Subdural tuberculous abscess of the lumbar spine in a patient with chronic low back pain

Subduraln ultraubulozni apses lumbalne kičme kod bolesnice sa hroničnim lumbalnim sindromom

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Abstract

Introduction. Despite modern imaging methods, tuberculous abscess in the subdural space of the spine can lead to misdiagnosis and to neurological complications development, even more up to paraplegia. We presented an extremely rare case of subdural tuberculous abscess of the lumbar (L) spine and paraparesis in immunocompetent a 49-year-old patient. Case report. A patient with chronic L syndrome and a history of intervertebral (IV) disc L3 and L5 operations got severe back pain late in July 2007. At the same time the patient had a purulent collection in the left kidney, and was treated with high doses of corticosteroids and antibiotics. Then, the patient got a high fever, the amplification of pain in the L spine and the development of paraparesis. Erythrocyte sedimentation rate was 108 mm/1 h, C-reactive protein 109/L with a left turn. MRI of the L spine was registered expansive formation in the spinal canal, from the level of the IV disc L2 to the mid-L4 vertebral body. This finding is a “spoke” in favor of the extrusion and sequestration of IV disc L3 with the cranial and caudal migration. The patient underwent an emergency neurosurgical operation. The diagnosis of subdural staphylococcal abscess of L spine was made. According to the antibiogram antibiotic therapy was applied but without effect on the course of the disease. Control MRI of the L spine showed spondylodiscitis L3/L4, abscess collection in the spinal canal and paravertebral muscle abscess. Late in September 2007 the patient underwent needle biopsy of the L3 vertebral body guided by computed tomography and the acid-fast bacilli (AFB) were found. Tuberculosatistics were introduced in the therapy. Two years later the patient was without significant personal difficulties, and with normal clinical, laboratory and morphological findings. Conclusion. Subdural tuberculous abscess of the spine is extremely rare manifestation of spine tuberculosis. The exact and early diagnosis and adequate treatment of atypical form of spine tuberculosis are key factors of good prognosis.

Key words: tuberculosis; abscess; subdural space; lumbar vertebrae; diagnosis, differential.

Apstrakt

Introduction

Tuberculosis (TB) of the spine accounts for about 2% of all cases of TB and for almost 50% of all patients with skeletal TB. The disease can affect one or more parts of the spine, vertebral body, intervertebral (IV) disc, paravertebral soft tissue and/or epidural space. Rare cases of intramedullary and extramedullary tuberculosis and tuberculous abscess with spinal cord compression, without radiological signs of tuberculous spondylitis and meningitis are also described. However, the development of tuberculous abscess in the subdural space of the spine is extremely rare. Despite modern imaging methods, atypical presentations of spinal TB can lead to misdiagnosis and the development of neurological complications, sometimes up to paraplegia. We presented an extremely rare case of subdural tuberculous abscess of the lumbar spine, and paraparesis.

Case report

In late July 2007, a 49-year-old patient with chronic lumbar (L) syndrome and a history of IV disc L3 and L5 operations felt severe back pain. During this period, after an injury, the patient developed a purulent collection in the area of the left knee that was drained with the use of antibiotic therapy. At the same time, because of severe pain in the L spine, the patient received high-dose of methylprednisolone from August 2-4. Suddenly, strong chills and 40ºC temperature appeared in the patient. The back pain intensified and spread out along both legs, followed by the occurrence of paresthesia in the toes of both feet and inability to walk. Therefore, the patient was admitted to the Clinic for Neurosurgery, Military Medical Academy (MMA), Belgrade on August 9. She felt tenderness on pressure and paravertebral muscle spasm in the lower part of the L spine. The clinical examination revealed high temperature, crossed sign of Lazarevic and hypoesthesia in the left dermatomes L3, L4 and L5. A rough main force of the dorsal flexors on the left foot has been weakened. A purulent collection was noticed in the area of the left knee. In laboratory studies on admission leukocytes were 38.4 × 10⁹/L and neutrophils were 35.0 × 10⁹/L.

Magnetic resonance imaging (MRI) of the spine, from the level of IV disc L2 to the mid-L4 vertebral body, revealed “an extradural”, expansive formation with signal intensity of IV disc in the spinal canal (Figure 1). This formation was occupying the anterior two thirds of the spinal canal. Following administration of contrast, the formation increased signal intensity in the T1W sequence just marginally. This finding was a “spoke” in favor of the extrusion – sequestration of IV disc L3 with the cranial and caudal migration.

Soon after the admission, incision and drainage of the purulent collection were done in the region of the left knee. Unfortunately, we did not test the culture of pus, and the patient received ceftriaxone, 2,000 mg daily intravenously. This therapy resulted in regression of the purulent collection of the knee, however, the fever and increased leukocytes count maintained continuously. Despite severe back pain and neurological deterioration the patient underwent neurosurgical intervention on August 17. On that occasion, laminectomies L3 and L4 were performed and then dural sack was moved. Unexpectedly, dural tearing and leakage of purulent content from the expansive formation into the spinal canal were found. Curettage of the abscess cavity was performed immediately and the dura was sutured. Staphylococcus aureus sensitive to most antibiotics was isolated from the purulent content. The antibiotic therapy was continued using vancomycin in a dose of 2,000 mg a day, and the diagnosis of spinal subdural Staphylococcus aureus abscess was made.

