

CASE REPORT

Seizures following lumbar spinal surgery- a case report and review of literature

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ABSTRACT

Seizures after spinal surgery are rare. However, cases of seizures have been reported after lumbar spinal stenosis surgery. The exact etiology of the event is unknown but some antibiotics mixed with irrigation fluid, intracranial hypotension subsequent to cerebrospinal fluid leakage after spinal procedure and potential toxic effect of fat molecules can be a cause. And it occurs rarely in the absence of a history of an internal problem such as renal system hypofunction or pre-existing seizure disorder.

Key words: Spine; Lumbar Vertebrae; Intervertebral Disc; Spinal Canal; Laminectomy; Seizures; Anticonvulsants; Antibiotics

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INTRODUCTION

Seizures after spinal stenosis surgeries are very rare. Well documented complications after lumbar spinal stenosis surgeries are of pulmonary, cardiovascular problems, nerve and dura matter injuries, cerebrospinal fluid leaks, complications secondary to instrumentation and infection etc.¹ We document one case report of a seizure, after lumbar spinal surgery in absence of any history or condition that might trigger a seizure. We tried to discover the possible reason after review of literature.

CASE REPORT

A 75-year-old female patient, weighing 100 kg with preoperative co-morbidities of hypertension, diabetes mellitus type-2, hypothyroidism and chronic kidney disease type- 1, presented with severe low back pain. Patient was categorized as ASA-3. All routine laboratory results were within normal limits except serum urea and creatinine, that were 82 mg/dl and 7.7 mg/dl respectively. She was on regular tab atenolol 10 mg, furosemide 20 mg and



Figure 1: Preoperative MRI showing L4-5 spinal compression

thyroxine 75 µg once daily and glibenclamide 500 mg twice a day. She complained of lumbar and right lower limb radiating pain, showed L4-5 spinal stenosis under a magnetic resonant image (MRI) examination (Image1). The pain failed to subside despite medical treatment, e.g. analgesics, opioids, steroids and physiotherapy.

She was scheduled for surgery including posterior lumbar spinal decompression, posterior lumbar inter-body fusion, and insertion of loop cage at L4-5 vertebrae. General anesthesia with reinforced endotracheal tube and postoperative patient controlled analgesia with morphine was planned. Anesthesia was induced with fentanyl 2 µg/kg, propofol 2 mg/kg and rocuronium 0.12 mg/kg. The patient was ventilated with 100% oxygen and 2% sevoflurane for three minutes and trachea was intubated with 7 mm cuffed reinforced ETT. Maintenance done with 40% oxygen plus sevoflurane (1.5-3.0%). A Foley's catheter was placed. An arterial line was inserted in left radial artery and the patient positioned prone. Surgery completed within six hours, and the patient underwent a normal postoperative recovery process. Before suturing the soft tissues, surgeon washed the region with 2 L of distilled water mixed with inj. gentamicin 160 mg. At the end of surgery patient received 1 gm of cefazolin IV. Intraoperative blood loss was approximately 500 ml and urine output was almost 80 ml/hr. Patient was positioned back to supine position, the residual effect of the muscle relaxant reversed, extubation done when fully awake and transferred to high dependency unit (HDU). Fifteen minutes after shifting to HDU, in our presence she developed tonic-clonic seizures with loss of consciousness; help was called and airway and breathing secured. Inj. midazolam 2 mg given IV. Arterial blood gas sampling done showed respiratory acidosis (pH 7.24, PaCO₂ 56 mmHg), but normal serum electrolytes and glucose. Her ventilation was assisted with 100% oxygen. After five minutes she was fully awake and complained of mild pain at operative site. Plain CT scan was done and it suggested left subacute basal ganglia insult. She was then transferred to surgical ICU. MRI and electroencephalogram (EEG) were done and they were unremarkable. After six hours enoxaprin 40 mg subcutaneous twice a day (BID) started. On second postoperative day she developed paroxysmal atrial fibrillation. Dabigatran 75 mg orally was given twice a day. On third postop day she was stable and transferred to the ward. On sixth postop day she was discharged home.

DISCUSSION

The term 'stenosis' comes from the Greek word meaning 'choking' and is often the result of degenerative conditions such as osteoarthritis and/or degenerative spondylosis. When the spinal nerves in the lower back are choked due to lumbar spinal stenosis and lead to back pain usually radiating through the lower limb and numbness. Reports of seizures after spinal stenosis surgery are rare; the most frequent causes being idiopathic epilepsy, post-meningitis, water intoxication, sustained myoclonus, cerebrovascular disease, cerebral myelitis, eclampsia, brain metastasis of a malignant tumor, hyponatremia, allergy to contrast medium, dialysis etc.⁴ In our case, the patient did not have any history of seizures and any of listed disease. In literature review, we found an interesting case report, which showed that the intravenous antibiotics used after surgery, or the unproven regimens or treatments for infection prevention used by the surgeons can cause postoperative seizures. The common examples are intravenous antibiotics such as, amoxicillin, ciprofloxacin and piperacillin. Antituberculous drugs such as rifampicin, isoniazide and antibiotics e.g. penicillin and ceftazidime used in a mixture with distilled water for washing the operated site can also be a cause.⁵ In our case the surgeon used gentamicin 80 mg/L in distilled water for wound irrigation. This could be a possible reason as already mentioned in literature.² It has been demonstrated that the injection of 500 to 2,500 IU of penicillin into the cortex could cause a focus of seizure in animals.³ Later on, this methodology was used by many researchers for experimental studies of seizures, which demonstrated that cortical injection as well as local application had the same effect. Furthermore, it has recently been demonstrated that the ventricular injection of about 3,000 IU of penicillin could cause a generalized seizure activity. It has been assumed that, during washing at the end of a surgery, the diluted penicillin solution penetrates into and stimulates the dura mater, and may cause seizures on contact with nerve tissues. Seizures have also been reported when piperacillin-tazobactam and cefazolin were injected IV in patients with compromised renal function.^{4,5} In our patient renal function tests were mildly elevated and she received cefazolin 1 G IV before the end of surgery. Postoperative seizure after laminectomy may occur as a result of unrecognized dural tear, resulting in acute cerebrospinal fluid (CSF) loss and the

drastic decrease in the CSF pressure.⁶ Intracranial hemorrhage, particularly subdural, subsequent to CSF leakage after spinal procedures have been associated with seizures.^{6,7} In our case there was no dural tear or CSF leakage. Postconvulsive decrease in pH and a raised PaCO₂ indicate respiratory acidosis probably due to hypoventilation during the episode of seizure. Once started, seizures must be managed with securing the airway, ensuring oxygenation and sedative hypnotics to protect the patient from injury. Most of the seizures subside spontaneously.

CONCLUSION

Our patient experienced a tonic-clonic seizure which appeared after lumbar laminectomy and spinal fixation. No cause found from preoperative history. From a review of literature on many case reports, rare causes of seizures included the antibiotics mixed with water for irrigation of the surgical field, or intravenous antibiotics used for the prevention of infection after surgery.

Conflict of interest: The authors declare no conflict of interest.

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