

STUDY OF INJECTION TRAMADOL AS ADDITIVE IN INTRAVENOUS REGIONAL ANESTHESIA

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ABSTRACT: Now a days IVRA is developed with use of double tourniquet and additive drugs like opioids, NSAIDS, muscle relaxants etc., to minimize the intraoperative discomfort of surgery and tourniquet pain. Many additives can take care of the post-operative pain. Each additive has its own pros and cons. Tramadol is a synthetic opioid analgesic having additional local anesthetic property and effect in neurotransmitter reuptake. With this background we studied the injection Tramadol 50mg as additive in IVRA against control group. **METHODOLOGY:** All the selected patients are from ASA Grade 1 and 2 for surgical procedure of upper limb. We have excluded the cases which are contraindicated for tourniquet and patients who are uncooperative and allergic to drug used for study. All 50 patients are divided in two groups. Group 1-25 patients who receive Intravenous Regional Anesthesia with injection lignocaine 0.5% 40cc volume. Group 2-25 patients who receive Intravenous Regional Anesthesia with injection Tramadol 50mg and injection lignocaine 0.5% total 40cc volume. After the drug is loaded in venous compartment sensory blockade is assessed at the interval of one min. by blunt needle pin pricks in all dermatome segments by using a 3-point scale: 0 = normal sensation, 1 = loss of sensation of pin prick (Analgesia), and 2 = loss of sensation of touch (Anesthesia). Motor block is assessed at the interval of two min. Motor block was determined according to the modified Bromage scale. It is on 3 point assessment i.e., thumb abduction (Radial nerve), thumb adduction (Ulnar nerve), thumb opposition (Median nerve), and flexion of elbow (Musculocutaneous nerve) **OBSERVATIONS:** we observed onset of sensory blockade, onset of motor blockade, intraoperative discomfort, postoperative analgesia and postoperative nausea vomiting. Onset of sensory blockade is significantly rapid in group 2 (Injection lignocaine + injection Tramadol group) (p=0.00001) whereas there is no effect of Tramadol on onset of motor blockade in both the group. In post-operative period the need of analgesic is delayed in group 2 which is statistically significant (p value is 0.00001) We observe post-operative nausea and vomiting events more in group-1 (24%) and in group-2 (16 %) but there is no statistical difference. Pain is the significant factor for post-operative nausea and vomiting. Group 2 patients (Tramadol group) are more comfortable with tourniquet intra-operatively but statistically it is not significant. Intraoperative discomfort may attribute to anxiety and fear along with possibility of dilution of drugs because of inadequate exsanguination. **CONCLUSION:** We conclude that addition of injection Tramadol 50mg in intravenous regional anesthesia will improve the onset of sensory blockade and improves the post-operative analgesia without any increase of postoperative nausea and vomiting. Also it is concluded that injection Tramadol has no effect on motor blockade.

KEYWORDS: IVRA, Tramadol, Bier's Block, tourniquet.

INTRODUCTION: Intravenous Regional Anesthesia (IVRA) is introduced more than 100 years ago and now is well established technique of regional anesthesia. Since its inception by August Bier it is evolved as reliable and safe technique of anesthesia. The efficiency of IVRA has practical and financial implications such as decreased total operating and recovery room times, decreased cost of medicines.^[1]

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Technically it is easy with success rate of about 94 to 98%.^[2] The major short coming of intravenous regional anesthesia is tourniquet pain and no post-operative analgesia. To facilitate the post-operative analgesia and intraoperative comfort various additive drugs are recommended like opioids, NSAIDS, muscle relaxants etc.

Tramadol activates opioid and non-opioid system. Tramadol is a synthetic opioid selective for μ -receptors and interferes with neurotransmitter reuptake. Thus it has dual mechanism of action .It also exerts a local anesthetic action on peripheral nerves.^[3,4,5]

This analgesic and local anesthetic effect is useful with intravenous regional anesthesia.^[6]We have used injection Tramadol 50mg as additive along with injection lignocaine to evaluate the onset of sensory block, motor blockade, surgical and tourniquet discomfort along with post-operative analgesia. This study was conducted at Shree bhausaheb hire govt. medical college in the department of Anesthesia.

