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Case Series

Successful neuraxial blockade under lumbar X-ray guidance in patients with ankylosing spondylitis: A series of 3 cases

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ABSTRACT

Ankylosing spondylitis poses several anesthetic challenges ranging from difficult airway to difficult neuraxial blockade. Limited cervical spine mobility, restricted opening of the temporomandibular joint, and cardiorespiratory compromise makes neuraxial anesthesia the preferred technique in these patients. However due to the ossification of the interspinous ligament and ligamentum flavum, and also syndesmophytes between adjacent vertebrae, neuraxial anesthesia poses its own set of challenges. We present a series of 3 cases in which a preoperative lumbosacral X-ray spine and fluoroscopic guidance in the operation theater allowed for an easy and more effective technique for neuraxial anesthesia in ankylosing spondylitis patients posted for transurethral resection of prostate.

1. Introduction

Ankylosing Spondylitis (AS) is a chronic inflammatory arthritic disease causing fusion of the axial skeleton. There is ascending progression of endochondral ossification leading to bamboo spine and severe limitation in spine mobility.[1] Various anesthesia challenges from difficult airway to difficult neuraxial anesthesia are posed. We present a case series of 3 patients with Ankylosing Spondylitis in which we were able to give successful neuraxial anesthesia with help of a preoperative Lumbar X-ray, and fluoroscopic guidance in the operation theater.

2. Case Series

2.1. Case 1

A 60-year-old male patient, a known case of AS since 10 years, with no medical comorbidities was posted for Transurethral Resection of Prostate (TURP) in view of Benign Prostatic Hypertrophy (BPH). All blood investigations were within normal limits. On airway examination limited cervical mobility was noted. X-ray Lumbar spine demonstrated characteristic bamboo spine (Figure 1).

2.2. Case 2

A 72-year-old male patient with no medical comorbidities, diagnosed case of ankylosing spondylitis since 15 years was posted for TURP surgery. Blood investigations, ECG, Chest X-ray were normal. On airway examination, mouth opening was adequate with limited neck movements.

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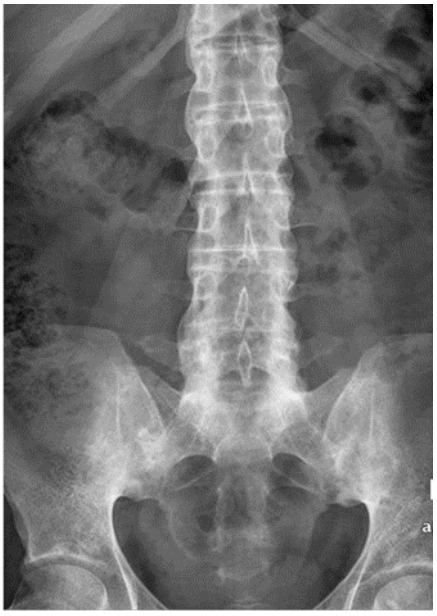

Fig. 1: Bamboo spine

2.3. Case 3

A 54-year-old male patient, known case of Ankylosing spondylitis with BPH was posted for TURP. He was a known case of ischemic heart disease, on medication. Mouth opening was adequate but neck extension was severely limited. Preoperative X-ray Spine showed severe bony ankylosis, however, a small opening to access the canal in left paramedian region, at L3-L4 level could be seen.(Figure 2)

All 3 patients aged from 54 to 68 years, were diagnosed to be suffering from Ankylosing spondylitis and were on treatment since several years. They were thoroughly investigated and optimized before surgery. All patients had mild respiratory and cardiovascular compromise. For TURP, neuraxial anesthesia is the preferred mode, in order to facilitate early detection of volume overload and electrolyte imbalance. However, in ankylosing spondylitis patients, neuraxial blockade is difficult, as there is ossification of the spinal ligaments which form a bony cast over the intervertebral spaces, thus blocking the access of the spinal needle.

Preoperatively, in all patients we advised a pre-operative X-ray of the lumbar spine in which the intervertebral spaces and pattern of ossification was studied. Dark areas on the X-ray represent low-density areas between or around the bone, whereas the denser bone shows up as lighter shades. The darker, low-density areas as seen in Figure 2 were identified as areas that may represent an access route for neuraxial anaesthesia. We chose the most probable intervertebral space for better outcomes.

