Original Research Article

A comparitive study of plain Bupivacaine and combination of bupivacaine with Ondansetron as an adjuvant in supraclavicular brachial plexus block

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Abstract

Background and objectives: Adjuncts to local anaesthetics for brachial plexus block may enhance the quality and duration of analgesia. Ondansetron, highly selective and potent antagonist of 5-hydroxytryptamine subtype 3 (5-HT_3) receptors is known to produce antiemetic and in addition above effect it blocks sodium channel and has antinociceptive property to enhance the effect of local anaesthetic when given in peripheral nerve blocks. The purpose of this study was to assess the effect of Ondansetron added to brachial plexus block by supraclavicular approach. **Methods:**A prospective, randomized, single blinded study was conducted on 60ASA Grade I or II adult patients undergoing upper limb surgeries under supraclavicular brachial plexus block. Patients were randomly divided into two groups. Patients in Group A (n = 30) were administered 30mL of 0.5% Bupivacaine and Group B (n = 30) were given 30mL of 0.5% Bupivacaine with Ondansetron 8mg/kg. The onset time and duration of sensory and motor blockade were recorded. Haemodynamic variables (i.e., heart rate, blood pressure and oxygen saturation), sedation scores and rescue analgesic requirements were recorded for 24 hr postoperatively. **Results**: The onset of sensory and motor block was significantly faster in Group B compared to Group A ($p< 0.05$). The duration of sensory and motor block was significantly longer in Group B compared to Group A ($p < 0.05$). Rescue analgesic requirements were significantly less in Group B compared to Group A ($p< 0.05$). Haemodynamics and sedation scores did not differ between the two groups in the post-operative period. **Conclusion**: Ondansetron (8mg) in combination with 30mL of Bupivacaine (0.5%) hastened onset of sensory and motor block, and improved postoperative analgesia when used in brachial plexus block, without producing any adverse events.

Keywords: Bupivacaine, Ondansetron, Supraclavicular brachial plexus block.

Introduction

Brachial plexus block provides a useful alternative to general anaesthesia for upper limb surgeries. They achieve near-ideal operating conditions by producing complete muscular relaxation, maintaining stable intra-operative haemodynamics and the associated sympathetic block. The sympathetic block decreases postoperative pain, vasospasm and oedema. Of various local anaesthetics, Bupivacaine is used most frequently, as it has a long duration of action varying from 3 to 8 hours. However there are many limiting factors like delayed onset, patchy or incomplete analgesia, sometimes short duration etc. Various drugs like Neostigmine, Opioids, Hyaluronidase, and Clonidine etc have been added to local anaesthetics in order to modify the block in terms of quick onset, good quality, prolonged duration and post-operative analgesia. But these are not without adverse systemic effects or of doubtful efficacy[1-4].Ondansetron, a highly selective and potent antagonist of 5- hydroxytryptamine subtype 3 (5-HT_3) receptors is known to produce antiemetic and in addition above effect it blocks sodium channel and has anti nociceptive property to enhance the effect of local anaesthetic when given in peripheral nerve blocks. Ondansetron produces this effect by its antagonistic action on sodium channel. Peripheral (5-HT_3) receptors are involved in pathway of nociception. These receptors bind to opoids receptors and agonist activity. So the present study is being undertaken in a randomized single blinded manner to evaluate the onset time and analgesic efficacy of Ondansetron- Bupivacaine combination compared to plain Bupivacaine (0.5%) for brachial plexus block by supraclavicular approach.

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Material and methods

A prospective, randomized, single blinded study was undertakenon 60 patients undergoing upper limb surgeries aged between 18 to 65 years under supraclavicular block in Osmania General Hospital, attached to Osmania Medical College, Hyderabad between November 2016 and October 2018. Informed written consent was taken. Results were recorded using a pre-set proforma.60 patients posted for upper limb surgeries under supraclavicular block were assigned to 2 groups, each containing 30 patients.

