

Haematoma block in reduction of distal radial fractures

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Summary

A total of 35 patients who presented in the Accident and Emergency Department of University College Hospital with displaced distal radial fracture between January 2000 and March 2001 had reduction of the fracture under haematoma block using 10ml of 2% lignocaine.

There was significant reduction of the pain following infiltration of the fracture site with lignocaine and significant pain reduction during manipulation compared to pain score at presentation. All the patients had satisfactory reduction of the fracture. The fracture was mobilised in Plaster of Paris 6 weeks in patients with Collens' fracture and 3 weeks in patients with distal radial epiphyseal injury. All patients had good range of movement at 8 weeks after removal of Plaster of Paris and patients expressed satisfaction with this method.

We recommend the use of Haematoma block for patients of 15 years and above with displaced distal radial fracture in the Accident and Emergency Department.

Keywords: Distal radial fractures, Reduction, Haematoma block

Résumé

Un total de 35 patients qui se sont inscrits au Service des Urgences du Collège Hospitalier. Universitaire atteints de la fracture radiale distale déplacée entre janvier 2000 et mars 2001 avaient la réduction de la fracture sous l'obstruction hématome tout en utilisant 10ml de 2% lignocaine.

Il y avait une remise importante de la douleur à la suite d'infiltration de la lignocaine sous la région de la fracture et un soulagement important au cours de la manipulation par rapport au niveau de la douleur durant l'hospitalisation. Tous les patients avaient indiqués un soulagement satisfaisant à l'égard de la fracture. La fracture a été mobilisée avec le plâtre de Paris pendant 6 semaines chez les patients avec la fracture Colles et pendant 3 semaines chez les patients avec la blessure épiphysioyse radiale distale. Tous patients avaient une bonne distance de mouvement après le 8em semaine d'enlèvement du plâtre de Paris et les patients ont fait des remarques de la satisfaction avec cette méthode.

Nous recommandons la méthode de l'obstruction hématome pour les patients âgés de 15 ans et plus atteints de la fracture radiale distale déplacée dans le Département de Service des Urgences.

Introduction

Displaced fracture of the distal radial metaphysis are manipulated using a variety of anesthetic techniques within the accident and emergency (A & E) department⁽¹⁾. In United Kingdom, a survey of large A & E department in 1994 showed that the use of haematoma block has increased dramatically in popularity over the preceding five years, largely at the expense of the general anaesthetic, accounting for 33% of all reductions.⁽¹⁾ A further 33% were performed under Bier's block, a proportion that had remained unchanged over the preceding five years⁽²⁾. Case retrospectively compared Haematoma Block, Bier's Block and general anaesthetic in 136 patients and concluded that there were no significant differences in the numbers requiring re-manipulation between the three methods employed. He gave the advantages of haematoma block as a safe procedure that can be performed by one operator and allowed rapid treatment when there were many fractures to reduce.⁽³⁾

in a prospective study comparing haematoma block and Bier's block, Cobb and Houghton reported that the haematoma block was simpler and quicker to perform but was inferior in efficacy.⁽⁴⁾ In a study conducted by Hunter et al in 1989, where 54 A&E were contacted by telephone to answer a questionnaire, he concluded that, haematoma block, Bier's block and general anaesthetic are all safe and efficient in the reduction of Colles fracture.

Wardrope et al⁽⁵⁾ prospectively compared haematoma block and Bier's in 79 patients and found Bier's block to be superior in terms of analgesia, re-manipulation rate and radiological outcome. Abbaszadegan and Johnson⁽⁶⁾ also reported the superiority of Bier's block in terms of reduced pain during re-manipulation. Kendall JM et al⁽⁷⁾ in a prospective study of 142 patients with Colles' fracture using Bier's block or haematoma block concluded that Bier's block is superior to haematoma block in terms of efficacy, radiological result and re-manipulation rate.

