OUR EXPERIENCE IN THE DIAGNOSIS OF SPINAL EPIDURAL ABSCESS WITH THE USE OF NEW DIAGNOSTIC METHODS – COMPUTED TOMOGRAPHY AND MAGNETIC RESONANCE IMAGING

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SUMMARY – A 69-year-old woman, a diabetic, presented to emergency unit for severe back pain that occurred three weeks of her having sustained a fall and blow in the back. Upon admission, she developed elevated body temperature, urinary retention and severe paraparesis of lower extremities. Laboratory testing showed increased levels of erythrocyte sedimentation rate (93 mm/h), leukocyte count ($18.3x10^3$/mL), C-reactive protein (246.5 mg/L) and liver enzymes, and abundant bacteria in urine sediment. Penicillin-resistant *Staphylococcus aureus* was isolated in blood culture. Antibiotic therapy according to the antibiotic sensitivity report was introduced. Magnetic resonance of thoracic spine revealed epidural liquid collection compressing the spinal medulla from Th2 to Th7. The patient was transferred to neurosurgery for posterior laminectomy and decompression, along with antibiotic therapy. Microbiology confirmed *Staphylococcus aureus* in the intraoperative tissue specimen. The patient was discharged from the hospital with mild paraparesis and continuing antibiotic therapy recommended.

Key words: *Spinal diseases – diagnosis; Spinal diseases – therapy; Epidural abscess – diagnosis; Epidural abscess – therapy; Case report*

Introduction

Spinal epidural abscess (SEA) is a rare infectious disease that may have lethal outcome unless being timely diagnosed and treated. The most common symptoms include back pain, elevated body temperature and neurological deficit[1]. The incidence of SEA ranges between 0.2 and 2 cases *per* 10,000 inpatients[2]. The disease shows male predominance, with a male to female ratio of 1:0.56[3]. The incidence of SEA is on an increase due to the growing use of intravenous drug administration and spinal procedures[3-5]. The mortality rate remains high (16%) in spite of considerable diagnostic and therapeutic advances[3]. Therapy for SEA includes emergency neurosurgical decompression in combination with antibiotic therapy administered for 4-6 weeks[2], or antibiotic therapy alone in some cases[6]. *Staphylococcus (S.) aureus* is the most common (50%-90%) causative agent of SEA[2,6,7].

Case Report

In April 2008, a 69-year-old woman arrived from Belgium for summer vacation in Croatia. While on the bus, she felt pain in the thoracolumbar region that increased in severity with time. She took some analgesics (ibuprofen, a nonsteroidal antirheumatic) that failed to produce pain relief. She was a diabetic on therapy with oral antidiabetics and had elevated serum lipids. Three weeks before the trip, she fell and sustained a blow in her back.

Four days after arrival, she presented to emergency unit in Šibenik for severe back pain. The patient underwent heart and lung x-ray and blood and urine labo-

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ratory testing. X-ray finding was within the normal limits. Laboratory findings showed elevated erythrocyte sedimentation rate (ESR; 85), elevated leukocyte count (L; 12.3x10^3/mL) with 18% of neutrophils, and elevated C-reactive protein (CRP; 244 mg/L). Urine sample appeared cloudy; urinary sediment contained 45-50 erythrocytes, 4-6 leukocytes, some squamous epithelium and rare bacteria.

The patient was referred to the urologist and infectologist for examination, and was then admitted to department of infectious diseases for the diagnosis of uroinfection. On the same day, empirical antibiotic therapy with ceftriaxone, metronidazole and azithromycin was introduced.

