

PAIN LOWERING EFFECT OF HEMATOMA BLOCK FOR CLOSE REDUCTION OF DISTAL RADIUS FRACTURES

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ABSTRACT

Background: Distal radius fracture is common in all age groups and close reduction is effective method of management. The objective of this study was to determine the pain lowering effect of hematoma block for close reduction of distal radius fractures.

Material & Methods: This was a quasi-experimental study conducted at Civil Hospital, Khanuspur, Abbottabad from September, 2011 to February, 2013. All patients presenting with distal radius fracture were included. Patients having multiple fractures, pathological fractures or injuries requiring general anesthesia were excluded. Pain score was measured on Visual Analogue Pain Scale before and five, 10 & 30 minutes after hematoma block. Paired t test was applied to see significance of difference at alpha value of 0.5.

Results: Out of 48 patients with distal radius fracture, males were 20(41.7%) while females were 28(58.3%). The mean age of the sample was 47.04 ± 18.45 . Nine (18.8%) patients were aged up to 20 years, 12 (25%) were from 21-50 years and 27(56.2%) were of age more than 50 years. In 25(52.1%) patients, there was right while in 23(47.9%) patients there was left distal radius fracture. There was highly statistically significant reduction in pain score at all three point intervals after hematoma block ($p < 0.001$ at all points).

Conclusion: The significant pain lowering effect of hematoma block with low risks make it a procedure of choice for close manipulations of distal radius fractures not only in peripheral but also in tertiary care set up.

KEY WORDS: Radius fractures; Pathological Fractures; Hematoma; Lidocaine; Pain Measurement; Visual Analogue Pain Scale.

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INTRODUCTION

The distal radius fracture is one of the most common of musculoskeletal injuries; and its occurrence is at a rate of approximately 2 such injuries per 1000 individuals per year.¹ The incidence is higher in young adults associated with trauma and in elderly for having low bone density.¹ Most common type of distal radius fracture is Colle's fracture, which occurs within 2 cm of articular surface. It is characterized by dorsal angulation, dorsal displacement, radial angulation and radial shortening.² In children and adolescent the distal radial fractures are most common physeal injuries and 46% of physeal injuries occur in distal radius.³ Management options for these

fractures range from non-operative (close reduction and cast application) to operative (plating, K-wire).¹ Union is almost always achieved no matter which method is used for treatment; however, subsequent wrist function can be impaired by loss of motion, posttraumatic arthritis, and pain.¹

Some kind of analgesia is required to patient for the purpose of close reduction which requires manipulation that enhances the pain which is already perceived because of tissue damage caused by fracture. General anesthesia (GA), intra venous regional anesthesia (IVRA), intravenous sedation, regional block local anesthesia (brachial plexus block and cubital nerve block) and local hematoma block are few options that can be used.⁴⁻⁷ Literature⁸ shows that hematoma block is a safe method to obtain analgesia for close reduction of fractures and is almost equally beneficial in term of efficacy to intravenous propofol.⁹

In present world, many more procedures are performed under local anesthesia in settings outside

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operation theatre.⁵ There is inclination in favor of hematoma block rather than general anesthesia for the reduction of distal radius fracture.^{5,10} Hematoma block is easily performed technique of local anesthesia that can be given by a non-anaesthetist.⁵

General anesthesia and intravenous regional anesthesia (Bier's block) requires very specific set of equipments, settings, expertise, admission, time to make patient nil by mouth for at least 4 hours prior to procedure, monitoring and resuscitation during and after the procedure. Simplicity, efficacy and low risks of hematoma block make it a procedure of choice for close manipulations even in tertiary care set up.

The objective of this study was to determine the pain lowering effect of hematoma block for close reduction of distal radius fractures.

MATERIAL AND METHODS

This was a quasi-experimental study conducted at Civil Hospital, Khanuspur; district Abbottabad, Pakistan from September, 2011 to February, 2013. All consecutive patients presenting with distal radius fracture were included in the study. Patients having multiple fractures, pathological fractures or injuries requiring general anesthesia were excluded. After explaining the whole procedure informed consent was taken from patients.

