MRI has improved the detection rate, resulting in an increase of reported cases. Some patients with SEA came to the hospital with non-typical symptom (low back pain), which makes early-onset diagnosis difficult (2, 3). The delay of the diagnosis results in neurological dysfunction like paralysis and the patient's death (2, 6, 7).

The clinical feature of SEA is related to the anatomy and structure of the spine. SEA is more common in the thoracolumbar region where the epidural space is wider and contains more infection-prone fat tissue. Low pressure from the venous plexus can easily cause reflux of venous plexus in the abdominal cavity and pelvic cavity in the same area (2, 8, 9). A large number of cases of SEA are mostly located below L1 level (2, 10). When SEA is caused by spondylitis or pyogenic discitis, it is often located to the anterior of the dural tube. Conversely, in the case of hematogenous infection, it is often found to the posterior of the dural tube. Furthermore, the vertical sheath of the epidural space allows the spread of the abscess from the initial level to several levels longitudinally (2).

Staphylococcus aureus is the most common etiology cause of this disease. The other etiology is *E. Coli, N. gonorhoeae*, and is an early sign of tuberculosis spondylitis (11-13). Depending on the onset of infection, it is possible to identify the main types of spinal epidural abscesses, due to the hematogenous spread of the pathogens or secondary infection, which result from direct inoculation of pathogens as a consequence of invasive procedures (injection, lumbar puncture, surgery) or trauma of the spine. The development of SEA is strongly associated with the presence of medical comorbidities and risk factors that facilitate bacterial spread. Most of the patients have at least one risk factor, such as intravenous drug use, diabetes, immunosuppressive therapy, neoplastic disease, AIDS, nephropathy, heart disease, liver disease, degenerative joint disease, or spinal traumatic (hematoma

and anatomical disorders). Spinal integrity can support the development of SEA (2, 14, 15).

The target of therapy for SEA is to reduce the volume of the abscess and the administration of antibiotic according to the culture. The prognosis, is unfavorable and can be life-threatening because of the late diagnosis (1, 2). It is essential to have good knowledge and understanding of this disease so that proper management can be begin as early as possible to reduce morbidity and mortality. Based on literature search to date there is no publication on spinal epidural abscess et causa *Staphylococcus pseudintermedius* nor spinal epidural abscess in Indonesia, so this case report represents the first report. This study will describe a case of 35-year-old man with spinal epidural abscess at Dr. Kariadi Hospital, Indonesia.

Case presentation

A 35-year-old man complained of pain in his lower back (not radiated) for three weeks prior to admission to the hospital. Initially, the patient seek treatment from a general practitioner for four days and there was no improvement of his symptom. One week later, his back pain radiated to the front of the abdomen, and pain was felt after the patient strained during defecation, He had fever but denied any sensory dysfunction (tingling and numbness). Two days later, the patient felt his legs were heavy when he was walking and he needed assistance to walk, and he also complained about being unable to urinate. The patient was then taken to the nearest hospital and a urinary catheter is applied. The next day, the patient was completely unable to move his legs. Numbness was felt from the toe to the umbilicus. The patient was then referred to Dr. Kariadi Hospital. History of trauma, history of injury or incision in the back, history of chronic coughing or taking medication 6 months, history of tooth cavity, history of keeping animals, history of similar complaints previously, and history of taking drugs previously were all denied.

On physical examination in the ED, his blood pressure: 140/80 mmHg, pulse rate: 82 times/minute, breathing rate: 20 times/minute, body temperature: 36.6 ^{0}C, and body weight: 70 kg. On neurological examination, GCS: E4M6V5, visual analog scale (VAS): 3-4, axis pain in the lumbar region 1, radicular pain according to thoracic dermatome 10, flaccid inferior paraplegia, hypoesthesia as high as thoracic dermatome 10, and retention of alvi et uri. On laboratory examination, he had leukocytosis (13,000/µL), negative TPHA/VDRL, and non-reactive HIV. The ECG showed normal rhythmic sinus and thoracic radiograph of lung and heart were within normal limits (Figure 1). The results of contrast thoracolumbar MRI examination were paravertebral mass in the left posterior aspect of the lumbar vertebrae 1-4, elongated lesion accompanied by widening of the spinal cord as high as the thoracic vertebrae 10-11, facet joint effusion as high as lumbar 1-sacrum 1 (right and left), bulging as high as thoracic vertebrae 10-11, facet joint effusion as high as lumbar 1-sacrum 1 both right left, lumbar intervertebral bulging L4-5 and L5-S1 (Figure 2).