On admission, the patient's status was normal apart from the painful sensation on palpation paravertebrally subscapularly on the right side. On the next day, the patient developed high febrility (39 °C), tachypnea, severe pain paravertebrally and urinary retention that required placement of urinary catheter. Neurologically, she developed paraparesis of lower extremities, unable to keep Mingazzini's position; her lower extremities showed reduced tone, enhanced patellar reflex, weak Achilles tendon reflex, and positive Babinski sign bilaterally. Repeat laboratory findings: ESR 93; L 18.3; CRP 246.5; AST 66; ALT 155; GGT 308; ALP 199. Urine sample showed cloudy appearance, while urinary sediment was abundant in bacteria. Urinary culture was sterile. Consultant neurologist recommended additional examinations. Cervical and thoracic spine x-ray showed normal finding, whereas x-ray of the lumbosacral spine indicated degenerative changes and narrowed L5-S1 intervertebral space. Computed tomography (CT) of Th 4-8 produced normal finding. Penicillin resistant *S. aureus* was isolated from blood culture. Antibiotic therapy was modified accordingly and cefazolin (Kefzol 3x2 g and Ciprinol 3x400 mg i.v.) was introduced. Magnetic resonance imaging (MRI) without contrast medium (because of the patient's poor general condition and unavailable information on the possible previous allergic reactions, since the patient could only speak Flemish) revealed an extradural neoplasm in the spinal canal, behind the medulla, pushing it ventrally, from Th 2 to Th 7, without infiltration of the vertebral osseous structure (Figs. 1 and 2).

Now, a neurologist was consulted again and on day 3 of admission the patient was transferred to Department of Neurosurgery, University Department of Surgery, Split University Hospital Center in Split, where she was immediately operated on with posterior laminectomy and decompression. An intraoperatively obtained specimen was referred for microbiologic analysis that confirmed the finding of *S. aureus*. During her stay at Department of Neurosurgery, the patient continuously received her previously introduced antibiotic therapy, which was recommended for the next 4 weeks. The patient was transferred to the place of residence in improved general condition, afebrile, resumed sphincter function and regression of paraparesis.

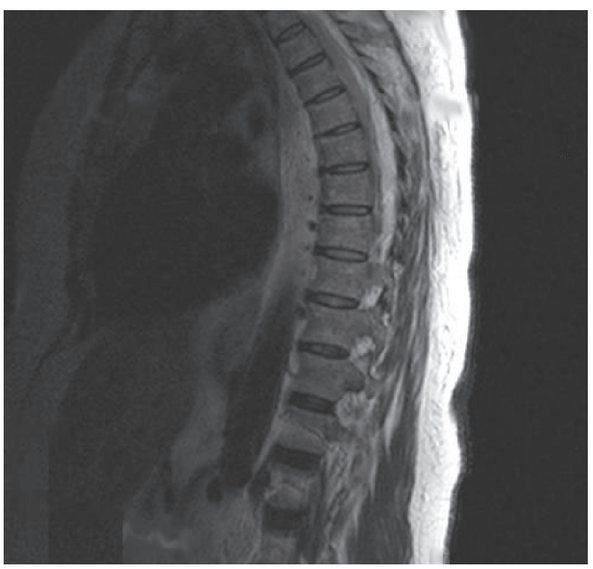

Fig. 1. T2 sagittal plane of thoracic spine showing extradural mass located posteriorly to spinal medulla from Th 2 to Th 7.

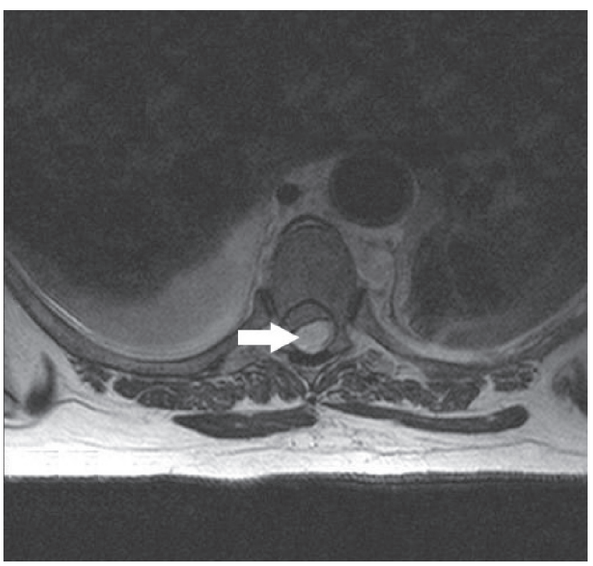

Fig. 2. T2 axial plane of thoracic spine showing extradural mass pushing spinal medulla ventrally.

