



## PEPTOSTREPTOCOCCUS EPIDURAL ABSCESS ASSOCIATED WITH VIRIDANS STREPTOCOCCAL BACTEREMIA: A CASE REPORT

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<p><b>Article Info</b></p> <p><i>Received 15/08/2015</i> <i>Revised 27/08/2015</i> <i>Accepted 12/09/2015</i></p> <p><b>Key words:</b> anaerobe; diabetes; epidural abscess; <i>Peptostreptococcus</i>; viridans streptococcus.</p>	<p><b>ABSTRACT</b></p> <p>Spinal epidural abscess (SEA) is a rare diagnosis. Delay in treatment can lead to neurological deficits or death. We herein describe the case of an apyrexial woman complained of non-traumatic neck pain for three weeks duration. Subsequent work-up including CT and MR imaging suggested cervical epidural abscess. Different anaerobes were yielded from her pus specimen and blood culture. Anaerobic organisms have been scarcely reported in these series. A high index of suspicion in immunocompromised hosts and modern imaging techniques are importance to establish a definitive diagnosis and appropriate interventions. The relevant microbial etiology, clinical manifestations, imaging modalities, and treatment of SEA are discussed.</p>
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### INTRODUCTION

Spinal epidural abscess (SEA) is a rare but potentially catastrophic infection that requires rapid recognition and treatment. (Reihsaus E et al, Hlavin ML et al) [1,2]. The damage to the spinal cord is consistent with mechanical compression and vascular compromise. (Sendi P et al) [3].

Diagnosis is challenging, because clinical symptoms are subtle and may mimic many benign processes. Imaging studies including CT, MRI or ultrasound are frequently required to verify the presence and extent of an abscess. (Maroldi R et al) [4]. Nuclear imaging is often positive early in the course of infection and more important to display a hidden infection from a remote source. (Klein M et al) [5].

Although an immediate decompression is the mainstay of treatment, conservative treatment can get success in selected patients.

### CASE REPORT

A 62-year-old apyrexial female presented with diffuse neck pain for three weeks. In the absence of preceding trauma or infection, she got a provisional diagnosis of degenerative joint disease but analgesics (Diclofenac and Tolperisone) given for which were in vain. Over the next week, pain became progressively worse and was aggravated by movement. Besides, shaking chills without distinct fever had started two days before admission. The patient had been diagnosed with hypertension and squamous cell carcinoma of the cervix at age of 60 years, and remained in remission after radical surgery plus concurrent.

On admission she was apyrexial (36.5°C), blood pressure 138/76 mmHg, and her vital signs were normal on the day of admission. She was noted to have decayed or missing teeth, and enlargement of the right palatine tonsil.



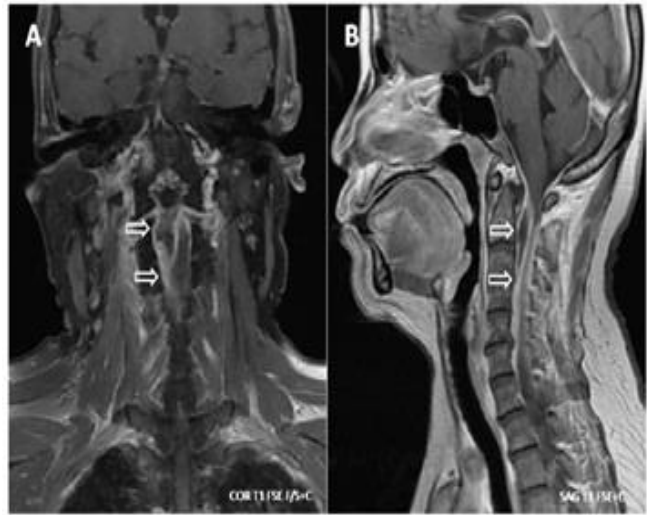
The cervical spine was tender, but there was no change in color or temperature to the neck skin. Review of systems was otherwise negative. Her hematological investigations revealed WBC  $23.6 \times 10^3/\text{mm}^3$  with neutrophils 89% and lymphocytes 4%, C-reactive protein 27.5 mg/L (CRP reference: 0-0.5), random blood glucose 395 mg/dL and glycated hemoglobin (HbA1C) 9.0 %. A computed tomography (CT) for further evaluation of her neck pain showed an epidural collection with slight rim enhancement located in the right anterolateral portion of spinal canal at about C-3 level (Figure 1). Subsequent MR image revealed a right ventrolateral epidural abscess extended from C1 to C5 (Figure 2). Ga-67 inflammatory scan revealed a diffuse radioactivity in right para-spinal