However, there had been reports of fatalities following Bier's block as reported by Heath in 1982.⁽⁸⁾ The medical Defense union⁽⁹⁾ and Henderson⁽¹⁰⁾ also reported adverse reactions to bupivacaine. This study is not to compare Haematoma block with other methods of anaesthetic in distal radial fracture but to examine the usefulness of Haematoma block in the reduction of distal radius fracture, to assess patients tolerability of the pain during reduction of distal radius fracture and to examine complications that may be attributed to haematoma block in our environment.

Patients and Methods

This is a prospective study conducted in the A&E Department of the University College Hospital between January 2000 and March 2001. All consecutive patients from 15 years of age with distal radial fracture requiring manipulation, were recruited into the study. Additional inclusion criteria for manipulation in colles fracture is $>15^\circ$ dorsal angulation, and ≥ 1 cm radial shortening while inclusion criteria in distal radial epiphyseal injury is displaced type 11 Salter & Harris fracture.^(11,12) Exclusion criteria are patients requiring general anaesthetic for other injuries sustained and those allergic to the local anaesthetic agent. Informed consent was obtained from all patients. Haematoma block was performed using 2% lignocaine, povidon iodine was used to prepare the skin of the forearm which is draped using sterile drapes. The operator wore sterile gloves and injected 10mls of 2% lignocaine into the cavity of the fracture and around the adjacent periosteum including ulnar styloid. The fracture was manipulated after waiting for 10 minutes and after initial gentle movement at the fracture site was noted not to produce pain^(4,11).

The wrist was manipulated appropriately and full colles plaster was applied and patient discharged after 4 hours post-manipulation to be seen the following day for Plaster of Paris (POP) and X-ray of the wrist to assess adequacy of reduction. The same criteria used for initial manipulation were used to determine if re-manipulation was necessary. The patients were followed up in the fracture clinic and POP was removed at 6 weeks for colles fracture and 3 weeks for epiphyseal injury.

All information was collected prospectively on an appropriate proforma. Demographic and other data were collected at initial time of patient presentation. The items of information included age, sex, side of fracture, mechanism of injury, date of injury, and the time of patient presentation and volume of anaesthetic administration. Pain scoring was done before administration of local anaesthetic agent, during manipulation, and after manipulation us-

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ing the visual analogue scales⁽¹⁴⁾

Patients were asked to rate their wrist pain using a 100mm visual analogues scale by placing a vertical mark along the line (between 0, for no pain and 100 for most severe pain) that best described their current pain. Using a metric ruler, the clinical monitor measured the millimeters from the left side of the line (0) to the mark and this was recorded in cm on the format forms.

The check x-ray was also scored as good if the reduction of the fracture is complete, fair if the reduction is not complete but dorsal angulation was less than 15° and shortening of radius less than 2cm in colles fracture, poor if the deformity was greater than above figures.

In case of epiphyseal injury only complete reduction was accepted.

Statistical analysis

The statistical package EPI-INFO Version 6.02 was used for data entry, editing and cleaning. The data files were subsequently converted to State Pac Gold Statistical Package for statistical analysis.

In cases where the assumption of normality and homoscedasity were not satisfied, the Mann Whitley U test was used to compare two groups and the Krushal Wallis test for more than two groups.

Result

All statistical tests were two tailed carried out at 5% level of significant.

Table 1 Age - Sex distribution of patients

Age (Yrs)	Male		Female		Both		X ²	P-value
	Freq.	%	Freq.	%	Freq.	%		
15-20	4	26.7	0	0.0	4	11.4		
20-24	7	46.7	8	40.0	15	42.9		
45-59	3	20.0	4	20.0	7	20.9	9.13	0.03
60+	1	6.7	8	40.0	9	25.7		
All Subjects	15	42.9	20	57.1	35	100.0		

Table 2 Summary of patient's age, presentation time and pain score at presentation by sex

Variables	Summary	Sex			Test	
		Male	Female	Both	Statistics	P value
Age (Yrs)	Mean	33.93	50.65	43.49	3.10	0.004
	S. D.	15.09	16.30	17.68		
	Range	15-60	20-75	15-75		
Presentation (Time Hrs)*	Mean	235.21	191.70	209.62	1.11	0.29
	S. D.	620.63	630.99	619.62		
	Range	6-23 52	2.0-2856	2.0-2856		
Pains score at presentation	Mean	6.43	6.80	6.64	0.67	0.51
	S. D.	1.59	1.61	1.59		
	Median	6.0	7.0	7.0		
	Range	3-9	2-9	2-9		