The diagnosis was based on history, clinical examination and X-rays of involved wrist in AP and lateral view. Ten ml of 2 % Lidocaine (Xylocaine) was injected into hematoma collected at site of fracture and also around the adjacent periosteum as well as ulnar styloid in an aseptic manner. Manipulation was done after 10 minutes of hematoma block. Traction-counter traction was applied to the affected limb in order to achieve length, followed by dis-impaction of fracture. Then fracture was reduced and Colles' cast was applied to each patient. Patients were retained in hospital for 3 hours post manipulation and check X-rays of wrist in AP and lateral view were taken to assess the adequacy of manipulation. Throughout the procedure monitoring of pulse and blood pressure were done. In case of epiphyseal injuries only complete reduction of fracture was accepted. In case of Colle's fracture standard reduction guidelines were followed. In case of failure of manipulation to reduce fracture adequately, the patients were referred to tertiary care hospital. Patients were then followed up till cast removal i.e. 6 weeks for fractures in adults and 3 weeks for Salter Harris injuries. All information was collected on a Performa.

The patients were explained how to score the wrist pain during the whole procedure using a Visual Analogue Pain Scale (VAPS) of 100 mm length by putting a mark on the ruler (between 0, for no pain to 100 for most severe pain). After being marked by

the patient, the pain was scored from one to 10 with one decimal.

Demographic variable were; gender, age in years, age grouping, and side involved, mechanism of injury, and time taken to reach hospital after injury. The research variables were basic pain (pain before anesthesia) score, pain score five minutes after anesthesia, pain score during manipulation, pain score 30 minutes after manipulation and success rate of satisfactory reduction under HB. Age grouping was; up to 20 years, 20-50 years and more than 50 years. Time taken to reach the hospital after injury was categorized as; less than three hours, three to six, seven to nine, 10-12, 13-15 and more than 15 hours. Age in years and all pain scores were continuous data while all other data were categorical. The continuous data were analyzed by mean and SD while categorical data were analyzed by frequency and percentage. Paired sample t test was applied as test of significance to see the difference between the basic pain score and the pain score at five minutes after anesthesia, during manipulation and 30 minutes after manipulation, using SPSS (SPSS Inc., Chicago, IL, USA) version 16. Alpha value of 0.5 was considered statistically significant.

RESULTS

Out of 48 patients with distal radius fracture, males were 20 (41.7%) while females were 28 (58.3%). The mean age of the sample was 47.04 ± 18.45 (15-71) with a range of 56 years. Nine (18.8%) patients were aged up to 20 years, 12 (25%) were from 21-50 years and 27 (56.2%) were of age more than 50 years. In 25 (52.1%) patients, there was right while in 23 (47.9%) patients there was left distal radius fracture. The mechanism of injury was fall at home in 30 (62.5%), fall at work in six (12.5%), RTA in nine (18.8%) and others in three (6.2%) cases. Time taken by patients to reach the hospital is shown in Table 1.

Table 2 gives the descriptive statistics for the Pain Scores at four point intervals.

Table 3 gives the inferential statistics for the Pain Scores at four point intervals.

As shown by Table 3, there is highly statistically significant reduction in pain score at all three point intervals after hematoma block.

The success rate of satisfactory reduction with closed reduction under HB was 44 (91.7%). Only four patients didn't meet the standard criteria with close reduction and were referred to tertiary care hospital for open reduction and internal fixation. Only a single female patient developed features of carpal tunnel syndrome but it was resolved over a period of two weeks. None had any systemic complication that can be attributed to Lidocaine i.e. cardiac arrhythmias,

Table 1: Time to reach the hospital in patients of Distal Radius Fractures (n=48)

S.No.	Time in hours	Frequency	Percent
1	Less than 3 hours	9	18.8%
2	3 to 6 hours	15	31.2%
3	7 to 9 hours	8	16.7%
4	10 to 12 hours	4	8.3%
5	13 to 15 hours	10	20.8%
6	More than 15 hours	2	4.2%
Total		48	100%

