Spinal Epidural Abscess: Analysis of 12 Cases

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ABSTRACT

Background: *Despite advances in neuroimaging and neurosurgical treatment, spinal epidural abscess remains a challenging problem; early diagnosis is often difficult and treatment is delayed. Optimal management is unclear, and morbidity and even mortality may be significant.* ***Methods:*** *Between January 2001 and December 2006, 12 patients with spinal epidural abscess were admitted and treated in the neurosurgery department, Assiut university hospital. Demographic characteristics, risk factors, clinical features, pathogens, current diagnostic guidelines, spinal location and extension, treatment options and outcome were analyzed.* ***Results:*** *There was a total of 12 patients at the average age of 39 years, a striking male predominance of the disease, accounting for 83.3% of cases. Most patients (91.7%) had some underlying conditions that predisposed to infection. Presenting symptoms included local spinal pain (backache or neck pain) in all patients (100%), fever (58.3%), radicular pain and sensory deficit (50% for each), weakness of an extremity (41.7%), bladder or bowel dysfunction (33.3%), and frank paralysis (25%), and toxic signs (pallor, under weigh or failure to thrive) in50% of patients. Magnetic resonance imaging (MRI) was the greatest diagnostic accuracy and the method of first choice in the diagnostic process revealing or suggesting the diagnosis in all 12 studied patients (100%). Erythrocyte sedimentation rate was elevated in all cases, and peripheral leukocyte count was mildly elevated in all patients. Abscesses extended over an average of 3.3 vertebrae, and the majority were located in the lumbar region followed by dorso-lumbar and cervical regions and they were more posterior than anterior (58.3% vs41.7%). Spinal epidural abscess is primarily a bacterial infection, and the gram-positive Staphylococcus aureus was the most common causative agent (41.7%), aerobic or facultative gram-negative bacilli were next most common (33.3%),mycobacterium tuberculum bacilli in one patient, however in 2 cases (16.7%) the causative pathogen was unknown. The therapeutic options were decompressive laminectomy and drainage followed by prolonged antibiotics in 58.3%, medical treatment (parentral followed by oral antibiotics) in 25% of cases and percutaneous CT and/or ultrasonic guided drainage in 16.7% of patients. The patients experienced complete recovery in 83.3%, no recovery at all of neurological deficit in 16.7% and the mortality rate was 16.7%.* ***Conclusion:*** *The essential problem of SEA lies in the necessity of early diagnosis, because only timely treatment is able to avoid or reduce permanent neurologic deficits. Febrile back pain, radicular pain, and occasional paralysis are very frequent among spinal epidural abscess (SEA) patients. The knowledge of a variable and insidious clinical presentation of this disease is crucial so that a fast and accurate diagnosis can be established. Magnetic resonance imaging has been the examination of choice because it shows the whole extension of the lesion and because it allows a better and distinct diagnosis. The emergency surgical treatment followed by specific antibiotic therapy has proved to be the safer and most efficient way to treat and prevent severe neurological sequels. The conservative treatment should be reserved to those cases in which there is a high surgical risk related to unfavorable clinical circumstances. Nevertheless, in spite of the aggressive treatment of the epidural abscesses, morbidity and mortality rates still remain considerable.*

Keywords: *spinal epidural abscess, febrile back pain.*

INTRODUCTION

Spinal epidural abscess (SEA) was first described in the medical literature in 1761 and represents a severe, generally pyogenic infection of the epidural space requiring early diagnosis and emergent neurosurgical intervention to avoid permanent neurologic deficits[64]. Optimal management is unclear, and morbidity and mortality are significant[66].

PATIENTS & METHODS

Between January 2001and December 2006, 12 patients with spinal epidural abscess were admitted and treated in the neurosurgery department, Assiut university hospital. The aim of this article is to analyze demographic characteristics, risk factors, clinical features, causative pathogens, current diagnostic guidelines, spinal location and extension, surgical and medical treatment, and outcome. For each patient, a full history, clinical examination, routine laboratory investigations notably erythrocyte sedimentation rate, peripheral leukocyte count, blood and/ or pus culture and neuroimaging studies including MRI and CT scan were done to clarify various objective issues. Therapeutic options were decompressive laminectomy and / or anterior approach with abscess drainage, percutaneous CT and/or ultrasonic guided drainage followed by parentral and oral antibiotics in both of them and medical or non surgical treatment.

