IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 6 Ver. 13 (June. 2018), PP 35-42
www.iosrjournals.org

To Evaluate the Efficacy of Tramadol as an Adjuvant to Ropivicaine in Intravenous Regional Anesthesia for upper Limb Surgeries

Mohammad Ilyas[1], Vinod Kumar Singh Senger[2], Neeraj Narang[3], Ruchi Singh[4]
[1.] *Senior Resident Department of Anaesthesiology Netaji Subhash Chandra Bose Medical College & Hospital Jabalpur (M.P.) India.*
[2]*Senior Resident Department of Anaesthesiology Netaji Subhash Chandra Bose Medical College & Hospital Jabalpur (M.P.) India*
.[3]*Assistant Professor Department of Anaesthesiology Netaji Subhash Chandra Bose Medical College & Hospital Jabalpur (M.P.) India*
.[4]*Senior Resident Department of Anaesthesiology Dr. B. R. A. Institute – Rotary Cancer Hospital Delhi India.*
Corresponding Author: Mohammad Ilyas

Abstract:
Aims and objectives: *To evaluate the efficacy of tramadol as an adjuvant to ropivicaine for intravenous regional anaesthesia(IVRA) and to study the effect of addition of tramadol in respect of onset of sensory blockade, quality of anaesthesia and duration of postoperative analgesia.*
Introduction: *Term 'VENOUS ANAESTHESIA' was coined by August Karl Gustav Bier, in 1908 and described an unusual method of producing analgesia of a limb.*
In this study, we evaluate the efficacy of tramadol as an adjuvant to ropivicaine for IVRA and to study the effect of addition of tramadol in respect of onset of sensory blockade, quality of anaesthesia and duration of postoperative analgesia.
Materials and Methods: *A total of 24 patients who were planned to undergo upper limb surgeries were divided into two groups. Group A received 40 ml , 0.2% ropivicaine (preservative free) alone. Group B received 40 ml, 0.2% ropivicaine with 100 mg tramadol (preservative free). Assessment of sensory blockade, motor blockade, quality of block, postoperative pain as done in both the groups.*
Result: *After prospective, randomized comparative study which was carried out in 24 patients, result achieved was that addition of tramadol to ropivicaine in IVRA shortens the onset of sensory blockade and prolongs the postoperative analgesia.*
Key words: *Intravenous regional anaesthesia.*

Date of Submission: 12-06-2018 Date Of Acceptance: 27-06-2018

I. Introduction

Anarsthesia began with "rag and bottle".Whether the rag was the sponge that Morten used, or the folded pocket handkerchief used by Simpson to turn a liquid into vapor by draining it from a bottle into a "rag". This was the first method of inhalational anesthesia. Then, there was the era of unending endeavors to control pain, The "Fifth Vital Sign"! The efforts to manage pain have evolved from the simple topical application of cocaine, through the use of sedation analgesia- the "twilight sleep" and techniques of neuraxial blockade, to the development of eponymous name or another.

In 1908, August Karl Gustav Bier[1], professor of surgery at Berlin, described an unusual method of producing analgesia of a limb, and named this technique 'VENOUS ANAESTHESIA' i.e, it "used the vascular bed to bring the anaesthetic agent to the nerve ending". In this technique, the arm was exsanguinated using an Esmsarch bandage, which was wound tightly around the arm above the lesion. A second bandage was put on below and a previously marked vein between the two bandages was exposed under the local infiltration and through this vein 0.5% procaine was injected. This resulted in prompt 'direct' anaesthesia supposed to be an action on the peripheral nerve endings and slower 'indirect' anaesthesia in the distal part of the limb due to effect on the nerve trunks. He didn't report any adverse effect and deaths. Later on, this method was popularized as "BIER BLOCK". Afterwards for so many years, this technique was not used much and no one had contributed further to the knowledge of this technique.

However, in this study we evaluate efficacy of tramadol as an adjuvant to ropivicaine in intravenous regional anaesthesia for upper limb surgeries.