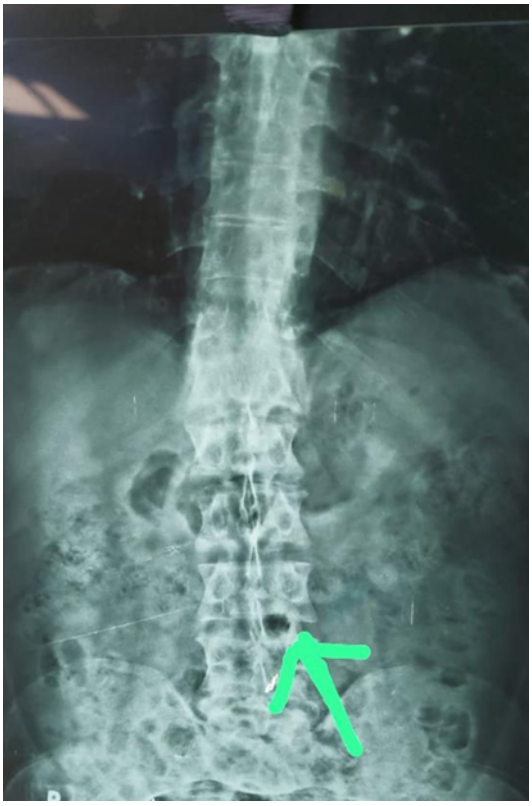

Fig. 2: Window for entry

After taking the informed written consent and discussing risks associated with general and regional anesthesia, patients were counseled for awake fibreoptic intubation, in case of regional anesthesia failure. The difficult airway cart with fiberoptic bronchoscope was kept ready.

After connecting multipara monitor and securing a wide bore peripheral IV access and started intravenous fluids. All 3 patients due to limited mobility and pain, had difficulty in giving sitting position for spinal anesthesia, hence lateral position was given. Under strict aseptic precautions, after painting and draping, under fluoroscopic guidance, we inserted 25G Quincke spinal needle via paramedian approach in lumbar intervertebral spaces either L3-4 or L4-5, as per the best space identified on the preoperative X-ray. Normally the needle entry is midline, through the interspinous ligament. However, in ankylosing spondylitis, due to ossification of the interspinous ligament, a paramedian approach needs to be taken. (Figure 3)

We gave 3cc 0.5% Bupivacaine and maintained level of spinal anesthesia at T-10 which was adequate for TURP. In the third patient, even after repeated attempts we were not able to reach the subarachnoid space. Prone position was given and we inserted 18 G Tuohy's Epidural needle in caudal space under fluoroscopic guidance.(Figure 4)

We achieved adequate level of sensory and motor anesthesia in all patients.

