INTRAVENOUS REGIONAL ANESTHESIA (BIERS BLOCK);

TO COMPARE THE ANALGESIC EFFECTS OF COMBINATION OF 0.5% LIDOCAINE PLUS KETROLAC IN INTRAVENOUS REGIONAL ANESTHESIA TECHNIQUE WITH THOSE OF LIDOCAINE 0.5 % ALONE TO PREVENT POST OPERATIVE PAIN

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ABSTRACT... Objective: To compare the analgesic effects of combination of 0.5% Lidocaine plus Ketorolac in intravenous regional anaesthesia technique with those of Lidocaine (0.5%) alone to prevent post operative pain after intravenous regional anaesthesia (Biers block). **Study design:** Randomized Control Trial. **Place and duration of study:** The study was carried out at Department of Anaesthesiology, Intensive Care and pain management, Combined Military hospital, Rawalpindi from July 2008 to February 2009. **Patients and Methods:** The study was conducted after complete evaluation of risk / benefit ratio to the patients. On the basis of random number method the patients were divided into two equal groups (group A and group B). The number of patients in each group was 75. Group A was assigned Lidocaine in a dose of 200mg 40ml of 0.5% solution and group B was assigned injection Ketorolac 30mg added to Lidocaine in a dose of 200mg 40ml of 0.5% solution. The patients were kept in post anaesthesia care unit for two hours and pain intensity was measured by visual analogue scale(VAS) on 15,30 minutes,1hour, 1.5 and at 2 hours after the cuff deflation. The analgesic efficacy recorded on the basis of visual analog scale of two groups, was compared using student's t - test. p value of less than 0.05 was considered statistically significant. **Results:** In group A 33 males and 42 females were enrolled for the study while in group B there were 38 males and 37 females. The mean age of the patients in group A was 34.31 ± 6.03 years while in group B was 32.99 ± 6.08 years. Patients were also classified according to ASA classification in which 87 patients were classified as ASA – I and 63 patients as ASA – II. Group B which received Ketorolac in addition to Lidocaine for Bier's block had low visual analogue scores as compared to group A which received only Lidocaine for Bier's block. P values obtained after the comparison of the mean VAS of two groups at 15 minutes, 30 minutes, 1 hour, 1.5 hours and 2 hours were all less than 0.05 (0.002 for 15 minutes, 0.004 for 30 minutes, 0.001 for 1 hour, 0.004 for 1.5 hours and 0.001 for 2 hours). **Conclusions:** Ketorolac improves the postoperative analgesia markedly when used with Lidocaine in intravenous regional anaesthesia.

Key words: Bier's Block, Lidocaine, Ketorolac, Post operative pain.

INTRODUCTION

Intravenous regional anaesthesia (Biers block) was first described in 1908 for anaesthesia of hand and forearm. This technique is quite popular among the anesthetists around the world[1]. Nowadays Lidocaine 0.5% is a drug of choice for intravenous regional anaesthesia in United States of America[2]. Various studies have suggested that intravenous regional anaesthesia(IVRA) is very safe, cost effective and has a very few side effects[3]. If we compare it with general anaesthesia, intravenous regional anaesthesia lacks the complications commonly associated with general Anaesthesia[4]. Although the technique was easy to perform and effective in giving surgical anaesthesia, the newer plexus block techniques largely replaced in a short time the "Bier block", because of time limitations of IVRA and safety considerations. Throughout the years modifications in procedure and new pharmacologic adjuvants have been shown to prevent toxic reactions to anaesthetics and mitigate limitations of IVRA.

In order to overcome post operative pain associated with intravenous regional anaesthesia, intravenous Ketorolac (Toradol) an NSAID, is very useful addition to 0.5% Lidocaine[5]. It has been recommended that Ketorolac (30mg) when added with Lidocaine (0.5%) results in significant post operative pain relief[6]. Recent research has shown that for adequate post operative pain relief Ketorolac when combined with 0.5% Lidocaine improves post operative analgesia[7].

The rationale of this study is to devise a safe and more effective method of reducing post operative pain which is usually associated with intravenous regional

anaesthesia. In Pakistan where majority of population is very poor, intravenous regional anaesthesia delivers good alternative to costly general anaesthesia for limb surgery.