Control group – Group-A: received 30 ml Bupivacaine (0.5%) and 4ml normal saline

Study group – Group B: received 30 ml of mixture of Bupivacaine (0.5%) and Ondansetron (8 mg).

Inclusion criteria: ASA class I & II aged between 18 to 65 years

Exclusion criteria : Patient on drugs modifying pain perception ,Known case of hypersensitive reaction to Ondansetron or

Bupivacaine, Patients with abnormal coagulation profile, phrenic nerve or recurrent nerve palsy, Local infection at the site of proposed puncture for supraclavicular block and Patient refusal

Investigations Required are Haemoglobin (Hb%), Total Leukocytes Count (TLC), Differential Leucocyte Count(DLC), Bleeding Time (BT), Clotting Time(CT), Random Blood Sugar(RBS), Blood urea and Serum Creatinine, ECG, HIV, HBs Ag.Intravenous access with a 20 guage IV cannula on the contralateral upper limb under aseptic techniques. The anaesthesia machine, emergency oxygen source (E type cylinders) pipeline O_2 supply, working laryngoscopes, appropriate size endotracheal tubes with connectors and oropharyngeal airways. Working suction apparatus with suction catheter. Drugs: Inj. Thiopentone, Succinylcholine, Hydrocortisone, Atropine, Adrenaline, Aminophylline, Mephenteramine, Calcium gluconate and Sodium bicarbonate. A multiparameter monitor with pulse oximeter, E.C.G and non Invasive Blood pressure. Patients lay supine, arms by the side and head turned slightly to the other side. The interscalene groove and mid-point of clavicle were identified. After aseptic preparation of the area, at a point 1.5 to 2.0 cm posterior and cephalad to mid-point of clavicle, subclavian artery pulsations are felt. A skin wheal was raised with local anaesthetic just cephalo-posterior to the pulsations. Next, a 22 gauge, 5 cm needle, mounted on a 20 ml syringe, was passed through the same point, parallel to the head and neck, in a caudad, slightly medial and posterior direction, until either paraesthesia was elicited or first rib was encountered. If the first rib was encountered, the needle would be moved over the first rib until a paraesthesia was elicited either in the hand or arm. After eliciting paraesthesia the study medication was injected. All patients were monitored for anaesthesia and analgesia upto 24 hours post-operatively. Sensory block was evaluated by pin prick testing using 22 guage on skin dermatomes C_4 to T_2 whereas motor block was assessed by asking the patient to adduct the shoulder and flex the fore-arm against gravity. Onset of sensory block was defined as the time elapsed between injection of drug and complete loss of cold perception of the hand, while onset of motor blockade was defined as the time elapsed from injection of drug to inability to adduct arm and flex fore arm against gravity (inability to touch one‟s nose). Pain was assessed by numerical rating pain scale where 0 represents no pain n 10 means worst possible pain.Heart rate, non-invasive blood pressure and O_2 saturation were also monitore. Duration of sensory block (the time elapsed between injection of drug and appearance of pain requiring analgesia) and duration of motor block (the time elapsed between injection of drug and complete return of muscle power) would also be recorded. IM injection of Diclofenac sodium was given as rescue analgesic when patient complains of pain. Number of rescue analgesics needed in 24 hours of post-operative period was also recorded. Quantitative data was analysed by student‟s „t‟ test. Qualitative data was analysed by Chi-square test. A p value of< 0.05 was considered statistically significant.

Results

Sixty ASA Grade I and II of either sex aged between 18-65 years, posted for upper limb surgeries under supraclavicular brachial plexus block were selected for the study. The study was undertaken to evaluate the efficacy of Ondansetron (8mg) as an adjuvant to Bupivacaine (0.5%) in comparison with plain Bupivacaine (0.5%) for brachial plexus block by supraclavicular approach.