II. Aims and Objectives

1 To evaluate the efficacy of tramadol as an adjuvant to ropivicaine for intravenous regional anaesthesia.
2 To study the effect of addition of tramadol in respect of onset of sensory blockade, quality of anaesthesia and duration of postoperative analgesia.

III. Materials and methods

The present study was undertaken in indoor patients admitted in orthpaedics and General surgery ward in NSCB Medical college and Hospital Jabalpur, Madhya Pradesh.

Sample size

The adequate required sample size was estimated using following formula

$n = z^2pq/d^2$

Where

n = sample size

z = 1.96 (considering 0.05 alpha, 95% confidence limits, and 80% beta)

q = 1- p

d = marginal error (precession error)

To calculate the adequate required sample size, We have taken assumption suggested by previous literature review that 15-45% (15% relative precision) difference between the groups would be observed.Sample size is 12 from the above formula. Therefore, minimum 12 subjects in each group will be adequate in number.

Sampling Method

Considering the best of the patients by reviewing the previous records of this health facility to achieve the maximum sample size, we had screened all the patients who fulfill the inclusion criteria and ready to give the written informed consent.

Selection of cases

After obtaining institutional and ethics committee approval and written informed consent, 24 patients both sexes in the age group 17 years to 65 years, body weight between 45 kg-65 kg belonging to class I and II of ASA classification posted for elective surgeries on the forearm, hand, and wrist were enrolled for the study. A detail history, thorough physical examination, routine investigation, or any special investigation if required were done for the study.

Exclusion criteria

Patient refusal

Local infection at needle insertion site.

Patient using anticoagulants drugs.

Patient with hypertension, pregnancy, chronic obstructive pulmonary disease, chronic artery disease, diabetes mellitus I and II, or pre-existing neuropathy involving the surgical limb.

Study design

This was a prospective, randomized, comparative study.

For the purpose of the study, the patients were randomly allocated by random number table into two groups of 12 patients each.

Group A- received 40 ml, 0.2% ropivicaine (preservative free) alone.

Group B- received 40 ml, 0.2% ropivicaine with tramadol 100 mg (preservative free)

Equipments in materials and method

10 and 20 ml glass syringes

22 SWG butterfly needle

Intravenous cannula 18/22 G

2 infusion sets

Intravenous fluids (ringer lactate and normal saline solutions)

0.2% ropivicaine solution preservative free

Injection tramadol ampoules

Distilled water

2 stainless steel bowls

Sponge holding forceps

Gauge pieces

Spirit and betadine

Needle 20/21 G

Double cuff pneumatic tourniquet
In case of any emergency or complications
Emergency drugs
Intubation kit
Resuscitation equipment
Premedication

Premedication with sedatives and narcotics were deliberately avoided so that there was no interference in the assessment of sensory and motor blockade

Monitoring

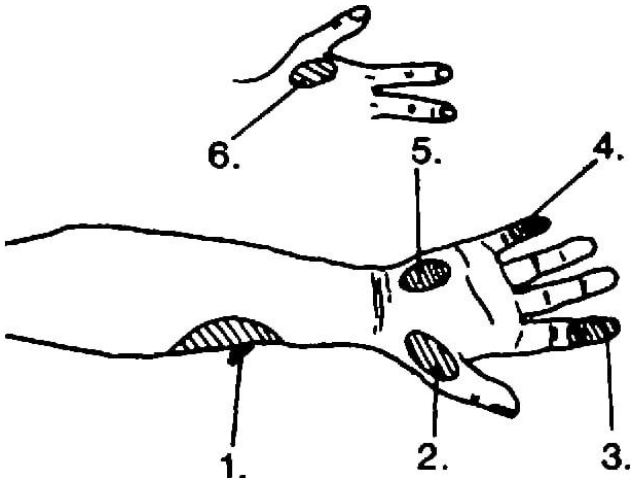
The patients were asked frequently and monitored continuously for any discomfort during the surgery. Throughout the procedure, tourniquet pressure was monitored and maintained. The pulse rate, BP and RR was recorded every 5 min throughout the procedure.

