TKR under combined femoral and sciatic nerve blocks

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Abstract

Total knee replacement is one of the most major and most successful surgeries in modern day Orthopaedics. Early mobilization is an integral part of successful outcome of this procedure. Moreover, in aged patients with significant co-morbidities, regional anesthesia may prove to be the safer alternative. Regional anesthesia again provides a way to start immediate and painless mobilization. We have done seven cases so far successfully through this technique. All the cases resulted in excellent intra operative and post operative analgesia and also immediate early mobilization and early discharge.

Introduction

Total Knee Replacement is one of the most successful surgeries in modern day Orthopaedics. Recently, it has gained lot of acceptance among the public and more and more people are undergoing this procedure. Being primarily done in old age, lot of patients present with severe co-morbidities. This puts them in the category of “high risk” for a long anesthesis. TKR under peripheral nerve block is a new thinking which will benefit such people.

For major lower limb surgeries, femoral peri-neural catheterization has demonstrated efficacy in providing postoperative analgesia¹. Peripheral neural blockade appears to provide effective analgesia with potentially less morbidity than central neuraxial techniques. Several factors, such as compromised cardiopulmonary function, anticoagulant therapy, or anatomical deformity in the elderly, prevent general anesthesia and neuraxial blockade from being conducted for total knee replacement arthroplasty⁴. Continuous femoral nerve blocks has many advantages over epidural analgesia like lack of hypotension and epidural haematoma associated with the use of anticoagulants, effective pain relief and improved functional recovery⁷–⁹. It also avoids the need for bladder catheterization in such patients.

Method

Patients were assessed for associated co-morbidities. Total body weight is measured. The maximal dose of the local anaesthetic agent is calculated. 0.5% Bupivacaine at 3 mg/kg is taken and mixed with 2% Lignocaine with adrenaline at 7 mg/kg. We sometimes add buprenorphine for prolongation of analgesia as an additive at 1–2mcg/kg. For a 50 kg patient 0.5% Bupivacaine at 3mg / kg will be 150 mg that is 30 ml; 2% Lignocaine with adrenaline 7 mg/kg will be 350 mg that is 15 ml. We mix both...
and make it to 45 ml. 15 ml is used for sciatic nerve
block; Sciatic nerve is identified under ultrasonogram
guidance and peripheral nerve stimulator. The local
anesthetic is given circumferentially around the nerve
and its effect lasts for 4 to 12 hours. The effect of sciatic
nerve block lasts longer so the patient and relatives are
explained about the anesthetic effect of sciatic block
beforehand. Femoral nerve block uses another 15 ml of
the mixture of local anaesthetic. Femoral nerve is again
located under ultrasonogram guidance and peripheral
nerve stimulator. Local anesthetic is injected and
circumferentially spread around the femoral nerve.
Obturator nerve block is then done both for anterior
and posterior division with 5 ml each under ultrasound
and peripheral nerve stimulator guidance. Lateral
femoral cutaneous nerve is blocked with 5 ml for the
tourniquet. Continuous nerve block catheter is inserted
and secured in the lateral tunnel. Post operatively the
catheter is used for post-operative analgesia. This is
with 0.1% ropivocaine mixed with 100 mcg fentanyl in
50 ml saline taken in a syringe loaded in an infusion
pump and infused at a rate of 5 to 7 ml/hour. This is
combined with paracetamol 1 g IV 8th hourly for
multimodal anaesthesia. Pain score is assessed at every
hour after surgery and if the pain score is 4 or more
than rescue analgesia with IV fentanyl 0.5–1 mcg/kg
bolus is given. Postoperatively if patient is having
pain while rigorous physiotherapy; that is, for break
through pain occasionally 1% lignocaine 5 to 6 ml
bolus is given through the femoral catheter or NSAIDS
are given parenterally.

**Our Experience**

Seven cases of total knee replacements have been
done so far using this technique. All had excellent
pain relief in the intra-operative and post-operative
period. Postoperatively the dose of ropivocaine is
titrated to maintain analgesia without motor blockade.
This helped us to mobilize the patients from the
day of surgery itself. Two patients complained of
pain in the hip on impaction of femoral prosthesis
and needed supplementation with IV analgesia. But
later on we depended on light impact followed by
straightening of the leg to adequately fix the prosthesis.
In addition, we included posterior capsular infiltration
of Sensorcaine intra operatively, which resulted in
excellent post-operative pain relief.

**Discussion**

In the past, lower extremity peripheral nerve blocks
were seldom the anesthetic procedure of choice for
patients undergoing total joint replacement, primarily
because of anesthesiologists’ lack of experience in
performing these procedures. These blocks are an
excellent anesthetic option for patients who are
not candidates for spinal or epidural anesthesia,
because of diabetes or anticoagulated status. Addition-
ally, patients with disease processes that can make
the hemodynamically significant significant sympathectomy seen
with neuraxial anesthesia unsafe can undergo a lower
extremity nerve block without significant risk of
hemodynamic instability. Furthermore, severe neuro-
logical complications (spinal hematoma, cauda equina
syndrome) after central neural blockade are rare
events but should be considered when choosing a
safe method for surgical anesthesia or postoperative
analgesia. Peripheral nerve damage can occur after
peripheral nerve block, but the consequences are not
as grave. These benefits of lower extremity peripheral
nerve block justify its use as an alternative anesthesia
in patients undergoing TKR.

There was significantly reduced use of antihyper-
tensives, analgesics, and sedatives in the femoral nerve
block patients. There were no significant differences
of perioperative side effects, duration and remaining
amount of intravenous patient-controlled analgesia,
race of satisfaction with the surgical anaesthesia and
postoperative analgesia, willingness to recommend the
same surgical anaesthesia and postoperative analgesia
to others, and postoperative visual analog scale scores
in comparison to patients with epidural analgesia.

However, femoral nerve blocks are performed
frequently but have suggested disadvantages, such as
motor weakness. In our case series we have used only
0.1% ropivocaine postoperatively for post-operative
analgesia in infusion pumps and we have not come
across motor weakness at this dose. Serious compli-
cations reported in literature include compartment
syndrome, periprosthetic fracture, and vascular injury.
The use of femoral catheter must be used with
appropriate precautions to reduce the risk of patient
falls, vascular injury, and wrong-site surgery.

The time taken to undertake the regional block is an
important consideration owing to financial and theatre
efficiency implications. There is a common perception
among many anaesthetists and orthopaedic surgeons
that lower-extremity peripheral blockade is slow to
perform and is less complete and less reliable than a
central neuraxial blockade.

In patients with cardiac disease with failure, if
epidural boluses had been given instead of femoral, the
resulting hypotension and tachycardia will complicate
the picture.

This study suggests that the combined blocks offer
a practical alternative to epidural analgesia for knee
replacements. They provided acceptable postoperative
analgesia and patient compliance was consistently
high. Common surgical perceptions of the procedure
being slower and technic-ally more difficult were not
confirmed. There was no significant difference in the
measured rehabilitation indices.
CONCLUSION
Combined femoral and sciatic nerve block offers a beneficial alternative anesthesia and postoperative analgesia to the patients undergoing TKR.

REFERENCES