CASE REPORT

EXTENSIVE SPINAL EPIDURAL ABSCESS

Salman Riaz, James K. Mahmood
Department of Orthopaedics, University of Alberta, Edmonton, Alberta Canada

Spinal epidural abscess (SEA) is a rare clinical entity associated with a high morbidity and mortality. It usually spans 3-4 levels. The literature contains very few reports of extensive or panspinal epidural abscesses and hence there is no consensus on management of such cases. We describe a case of 56 years old male presenting with a posteriorly located SEA extending from the Foramen Magnum to thoracolumbar junction. The abscess had led to quadriparesis for the last 24 hours. This abscess was treated operatively by performing noncontiguous minimally invasive decompressions of the cervical and thoracic spine. The patient showed progressive improvement in neurologic status and was walking with minimal support at 4 months of follow-up.
Keywords: Epidural; Abscess; Paralysis; Thoracic; Laminectomy; Ambulation.

INTRODUCTION

Pyogenic involvement of the spinal epidural space is associated with significant morbidity and is a potentially life threatening entity. Permanent neurologic injury may result from delays in diagnosis and treatment of spinal epidural abscess (SEA).It commonly presents in the lumbar followed by thoracic and cervical regions. SEA usually spans 3-4 levels. Extensive / panspinal SEAs have been described but are exceedingly rare. There is no consensus on treatment of these extensive spinal abscesses and few authors point that they should be treated non-operatively since decompressing such a large area would lead to instability and will be a great strain on patient's physiologic reserves. We describe in our report a case of extensive spinal epidural abscess and its management.

CASE REPORT

A 56 year old male, truck driver by profession, had a fall at work. He progressively developed back pain over the course of next few days. He was seen by a general practitioner (GP) and was advised physiotherapy for two weeks and sent off work. After two weeks he was seen again by the GP and was declared fit to return to work. His pain continued to increase and over the next three days he progressively developed weakness of his lower extremities and was unable to walk. He was therefore taken to a tertiary care hospital emergency department (ED). At the time of presentation he had complete paralysis of his both lower extremities and had marked weakness of his both upper limbs.

He also had urinary retention for 24 hours. On examination he was found to be febrile (38.5° C), tachycardiac, with a blood pressure of 110/70 and having cold, sweaty extremities. Chest auscultation revealed bilateral rhonchi. Examination of CVS and abdomen was normal. Neurologic examination showed a grade 2/5 motor strength in upper extremity muscle groups bilaterally and 0/5 muscle strength in all muscle groups of both lower extremities. He had a C4 sensory level. Rectal tone was absent on digital rectal examination. Examination of the back showed a localized swelling in upper lumbar paraspinal region on the left side which was tender but no redness or erythema could be seen over the back. His laboratory examination showed hemoglobin of 123 gm/L, platelets 741,000/ml, WBC 26.8 x 10^9 / L with 93% neutrophils. Electrolytes, blood urea nitrogen, creatinine and PT, APTT were all within normal ranges. X-rays of the chest showed patchy pneumonia on both sides with greater involvement of the right side.

X-rays of the cervical, thoracic and lumbar spine showed no significant abnormality. MRI scan of the whole spine was performed. It showed an extensive posteriorly located epidural abscess extending from foramen magnum to T12. The abscess was causing significant compression of the cord in the cervical and thoracic regions but more so in the narrow thoracic canal. A left psoas abscess and a left paraspinal subfascial abscess were also noted. The patient was urgently taken to the operating room. Bilateral Cervical laminotomies were performed at C4 and C5 and copious amount of thick yellowish pus was drained. The wound was irrigated thoroughly using saline and diluted hydrogen peroxide and closed over a suction drain. The subfascial abscess in the paraspinal muscles in the thoracolumbar region was drained as well. Bilateral laminotomies were performed at T12-L1 level and thick yellow coloured pus drained. The pus was sent for culture and sensitivity. This wound was closed over a suction drain.