Technique

A padded double cuff tourniquet was then positioned around the arm, on the side, to be operated and tested. A 22G butterfly needle was placed for drug injection in a peripheral vein, preferably over the dorsum of the hand and secured in position. Now the limb was exanguinated by elevating it to 90 degrees for three minutes followed by proximal tourniquet cuff inflation to 250 mmHg. This criteria was fixed for all the cases of the study. Then a dose of 40 ml, 0.2%ropivicaine was injected slowly, either alone or with tramadol 100 mg depending upon group, as mentioned earlier. During the period of injection patients was frequently asked for any untoward feeling of sensations. BP, pulse and RR were recorded immediately after the drug injection and then every 5 minutes.

Assessment of sensory blockade

After injecting drug(considering as time zero), the time of onset of sensory block was tested by pinprick using fine hypodermic needle. The six skin areas supplied by smaller branches of four peripheral nerves i.e lateral aspect of forearm (musculocutaneous nerve), dorsal 1stweb space (radial nerve), index fingertip & hypothenar eminence (ulnar nerve) as described by urban B.J and Mckain C.W., 1982. This was maped out in every case.[2]



The time taken from injection of drug to loss of pinprick sensation was taken as onset of sensory blockade. If there was loss of pinprick sensation in all six-skin areas tested it was considered as complete sensory blockade.

Assessment of motor blockade

Patients were asked to make finger movements and dorsiflexion at wrist joint. Inability to do was taken as motor blockade. The time taken from completion of injection of drug to inability to make finger & wrist movements, was recorded as onset of motor blockade.

After establishment of complete analgesia, distal cuff was inflated to 250 mmhg followed by deflation of proximal cuff, to avoid any tourniquet discomfort. Throughout the procedure tourniquet pressure was monitored and maintained at 250 mmHg. Whenever fall in tourniquet pressure was found below 250 mmHg, it was again re-inflated to that level to avoid any leakage into systemic circulation.

Following completion of surgery tourniquet cuff was deflated with repeated deflation-reinflation technique. For this, cuff was deflated for 10 seconds and then re-inflated again for 1 minute. This sequence was repeated three times with great care taken not to deflate the cuff within 30 minutes of local anaesthetic injection, in any case to avoid local anaesthetic toxicity. Even if the surgical procedure was over within 30 min, the tourniquet was not deflated before 30 min. This was strictly observed throughout the study.

Tourniquet time

Time from the inflation of distal cuff to deflation of cuff was designated as total tourniquet time & it was recorded in every case.

All the patients were then observed for at least 30 minutes postoperatively in recovery for signs of any untoward reaction.

Assessment of quality of block

The quality of overall block was assessed according to the grading by Ware R.J (1975)[3] as follows :

A. Excellent- complete anaesthesia (lack of any sensation to pinprick and no movement of wrist and fingers)
B. Good- complete anesthesia (touch sensation may be preserved, but no pain to pin-prick and minor movements of fingers).
C. Fair- adequate anaesthesia (slight discomfort but tolerable without any supplementation).
D. Poor- inadequate anaesthesia (requiring supplementation; either sedative, systemic analgesics or general anaesthesia).

Assessment of postoperative pain

It was rated on a Visual Analogue Scale (VAS) graded from 0 mm (no pain) to 100 mm (unbearable pain) (Pilousky and Bond).[4]

Grading of VAS scores:

a. 0 = no pain
b. 1-25 = mild pain (slightly uncomfortable)
c. 26-50 = moderate pain (uncomfortable but can cope)
d. 51-75 = severe pain (very uncomfortable)
e. 76-100 = very severe pain (unbearable)

The first pain assessment was done immediately after deflation of cuff and then pain assessment was done every 30 min and recorded

Observations

The present study was done on 24 patients in whom Intravenous Regional Anaesthesia was employed for various surgical procedures, done on upper extremity as routine procedures at N.S.C.B. Medical College and Hospital, Jabalpur (M.P)

The patients of either sex, between age group 17 to 65 years, belonging to ASA grade I and II were included in this clinical study.

The patients were allocated into two groups (Group A, and Group B) depending upon the drug injected intravenously for IVRA. Group A comprised of 12 patients who received 0.2% 40 ml ropivicaine alone. Group B consisted of 12 patients who received 0.2% 40 ml ropivicaine with tramadol 100 mg in IVRA.

