



## 3 IN 1 BLOCK FOR POSTOPERATIVE ANALGESIA IN LOWER LIMB SURGERY

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**ABSTRACT** Postoperative analgesia is a factor of prime importance in day care surgery .The advantage of effective postoperative pain management results in patient's comfort and satisfaction, early mobilisation, reduced risk of deep vein thrombosis with reduced cost of care.

60 patients were divided in two groups of 30 each to receive either 3 in 1 block with Inj Bupivacaine 0.5% with Inj. Fentanyl or IV Inj Tramadol as a sole analgesic agent in postoperative period for lower limb surgeries.

After comparing three in one block with intravenous Tramadol for postoperative analgesia it can be concluded that better postoperative analgesia with better hemodynamic stability was observed in three in one block group. It can be a preferred alternative to IV Tramadol in respect of nausea vomiting or any other postoperative complications.

**KEYWORDS :** Postoperative analgesia, regional block, Bupivacaine, Tramadol.

### Introduction

Postoperative pain either acute or chronic is observed after surgical procedure. It presents with noxious sensation ,burning ,itching, tenderness at surgical site. Severity of pain is sometimes associated with fever, disorientation and vomiting.

Peripheral nerve block like 3in 1 block is an effective method of offering postoperative analgesia in lower limb surgeries being safe and effective technique where femoral nerve, lateral cutaneous nerve of thigh and obturator nerve are blocked in a single injection. It is given postoperatively with the obvious advantage of maximising the duration of sensory analgesia.

A study was performed to evaluate the effectiveness of 3 in 1 block with Inj Bupivacaine 0.05% with Inj. Fentanyl in patients who underwent lower limb surgeries under spinal anaesthesia as against Inj Tramadol given intravenously as a sole analgesic agent in postoperative period.

### Aims and objectives

- To evaluate efficacy of Inj Bupivacaine 0.5% with Inj Fentanyl as an adjuvant in three in one block for postoperative analgesia.
- To study the efficacy of Inj Tramadol IV as a sole analgesic agent for postoperative analgesia
- To study any adverse effects or complications in either method.

### Material and Method

After approval from institutional ethical committee 60 patients between age 20-60 years were studied who underwent lower limb surgery under spinal anaesthesia. Patients were divided into two groups of 30 each.

**Grp A:** Three in one block group (n=30)

**Grp B:** Inj Tramadol IV group (n=30)

Inclusion criteria: 30 patients of age between 20 -60 years of ASA Grade I and II who underwent lower limb surgery under spinal anaesthesia were included in the study. Exclusion criteria: Patients of paediatric and geriatric age group, ASA III, IV V, with coagulation abnormality, patients with known hypersensitivity to study drug ,pre-existing femoral nerve injury or any other systemic disorder, infection at local site or patients not willing to participate in the study were excluded .All patients were evaluated thoroughly preoperatively and were investigated for Hb, CBC, Urine routine, LFT, KFT, ECG and X-ray chest. Multipara monitor with Pulse rate, NIBP ECG and SpO2 was applied. Written valid informed consent was obtained from all patients. At the regress of level of spinal anaesthesia three in one block with solution containing 0.5% Bupivacaine 2.5mg/Kg with Inj Fentanyl 25 µg as an adjuvant ,diluted with distilled water to make total volume 40ml ,was given to Grp A and Inj Tramadol IV 2mg/Kg was given to Grp B.

### Technique of 3 in 1 block.

Patient is made to lie supine with legs extended. The operator stands on the side to be blocked. After preparing the site with antiseptic solution ,anterior superior iliac spine and pubic tubercle are palpated and a line is drawn overlying inguinal ligament. Femoral artery lies at the midpoint of inguinal ligament and is located by feeling the pulsations. The site is marked 1 cm lateral to the uppermost pulsation of femoral artery. A 23 G hypodermic needle of 3-4 cm length is inserted perpendicular to skin just lateral to this mark with a tip directed slight cranially.

The femoral nerve lies deep to fascia iliaca and femoral sheath containing femoral artery ,vein and femoral canal lies on top of it. From medial to lateral the structures are femoral vein, femoral artery and femoral nerve. First loss of resistance or 'pop' is felt at the penetration of fascia lata. Whereas second pop is felt at the penetration of fascia iliaca. The needle is fixed at this position and 40 ml solution is injected after aspiration to avoid intravenous infusion of drug. After needle removal, firm pressure is applied with thumb at the site for about 30 sec to encourage the spread of local anaesthetic towards lumbar nerve roots.

Patient is then observed for pulse rate, systolic and diastolic blood pressure, respiratory rate, VAS score ,requirement and time for rescue analgesic and any complications for 12 hrs.

### Results:

Comparative evaluation was done for age ,sex., weight. P value was calculated using t test and was statistically insignificant. (p>0.05).

Baseline pulse rate, systolic and diastolic blood pressure was measured before giving block . The baseline mean pulse rate of 3 in 1 block group was 99.76 and 102.17 for IV Tramadol group. The difference was statistically insignificant (p=0.0001). The baseline mean systolic blood pressure in 3 in 1 block group was 136.27 and 129.2 for IV Tramadol group. The difference was statistically insignificant (p=0.473). The baseline mean diastolic blood pressure was 85.73 in 3 in 1 block group and 84.2 in IV Tramadol group which was statistically insignificant.