Postoperatively the patient remained febrile and did not show any significant change in neurologic status in the lower extremities though steady improvement in upper extremity strength was noted bilaterally. A repeat MRI was done which showed drainage of abscess in the upper cervical region but persistence of abscess in the thoracic spine. The patient was again taken to the operating

Figure I: MRI cervicothoracic spine, posteriorly located Extensive epidural abscess (Arrows) extending from Foramen Magnum into the thoracic spine

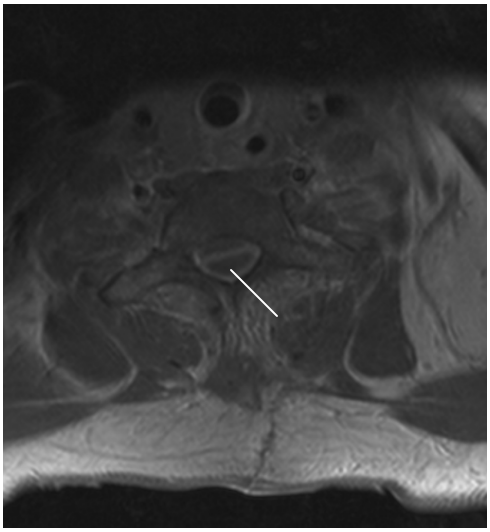

Figure II: MRI of the cervical spine, axial view, showing compression of the spinal cord by the posteriorly located abscess (Arrow).

Figure III: MRI of the thoracolumbar spine, posteriorly located abscess extending all the way to thoracolumbar region.

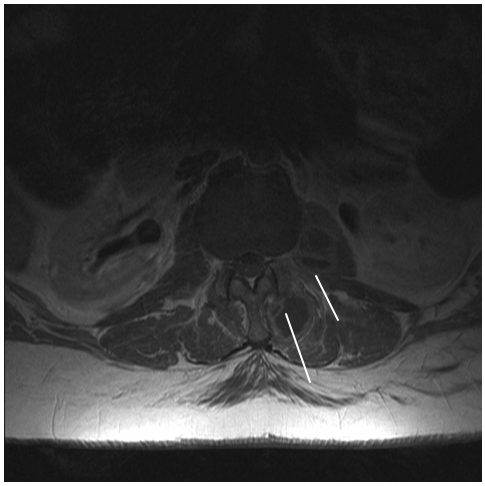

Figure IV: MRI Lumbar Spine, Para Spinal and Psoas Abscess (both shown by arrows) showing ring enhancement, on the left side.

room about 48 hours after the first surgery. A laminectomy was performed in the mid thoracic spine at T6 and 7 and significant amount of liquid pus drained. A repeat debridement of the cervical and thoracolumbar wounds was also performed concurrently.

After the second debridement the patient started regaining motor strength in his lower extremities. His sensations improved significantly. He was kept catheterized from the time of presentation due to his atonic bladder. His blood cultures showed no growth. His sputum and epidural abscess cultures both showed growth of Streptococcus Pneumoniae, sensitive to similar antibiotics. An echocardiogram showed aortic vegetations. His improvement in motor strength continued and at four month follow up, he was ambulant with walking aids, indoors and outdoors. In both lower extremities his motor strength had improved to 4+/5, with complete recovery of motor strength of upper limbs and sensations. He still required intermittent self catherization to empty his bladder but had some subjective feelings of improved control.

DISCUSSION

Spinal epidural abscess is an accumulation of pyogenic material in the space between the spinal duramater and the osseo-ligamentous confines of the spinal canal. These infections can lead to permanent neurologic injury and death. Fortunately spinal epidural abscess is a rare entity and has been reported to be diagnosed in 0.2 to 1.2 cases per 10,000 hospital admissions in one study[1]. Higher rates have been cited by some recent studies.[2,3].

Various predisposing factors to spinal epidural abscess include conditions which impair host immune competence like diabetes mellitus, HIV infection, intravenous drug abuse, end-stage renal disease, alcoholism, malignancy, morbid obesity, long-term corticosteroid use, and septicemia[4]. Introduction of pathogens into the epidural space can occur from hematogenous seeding, direct spread from contiguous structures, or from direct inoculation from trauma or invasive procedures. The most commonly offending organism is Staphylococcus aureus (70% of cases) followed by Streptococcus species.

Spinal epidural abscess has a peak incidence during sixth and seventh decades of life.. Back pain is the most common presenting symptom (71%) followed by fever (66%) and neurologic deficits (34%) [5]. The severity of neurologic compromise can vary from a radiculopathy to quadriplegia / paraplegia. Delay in diagnosis is common due to the non-specificity of symptoms. One study revealed that the classic triad of fever, pain, and neurologic deficits was present in only 13% of 63 patients presenting to the emergency room and eventually diagnosed with SEA[6].Gadolinium-enhanced magnetic resonance imaging (Gd-MRI) is currently the investigation of choice in patients with a suspected spinal epidural abscess.

