

Case report:

Ultrasound guided psoas compartment block and sciatic nerve block for revision arthroplasty of the knee performed two times in a patient with ankylosing spondylitis

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Abstract:

Anesthetic management including endotracheal intubation and neuroaxial blocks is challenging in patients with ankylosing spondylitis because of the stiffness of vertebral joints. Peripheral blocks in these patients may be helpful although it is not common. A 56 year-old male patient with ankylosing spondylitis having the history of total knee arthroplasty and difficult airway management was operated for the contracted knee joint prosthesis. Anteromedialisation of tuberositas tibia was performed with combination of ultrasound guided psoas compartment block (PCB) and sciatic nerve block (SNB), and repeated forty days later because of the displacement of the osteotomy site. We conclude that PCB together with SNB may be performed for knee surgery in patients with severe ankylosing spondylitis.

Keywords: Ultrasound guided psoas compartment block, ultrasound guided sciatic nerve block, knee arthroplasty, ankylosing spondylitis.

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Introduction

Ankylosing spondylitis (AS) is a chronic and progressive inflammatory arthropathy that primarily affects the spine and causes bony ankylosis of the vertebral joints. The posture of the patient changes as the disease progresses, patient can not extend his head, and fixed cervical flexion results in “chin on chest” deformity. Endotracheal intubation of these patients is most of the time difficult and unsuccessful because of the immobilization of the neck and temporomandibular joints (1,2). Performing neuroaxial blocks is also difficult, and success rate was reported to be very low due to the stiffness and hard tissue of the intervertebral space (3). Lumbosacral blocks gain importance in the management of these patients when hip and/or knee

surgery is needed, although these are not commonly performed yet. We hereby report management of a patient with ankylosing spondylitis who underwent revision arthroplasty of the knee, two times within 40 days, with combination of ultrasound guided psoas compartment block (PCB) and sciatic nerve block (SNB).

Case

A 56 year-old male patient having had the diagnosis of ankylosing spondylitis was planned to be operated for the contracted knee joint prosthesis. History of the patient revealed that he had an operation of total knee arthroplasty nine months ago in another hospital. Spinal anesthesia had been tried first for anesthetic management, but after unsuccessful attempts, the patient eventually had been intubated

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with the guide of fiberoptic video-endoscope. Three weeks later roentgenographies displayed patellar luxation. Anesthesiologists offered tracheostomy at that time because of the expected difficult intubation. The patient was hesitant to undergo surgery again because of the previous problems. Patient had changed his mind to undergo operation after eight months, and referred to our university hospital.

His preoperative test results were all normal. His chest radiographies revealed severe kyphosis, ankylosis of intervertebral spaces, and “chin on chest” appearance (Fig.1,2). After monitoring (ECG, pulse-oxymetry, noninvasive blood pressure, temperature) the patient in the operation room, PCB was performed using a low frequency curved ultrasound probe that was placed transversally in the abdominal flank as described by Sauter (4), and vertebral body, transverse process, psoas muscles and nerves, and kidney were visualized using a developed ultrasound machine (H60NF4L/WR, Samsung Medison, Seoul, Korea). A 22-Gauge 100 mm insulated needle (Stimuplex A, BBraun, Melsungen, Germany) was inserted 3 mm lateral to the midline of the spinal cord, using in-plane technique. The correct tip position was confirmed with quadriceps contraction at 10 cm with 0,5 mA stimulation by a nevre stimulator (Stimuplex HNS11, BBraun, Melsungen, Germany). A 30 mL mixture of local anesthetics (15 mL 2% lidocaine and 15 mL 5% bupivacaine) was injected incrementally in fractioned doses with frequent aspiration. The spread of local anesthetic was observed on transverse axis scan. Immediately after this procedure SNB was performed with the technique described by Karmakar et al (5). After confirming the success of blocks using pin-prick test and with the loss of movement of foot muscles, surgery was started. In the surgery, anteromedialisation of tuberositas tibia with provisional K wire fixation was done following osteotomy, and stabilized with three cannulated screws. Surgery was successfully completed within 2 hours without any additional anesthetic/analgesic requirement. Forty days after this first operation his roentgenographies revealed displacement of the osteotomy site at the proximal tibia, and new operation was performed with US guided PCB and SNB, similar to the previous operation.



Fig. 1. Chest radiography of the patient (PA view)



Fig. 2. Chest radiography of the patient (Lateral view)

Discussion

General anesthesia (GA) is preferred commonly in the anesthetic management of patients with AS since the stiffness in vertebral column may cause neuroaxial blocks to be impossible. However, airway management in these patients may be difficult during GA depending on the severity of the disease.

