



## DIFFICULT AIRWAY WITH DIFFICULT REGIONAL ANAESTHESIA FOR LOWER LIMB ORTHOPAEDIC SURGERIES IN PATIENTS WITH ANKYLOSING SPONDYLITIS.

### Anaesthesiology

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### ABSTRACT

A difficult airway in an ankylosing spondylitis patient may be a nightmare for an anaesthesiologist. We report a case of a 48-year-old man who was scheduled for close reduction and internal fixation of left proximal tibia fracture. He was diagnosed with ankylosing spondylitis with multiple extra-spinal joint involvements. He had CAD and hypothyroidism with a no history of exposures to any kind of anesthesia. He was a chronic tobacco chewer and had a difficult airway. He was managed successfully with sciatic and femoral block with the help of nerve locator.

### KEYWORDS

ankylosing spondylitis, difficult airway and difficult spinal anaesthesia, sciatic and femoral block, lower limb orthopaedic surgery

### INTRODUCTION

Ankylosing spondylitis is an inflammatory arthropathy of insidious onset. The pathological process is one of infiltration of granulation tissue into bony insertions of ligaments and joint capsules. It further progresses to fibrosis, ossification and ankylosis<sup>1</sup>. It is a systemic disorder and a proportion of patients may develop non-articular manifestations of the inflammatory process<sup>2</sup>. Clinical diagnosis with supportive diagnostic investigations is the hallmark of this disease and the clinical features include backache, stiffness with spinal cord compression or atlantoaxial subluxation of cervical spine.

The disease per se is a challenge for the anaesthesiologists. Airway management, central venous access, positioning, neuraxial monitoring and management of massive blood loss all may prove to be difficult in these patients<sup>3</sup>. Patients with ankylosing spondylitis may require surgery for the complications of the disease process itself or any other incidental surgical procedure.

Repair of inguinal hernia, hip surgery, lumbar or cervical osteotomy, cardiac, vocal cord surgery, joint replacement surgeries and temporomandibular surgeries in previously diagnosed cases of ankylosing spondylitis have been reported<sup>4, 5</sup>. Peripheral arthritis develops in at least 50% of patients and may be a presenting feature in 15% of cases<sup>6</sup>. In 25% of patients with peripheral joint involvement the arthritis becomes chronic and the commonly involved joints are hip (75% bilateral), followed by shoulder<sup>7</sup>. Spinal and extradural anaesthesia are usually technically difficult and tracheal intubation may be difficult due to involvement of the cervical spine or temporomandibular joints<sup>8</sup>.

We report here with a novel combination of sciatic and femoral block successfully used in fracture of proximal tibia with severe ankylosing spondylitis without any opioids and intravenous propofol.

### Case Report

A 48-year old male presented to orthopaedic emergency department with a history of trivial trauma over left leg with severe pain and tenderness for the last 7 days. Proximal tibia fracture was diagnosed by orthopedic surgeons and the patient was scheduled for close reduction and internal fixation of left tibia fracture.

He had a history of coronary heart disease and hypothyroidism. He was on tab rosuvastatin 10 mg once daily, tab aspirin 75 mg once daily and tab thyroxin 75 mg once daily.

On assessment of the airway he had no neck extension. Neck flexion was only 10° and side to side movements were not possible. Due to bilateral temporomandibular ankylosis, the patient's mouth opening was only 1½ fingers with a modified Mallampati grade IV score. The respiratory system revealed bilateral occasional basal crepitations on examination and X-ray chest showed features of obstructive lung disease.

All other investigations were within normal limits including coagulation profile. There was significant disability as the patient was unable to stand, sit properly or turn in either lateral position. Anteroposterior and lateral radiographs of lumbar spines revealed extensive ossification and ankyloses.

In the operation theatre standard monitoring was established. i.e continuous ECG, non-invasive blood pressure and peripheral oxygen saturation. After insertion of an 18G intravenous cannula, preloading was carried out with one unit of Ringer lactate solution. Since the patient had a difficult airway and difficult intrathecal block, so combination of sciatic and femoral block was planned. Difficult intubation carts, including LMA, bougie, cricothyrotomy needle and tracheostomy set, were standby.

