



## VERAPAMIL AS AN ADJUVANT TO BUPIVACAINE FOR ULTRASOUND GUIDED INTERSCALENE BRACHIAL PLEXUS BLOCK FOR POST OPERATIVE PAIN RELIEF IN ARTHROSCOPIC SHOULDER SURGERIES

**Dr. Akanksha Monil Parsana**

Assistant Professor, Dept. of Anaesthesia, PSMC, Karamsad, Gujarat

**Dr. Mukesh Kumar**

Senior Resident, Dept. of Anaesthesia, LNJP Hospital, New Delhi.

**Dr. Abhinav Bishnoi\***

Assistant Professor, Dept. of Anaesthesia, Ram Krishna Medical College and Research Centre, Bhopal. \*Corresponding Author

### ABSTRACT

**Background-** Interscalene Brachial plexus blocks are most popular regional nerve block of upper extremity. Various adjuvants are used to prolong action of local anaesthetics in regional blocks. **Aim-** To assess effect of Verapamil in interscalene brachial plexus block. **Materials And Methods-** The study was done on 60 ASA I and 2 patients of either sex posted for arthroscopic shoulder surgeries( n=30). Patients in test group received 0.25% Bupivacaine Hydrochloride (1.5mg/kg) + Verapamil 5mg in brachial plexus block and patients in control group received 0.25% Bupivacaine Hydrochloride (1.5mg/kg) after administration of GA by standardized technique. **Observations-** It was observed that mean duration of motor block, sensory block and analgesia were significantly longer in test group than control group. **Conclusion-** Addition of Verapamil to local anaesthetic solution for interscalene brachial plexus block can modify the action of the local anaesthetic.

**KEYWORDS :** Interscalene, Brachial, Verapamil.

### INTRODUCTION

Interscalene Brachial plexus blocks are most popular and most widely employed regional nerve blocks of upper extremity. It can be used to provide regional anaesthesia or as an analgesic technique to be used in combination with general anaesthesia. Various local anaesthetic agents are used for brachial plexus block but most commonly used drug are Bupivacaine. There are various different additives that can be used to prolong regional blockade like Tramadol, Fentanyl, Neostigmine, Dexamethasone etc. Verapamil, a calcium channel blocker has been used successfully for post-operative pain relief. Calcium ions have an important role in analgesia mediated by local anaesthetics. Local anaesthetics reduce calcium permeability and various studies have shown that Verapamil can potentiate the analgesic effects of local anaesthetics.

### Aims

- To assess effect of Verapamil in interscalene brachial plexus block.
- To compare the duration of sensory and motor block
- To compare the duration of effective analgesia
- To study the side effects.

### MATERIALS AND METHODS

After obtaining institutional ethical committee approval and written informed valid consent, a study of 60 patients of either sex, ASA-I/II in the age group of 20-60 years was conducted on patients posted for shoulder arthroscopic surgeries.

### Inclusion Criteria

- 1) Age of patient: 20 years to 60 years.
- 2) Either gender.
- 3) Written and informed consent.
- 4) ASA grade I and II.
- 5) Patients undergoing various elective orthopaedic surgeries on upper limb.

### Exclusion Criteria

- 1) ASA grade III and IV.
- 2) Any bleeding disorder or coagulopathy.
- 3) Local infection at injection site.
- 4) H/o allergy to local anaesthetic.
- 5) Neurological deficit involving brachial plexus.
- 6) Patients with h/o peptic ulcer disease, diabetes, hepatic or renal failure

### Procedure

ASA grade I and II patients aged 20 years to 60 years of either gender were randomly assigned to 2 groups each containing 30 patients.

**Group T (Test Group):** Patients in this group received 0.25% Bupivacaine Hydrochloride (1.5mg/kg) + Verapamil 5mg.

**Group C (Control Group):** Patients in this group received 0.25% Bupivacaine Hydrochloride (1.5mg/kg).

Preoperative assessment was done on previous day, detailed clinical history was taken, general & systemic examination was done & all patients were investigated. After thorough explanation of the procedure routine and standard monitoring like ECG, pulse oximetry, NIBP applied and baseline values noted in operation theatre. Intravenous access established using 18G cannula. Patients were premedicated with Inj. Glycopyrrolate 4 µg/kg and Inj. Fentanyl 2 µg/kg IV. Inj. Ondansetron 0.15 mg/kg. Preoxygenation: with 100% O<sub>2</sub> for 3mins. Induction was achieved done Inj. Propofol 2 mg/kg and Inj. Cisatracurium 0.1mg/kg. Patient were intubated. Maintenance: 50% O<sub>2</sub> 50% Nitrous oxide mixture with Sevoflurane and Inj. Cisatracurium 1 mg incremental doses SOS. Thoroughly cleaning and drapping of interscalene area was done and ultrasound guided interscalene block was administered using 5 cm 24G stimplex needle with drug according to the group. During injection of drugs, negative pressure aspiration was performed after every 5-6ml to avoid intravascular injection depending on the group selected for study.<sup>[1]</sup> Intraoperative vitals were monitored. During the conduct of block and thereafter, the patient was observed vigilantly for any complications and toxicity of the drugs. Sensory block was assessed by pinprick method. Motor block was assessed by Bromage scale. Analgesic effects assessed by VAS Score. Parameters were observed at 5 minute interval for 15 minute, then 30 minute interval for 90 minutes, then 2 hourly interval for 12 hour and 24 hour.

### Observations

After studying 60 cases, observation and results were summarized.

