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Comparison of Tramadol and Clonidine as an Adjuvant in Brachial Plexus Block

KEYWORDS: Brachial plexus block, Tramadol, Clonidine

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ABSTRACT *Brachial plexus block provides a useful alternative to general anesthesia for upper limb surgery. Various adjuvant drugs had been tried to improve the quality of block. Methods ; Study was conducted to evaluate the efficacy of injection Clonidine (150 µg) or injection Tramadol (100mg) as an adjuvant to local anesthetic mixture in 50 adult patients (ASA Grade I and II)in the age group of 18-50 years via supraclavicular approach of brachial plexus block. Assessment of patients of both groups were done for Onset and duration of sensory and motor blockade, Perioperative hemodynamic changes, Duration of post operative analgesia and Adverse effects of drugs .Conclusion: onset of sensory and motor block was comparable in both the groups but Clonidine provides longer duration of sensory and motor blockage and post operative analgesia than Tramadol.*

INTRODUCTION

Post operative analgesia has prime importance in all types of surgeries. The aim is to have a technique which is simple, safe, less invasive and relatively fast. Brachial plexus block is a useful alternative to general anesthesia with good operating conditions with complete muscle relaxation, stable hemodyanamics and sympathetic block for upper limb surgery. Various adjuvants have been tried with local anesthetics to improve quality of blocks[1]. The present study is to compare the effect of Clonidine v/s Tramadol as an adjuvant to local anesthetics for brachial plexus block.

AIMS OF THE STUDY

A study was conducted to evaluate the efficacy of injection Clonidine (150 µg) [5,6]or injection Tramadol (100mg)[7] as an adjuvant to local anesthetic in 50 adult patients (emergency or planned) in ASA Grade I and II via supraclavicular approach of brachial plexus block. Assessment of patients of both groups were done for Onset and duration of sensory and motor blockade, Perioperative hemodynamic changes, Duration of post operative analgesia and Adverse effects of drugs .

MATERIAL AND METHOD

The present study was conducted after receiving institutional ethical committee's approval. Patients excluded from the study were for whom supraclavicular brachial plexus block or the study medications were contraindicated or those who had a history of significant neurological, psychiatric, neuromuscular, cardiovascular, pulmonary, renal or hepatic disease or alcohol or drug abuse, as well as pregnant or lactating women.

Detailed preoperative evaluation and routine investigations (Hemoglobin, renal function tests, serum electrolytes, urine examination, random blood sugar and chest X-ray, ECG) were carried out to rule out local infection over supraclavicular area, bleeding diathesis, mental retardation or neurological deficit. Patients were explained about the procedure in detail, VAS scores and written consent was obtained. All patients were instructed to remain nil by mouth for 6 hours prior to surgery. No patient received any sedative and narcotic premedication before arrival in operation theatre. On arrival in the operation theatre, usual monitors like ECG, Pulse oximetry, blood pressure cuff were applied and baseline pulse, blood pressure, oxygen saturation and respiratory rate were noted. Intravenous line was secured with 18G cannula and inj. ringer lactate was started in all patients. Brachial plexus block was performed using a supraclavicular approach by classic technique using nerve stimulator. The location end point was a distal motor response with an output lower than 0.7ma. On localization of the brachial plexus and negative aspiration of blood, the study medication was injected.

The patients were randomly divided into two groups. Patients in group A received Inj Lignocaine + Adrenaline 1.5% 30ml and Inj Bupivacaine 0.5% 10 ml and 100mg Tramadol while those in group B received local anesthetic in the same dose with Clonidine 150 µg. The assessment for onset of sensory and motor block was done every minute from the time of injection of test drug until the block was established. Sensory block was evaluated by pinprick test in hand and forearm where as motor block was assessed by asking the patient to abduct the shoulder and flex the forearm and hand against gravity. Onset of sensory block was defined as the time elapsed between injection of drug and complete loss of pin prick sensation, while onset of motor block was defined as the time elapsed from injection of drug to complete motor block. Only patients with complete motor block were included in the study. After the establishment of block, surgery was started and time of beginning of surgery was noted. Intravenous fluids were continued intraoperative at a rate of 2 ml/kg/hour. Intra operatively, pulse, BP, SPO_2 and ECG were monitored every half hourly. Any complication like tachycardia, bradycardia, hypotension, nausea, vomiting, breathlessness, cough, discomfort and sedation were noted.

