10.5005/jp-journals-10049-0042

CASE SERIES

Ankylosing Spondylitis: Challenges in Anesthetic Management for Elective Orthopedic Surgeries

[1]Sarika S Naik, [2]Channabasava Patil, [3]Saraswathi Devi

ABSTRACT

Ankylosing spondylitis (AS) is a chronic inflammatory disease of the axial skeleton in which the inflammatory process starts from the sacroiliac joints and spreads cephalad to affect the spine up to the cervical level along with costovertebral joints. These changes make administration of both general and regional anesthesia difficult. Patients with chronic diseases of the spine and altered anatomy pose technical challenges to the anesthesiologist. Hence, airway management and achieving central neuraxial blockade may be impossible. Complications of difficult intubation can be avoided by regional anesthesia with an added advantage of postoperative analgesia and faster recovery of the patient.

Keywords: Ankylosing spondylitis, Caudal epidural block, Central neuraxial block, Lumbar plexus block.

How to cite this article: Naik SS, Patil C, Devi S. Ankylosing Spondylitis: Challenges in Anesthetic Management for Elective Orthopedic Surgeries. Res Inno in Anesth 2018;3(1):18-21.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Ankylosing spondylitis is a chronic inflammatory disease of the axial skeleton in which the inflammatory process starts in the sacroiliac joints and spreads cephalad to affect the spine up to the cervical level along with costovertebral joints.[1] There may be stiffness of the axial skeleton with ossification of axial ligaments and sacroiliac joints, along with decreased intervertebral spaces causing spinal rigidity.[1,2] The formation of bony bridges (syndesmophytes) between vertebrae results in a classic "bamboo spine" appearance.[1,2] These changes make the administration of both general and regional anesthesia challenging.[1,2]

[1]Assistant Professor, [2,3]Professor and Head

[1,3]Department of Anesthesia and Critical Care, The Oxford Medical College and Research Hospital, Bengaluru, Karnataka India

[2]Department of Orthopedics, The Oxford Medical College and Research Hospital, Bengaluru, Karnataka, India

Corresponding Author: Saraswathi Devi, Professor and Head Department of Anesthesia and Critical Care, The Oxford Medical College and Research Hospital, Bengaluru, Karnataka India, Phone: +919916822927, e-mail: bitta301@gmail.com

MATERIALS AND METHODS

We report the challenges encountered due to the varied anatomy of the spine in our institution posted for elective orthopedic surgeries. We managed two cases of AS posted for total hip replacement. The first patient was a 31-year-old male and the second was a 35-year-old female. Both patients presented with lower backache with progressive stiffness of the knee joint progressing gradually to hip joint and lumbar spine with no family history and extraskeletal manifestations. On examination, both patients were moderately built and nourished with adequate mouth opening ruling out temporomandibular joint pathology and the other systems were within normal limits.

The classical "bamboo spine" appearance was seen in both cases with varying amount of syndesmophytes seen on radiography (Fig. 1). The first case had 2 cm chest expansion with pulmonary function test showing severe restrictive lung disease with minimal improvement on postbronchodilator therapy. The other case had 5 cm chest expansion with pulmonary function test and reported moderate restrictive lung disease which improved on postbronchodilator therapy. We planned an elective regional anesthesia in both cases to avoid complications of general anesthesia. The procedure was explained in detail to the patients and written informed consent was taken. The first case was planned under combined spinal and epidural anesthesia. After attaching standard monitors, intravenous fluid was started and patient was

Fig. 1: Altered anatomy of ankylosing spondylitis

Fig. 2: C-arm guided technique for regional anesthesia

positioned in the left lateral side. Under strict aseptic precautions, the procedure was started, epidural space could not be identified by median, paramedian, Taylor's approach, blind technique as well under C-arm guidance (Fig. 2). Later, caudal epidural space was identified by loss of resistance technique and epidural catheter was threaded in a left lateral position. Local anesthesia was given with 0.5% bupivacaine and 2% lignocaine with adrenaline and fentanyl in a graded amount. But the level of anesthesia was only up to L1 after 30 minutes. So, we decided to thread lumbar plexus catheter. The psoas space was identified using 18 g Tuohy needle by loss of resistance technique and catheter was threaded. The level of anesthesia was adequate with both catheters *in situ*. The surgery was carried out under continuous lumbar plexus and caudal epidural block. The patient was stable throughout the surgery. Continuous analgesia was given for 72 hours through both the catheters. The patient was mobilized on the second day of surgery with no pain. Both catheters were removed after 72 hours.

The second case was also managed under regional anesthesia. We had planned for combined spinal and epidural anesthesia. After attaching all standard monitors, intravenous fluid was started, the patient was positioned in left lateral side. Epidural space was not identified by midline approach after multiple attempts. Paramedian approach was tried with 18 g Tuohy needle and we could successfully thread the catheter. Later, spinal anesthesia was given at L2 to L3 space by paramedian approach. The patient was stable throughout the surgery. Continuous postoperative analgesia was given for 72 hours through the catheter. The patient was mobilized on the second day of surgery with mild pain.

