

ORIGINAL RESEARCH

To evaluate the effect of local infiltration of Ropivacaine 0.75 % and clonidine in post operative pain management of total knee arthroplasty

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BACKGROUND

Introduction: Pain is constant companion for human. There is perhaps nothing as dreaded as pain. Pain is the ultimate teacher. It alerts the body to disease. Depending upon the intensity and duration, it impacts quality of life. Pain after total knee arthroplasty (TKA) is a big concern in orthopaedics. Although opioids and continuous epidural analgesia remains the major option for the postoperative pain management of TKA, they have undesirable side effects like sedation, nausea and hypotension. Epidural catheterization is skilful and technically demanding procedure with close monitoring. Infiltration of local anesthetic solution minimizes pain at the source superiorly. It has short learning curve, no systemic side effects, no infection, level of motor block is none, early mobilization and cost effective. There is not much study done on combination of Ropivacaine and Clonidine as a LIA.

Material and Methods: A prospective study was carried out among 30 cases undergoing total knee surgery at a tertiary care hospital. During pre-anaesthetic check up detailed assessment of airway, respiratory and cardiovascular system was carried out. Basic laboratory data were reviewed. Informed consent was taken. All patients were kept nil per oral for 8 hours and were pre-medicated with Tab Ranitidine 150mg, Tab Diazepam 5mg orally 12 hours before surgery. Patients were taught the visual analog pain scale (VAS) (0 = no pain, 10 = worst imaginable pain), and VAS was measured preoperatively at rest and on movement of the knee to be operated.

Results: We observed that; mean age was 62.7 ± 9.9 years. Out of 30, 70% were female and 30% were males. Pain control with Ropivacaine and clonidine has been very effective in 1st 24 hours in total knee replacement surgery.

Conclusion: From this study s we concluded that, with the use of local infiltrative anesthesia i.e combination of Ropivacaine & clonidine, requirement of opioid has been decreased. Effects on cardiovascular system like tachycardia, hypertension has also been decreased. It also benefited patient by early mobilization.

Key words: Ropivacaine, clonidine, total knee replacement surgery

INTRODUCTION

Meniscal and ligament injuries of the knee joint are common in sportsperson and athletes. In other individuals, meniscal injuries can also occur as a result of road traffic accident and mine workers involving rotational injuries of knee joint. Meniscal tears are the most common injury of the knee, with an incidence of meniscal injury resulting in meniscectomy of 66 per

100,000 population per year. Menisci are essential for the normal function of the knee joint. ¹⁻³

Ropivacaine is an amino amide local anaesthetic. It has similar duration of action but lesser systemic toxicity as compared to Bupivacaine so larger doses of it can be administered. It also has an inherent local vasoconstrictor effect which may help prolong its duration of action locally. All these characteristics make it a more suitable local anaesthetic for Intra-articular injection as compared with Bupivacaine. ⁴

Another advent in post arthroscopy analgesia includes multimodal pain therapy. (Balanced analgesia). The rationale for this therapy is to achieve sufficient analgesia by additive or synergistic effects of different analgesics, with concomitant reduction of side effects of each drug because of reduced dosage of each drug. Common combinations of local anaesthetics with drugs like Morphine, Ketorolac etc have been tried with good. ⁵

In our study, we infiltrate Inj.Ropivacaine 0.75% and clonidine to a patient who underwent total knee arthroplasty. Ropivacaine is long acting local anesthetic agent, ropivacaine, with its efficacy, lower propensity for motor block and reduced potential for CNS toxicity and cardiotoxicity, appears to be an important option for regional anaesthesia and for the management of postoperative pain management. Clonidine, an alpha-2 adrenergic receptor agonist, has well-established role in acute perioperative pain management.

AIM

To evaluate the effect of local infiltration of Ropivacaine 0.75 % and clonidine in post operative pain management of total knee arthroplasty.

MATERIAL AND METHODS

A prospective study was carried out among 30 cases undergoing total knee surgery at a tertiary care hospital. During pre-anaesthetic check up detailed assessment of airway, respiratory and cardiovascular system was carried out. Basic laboratory data were reviewed. Informed consent was taken. All patients were kept nil per oral for 8 hours and were pre-medicated with Tab Ranitidine 150mg, Tab Diazepam 5mg orally 12 hours before surgery. Patients were taught the visual analog pain scale (VAS) (0 = no pain, 10 = worst imaginable pain), and VAS was measured preoperatively at rest and on movement of the knee to be operated.