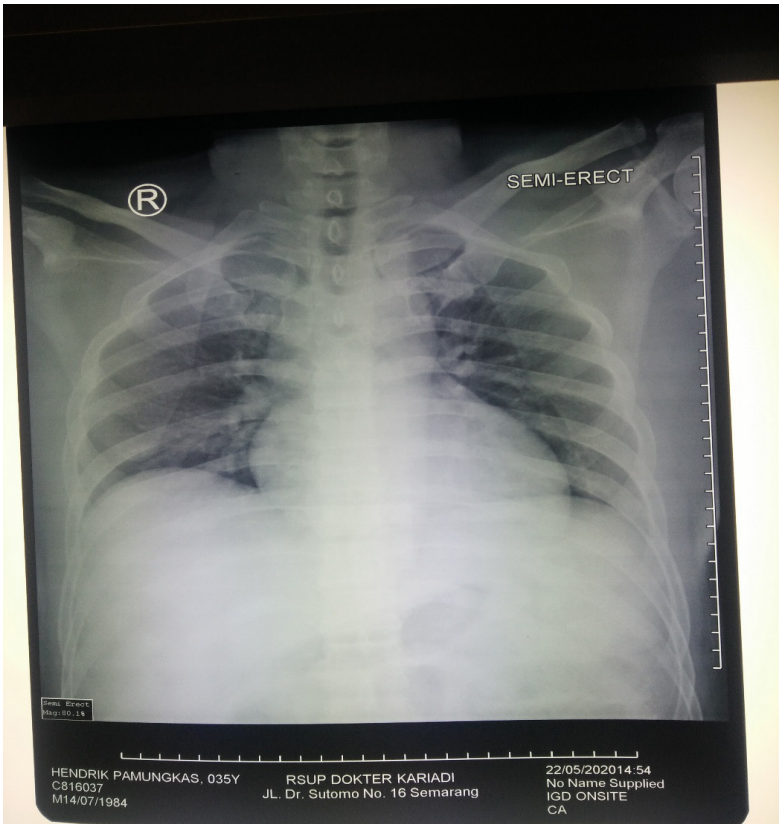

Figure 1: Chest X-Ray in normal limit

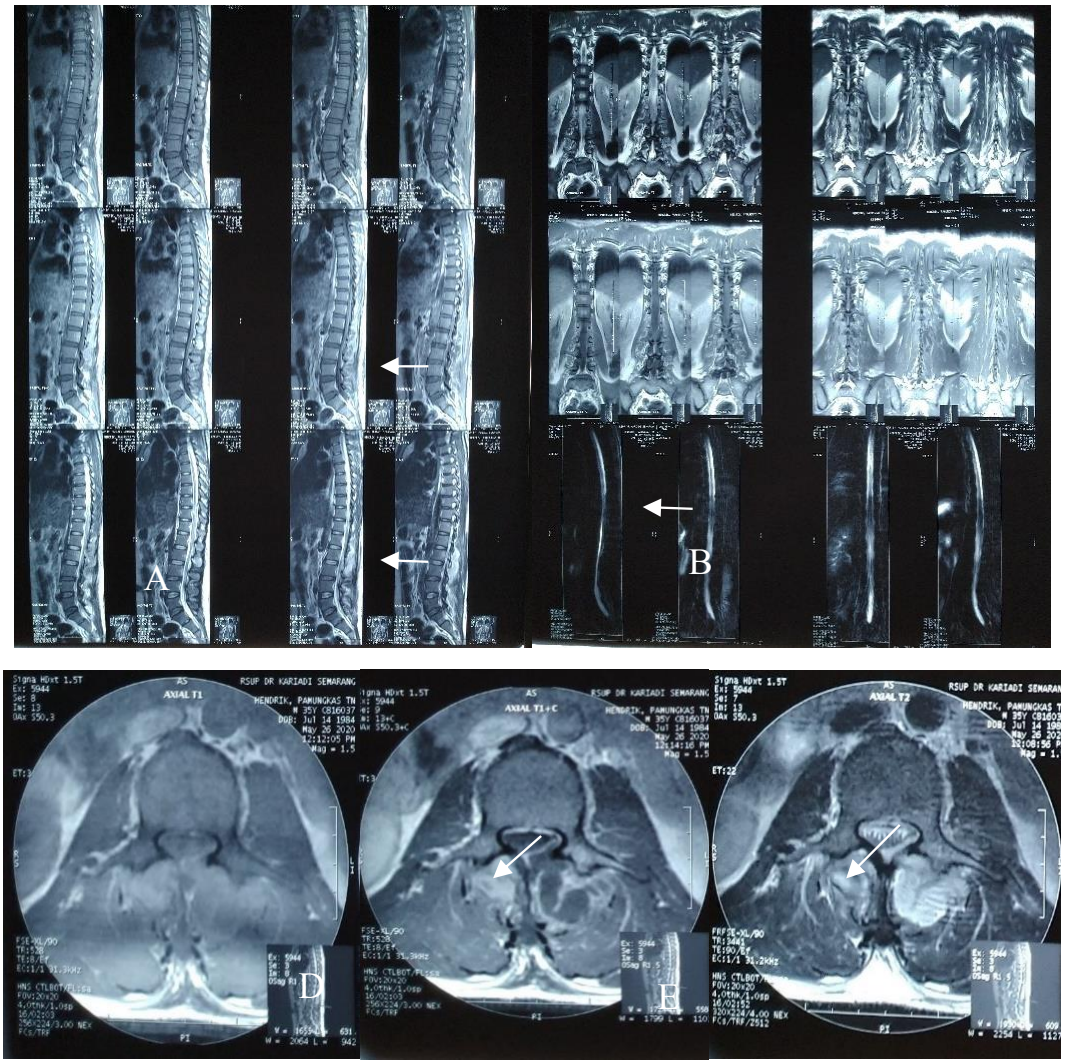

Figure 2: Thoracolumbar MRI with contrast

A: sagittal section of plain T1 sequence - contrast T1 - T2, arrows indicate abscesses. B: coronal section with myelography, arrows indicate heterogeneity on myelography. C: axial section of T1 sequence. D: axial section of contrast T1 sequence, arrows indicate paravertebral mass in the left posterior aspect. E: axial section T2 sequence, arrows indicate paravertebral mass in the left posterior aspect

The patient was given Ringer lactate infusion 20 drops per minute, injection of methylprednisolone 125 mg/8 hours intravenous (iv), injection of ranitidine 50 mg/12 hours iv, natrium diclofenac 50 mg/12 hours per oral (po), diazepam 5 mg/12 hours po, gabapentin 300 mg/24 hours po, B1B6B12 vitamin/8 hours po.

The patient was scheduled for laminectomy and debridement surgery because of the presence of pus. The drainage was drained with gentamicin in Ringer lactate which was removed on day 7. The tissue surrounding the abscess and the abscess were cultured and the result was *Staphylococcus pseudintermedius*. After surgery, the patient had a fever and in the blood culture, the same bacteria were found. He was given intravenous injection of cefoperazone sulbactam 1 gram/12 hours for 7 days based on consultation with the infectious disease team and antibiotic sensitivity test.

During 47 days of treatment, his neurological status improved. The complaints improved from hypoesthesia as high as thoracic vertebrae 10 to as high as lumbar vertebrae 1-2 and there are new complaints of allodynia according to the thoracic vertebrae dermatome 10. The patient was discharged from the hospital with a urinary catheter and flaccid inferior paraplegia.

Discussion