The demographic factors like mean age, sex ratio, body weight, nature and duration of surgery in test and control groups were comparable.

**Duration Of Motor Block**

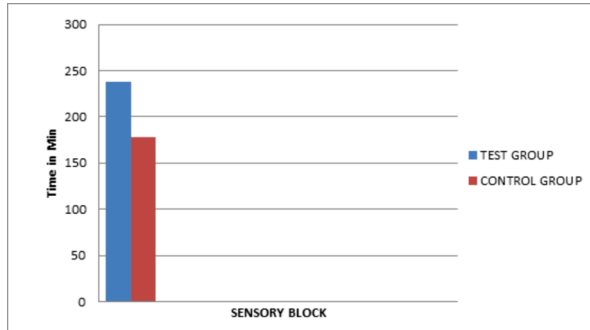
GROUPS	DURATION OF MOTOR BLOCK (MIN) (Mean sd)
TEST GROUP	185.4315.33
CONTROL GROUP	136.712.43

P VALUE=0.008 (<0.05)

**Duration Of Sensory Block**

GROUPS	DURATION OF SENSORY BLOCK (Mean sd)
TEST GROUP	248.315.55
CONTROL GROUP	165.511.10

**Duration Of Sensory Block**

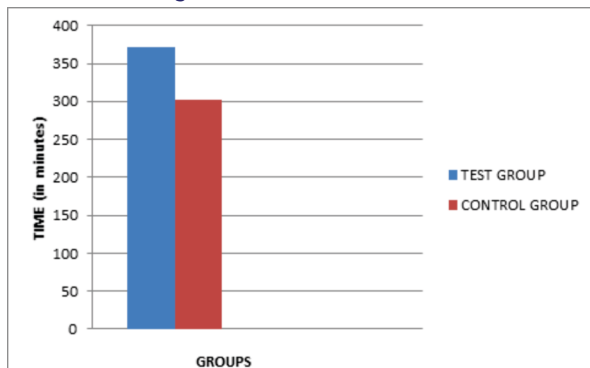


P VALUE=0.0001 (<0.05)

**Duration Of Analgesia**

GROUPS	DURATION OF ANALGESIA (min) (Mean sd)
TEST GROUP	37122.82
CONTROL GROUP	302.0311.01

**Duration Of Analgesia**



P VALUE=0.295 (>0.05)

It was observed that mean duration of motor block, sensory block and analgesia were significantly longer in test group than control group.

**DISCUSSION**

We designed a randomized prospective and controlled study to assess effect of Verapamil on onset and duration of sensory and motor block and duration of analgesia in interscalene brachial plexus block and analgesic effects of it when is added to local anaesthetic. This study was conducted in 60 patients of varying age and sex belonging to ASA-I and II grade for upper limb surgery. Patients were divided into 2 groups. In test group, 0.25% Bupivacaine (1.5mg/kg) and Inj. Verapamil 5mg (1 ml) was injected. In control group, 0.25% Bupivacaine(1.5mg/kg) was injected. We had taken a total volume of drugs according weight in our study. In our study, mean age of patients in test group 36.86 15.34 (Mean SD) years. Mean age of patients in control group 36.2314.33 (Mean SD) years. Mean age were comparable between two groups and there was no significant difference.

There was no significant difference regarding the sex distribution (M: F) [test group 20:10 and control group 24:6] between two groups. Mosaffa et al in 2007 evaluated 60 patient for the analgesic effect of 2 doses of Verapamil with Bupivacaine compared with Bupivacaine alone. Patients were randomly divided into 3 different groups. Results clarified that Verapamil decreased the onset time of anesthesia, motor block and total anesthesia but there was no statistical difference between 2.5 and 5mg doses of verapamil (P>0.05). Blood pressure and heart rate fluctuations were not more than 20% in group II and III. Delpozo et al found that subcutaneous Verapamil failed to exhibit anti-nociceptive effects, but was clearly analgesic when administered by intracerebroventricular route in rats. Some researchers have suggested that the analgesic effect of Verapamil is centrally and not peripherally mediated. [2,3] In our study, we also did not find significant changes in pulse rate, blood pressure, respiratory rates and SPO2 at different time intervals between both groups. There was reduction in blood pressure, pulse rate within 30 minutes in both the groups, but once the effect of block had been established, the patients remained haemodynamically stable till the effect of block continued. Mean duration of surgery in both the groups were comparable.

Though actual mechanism of Verapamil in prolonging duration of analgesia is not well understood but by reviewing various previous studies, there are three distinct types of calcium channels in sensory neurons namely L, T, and N type. Of these L and N type of channels have a significant role in regulating neurotransmitter release from neurons. The N type has much more potent anti-nociceptive effects than L type. Studies in rats have shown that application of morphine and N type calcium channel blockers attenuate pain mediated by A delta and C fibre. N type channel blockers were not clinically suitable for use because of their severe neurotoxicity.

Adverse effects with a single dose of Verapamil are probably extremely rare and minor in nature. Thus, our study has shown that addition of Verapamil to local anaesthetics in brachial plexus block produced prolonged sensory blockade and effective postoperative analgesia which lasted longer than that produced by local anaesthetics alone without any significant side effects and patient does not require other analgesic drug in immediate postoperative period.

**CONCLUSIONS**

Addition of Verapamil to local anaesthetic solution for interscalene brachial plexus block can modify the action of the local anaesthetic. In our study it significantly increased the duration of analgesia, sensory and motor blockade.

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