RESULTS

Demographic characteristics

12 patients included in this study. Their ages varied from 13 to 60 years, and the average age was 39 years, a striking male predominance of the disease, accounting for 83.3% (10 out of 12) of cases.

Clinical features

All patients had local spinal pain (100%) of variable duration ranged from 2 weeks to 12 weeks either backache in 10 patients or neck pain in the other 2 patients, fever 58.3% (7 out of 12 patients), radicular pain including truncal girdle pain and sensory deficit (50% for each), weakness of an extremity in 5 patients (41.7%), bladder or bowel dysfunction in 4 patients (33.3%), frank paralysis (25%), and toxic signs (pallor, under weigh or failure to thrive) in50% of patients.

Predisposing factors

The following table (1) summarizes the predisposing factors identified among the 12 patients.

Table (1): The predisposing factors identified among the 12 patients

Predisposing factors	*No. of cases**	*% of the total*
Recent spinal surgery	4	33.3%
Epidural analgesia	1	8.3%
Diabetes	3	25%
Penetrating injury	1	8.3%
T.B osteitis	1	8.3%
Liver cirrhosis (HBV)	1	8.3%
Rheumatic heart (bacterial endocarditis)	1	8.3%
Not identified	1	8.3%

***** *One patient had two predisposing factors (diabetes+ discitis)*

Causative pathogens

The infectious agent was identified in 10 patients (83.3%). *Staphylococcus aureus* was the predominant germ and was identified in 5 patients (41.7%). aerobic or facultative gram-negative bacilli were next most common and identified in 4 patients (33.3%), the tuberculosis bacillus in one patient (8.3%). The other 2 patients (16.7%) did not present any microorganism (Table 2)

Table (2): Causative pathogens among the 12 patients

Infectious agents	*No. of cases*	*% of the total*
Staphylococcus aureus	5	41.7%
Gram-negative bacilli	4	33.3%
Tuberculosis bacilli	1	8.3%
Not identified	2	16.7%
Total	12	100%

Abscess localization and extension

The lumbar area was the most affected (58.3%) region (7 out of 12 patients), the dorso-lumbar spine was involved in 3 patients (25%), and the cervical spine was involved in 2 case patients (16.7%).The abscesses extension varied from 2 to 8 levels with an average of 3.3 vertebrae. The most common finding was the involvement of 2 or 3 spinal levels in 9 patients (75%). The extension of the abscess in 4, 6 and 8 levels was diagnosed in one case patient each. The epidural abscesses were more common posterior or postro-lateral than anterior or antro-lateral (58.3% versus 41.7%) and the posterior abscesses were more extensive.

Diagnostic guidelines

Back pain, progressive neurologic deficit, and low grade fever remained the distinguishing diagnostic features. Erythrocyte sedimentation rate was elevated in all patients (100%); peripheral leukocyte count was mildly elevated in all patients also (100%).Degeneration of the disk space with erosion of the superior and inferior plates of adjacent vertebrae in 3 individuals (25%) via CT of the spine. However, MRI was the most effective technique for diagnosing spinal epidural abscess, in all patients; we observed T2 hyperintense and T1 hypointense images, which is reinforced by the contrast media injection (fig1, 2 for one patient and fig. 3, 4 for another patient).

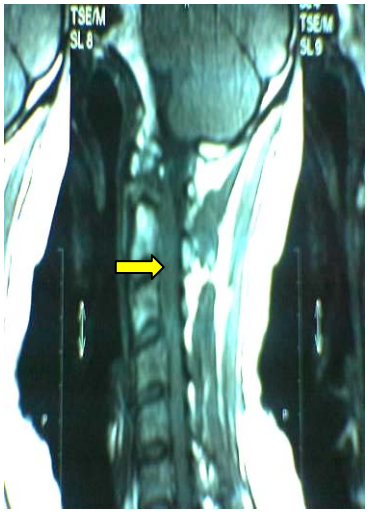

Fig. (1): T 1W saggital cut showing anterior spinal epidural abscess (SEA) opposite C1, 2, 3, 4.