Table 1: Detailed Distribution of Study groups

Age Distribution in years	**Mean ± SD**	**p value**	**Significance**
Bupivacaine+ normal saline	34 ± 9.56	0.491	Not Sig
Bupivacaine+ Ondansetron	32.3 ± 9.45		
Weight Distribution			
Bupivacaine+ normal saline	81.7 ± 4.28	0.207	Not Sig
Bupivacaine+ Ondansetron	83.2 ± 4.82		
Duration of surgery			
Bupivacaine+ normal saline	75.06 ± 6.30	0.120	Not Sig.
Bupivacaine+ Ondansetron	72.7 ± 5.24		

The minimum age of the patient was 18 years and the maximum age was 65 years. The mean age of the patients in group B was 32.3 ± 9.56 and in group A was 32.3 ± 9.45 years. Age distribution between two groups was comparable. The mean weight of the patients in group B was 83.3 ± 4.28 and in group A was 81.7 ± 4.82 kgs. Weight distribution between two groups were comparable.The mean Duration of surgeries in group B was 72.06 ± 5.24(min) and in group A was 72.7± 5.24(min). Duration of surgeries between two groups were comparable .The mean time for onset of sensory block in group B was 8 ± 0.74 minand in group A was 8.13 ± 1.63 min. The statistical analysis by student‟s unpaired „t‟ test showed that, the time for onset of sensory block in group B was comparable to group B (p>0.05).

Table 2: Time for onset of motor block and sensory block

Time for onset of sensory block	**Mean ± SD**	**p value**	**Significance**
A	8.13 ±1.63	< 0.692	NS
B	8 ± 0.74		
Time for onset of motor block			
A	9 ± 1.63	< 0.001	SS
B	7.76± 0.77		
Duration of sensory block			
A	504 ± 32.81	P < 0.001	SS
B	880 ± 59.91		
Duration of motor block			

A	486 ± 32.40	P < 0.001	SS
B	754 ± 69.69		

The mean time for onset of motor block in group B was 7.76 ± 0.77 min and in group A was 9 ± 1.63 min. The statistical analysis by unpaired student"s „t" test showed that, the time for onset of motor block was significantly faster in group Between compared to group A (p< 0.05).
Patients of both groups were observed for 24 hours. Time was noted when the patient asked for rescue analgesics. The mean duration of sensory block in group B was 880±59.91 min and in group A was 504±32.81. The statistical analysis by students unpaired„t" test showed that the duration of sensory block in group B was significantly longer when compared to group A (p< 0.05) .The mean duration of motor block in group B was 754 ± 69.69 mins and in the group A was 486 ± 32.40 mins. The statistical analysis by students"t" test shows significant difference, with p value less than 0.05 (p< 0.05).Number of rescue analgesics in post-op 24 hours

Table 3: Number of rescue analgesics in post-op 24 hours

No. of Rescue Analgesic doses in 24 hours post-op	Bupivacaine + Normal Saline	Bupivacaine + Ondansetron
3	15 (25)	0
2	45 (75)	15 (25)
1	0	45 (75)

χ^2 = 61.25 p< 0.0001 Highly Significant
In group B, 75% patients required only 1 rescue analgesic dosage and 25% of patients required 2 rescue analgesic doses in post-op 24 hours. In group A 75% of patients required 2 and 25% of patients required 3 rescue analgesic doses in post-op 24 hours. This difference in number of rescue analgesic doses required by patient of both groups is statistically significant by chi-square test (χ^2 = 61.25, P < 0.05). Pulse rate, systolic BP, diastolic BP, O_2 saturation were recorded at 0 min, 5min, 15 min, 30 min, 60 min, 2 hours, 6 hours, 12 hours, 24 hours.

