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Research Article

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A 5-Year Analysis of Spinal Infections at a Neurosurgical Department in New Zealand

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Introduction

A spinal infection is defined as an infectious disease that affects the vertebral body, intervertebral disk or adjacent paraspinal tissue [1]. The main routes of infection include hematogenous spread, direct inoculation into the region by spinal surgery or other minor procedures and direct extension from adjacent infected tissue [2-4]. A native/de-novo infection is one that occurs without any prior intervention to the natural human body. Although this disease is considered uncommon in developed countries, its incidence is on the rise [5]. Diagnosis is often delayed because of its rarity and presentation as vague signs and symptoms.

Methods

This retrospective analysis was conducted at a neurosurgical department in Waikato Hospital, New Zealand. The inclusion criteria included all spinal patients admitted under our department from January 2013 to January 2018. This information was extracted from the hospital's online patient registry. This was cross-examined and checked with our theatre operative records. Statistical analysis was performed on data obtained from clinical notes, discharge summaries, imaging and operation reports. 554 patients who in total had 604 procedures were analysed.

Results

27 patients were treated for spinal infections during that period of time. 15 were male, 12 were female. 20 were post-operative, 7 were native. The mean age was 58.4 years. Of the patients with a recorded smoking status during admission, 71% were smokers. Diabetes was the most common co-morbidity, present in 1/3 of these patients.11% of them were on immunosuppressive medications including prednisolone and methotrexate. The mean WCC (white cell count)on presentation for the 27 patients was 11.6. Staphylococcus aurous was isolated in 55% of these patients. 35% (the majority) of infectionswere localized to the lumbar region. 56% of infections were deep to the fascia. 85% were treated with a washout and antibiotics, 15% with antibiotics alone. The length of inpatient stays for thesepatientsranged from 4-48 days with a mean length of 16.3 days. This was a substantial difference compared to the 5.3 days the other spinal patients spent as inpatients. For the post-operative infections, the duration between surgery and date of recognized infection was 13.6 days.

In a subset of this analysis, native infections were compared against post-operative infections. Patients with native infections had a mean WCC of 15.3 and CRP of 269.7on presentation which was significantly higher than those with post-operative infections (10.3 and77.7 respectively). In terms of discharge destinations, of the patients with native infections 14% were discharged home, 57% were down-transferred to smaller facilities for rehab and 29% died. Of the patients with post-operative infections, 60% were discharged home and 40% down-transferred to smaller facilities. There were no mortalities in this group.

Conclusions

In our cohort of patients, the risk of a post-operative spinal infection was about 3.3%. Patients with spinal infections have three times longer duration of inpatient stay. This predisposes them to further health conditions associated with prolonged hospital admission. The WCC is not a reliable marker of spinal infection. Native infections provoke a more aggressive immune response and have a worse prognosis than post-operative infections.

Pitfalls

1. Two separate units (neurosurgery and orthopaedics) dealing with spinal pathology within Waikato hospital; our department's figures do not represent the entire cohort of spinal patients in the health district
2. Most acute spinal patients are admitted under the orthopaedic unit
3. Suboptimal note-keeping in a small portion of our patients leading to gaps in information

Discussion

A spinal infection involves the vertebral body, intervertebral disk or adjacent Paraspinal tissue [1]. Microorganisms invade these structures by hematogenous spread, direct inoculation into the region by spinal surgery or other minor procedures and direct extension from adjacent infected tissue [2-4]. Spinal infections have a predilection for males and a bimodal age distribution affecting the pediatric population and those in their 50s [3,5,6]. Its incidence is on the rise due to the increased number of spinal surgeries being performed and the rising rates of intravenous drug abuse [7]. A gradual onset back pain that worsens with movement is the most common symptom. The presence of neurologic deficit is often a late sign. Other symptoms include pyrexia, malaise, stiffness and restricted motion, night sweats

and also signs and symptoms of septic shock in severe cases [8,9].

Some of the findings of our 5-year retrospective analysis correlated with international data. We found the mean age of spinal infections to be 58.4 years.Hlavin et al (1990) found the peak incidence to be around the 6th and 7th decades of life [10]. The meanWCC for our 27 patients with spinal infections was 11.6. Davis et al (2004) described only 60% of their cohort of patients with spinal infections having leucocytosis on presentation [11]. Staphylococcus aurous was isolated in 55% of our patients with spinal infections. On a worldwide scale, it is the most commonly responsible microorganism, present in about 63% of cases.

Spinal infections should be taken seriously as they may result in a fatal outcome.Urgent treatment with surgical intervention and antibiotics or just antibiotics where appropriate must be implemented without delay once the diagnosis is confirmed. Clinicians should not be overly reliant on inflammatory markers to prove or disapprove of the diagnosis as they have been shown to be inconsistent in representing an infective process in this condition. Despite the advancements in healthcare, mortality rates remain high as demonstrated by our findings, particularly in the setting of native infections. Some sources quote mortality rates to be about 20% [12].

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