As per ASA I and ASA II criteria and considering inclusion and exclusion criteria, patient undergoing unilateral TKA had been selected and consent was taken from patient for enrolment into the study and entire procedure was explained a day prior to surgery.

Under all aseptic precaution sub arachnoid block with bupivacaine 0.5% (hyperbaric) 0.6ml/10kg, was given in sitting position with 25G quincke's needle at L3-L4 space by mid-line approach.

Local infiltrative anesthesia, consisting of Ropivacaine 0.75% (2 mg/kg) with Clonidine 75 mcg and Normal Saline was added accordingly to make 25 ml solution, it was locally infiltrated at supra-patellar pouch, synovium around quadriceps tendon, patellar fat pad, Median meniscus capsular attachment, posterior-medial capsule, postero-lateral capsule, Medial Retinaculum and Lateral retinaculum.

Assessment of pain was done on visual analogue scale every 4 hourly in first 24 hour was done. VAS grading system is as follows –

0 - No pain

1-3 - Mild pain

4-6 - Moderate pain

7-9 - Very severe pain

10 - Worst pain possible

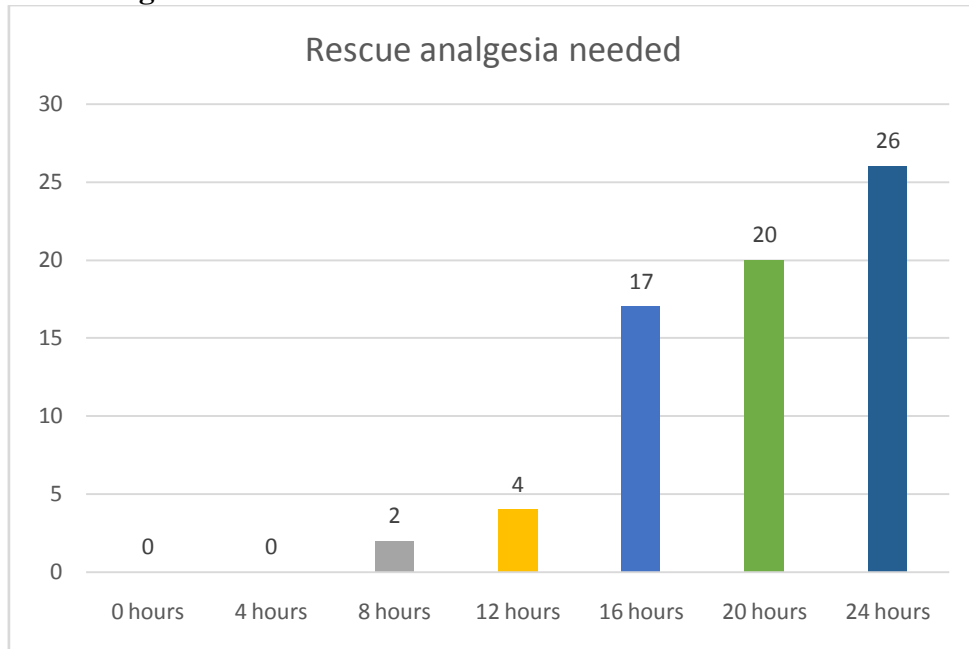
RESULTS

We observed that; mean age was 62.7 ± 9.9 years. Out of 30, 70% were female and 30% were males.

Table 1: Visual Analogue Score

VAS	Mean	SD
0 hours	0.06	0.25
4 hours	0.06	0.25
8 hours	0.3	0.6
12 hours	0.76	0.7
16 hours	1.5	0.9
20 hours	1.7	0.8
24 hours	2.2	1.01

Applying repeated ANOVA, $p < 0.000001^*$, shows statistical significance VAS score showed increasing trend.