Table 4: Pulse Rate (beats / min)

Time of Assessment	Mean+/- SD		p Value	Significance
	Bupivacaine +Normal saline	Bupivacaine +Ondansetron		
0 min	83.5 ± 6.45	81.2 ± 6.58	>0.05	NS
5 min	80 ± 6.37	78.2 ± 6.27	>0.05	NS
15 min	78 ± 7.0	76.4 ± 6.58	>0.05	NS
30 min	77.7 ± 6.88	76.0 ± 7.15	>0.05	NS
60 min	77.8 ± 6.84	75.1 ± 7.05	>0.05	NS
2 hrs	78.03 ± 6.36	75.6 ± 6.23	>0.05	NS
6 hrs	78.5 ± 6.94	75.7 ± 6.24	>0.05	NS
12 h	78.6 ± 6.43	76.2 ± 6.19	>0.05	NS
24 hrs	79 ± 6.81	77.4 ± 6.20	>0.05	NS

In group A, the mean pulse rate ranged from 77.7±6.88 to 83.5 ± 6.45beats/ min.In group B, the mean pulse rate ranged from 75.1± 7.05 to 81.2 ± 6.58 beats / min. The statistical analysis by student"s unpaired „t" test showed that there was no significant difference in pulse rate between the two groups (p> 0.05).

Table 5: Diastolic blood pressure (mm of Hg)

Time of Assessment	Mean+/- SD		p Value	SignifiCance
	Bupivacaine + Normalsaline	Bupivacaine + Ondansetron		
0 min	76.8 ± 7.8	75.8 ± 7.13	> 0.05	NS
5 min	76.3 ±7.79	76.2± 8.34	> 0.05	NS
15 min	76.6 ± 7.19	76.4± 7.37	> 0.05	NS
30 min	75.8 ± 5.96	76.7 ± 7.40	> 0.05	NS
60 min	76.8 ± 6.65	76.5 ± 6.22	> 0.05	NS
2 hrs	76.8 ± 7.23	76.3 ± 6.91	> 0.05	NS
6 hrs	76.5 ± 7.32	76.3 ± 6.71	> 0.05	NS
12 hrs	76.3 ± 7.37	75.9 ± 6.61	> 0.05	NS
24 hrs	76.7 ± 6.65	76.5 ± 7.02	> 0.05	NS

In group A, the mean diastolic blood pressure ranged from 75.8 ± 5.96 to 76.8 ± 7.8 mm of Hg. In group B, DBP ranged from 75.9 ± 6.61 to 76.7 ± 7.40 mm of Hg. The statistical analysis by unpaired student"s„t" test showed that there was no significant difference in systolic blood pressure between two groups (p > 0.05)

Table 6: Oxygen saturation (%)

Time of Assessment	Mean+/- SD		p Value	Significance
	Bupivacaine	Bupivacaine- Ondansetron		
0 min	99.7 ± 0.57	99.7 ± 0.59	> 0.05	NS
5 min	99.8 ± 0.51	99.7 ± 0.54	> 0.05	NS
15 min	99.7 ± 0.63	99.7 ± 0.65	> 0.05	NS
30 min	99.7 ± 0.65	99.8 ± 0.53	> 0.05	NS
60 min	99.7 ± 0.58	99.8 ± 0.4	> 0.05	NS
2 hrs	99.7 ± 0.64	99.8 ± 0.48	> 0.05	NS
6 hrs	99.7 ± 0.56	99.8 ± 0.47	> 0.05	NS
12 hrs	99.7 ± 0.75	99.8 ± 0.55	> 0.05	NS
24 hrs	99.7 ± 0.53	99.8 ± 0.53	> 0.05	NS.

0,5, 15 30 60 mins 2hr 6hr 12hr 24hr In group A, the mean O_2 saturation ranged from 99.7 ± 0.57% to 99.8 ± 0.51%. In group B, the mean O_2 saturation ranged from 98 ± 0.5%. The statistical analysis by students unpairedt" test showed that there was no significant difference in O_2 saturation between the two groups (p> 0.05).