Table 1 shows mean age of patients (in years) in both the groups which were almost comparable ($P>0.05$).

Table 2 shows the sex wise distribution of patients in both the groups. Majority of patients were male in both the groups as compared to females. However, the distribution of both males and females in each group was comparable($P>0.05$).

Table 3 shows the mean weight (in kg) in both the groups. Both the groups were comparable ($P>0.05$).

Table 4 shows assessment of onset of sensory block in both the groups. The mean onset of sensory blockade was 4.71 ± 0.33 and 1.58 ± 0.29 minutes in group A and B respectively which was statistically significant ($P<0.0001$).

Table 5 shows assessment of onset of motor blockade. The mean onset of motor blockade was 14.33 ± 1.01, 12.75 ± 1.71 minutes in group A and B respectively which was statistically significant ($P<0.05$).

Table 6 shows the quality of blockade in both the groups while comparing it shows insignificant correlation ($P>0.05$), but at 95% confidence limits for this suggest that group B has higher advantage over group A (5.25%; upper limit of 95% of confidence interval) at the best while slightly lower disadvantage (0.0%; lower limit of 95% confidence interval) at worst.

Table 7 shows duration of postoperative analgesia in both the groups. In group A mean duration was 0.29 ± 0.097 hours and in group B mean duration was 6.33 ± 0.49 hours. On statistical comparison of duration of postoperative analgesia between two groups was highly significant ($P<0.001$)

Table 8 shows mean duration of tourniquet time in group A and group B was 58.75 ± 16.25 and 57.5 ± 19.13 respectively. The difference in tourniquet time in both the groups was found to be insignificant statistically (P>0.05).

TABLE NO. 1 AGE-WISE DISTRIBUTION OF PATIENTS

AGE(years)	No. of casesxx	
	Group A	Group B
	n= 12 (%)	n= 12(%)
16-25	05(20.83)	07(29.16)
26-35	04(16.66)	04(16.66)
36-45	01(4.16)	01(4.16)
46-55	02(8.33)	0
56-65	0	0
Mean + SD	32.5 +11.90	25.83 + 8.27

TABLE NO.2 SEX-WISE DISTRIBUTION OF PATIENTS

GROUP	MALE (%)	FEMALE (%)
A (n = 12)	09(37.5)	03(12.5)
B (n = 12)	07(29.16)	05(20.83)
Total (n =24)	15(62.5)	08(33.33)

TABLE NO.3WEIGHT WISE DISTRIBUTION OF CASES

WEIGHT	NO. OF CASES	
	GROUP A n = 12 (%)	GROUP B n = 12 (%)
46-50	02(8.33)	0.0
51-55	03(12.5)	05(20.83)
56-60	05(20.83)	06(25)
61-65	02(8.33)	01(4.16)
Mean ± SD	56.58 ± 4.67	56.58 ± 2.97

TABLE NO. 4 ASSESSMENT OF ONSET OF SENSORY BLOCKADE

Onset time (minutes)	Total no. of cases	
	Group A n = 12 (%)	Group B n = 12 (%)
0.5-1.0	0	01(8.33)
1.1-1.5	0	08(66.67)
1.6-2.0	0	03(25.0)
2.1-2.5	0	0
2.6-3.0	0	0
3.1-3.5	0	0
3.6-4.0	01(8.33)	0
4.1-5.0	11(91.67)	0
Mean ± SD	4.71 ± 0.33	1.58±0.29

TABLE NO 5 ASSESSMENT OF MOTOR BLOCKADE

Onset time (minutes)	Total no. cases	
	Group A n = 12(%)	Group B n = 12(%)
9-10	0	02(16.67)
11-12	0	03(25.0)
13-14	05(41.67)	06(50.0)
15-16	07(58.33)	01(8.33)
Mean ± SD	14.33 ±1.01	12.75 ± 1.71

TABLE NO 6 QUALITY OF BLOCKADE

Grading of	Total no. of cases	
Quality of	Group A	Group B
Blockade	n = 12(%)	n = 12(%)
Excellent	10 (83.33)	12(100.0)
Good	2 (16.7)	0
Fair	0	0
Poor	0	0