In order to continue the treatment, the patient was transferred to the Clinic for Infectious Diseases, MMA, on August 23, 2007. At the admission, the patient had high fever, and was hardly moving because of severe pain in her back and legs. In laboratory studies erythrocyte sedimentation rate (ESR) was 108 mm/1.h, C-reactive protein (CRP) 106.0 mg/L, leukocytes 13.2 × 10⁹/L, neutrophils 78.3%, erythrocytes 3.3 × 10¹²/L, hemoglobin 99 g/L, platelets 616 × 10⁹/L, albumin 17 g/L. Control MRI of the L spine in early September showed edema and inflammation of L3 and L4 vertebral bodies with signs of discitis and thickening of the dura mater at the level of L4 (Figure 2). Paravertebral puru-
lent collections around the vertebral bodies L3 and L4 and the abscess collection in the spinal canal, lower than the baseline were also registered.

The combined use of glycopeptides and carbapenems, followed by other antibiotics was continued (Figure 3). However, the fever, back pain and high values of ESR (100 mm/1.h) and CRP (43.5 mg/L) were still held. Due to lack of response to this therapy, the patient underwent needle biopsy of the vertebral body L3 guided by computer tomography on September 27. Using direct observation of the obtained material, acid-fast bacilli (AFB) were seen, suspected on Mycobacterium tuberculosis (MBT). On the following day, the treatment was continued by using four first-line of tuberculostatics (streptomycin – 1,000 mg daily, isoniazid – 500 mg daily, rifampicin – 600 mg daily, ethambutol – 1,200 mg daily). This therapy leads to a gradual normalization of body temperature, thus reducing the patient’s discomfort problems and normalization of laboratory findings (Figure 3). Polymerase-chain reaction (PCR) results on Mycobacterium tuberculosis and culture of biotyped specimens by Löwenstain, as well as MBT cultures from vertebra and paravertebral abscess collections, which were subsequently obtained, were negative. Malignant cells were not registered using cytological examination of the tissue obtained by biopsy, and its histological analysis indicated that it was a blood clot.

Control MRI of the L spine was done in late October 2007. The slight regression of spondylodiscitis L3/L4 was registered, compared to the previous review. The collapse of the IV disc and progression of destruction IV space L3 were recorded, too. Subdural and paravertebral fluid collections were not identified. Since, November 5, 2007, the patient continued the treatment by three tuberculostatics, without streptomycin for the a total of 18 months (Figure 3). This therapy was conducted daily for 12 months. After that, the same drugs were administered three times a week for three months, and then twice a week. Upon completion of the therapy, the patient was without significant subjective symptoms, and clinical findings and laboratory tests were within normal limits. There were no signs of spondylodiscitis, and subdural or paravertebral fluid collection on MRI of the L spine (Figure 4).

Fig. 3 – The course of the disease and treatment of patients with subdural tuberculous abscess of the lumbar spine

In this paper, we presented an extremely rare case of subdural tuberculous abscess of the L spine, as a serious differential diagnostic problem. Generally, the classic form of spinal TB (Pott’s disease) is easily recognized and treated promptly. Radiological methods revealed frontal destruction of two adjacent vertebrae with destruction of the corresponding IV disc and kyphotic deformity. Often, there is a bilateral psoas abscess, and all patients have compression of the spinal cord or cauda equina. On the other hand, the atypical forms of spinal TB, which accounts for nearly 25% of all patients with this disease, may represent an important problem. Despite modern radiological methods and therapy, they are accompanied with frequent development of neurological complications, because of delayed diagnosis, which sometimes can lead up to paraplegia. Atypical forms of spine TB are a tuberculosis spondylitis without involvement of IV disc, TB of posterior spinal elements or different parts of the spine and destructive lesions of cervical vertebrae and the sacrum. Cases of spine TB with signs of compression of the spinal cord without radiological evidence of tuberculous spondylitis or meningitis have been described very rarely.

The development of spinal subdural abscess, particularly of tuberculous origin, has been recorded extremely rare. Velissaris et. al. pointed out that a total of 65 cases of spinal subdural abscess had been reported in the literature until the first half of 2009. According to the same authors, Staphylococcus aureus was the most common bacterial cause of this disease, in 35 patients, while Mycobacterium tuberculosis was causative agent in only two cases. However, in both of the above cases, the development of tuberculous spinal subdural abscesses occurred during the course of tuberculosis meningitis, which facilitated the diagnosis. All these facts about atypical spine TB are sufficient to clarify why our patient was initially misdiagnosed. In addition, wrong diagnosis is ascribed to the fact that patients suffer from chronic low back pain for many years. Also, the presented patient was operated for IV disc herniation twice. The appearance of high fever and leukocytosis were initially in-