During the procedure, anesthesia was considered satisfactory if patient did not complain of any pain or discomfort. Any patient requiring supplemental anesthesia was excluded from the study. All 50 patients were monitored for anesthesia and analgesia up to 24 hours in the postoperative period.

Duration of sensory block (the time elapsed between injection of the drug and return of pinprick sensation) and duration of motor block (time elapsed between injection

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of the drug to complete return of motor power evaluated by finger and shoulder movement) were recorded. Intensity of postoperative pain was evaluated using VAS (Visual Analog Scale), Grade 0 (No pain) to 100 (Worst pain). Analgesia was considered satisfactory if the score was 30 or less. If the score was more than 30 rescue analgesic inj. Diclofenac sodium 75mg i.v was administered. Time for first analgesic was noted. Postoperatively vitals and VAS score observed for 24 hours. Patients were observed carefully for any complications of supraclavicular block like pneumothorax, local anesthetic toxicity and complications of Clonidine like sedation, bradycardia, nausea, vomiting etc. In each patient, a chest x-ray was done 6 hrs postoperatively to rule out pneumothorax. Any neurological complication was noted. Both groups were compared for the duration of satisfactory analgesia from the time when the block was performed and the time for first administration of rescue analgesic. Data were presented as mean values and mean ± S.D and analyzed using unpaired t' test with p value <0.05 considered statistically significant.

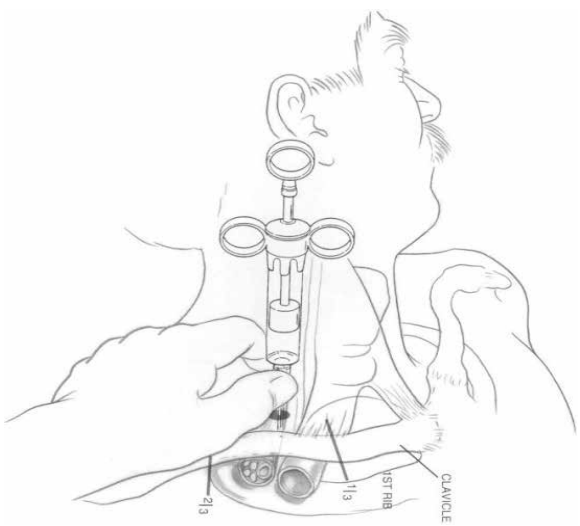

Fig 1 ANATOMY

OBSERVATIONS AND RESULTS

After studying 50 cases, observation and results are summarized .Both groups comprised of 25 patients each. Demographic data were comparable in both the groups. Types of surgical procedures, vitals and ASA risk were comparable in both groups. The onset of sensory block in group A was 11.4±0.81min as compare to 11.32± 0.852 min in group B. The onset of motor block in group A was 6.6±0.64 min as compare to 5.98±0.89min in group B. The mean time of onset of anesthesia (sensory and motor block) was comparable in both the groups. Intraoperative vitals were comparable in both the groups. Post operative hemodynamic parameters were also comparable in both the groups.

Table 1
Duration of Analgesia and Anesthesia

Time(hrs)	Group A	Group B	P value	Inference
Mean duration of Motor Block	6.05 ± 0.39	7.15 ±0.53	<0.05	S
Mean duration of Sensory Block	7.096 ± 0.41	9.61 ±1.63	<0.05	S
Mean time of 1st analgesic	8.752 ± 0.51	11.85±1.54	<0.05	S

Mean duration of motor block and sensory block are significantly longer in Group B than in Group A. Mean time for first analgesic requirement for Group B is 11.85 ± 1.54 hrs and it is significantly longer than that in Group A (8.75 ± 0.51) hrs. P<0.05

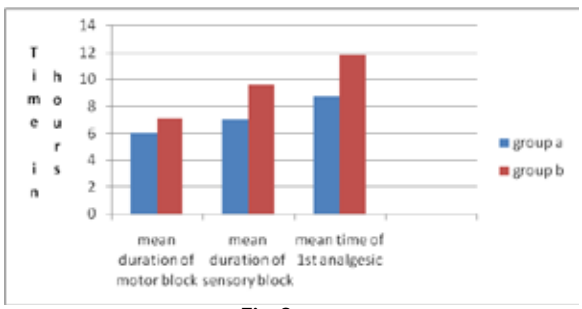

Fig 2

Perioperatively no incidence of nausea, vomiting, hypotension, tachycardia or bradycardia was observed in any patient in group A. One patient in Group B had pulse rate <60/min and two patients had systolic blood pressure <90 mmHg which was clinically not significant and did not require treatment. No incidence of decline in SPO_2 perioperatively.