TABLE NO 7 DURATION OF POSTOPERATIVE ANALGESIA

Duration (in hours)	Total no. of cases	
	Group A	Group B
	n = 12(%)	n = 12(%)
0-1	12(100)	0
2-3	0	0
4-5	0	0
6-7	0	12(100)
Mean ± SD	0.29 ± 0.097	6.33 ± 0.49

TABLE NO. 8 TOUNIQUET TIME

Touniquet time	Total no. of cases	
(minutes)	Group A	Group B
	n = 12(%)	n = 12(%)
30-45	02(16.67)	05(41.67)
46-60	08(68.06)	04(33.33)
61-75	01(8.33)	01(8.33)
76-90	01(8.33)	02(16.67)
Mean ± SD	58.75 ± 16.25	57.5 ±19.13

IV. Discussion

In 1908, August Karl Gustav Bier,[1] professor of surgery at Berlin, described an unusual method of producing analgesia of a limb, and named this technique 'VENOUS ANAESTHESIA' i.e, it "used the vascular bed to bring the anaesthetic agent to the nerve ending". In this technique, the arm was exsanguinated using an Esmarch bandage, which was wound tightly around the arm above the lesion. A second bandage was put on below and a previously marked vein between the two bandages was exposed under the local infiltration and through this vein 0.5% procaine was injected. This resulted in prompt 'direct' anaesthesia supposed to be an action on the peripheral nerve endings and slower 'indirect' anaesthesia in the distal part of the limb due to effect on the nerve trunks. He didn't report any adverse effect and deaths. Later on, this method was popularized as "BIER BLOCK". Afterwards for so many years, this technique was not used much and no one had contributed further to the knowledge of this technique.

IVRA is suitable for operations of the distal extremities, in situations where it is safe and easy to apply an occlusive tourniquet. It is mainly used for surgical procedures of the upper extremity, but it can also be used for procedures involving the lower extremity.1 The primary advantages of IVRA are its simplicity, reliability, and cost-effectiveness.[5] It is a regional anesthetic technique that is easy to perform, with success rates varying between 94% and 98%.[6]For these reasons, it remains a popular choice among anesthesiologists. Constraints of anesthetic duration and tourniquet time limit the use of this technique to short procedures (approximately 20–60 minutes).[7] The rapid recovery of function make this technique ideally suited for surgeries performed in an ambulatory setting.

An essential step in the overall success of the Bier block is the exsanguination of the extremity before injection of local anesthetic. After an IV is placed on the extremity to be anesthetized, it is common practice to place a proximal double –cuffed pneumatic tourniquet on that same extremity. The IV should be placed as close to the site of surgery or injury as possible. The dorsum of the hand is one of the more common sites for placement. Commonly, the extremity is elevated for 2-3 minutes to aid in passive venous drainage. Following this 2-3 minute period, a soft roll of gauze can be placed in the patient's hand to minimize discomfort while an Esmarch bandage is applied to exsanguinate the arm. Once it is wrapped above the level of the pneumatic tourniquet, the proximal cuff is inflated. At this point, local anesthetic can be injected through the IV catheter. Once the local anesthetic (typically 40 mLs of 0.5% Lidocaine) is injected, there may be visible blanching in various areas of the extremity. This blanching is thought to be due to any residual blood being forced toward the skin surface. Although this does not ensure a successful block, it is a positive indicator that analgesia will likely be adequate. The volume of administration can vary based on the potency of the local anesthetic used. It has been common practice to use a 30-50 mL of 0.2% ropivicaine based on initial descriptions of the technique. Although Lidocaine is the most commonly used local anesthetic, others can be used to include prilocaine and chloroprocaine. Whichever local anesthetic is used, it should be preservative-free to minimize the risk of thrombophlebitis and free of epinephrine. Regardless of the practitioner's technique used, the total volume and concentration used should be less than the maximum recommended dose of the local anesthetic used to avoid LAST should there be tourniquet failure. Additionally, the tourniquet should remain inflated to two times the systolic blood pressure for at least 30 minutes before deflating. It is also general practice to either release the tourniquet incrementally or cyclically deflate the tourniquet.