Fig. (2): saggital cut T1W with Gd. showing wall enhancement of SEA opposite C1, 2, 3, 4 (the same patient).

Fig. (3): saggital cuts T2W of dorsal spines showing posterior spinal epidural abscess (SEA).

Fig.(4): axial cut of a dorsal spine (the same patient) T1W with Gd. Showing enhancement of posterolateral epidural abscess (SEA)

Treatment and outcome

Surgical intervention was applied in 7 out of 12 patients (58.3%), in 5 of them decompressive laminectomy with abscess drainage and debridement was done. In one patient who had undergone a prior spinal surgery with plate and screws fixation, we drained the abscess, removed the plate and screws and installed a continuous suction irrigation system. In the other one patient we reached the abscess through the abdominal antrolateral retroperitoneal approach with debridement the intervertebral space and drainage the abscess. All the 7

patients received parentral antibiotics according to the culture sensitivity of the pus and /or granulation tissue for 2 weeks followed by oral antibiotics for 4weeks. Medical treatment (parentral followed by oral antibiotics) for total of 6 weeks according to the blood culture in 3 (25%) case patients and percutaneous CT and/or ultrasonic guided drainage in 2 (16.7%) patients as their general condition was bad (one patient was tuberculus and the other one had liver impairment) with fixation of drainage system for 4 days plus the antibiotic regimen.

Ten patients (83.3%) showed excellent results, presenting independent ambulation and no sphincter changes. 9 of them either had back or radicular pain without or with mild to moderate motor deficit upon admission. However, the tenth one was quadriplegic for 2 hours before surgery. Two patients were paraplegic for 2 weeks at the time of the neurological evaluation and none of them recovered after the surgery. There were 2 deaths in this series 2 months later on due to liver cell failure in one patient and sever depression with subsequent sever malnutrition and immunocompromise in the other.

DISCUSSION

Internationally the frequency of spinal epidural abscesses (SEA) is unknown due to their rare occurrence[74]. However, the appearance of several small series of cases in the last few years suggests that it is no longer as rare a complication[62,82&86]. In the review carried out by Darouiche et al[12], the prevalence rate varied from 0.18 to 1.96 per 10.000 admissions in general hospitals. However, if I consider the number of cases of some series[8&64,66] in relation to its study duration I'll disclose the possible explanation to the wide variation of the SEA frequency between them and my thesis (table 3).

Series of	*No. of cases*	*Duration in yrs.*	*No. of cases Per year*
Rigamonti et al	75	1983-1992=10	7.5
Reihsaus et al	915	1954-1997=44	20.8
Celestino Esteves and José Carlos	24	1986-2003=17	1.4
My thesis	12	2001-2006= 06	02

Spinal epidural abscess can occur at any age however the peak incidence in the sixth and seventh decades of life[11,14&30]. The disease is rare in children, with fewer than 90 cases reported[33]. nevertheless the range of age and /or the average age varies from one case series to another. Reihsaus et al[64] reported that most cases of SEA occur in patients aged 30 to 60 years, but the youngest patient was only 10 years old and the oldest was 87, Celestino et al[8] reported that their patients' ages varied from 17to 73 years, and the average age was 47.5 years and in Wong and Raymond[84] series the average age was 52 years (range 24-75 years).In my thesis the range of age (13-60years) and the mean age (39year) seemed to be less

than others which may be correlated to the small sample of patients. Regarding the gender predominance most of the studies[8,12,64,74&75] and my series confirmed the striking male predominance, some suggested IV drug abuse[74] and in my opinion may be a reflection of the predominance of the diseases and / or predisposing factors to SEA among males.