*Mann Whitley U test

Table 3 Distribution of patient's mechanism of injury and side fracture by sex

Variables	Sex			X ²	P value			
	Male	Female	Both					
	Freq.	%	Freq.	%	Freq.	%		
Mechanism of Injury								
Fall	6	40.0	12	60.0	18	51.4	2.41	0.30
RTA	6	40.0	7	35.8	13	37.1		
Others	3	20.0	1	5.0	4	11.4		
Side of Fracture								
Right	7	46.7	10	50.0	17	48.6	0.02	0.88
Left			10	50.0	18	51.4		

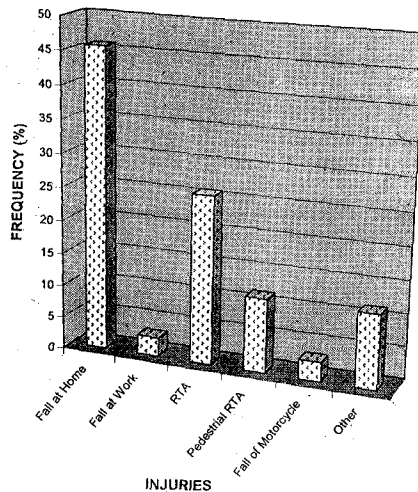
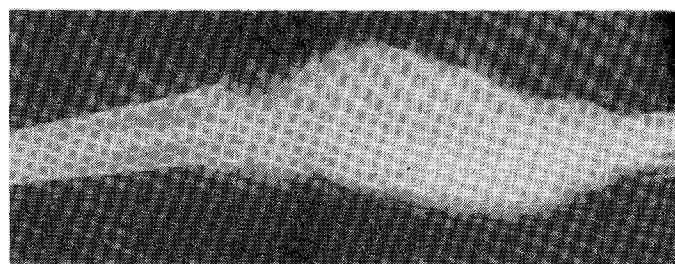


Fig.1 Distribution of mechanisms of injury



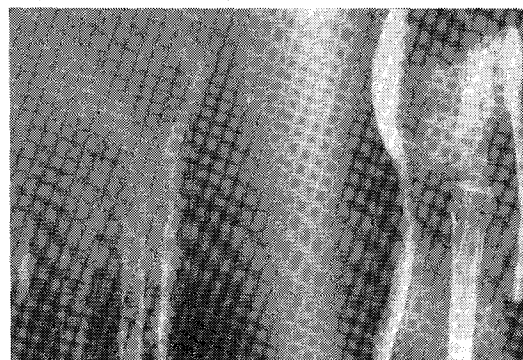
The obvious shortening with radial deviation at the fracture site is obvious.

Fig. 2 Plain radiograph of the wrist before manipulation.
2a. Antero-posterior view



The dorsal displacement and angulation is shown.

2b. Lateral view



Good reduction is achieved in both anteroposterior and lateral views.

Fig. 3 Post reduction film

Demographic information

A total of thirty-five (35) patients with distal radial fractures were seen over the study period. Table 1 shows the age-sex distribution of patients, the majority of whom (57.1%) were females. A sizeable proportion of the patients were young adults aged 20 to 34 years (42.9%), followed by the elderly people of age 60+ (25.7%). The youngest patient was aged 15 years and the oldest 75 years. Overall, the patients mean age was 43.5 years, (SD = 17.7 years). The females with a mean age of 50.7 years, (SD = 16.3 years) were statistically significantly older than their male counterparts with mean age of 33.9 years, (SD=15.01 years) ($P<0.05$).

The summary statistics of the patient's age, presentation time and pain score at presentation is shown in Table 2. The patients presentation time (hours) was positively skewed with a median time of 24 hours. Male patients were found to report later than females (median 36 hours vs. 16.5 hours) but the difference did not reach the 5% level of statistical significance. Similarly, the patients pain score at presentation was statistically the same, although the female patients had a slightly higher pain score (6.50 ± 1.60) compared to the male patients (6.43 ± 1.59).