The Bier block is a very safe technique but the user should be aware that there are potential complications that can occur with this technique. According to the ASA Closed Claims Project from 1980-1999 there were only three reported cases of death or brain damage associated with IVRA. Some rare, but reported,

severe adverse effects include local anesthetic systemic toxicity (LAST), preictal behavior, seizures, and cardiac arrest. Other less severe complications include potential for nerve damage, compartment syndrome, skin discoloration or petechiae, and thrombophlebitis. The most common adverse event encountered during IVRA is tourniquet pain. The initial treatment, if using a double tourniquet, would be inflation of the distal tourniquet followed by deflation of the proximal cuff. This will generally provide increased patient comfort. If this is ineffective, additional sedative medications or alternate methods of providing analgesia may be required.

There are a few limitations associated with IVRA[6] and those concerns regarding its use must be considered. These concerns include, but are not limited to, local anesthetic (LA) toxicity, delayed onset of action, poor muscle relaxation, tourniquet pain, and minimal postoperative analgesia.[8] Features of an ideal IVRA solution include rapid onset of sensory and motor block, reduced intraoperative and tourniquet pain, prolonged post-deflation analgesia, and minimal side effects. Various LA options and adjuncts for IVRA exist, each possessing its own advantages and disadvantages. Selecting an ideal IVRA solution can be a challenge.

Lidocaine is the most frequently used LA for IVRA in North America.[9] Despite its benefits, it has a relatively brief duration of action which may limit the postoperative analgesia that can be provided.[10] The use of a longer-acting agent may offer an improvement. Bupivacaine, a long-acting agent used in the past, is no longer recommended for IVRA because of its risk of causing irreversible cardiac arrest.[11,12]Ropivacaine, a derivative of bupivacaine and produced as a pure levorotatory enantiomer,[13] causes less depression of cardiac conduction.[14–15] Its use has increased in popularity because of its potential to offer prolonged and improved analgesia compared to lidocaine, with a lower toxicity profile than bupivacaine.There are numerous studies that have evaluated additional adjunct medications that can be administered in a Bier block to include: opioids (fentanyl, morphine, meperidine, sufentanil), dexamethasone, clonidine, dexmedetomidine, tramadol, ketamine, muscle relaxants, anti-emetics, benzodiazepines, and non-steroidal anti-inflammatories (NSAIDS).There have been many studies using the adjuvant tramadol in IVRA. But despite extensive search of the medical literature , no study has incorporated the use of tramadol as an adjuvant with ropivacaine. This was the main reason why we undertook this study, compairing two different doses of tramadol with 0.2% ropivacaine.

Sensory anesthesia

Five studies evaluated offset of sensory block with the use of ropivacaine compared to lidocaine . All five studies found recovery to be prolonged when ropivacaine was used.[10,16,17,18,19]Hartmannsgruber et al[10] found that sensory recovery was prolonged by up to 30 minutes in those who received 0.2% ropivacaine compared to 0.5% lidocaine (but only in the area of the lateral antebrachial cutaneous nerve). Likewise, Chan et al[19] found that sensory recovery in the high-dose ropivacaine group (1.8 mg · kg^{-1}) was significantly longer than the low-dose ropivacaine (1.2 mg · kg^{-1}) or lidocaine group (3 mg · kg^{-1}). Atanassoff et al[18] found a prolonged sensory recovery by approximately 19 minutes, on average, with the use of 0.2% ropivacaine compared to lidocaine. Asik et al[17] demonstrated sensory recovery to be significantly prolonged in both 0.2% and 0.25% ropivacaine groups compared to 0.5% lidocaine (20.5 ± 4.6 minutes and 23.5 ± 4.8 minutes compared to 3.5 ± 1 minute). Onset of sensory blockade defined in terms of loss of sensation to pin prick was quick in our group B cases(66.67% had the onset of sensory analgesia between 1.1 and 1.5 minutes; the mean duration calculated to be 1.58 minutes).