**Table No.1 : Measurement of mean pulse rate after block.**

Hours	3 in 1 Block group (beats /min)	IV Tramadol Group (beats /min)	P value
1	85.86	94.55	<0.001
2	80.8	93.03	<0.001
3	80.16	89.86	<0.001
4	77.4	93.96	<0.001
5	78.16	95	<0.001
6	76.23	93.7	<0.001
7	77.9	93.6	<0.001
8	76.33	90.13	<0.001
10	94.6	95.83	0.355

12	105.97	105.5	0.872
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The mean pulse rate was measured in both groups at hourly interval upto 12 hours after giving block or IV Tramadol. Statistically significant difference was noted in both the groups upto first 8 hours. Later on the difference was insignificant suggesting veining effect of the block.

**Table No. 2: Measurement of mean systolic and diastolic blood pressure**

Hours	3 in 1 Block Group (mm of Hg)		IV Tramadol Group (mm of Hg)		P value	
	Systolic	diastolic	Systolic	diastolic	systolic	diastolic
1	112.93	71.53	127.53	85.2	0.473	0.879
2	113.07	72.86	131.73	84.2	<0.001	<0.001
3	115.47	73.06	131.67	85.2	<0.001	<0.001
4	116.87	74	130.93	83.93	<0.001	<0.001
5	113.07	74.46	131.73	82.93	<0.001	<0.001
6	115.67	73.86	133.4	87.2	<0.001	<0.001
7	117.2	73.66	128.2	84.06	<0.001	<0.001
8	117.6	75.73	130.13	82.86	<0.001	<0.001
10	130.07	80.53	131.13	82.53	0.473	0.192
12	133.07	84.33	131.73	82.8	0.68	0.105

The mean systolic and diastolic blood pressure was measured in both the groups at hourly interval upto 12 hours. Statistically significant difference was noted in both the groups upto 8 hours. Later on the difference was insignificant suggesting veining effect of the block.

The mean duration of analgesia was noted. It was 8.03 hrs in 3 in 1 block group and 5.3hrs in IV Tramadol group. p value was <0.001. It was observed that maximum number of patients experienced analgesia for 7 to 8 hours in 3 in 1 block group whereas it was less than 6 hrs in Tramadol group.

No patient in either group had any complication or side effect.

### Discussion

Analgesia is one of the most important component in postoperative care of patients. In spite of newer methods of providing analgesia like epidural analgesia, use of opioids in neuraxial block, patient controlled analgesia etc; peripheral nerve blocks with newer local anaesthetics like Bupivacaine or Ropivacaine changed the scenario for postoperative analgesia.

In 1973 Winnie<sup>1</sup> introduced 3 in 1 block being safe, simple to perform and effective in providing excellent analgesia in lower limb surgeries. Snoeck MM<sup>2</sup> et al practiced the block in geriatric patients for fracture femur with bupivacaine 2mg/kg and found pain relief upto 26 hours. Contreras Dominduez<sup>3</sup> studied 3 in 1 block for anterior cruciate ligament repair of knee using Bupivacaine and clonidine and was found to be better than IV Ketoprofen. However obturator may get spared due to subfascial dissemination.

Ng Hp<sup>4</sup> used Ropivacaine and compared it with bupivacaine in 3 in 1 block for knee replacement. He found Ropivacaine better than bupivacaine. Singelyn F<sup>5</sup> compared 3 in 1 block with IV patient controlled analgesia for knee arthroplasty and found block to be effective for early ambulation. Neuber Martins<sup>6</sup> et al compared block with intrathecal morphine. They found higher incidence of nausea and vomiting in morphine group and significantly increased duration of analgesia in block group.

In our study, we gave either 3 in 1 block or IV Tramadol for skin grafting, interlocking nailing of femur and postoperative pain relief for lower limb surgeries and found that better pain relief was observed in 3 in 1 block group. We also observed that number of patients having nausea and vomiting in postoperative period was higher in IV Tramadol group than Block group which was treated by Inj Ondansetron 4mg IV.

In our study we used injection 0.5% Bupivacaine in the dose of 2.5mg/Kg and Inj Fentanyl 25 µg diluted with distilled water to make total volume 40ml. Bupivacaine though cardio stable local anaesthetic, the total dose used was 125g for 50 Kg patient which was much lower than the prescribed limit for peripheral nerve block which

is 175 mg.<sup>7</sup>

Fentanyl is lipophilic opioid and potent analgesic agent. We used the combination of Bupivacaine and Fentanyl in appropriate doses being most useful in cardio-compromised patients to prolong the postoperative analgesia which was 8.26hrs in 3 in 1 block group while analgesia was observed for 5.3hrs in IV Tramadol group. The difference was statistically significant. Tramadol has non opioid receptor mediated analgesic effect.

In our study we monitored the respiratory rate in both the groups before and after giving either block or IV Tramadol. However no significant difference in respiratory rate was found in either group. 17 patients in tramadol group experienced nausea and vomiting while block group was devoid of it.

Three in one block can be associated with certain complications like transient femoral nerve palsy, local anaesthetic toxicity due to inadvertent intravascular injection as femoral artery lies in close proximity or local hematoma formation if drug is given subcutaneously, prolonged motor block of muscle of thigh. However no such complications were found in our study. Use of ultrasound guided nerve blocks are technically superior and they decrease the dose of opioids and volume of local anaesthetic requirement for pain management. So also it reduces the chances of accidental arterial injection or direct nerve injury due to direct visualisation<sup>7</sup>

### Conclusion

After comparing skilfully performed three in one block with intravenous Tramadol for postoperative analgesia in lower limb surgeries it can be concluded that better postoperative analgesia with hemodynamic stability was observed in three in one block group. It can be a better alternative to IV Tramadol in respect of nausea vomiting or any other postoperative complications.

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