Table 2: Descriptive Statistics of Pain Scores of Patients with Distal Radius Fractures (n=48)

Pain Scores	Minimum	Maximum	Range	Mean	SD
Pain Score Basic	3.0	9.0	6.0	6.63	1.68
Pain Score at 5 minutes	0.2	2.4	2.2	0.92	0.48
Pain Score at 10 minutes	0.6	3.4	2.8	1.65	0.64
Pain Score at 30 minutes	0.3	2.7	2.4	1.01	0.40

Table 3: Inferential Statistics of Pain Scores of Patients with Distal Radius Fractures (n=48)

Pairs for Paired Samples t test		Paired Differences						
		Mean	SD	95% CI Lower	95% CI Upper	t-value	DF	p-value
Pair 1	Pain Score Basic - Pain Score at 5 minutes	5.70	1.68	5.22	6.19	23.56	47	< 0.001
Pair 2	Pain Score Basic - Pain Score at 10 minutes	4.98	1.56	4.52	5.43	22.00	47	< 0.001
Pair 3	Pain Score Basic - Pain Score at 30 minutes	5.61	1.62	5.13	6.08	23.87	47	< 0.001

SD=Standard Deviation, CI=Confidence Interval, DF=Degree of Freedom

anaphylactic reaction, collapse etc during or after the procedure while patient stayed in hospital.

DISCUSSION

One of the necessities for fracture reduction is adequate anesthesia. So many different types of anesthesia are used each having its own bag of advantages and disadvantages.⁵ In case of distal radius fracture reduction, there is gradual drift from general anesthesia towards more use of localized sedation like hematoma block (HB).¹⁰ Handoll et al¹¹ reviewed in Cochrane Database of Systemic Reviews that hematoma block is much safer than general anesthesia in elderly patient for reduction of distal radius fracture. Hematoma block at fracture site is effective method to decrease need for analgesic and also facilitates fracture reduction.¹² Similar results are obtained by comparative studies comparing hematoma block with conventional sedation¹³ and brachial plexus block.¹⁴

Demographic data of our study is comparable

to other studies both national and international with more than 50% of patients of age more than 50 years and females more than males in having inflicted with distal radius fracture.^{5,15}

In more than 50% of patients in our series, the mechanism of injury was fall which is comparable with study by Ogunlade SO.¹⁵

Our study showed statistically significant decrease in pain score with hematoma block at all the three points intervals; five minutes after HB, during and 30 minutes after manipulation. The results of our study are promising and comparable with similar studies.^{5,15}

In our study, there was highly statistically significant reduction in pain score at all the three point intervals i.e. five, 10 and 30 minutes after hematoma block. This finding is in line with the findings of other^{5,12,16} studies. In a comparative study by Funk,¹⁷ the general anesthesia group experienced far greater pain than hematoma block group (VAS score 5.8

versus 1.5, $p < 0.01$) showing the added advantage of reduced post manipulation pain perception. In our study also the post manipulation pain score was 1.69 which is in line with this study.

Only single patient developed carpal tunnel syndrome in our study which was relieved in two weeks time. None of our patients had complications like reflex sympathetic dystrophy, cardiac arrhythmias, anaphylactic reaction, collapse etc. and this was consistent with other studies.¹⁸

Although we didn't perform comparative study but a clinical trial comparing nitrous oxide (Etonox) with hematoma block by Man KH et al¹⁹ showed no major complication in any group but pain score by VAPS and procedure time were less in hematoma block group. Another study⁹ comparing intravenous general anesthesia (Propofol) to hematoma block showed that hematoma block is effective and safe choice that can be easily done in emergency keeping the risks and complications of intravenous general anesthesia in mind.

One argument against the hematoma block is that it converts a close fracture to open fracture while infiltrating fracture site and bacteria can enter and increases the chances of infection. Although there is risk of infection but studies have shown that risk of infection is very low.^{5,10,16} We used aseptic technique for administering for HB and had no case of infection.

