

# Rheumatoid Arthritis with Fracture Femur Managed with Three-in-one Femoral Nerve Block

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## Abstract

Rheumatoid arthritis (RA) can be defined as chronic polyarthritis affecting mainly the peripheral joints, running a long course with exacerbations and remissions, and also accompanied by a generalized systemic disturbance. Anesthetic risks in osteoarticular disorders involve not only the mechanical deformities caused by the diseases but also their cardiovascular, respiratory, renal, and digestive systemic effects. Whenever possible, surgery should be performed under regional anesthesia, the advantages of which include avoidance of airway manipulation and polypharmacy related to general anesthesia. The “3-in-1 block” entails injection of large volume of local anesthetic around the femoral nerve with resultant blockade of the obturator, femoral, and lateral cutaneous nerves of the thigh. Here, we report a case of fracture neck of femur with coexisting RA and hypertensive disorder managed with three-in-one femoral nerve block.

**Keywords:** Regional anesthesia, rheumatoid arthritis, three-in-one block

## INTRODUCTION

Arthritis and diseases of joints have been plaguing around since ancient times. In 1500 BC, EBERS PAPYRUS described a condition similar to rheumatoid arthritis (RA). This is probably the first reference of the disease. In Indian literature, Charak Samhita (300-200 BC) described a condition that described painful joint swelling and loss of joint mobility and function. A B Garrod in 1858 coined the term RA.<sup>[1]</sup>

RA is a chronic inflammatory, autoimmune disease causing symmetrical polyarthropathy leading to inflammatory synovitis involving multiple joints most commonly the small and proximal joints of hands and feet, with the course of disease involving exacerbations and remissions. Synovitis leads to tethering of tissues with loss of movement and erosion of the joint surface causing deformity and loss of function. The cause is not clear and believed to involve the combination of genetic and environmental factors. RA affects between 0.5% and 1% of adults in the developed world. Onset most frequently being middle age (30–40 years) and women are affected 2.5 times more than men.<sup>[2]</sup>

The “3-in-1 block” entails injection of a large volume of local anesthetic around the femoral nerve at the site of elicitation of paresthesia with resultant blockade of the obturator, femoral, and lateral cutaneous nerves of the thigh.<sup>[3]</sup>

## CASE REPORT

A 50-year-old female weighing 80 kg, coming with a history of self-fall, diagnosed to have right fracture neck of femur, and was posted for dynamic hip screw. The patient was a known case of hypertension for the past 8 years and was on regular treatment with tablet amlodipine 5 mg OD. She was also diagnosed to have RA 5 years back and was on tablet methotrexate, tablet leflunomide, and tablet prednisolone for the past 4 years. On general physical examination, the patient was conscious, oriented, and afebrile with a pulse of 90 beats/min regular, good volume, and blood pressure of 140/90 mmHg in sitting position. Systemic examination did not reveal any abnormalities.

Airway examination revealed a short neck with unrestricted neck movements and mouth opening with an Mallampati Grade III and no loose tooth. The patient had normal biochemical and laboratory profile. Electrocardiography (ECG) showed right axis deviation and two-dimensional echocardiography revealed right ventricular hypertrophy with ejection fraction of 60%.

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**How to cite this article:** Vasantha Kumar KR, Kauser T, Prabhu A, Pachaiyappan H. Rheumatoid arthritis with fracture femur managed with three-in-one femoral nerve block. *Karnataka Anaesth J* 2017;3:28-30.

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**DOI:**  
10.4103/kaj.kaj\_10\_17

The patient was advised tablet ranitidine 150 mg and tablet alprazolam 0.5 mg the night before surgery. Written and informed consent was taken after explaining the risks involved in both the surgery and anesthetic management.

On the day of surgery, a thorough cockpit drill of the anesthesia machine was performed, and circuits were checked. A working laryngoscope with two Macintosh blades, properly fitting face mask, airways, endotracheal tubes of appropriate sizes, stylet, laryngeal mask airway (LMA), suction apparatus, difficult airway cart and emergency drugs, and nerve stimulator were kept ready. Regional anesthesia by 3 in one femoral nerve block was planned.