Nonoperative management with antibiotics alone have been described for patients who are poor surgical candidates, have an extensive or pan spinal abscess, have complete paralysis for more than 72 hours and in patients having no neurologic involvement, location of abscess in the lumbosacral region and no mass effect. Savage et al reported 83% good clinical results in patients treated with antibiotics alone using the above mentioned indications[7].

The cornerstone of treatment is emergent surgical decompression and drainage of the abscess combined with the antimicrobial therapy. SEAs can occasionally involve adjacent multiple spinal segments (i.e., cervical, thoracic and lumbar). In such cases, perfo rming multilevel laminectomies may predispose the patient to complications such as increased blood loss, cardiac and respiratory difficulties, increased postoperative pain and recovery time and late kyphotic deformity and instability.

Schultz Jr et al have described a technique used for 2 patients with extensive spinal epidural abscess[8]. They performed laminectomies / hemilaminectomies at the cranial and caudal extent of the abscess and placed forgarty embolectomy catheter from the one end to the other end and once it appears from the caudal end it was inflated to 1-1.5 ml of air and catheter gently withdrawn back to remove the purulent material with it.

Panagiotopoulos et al have decribed a case of extended cervicolumbar spinal epidural abscess (SEA) treated medically initially but on deterioration of neurologic status was decompressed using limited laminotomies and suction and irrigation by a silicon catheter with saline and diluted hydrogen peroxide[9]. The patient had full neurologic recovery after decompression.

Our report describes a case of management of an exceedingly rare entity, an extensive SEA, spanning from the Foramen Magnum to the thoracolumbar region. There has been no consensus on management of such extensive abscesses in literature with few authors recommending non-operative treatment in order to avoid instability due to extensive decompression required for abscess drainage[4]. We though believe that decompression of such extensive abscesses can be reliably performed by doing minimally invasive decompressions at multiple non-contiguous levels by doing

laminotomies or carefully performed laminectomies without causing instability.

We believe that in our patient the likely cause of infection may be the hematogenous seeding of the psoas and paraspinal hematoma which lead to spread to the epidural space through the intervertebral foramina. The primary focus of infection may be in the lung, since it grew the same organism with the same sensitivities as the abscess, or it may have arisen from the aortic vegetations (endocarditis).

REFERENCES

1. Baker AS, Ojemann RG, Swartz MN, Richardson EP Jr. Spinal epidural abscess. N Engl J Med 1975; 293:463-468.
2. Hlavin ML, Kaminski HJ, Ross JS, Ganz E. Spinal epidural abscess: a ten-year perspective. Neurosurgery1990; 27:177–84.
3. Pilkington SA, Jackson SA, Gillett GR. Spinal epidural empyema. Br J Neurosurg 2003;17:196–200..
4. Bluman EM, Palumbo MA, Lucas PR. Spinal epidural abscess in adults. J Am Acad Orthop Surg 2004;12(3):155-63.
5. Reihsaus E, Waldbaur H, Seeling W: Spinal epidural abscess: a meta-analysis of 915 patients. Neurosurg Rev 2000; 23:175-205.
6. Davis DP, Wold RM, Patel RJ, Tran AJ, Tokhi RN, Chan TC et al. The clinical presentation and impact of diagnostic delays on emergency department patients with spinal epidural abscess. J Emerg Med 2004; 26:285–91.
7. Savage K, Holtom PD, Zalavras CG. Spinal epidural abscess: early clinical outcome in patients treated medically. Clin Orthop Relat Res 2005;439:56-60.
8. Schultz KD Jr, Comey CH, Haid RW Jr. Technical note. Pyogenic spinal epidural abscess: a minimally invasive technique for multisegmental decompression. J Spinal Disord 2001;14(6):546-9.
9. Panagiotopoulos V, Konstantinou D, Solomou E, Panagiotopoulos E, Marangos M, Maraziotis T. Extended cervicolumbar spinal epidural abscess associated with paraparesis successfully decompressed using a minimally invasive technique. Spine 2004;29(14):E300-3.

Address for Correspondence: Dr. Salman Riaz, # 308, 11012, 82 Avenue, Edmonton, Alberta, Canada T6G 2P6.
Ph: 780-445-7704, Fax: 780-407-8203.
E-mail: orthoedu2002@yahoo.ca