Motor block

The onset of motor block revealed no significant difference between agents.[10,16,17,19,20,21] When assessing motor block recovery, ropivacaine use was found to cause a delayed recovery in all studies.[10,16,19]Hartmannsgruber et al[10] found that 0.2% ropivacaine resulted in decreased grip strength for up to 30 minutes in comparison to 0.5% lidocaine. Chan et al[19] had similar findings with the high-dose ropivacaine group (1.8 mg · kg^{-1}), where decreased grip strength was found to be sustained for 70 minutes compared to complete recovery in the lidocaine group during the same period. We have evaluated the onset of motor block after the institution of injectate. Both the groups did not differ much in this particular aspect. Majority of patients, 58.33%, in group A had the onset of motor blockade between 15th and 16th minute. While 50% in group B had their onset time between 13th and 14th minute. We have also assessed the motor blockade in terms of quality. It was found that every patient in group B had excellent quality of motor block while only 83.35% in group A has the block quality to be excellent.

Postoperative analgesia

Three out of four studies found significant postoperative benefits with ropivacaine compared to lidocaine.[17,18,20]Atanassoff et al[18] found lower numerical pain scores at the time of postanesthesia care unit (PACU) admission and a significantly longer time to first analgesia (TTFA) in those receiving 0.2% ropivacaine compared to 0.5% lidocaine (median [range]: 47 [27–340] minutes vs 34 [2–140] minutes). Peng et al[20] demonstrated lower postoperative verbal pain rating scores in subjects receiving 0.375% ropivacaine compared to 0.5% lidocaine after 60 minutes. In addition, this subject group was found to request analgesia less often in

the first 2 hours (six patients) compared to the 0.5% lidocaine group (13 patients). Asik et al[17] demonstrated lower verbal numerical pain scores and longer TTFA in the 0.25% and 0.20% ropivacaine subjects compared to 0.5% lidocaine (29.8 ± 4.9 minutes, 27.5 ± 7.3 minutes vs 11.3 ± 3.9 minutes). Furthermore, the number of patients taking more than two tablets of tramadol within the first 24 hours was lowest in the high-dose ropivacaine group compared to 0.2% ropivacaine and 0.5% lidocaine groups (three vs 18 and 16 patients, respectively). Tramadol when used as an adjuvant has the property of prolonging the postoperative analgesia and time to first rescue analgesic. This has been shown in various studies using tramadol along with lignocaine in IVRA. We have used tramadol in one of the group in dose of 100mg along with 0.2% ropivacaine. As expected, the group which had tramadol as an adjuvant demonstrated prolongation of the duration of postoperative analgesia(6-7 hrs versus 0-1 hrs).

Side effects

Several studies demonstrated minor side effects without accompanying statistical analysis.[10,16,17,19]. The volunteer patient studies[10,19] both demonstrated an increased incidence of temporary dizziness, tinnitus, and light-headedness in the lidocaine groups.Asiket al[17] identified an increased incidence of light-headedness, tinnitus, and metallic taste in patients receiving lidocaine. There were two patients in group B who had minor rash in the forearm area. The rash was red, non itchy and did not required any intervention. As depicted in the previous studies, rash is attributed mainly to the tramadol component of the concoction.

In summary, ropivacainealong with tramadol prolongs the sensory and motor block, which in turn results in superior postdeflation analgesia.