region of the neck, in absence of remote focus or metastatic disease (Figure 3). The patient was started on intravenous ertapenem at a dose of 1.0 g daily. A CT-guided needle aspiration confirmed the presence of abscess, and 1 mL of pus was collected which yielded *Peptostreptococcus* species. Her blood culture grew viridans streptococcus simultaneously. Subsequently antimicrobial regimen was changed to a triple cocktail (penicillin G, vancomycin and ceftazidime) based on susceptibility results, a choice for covering both pathogens. She was discharged in stable condition on day 33. She made an uneventful recovery with no significant neurologic sequelae observed at her 6-month follow-up evaluation.

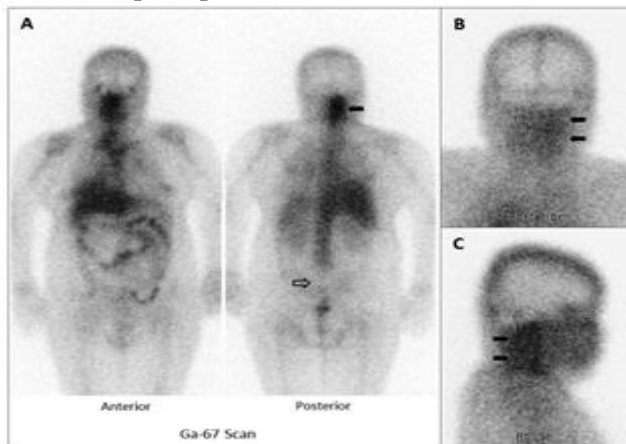
**Figure 1.** Post-contrast axial CT of the neck. An epidural fluid collection with slight rim enhancement located in the right portion of the spinal canal and bulging to the neural foramen at C3 level (*white arrows*). A thrombus of the right internal jugular vein was noted (*hollow arrow*).



**Figure 2.** Post-contrast coronal (A) and sagittal (B) images of the cervical spine. A rim-enhanced collection is seen in right ventrolateral epidural space, extending from level C1 to C5 (*arrows*). Soft-tissue enhancement around right neural foramen and paraspinal muscles is also noted. The findings represent a spinal epidural abscess and diffuse inflammation of adjacent areas.



**Figure 3.** Gallium-67 citrate scan illustrated a diffuse inflammatory process predominantly around the upper cervical spine and right para-spinal regions of the neck (*black arrows*). Diminished Ga-67 in the sacral region was resultant from bone marrow suppression related to prior pelvic irradiation (*hollow arrow*).



## DISCUSSION

Spinal epidural abscess (SEA) is a rare entity with an estimated incidence of 0.2-2 per 10,000 hospitalizations and even more rarely cervical in presentation. (Reihsaus E et al, Hlavin ML et al, Soultanis KC) [1,2,6]. Diagnosis is challenging due to its rarity and clinical variability that, in early stage, SEA can be mistaken for a common neck pain. (Maroldi R et al) [4]. The classic triad of SEA (fever, neck/back pain and neurologic dysfunction) is neither sensitive nor specific. As illustrated by this case, our patient was afebrile and her neck pain was poorly localized, but her inflammatory parameters were sufficiently elevated which raised the concern for infection. Contrast enhanced CT or MR images can delineate infection and differentiate soft-tissue edema from abscess. Also these techniques are useful to recognize potential complications such as airway compression, venous thrombosis, and contiguous spread of infection. (Marin JM et al) [7].

A metabolic approach to diagnosis may have been to use nuclear imaging. Ga-67 whole body scan is well established tool for detecting malignancy or inflammation, and plays an important role in making a wider range of assessment: early acknowledge before the onset of x-ray findings, disclosure of remote foci, and metabolic characterization of lesions. (Klein M et al) [5]. With more widespread use of modern imaging techniques, recent reports suggest a higher prevalence of SEA than previously thought.

Risk factors for the development of SEA include diabetes mellitus, bacterial infections, malignancy, immunosuppression, alcohol or drug abuse, or spinal disruption. (Recinos PF et al) [8]. A predilection for anaerobic infections in elderly patients was also reported previously. (Leibovici L) [9]. No source or predisposing illness accounted for 30–40%, suggesting silent bacteremia seeding the epidural space. (Sendi P et al) [3]. Diabetes mellitus is the most important predisposing factor of SEA, accounting for 18-54% of cases. (Reihsaus E et al, Grewal S et al) [1,10]. Hyperglycaemia can result in abnormalities in granulocyte adherence, phagocytosis, chemotaxis, and bactericidal function. (Mowat A et al, Bagdade JD) [11,12]. Our patient had not been diagnosed with diabetes but her HbA1C was 9 percent, implying her average blood glucose level was about 210 mg/dl in the past 3 months. Diabetic patients have increased carriage rates for many pathogens. (Ladhani S et al) [13].