PATIENTS AND METHODS

The randomized control trial was carried out at Department of Anaesthesiology, Intensive Care and pain management, Combined Military hospital, Rawalpindi from July 2008 to February 2009, after seeking permission from the Hospitals Ethics Committee.

150 Patients, belonging to American society of Anaesthesiology physical status I and II, between ages 20 to 50 who were scheduled for elective hand and forearm surgery under Bier's block were selected and divided into two equal groups by random number method (Group A and Group B). The number of patients in each group was 75. Patients not willing for regional anaesthesia, those with hypertention, peripheral vascular disease, open wounds were excluded from the study. Informed written consent was taken from all the patients selected for the study. Each patient was visited in the ward, the evening before surgery for detailed pre-anesthesia assessment.

An intravenous cannula 22 gauge was inserted in the arm to be operated as distally as possible for injecting the local anaesthtic; a second one 18 gauge was inserted in the controlateral one for injection of drugs (sedative or resuscitative) if needed. A Double pneumatic tourniquet was placed on the arm to be operated. The extremity was elevated and exsanguinated by tightly wrapping an Eschmark elastic bandage from a distal to proximal direction. The proximal tourniquet was inflated, the Eschmark bandage was removed. Group A was assigned Lidocaine in a dose of 200mg 40ml of 0.5% solution and group B was assigned injection Ketorolac 30mg added to Lidocaine in a dose of 200mg 40ml of 0.5% solution. 22 gauge cannula was removed after injecting the local anaesthtic. Block was allowed to take effect. The minimum time for cuff deflation was kept no less than 30 minutes. However if the procedure was prolonged and patient complained of tourniquet pain the distal cuff was inflated and proximal cuff was deflated. The proximal cuff was deflated only after the distal cuff had been inflated.

The patients were kept in post anaesthesia care unit for two hours and pain intensity was measured by visual analogue scale on 15, 30 minutes, 1hour, 1.5 and at 2 hours after the deflation of the cuff. Any complication if arose was to be documented. Throughout the procedure the vital signs of patients were monitored continuously along with the ECG and pulse oximetry.
All equipment and drugs to deal with a case of local anaesthesia toxicity were kept in hand. The equipment and drugs for general anaesthesia were also prepared to deal with any case of ineffective block.

The data was entered in a computer using SPSS (Statistical package for social sciences) version 15.0. Descriptive statistics such as mean and standard deviation was calculated for age and frequencies were calculated for gender. The analgesic efficacy recorded on the basis of visual analog scale of two groups, was compared using student's t - test. p value of less than 0.05 was considered statistically significant.

RESULTS

The age group of the patients in the study was 20 to 50.The overall mean age of the patients in group A was 34.31 ± 6.03. Mean age of females in Group A was 33.14 ± 5.63 and mean age of males was 35.79 ± 6.28. The mean age of the patients in group B was 32.99 ± 6.08. Mean age of females in Group B was 32.03 ± 5.95 and mean age of males was 33.97 ± 6.13.

There were 44% (33) males and 56% (42) females in group A. Group B comprised of 50.7% (38) males and 49.3% (37) females.

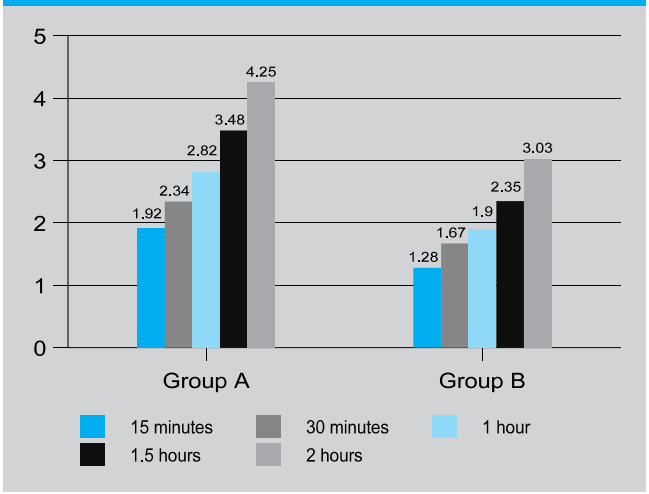
There was no case of any local anaesthesia toxicity. There was no case of ineffective intravenous regional anaesthesia, no case had to be given general anaesthesia due to failure of IVRA.