We performed all of the peripheral nerve blocks guided by nerve stimulator (Stimuplex HNS12, B-Brawn, USA), and we chose a 10 cm 22G short bevel insulating stimulating needle for transgluteal approach of sciatic block and 5 cm 22G needle for femoral block (Sonoplex, Pajunk, Germany).

### SCIATIC NERVE BLOCK: Transgluteal Approach

**Distribution of Blockade:** A sciatic nerve block results in anesthesia of the skin of the posterior aspect of the thigh, hamstring, and biceps femoris muscles; part of the hip and knee joint; and the entire leg below the knee with the exception of the skin of the medial aspect of the lower leg. Depending on the level of surgery, the addition of a saphenous or femoral nerve block may be required to provide coverage for this area.

**Landmarks and Patient Positioning:** The patient is in the lateral decubitus position tilted slightly forward. The foot on the side to be blocked should be positioned over the dependent leg so that elicited motor response of the foot or toes can be easily observed.

Landmarks for the posterior approach to a sciatic blockade are easily identified in most patients. A proper palpation technique is important to adhere to because the adipose tissue over the gluteal area can obscure these bony prominences. The landmarks are outlined with a marking pen:

1. Greater trochanter
2. Posterior superior iliac spine (PSIS)
3. Needle insertion point 4 cm distal to the midpoint between landmarks 1 and 2

A line between the greater trochanter and the PSIS is drawn and divided in half. Another line passing through the midpoint of this line and perpendicular to it is extended 4 cm caudal and marked as the needle insertion point.

### Technique

After skin disinfection, local anesthetic is infiltrated subcutaneously at

the needle insertion site. The operator should assume an ergonomic position to allow precise needle maneuvering and monitoring of the responses to nerve stimulation.

The fingers of the palpating hand should be firmly pressed on the gluteus area to decrease the skin to nerve distance. Also, the skin between the index and middle fingers should be stretched to allow greater precision during block placement. The palpating hand should not be moved during the entire procedure. Even small movements of the palpating hand can change the position of the needle insertion site because of the highly movable skin and soft tissues in the gluteal region. The needle is introduced perpendicular to the spherical skin plane. Initially, the nerve stimulator should be set to deliver a current intensity of 1.5 mA to allow for the detection of both twitches of the gluteal muscles as the needle passes through tissue layers and stimulation of the sciatic nerve.

As the needle is advanced, twitches of the gluteal muscles are observed first. These twitches merely indicate the needle position is still too shallow. Once the gluteal twitches disappear, brisk response of the sciatic nerve ensues (hamstring, calf, foot, or toe twitches). After an initial stimulation of the sciatic nerve is obtained, the stimulating current is gradually decreased until twitches are still seen or felt at 0.2 to 0.5 mA. Typically, this occurs at a depth of 5 to 8 cm. At this low current intensity, any observed motor response is from the stimulation of the sciatic nerve, rather than direct muscle stimulation (false twitch). After negative aspiration for blood, 15 mL of injection bupivacaine 0.5% is injected slowly. Any resistance to the injection of local anesthetic should prompt cessation of the injection and withdrawal of the needle by 1 mm before reattempting to inject. Persistent resistance to injection should prompt complete needle withdrawal and flushing to ensure the patency of the needle before reattempting the procedure.

#### FEMORAL NERVE BLOCK

**Distribution of Blockade:** Femoral nerve block results in anesthesia of the skin and muscles of the anterior thigh and most of the femur and knee joint. The block also confers anesthesia of the skin on the medial aspect of the leg below the knee joint (saphenous nerve, a superficial terminal extension of the femoral nerve).

**Landmarks and Patient Positioning:** The patient is in the supine position with both legs extended. In obese patients, a pillow placed underneath the hips can facilitate palpation of the femoral artery and the block performance.

Landmarks for the femoral nerve block are easily recognizable in most patients and include the femoral crease and femoral artery pulse.

#### Technique

After thorough preparation of the area with an antiseptic solution, local anesthetic is infiltrated subcutaneously at the estimated site of needle insertion. The injection for the skin anesthesia should be shallow and in a line extending laterally to allow for a more lateral needle reinsertion when necessary. The anesthesiologist should stand at the side of the patient with the palpating hand on the femoral artery. The needle is introduced immediately at the lateral border of the artery and advanced in sagittal, slightly cephalad plane.