Discussion

Brachial plexus block provides postoperative analgesia of short duration, even when a long-acting local anaesthetic like Bupivacaine is used alone. Various adjuvant drugs like Opioids, Clonidine, Neostigmine and Hyaluronidase have been evaluated in conjunction with local anaesthetics to prolong the period of analgesia, but they were found to be either ineffective or to produce an unacceptably high incidence of adverse effects. A total of 60 patients within the age group of 18-65 were in included in the study, 30 in each group. Out of which the mean age of group A (receiving only Bupivacaine + Normal saline) was 34 ± 9.56 years and the mean age of group B (receiving ondansetron with Bupivacaine) was 32.3 ± 9.45 years. Hence both groups were comparable in regard to age. Male to female ratio was almost same. In our study we found that the onset of sensory block comparable in both groups and motor blocks was significantly faster in patients who received a combination of ondansetron and Bupivacaine. Onset of sensory block (group A, 8.13 ± 1.63 min; group B, 8 ± 0.74 min). Onset of motor block (group A, 9 ± 1.63 min; group B, 7.76 ± 0.77 min). This could be due to a local anaesthetic property of Ondansetron and its synergistic action with local anaesthetics. The onset of motor block was found to be faster than the onset of sensory block in our study groups. This is probably due to Pharmacokinetics of local anaesthetics action on nerve bundles and their somatotrophic arrangement of fibres. This has explained by Winnie et al who also had similar results in their study by observation that the motor fibres are located more peripherally than sensory fibres and are easily blocked first as compared to the centrally located sensory nerve fibres in the nerve bundles.[1,2].The sensory fibres are smaller as compared to motor fibres which are larger. The minimal effective concentration of local anaesthetics to block large fibres is greater than that of smaller sensory fibres. As a result motor function returns back faster than pain perception during weaning period of the block as concentration of drug decreases. This is what seen in our study as observed by de Jong et al in their study "Physiological mechanism of peripheral nerve block by local anaesthetics" [3].

The addition of ondansetron to local anaesthesticenchanced the onset of motor block and increased duration of both sensory and motor block in our study. This may be due to peripheral 5HT3 receptor & sodium channel blocking action, mu opioid receptor agonist action which is similar to study with ondansetron as an adjuvant in supra clavicular block observed by Dr Vasundha Jadhav, Dr Ranjeetsinha, Dr B.M. Diwanmalet al.In our study, the mean duration of sensory block (i.e. time elapsed from time of injection to appearance of pain requiring analgesia) was significantly higher (p< 0.05) in group B than in group A. (group B, 880 ± 59.91min; group A, 504± 32.81min). Duration of sensory block, post operative analgesia is more & requirement of rescue analgesic drugs is less in group B similar to a study conducted by Dr Vasundha Jadhav et al studies[4].A study of Ye et al showed that the effect of subcutaneous injection of ondansetron was 15 times than that of local anaesthesia with lidocaine[5]. The molecular structure of 5-HT3 receptor blockers was completely different from that of local anesthetic, but it has a similar effect to that of local anesthetic. However, the mechanism is not yet entirely clear; they found that 5-HT3 receptor antagonist could block the sodium channel of block the brain nerve cells of rats. It activated opioid receptors while inhibiting the release and uptake of norepinephrine to achieve analgesic effect. The molecular structure of 5-HT3 receptor blockers is completely different from local anaesthetics, but can produce similar local anaesthesia. The limitations of this study include limited documentation of the inclusion criteria, relatively insufficient samples, inadequate analysis .More high-quality studies with careful design are needed to reduce and decrease the effect of bias on the study result Farber and et al colleagues showed that 5-HT3 receptor antagonist like tropesetron have analgesic effect in patients with fibromyalgic pain. Also the analgesic effect of 5-HT3 receptor antagonist like alosterone in female patients with diarrhea predominant irritable bowel syndrome was reported by Camilleri et al and Muller et al showed that local administration of 5-HT3 antagonist had rapid analgesic effect in various rheumatic diseases[6-8].It was reported that this local anesthetic effect lasts significantly longer compared with local injection of local anesthetics combined with cortico steroids Ondansetron potentiates the action of local anaesthestics due to its peripheral action of blocking 5HT3 receptors & sodium channels, agonist action on mu opioid receptors there by producing antinociceptive action. This is seen not only seen in supraclavicular brachial plexus block but also intravenous regional anaesthesia. Stratz and colleagues showed that 5-HT3 receptor antagonists had anti-inflammatory effects and due to this property they could have a role in decreasing pain following surgical incision pain. Also, they founded that 5-HT3 receptor antagonists could acted as supplement or replacement for local administration of corticosteroids. Not only ondansetron but the other 5-HT3 antagonists such as tropisetron and alosetron have analgesic effect[9].It was showed by the Zeitz et al that peripheral 5-HT3 receptors acts as a novel complement for the primary afferent nociceptors. As tourniquet inflation prevent whole body distribution of ondansetron. There study may be useful model for investigating mechanism of peripheral action of ondansetron. Cui and colleagues concluded that stimulation of periaqueductal gray matter could increase release of 5-HT in dorsal horns of spinal cord that consequently might inhibit the nociception of dorsal horn