Furthermore, malignancy is frequently complicated by localized and systemic infections. Chemotherapy is known to predispose patients to infections through damage of immune reactions and mucosal barriers, providing a portal of entry for bacteria. Prior surgery and radiotherapy that produce obstruction and disruption of anatomic barriers also increase susceptibility to infections. (Bodey GP et al, Lassmann B et al, Marron A et al) [14-16].

We speculate that diabetes mellitus, known malignancy and older age (>50 years) were the predisposing conditions in our case. A variety of microorganisms for SEA have been isolated, 67% of the causative agents were *Staphylococcus aureus*, (Reihsaus E et al) [1] and only 2% of the cases were caused by anaerobic bacteria. (Sendi P et al) [3]. As illustrated in this case two anaerobes, *Peptostreptococcus* and *viridans* streptococcus, were yielded. Both are commensal anaerobes in the oral cavity, gastrointestinal and genitourinary tracts and have been known to cause SEA. (Reihsaus E et al, Frat JP et al) [1,17]. The co-inhabitants may take advantage of hosts with breakage of the normal barrier and a weakened immunity. (Marron A et al) [6]. Both oral anaerobes have been incriminated in bacteremia and brain abscess following oral infection or dental procedures. (Moazzam AA et al) [18].

Even simple tooth brushing can predispose patients to the development of bacteremia. (Lockhart PB et al) [19]. Often, these bacteremias are silent and transient in immunocompetent hosts. The bacteria are scavenged from the bloodstream quickly by host defenses. (Cobe HM, Parahitayawa NB et al) [20,21]. The pathogenic potential of oral anaerobes is realized in patients with tonsillitis, alveolar abscesses and cervical adenitis which may then act as the portal of entry for an ensuing anaerobic bacteremia and distant infection. (Reilly S et al) [22]. Admittedly, poor dentition, tonsil enlargement and positive cultures were noted in our case, but not a convincing proof of a dental or tonsillar origin for her anaerobic infections.

It is noteworthy that our patient had a discrepancy in yield of anaerobes from her pus and blood cultures, namely, *Peptostreptococcus* epidural abscess versus *viridans* streptococcal bacteremia. Anaerobic opportunists may cause disease when they gain access to tissues or bloodstream. Patients with positive blood cultures may be bacteremic signifying a true infection. (Perez-Jorge EV et al) [23]. Conversely, in the observation of *viridans* streptococci isolated from blood cultures of 86 patients, Swenson et al concluded that only 21% of the isolates were significant of infection [24]. It is well known that positive blood cultures are more likely to be contaminants than true pathogens. (Perez-Jorge EV et al, Han XY et al, Ruoff KL) [23,25,26]. However, the differentiation between contaminations and bacteremia is sometimes difficult, and mostly a clinical judgment based on clinical scenario, repeated cultures and identification of the bacteria. Because of their fastidious nature, anaerobes are difficult to isolate and are often overlapped among species. Most clinical microbiology laboratories rarely attempt to identify *viridans* streptococci to species level. (Han XY et al) [25].

Then again, according to Wren et al, specimens taken directly from infected sites and yielded anaerobes only, unlike blood cultures, represent true anaerobic



infections [27]. Anaerobic infections are characterized by tissue destruction, abscess formation, and foul-smelling pus. Prompt institution of antibiotic therapy based on susceptibility testing is crucial to ensure a positive outcome. Treatment guidelines for SEA dictate an antimicrobial therapy if the abscess is small and not causing neurological deficit. If there is neurological deterioration, surgical intervention should include prompt decompression coupled with targeted antimicrobial regimen. (Danner RL et al) [28]. Conservative management was adopted in our case, because the patient was neurologically intact.

## CONCLUSIONS

Diagnosis of SEA is challenging, because the disease is so rare and has such common symptoms. Positive screening tests are required to establish a definitive diagnosis. Human commensals may take

advantage of hosts with breakage of the normal barrier and a weakened immunity. Raised awareness can speed up the identification of the devastating condition and greatly increases the chances for successful treatment.

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## CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

## STATEMENT OF HUMAN AND ANIMAL RIGHTS:

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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