Patients were also classified according to ASA classification in which 87 patients were classified as ASA – I and 63 patients as ASA – II.

Visual analogue scale was measured at 15 minutes, 30

minutes, 1 hour, 1 and half hour, 2 hours after the deflation of the cuff (Figure 1).

Fig-1. Comparison of mean VAS of group A & B



The analgesic efficacy recorded on the basis of visual analog scale of two groups, was compared using independent student's t - test. p value of less than 0.05 made our results statistically significant. p values obtained after the comparison of the mean VAS of two groups at 15 minutes, 30 minutes, 1 hour, 1.5 hours and 2 hours were all less than 0.05 (0.002 for 15 minutes, 0.004 for 30 minutes, 0.001 for 1 hour, 0.004 for 1.5 hours and 0.001 for 2 hours).

DISCUSSION

Painful stimuli, like that produced by a surgical incision, can lead to a hyper excitable state in the spinal cord. This hyper excitable state can exacerbate postoperative pain[8]. Once the hyper excitable state has been established, a larger dose of analgesic is required. If it is administered before the painful stimulus that occurs with surgical incision, postoperative pain can be greatly diminished. Epidural, intravenous, an intra-muscular opioids have been shown to reduce the severity of postoperative pain to greater extent when administered before surgical stimuli rather than following it. Intravenous regional anaesthesia is one of the techniques that have been used in this study to provide anaesthesia and postoperative analgesia in short procedures of upper arm surgery.

Intravenous regional anaesthesia is widely used in forearm and hand surgery. The draw back with this technique is the absence of postoperative anaesthesia[3,4]. In several studies it was tried to find a local anaesthesia mixture that allows prolonged duration of analgesia after tourniquet release. In this context non-steroidal anti-inflammatory drugs, Opioids and combination of opioid and muscle relaxant have been used[9,10,11,12,13,14,15]. The first reported use of IVRA with Ketorolac was by Vanos et al[16] in the management of patients with sympathetically mediated pain. They reported prolonged pain relief in the seven patients who were treated using IVRA with Ketorolac.

In our study combination of lignocaine 0.5% and Ketorolac 30 mg has been used and we compared the postoperative analgesia while using lignocaine alone in the other group. Our results support the previously held studies conclusion that Ketorolac improves the postoperative analgesia markedly when used with Lidocaine in IVRA[5,6,7,15,16,17,18,19].

For 15 minutes after the cuff deflation the comparison of VAS of two groups had a p value of 0.002. The p value for comparison of group A and B at 30 minutes interval was 0.004. Similarly the p value obtained after the comparison of mean VAS of group A and B for 1 hour, 1.5 hour and 2 hours was found to be 0.001, 0.004 and 0.001 respectively. It is quite evident from the p values obtained by the comparison of VAS of group A and B after the specified time periods that our results are highly significant. This proves that Ketorolac (30mg) as an adjuvant with Lidocaine in a dose of (200mg), 40ml of 0.5% solution will provide post operative adequate pain relief more than 0.5% Lidocaine alone.Therefore, patients in Group B experienced less postoperative pain. These patients had better analgesia than did the other patients; they reported lower VAS in the postoperative period and required no supplemental analgesics in the postoperative period.

One of the advantages of IVRA with Ketorolac and Lidocaine , especially in a country like Pakistan where majority of patients are poor and cannot afford expensive and long term hospital stays, is that it is very cost effective and cheap as compared to general anaesthesia and post operative analgesia costs. Furthermore the reduced hospital stay is also a definite advantage of this

technique, reducing significant burden on limited medical resources of our country.

CONCLUSIONS

In IVRA, Ketorolac (30mg) as an adjuvant with Lidocaine in a dose of (200mg), 40ml of 0.5% solution provides adequate post operative pain relief more than 0.5% Lidocaine alone.

There is a need for further studies to be conducted to assess the effectiveness of Ketorolac in IVRA. Furthermore the role of Ketorolac in control of the tourniquet pain also needs to be assessed.

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