

# Bilateral Total Hip Replacement In A Patient With Severe Ankylosing Spondylitis Utilizing Continuous Spinal Anaesthesia

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## Abstract

This case reports describes successful use of continuous spinal anaesthesia for Intraoperative use and postoperative management of right sided total hip replacement in a 38 year old Chinese patient with severe ankylosing spondylitis. A 25G spinal catheter was introduced in Lumbar3-4 space using a paramedian approach. The block was induced with 2.5 ml of 0.5% Bupivacaine heavy with 20 µg of fentanyl. Post operative analgesia was provided by a continuous infusion of 6 mg/hr of Bupivacaine. The procedure was uneventful and patient was completely pain free. The patient underwent total hip replacement for left hip joint three months later under continuous spinal anaesthesia again. No complications associated with procedure were encountered on either occasion.

Continuous spinal anesthesia can be considered as an option for management of lower limb surgery in patients with ankylosing spondylitis where management of airway is a problem.

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## INTRODUCTION

Ankylosing spondylitis (AS) is defined as a chronic inflammatory disease of the joints of the axial skeleton, manifested clinically by pain and progressive stiffening of the spine<sup>1</sup>. Functionally, the patient is most limited by the hip disease. Total hip replacement offers such patients a new lease of life.

AS also presents with unique problems for anesthesiologist like limited respiratory excursion corresponding to restrictive lung disease, difficult airway due to fused cervical spine, difficulty in performing regional block due to fused spinal spaces, risk of subluxation of atlanto-axial joint and increased risk of cervical spine fracture.

Total hip replacement (THR) in such patients can be performed under regional or general anaesthesia. Regional anaesthesia techniques described include epidural, spinal, combined spinal epidural for such patients. However, we selected continuous spinal because of well defined endpoint of procedure and option of reliable, fast prolongation of duration of block.

## CASE REPORT

We would like to share our experience in the use of Continuous Spinal Anaesthesia (CSA) for bilateral THR, in two separate sittings, in a 38 year old Chinese male, 152 cm tall, weighing 58 kg and with severe AS involving complete spinal column and both the hip joints. The patient had great difficulty in walking and was unable to sit. The patient had a history of increasing neck and back stiffness for the past 20 years later diagnosed as AS. He was later diagnosed to have avascular necrosis of the both the femoral head and as such was planned for total hip replacement of right side to be followed by that of left hip joint in second sitting.

The patient had extreme difficulty turning his neck. Neck flexion, extension and rotation were less than 15 degrees. Lumbar flexion was similarly limited. He had an Interdenture distance of only 2 fingerbreadths. Modified Mallampati score was grade 4, Thyromental distance was less than 3cm and mouth opening was 2.5cm. Patient also had a goiter.

Because of nature of surgery it was decided to conduct the surgery utilizing continuous spinal anaesthesia with provision of difficult airway cart having fiberoptic bronchoscope and alternate airways like laryngeal mask and

airway management device kept ready in case of need of assisted ventilation.

Spinal anaesthesia was induced in induction room with patient in left lateral position and under monitoring of ECG lead II, SpO<sub>2</sub> and NIBP. Patient's back was prepared and draped. A skin wheal was raised with 2% Lignocaine at L3-4 space 2 cm left to midline. A 21 G spinal needle (Pencil point Sproette needle 21G, 25G spinal catheter with single end hole 90cm, Intralong set, Pajunk, Germany) needle was then introduced with a slight cephalad and medial direction attempting to enter intervertebral foramen between L3-4. The subarachnoid space was located about 6 cm from skin, a 25G single hole spinal catheter was then introduced to a depth of 3 cm in subarachnoid space and secured to skin.

The patient was then turned supine and spinal anaesthesia was induced by introducing 2.5ml of 0.5% heavy Bupivacaine (Astra Zeneca Australia) and 20mcg of Fentanyl through the spinal catheter. Five minutes later the level of sensory analgesia was confirmed to be at T6. Patient had an episode of hypotension (BP 84/48 mm of Hg) 5 minutes after inducing block which could be managed with fluid challenge and 6mg bolus of iv Ephedrine. The patient was kept supine for 20 minutes and level of sensory block was rechecked (T6). The patient was then positioned for surgery and surgery was allowed to proceed.

After about 150 min after initiation of block patient experienced some discomfort at operative site. The block was augmented with 0.6ml of 0.5% plain Bupivacaine. Patient required one more dose of 6mg of iv Ephedrine intraoperatively for another episode of hypotension.

Patient also received IV Pethidine 30mg (for shivering), IV Cefuroxime 3g in 2 equally divided doses, and IV Metoclopramide 10mg. He was also provided 3liters of IV fluids both crystalloid as well as colloids.

Intraoperatively patient was comfortable and vital parameters could be maintained without much problem. The surgery lasted for four hours and estimated blood loss was 600 ml.