References

[1]. Brown BL, Fink BR. The history of neural blockade and pain management. In: Cousins MJ, Bridenbaugh PO, editors. Neural Blockade in Clinical Anesthesia and Management Of Pain. 3rd ed. Philadelphia, PA: Lippincott-Raven; 1998. pp. 3–34.
[2]. Urban B.J et al. AnesthAnalg. 1982 Oct;61(10):834-8.
[3]. Ware R.J.(1975) Intravenous regional analgesia using hupivicaine. Anaesthesia,30, 817.
[4]. Bond MR, Pilousky I. subjective assessment of pain. Journal of Psychomotor Research 1966; 10:203-206.
[5]. Chilvers CR, Kinahan A, Vaghadia H, Merrick PM. Pharmacoeconomics of intravenous regional anaesthesia vs general anaesthesia for outpatient hand surgery. Can J Anesth. 1997;44(11):1152–1156.
[6]. Brown EM, McGriff JT, Malinowski RW. Intravenous regional anaesthesia (Bier block): review of 20 years' experience. Can J Anaesth. 1989;36(3 Pt 1):307–310.
[7]. McDonald S. Intravenous regional anesthesia. In: Mulroy MFBC, McDonald SB, Salinas FV, editors. A Practical Approach to Regional Anesthesia. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009. pp. 203–209.
[8]. Esmaoglu A, Akin A, Mizrak A, Turk Y, Boyaci A. Addition of cisatracurium to lidocaine for intravenous regional anesthesia. J ClinAnesth. 2006;18(3):194–197.
[9]. Henderson CL, Warriner CB, McEwen JA, Merrick PM. A North American survey of intravenous regional anesthesia.AnesthAnalg. 1997;85(4):858–863.
[10]. Hartmannsgruber MW, Silverman DG, Halaszynski TM, et al. Comparison of ropivacaine 0.2% and lidocaine 0.5% for intravenous regional anesthesia in volunteers. AnesthAnalg. 1999;89(3):727–731.
[11]. Albright GA. Cardiac arrest following regional anesthesia with etidocaine or bupivacaine. Anesthesiology. 1979;51(4):285–287.
[12]. Heath ML. Deaths after intravenous regional anaesthesia. Br Med J (Clin Res Ed) 1982;285(6346):913–914.
[13]. Beilin Y, Halpern S. Focused review: ropivacaine versus bupivacaine for epidural labor analgesia. AnesthAnalg. 2010;111(2):482–487.
[14]. Knudsen K, Beckman Suurkűla M, Blomberg S, Sjövall J, Edvardsson N. Central nervous and cardiovascular effects of i.v. infusions of ropivacaine, bupivacaine and placebo in volunteers. Br J Anaesth. 1997;78(5):507–514.
[15]. Scott DB, Lee A, Fagan D, Bowler GM, Bloomfield P, Lundh R. Acute toxicity of ropivacaine compared with that of bupivacaine. AnesthAnalg. 1989;69(5):563–569.
[16]. Niemi TT, Neuvonen PJ, Rosenberg PH. Comparison of ropivacaine 2 mg ml(-1) and prilocaine 5 mg ml(-1) for i.v. regional anaesthesia in outpatient surgery. Br J Anaesth. 2006;96(5):640–644.
[17]. Asik I, Kocum AI, Goktug A, Turhan KS, Alkis N. Comparison of ropivacaine 0.2% and 0.25% with lidocaine 0.5% for intravenous regional anesthesia. J ClinAnesth. 2009;21(6):401–407.
[18]. Atanassoff PG, Ocampo CA, Bande MC, Hartmannsgruber MW, Halaszynski TM. Ropivacaine 0.2% and lidocaine 0.5% for intravenous regional anesthesia in outpatient surgery.Anesthesiology. 2001;95(3):627–631.
[19]. Chan VW, Weisbrod MJ, Kaszas Z, Dragomir C. Comparison of ropivacaine and lidocaine for intravenous regional anesthesia in volunteers: a preliminary study on anesthetic efficacy and blood level. Anesthesiology. 1999;90(6):1602–1608.
[20]. Peng P, Coleman MM, McCartney CJ, et al. Comparison of anesthetic effect between 0.375% ropivacaine versus 0.5% lidocaine in forearm intravenous regional anesthesia. RegAnesth Pain Med. 2002;27(6):595–599.
[21]. Simon MA, Gielen MJ, Alberink N, Vree TB, van Egmond J. Intravenous regional anesthesia with 0.5% articaine, 0.5% lidocaine, or 0.5% prilocaine. A double-blind randomized clinical study. RegAnesth. 1997;22:29–34.

Mohammad Ilyas "To Evaluate the Efficacy of Tramadol as an Adjuvant to Ropivicaine in Intravenous Regional Anesthesia for upper Limb Surgeries."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 6, 2018, pp 00-00.