Numerous guidelines have been provided for the management of difficult airways like AS patients. Awake fiberoptic intubation is the method that is accepted as a gold standart for having a secure airways in the management of a predicted or unexpected difficult airway in most centers. However, clinicians nowadays can use alternative methods to have a secure airway like videolaryngoscopy. Umbaik et al (6) reportad that they intubated their patients, who had supraglottitis or epiglottitis and cervical abscess, using glide scope (with fiber optic intubation trolley and rigid bronchoscopy guided intubation trolley standby) for operative procedure. Ultrasound guided peripheral nevre blocks are getting used as alternative methods because of the advantages such as airway problem free and effective anesthesia, and possible postoperative analgesia. Psoas compartment block, a type of lumbar plexus block in which femoral, lateral femoral cutaneous and obturator nerves are blocked simultaneously, can provide anesthesia and/or analgesia to the anterolateral and medial aspects of the thigh, the knee, and the medial portion of the leg below the knee. The sciatic nerve block results in anesthesia of the posterior aspect of the knee, hamstring muscles, and entire lower limb below the knee, both motor and sensory blockade, with the exception of skin on the medial leg and foot (supplied by the saphenous nerve). When PCB is combined with SNB, unilateral anaesthesia of the lower limb may be induced (7). Demirel et al (8) combined PCB and SNB with L₁ paravertebral block, and compared it with unilateral spinal anesthesia for

partial hip prosthesis in elderly patients, and reported these blocks to be as effective as spinal anesthesia. Combined continuous PCB and SNB were performed by Lee et al (9) for fevision arthroplasty of the hip in a patient with ankylosing spondylitis. In a recent study Jogdand et al (10) compared the combination of PCB and SNB with that of spinal anesthesia for lower extremity surgeries, and concluded that this combination was a beneficial alternative to existing anaesthesia techniques. However, all these reports are related to surgeries other than knee surgery. Touray et al (7) reported a metaanalysis about the combination of PCB and SNB for lower extremity surgeries more than 10 years ago, and mentioned the presence of conflicting evidence to support the use of this technique as an alternative to GA and neuraxial anaesthesia for total knee arthroplasty. We still do not have enough data about the effectiveness of this combination to be used as an alternative anesthetic method to GA or neuroaxial block for knee surgery. In our case we preoperatively planned to perform PCB together with SNB for anesthetic management because of the history unsuccessful intubation and fear of the patient from GA. Blocks were successful in our case, and surgery has been performed without any problem related to the blocks. We combined PCB with SNB since PCB alone would not be enough for surgery of the knee.

We conclude that PCB together with SNB may be a suitable choice for knee surgery in patients with severe AS.

References:

- Woodward LJ, Kam PC. Ankylosing spondylitis: Recent developments and anaesthetic implications. *Anesthesia*. 2009;64(5):540–8.
- Hoh DJ, Khoueir P, Wang MY. Management of cervical deformity in ankylosing spondylitis. *Neurosurgical Focus*. 2008;24(1): E9.
- Schelew BL, Vaghadia H. Ankylosing spondylitis and neuraxial anaesthesia - a 10 year review. *Can J Anaesth*. 1996;43:65–8.
- Sauter AR. The “Shamrock Method” - a new and promising technique for ultrasound guided lumbar plexus blocks. *BJA*. 2013;111: Issue eLetters Supplement.
- Karmakar MK, Kwok WH, Ho AM, Tsang K, Chui PT, Gin T. Ultrasound-guided sciatic nerve block: description of a new approach at the subgluteal space. *British Journal of Anaesthesia*. 2007; 98(3):390–5.
- Umbaik NAM, Sofi AIM, Haron A, Mohd NKN, oses SS, Nor RM1,Hashimah Ismail1, Mohamad I. Intraoral Drainage And Neck Exploration of Cervical abscess following Acute Supraglottitis: A Case Series. *International Journal of Human and Health Sciences* 2018; 2(3)[S.1.]:149-54.
- Touray ST, De Leeuw MA, Zuurmond WWA, Perez RSGM. Psoas compartment block for lower extremity surgery: a meta-analysis. *British Journal of Anaesthesia*. 2008;101(6):750–60.
- Demirel I, Ozer AB, Duzgol O, Bayar MK, Karakurt L, Erhan OL. Comparison of unilateral spinal anesthesia and L₁ paravertebral block combined with psoas compartment and sciatic nerve block in patients to undergo partial hip prosthesis. *Eur Rev Med Pharmacol Sci*. 2014;18(7):1067-72.
- Lee SM, An IS, Choi JS, Park CH, Lee CS, Kim WT. Combined continuous psoas compartment block and sciatic nerve block for revision arthroplasty of the hip in a patient with ankylosing spondylitis: A case report. *Korean Journal of Anesthesiology* 2007;52(1):99-103.
- Jogdand P, Sule PM. Comparative study of psoas compartment block and sciatic nerve block with that of spinal block anesthesia for lower extremity surgeries. *Indian Journal of Clinical Anaesthesia* 2018;5(1):141-46.