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## Hematoma block: An effective anesthesia for distal radius fractures

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### Abstract

**Introduction:** Hematoma block is a widely used method for pain relief while manipulation of distal radius fractures worldwide. In this method, 10-15 ml of 2% lignocaine, a local anesthetic is used to alleviate pain during fracture reduction.

**Materials and Methods:** We enrolled thirty five patients in our study from January 2018 to December 2018. All patients had extra-articular fractures of distal radius, which needed either plaster casting or percutaneous pinning. All the patients were subjected to Hematoma Block with 12 to 18ml 2% lignocaine in the fracture site hematoma. The patients' pain distribution and intensity was checked by Visual Analogue Scale system during the pre-reduction, reduction manipulation and post- reduction periods.

**Results:** The average Visual Analogue Scale (VAS) score before hematoma block was 7.1. The average VAS score reduced to 1.6 (ranging from 0.5 to 3.5) during reduction and less than 1 (0.9) one hour after the procedure. The scoring system of VAS is described on a scale of 0-10cm.

**Conclusion:** We conclude that Hematoma Block is a safe and effective means of anesthesia for distal radius fractures where reduction or manipulation for casting or pinning is required.

**Keywords:** hematoma block, distal radius fractures, 2% lignocaine, visual analogue scale (VAS)

### Introduction

Hematoma block is a well known method of anesthesia for displaced fractures of lower end of the radius during reduction maneuvers or fixation with pins <sup>[1-3, 5]</sup>. Distal radius fractures (Colles', Smith's), when displaced or angulated, generally result in the formation of a hematoma between the fracture fragments. The hematoma is easily accessible with a needle and the injection of local anesthetic solution can significantly alleviate pain. The majority of important neurovascular structures in the upper extremity are contained in the volar soft tissue, making the dorsal or lateral approach preferred.

In this method, a local anesthetic agent (Usually 2% Lignocaine) is used to inject in the hematoma formed between two displaced fracture fragments. Fracture manipulation can then often be undertaken painlessly or with significantly reduced pain. Hematoma blocks of the distal forearm are considered safe in children and adults <sup>[1, 3, 5, 8]</sup>. The Hematoma block (HB), being easy to administer is used widely by clinicians around the world. Hematoma block is safe for ankle fractures too <sup>[4]</sup>. The hematoma block, unlike intravenous sedation, avoids the side effects of sedating drugs, does not require intravenous access and cardiac monitoring, and is not associated with a prolonged recovery phase. The disadvantages of HB include discomfort to the patient, decreased pain control, infection and compartment syndrome. These are rare complications and pain control with HB as compared to intravenous sedation used for short procedures like closed reduction and casting or percutaneous pinning of distal radius fractures is better <sup>[6]</sup>. Nowadays, ultrasound to locate the hematoma is more efficient, especially in obese patients and a well accepted method to administer a HB <sup>[7]</sup>.

In this article we analyze the efficacy of HB in treatment of thirty-five distal radius fractures by closed reduction with or without percutaneous pinning.

### Materials and Methods

**1.1 Inclusion criteria:** From January 2018 to December 2018, thirty-five patients with isolated distal-end radius fractures (Colles' and Smith's) were enrolled in this study after

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obtaining their informed written consent. The age of patients ranged from 32 to 69 years.

**1.2 Exclusion criteria:** Any patient with other co-existing injuries, mental retardation, intra-articular fracture, open fracture, allergy to local anesthesia and apprehensive mental state was excluded from the study.

**1.3 Procedure:** Displaced or angulated fractures cause the blood to pool around the broken bones, forming a hematoma. Anesthetizing the nerves around this injured area with a hematoma block (HB), allows for successful manipulation of the bones for reduction. Taking the benefit of this fact, HB proves to be a successful way of anesthetizing the distal radius fractures.

First of all, we enrolled the patients according to the inclusion criteria and studied their radiographs to locate the site of injection. In the Operating Room, we prepped and draped the limb and with a sterile 18 gz needle and 20 ml syringe, drew approximately 15 ml of 2% lignocaine from the bulb. Then the needle was changed to 24 gz and site of injection at the wrist was determined. We injected the lignocaine in parts from dorsomedial and dorsolateral sides of the fracture site,

angulating the syringe according to the fracture pattern. We took utmost care not to violate the volar compartment of the wrist at this site as there is risk of damaging the neurovascular bundle. In all cases we confirmed the position of our needle under fluoroscopic imaging. On injecting primarily, we aspirated to see if we are in the hematoma. This was confirmed with fresh red colored blood coming into the syringe. Then we started injecting the 2% lignocaine while slowly withdrawing the needle and also injected it in the subcutaneous tissue. In each case we injected around 12 ml to 18 ml lignocaine, administered collectively from the two mentioned sites.