Mechanisms of injury

The distribution of the patient's mechanism of injury and side of fracture by sex are shown in Table 3. The most reported mechanism or injury was fall (51.4%), followed by Road Traffic Accident (RTA) (37.1%) and the remaining number of patients (11.4%) reported other mechanism of injury. This distribution was similar in both sexes except that the proportion of male patients that reported fall and RTA were the same (40.0%) whereas, most of the female reported fall (60.0%).

Also, the distribution was not statistically significantly different in the two sex groups ($P>0.05$). Figure 1 shows the distribution of various types of fall and RTA mentioned. The two sides of fracture left and right were equally reported by the patients (51.4% vs 48.6%). But, while equal proportion of female patients mentioned the two sides (50.0%), more male patients (53.3%) reported having their fracture at the left side. However, there was no statistically significant difference in the distribution of side of fracture by sex ($p>0.05$).

Pain score

The summary of patient's pain score at presentation, after L. A. injection (5-10) minutes during manipulation (10 minutes post L. A. injection) and post manipulation (30 minutes post manipulation) were also examined. The pain scores showed a sharp statistically significant decrease from a mean pain score 6.6, SD=1.6 at time of presentation to a mean score of 0.72, SD = 1.1 when L. A. injection was administered ($P>0.05$). This was followed by a less rapid but statistically significant pain score increase to 1.79, SD = 0.66) during manipulation and 5% reduction to 0.90, SD = 0.45, at 30 minutes post manipulation injection ($P<0.05$). The changes in the pain score at various period after the presentation time was statistically significant ($P<0.05$).

Post MUA characteristics

The distribution of the post manipulation characteristics by the side of fracture also showed a high majority of the patients (97.1%) showed their performance for this method, this was similar in the two sides of the fracture. The post manipulation x-ray was good in almost all the patients (97.1%) and final X-ray at 6 weeks after manipulation was also good for all majority of patients (91.1% Colles POP was used as post manipulation POP type while only a patient used forearm POP. The distribution of the post manipulation characteristics by side of fracture by the patients is shown in Figure 1. A high majority of the patients had no other injury

(74.3%), 14.3% had other fracture while 14.3% each mentioned burns, scalp laceration, Neck, Injury and Head injury.

Discussion

In our environment, the distal radial fracture requiring manipulation will have to compete for general anaesthetic time with other life threatening emergencies which are many, this makes it essential to use other methods of anaesthesia for distal radial fractures, Bier's block for distal radial fractures which is recommended by some authors needs two operators, besides the anaesthetic agent of choice, prilocaine is difficult to come by in Nigeria while potential hazards of this method discourage its used in the country. The result of our study showed that haematoma blocks is safe, simple and effective in the manipulation of distal radial fracture.

There was effective relief of pain following injection with local anaesthetic drug within 10 minutes of injection. The pain during manipulation also significantly reduced and this persisted until the patient was discharged. All our patients were discharged four hours following the injection with the local anaesthetic. This is of advantage in our environment where available hospital beds are highly competed for by more serious and life threatening diseases. This method is acceptable to patient due to early discharge from the hospital.

The finality of a satisfactory reduction of the fracture in all patients in our study with no remanipulation seems to contradict the view of difficult reduction of the fracture with less relaxation of muscles reported in previous studies⁽⁴⁾. Also the same study objected to haematoma block because of the possibility of infection as a result of local infiltration. This view was not supported by our study as there was no single case of infection. Our patient also regained good range of movement following wrist physiotherapy within 6 weeks after removal of the plaster of Paris.

In United Kingdom Haematoma block is on the increase in the manipulation of colles fracture at the expense of general anaesthetics^(1,2). The reason adduced includes firmly entrenched personal experience, previous experience and training and financial implication of admission.^(1,2)

Conclusion

We recommend the use of haematoma block for reduction of displaced distal radius fracture as it is safe, quick and good reduction of the fracture achieved with this method in a busy accident and emergency department.

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