neurons[10,11]. Murphy RM et al &Alhaider AA et al showed that the 5-HT3 receptors, which are present on PAF (from the nociceptors up to the dorsal horn) mediate pronociceptive action while those receptors located postsynaptically in relation to PAF mediate the antinociceptive effect of endogenous (5-HT) or administered agonist[12,12].Gregory et al showed that ondansetron may be effective in preventing pain following injection of propofol by binding to the opioid receptors. Ondansetron has action on peripheral 5HT3 receptor mainly & minimal action on central 5HT3 receptors. Ondansetron through above action produces analgesic effect locally & increases pain threshold. A study was conducted by Azim Honarmand et al to evaluate effect of adding 8mg of ondansetron to lidocaine for Biers block on post operative pain. Ninety American Society ofAnaesthesiologist (ASA) physical status I-II patients, aged 18-65 years old, scheduled for elective hand or forearm surgery were randomly allocated to the three groups to receive 3 mg/kg 2% lidocaine diluted with saline to a total dose of 40 mL (Group L, n = 30) or 8 mg ondansetron plus 3 mg/kg 2% lidocaine diluted with saline to a total dose of 40 mL (group LO, n = 30) or 3 mg/kg 2% lidocaine diluted with saline to a total dose of 40 mL plus 8 mg ondansetron intravenously (Group IO, n = 30). The sensory and motor block onset times were significantly shorter in Group LO compared with Group L and Group IO. The sensory and motor block recovery times were significantly longer in Group LO compared with Group L and Group IO. Post- operative VAS scores were significantly less in Group LO compared with Group L and Group IO till 24 h after tourniquet deflation ($P < 0.05$). The addition of 8 mg ondansetron to lidocaine for IVRA reduced intraoperative and post-operative analgesic use till 24 h. Results of above IVRA study shows that analgesic action of ondansetron through peripheral 5HT3 receptor & sodium channels in Group LO & central 5HT3 receptors in Group IO lead to faster onset of sensory block, onset of motor block & duration of sensory block, duration of motor block is more in Group-LO than Group L & Group IO. In our study analgesic action of ondansetron may be through peripheral 5HT3 receptor and sodium channels in supra clavicular block which resulted in faster onset of motor block, more duration of sensory block & motor block except onset of sensory block[14,15].Mc clean et al.,showed that ondansetron as a 5 HT3 receptor antagonist has potential benefit in neuropathic pain. 0ndansetron analgesic efffect by action on 5HT3 receptor increased by increasing dosage of drug. A study was conducted by Nahla S. El Bahnasawy, to evaluate and compare the analgesic effect of adding two different doses (4or 8 mg) of ondansetron to lidocaine for intravenous regional anesthesia (IVRA). Significantly shorter onset times and longer recovery times of sensory and motor block were recorded in groups with ondansetron 4 mg & ondansetron 8 mg compared with only lignocaine group. with no significant difference between ondansetron groups. Delayed onset of tourniquet pain occurred in ondansetron groups compared with only lignocaine group . Addition of ondansetron to lidocaine enhanced the performance of lidocaine when used in IVRA, prolonged postoperative analgesia and reduced intraoperative and postoperative analgesic drugs. However, adding 8 mg ondansetron to lidocaine provided better analgesia than 4 mg[16-18].In our study ondansetron used as an adjuvant in supraclavicular block they used ondansetron as an adjuvant in IVRA block & observed that there is faster on set of sensory block & onset of motor block, longer duration of sensory block & motor block, reduced post operative analgesic drugs requirement similar resulted noted in our study except faster onset of sensory block in ondansetron as an adjuvant group. Ondansetron has