METHODOLOGY: All the selected patients are from ASA Grade 1 and 2 for surgical procedure of upper limb.

Cases Excluded are:

1. Peripheral vascular disease
2. Infection in the upper limb to be operated.
3. Procedures for which expected time of surgery is more than 90 min.
4. Sickle cell disease or trait
5. Uncooperative or confused patient.
6. Allergy to local anesthetic

Study Group: All 50 patients are divided in two groups.

Group 1-25 patients who received Intravenous Regional Anesthesia with injection lignocaine 0.5% 40cc volume.

Group 2-25 patients who received Intravenous Regional Anesthesia with injection Tramadol 50mg and injection lignocaine 0.5% total 40cc volume.

A day before surgery patients are visited for preoperative anesthesia assessment and base line parameters like pulse, blood pressure and oxygen saturation are noted. Complete procedure for anesthesia is explained and informed written consent is obtained. On the day of surgery premedication with intravenous injection of midazolam 1mg is given in the operation theater.

On the operation table double tourniquet is applied and kept ready for inflation. Venous cannulation is done on the dorsum of hand which is to be operated. Exsanguination is done by Esmarch bandage and proximal cuff is inflated till the pressure is 100mmHg above the preoperative assessment systolic blood pressure of that patient. In Group 1 Injection lignocaine 0.5% 40volume is injected slowly by keeping watch on vital parameters and drug toxicity and in Group 2 -injection tramadol 50mg with 0.5% lignocaine in total volume of 40cc is injected.

After the drug is loaded in venous compartment sensory blocked is assessed at the interval of one min. by blunt needle pin pricks in all dermatome segments by using a 3-point scale: 0 = normal sensation, 1 = loss of sensation of pin prick (analgesia), and 2 = loss of sensation of touch (anesthesia).

Motor block is assessed at the interval of two min. Motor block was determined according to the modified Bromage scale. It is on 3 point assessment i.e., thumb abduction (radial nerve), thumb

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adduction (Ulnar nerve), thumb opposition (Median nerve), and flexion of elbow (Musculocutaneous nerve)

Grade 0: Normal motor function with full flexion and extension of elbow, wrist, and fingers

Grade 1: Decreased motor strength with ability to move the fingers only

Grade 2: Complete motor block with inability to move the fingers

After complete sensory blocked distal tourniquet is inflated and again same pressure is kept as that is in proximal cuff. Now the proximal cuff is deflated and patient is handed over for surgery. Pulse and blood pressure is monitored at every 5 min for first half hour and there after every 10 min. till procedure is over.

After tourniquet release patient is observed for drug toxicity and tourniquet syndrome.^[7] In post-operative period at 1 hr interval patient is assessed for pain and time of first dose of analgesic is noted. Injection diclofinac sodium 75 mg intramuscularis used as analgesic. Along with this assessment post-operative nausea and vomiting is also noted and injection ondencetron 4mg intravenous is used to manage this issue.

Patient is kept under observation till the complete motor tone is regained to rule out the tourniquet palsy.

OBSERVATIONS:

	Parameter	Group 1 (Lignocaine)	Group 2 (lignocaine + Tramadol)
1	Average tourniquet time	68 min	72 min
2	Average time of Onset of sensory blockade	5 min 6 sec	3 min 52 sec
3	Average time of Onset of motor blockade	11min 6 sec	12min 12 sec
4	Intraoperative tourniquet discomfort	28%	12%
5	Average time from tourniquet release to first analgesic	2 hrs 7 min	5 hrs 28 min
6	Post-operative nausea & vomiting	24%	16%

Table showing the comparative parameters:

The data was analyzed by paired t test to compare the value between two group for duration of tourniquet time, onset of sensory blockade, onset of motor blockade, duration from tourniquet release to first analgesic given and post-operative nausea vomiting.

