CASE REPORT

Continuous spinal anesthesia in a patient with ankylosing spondylitis for total hip replacement

Jasmeet Kaur, MD, DNB[1], Adarsh C. Swami, MD[2], Ashwini Sharma, MD, DNB[3], Anjana Sharma, DA[1]

[1]Associate Consultant; [2]Director and Head of Department; [3]Consultant
Department of Anesthesia & Intensive Care, Fortis Hospital, Sector 62, Phase - VIII, Mohali - 160062, Punjab (India)

Correspondence: Dr Jasmeet Kaur, House No. 55, Sector 15-A, Chandigarh- 160015 (India); Tel: 09781995392; E-mail: jasmeetkaurdr@gmail.com

ABSTRACT

Ankylosing spondylitis (AS) is an autoimmune spondyloarthropathy, primarily affecting spine and sacroiliac joints. Other joints including hip, knee, ankle, shoulder, wrist, and temporomandibular joints may be involved. Patients with AS usually present for knee and hip joint replacement and corrective spinal surgery. They pose a challenge to the anesthetist because of difficult airway, restrictive lung disease, and difficulty in performing regional blocks due to fused spinal spaces. Both general and regional (spinal, epidural, combined spinal epidural) anesthesia have been used for the management of these patients. We share our experience of managing a 44 years old male patient with AS with difficult neuraxial approach, for total hip replacement using continuous spinal anesthesia.

Key words: Ankylosing spondylitis; Spinal anesthesia; Ropivacaine

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INTRODUCTION

Ankylosing spondylitis (AS) is an autoimmune spondyloarthropathy, primarily affecting spine and sacroiliac joints. Patients with AS usually present for knee and hip joint replacements and corrective spinal surgery. They pose a challenge to an anesthetist because of difficult airway, restrictive lung disease, and difficulty in performing regional block due to fused spinal spaces. We share our experience of managing a 44 years old male patient with AS for total hip replacement (THR), using continuous spinal anesthesia (CSA).

CASE REPORT

A 44 years old, 170 cm tall, 69 kg male patient, diagnosed case of ankylosing spondylitis, was scheduled for left THR. He had history of AS for the past 15 years, with progressive limitation in movements of spine and both of his hip joints. He also had a well-controlled type-2 diabetes, and was on tab metformin 500 mg twice daily for 3 years. He underwent right THR 18 months back at some other institute under general anesthesia, following multiple failed attempts of spinal/epidural technique. On examination, his vitals and systemic examination were unremarkable. His neck movements were slightly restricted, with adequate mouth opening and Mallampati grade II. His lumbar spine movements were severely limited. Routine blood investigations revealed mild anemia (Hb 8.7 gm/dl). Electrocardiography (ECG) and echocardiography were within normal limits. Pulmonary function tests revealed a restrictive pattern.

Informed written consent was taken for surgery and anesthesia. Patient was premedicated with tablet ranitidine 150 mg and tablet alprazolam 0.25 mg the night before and at 6AM on the morning of surgery. In the operating room, standard monitors were applied, including non invasive blood pressure (NIBP), ECG and pulse oximetry (SpO_2). Continuous spinal anesthesia was planned in sitting position. After local infiltration with inj. lignocaine 2%, epidural needle was advanced in L3-4 space, in subarachnoid space (achieved at a depth of 5 cm from the skin) with difficulty. Keeping the bevel of the needle in cephalad direction, a 20 G epidural catheter was inserted through it, to a depth of 3 cm in the

subarachnoid space. Patient was put in left lateral position after fixing the catheter, and inj bupivacaine heavy 0.5%, 10 mg plus inj fentanyl 25 μg (0.5 ml) was administered through the catheter after aspirating cerebrospinal fluid (CSF). After 5 min, the level of sensory analgesia was checked and confirmed to T7 dermatome level. After 15 min, patient was put in right lateral position and surgery was started. Patient remained hemodynamically stable throughout the surgery. One unit of packed red blood cells was transfused during the surgery. Patient did not require any incremental doses of intrathecal local anesthetic intraoperatively. Surgery was completed within 2 hours uneventfully and the patient was shifted to the high dependency unit (HDU).