Discussion

Our patient was aged 69, had diabetes mellitus and a history of trauma, thus being at an increased risk of SEA, which is also associated with carcinoma, alcoholism, chronic renal insufficiency, acquired immunodeficiency syndrome and overweight, and with intravenous drug administration, epidural anesthesia and spinal surgery[2-5,7,8]. Patients without such predisposing factors, accounting for up to 20% of cases, pose a major diagnostic problem[9].

In our patient, clinical picture included back pain, elevated body temperature, urinary retention and paraparesis as the most common symptoms of SEA[1,3,5,10]. Rigamonti *et al.* report on 75 cases of SEA during the 1983-1992 period, with back pain as the most common symptom, followed by paresthesia, paraplegia, elevated temperature, paraparesis, urinary and stool incontinence, modified reflexes and encephalopathy. Accurate diagnosis was especially difficult to make in 22 (29%) patients free from motor deficit and back pain[5].

In our patient, SEA was caused by *S. aureus* as the most common causative agent of all abscesses. Other agents include streptococci, gram-negative bacteria such as *Escherichia coli* and *Pseudomonas aeruginosa*, then *Mycobacterium tuberculosis* and rarely *Nocardia* species[2,6,7]. Laboratory tests are not specific for this diagnosis because elevated ESR, leukocyte count and CRP are general inflammatory parameters; the more so, leukocyte count may normalize in chronic SEA cases. Blood culture should always be used to prescribe appropriate antibiotic therapy; blood culture is positive in 60%-70% of cases caused by *S. aureus*[2]. Curry *et al.* describe 48 patients with SEA free from temperature elevation and with normal leukocyte count[10].

Contrast MRI (gadolinium) is a radiological method of choice to reach an accurate diagnosis, when it is available. On T1 image, the abscess is visualized as a hypo- or isointense mass, and on T2 image as a hyperintense mass[2,11]. We did not use contrast medium in our patient because of her poor general condition and lack of information on her possible previous allergic reactions. If MRI is not available, CT myelography can also be helpful[7]. CT did not show SEA, probably because myelography was not performed, hence MRI proved very useful in this case.

SEA is a rare infectious disease that may have lethal outcome unless timely diagnosed and treated. In most cases, combined treatment with neurosurgical decompression and antibiotic therapy for 4-6 weeks is recommended[2,10,12]. Surgical therapy is recommended in patients with neurological deficit, while antibiotic therapy alone is advised when there is minimal or no neurological deficit and in patients in poor general condition where postoperative survival may be questionable[2,6,7]. The outcome depends on the patient age, duration of symptoms, abscess localization, grade of spinal compression, comorbidities and patient general condition[13].

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Sažetak

NAŠE ISKUSTVO U DIJAGNOSTICI SPINALNOG EPIDURALNOG APSCESA UPOTREBOM NOVIH DIJAGNOSTIČKIH METODA – KOMPJUTORIZIRANE TOMOGRAFIJE I MAGNETSKE REZONANCIJE

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Bolesnica u dobi od 69 godina sa šećernom bolešću javila se na hitnu pomoć zbog jakih bolova u leđima tri tjedna nakon pada i udarca u leđa. Kod prijma je zabilježena visoka temperatura, zadržavanje mokraće i teška parapareza donjih udova. Laboratorijski nalazi su pokazali povišene vrijednosti sedimentacije (93 mm/h), leukocita ($18,3x10^3/\mu L$), C-reaktivnog proteina (246,5 mg/L), jetrenih enzima te dosta bakterija u mokraći. Iz kemokulture izoliran je *Staphylococcus aureus* rezistentan na penicilin pa je bolesnici uvedena antibiotska terapija prema antibiogramu. Magnetska rezonancija torakalne kralježnice pokazala je epiduralnu nakupinu tekućeg sadržaja koji je izazivao pritisak na medulu spinalis od Th2 do Th 7. Na neurokirurgiji je izvedena stražnja laminektomija i dekompresija te je nastavljena antibiotska terapija. Mikrobiološka analiza operacijskog uzorka potvrdila je *Staphylococcus aureus*. Bolesnica je otpuštena u poboljšanom stanju, s blagom paraparezom i preporukom za daljnju antibiotsku terapiju.

Ključne riječi: *Bolesti kralježnice – dijagnostika; Bolesti kralježnice – terapija; Epiduralni apsces – dijagnostika; Epiduralni apsces – terapija; Prikaz slučaja*