After waiting for a period of approximately 7 to 10 minutes, we assessed the pain at fracture site with the VAS (Visual Analogue Scale). In cases where we found moderate to severe pain, we re-injected the site with 5 ml of 2% lignocaine. After the waiting period and improvement in VAS score, we began to manipulate the fracture gradually and reduce it. The reduction was accepted as per the criteria shown in table 1. After reduction, either plaster of paris cast was applied (if fracture was found to be stable) or Kirschner's wires were inserted prior to casting to hold fracture in place. Figure 1 shows the method of administration of HB.

**Table 1:** Acceptability criteria for lower end radius fractures

View	Measurement	Normal	Acceptable criteria
AP	Radial height	13mm	< 5mm shortening
	Radial inclination	23°	change < 5°
	Articular stepoff	congruous	< 2 mm stepoff
Lateral	Volar tilt	11°	dorsal angulation < 5° or within 20° of contralateral distal radius



**Fig 1:** Method of injecting 2% lignocaine for a hematoma block

## Results

All the patients were assessed according to the VAS score prior to induction, during reduction and one hour after the procedure. The average VAS score in patients before HB was 7.1. The average VAS score reduced to 1.6 (ranging from 0.5 to 3.5) during reduction and less than 1 (0.9) one hour after the procedure. The scoring system of VAS is described on a scale of 0-10cm. Based on the distribution of pain VAS scores in patients who described their pain intensity as none, mild, moderate, or severe, the following cut-off points on the pain scale have been recommended: no pain (0-4 mm), mild pain (0.5-4.4 cm), moderate pain (4.5-7.4 cm), and severe pain (7.5-10.0 cm). Table 2 shows the VAS scores of patients before, during and after reduction of fracture.

**Table 2:** VAS score in our series

VAS score	10 minutes before reduction ( No. of patients)	During reduction (No. of patients)	One hour after reduction (No. of patients)
0	0	5	28
1	0	18	5
2	0	6	2
3	0	4	0
4	0	2	0
5	5	0	0
6	4	0	0
7	12	0	0
8	11	0	0
9	3	0	0
10	0	0	0

## Discussion

There are various methods to alleviate pain during reduction and fixation of fractures of distal radius with their own merits and demerits. Various comparative studies have been carried out to know the efficacy of one method over the other [3, 5, 6, 9].

Singh *et al.* published a comparative study between two groups, one with having anesthesia with hematoma block and the other with intravenous sedation in sixty six cases [7]. They concluded that hematoma block (HB) is a safe and effective alternative to sedation in reduction of Colles' fracture way

back in 1992. Similarly, a recent study by Gaur *et al.* in fifty subjects over the age of sixty years showed comparative results of HB<sup>[8]</sup>. They concluded that HB with lignocaine is safe and effective form of alternative anesthesia. The reduction in VAS score after administration of HB is significant and our study showed similar results when compared to study conducted by Gaur *et al.*<sup>[8]</sup>. The VAS score reduced from an average of 7.1 to 1.6, which is comparable to Gaur *et al.* So, it is clear that there is significant reduction in pain and ease in reduction of fractures of distal radius by HB method. Fanjalalaina *et al.*<sup>[2]</sup>, Johnson *et al.*<sup>[5]</sup> and Gaur *et al.*<sup>[8]</sup> showed in their respective studies of 40, 132 and 50 cases that HB is a safe method with very less chance of infection. None of the authors encountered infection in patients which were administered HB either in the operating room or in the emergency department. We did not have any case of infection following reduction under HB either. Recently an online news journal in Emergency medicine under the banner of Wolters Kluwer, blogged about the HB; its benefits and method of administration with relevant references with the title “The Procedural Pause- The Almighty Hematoma Block for Wrist Fractures”<sup>[10]</sup>.

### Conclusion

We conclude that Hematoma Block for anesthesia of distal radius fractures is a safe, effective and easy method. It is less time-consuming and has negligible complications when compared to intravenous sedation or regional brachial plexus block methods. It needs less number of clinicians attending the patient and can be accomplished short time span with comparable efficacy.

### Conflict of interest and/or funding for this study

None.

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