



Finding the needle in the haystack

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Spinal epidural abscess (SEA) contains some of the greatest challenges and fears of emergency medicine within a single condition. SEA is a rare and potentially debilitating disease, which can be difficult to diagnose, with most individuals having several ED visits prior to diagnosis. The presenting complaint in SEA, low back pain, is a common presenting complaint, representing the fourth most frequent reason for adult emergency department (ED) visits [1]. The differential diagnosis of back pain is vast and varied, with SEA being only one among myriad pathologies responsible for back pain [2]. Our medical school training mantras fall short with the so-called “classic triad” [3] of SEA being found only in 10–15% of cases, and the definitive test, MRI with gadolinium, is expensive, time-consuming, and not always available. Delays in diagnosis may subsequently lead to significant morbidity with neurological deficits. In essence, SEA is analogous to the needle hidden in the haystack, which, if not recognized, has the potential to result in devastating consequences.

As emergency physicians, we frequently consider high-risk conditions and assess risk profiles when evaluating common presenting complaints. With chest pain, for instance, we have clinical decision-making rules and risk assessments that shape our decision to test for pulmonary embolism or acute coronary syndrome [4–6]. Using risk factors in emergency medicine has allowed us to practice safe and competent patient care, improve medical decision-making, and provide risk mitigation in our documentation.

The authors of the paper, “The Time-Sensitive Challenge of Diagnosing Spinal Epidural Abscess in the Emergency Department” have provided a review of the challenges and pitfalls of diagnosing SEA [7]. The true value of this paper lies in the presentation of risk factors and possible framework for evaluating for SEA in patients with back pain. The

algorithm provided, while in need of further validation, might enable emergency physicians to have an organized approach to low back pain, with increased confidence in potentially identifying the proverbial deadly needle in the haystack that is SEA in the multitude of presumed musculoskeletal less critical low back pain patients.

The risk factor assessment described by the authors is well delineated and well supported by their review of the literature. Recent spinal instrumentation, intravenous drug use, hemodialysis, contiguous bony or soft tissue infection, bacteremia, and immunosuppression are recognized as risk factors for SEA. Although some of these would appear fairly obvious as risk factors, our work in the ED is characterized by sensory overload, distractions, and time pressures, and this list can serve as an important cognitive aid to guide appropriate and efficient work-up and documentation [8, 9].

The description of the role of erythrocyte sedimentation rate (ESR) in the diagnosis of SEA is notable. ESR is typically helpful in differentiating inflammatory conditions versus non-inflammatory conditions. Nevertheless, the low specificity of a positive ESR poses a diagnostic dilemma. When using ESR in evaluating for possible SEA versus other non-inflammatory conditions, indiscriminate use of ESR may lead to an increase in potentially unnecessary advanced imaging. Since the implementation of D-dimer testing, for instance, there has been an increased use of chest CT imaging when its intention was to decrease the number of CTs performed [10, 11]. Many would caution the overuse of ESR, and instead suggest that it be used judiciously in conjunction with a careful history, physical, and well-reasoned differential diagnosis when comparing musculoskeletal etiologies and SEA. Another caveat is that the sensitivity of ESR in ruling out SEA varies in the studies reviewed by the authors (from 94 to 100%); as such, when a high clinical probability is present, a negative ESR does not necessarily preclude the need for obtaining an MRI, especially if no other source of fever is present in a patient with back pain and a static neurological deficit.

The authors mention other notable considerations that are perhaps not performed as routinely as they should be.

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A thorough neurologic examination must be performed and documented. Although many would say they routinely perform thorough neurologic examinations in cases of back pain, this can be challenging during a busy shift. It is important to note the specific components of a thorough neurological examination that are most pertinent in ruling out SEA. Urinary retention can be one of the initial neurologic deficits, and, as such, the use of bedside ultrasound for evaluation of post-void residual represents a simple, efficient, and low-cost modality in the work up of low back pain [12].

Of note, the Alerhand et al. piece fails to mention the utility of C-reactive protein (CRP) as a diagnostic tool. The use of CRP has clearly been found to assist in the diagnosis of SEA. The use of CRP has some of the same limitations experienced by ESR, to include the challenges of low specificity in patients with other concomitant inflammatory conditions [13, 14].

One thing that must be considered, which is not specifically identified in the review by Alerhand et al., is the reality in which many patients with SEA often present. As the presenting complaint of SEA is generally back pain, patients with a history of chronic back pain often present with the chief complaint of acute exacerbation of back pain. This speaks to the fact that it is easy to disregard or minimize patients based on their history. Furthermore, such patients often have prior evaluations done for back pain. Patients with a previous evaluation must have a review of previous records, examination findings, plain film X-ray studies, or other imaging tests. For example, in patients with a final diagnosis of SEA, the comparison to a previous imaging study can often identify subtle changes that might provide the only insight into an underlying SEA. Previously unrecognized erosions or bone decalcifications may be the only changes that point to this challenging diagnosis [15]. Patients with chronic back pain, leading to a lower suspicion for SEA, may have a non-contrast MRI performed. Paraspinial edema is the most sensitive feature of lumbar spinal epidural abscess on unenhanced MRI [16].

One cautionary note from this review involves the recognition that such articles can raise the possibility of a SEA to a degree that causes increased testing without potential benefit. For instance, if the algorithms and thought process were followed in this review to the highest levels of sensitivity, it would result in a dramatic increase in the number of contrast enhanced MRI imaging studies. Furthermore, MRI studies have proper indications and limits. For example, MRI demonstrates a yield as low as 7% in suspected cases of SEA [17]. Selection criteria of high-risk ED patients with SEA must be carefully considered to avoid unnecessary imaging. Other limitations of MRI include those limitations that can occur with an MRI for any condition, such as inability to use this test in patients with renal insufficiency and some metal implants. An MRI is not appropriate in every patient and in

some cases is contraindicated; thereby helping us recognize the MRI is not the proper test in every patient.

This thoughtful review by Alerhand et al., emphasizes the importance of risk factor screening in SEA. This review is additive to the body of literature as an educational article and a point-of-reference for evaluating a high-risk condition that is difficult to diagnose. The discussion of the algorithm described by Davis et al. highlights the value of utilizing guidelines for decision support in SEA work-up, but also highlights that no clinical decision tool is perfect, and guidelines should be interpreted in the context of the individual patient and clinical judgment [18]. Even so, we can appreciate that utilizing clinical judgment and appropriate knowledge of risk factors, we can approach the diagnosis of SEA among back patients with healthy respect rather than fear.

Compliance with ethical standards

Conflict of interest None.

Statement of human and animal rights This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent No informed consent was required as this was an editorial.

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