Surgically assisted caudal anesthesia in a case of Ankylosing Spondylitis—An innovative approach

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Abstract

Anticipated difficult endotracheal intubation and impossibility of conventional methods of neuraxial blocks in Ankylosing Spondylitis (AS) led to our search for an alternative technique of regional anesthesia for total hip replacement surgery in such a patient. The approach undertaken was, after infiltration of the area with a local anesthetic drug, an orthopedic surgeon drilled the posterior wall of sacral hiatus and surgically created a small opening on it. A nerve stimulator needle was then introduced through this opening to get muscle twitches of the great toe, which helped in identification of the sacral epidural space. 30 ml of 0.5% injection ropivacaine was then deposited in this extradural space. Motor and sensory blocks developed within 10 minutes. The novel approach of surgically assisted drilling of the posterior wall of sacral hiatus may be established as an alternative approach to the classical caudal anesthesia when other alternatives fail.

Keywords: Anesthesia, ankylosing spondylitis, caudal anesthesia

Introduction

Ankylosing Spondylitis (AS) is known to be a challenge to the anesthesiologist due to either a difficult airway or seemingly impossible central neuraxial blockade.[1-4]

We report a case of a patient suffering with severe AS and posted for total hip replacement (THR), and how we successfully managed the case by a novel technique of surgically-assisted caudal anesthesia

Case History

A 40-year-old male admitted for total hip replacement (left) was a known case of severe AS in an advance stage. A few years back, he was operated for total hip replacement (right side) in our hospital. At that time, neuraxial blocks at lumbar and sacral region (spinal, epidural and caudal anesthesia) were attempted, but every attempt failed. He was operated under general anesthesia after a troublesome conscious blind nasal intubation.

The patient had a deformed rigid spine from the neck down to the lower back with a stooped posture and without any mobility of head and neck. He was able to open his mouth up to a gap of 1.5 cm between the upper and lower incisor teeth. He had a fused axial skeleton without any movement of the vertebral column [Figure 1]. At the time of his preoperative visit, we examined thoroughly but failed to detect any other systemic involvement, such as any cardiac conduction defects, aortic regurgitation, pulmonary fibrosis and previous cervical spine fracture.

With his bitter experience in the previous anesthetic procedures, he desired to avoid the uncomfortable method

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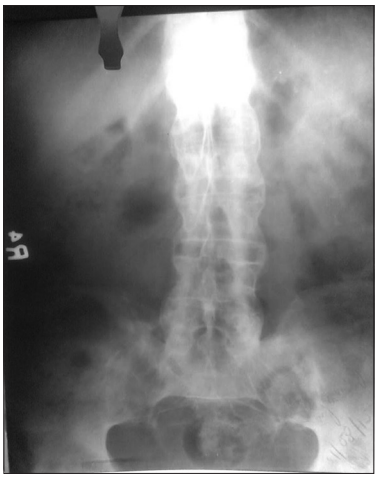

Figure 1: A Lumbo-sacral spine X-ray of the patient showing squaring of the vertebrae, prominent syndesmophytes leading to bamboo spine appearence and diffuse calcification of the spinal ligaments

of blind nasal intubation and repeated attempts at neuraxial anesthesia and accepted the new invasive process. We discussed with him the anticipated difficulties and impending dangers and outcomes of anesthesia and obtained advanced informed consent. Consent was taken for both general and regional anesthesia, and the patient was fasted adequately. The strategy was to first attempt a spinal block, and in case of problem or failure, the alternative plan was a form of surgically-assisted caudal anesthesia. General anesthesia was the last option to try. Awake intubation was not possible due to the unavailability of a fiberoptic bronchoscope in our hospital.

In the operating room, intravenous fluids were started and non-invasive monitoring of blood pressure, heart rate and pulse was initiated. At different spinal levels, lumbar punctures were attempted by median and paramedian approach by two experienced anesthesiologists, but both the attempts failed. The positioning of the patient for the neuraxial block was extremely difficult as there was absolutely no flexion at the hip joints. Next, spinal anesthesia was attempted through sacral dorsal foramen but became unsuccessful. Taylor approach for spinal anesthesia was tried but failed again. After unsuccessful intrathecal approach at different sites and by various techniques, decision was taken to try caudal anesthesia.

Tentative anatomical landmarks like the cornua, the caudal end of the median crest and tip of the coccyx were identified in prone position. The sacral hiatal space was further confirmed with C-arm.[5] After antiseptic dressing over the sacrum, we infiltrated the specific predetermined site with 4 ml of 1% injection lignocaine and draped the patient properly. Before the surgical intervention, caudal anesthesia was tried with an epidural needle and after several unsuccessful attempts decision was taken to drill the posterior wall of sacral hiatus for the introduction of nerve stimulator needle into sacral epidural space.

An orthopedic surgeon drilled the posterior wall of the sacral hiatus with a 2.5 mm drill bit fitted to a hand drill. The drill bit had an adjustable guard 2.5 mm away from its tip to easily control the depth of the drilling hole. He drilled the posterior wall at the angle of 45 degrees in a cephalic direction with great caution so as to avoid drilling the anterior wall. Through the created hole, we introduced the nerve stimulator needle to assess the response of sciatic nerve to the electric stimulus by visualizing the movements of the great toe. We injected 30 ml of 0.5% Ropivacaine in the sacral epidural space (2 ml/segment of the vertebra) through the nerve stimulator needle.

The presence of structures like a pair of coccygeal nerve and the filum terminale does not pose significant problems, especially when the expertise of an orthopedic surgeon is available.

The use of nerve-stimulating needle through the drilling hole on the posterior wall detects sacral epidural space perfectly by stimulation of the sciatic nerve and helps to deposit the local anesthetic drug within it.[6] Movement of the great toe due to the electric stimulus from the nerve stimulator needle tip suggests the needles' position near the L5 and S1 spinal nerve roots and explains the immediate onset of motor and sensory block in both lower limbs with deposition of LA. The excess dose of LA calculated as 2 ml/vertebra was used to accommodate the large capacity of sacral cavity, to attain the desired level of block and to combat the free leakage through the created hole.[7]

Motor and sensory block developed within 15 minutes. We turned the patient to the desired surgical position and asked the surgeons to proceed with surgery. We recorded the blood pressure, heart rate, oxygen saturation and respiration every five minutes. Before beginning the procedure, the upper level of the sensory block by pinprick and motor block by modified Bromage scale was assessed. The sensory block level extended to T11. Motor block involved both lower limbs.

The surgery was uneventful and completed within 2 hours without the need for any intravenous analgesia or sedation. Patient showed hemodynamic stability, full consciousness and satisfaction throughout the operation.

Conclusion

Surgically-assisted caudal anesthesia is beneficial in anatomically distorted sacral hiatus where technical difficulty

in central neuraxial block placement exists. The procedure may however require planning and thorough understanding of the spinal anatomy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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