The patient was shifted to the operation theater, a 20 gauge intravenous (IV) cannula was secured and IV fluids started. Noninvasive blood pressure, SpO<sub>2</sub>, and ECG monitors were connected and baseline vital parameters were recorded.

Nerve stimulator guided three-in-one block procedure was explained to the patient. Difficult intubation trolley (Macintosh blade 3, 4, McCoy blade, stylet, bougie, masks, endotracheal tubes of appropriate sizes, video laryngoscope, supraglottic airway devices like i-gel and LMA, cricothyroidotomy needle, and tracheostomy set) kept ready. In view of accidental vascular injection of local anesthesia and as there was no availability of lipid emulsion difficult intubation trolley as mentioned above, anticonvulsants, inotropes, atropine, and all the necessary emergency drugs were kept ready. With the patient in supine position, needle insertion was done on the right side according to the landmarks, that is, femoral artery was palpated and 1 cm lateral to it, the needle was inserted and with the help of nerve stimulator with 2 Hz frequency after eliciting the quadriceps twitch, three-in-one femoral nerve block was given with injection lignocaine 2% with adrenaline 15 ml + injection bupivacaine 0.5% plain 15 ml + injection sodium bicarbonate 2 ml with intermittent aspiration to rule out intravascular needle placement. Adequate analgesia was achieved. Intraoperatively, the patient was comfortable with the operating limb apart from the discomfort in the nonoperating limb for which intraoperative analgesia of injection fentanyl 30 µg boluses a total of 90 µg given. Intraoperative sedation of injection midazolam 2 mg boluses with a total of 8 mg and dexmedetomidine infusion of 1 µg/h with injection hydrocortisone 100 mg IV given. The surgery lasted for 4 h with stable hemodynamics. The patient was comfortable after surgery and was shifted to postoperative ward. Postoperatively, the motor blockade lasted for 6 h and sensory blockade lasted for 8 h.

## DISCUSSION

RA is characterized by autoimmune-mediated joint destruction with chronic and progressive inflammation of synovial membrane. It is a systemic disease which involves multiple organ systems, often affecting small joints of hands wrist and feet.

Extreme cases of RA can involve almost all the synovial membranes of joints which include cervical spine, temporomandibular and cricoarytenoid joints with the risk of symptomatic or asymptomatic cervical spine subluxation. In cervical spine subluxation, extension exacerbates the process, while flexion reduces, hence, making induction and intubation challenging.<sup>[4,5]</sup>

Its multisystem involvement including CVS, RS like chest wall rigidity leading to reduced lung expansion thereby lung volumes,<sup>[6,7]</sup> blood, and musculoskeletal systems can lead to intraoperative hemodynamic deterioration.

The above multisystem involvements in RA poses a great challenge for the anesthesiologists starting from intravenous and radial artery cannulation.

Patients with RA are already on multiple drugs such as nonsteroidal anti-inflammatory drugs, disease-modifying antirheumatic drugs, steroids, tumor necrosis factor receptor inhibitors, and interleukin 1 receptor inhibitors which themselves add on to the derangement of hemodynamics after induction of anesthesia and to surgical stress. Current trends in anesthesia point to the use of regional anesthesia over general anesthesia whenever possible for many reasons. Complications from airway manipulation, intubations, and ventilatory agitations are avoided. Besides being safe, a regional approach allows for excellent operating conditions, successfully blunts the neurohormonal stress response during surgery, and paves the way for a smooth transition into the postoperative period.<sup>[8]</sup> Yet, regional anesthesia like subarachnoid block does carry a risk of refractory hypotension which can be seen in patients having adrenal insufficiency due to intake of long-term corticosteroid therapy by hypothalamic–pituitary–adrenal axis suppression.<sup>[9]</sup>

Keeping in mind the above complications, this patient was planned for a three-in-one block with local anesthetic looking into the dosage according to weight and maintaining analgesia and anesthesia appropriately throughout the surgery.

## CONCLUSION

Successful outcome was experienced with nerve stimulator-guided three-in-one femoral nerve block. However, no definite conclusion can be drawn from the single case and one should tailor the anesthesia technique. This case demonstrated that RA patient coming with fracture femur can be managed with three-in-one block preventing the complications occurring by subarachnoid block and general anesthesia.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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