Only four of our patient didn't meet the close reduction criteria and had to be shifted to tertiary care hospital for K-wire fixation under image intensifier.

CONCLUSION

The significant pain lowering effect of hematoma block with low risks make it a procedure of choice for close manipulations of distal radius fractures not only in peripheral but also in tertiary care set up.

REFERENCES

1. The Treatment of Distal Radius Fractures: Guideline and Evidence Report. Dec 2009, American Academy of Orthopaedic Surgeons. www.aaos.org/guidelines.
2. Cooney WP, Linscheid RL, Dobyns JH. Fractures and dislocations of the wrist. In: Rockwood CA, Green DP, Bucholz RW, editors. Rockwood and Green's Fractures in adults. 3rd edition. Philadelphia: Lippincott-Raven; 1996; p.745- 867.
3. Boyden EM, Peterson HA. Partial premature closure of the distal radial physis associated with Kirschner wire fixation. Orthopaedics 1991; 14:585-8.
4. Richard CH, Graham CA, Munro PT. Bier's block for emergency department management of distal radius fractures. Hong Kong J Emerg Med Jan 2009; 16:21-5.
5. Ismatullah. Hematoma block local anesthesia for close reduction of Colles'-type fractures. J Postgrad Med Inst 2011; 25:56-61.
6. Pickering SAW, Hunter JB. Bier's block using prilocaine: safe, cheap and well-tolerated. Surg J R Coll Surg Edinb Irel 2003; 1:283-5.
7. Jarbo K, Batra YK, Panda NB. Brachial plexus block with midazolam and bupivacaine improves analgesia. Can J Anaesth 2005; 52:822-6.
8. Johnson PQ, Noffsinger MA. Hematoma block of distal forearm fractures: Is it safe? Orthop Rev 1991; 20:977-9.
9. Myderrizi N, Mema, B. The hematoma block: an effective alternative for fracture reduction in distal radius fractures. Med Arh 2011; 65:239-42.
10. Kendall JM, Allen PE, McCABE SE. A tide of change in the management of an old fracture. J Accid Emerg Med 1995; 12:187-8.
11. Handoll HH, Madhok R, Dodds C. Anesthesia for treating distal radial fracture in adults. Cochrane Database Syst Rev 2002; CD003320.
12. Dezfali B, Edwards CJ, DeSilva GL. Distal radius fracture hematoma block with combined lidocaine and bupivacaine can induce seizures while within therapeutic window: a case report. Journal of Orthopaedic Case Reports 2012; 2:10-3.
13. Singh GK, Manglik RK, Lakhtakia Pk, Singh A. Analgesia for the reduction of Colles fracture. A comparison of hematoma block and intravenous sedation. Online J Curr Clin Trials. 1992; Doc No 23:[3614 words; 43 paragraphs].
14. Bajracharya S. Singh S, Singh GK, Singh M, Bajracharya T. The efficacy of the hematoma block for fracture reduction in the distal forearm fractures: A double blind randomized controlled trial [Internet]. 2013 [cited 2013, August 10]. Available from: <http://ispub.com/IJA/17/2/11847>.
15. Ogunlade SO, Omololu AB, Alonge TO, Salawu SA, Bamgboye EA. Hematoma block in reduction of distal radial fracture. WAJM 2002; 21:282-5.
16. Johnson PQ, Noffsinger MA. Hematoma block of distal forearm fractures. Is it safe? Orthop Rev 1991; 20:977-9.
17. Funk L. A prospective trial to compare three anaesthetic techniques used for the reduction of fractures of the distal radius. Injury 1997; 28:209-12.
18. Khan M, Mumtaz N. Frequency of carpal tunnel syndrome after conservatively managed colle's fracture. Pak Armed Forces Med J 2004; 54:151-4.
19. Man KH, Fan KP, Chan TN, Yue YM, Sin FP, Lam KW. A prospective clinical trial comparing self administered nitrous oxide and hematoma block for analgesia in reducing fractures of the distal radius in an emergency department. Hong Kong J Emerg Med 2010; 17:126-31.