Clinically the early signs and symptoms may be vague, the 'classic' triad of back pain, fever and variable neurological deficit occurred in only 13% of patients by the time of diagnosis, and contributed to diagnostic delay in 75%[6,12&13]. Local spinal Pain is the most consistent symptom and occurs in virtually all patients at some time during their illness[12,25,50&75] as occurred in all my patients and it was the only feature in four of them at the time of diagnosis. Spinal pain and fever are usually the only symptoms present before a precipitous neurological deterioration occurs[68] and were the only features in two of Mackenzie et al patients[50] and also seven of my patients. There may be a history of neck stiffness with cervical lesions[12] and children may complain of abdominal pain or feeling generally 'unwell'[6&19]. Radicular pain including girdle truncal one occurred in six (50%) of my patients at some time during their illness and also constituted 57% and 47% of Tang et al[75] and Darouiche et al[12] patients respectively. Most patients have major neurological signs before surgery[33] which are thought to result from a compromised spinal cord vasculature rather than direct cord compression[43]. In my series the neurological signs included motor weakness in 8/12 cases and ranged from limb/s weakness in 5/8 to frank paralysis in 3/8 patients, also bladder and /or bowel dysfunction in 4/12 patients. In patients with chronic infection, constitutional symptoms of fever, weight loss, and systemic upset may predominate over the neurological syndrome[16] and lead to late diagnosis and treatment and this presented in two of my patients. Therefore a high index of suspicion is warranted when a patient presents with spinal pain or a neurological deficit in conjunction with fever.

In a major meta-analysis of reports encompassing 915 patients, Reihsaus and colleagues[64] noted predisposing risk factors in 854. The degree of risk associated with each is unclear, but the main ones are:

1. *Compromised immunity*: diabetes mellitus, steroid or other immunosuppressive therapy, malignancy, pregnancy, HIV infection, alcoholism and cirrhosis[67&81]. *Disruption of the spinal column*: degenerative disease and disruption by trauma, surgery or instrumentation, including discography, chemonucleosis and central neuraxial block, the latter also providing a direct portal for organisms. Even temporally distant blunt trauma is a risk factor[12].
2. *Source of infection*: respiratory, urinary and minor soft tissue infections may all act as primary sources of haematogenous spread; i.v. drug abusers are constantly at risk, as are patients with indwelling vascular catheters.

Of the disease processes, diabetes mellitus is the most important, with studies reporting it as a factor in 18–54% of cases[12,59&64] and it was in three (3/12 =25%) of my patients. Also, liver cirrhosis and T.B of the spine (one patient for each) were identified as a disease processes that compromise immunity and predispose

to SEA. The second most common factor in many studies is a history of i.v. drug abuse (7–40%)[59&78], although these figures reflect the study populations of poor, urban communities in the USA[37&59]. In my series this factor has not a role which may reflect the rarity of this bad habit in our societies Remote infection has been described in up to 44% of cases[67], with minor skin or soft tissue infections being encountered in 7–44%[37&53]. Spread to epidural space is usually haematogenous, tend to progress rapidly and is the suspected source of infection in most children and is thought to occur in many adults as well[74] as in one of my child patient who had bacterial endocarditis, but it may be contiguous from psoas, paraspinal, retropharyngeal abscesses, vertebral osteomyelitis or spndylodiscitis which occurs in adults and rarely in children and may evolve over weeks or months with slow progression symptoms[74] this was the case in five of my patients (41.7%).The source of infection and/or predisposing factors could not be identified in many patients[74&80] and this was the case in one of my patients Ten per cent of cases in the review were preceded by trauma, which may have disrupted anatomical barriers or created a portal for the direct entry of bacteria. Also, some authors believe that trauma may lead to formation of vertebral heamatoma which provides ideal conditions for bacterial growth, whatever the route of entry[12&69]. Penetrating non missile injury preceded the occurrence of spinal epidural abscess in one of my patients. The presence of a number of factors obviously increases the risk. For example, in the postpartum period there is altered immunity, with a large raw area open to contamination by skin or faecal flora after delivery, and the epidural space may have been cannulated[38].