DISCUSSION

Ankylosing spondylitis is a chronic progressive inflammatory disease affecting mainly the sacroiliac joint progressing centrally to vertebral involvement leading to fibrosis and fusion of all the axial skeleton.[3] The peak age of onset is between 20 and 30 years and is more common in males.[3] Chronic spondylitis and ankylosis cause forward curvature of the thoracic spine, leading to restrictive lung disease.[4,5] It also affects the joints of the rib cage decreasing the lung capacity further.[4,5] This leads to the respiration being diaphragm dependent.[4,5] The cervical spine is affected late, leading to stiffness of the cervical spine and reduced movement.[4,5]

Arthritis in joints other than the spine can occur at the hips, knees, and ankles.[4,5] Other areas of the body affected include the eyes, heart, lungs, and occasionally the kidneys.[4,5] Patients with severe AS present specific challenges to the anesthesiologist.[4,5] The anesthesiologist should consider the extension of the disease, degree of upper airway involvement, problems related to positioning, and technical difficulties of neuraxial anesthesia.[5,6] Patients with extra-articular involvement are at increased risk of anesthesia.[5,6] In our patients, we had planned for regional anesthesia to avoid complications related to general anesthesia. The central neuraxial blockade was difficult through midline approach due to ossification and syndesmophytes formation, but we could identify spinal and lumbar epidural space through paramedian approach in one patient. In the other case, we could pass caudal epidural catheter and lumbar plexus catheter to carry out the surgery.

Though the regional anesthesia has many advantages over general anesthesia, it was being used rarely in the past due to technical difficulties.[7] There are only few studies of successful spinal and epidural anesthesia in AS.[7] Schelew and Vaghadia[8] reviewed 80 patients over a period of 10 years, where a partial success was seen with spinal anesthesia attempted in 20% of the cases only. Central neuraxial blockade may be difficult by midline approach in these patients due to ossification and osteophytes while paramedian or Taylor's approach may be tried.[9,10] Caudal epidural is also an option for hip replacement surgeries.[11] Increased height of blockade affects the diaphragmatic innervation, leading to respiratory complications and acute hemodynamic effects due to high sympathetic blockade.[11-13] The patients can still move the neck, fusion of the lumbar spine may be incomplete, enabling the increase in the success rate of central neuraxial blockade.[11-13] High-resolution sonography can be used preoperatively to assess the technical difficulty before performing central neuraxial blockade.[14-17] Spinous process and interspinous space can be identified very accurately using sonography compared with clinical assessment.[14-17]

Chin et al[18] reported more accurate location of central neuraxial blockade with ultrasound compared

with the clinical method by palpation. In their study of 120 patients undergoing total hip replacement under spinal anesthesia with a body mass index >35 kg/m^2 and significant spinal deformity, they reported twofold success rate in ultrasound-guided group compared with palpation group. The number of needle passes was less in the ultrasound group and the first attempt success rate was double in this group.[19] Karmakar et al[20] could access the epidural space successfully in the first attempt in 14 out of 15 cases using real-time ultrasonography.

Marino et al[21] reported the less need for opioid dosage with decreased side effects during continuous lumbar plexus and femoral blocks. They also reported continous lumbar plexus block as a superior pain control modality to femoral block or patient-controlled analgesia after total hip replacement.[21] Continuous lumbar plexus block is a more effective analgesic modality than is a continuous femoral block or patient-controlled intravenous administration of hydromorphone alone during physical therapy following primary unilateral total hip arthroplasty.[21] In their study, there was a significant decrease in the pain score during physiotherapy on postoperative day 1 ($p < 0.0001$) and day 2 ($p < 0.0001$) with continuous lumbar plexus block in comparison with femoral block or patient-controlled analgesia.[21] They also reported that continous lumbar plexus block was associated with less patient-related side effects ($p < 0.05$) and increased patient satisfaction ($p < 0.05$); the patient could walk more ($p < 0.05$) with lumbar plexus block in comparison with continous femoral block or patient-controlled analgesia.[21] In their study, continuous lumbar plexus block significantly reduced pain scores during physiotherapy on postoperative day 1 ($p < 0.0001$) and day 2 ($p < 0.0001$) compared with either continuous femoral block or patient-controlled analgesia alone.[21]

A comparative study by Nishio et al[22] compared caudal epidural block, intravenous patient-controlled analgesia, femoral nerve block, and nonsteroidal anti-inflammatory drug (NSAID) for postoperative analgesia after total hip replacement. They reported that pain was less in femoral nerve blockade, caudal epidural, intravenous patient-controlled analgesia group compared with the NSAID group. They also reported that nausea and vomiting were less in patients with femoral nerve block and caudal epidural compared with the other two groups.[22] The postoperative rehabilitation was early in the caudal epidural and femoral nerve blockade group.[22]

CONCLUSION

Patients with chronic diseases of the spine and altered anatomy pose technical challenges to the anesthesiologist. Hence, airway management and achieving central neuraxial blockade may be difficult or impossible. In our cases, we have highlighted various modalities of regional anesthesia in severe AS like paramedian approach for central neuraxial blockade, lumbar plexus block, and caudal epidural block. Difficult intubation complications can be avoided by regional anesthesia with an added advantage of postoperative analgesia and faster recovery of the patients.