After initial stimulation of the femoral nerve is obtained, the stimulating current is gradually decreased until twitches are still seen or felt at 0.2 to 0.4 mA, which typically occurs at a depth of 2 to 3 cm. After obtaining negative results from an aspiration test for blood, 10 mL of injection bupivacaine 0.5% is injected slowly.

#### DISCUSSION

Ankylosing spondylitis is a common inflammatory rheumatic disease that affects the axial skeleton, causing characteristic inflammatory back pain, which can lead to structural and functional impairments and a decrease in quality of life. The disease predominantly affects young men, beginning most often in the third decade. Structural changes are mainly caused by osteoproliferation. Spinal stiffness, loss of spinal mobility, syndesmophytes and ankylosis are the characteristic features of ankylosing spondylitis. The hip and shoulder joints become affected in about 20% of patients with this disease. Hip involvement and extra articular manifestations indicate poor prognosis<sup>9</sup>. Limited mouth opening was due to temporomandibular joint involvement was reported in 10% of patients and may increase in the late stage<sup>10</sup>. Involvements of the costovertebral joints may result in respiratory

complications include upper lobe fibrosis and reduced chest expansion<sup>10</sup>. Anesthesia management for ankylosing spondylitis is a challenge due to management of difficult airway, respiratory and cardiovascular complications, as well as the medications for disease and pain control<sup>10</sup>. Both airway management and neuraxial access may prove to be difficult<sup>11</sup>. At present, both general anesthesia and spinal anaesthesia can be administered for most of the patients with ankylosing spondylitis undergoing lower limb orthopedic surgeries. Fixed neck may make regular endotracheal intubation and tracheostomy difficult<sup>10</sup>. In patients with chronic cervical kyphosis, risk of neurological injury increased with excessive neck extension. Due to an anticipated difficult airway, awake fibrotic endotracheal intubation employed may subject the patients to significant discomfort. Because the fixed angle of the oropharynx axis, it may be difficult to place and secure a laryngeal mask in suitable place in patients with severe flexion deformities<sup>10</sup>. Furthermore, a recent large population-based study, that included 104, 088 geriatric patients undergoing hip repair surgeries, concluded that compared with neuraxial anesthesia, general anesthesia were associated with higher incidences of and risks for the adverse in-hospital outcomes of stroke, respiratory failure, and death<sup>12</sup>.

An update to evidence-based guidelines for the management of lower limb orthopedic surgery in older persons suggests that regional anesthesia is recommended for most patients with a grade A of evidence. However spinal and epidural anesthesia are technically difficult and the patients may be subjected to an increased risk of complications. Placement of spinal needle is difficult in patients with AS due to ossification of interspinous ligaments and ligamentum flavum, and bony bridges, especially through a midline approach<sup>13</sup>. A 10 years review in Vancouver Hospital showed of 82 procedures performed on AS patients, 3 spinal anesthesia failed in 13 (23.8%) and epidural anesthesia was unsuccessful in every attempt. Wulf reported in a comprehensive review five out of 51 patients with spinal hematoma occurred in patients with AS<sup>14</sup>. These may result from difficult or traumatic insertions, concurrent NSAIDs therapy and a narrow epidural space. Disadvantages of spinal anesthesia may include urinary retention, hypotension, and issues involving perioperative anticoagulation<sup>15</sup>, the risk of spinal hematoma, meningitis, or spinal abscess.

Regional anaesthesia is a valuable option if the scope of surgery is appropriate. Majority of studies preferred regional anaesthesia over general anaesthesia in patients with diagnosed ankylosing spondylitis whereas Wittman and Ring considered epidural or spinal anaesthesia to be contraindicated because the placement of epidural or spinal needle may be difficult or impossible due to the condition of the interspinous ligaments and bony bridges<sup>16</sup>.

So we used combination of sciatic and femoral block to overcome complication and difficulty related to general and spinal anaesthesia.

#### CONCLUSIONS

The combination of sciatic and femoral plexus block may provide reliable surgical analgesia, adequate muscle relaxation, and satisfied postoperative pain control for lower limb orthopedic surgery in patients with ankylosing spondylitis.

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