Microbiologically, the spectrum of infection depends on the population being studied. In the 'developed' world the organisms most frequently encountered are *Staphylococcus aureus* (57–93% of cases), Streptococci (18%) and a variety of Gram-negative bacilli (13%)[5,37,50,53,54,57,70]. In my series *Staphylococcus aureus* and Gram-negative bacilli were the commonest pathogens and constituted 41.7% (5/12 cases) and 33.3% (4/12 cases) respectively. There are isolated Japanese reports of tuberculous abscesses in immuno-compromised patients[23,72,76] but this infection occurs more widely in less well developed countries[36]. This also was the case in one of my patients (1/12=8.3%) however, in two cases the pathogen was unknown. *Streptococcus milleri* has previously been reported as a cause of spinal epidural abscess[22] and is recognised as an organism with a tendency to abscess formation[2]. *Haemophilus parainfluenzae*[4], Brucella species[61], and *Actinomyces israelii*[35] are amongst the many other isolates described. Disseminated fungal infections such as cryptococcosis, aspergillosis, and blastomycosis are rare causes and usually arise in immunocompromised patients[36]. *Aspergillus* species are known to cause spinal epidural abcess in patients with AIDS[24].

The spinal epidural space is not a uniform space. Posteriorly, the epidural space contains fat, small arteries, and the venous plexus. Infections in this space can and do spread over several vertebral levels. Anteriorly, the epidural space is a potential space with the dura tightly adherent to the vertebral bodies and ligaments[74]. The

described sites of spinal epidural abscess are variable. Rigamonti et al[66] in their series reported that sites of spinal epidural abscess were equally distributed along the spinal axis, also Darouiche et al[12] in their review series noted an equal frequency of anterior and posterior epidural abscesses, although differences were not statistically significant, however the majority were located in the lumbar region followed by thoracic and cervical regions and abscesses extended over an average of 4 vertebrae. On the contrary, Celestino Esteves and José Carlos[8] noted that, the abscesses most frequently occurred on the posterior lumbar region and most of which compromised 2 spine levels, also Danner and Hartman[11] stated that only 20% occur anterior to the spinal cord. Mackenzie et al[50] suggest that abscesses in the cervical or upper thoracic region are not uncommon and three of their eight patients had cervical or thoracic spinal epidural abscesses. Larger studies, however, describe a preponderance of lower thoracic and lumbar abscesses[42]. The patients with lumbar abscesses may be misdiagnosed as having a herniated lumbar disc[17]. In my series the posterior and posterolateral epidural space was more affected than anterior and anteriolateral one (7/12 versus5/12 cases respectively) and the majority were located in the lumbar region (7/12=58.3%) followed by dorso-lumbar (3/12=25%) and cervical (2/12=16.7%) regions and abscesses extended over a range of 2 to 8 spinal levels with an average of 3.3 spinal levels.

Laboratory investigations are helpful, but not diagnostic. Leukocytosis was present in only 68% of cases in one series[12], in my series it was mildly elevated in all cases, whereas the erythrocyte sedimentation rate was consistently elevated, even in patients without neurological deficit[13,75], as in four of my patients and was above 30 mm h^{-1} in a series of patients without fever or leukocytosis[84]. Celestino Esteves and Jose' Carlos[8] in their series observed a direct relationship between the high rates of leukocytosis and ESR and the acute forms of the disease and in the case of patients in whom the ESR was followed in a serial way, they observed a clear relationship between its reduction and the improvement of the clinical symptoms. In adults, especially those with systemic infection, there may be thrombocytopenia, whereas children often have thrombocytosis[3,75]. Blood cultures may grow the infecting organism, especially in those with haematogenous spread and in i.v. drug abusers[48,58]. CT has long been considered the investigation of choice and is only now being replaced by MRI. It is non-invasive, produces reliably high-resolution axial tomograms of the spine, and can detect both encroachment of the spinal canal and air in epidural pus[39]. However, it does not always reliably delineate the spinal cord, epidural space or contained lesions because it is insufficiently sensitive to different soft tissue densities[11], particularly in the cervical region where bone artifact may obscure the canal. Intrathecal injection of water soluble contrast media may aid soft tissue identification, and CT may also be used to guide percutaneous drainage as an alternative to surgical decompression[49], as I did in one of my patients. Magnetic resonance imaging has been considered the most efficient method for SEA diagnosis[11,12,27,28,46,51,55,57,63]. The most