He was transferred to the ICU postoperatively for close observation and continuation of CSA.

In the postoperative period analgesia was provided with a continuous infusion of Bupivacaine at 0.6mg/hr (4 ml of 0.5% Bupivacaine diluted with 16 ml of normal saline,

infused intrathecal @ 0.6ml/hr) for 30 hrs. Pain score ranged from 0 to 1 (VRS scale of 0-3) at rest, indicating no or minimal pain. Ramsay's sedation score was 0. The patient was able to move the toes and ankle on operated site indicating absence of motor block. The patient had stable hemodynamics in the postoperative period and did not require any vasopressor support. Patient was orally allowed two hours later. The same night was also started on tab. Celecoxib 400mg stat and 200mg once daily. After 30 hrs of completion of surgery the catheter was withdrawn. There were no complaints of headache, nausea and vomiting, pruritis.

He was discharged ambulating well 6 days post operatively. The patient came back for left THR after 3 months which again was conducted under CSA in similar manner. The perioperative course was uneventful this time as well.

## DISCUSSION

With increased awareness of the disease, more patients have been diagnosed as having AS<sub>2</sub>. The Diagnosis is made clinically according to a set criteria<sub>2</sub>. A small proportion of these patients may develop complete spinal ankylosis with or without extra articular complications<sub>3</sub>.

Identifying a patient such as this is important as the disease is associated with systemic complications affecting respiratory, cardiovascular, neurological systems and amyloidosis, iritis and those associated with treatment of condition<sub>4</sub>. These complications may influence the perioperative management of patient

The fixity of spinal column renders airway management in patients with severe AS biggest anaesthetic challenge<sub>4</sub>. We already know that difficulty in managing the airway is the single most important cause of anaesthetic morbidity and mortality<sub>5</sub>. Hence anaesthetic technique available and their complications need to be discussed thoroughly with the patient before hand.

Regional anaesthesia techniques available for THR include spinal, epidural, caudal, combined spinal epidural, continuous lumbar plexus block etc. Various general and regional anaesthesia techniques have been used for THR in patients with AS. However, an extensive search of database failed to reveal the use of CSA for THR in patient with AS.

We chose CSA over GA because the patient stays awake and able to maintain his own airway. However, to meet the eventuality of control of airway in case the eventuality arose

a cart for difficult intubation was arranged including McCoy blade, fiberoptic laryngoscope, LMA and airway management device<sup>6,7</sup>

CSA was selected over other available options because of the advantages over other regional anesthesia techniques. In relation to CEA, caudal and CSE, CSA is associated with the simplicity of technique, higher reliability, faster onset of surgical anaesthesia and a definite end point of the procedure with CSF coming out from SA space as compared with epidural anaesthesia. Further, compared to epidural analgesia, spinal anaesthesia ensures better analgesia and results in more satisfied patients after hip replacement (92% vs 71% satisfaction)<sup>8</sup>.

CSA has the advantage that the level of block can be incrementally adjusted to level required thus avoiding relatively larger doses used with single shot technique without the risk of failure. Further the lower doses used also result in lesser incidences of hypotension and more cardiovascular stability<sup>9,10</sup>.

The lower doses used with spinal anaesthesia makes it safer as compared to epidural in respect of drug side effects related to overdose. Even the test does with epidural anaesthesia have been reported to result in total spinal anaesthesia in which may prove catastrophic in a patient with anticipated difficult airway<sup>7</sup>.

The paramedian approach to SA is better than the midline approach in patients with AS as well in elderly. This is so because in these patients the intraspinal ligaments get ossified and entering the SA space through them is extremely difficult and may lead to trauma and other complications.

CSA is not without complications. Neurological complications, particularly cauda equina syndrome (CES) has been associated with the use of CSA<sup>12,13</sup>. CES has been ascribed to maldistribution of the local anaesthetic especially Lignocaine 5%, following a slow injection through a small micro catheter and probably a caudal direction of catheters in the cases involved leading to pooling of lignocaine in cauda equina region. The spread of local anaesthetic agent in CSF depends primarily on Dose of drug, baricity and posture of patient amongst other more complex factors.<sup>14</sup> However, in case of CSA cranial positioning of tip of catheter has been associated with a more uniform spread of drug. Use of directional needle for CSA<sup>15</sup> and restriction of intrathecal

length of catheter to less than 4 cm are advocated to be higher chances of cranial position of intrathecal catheter. The use of a 25G spinal catheter in this patient rather than a 27G may offer an advantage by minimizing the problems derived from smaller diameter catheters. Further, failure of a proper spread of anaesthesia in the expected region should serve as a warning of possibility of an improperly placed catheter.

In conclusion, CSA performed properly is a reliable, simple and safe technique of regional anesthesia for patients with ankylosing spondylitis undergoing lower limb surgery.

## CORRESPONDENCE TO

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