For postoperative analgesia, continuous infusion was started using inj ropivacaine 0.05% at the rate of 4 ml/hour (2 mg/hour) through the intrathecal catheter. Systemic analgesics were administered as per our postoperative analgesia protocol, e.g. inj paracetamol 1gm IV every 6 hours and inj diclofenac 75 mg in IV infusion every 12 hours. Pain scores ranged from 0-2 on visual analog scale. Vital signs and motor power of the lower limbs using Bromage scale were closely monitored for 48 hours postoperatively. Patient had no demonstrable motor block. He had stable hemodynamics and did not require any vasopressor support. Low molecular weight heparin and antibiotics were administered as per the protocol. Intrathecal catheter was removed 48 hours post surgery. There were no complaints of headache, nausea or vomiting throughout the HDU stay. Patient was transferred from HDU 72 hours after surgery and was followed up for any occurrence of post dural puncture headache (PDPH). He remained comfortable with no complaint of headache, throughout his postoperative hospital stay of one week.

DISCUSSION

Ankylosing spondylitis is an autoimmune seronegative spondyloarthropathy, characterized by painful chronic inflammatory arthritis. Its incidence is more in males, with a peak age onset of 20-30 years.[1] It primarily affects the spine and sacroiliac joints and eventually causes fusion and rigidity of the spine, typically called the 'bamboo spine'. Other joints including hip, knee, ankle, shoulder, wrist, and temporomandibular joints may be involved. Extra-articular manifestations, relevant to anesthesia, include cardiovascular (valvular defects, conduction defects) and respiratory (restrictive lung defect) systems.

Patients with AS usually present for knee and hip joint replacements and corrective spinal surgery for severe flexion deformities. They pose a challenge to the anesthetist because of difficult airway due to fused cervical spine, restrictive lung disease, difficulty in performing regional block due to fused spinal spaces, risk of atlanto-axial joint subluxation and increased risk of cervical spine fracture.

A thorough pre-operative evaluation should include airway assessment, presence of any extra articular manifestations, documentation of any neurological deficits, and involvement of all joints to plan optimum positioning of the patient. Apart from routine investigations, other tests indicated are ECG, echocardiography, pulmonary function tests, arterial blood gas analysis, and imaging of the cervical and lumbar spine.

We planned to perform a regional block instead of general anesthesia because of its advantages like less blood loss, lesser incidence of deep vein thrombosis, avoidance of respiratory complications post extubation, and better postoperative analgesia.

We performed CSA instead of Combined Spinal Epidural anesthesia, as it was technically simpler and more reliable with a definite end point of CSF aspiration from the catheter. Epidural space is narrow in patients of AS, so there is an increased risk of inadvertent dural puncture during attempts of epidural catheter insertion. Total spinal anesthesia has been reported after test dose in epidural catheter in a patient of AS undergoing THR.[2] Moreover, the patient had history of failed attempts of neuraxial block in the past. Mollman et al, compared the quality of analgesia between spinal and epidural anesthesia, using bupivacaine 0.25%, in post THR patients and concluded that CSA provides faster onset, and ensures better analgesia.[3] Shukla et al have described successful use of CSA, using bupivacaine, for intraoperative use and postoperative management of THR in a patient with severe AS.[4] A retrospective study done by Sutter et al compared continuous spinal anesthesia with continuous epidural anesthesia for lower limb orthopedic surgery in the elderly and found continuous spinal anesthesia to be more reliable and to provide better cardiovascular stability.[5]

CSA has the advantage over single shot spinal anesthesia, that level of block can be adjusted using incremental doses of local anesthetic drug, thus maintaining more stable hemodynamics. Also, it can be used as a reliable means for postoperative analgesia.

Bupivacaine has been extensively used in spinal and epidural blocks. We used Bupivacaine in the intraoperative period and switched to ropivacaine for post operative analgesia as it causes less motor blockade [6] and has higher toxicity threshold as compared to bupivacaine. Ropivacaine has been used postoperatively for continuous spinal analgesia after arterial bypass surgery of the lower extremities, at a dose of 2 mg/hour.[7]

We used standard epidural set (18G Touhy needle and 20G catheter) for the procedure, due to non-availability of spinal catheter set in our institution. Main concerns regarding use of intrathecal catheters are infection, postdural puncture headache (PDPH), and neurological complications, including cauda equina syndrome (CES).[8,9] Cranial positioning and restriction of intrathecal length of catheter to less than 4 cm are advocated to prevent CES. Initially micro-catheters were recommended (28 Gauge) for CSA to prevent PDPH. Due to high resistance of micro-catheters and slow speed of injection, two main problems were reported with them i.e. inadequate anesthesia and neurotoxic effects (CES).[8] Also, studies have shown that fine catheters may bend or knot during insertion.[10]

In conclusion, continuous spinal anesthesia, if done cautiously, is a reliable and effective technique for the intra-operative and postoperative management of patients with difficult neuraxial approach.

Conflict of interest: None declared by the authors

Author contribution: JK: Conducted the case; ACS: Supervision of the case and the report; AS & AS; Concept and manuscript writing

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