Fig. 4 – Magnetic resonance imaging of the spine (September 9, 2009) in the patient with subdural tuberculous abscess after therapy completion shows a complete regression of the disease

Discussion

In this paper, we presented an extremely rare case of subdural tuberculous abscess of the L spine, as a serious differential diagnostic problem. Generally, the classic form of spinal TB (Pott’s disease) is easily recognized and treated promptly. Radiological methods revealed frontal destruction of two adjacent vertebrae with destruction of the corresponding IV disc and kyphotic deformity. Often, there is a bilateral psoas abscess, and all patients have compression of the spinal cord or cauda equina. Atypical forms of spinal TB, which accounts for nearly 25% of all patients with this disease, may represent an important problem. Despite modern radiological methods and therapy, they are accompanied with frequent development of neurological complications, because of delayed diagnosis, which sometimes can lead up to paraplegia. Atypical forms of spine TB are a tuberculosis spondylitis without involvement of IV disc, TB of posterior spinal elements or different parts of the spine and destructive lesions of cervical vertebrae and the sacrum. Cases of spine TB with signs of compression of the spinal cord without radiological evidence of tuberculous spondylitis or meningitis have been described very rarely.

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Interpretation with the development of sepsis from purulent foci in the region of the left knee, after the administration of high doses of corticosteroids. Therefore, no surprise, that the spinal subdural abscess was initially misdiagnosed as IV disc extrusion, in this case.

In recent years, “medical awareness” of spine TB is less than the actual incidence of the disease. Late set of exact diagnosis is the main cause of permanent damage to the high rate and prolonged duration of illness. Therefore, it is important to know that extensive abstraction of the spinal canal and compression of the spinal cord, in the absence of radiological signs of vertebral infection, indicate spine TB. The authors from the MMA have previously described spinal subdural abscess caused by *Staphylococcus*. This may be another reason for this rare entity to be associated with possible staphylococcal infection in the area of the left knee. Unfortunately, it has been confirmed by *Staphylococcus aureus* isolation from the surgical site. At the same time it was justified to continue the patient treatment with glycopeptides. However, over time it was shown that it was most likely, a contamination. On the other hand, it is difficult to believe in the possibility of a dual infection, although such an assumption in the case of our patient is difficult to completely rule out.

Due to the lack of response to antibiotics and spread of inflammatory processes in the vertebrae and paravertebral soft tissue, a suspicion of spine TB was placed. Today, it is clear that percutaneous computed tomography guided biopsy of the spine is an effective and well-evaluated procedure. In order to confirm the diagnosis of spinal TB we have done a fine needle biopsy of the L3 vertebral body, successfully. Using direct observation of the obtained material, AFB were detected suspicious to *Mycobacterium tuberculosis*.

In the absence of severe neurological disorders in patients with spine TB, administration of antituberculous drugs is the first choice of therapy. The appropriate duration of drug administration, as well as possible combinations of antituberculous drugs has not been precisely defined, although there are recommendations. A treatment decision should be individualized for each patient. According to the recommendations of the US Centers for Disease Control and Prevention, the Infectious Diseases Society of America, and the American Thoracic Society, a four drug regimen should be empirically used to treat spine TB. Isoniazid and rifampin should be administered during the whole course of therapy, and additional drugs should be administered during the first 2 months of therapy. These drugs are generally chosen among the first-line drugs. Studies performed by the British Medical Research Council indicate that TB of the thoracolumbar spine should be treated with combination chemotherapy for 6–9 months. Regardless therapy duration, these studies did not include patients with multiple vertebral involvement, cervical lesions, or major neurologic involvement. Because of these limitations, many experts still recommend chemotherapy for 9–12 months.

Similar to other authors we started the treatment of our patient with a combination of four first-line antituberculous drugs in order to minimize the risk of drug resistance developing. Technical reasons, we started treatment with streptomycin, although the modern therapy of a specific process usually begins with combination including pyrazinamide. Five weeks later, the therapy was continued with the combination of isoniazid, rifampicin, and ethambutol, and lasted for 18 months. Good and fast effect of tuberculostatics further confirmed the diagnosis of subdural tuberculous abscess of the spine. Due to the delayed diagnosis and advanced disease, the treatment was carried out more than the recommended 9–12 months.

When subdural tuberculous abscess of the spine is diagnosed, a patient must be under constant surveillance by the infectious disease specialist and neurosurgeon with the regular consultation of radiologists. This is necessary in case of the need for early decompression of the spinal cord. This surgical procedure may lead to rapid and complete recovery of neurological deficit. However, according to the literature in most cases the treatment of spine TB passes without surgery. Neurosurgical or orthopedic treatment is required in approximately 20% of all cases of spine TB.

**Conclusion**

Subdural tuberculous abscess of spine is extremely rare manifestation of spine TB. The exact and early diagnosis and adequate treatment for atypical form of spine TB are key factors of good prognosis. We believe that this review will improve the diagnosis of spine TB in early stage of the disease, before the development of irreversible neurological deficits and spinal deformity.

**REFERENCES**


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