usual image is a lesion producing a mass effect with iso- or hypointense signal in T1, which is reinforced by gadolinium injection, and a nonhomogeneous and hyperintense signal in T2[12&28]. MRI was the most effective technique for diagnosing spinal epidural abscess, in all of my patients.

Most authorities conclude that early surgical decompression and prolonged (6–12 weeks) antibiotic therapy (i.v., followed by oral) are the mainstays of treatment[50,54,66,85], although some acknowledge that there is a place for conservative management with antibiotics alone in carefully selected patients[37]. The decompressive laminectomy is the prescribed procedure with the drainage of the abscess and complete debridement of the infected tissues followed by antibiotic therapy[5,11,12,15,21,28,29,31,37,46,51,56,57,70]. This was the case in five (5/12) of my patients however, in one patient who had undergone a prior spinal surgery with plate and screws fixation, I drained the abscess, removed the plate and screws and installed a continuous suction irrigation system and in other one patient I reached the abscess through the abdominal antrolateral retroperitoneal approach. The drug(s) used must have bactericidal activity against *S. aureus*, low toxicity to permit prolonged treatment, and the capability to penetrate bone effectively[65,77]. A combination of synergistic agents is appropriate until definitive bacteriology results are available. As to start with a third generation cephalosporin and a penicillin with anti-staphylococcal activity, with or without metronidazole, while awaiting the results of culture[16,79]. This combination was applied in all of my patients while awaiting the results of culture. In patients likely to be carrying methicillin resistant *S. aureus*, clindamycin or vancomycin should be part of the empirical regimen[19,20,52]. A scheme of 4 to 6 weeks of intravenous intake of antibiotics followed by 2 to 4 weeks of oral use is enough to eradicate the disease[12,41,56]. In the case patients associated with osteomyelitis, this period should be extended to 8 weeks[11,28,36,55,56]. However, efficacy of antimicrobial therapy and duration of treatment required can be established by monitoring reduction in ESR, CRP, pain, improvement in function and resolution of radiographic abnormalities. It may be appropriate to stop parenteral antibiotics after 4 weeks if the abscesses are drained, the patient is improving clinically and the ESR has decreased by half[71]. In my series only two weeks of IV antibiotics followed by 4 weeks of oral use after the definitive microbiology results was sufficient.

For posterior abscesses well delineated by imaging, percutaneous drainage is possible, and may be the treatment of choice for multi-compartmental abscesses involving the epidural space, and for paraspinal compartments where open surgery is impracticable[9]. Percutaneous drainage has been used mostly in very small children to avoid the long-term complications of spinal surgery[18], but has been reported in adults[9,32,40]. In my series percutaneous CT and ultrasonic guided drainage was applied in one patient for each as their general condition was bad (one patient was tuberculus and the other one had liver impairment) with fixation of drainage system for 4 days plus the antibiotic regimen.

It might be assumed that every patient with an epidural abscess should

undergo surgery, but 11% of those identified in a major review did not[47,64], and another report identified 38 such individuals in case series and reports published between 1970 and 1990[83]. The reasons for medical management were wide: minor neurological signs with the patient already established on antibiotics; poor surgical candidate due to an underlying medical condition; an abscess so extensive that surgery would destabilize the spine; and irreversible paraplegia. This was the case in three of my patients where 2 of them were devoid of neurological deficit and the 3rd had minor neurological signs. However, medical management may have failed in many patients subsequently treated surgically[37]; a conclusion supported by the observation that 19% of patients treated medically suffered a neurological deterioration while on appropriate antibiotics[47]. Some series have noted that tuberculous epidural abscess responds well to non-operative treatment, with good return of function even when the neurological deficit was present for weeks or months[44,45]. Operative treatment is only recommended when medical therapy has failed to produce resolution of symptoms after several weeks and, even then, it may not improve the radiological appearance because of dense scar formation[7,60]. Overall, an epidural abscess due to tuberculosis infection has a better prognosis than one caused by other organisms[1].

