

# Comparison of 3 ml vs. 5 ml Local Injection of Lignocaine in Closed Reduction of Colles' Fracture

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## ABSTRACT

**Objective:** To compare the efficacy of 3 ml vs. 5 ml lignocaine given locally in closed reduction of Colles' fracture.

**Methods:** Prospective randomized control trial was performed from July 2015 to December 2015. Patients older than 40 years, Colles' fracture and fracture less than 5 days duration were included. Patients with intra articular fracture, open fracture, co-morbidities were excluded. Patients were divided equally into 2 groups, A and B by blocked randomization. Each group was injected with 1% 3 ml and 5 ml of local anesthetic lignocaine respectively. Standard hematoma block technique for Colles' fracture was used. Efficacy was measured by pain relief at the time of manipulation using visual analogue pain scale and recorded on proforma. The data was then analyzed using SPSS software version 16.

**Results:** 100 patients, 50 in each group were selected. In Group A patients, 05 (10%) patients had visual analogue scale (VAS) average of  $2\pm 1$ , while 45 (90%) patients had visual analogue scale (VAS) average of  $5\pm 1$ , thus non satisfactory pain control. In Group B patients, 47(94%) patients had visual analogue scale average of  $1\pm 1$ , while 03 (06%) patients had visual analogue scale average of  $5\pm 1$ , thus a satisfactory pain control.

**Conclusion:** 5 ml of local anesthetic lignocaine used as hematoma block at fracture site provides adequate analgesia, sufficient enough for close manipulation and reduction of Colles' fracture.

**Key words:** Colles' fracture, hematoma block, local anesthetic, closed manipulation

## INTRODUCTION

Hematoma block is injection of local anesthetic into fracture hematoma for closed manipulation and reduction. Different types of anesthesia and analgesia procedures are used for closed management of Colles' fracture. They include, general anesthesia [1], biers block [2], local hematoma block [3], regional nerve block [4], intravenous sedation and analgesia [5]. These procedures require different expertise, setup requirements and patient's preference and requirements, for example; different for primary, secondary and tertiary hospitals. Hematoma block is a safe [6], simple technique, easy applicability in any emergency department [7], quality of reduction [8], low cost of procedure and effective pain control during the procedure [9]. Different volume of local anesthetics

is used for hematoma block. Usually about 5 ml of anesthetic is used and controls pain effectively.

We used two different volumes of local anesthetic lignocaine solution in our research study, so we could know minimum effective volume of anesthetic in proper pain control during the procedure. Then compare it with international and local studies to recommend proper range of anesthetic solution volume. This will help to standardize the amount, which will have benefit for the patient and for closed management of Colles' fracture in emergency department.

## METHODS

Patients older than 40 years, Colles' fracture and fractures less than 5 days duration were included. Patients with intra articular fracture, open fracture and co-morbidities were excluded because it would alter the effect and response of anesthetic agent. Patients were selected into groups A and B by blocked randomization. Patients in-group A were injected with 3 ml of 1% local anesthetic, and group B patients were injected with 5 ml of 1% local anesthetic solution.

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Patients were informed about the purpose of study, the volume of local anesthetic used in hematoma block and about the intra procedure effects. Informed consent was then taken. Patients received pre procedure preparation with antiseptic solution and draping. Local anesthetic was injected into fracture site from posterior aspect using standard technique [10]. Patients were injected with 1% 3ml and 5ml of lignocaine in group A and B patients respectively. After waiting for 5 minutes for the anesthetic to take full effect, fracture was manipulated using standard technique for closed reduction [11]. Plaster of Paris backslab cast was applied after reduction of fracture. Efficacy was measured by pain relief at the time of procedure and was recorded post procedure using visual analogue scale for each patient individually in each group. Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The patient marks on the line the point that they feel represents their perception of their pain status. The Visual Analogue Scale (VAS) score is determined by measuring in millimeters from the left hand end of the line to the point that the patient marks<sup>12</sup>. Lower reading on VAS is better pain control in each patient and subsequently in each group. VAS reading of 3 or less out of 10 was termed as satisfactory. VAS reading of 4 or above out of 10 was termed unsatisfactory<sup>13</sup>. Readings of every patient was recorded on the proforma.