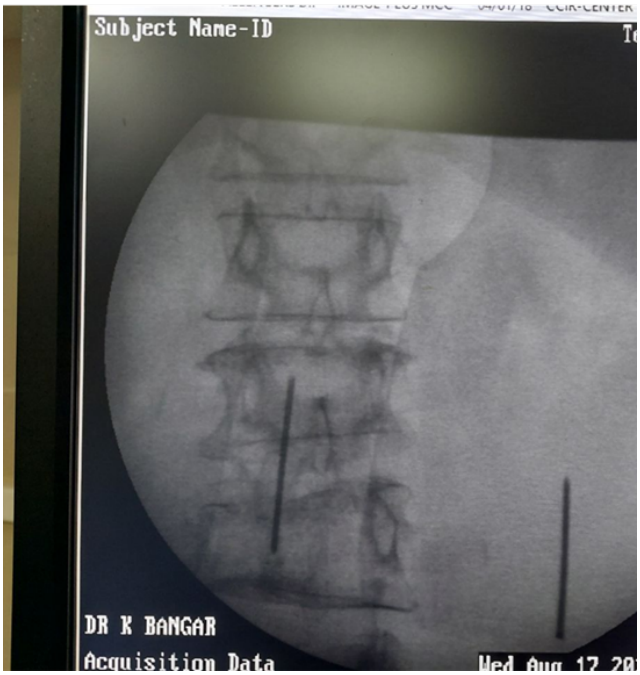

Fig. 3: Paramedian approach

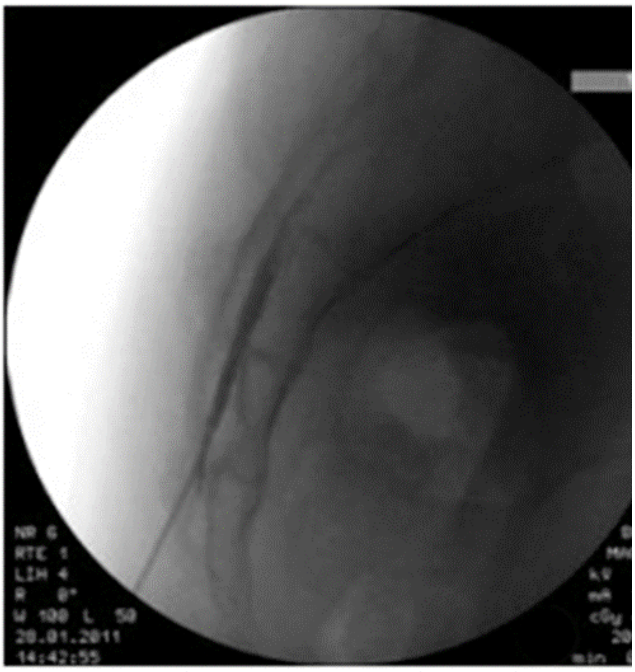

Fig. 4: Caudal dye spread

3. Discussion

Ankylosing Spondylitis is a chronic immunological disorder which results in severe limitation in joint mobility and involves various organs resulting in cardiorespiratory compromise. This presents as unique challenge to anesthesists.[2] Due to cervical involvement there is difficulty in neck extension, also due to fibrosis and ossification TM joint may be involved resulting in difficult airway management. Neuraxial anaesthesia becomes difficult due to bony bridges (syndesmophytes) between adjacent vertebrae. Due to the ossification of interspinous ligament and ligamentum flavum, placement of epidural or spinal needle fails in many cases. Due to decrease in mobility and ossification of ligaments regional anesthesia becomes nearly impossible using blind technique. Therefore we planned X-ray guided regional anesthesia which we observed as a technique which resulted in successful regional anesthesia. Our patients were posted for TURP in which regional anesthesia is preferred. Coetzer et al have similarly used lumbar X-rays for neuraxial anesthesia in previous spine surgery patients.[3] Several techniques have been applied for regional anesthesia like epidural and caudal anaesthesia each with its own merits and demerits. Ultrasound guided approach has also proven to have a good success rate[4,5] with the added advantage of absence of radiation exposure. However, availability and expertise may be an issue.

Another interesting approach described by K.H. Leung was by performing spinal laminotomy under local anaesthesia and was introducing a spinal catheter, followed by 0.5% bupivacaine with fentanyl given for anaesthesia.[6]

In 2018, Mayank Gupta has described Fluoroscopy guided paramedian approach to subarachnoid block in a similar case series.[7]

Few challenges that we can foresee in applying this technique could be:

1. Inability of the patient to lie prone in cases where the spine fusion has occurred in an abnormally flexed position as is seen in some AS patients. In such cases, lateral position, though could be challenging in itself, could be tried.
2. Anesthesiologists are not routinely using fluoroscopy for neuraxial blockade or even for peripheral blocks. Hence visualization, orientation, space identification may be difficult. Spine interventions need goof understanding of various structures, ability for squaring and getting the perfect image is key for success of use of our described technique. In our opinion, a basic course in fluoroscopic spine interventions would help anesthesiologists to utilize this effective tool in their practice for difficult cases such as these.

We found fluoroscopy guided approach better than blind in AS. We were able to provide safe anesthesia with minimum discomfort to patients and at the same time avoiding general anesthesia. The technique used by us, unlike most other authors has utilized a preoperative X-ray to identify potential space for entry into the neuraxial space. Through this we would like to stress the importance of preoperative assessment and investigations for optimum preparedness, so that we are able to provide the best possible option to our patients.

4. Conclusion

Patients with AS pose a challenge to anesthesiologists in terms of difficult airway, respiratory and cardiovascular compromise and difficult neuraxial blockade. Through this case series we have highlighted ways in which we can achieve central neuraxial blockade satisfactorily, through use of simple means such as preoperative lumbar X-ray and use of fluoroscopy during induction of anesthesia.

5. Source of Funding

None.

6. Conflict of Interest

None.

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