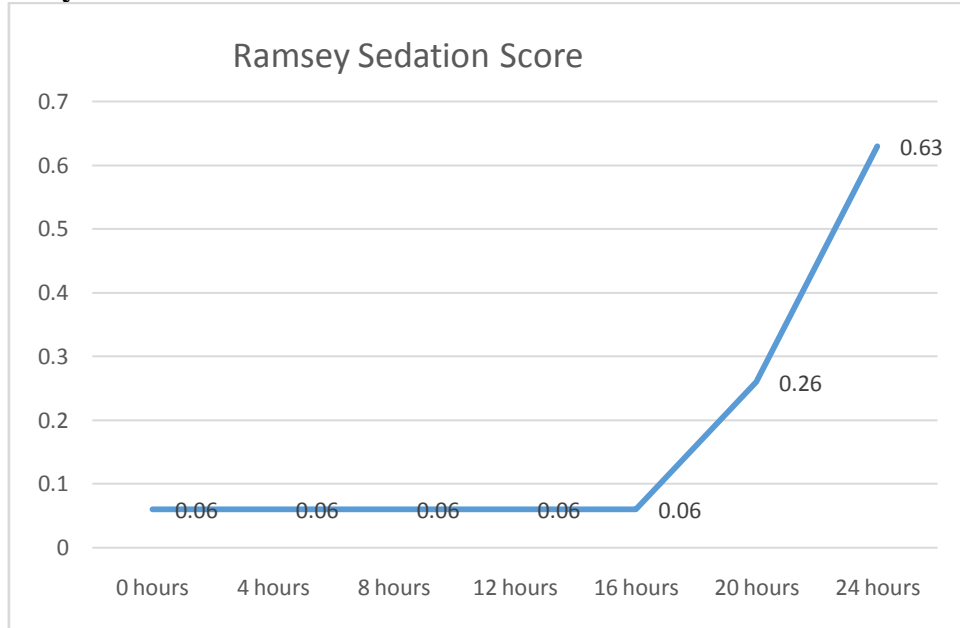
Figure 1: Rescue analgesia

Initially rescue analgesia was not needed. As time increased need also increased

Table 2: Respiratory rate

Respiratory rate	Mean	SD
0 hours	14.2	0.5
4 hours	14.1	0.5
8 hours	13.8	0.8
12 hours	13.7	1.1
16 hours	14.3	0.8
20 hours	14.4	0.9
24 hours	14.5	0.8

Respiratory rate showed decreasing trend and after 16 hours it started increasing. Applying repeated ANOVA, $p < 0.0004^*$, shows statistical significance.

Figure 2: Ramsey sedation score

Ramsey score started increasing after 16 hours. Pain control with Ropivacaine and clonidine has been very effective in 1st 24 hours in total knee replacement surgery.

DISCUSSION

We observed that; mean age was 62.7 ± 9.9 years. Out of 30, 70% were female and 30% were males. Applying repeated ANOVA, $p < 0.000001^*$, shows statistical significance VAS score showed increasing trend. Initially rescue analgesia was not needed as time increased need also increased. Suresh, A et al ⁽⁶⁾ showed statistical significance, rescue analgesia was needed after 24 hours. Respiratory rate showed decreasing trend and after 16 hours it started increasing. Suresh, A et al ⁽⁶⁾ showed similar respiratory rate. Applying repeated ANOVA, $p < 0.0004^*$, shows statistical significance. Ramsey score started increasing after 16 hours. Pain control with Ropivacaine and clonidine has been very effective in 1st 24 hours in total knee replacement surgery. On analysis of results by Suresh, A et al ⁽⁶⁾, the authors concluded that the use of dexmedetomidine at $2 \mu\text{g}/\text{kg}$ doses in femoral nerve block is superior to $1 \mu\text{g}/\text{kg}$ for providing analgesia after TKA. Meta-analyses by Karlson APH et al ⁽⁷⁾ demonstrated a statistically significant 0–24 hour postoperative morphine sparing effect of 6 mg (95% CI: 3.2 to 8.7; $P < 0.0001$), and a reduction in pain scores at rest at 6 hours postoperatively of 7 mm (1 to 14; $P = 0.02$), at 24 hours at rest of 5 mm (3 to 8; $P < 0.0001$), and at 24 hours during movement of 3 mm (-4 to 10; $P = 0.41$). study by Kirkham KR et al ⁽⁸⁾ showed that based on 11 randomised controlled trials, which included a total of 628 participants, we showed that femoral nerve block reduced pain scores at rest at all time periods examined; the trial sequential analysis further confirmed that the threshold for reliable evidence was reached. Pain scores in the early, intermediate and late postoperative periods were significantly lower in patients who received a femoral nerve block.

CONCLUSION

From this study conducted by us we concluded that, with the use of local infiltrative anesthesia i.e combination of Ropivacaine & clonidine, requirement of opioid has been decreased. Effects on cardiovascular system like tachycardia, hypertension has also been decreased. It also benefitted patient by early mobilization

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