been shown to bind to opioid μ-receptors in humans and possess agonist activity. Five hydroxytryptamine receptors are involved in the nociceptive pathways. Five hydroxytryptamine receptors play a pronociceptive role and mediate descending excitatory controls that allow spinal neurons to fully code peripheral stimuli. Ondansetron decreases chronic benign neuropathic pain, this effect seems to be produced by an action on the neurons in the spinal cord that code and transmit peripheral nociceptive stimuli. Fivehydroxytryptamine receptors are also a target for local anesthetics. The ability of ondansetron to block sodium channels and 5-HT3 receptor has put forward the hypothesis thatondansetron possesses antinociceptive properties probably in a similar way to local anesthetics. A study conducted by Omid Azimaraghi, et al (7) to evaluate Ondansetron reducing pain on injection of etomidate. The mean VAS for injection pain ofetomidate after pre-administration of intravenous ondansetron was 1.5 ± 1.2 which was lower compared to pre-administration of placebo. A Study of Ye et al. found that 5-HT3 receptor antagonist could block the sodium channel of block the brain nerve cells of rats. It activated opioid receptors while inhibiting the release and uptake of norepinephrine to achieve analgesic effect. Propofol is the drug of choice for induction of anaesthesia because of its rapid onset and short duration of action, easy titration, and favourable profile for side effects. Propofol injection associated with pain. Various drugs pretreatment with propofol injection compared efficacy of this drugs. A Study was conducted by Farrukh Ayub, et al to compare the effects of intravenous ondansetron and intravenous lidocaine on reduction of Propofol induced vascular pain. Pain reduction was observed in (64.0%) of group-A while in group-B pain reduction was reported (76.0%) of patients[19].Ondansetron is found to have μ opioid agonist action. So Ondansetron may be potentially used to decrease pain produced by propofol. This Study shows that ondansetron has less analgesic property & less side effects but more analgesic & more side effects lignocaine. Local anaesthetics contain hydrophilic and hydrophobic structures separated by an intermediate amide or ester linkage. The hydrophilic group is a tertiary or secondary amine, and the hydrophobic group an aromatic moiety. Although ondansetron does not possess this aromatic moiety, it has been shown to block sodium channels.Recently, ondansetron has been shown to bind to opioid μ-receptors in humans and exhibit agonist activity. These properties, together with the observation that 5-HT3 receptors are involved in the nociceptive pathways, have been postulated to explain the anti-nociceptive properties of ondansetron. A study wasconducted by Gangurbasappasumalatha, et al[20]to evaluate attenuation of propofol-induced pain by lignocaine, ondansetron, and ramosetron. Pre-treatment with IV ramosetron and lignocaine significantly reduced the propofol-induced pain when compared to ondansetron. But ramosetron is recent drug , not easily available , more costlier ,over all side effects needs to be further evaluated. Ondansetron which easily available drug, cheaper, over all less side effects also reduced propofol induced pain to some extent but not more than ramosetron& lignocaine. This study also shows that ondansetron analgesic property & anti emetic property.

Conclusion

From our study, we conclude that, the addition of Ondansetron (8 mg) as adjuvant to Bupivacaine (0.5%) hasSimilar onset of sensory block, Faster onset of motor block , Longer duration of sensory and motor blocks, Less number of rescue analgesics in post-op 24 hours and No significant difference in haemodynamic variables i.e., pulse rate, Systolic Blood Pressure, Diastolic Blood Pressure and O_2 saturation.

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