REFERENCES

1. Goyal R, Singh S, Shukla RN, Singhal A. Management of a case of ankylosing spondylitis for total hip replacement surgery with the use of ultrasound-assisted central neuraxial blockade. Indian J Anaesth 2013 Jan;57(1):69-71.
2. Woodward LJ, Kam PC. Ankylosing spondylitis: recent developments and anaesthetic implications. Anaesthesia 2009 May;64(5):540-548.
3. Sieper J, Braun J, Rudwaleit M, Boonen A, Zink A. Ankylosing spondylitis: an overview. Ann Rheum Dis 2002 Dec;61 (Suppl 3):iii8-iii18.
4. Saringcarinkul A. Anesthetic considerations in severe ankylosing spondylitis. Chiang Mai Med J 2009 Sep;48(2):57-63.
5. Kotekar N, Nagalakshmi NV, Gururaj, Rehman M. A case of severe ankylosing spondylitis posted for hip replacement therapy. Indian J Anesth 2007 Mar;51(6):546-549.
6. Sciubba DM, Nelson C, Hsieh P, Gokaslan ZL, Ondra S, Bydon A. Perioperative challenges in the surgical management of ankylosing spondylitis. Neurosurg Focus 2008;24(1):E10.
7. Sivrikaya GU, Hanci A, Dobrucali H, Yalcinkaya A. Cesarean section under spinal anesthesia in a patient with ankylosing spondylitis. Middle East J Anesthesiol 2010 Oct;20(6): 865-868.
8. Schelew BL, Vaghadia H. Ankylosing spondylitis and neuroaxial anaesthesia—a 10 year review. Can J Anaesth 1996 Jan;43(1):65-68.
9. Jindal P, Chopra G, Chaudhary A, Rizvi AA, Sharma JP. Taylor's approach in an ankylosing spondylitis patient posted for percutaneous nephrolithotomy: a challenge for anaesthesiologists. Saudi J Anaesth 2009 Jul-Dec;3(2):87-90.
10. Talikoti AT, Dinesh K, Kumar A, Goolappa. Ankylosing spondylitis: a challenge to anaesthesiologists due to difficulties in airway management and systemic involvement of disease. Indian J Anaesth 2010 Jan-Feb;54(1):70-71.
11. DeBoard JW, Ghia JN, Guilford WB. Caudal anaesthesia in a patient with ankylosing spondylitis for hip surgery. Anaesthesiology 1981 Feb;54(2):164-166.
12. Viitanen JV, Kokko ML, Lehtinen K, Suni J, Kautiainen H. Correlation between mobility restrictions and radiologic changes in ankylosing spondylitis. Spine (Phila Pa 1976) 1995 Feb;20(4):492-496.
13. Kumar CM, Mehta M. Ankylosing spondylitis: lateral approach to spinal anesthesia for lower limb surgery. Can J Anaesth 1995 Jan;42(1):73-76.
14. Furness G, Reilly MP, Kuchi S. An evaluation of ultrasound imaging for identification of lumbar intervertebral level. Anaesthesia 2002 Mar;57(3):277-280.
15. Grau T, Leipold RW, Conradi R, Martin E, Motsch J. Efficacy of ultrasound imaging in obstetric epidural anesthesia. J Clin Anesth 2002 May;14(3):169-175.

16. Vallejo MC, Phelps AL, Singh S, Orebaugh SL, Sah N. Ultrasound decreases the failed labor epidural rate in resident trainees. Int J Obstet Anesth 2010 Oct;19(4):373-378.
17. O'Donnell D, Prasad A, Perlas A. Ultrasound-assisted spinal anesthesia in obese patients. Can J Anaesth 2009 Dec;56(12):982-983.
18. Chin KJ, Perlas A, Chan V, Brown-Shreves D, Koshkin A, Vaishnav V. Ultrasound imaging facilitates spinal anesthesia in adults with difficult surface anatomical landmarks. Anesthesiology 2011 Jul;115(1):94-101.
19. Chin KJ, Perlas A. Ultrasonography of the lumbar spine for neuraxial and lumbar plexus blocks. Curr Opin Anesthesiol 2011 Oct;24(5):567-572.
20. Karmakar MK, Li X, Ho AM, Kwok WH, Chui PT. Real-time ultrasound-guided paramedian epidural access: evaluation of a novel in-plane technique. Br J Anaesth 2009 Jun;102(6):845-854.
21. Marino J, Russo J, Kenny M, Herenstein R, Livote E, Chelly JE. Continuous lumbar plexus block for postoperative pain control after total hip arthroplasty. J Bone Joint Surg Am 2009 Jan;91(1):29-37.
22. Nishio S, Fukunishi S, Juichi M, Sahoko K, Fujihara Y, Fukui T, Yoshiya S. Comparison of continuous femoral nerve block, caudal epidural block, and intravenous patient-controlled analgesia in pain control after total hip arthroplasty: a prospective randomized study. Orthop Rev (Pavia) 2014 Mar;6(1):5138.