All collected data on purposive designed proforma was entered into statistical package for social sciences (SPSS) version 16.0. A descriptive statistical analysis of continuous and categorical variables was performed. Data on continuous variables include age, duration of fracture, presented as mean  $\pm$  SD. Data on categorical variables include gender and functional outcome and were presented as frequency and percentage proportion. Statistical comparison (3ml and 5ml groups) was performed by comparing scores of functional outcome. Effect modifier like age, gender and type of fracture was controlled by stratification to see impact on this variable.

## RESULTS

100 patients were selected and 50 patients were included in each group. 42(42%) were male and 48(48%) were female. Minimum age was 40 years and the maximum was 68 years. Mean age was  $52.2 \pm 3.34$  years. 45(45%) patients were between 40-50 years, 40 (40%) between 51-60 years and 15 (15%) patients were

between 61-68 years. Mean duration of fracture was  $4.72 \pm 1.88$  hours. Minimum time of treatment for 6 hours and maximum time of treatment was 5 days. 63 (63%) patients reached the hospital in less than 5 hours of trauma, 27(27%) patients took 5-10 hours to reach hospital, 7(7%) patients took more than 10 hours to reach hospital and 3(3%) patients could not specify time. In Group A out of 50 patients, males were 19 (38%) and females were 31(62%). In Group B out of 50 patients 23 (46%) were males and 27 (54%) were females. In Group A patients, 05 (10%) patients had VAS average score of  $2 \pm 1$ , while 45 (90%) patients had VAS average score of  $5 \pm 1$  (4 and above), thus non satisfactory pain control. In Group B patients, 47(94%) patients had VAS average score of  $1 \pm 1$ , while 03 (06%) patients had VAS average score of  $5 \pm 1$  (4 and above), thus a satisfactory pain control.

## DISCUSSION

Hematoma block has been used for long time in closed reduction of Colles' fracture. It is preferred now by many orthopedic surgeons in developing countries [14], where anesthesia resources are limited [7] and public hospitals receive high number of Colles' fracture cases. It is less time consuming in administering, cost effective [9], easy to learn and apply, and provides effective local anesthesia for the procedure. Volume of local anesthetic required for hematoma block is still a controversy. Surgeons use different quantity of volume achieving effective analgesia. Most of them use variable increased quantity where as some are satisfied with small quantity. But generally surgeons around the world have consensus over increased volume producing desired effects. Considering all different forms of anesthesia and analgesia for closed manipulation and reduction of Colles' fracture, we considered hematoma block and amount of volume, to be worth exploring as an option for our study because of its advantages over other procedures in our setup. Different researchers used different volumes of local anesthetic in their studies, to recommend suitable volume of anesthetic solution that can be used in hematoma block and published their results. In our study we showed the high volume of local anesthetic provides better relief during procedure. Ogunlade SO and colleagues [15] also showed high volume of local anesthetic for better pain control. Afsar SS and colleagues [7] also used more than 5 ml volume of lidocaine in hematoma block and had satisfactory pain relief during fracture reduction like our study, because

we also got satisfactory results with 5 ml volume. Man KH and colleagues [16] used 5 ml of local anesthetic and reported satisfactory control of pain in hematoma block like our study. Bear DM and colleagues [17] used high volume of local anesthetic in reduction of distal radius fractures in children, which proved effective in high quantity. Our study as compared to other studies shows that increased volume of local anesthetic solution provides better analgesia during closed reduction procedure of Colles' fracture, which should be at least 5 ml. Lower volume doesn't provide effective analgesia. It gives good results in increased volume.

## CONCLUSION

Hematoma block is used in different quantity for hematoma block. From our study we recommend that minimum of 5 ml of local anesthetic should be used for effective pain control during closed reduction procedure in Colles' fracture in each patient for effective pain control during a procedure. Less than 5 ml doesn't provide effective analgesia. So hematoma block is effective technique for analgesia provided used in volume 5 ml or more.

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