

A rare case of Spinal Epidural Abscess following mesotherapy: a challenging diagnosis and the importance of clinical risk management. Considerations concerning uncommon risk factor for development of Spinal Epidural Abscess and its prevention

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Abstract

Spinal Epidural Abscess (SEA) is a rare pyogenic infection localized between dura mater and vertebral periosteum. The development of SEA is associated with the presence of medical co-morbidities and risk factors that facilitate bacterial dissemination. It is possible to distinguish two types of SEA: primary SEA due to pathogen hematogenous dissemination and secondary SEA resulting from direct inoculation of pathogen. This entity, very uncommon, shows a prevalence peak between the 5th and the 7th decade of life with predominance in males.

The case is a 44 years old Caucasian man with chronic low back pain, treated with physiotherapy and anti-inflammatory drugs. Following an episode of acute severe exacerbation of pain, the patient underwent four sessions of dorsal and lumbo-sacral area mesotherapy. One month after the last session, the patient experienced acute severe lumbar pain, radiated to left lower limb and accompanied by fever and vomiting. During hospitalization, elevated levels of white blood cells and C Reactive Protein (CRP) were found. Moreover, a vertebral magnetic resonance imaging revealed the presence of intramedullary lesion. Furthermore, methicillin sensitive staphylococcus aureus was isolated from three blood cultures and antibiotic therapy was performed.

In our case the patient had the typical SEA onset, without any specific risk factors excepting the execution of four sessions of mesotherapy.

Aim of this study is to explain risk factors for the SEA development and to clarify how to act as a preventive measure, because also acupuncture can promote bacterial infection. *Clin Ter 2020; 171(1):e??-???. doi:10.7417/CT.2020.????*

Key words: Medical liability, Clinical Risk management, Spinal Epidural Abscess, mesotherapy

Introduction

Spinal Epidural Abscess (SEA) is a rare, potentially devastating, pyogenic infection localized between dura mater and vertebral periosteum (1).

Depending on the onset of the infection, it is possible to identify a primary type of SEA, due to pathogen hematogenous dissemination from a remote site and a secondary SEA, resulting from direct inoculation of the pathogen as a consequence of invasive procedures (injections, lumbar puncture, surgery) or spinal trauma (2,3). The development of SEA is strictly associated with the presence of medical co-morbidities and risk factors that facilitate bacterial dissemination. The majority of patients present at least one risk factor, such as intravenous drug use, diabetes, immunosuppressive therapy, neoplastic disease, AIDS, nephropathy, heart disease, liver disease, degenerative joint disease, spinal traumatism (hematomas and interruption of the anatomical spinal integrity) can favor the development of SEA.

SEA represents a very uncommon entity, but its incidence is increasing, with a current rate of 2.5-3 cases per 10000 hospital admissions. The growing number of subjects carrying predisposing factors and the increased diagnostic sensitivity of modern neuroimaging techniques explain at least partly this trend (4).

SEA shows a prevalence peak between the 5th and the 7th decade of life with predominance in males.

Case presentation

We present the case of a 44 years-old Caucasian man with chronic low back pain, treated over the years with physiotherapy and non-steroidal anti-inflammatory drugs. Following an episode of acute severe exacerbation of pain, the patient underwent four sessions of mesotherapy, with relief of symptoms. Mesotherapeutic applications were performed on both sides of the dorsal and lumbo-sacral area.

One month after the last session, the patient experienced acute severe lumbar pain, radiated to left lower limb and accompanied by fever and vomiting. Once hospitalized, blood tests showed elevated levels of white blood cells and

Scopo di questo studio è chiarire quali sono i fattori di rischio per lo sviluppo di ASE, ponendo attenzione sulle misure di prevenzione, in quanto anche semplici manovre, quale l'agopuntura, possono promuovere un'infezione batterica.

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C Reactive Protein (CRP). Concomitantly the patient showed the sudden onset of paraplegia and urinary incontinence. A vertebral Magnetic Resonance Imaging (MRI) revealed the presence of an intramedullary lesion extended between multiple cervical and dorsal metamers and Methicillin Sensitive Staphylococcus Aureus (MSSA) was cultured from three blood cultures; antibiotic therapy with vancomycin and meropenem was set up, with periodic checks until the end of patient's hospital stay.