SEA is a rare spinal infection that produces an accumulation of purulent fluid in the epidural space. Overall, the incidence of SEA in developed countries is estimated to be 0.2-2 cases for every 10,000 patients (1, 2, 14, 16). Initial signs and symptoms are not specific, and often cause a delay in diagnosis. Symptoms usually begin with back pain and progress to radicular pain and limb weakness (17-19). This patient initially complained of pain in the lower back, radicular pain according to thoracic dermatome 10,

hypoesthesia as high as thoracic vertebrae 10, and flaccid inferior paraplegia accompanied by retention of uri and alvi. There was a delay in diagnosis because the patient only felt back pain without fever in the beginning. The question is why he demonstrated flaccid inferior paraplegia with hypoesthesia as high as thoracic vertebrae level 10 when it should bewhich spastic inferior paraplegia. We observed in the thoracolumbar MRI with contrast in sagittal section, especially in T2 sequences (Figure 2), the presence of hyperintense in the thoracolumbar region. This indicates the suspicion of a spinal abnormality that could be due to the suppression of the abscess or the invasive pathogenic bacteria that became transverse myelitis. T2 hyperintensity can reflect many processes at the microscopic level; including myelopathy, myelomalacia, cavitation, inflammation process (edema) due to the injury of the spinal cord, and ischemia. The differential diagnosis includes a large number of diseases that affect the spinal cord. Thus, abnormalities in intramedullary signal intensity are nonspecific and makes a diagnosis a dilemma. Clinical evaluation (including patient history, physical examination, and laboratory tests) is important for examining suspected spinal cord disease. The clinician and radiologist should integrate the clinical evaluation and the radiological findings into the diagnostic algorithm. This finding makes it essentially indistinguishable from demyelinating conditions, and differentiation is more likely to be achieved after CSF sampling and laboratory tests (20, 21). In this patient, the result of the tissue culture was *Staphylococcus pseudintermedius*.