DISCUSSION

Brachial plexus block provides a useful alternative to general anesthesia for upper limb surgeries as they achieve ideal operating conditions by producing complete muscular relaxation maintaining stable intraoperative hemodyanamics and the associated sympathetic block. Clonidine and local anesthetic agents have a synergistic action. Clonidine enhances both sensory and motor blockade of neuraxial and peripheral nerves blocks achieved by local anesthetics[3]. This may be due to blockage of conduction of A delta and C fibers, increase in the potassium conductance in isolated neurons in vitro and intensification of conduction block achieved by local anesthetics[2]. Tramadol is known to produce antinociception and enhance the effect of local anesthetics when given by epidural or intrathecal route[4].

Therefore, the present study was performed to evaluate the efficiency of Clonidine and Tramadol as an adjuvant to local anesthetics in supraclavicular brachial plexus block. Onset and duration of sensory and motor blockade, postoperative analgesia, hemodynamic changes and side effects were also studied In our study, no significant difference was seen between the onset of motor and sensory blockade in two groups. The mean duration of onset of motor and sensory blockade was 6.6 ± 0.645 mins and 11.4 ± 0.816 mins respectively for Group A and 5.98 ± 0.89 mins and 11.32 ± 0.89 mins respectively for Group B. Büttner J, et al [3] also noted that clonidine doesn't have influence on onset of anesthesia. Kapral S.et al also noted same for Tramadol.[8] Perioperative hemodynamics In our study, there was no significant difference in the hemodyanamics parameters – (Heart Rate, Blood Pressure, Spo_2, and Respiratory Rate) between the two groups perioperatively. Same observations were noted by Büttner J et al.[3] In one patient in Clonidine group, heart rate decreased to < 60/minute, but that was not clinically significant. Also during intraoperative period, hemodyanamics remained stable.

In our study, 2 patients in group B developed hypotension but it was corrected by i.v. fluids without use of vasopres-

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sors. Büttner J, et al [3] also noted same. The duration of surgery was comparable in both groups in our study. The duration of motor block was more in Group B 7.15 ± 0.53 hrs than in Group A 6.05 ± 0.39 hrs ($P < 0.05$). The mean duration of sensory blockade was longer in Group B 9.61 ± 1.63 hrs than in Group A 7.096 ± 0.41 hrs ($P < 0.05$). Block prolongation was observed in clonidine and Tramadol by many observers [3,7].

Duration of Postoperative analgesia

Intensity of postoperative pain was evaluated using VAS. The duration of postoperative analgesia was assessed in terms of first analgesic requirement (VAS > 30). In our study, the time for first analgesic requirement in Tramadol group (GROUP A) was 8.75 ± 0.51 hours compared to 11.85 ± 1.54 hours in Clonidine group (GROUP B) which means duration of postoperative analgesia was significantly more in Group B. ($P < 0.05$).[3,5] Adverse effects Procedural complications like pneumothorax, haematoma, discomfort, neurological sequelae were not observed in any group of patients. No side effects were noted in Group A patients intraoperatively. Postoperatively no complications were observed in any group. Few patients were sedated but easily arousable in group B without any decrease in SPO2.

SUMMARY

After approval from ethical committee and informed consent, a comparative study of 50 patients (ASA Grade I/II) scheduled for various Upper limb surgeries either planned or emergency, under supraclavicular brachial plexus block, was carried out. Patients were randomly divided into two groups of 25 each .Group A patients received Inj Lignocaine + Adrenaline 1.5% 30ml and Inj Bupivacaine 0.5% 10 ml with 100mg Tramadol and Group B patients received Clonidine 150 µg (1ml) along with the same dose of local anesthetic agents in brachial plexus block.

- The onset and duration of sensory and motor blockade was comparable.
- Perioperative hemodynamic stability was observed in both the groups.
- The mean duration of sensory and motor blockage was significantly longer in group B. ($P < 0.05$).
- Duration of postoperative analgesia was significantly more in Group B. ($P < 0.05$).
- No adverse effects of drugs or complications of the procedure were observed in any group.

CONCLUSION

Tramadol 100mg or clonidine 150 µg is added to local anesthetic solution in supraclavicular brachial plexus block, it provides rapid onset of block, profound and prolonged analgesia, good hemodynamic stability without any side effects. Both are good adjuvant to local anesthetic agent for brachial plexus block via supraclavicular approach for various upper limb surgeries but Clonidine provides longer post operative analgesia with sedation than Tramadol.

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