Khanna and colleagues[37], followed up 41 patients for an average of 21 months, and identified three factors that were significantly and independently associated with poor outcome; patient age, degree of thecal sac compression and duration of symptoms. With every decade increase in age, the likelihood of poor outcome doubled, presumably due to declining health and, possibly, reduced 'plasticity' of the spinal cord. Duration of symptoms has long been recognized as influencing outcome[28], absence of paralysis, or its presence for <36 h, being associated with better survival and return of function. Others have confirmed both these findings[5,59,85]. In my series the duration of symptoms had a great impact on the outcome where complete quadriplegia with respiratory difficulty for 2 hours before surgery in a 45 years old patient with cervical epidural abscess (C2, 3, 4) reversed to normal after surgery while in another two patients who were paraplegic for 2 weeks before surgery and nearly the same age remained paraplegic after surgery. Although the duration of neurological deficit before surgery determines, in part, the neurological outcome, it is not the sole factor. It has been suggested that permanent axonal or cell body damage, for which Mackenzie et al[50] do not have a clinical indicator, has prognostic relevance. In their experience one patient who was paraparetic for only three hours before surgery remained paraparetic afterwards. By contrast, another patient who was paraplegic for seven hours made a virtually complete recovery after surgery.

A low platelet count may be associated with worse outcome, but may be acting simply as a surrogate marker for the severity of sepsis. The presence of pus as opposed to granulation tissue is also associated with a better outcome because this reflects acute rather than chronic disease[37].

The mortality of epidural abscess has decreased significantly as diagnosis and treatment have improved. A mortality of 81% was reported in

1926[10], but this decreased from 34 to 16% between 1954 and 1980[64]. Some recent surveys have figures below 10%[1,13,26,34,73], but larger studies of non-tuberculous patients suggest that the true figure remains between 13 and 16%[37]. Death may be due to overwhelming sepsis or secondary to prolonged immobility. Khanna et al[37] reported a mortality rate of 19.5%. In the experience of Nussbaum et al[57], there were 2 deaths (5%). Two deaths (4.6%) also occurred in a study of 43 case patients reported by Darouiche et al[12]. There were no surgical deaths in Celestino Esteves and Jose' Carlos study. In the present study there were 2 deaths (16.7%) two months later on due to liver cell failure in one patient and sever depression with subsequent sever malnutrition and immunocompromise in the other. However, ten patients (83.3%) showed excellent results, presenting independent ambulation and no sphincter changes. 9 of them either had back or radicular pain without or with mild to moderate motor deficit upon admission. However, the tenth one who was quadriplegic for 2 hours before surgery.

CONCLUSION

Febrile back pain, radicular pain, and occasional paralysis are very frequent among spinal epidural abscess (SEA) patients. The knowledge of a variable and insidious clinical presentation of this disease is crucial so that a fast and accurate diagnosis can be established. Magnetic resonance imaging has been the examination of choice because it shows the whole extension of the lesion and because it allows a better and distinct diagnosis. The emergency surgical treatment followed by specific antibiotic therapy has proved to be the safer and most efficient way to treat and prevent severe neurological sequels. The conservative treatment should be reserved to those cases in which there is a high surgical risk related to unfavorable clinical circumstances. The essential problem of SEA lies in the necessity of early diagnosis, because only timely treatment is able to avoid or reduce permanent neurologic deficits. The problem with spinal epidural abscesses is not treatment, but early diagnosis - before massive neurological symptoms occur" (Strohecker and Grobovschek 1986). Nevertheless, in spite of the aggressive treatment of the epidural abscesses, morbidity and mortality rates still remain considerable.

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