Some cases of SEA are secondary infections from the surrounding tissue (either vertebrae bones, muscles, or ligaments), hematogenous (such as *M. tuberculosis*), the presence of immunocompromised conditions (such as steroid drugs, HIV, diabetes, etc.), or traumatic condition (lumbar puncture, anesthetic block) (8). From the history of the patient's disease, there is no source of infection, drug use, or history of fall. The most common cause of abscess is *Staphylococcus aureus* (60%), enteric gram-negative bacilli (*Escherichia coli*, 10%), coagulase-negative *staphylococcus* (3-5%), other bacteroides species (2%), *Pseudomonas species* (2%), *Streptococci species* (10%), *Myccobacteria* (most in developing countries), *N. gonorrhoeae*, and *Salmonella* (12, 22).

Stapylococcus pseudintermedius (S. pseudintermedius) is a zoonosis positive coagulase bacterium that is usually found in pets (like dog and cat) and sporadically in human (23–25)our understanding of the molecular mechanism of β-lactam resistance and its genetic diversity remains limited. We aimed to: i. *S. pseudintermedius* is a normal flora and is often an opportunistic pathogen of canine animals. *S. pseudintermedius* is a common pathogen that causes pyoderma, otitis externa, and urinary tract infection in pets. Recently, there has been an increasing number of cases of methicillin-resistant S*. pseudintermedius* (MRSP) in pets (23, 26). In human, *S. pseudintermedius* causes a spectrum of infections similar to *S. aureus* because of the similar characteristics and morphologies (25). *S. pseudintermedius* has been reported as the pathogen in rhinosinusitis, endocarditis, surgical site infection, and catheter-associated bacteremia (27). This case report represents interesting material related to SEA et causa *S. pseudintermedius*.

The target of the treatment is to reduce the volume of SEA and eliminate etiology through surgery and antibiotic (6, 28)surgery may not be indicated when patient's general health condition is poor. Percutaneous drainage has been reported as a non-surgical treatment for children or patients with no or minor neurological deficits. Here we describe the successful treatment of an extensive spinal epidural abscess with fluoroscopy-guided percutaneous drainage in an elderly man with progressive muscle weakness who could not be operated because of a poor general health condition. Case presentation: An 81-year-old man presented with fever, back pain, and progressive muscle weakness in bilateral legs. Magnetic resonance imaging (MRI. Surgery mainly involves laminectomy, degranulation, and drainage of pus (2). The stages of SEA (see Table 1) are divided into 4 stages and are related to the severity of the disease and the clinical outcome. Most studies recommended early surgery (stages I and II) that is beneficial to improve outcomes. In stage II, a better outcome can be obtained in more than 90% of cases if surgery is performed within 24 hours. Progression from stage III to IV is often rapid, occurring within 24 hours, especially if the abscess is extensive or the presence of comorbidity. The clinical outcome is poor in stage IV (2, 8, 9).

Table 1: Stage of spinal epidural abscess (2)

Stage	Clinical manifestations
I	Back pain, fever, tenderness
II	Nerve root symptoms (radicular pain), nuchal rigidity/neck stiffness, decrease in tendon reflex
III	Muscle weakness, sensory abnormalities (hypesthesia, paresthesia, dysesthesia), bowel and bladder dysfunction
IV	Complete paralysis

In this patient, hypoesthesia as high as dermatome thoracic 10 became allodynia, so the dose of gabapentin is increased to 300mg/8 hours po, then allodynia disappears. Allodynia is one of the symptoms of central sensitization that involves *N-methyl d-aspartate* (NMDA) receptors and *α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid* (AMPA) receptors. The role of NMDA receptors is very important, because the activation after repeated stimulation causes an increase in the number of receptors, which ultimately increases the signal to the thalamus. (29, 30).

A recent Cochrane meta-analysis reported that gabapentin and pregabalin can reduce pain in post-herpetic neuralgia and diabetic neuropathy. Neuropathic Pain Special Interest Group strongly recommends the use of gabapentin (in a daily dose of 1200-3600 mg, divided into three doses) and pregabalin (in a daily dose of 300-600 mg, divided into two doses) in the treatment of neuropathic pain. Gabapentin is approved for the treatment of peripheral neuropathic pain, and pregabalin for the treatment of peripheral and central neuropathic pain (30,31).

Conclusion

This patient was diagnosed with spinal epidural abscess from history, physical examination, laboratory finding, and radiology finding. The prognosis of motor strength of this patient was poor (stage IV). This case is rarely found and is a big problem for neurologist due to the difficulty of early diagnosis.

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Competing interests

The authors declare that they have no competing interests.

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Consent

Informed consent available.

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