The patient received a diagnosis of transverse myelopathy with complete sensory-motor involvement at D5 level. Two vertebral MRI were performed, respectively 30 and 45 days after patient's admission, with the evidence of multiple areas of T2 hyperintense signal, in lower dorsal spinal segment, without evidence of spinal cord compression. 51 days after admission, the patient was transferred to another hospital, in order to start a rehabilitation program, with the diagnosis of ischemic myelopathy secondary to Staphylococcus Aureus spinal epidural-subdural abscess.

At present the patient is suffering from paraplegia, with walking allowed only in a wheelchair.

Discussion

SEA often affects the thoracic and/or lumbar spinal tract (5) and usually represents a challenging diagnosis: initial clinical presentation, prior to the onset of neurological involvement, is often characterized by non-specific symptoms, attributable to a wide range of diseases (6). The classic triad of SEA (spinal pain, fever and neurological deficits) is found only in 10-15% of cases (4). Laboratory findings, such as increased white cells count and CRP, are generally present, yet non-specific. Individual risk factors for SEA should be always taken into account to suspect such diagnosis, especially when radiographic tests show compatible evidences. Gadolinium-enhanced MRI is the diagnostic method of choice for the detection of SEA, with a specificity and sensitivity >90% (4,7,8). The use of fat-suppressed sequences allows the detection of alterations such as edema of vertebral spongy bone and soft tissue, enabling the assessment of the extent of the infection. In T2 sequences, SEA often presents an increased signal, but with a variable pattern, and a comparison between T2 and T1 images can be useful when the infected area corresponds with the site of enhancement. A canal stenosis greater than 50% associated with a ≥ 3 cm abscess often predicts an unfavorable prognosis (9). Computed Tomography (CT) is preferred in patients where MRI is contraindicated. Isolation of the involved pathogen from blood and/or cerebrospinal fluid is essential to tailor antimicrobial therapy, Staphylococcus Aureus is the most commonly isolated microbe in SEA patients (10,11). In half of cases, microbial invasion of the epidural space is a consequence of hematogenous dissemination, where direct inoculation with invasive maneuvers is involved in 15% of cases (12,13).

In our report, patient showed a typical SEA clinical onset, although not presenting any pre-existing risk factor. Mesotherapy, introduced by Pistor in 1958, consists in the direct intradermal administration of diluted medications through intradermal injections. The main advantage of this

technique is that drugs can exert local action without reaching high systemic concentrations. It is used to treat local pain due to nervous, osteo-muscular and tendons affections. Furthermore, intradermal administration of drugs in association with other systemic therapies may evoke synergistic effects with the possibility to reduce therapeutic doses. The procedure must be carried out with strictly aseptic technique, applying appropriate local hygiene and sterilization procedures (14).

In addition to traditional dispensing devices (needle + syringe), more sophisticated and expensive tools like the "mesotherapeutic gun" are used. These guns perform multiple electronically controlled injections both in the amount of drug and in the dispensing depth. The disadvantage of this system is the difficulty in guaranteeing the sterility of the apparatus since only the needle is disposable.

Mesotherapy works through two mechanisms: short distance effect from the injection by stimulation of the dermal receptors in situ and long-distance effect reaching other organs through blood circulation. The concept of meso-interface refers to the contact surface between injected product and the surrounding tissue: the more the injected substance is fragmented (multiple punctures with the smallest possible amount of drug), greater the interface will be, activating a greater number of dermal receptors. The more superficial the injection, the slower drug will spread, increasing its permanence in the superficial derma: 50% of the injected drug at less than 4 mm of depth will remain at the point of administration after 10 min, compared with only 16% if the injection is performed >4 mm in depth. This technique is associated with many complications, among which the most feared is infection. Secondary infections are attributed to an inadequate asepsis before the procedure or to contamination of the administered product. Other complications are: lichenoid eruption, psoriasis, urticaria, cutaneous necrosis, SLE, panniculitis, dyschromia, atrophy and others; these complications are attributed to a mediocre technique or side effects of drugs (15, 16). In our patient, mesotherapy produced a paravertebral cellulitis in the lumbar-sacral area with subsequent hematogenous dissemination to dorsal and cervical district, as suggested by the presence of fever, MSSA bacteremia and MRI "leopard patch" at the instrumental examinations performed during patient's hospitalization (Fig. 1-2).