In our study on statistical analysis we observe that duration of tourniquet time in both the group is comparable. [Average time for group-1 is 68 minutes and for group-2 is 72 minutes]. The difference between two groups is not significant. (p is 0.80694). This finding suggest that both the groups are comparable as far as intraoperative tourniquet discomfort and pain is concerned. Onset of sensory blockade is significantly rapid in group2 (Injection lignocaine+injection Tramadol group) (p-0.00001) whereas there is no effect of Tramadol on onset of motor blocked in the Group 2 patients.

In post-operative period the need of analgesic is delayed in group 2 which is statistically significant. (p value is 0.00001)

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We observe post-operative nausea and vomiting events more in group-1(24%) and in group-2(16 %) but there is no statistical difference. Pain is the significant factor for post-operative nausea and vomiting. This may have contributed for more cases of nausea and vomiting in group -1.

DISCUSSION: IVRA is established by August Bier in 1908 and reintroduced by Holmes in 1960. When local anesthetic is injected intravenously in a limb guarded by tourniquet rapid onset of anesthesia is developed in the area distal to the tourniquet. Today IVRA is developed with use of double tourniquet and additive drugs like opioids, NSAIDs, muscle relaxants etc., to minimize the intraoperative discomfort of surgery and tourniquet pain. These additives can take care of the post-operative pain. Each additive has its own pros and cons.

Tramadol is good analgesic agent amongst the opioid group for the treatment of moderately severe acute or chronic pain. Its short term use minimize the nausea, dizziness, sedation etc. The minimum respiratory depression and equal analgesic property like pethidine makes the Tramadol as choice of drug.^[8] It is a synthetic opioid analgesic having additional local anesthetic property and effect in neurotransmitter reuptake. After tourniquet release the introduction of Tramadol in systemic circulation is safe as its respiratory depression is minimum and effect on cardiovascular parameters is not significant. It offers additional advantages like good intraoperative analgesia along with minimum side effect like skin rash.

With this background we studied the injection Tramadol 50mg as additive in IVRA against control group. In our study we observed onset of sensory blockade, onset of motor blockade, intraoperative discomfort, postoperative analgesia and postoperative nausea vomiting.

We found that onset of sensory blockade is rapid with Tramadol. Post-operative analgesia is significant in lignocaine and Tramadol group. These findings may have attributed to its local anesthetic property.

Study of Tan S Met et al.^[9] shows faster onset of sensory blockade and motor blockade, but it is statistically not significant. Another study by Aslan B et al.^[10] shows improvement in sensory block and post-operative analgesia. But no effect on motor block.

Siddiqui AK et al.^[11] also recommended the use of injection Tramadol to improve the onset of IVRA, Intraoperative tourniquet tolerance and post-operative analgesia.

Our results are consistent with previous studies except Intraoperative comfortness of tourniquet. Group 2 patients (Tramadol group) are more comfortable with tourniquet intraoperatively but statistically it is not significant. Intraoperative discomfort may attribute to anxiety and fear along with possibility of dilution of drugs because of inadequate exsanguination.

Gregoire Longlois et al.^[12] also commented that there is no reduction in Intraoperative discomfort of tourniquet. They have also found no significant post-operative pain relief by Tramadol.

Tramadol is equipotent with pethidine.^[13] It was noticed that the addition of pethidine (30mg dose) as adjunct to lidocaine in (IVRA) did not increase the tourniquet tolerance when compared to the lidocaine group [Austin J Anesthesia and Analgesia -Pethidine in Hand and Forearm Surgeries under Intravenous Regional Anesthesia -Ibrahim AN*].

The disadvantage of Tramadol is skin rash because of histamine release.^[14] We had come across only two patients of such rash which required no treatment. After tourniquet release rash disappeared spontaneously. There are no other side effects of tourniquet in our study.

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There is no change in the incidence of post-operative nausea vomiting in both the group. There are no significant change in mean arterial blood pressure and pulse rate in both the groups. Moreover there are no findings suggestive of significant ECG changes in either group.

CONCLUSION: We conclude that addition of injection Tramadol 50mg in intravenous regional anesthesia will improve the onset of sensory blockade and the post-operative analgesia without any increase of postoperative nausea and vomiting. Also it is concluded that injection Tramadol has no effect on motor blocked.

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