Since SEA is a disease with debilitating sequelae, it is necessary to put into practice all the measures aimed at preventing the development of the infection. In this perspective, Clinical Risk Management becomes fundamental, because its function is to improve the quality and safe delivery of health services, through procedures designed to identify and prevent the circumstances that could expose a patient to the risk of an adverse event (17-19).

Conclusions

SEA is a rare nosological entity whose timely diagnosis is crucial to prevent long term dramatic sequelae. Attention must be paid to patients' clinical history: even simple maneuvers, such as mesotherapy, can promote bacterial infection. In order to prevent infection, a great role is played by the



Fig. 1. RMN, performed during first days of hospitalization, showing cellulitic signal on the lumbo-sacral paravertebral soft tissues. the characteristics of the signal are a thickening of adipose tissue and post-contrastographic enhancement.

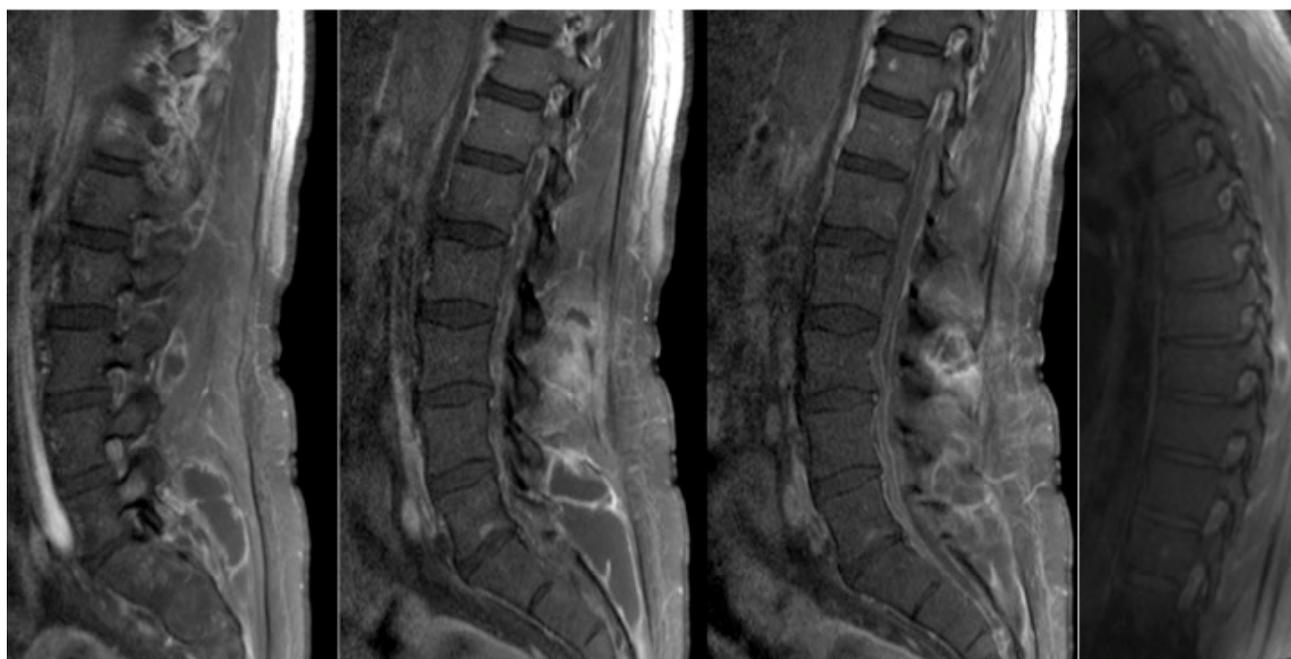


Fig. 2. Evolution of SEA. This RMN, performed after patient's severe neurologic impairment, highlights the presence of multiple encapsulate fluid collections on lumbo-dorsal paravertebral soft tissue. The lesions showed walls post-contrastographic enhancement.

Clinical Risk Manager who, through the study of health care related infections and its incident reporting, addresses physicians to the correct diagnosis, avoiding dramatic progression of disease and thus possible medical liability (17, 18, 19, 20).

A further preventive measure is to ensure the sterilization of all the tools necessary to carry out the injections. Every patient with back pain, fever and predisposing risk factors should be evaluated as suspected of SEA.

In conclusion, looking at the objectives of the study, one could argue that the combined use of instrumental devices and accurate medical observation could be relevant aid for the medico-legal point of view (26, 27, 28).

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