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Analysis of functional outcome of both bone forearm fracture in paediatric age group managed conservatively during the SARS-CoV-2 Pandemic

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Abstract

Aims and Objectives: To study the functional outcome of closed reduction casting in both bone forearm fracture in paediatric age group. To evaluate the functional outcome of closed reduction casting in both bone forearm fractures in paediatric age group with the help of Price *et al.* criteria.

Materials and Methods: A retrospective observational study was performed on patients treated in MGM Medical College and Hospital, Navi Mumbai from April 2020 to November 2020. A total of 30 cases of both bone forearm fractures in paediatric age group were treated with closed reduction casting. Their functional outcome post casting was evaluated according to Price *et al.* scoring.

Results: Based on Price *et al.*, criteria functional outcome was calculated which showed excellent results in 24 patients (80%), good in 4(13.33%), fair in 2(6.6%) and no poor results. All patients with excellent results had lost 10 degrees or less of forearm rotation. In four patients with good results, two had lost 11-30 degrees of forearm rotation while the other two had lost 10 degrees or less but grouped under good rather than excellent outcome since patients had mild complaints of pain and fatigue with strenuous activities.

Conclusion: Non-operative treatment of both-bone diaphysis forearm fracture with closed reduction casting, has well to excellent functional outcomes in children in the age group of 4- 15 years.

Keywords: SARS-CoV-2, age group, bone forearm

Introduction

Fractures of both radius and ulna are the most common diaphyseal injuries in paediatric age group which accounts for 5% to 10% of paediatric fractures [1, 2]. Successful outcomes are based mainly on the restoration of pronation and supination. Most previous studies on forearm fractures in children showed favourable outcome during follow-up. However, the information on outcome measured after skeletal maturity is still scanty.

On January 2020, the World Health Organization (WHO) issued a global health alert for a novel coronavirus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that caused an acute respiratory infection disease (COVID-19) which originated in Wuhan, Hubei Province, China.

During SARS outbreaks, health care workers (HCWs) have a significantly increased risk of contracting the SARS-CoV-2. The risk of acute respiratory infection (ARI) transmission through surgical care services is not fully delineated. It is important to emphasize that surgical patients are a distinct patient category as they can be highly contagious for HCWs under specific conditions during provision of surgical care services. The reason why surgical patients should be treated as highly contagious is that these patients demand close contact and prolonged exposure during surgical care and all are prone to be submitted to aerosol generating procedures, factors that all contribute to ARI transmission [3].

Hence due to the risk of transmissions of SARS-CoV-2, majority of the paediatric age group both bone forearm fractures were conservatively managed considering their high remodelling potential. This study was conducted to evaluate the functional outcomes in these patients.

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Materials and methods

A Retrospective observational study was performed in MGM Medical College, Kamothe, using the data collected from April 2020 to November 2020. A total of 30 patients of both bone forearm fractures in paediatric age group were treated with closed reduction casting during this period.

All patients were evaluated post casting to satisfy inclusion and exclusion criteria.

Patient were followed up at 4 weeks, 8 weeks and 12 weeks post casting.

At follow up visit Price *et al.* score was evaluated for these patients.

Inclusion criteria

Skeletally immature patients aged between 5 – 15 years of age.

Closed both bone forearm fractures.

Exclusion criteria

Age beyond 4 to 15 yrs.

Isolated bone forearm fracture.

Open fracture of forearm.

Table 1: Price *et al.* criteria ^[4]

Outcomes	Symptoms	Forearm rotation
Excellent	No complaints with strenuous activity	<15
Good	Mild complaints with strenuous activity	15-30
Fair	Mild complaints with daily activities	31-90
Poor	All other results	>90

Results

This study was a retrospective study conducted in MGM Medical College, Kamothe, using the data collected from April 2020 to October 2020. The study included 30 paediatric patients of both bone forearm fractures that were. In 30 children 9 were female and 21 were male. Mean age of patients 10.2 years range 5-15 years. Mechanism of injury being 23 had fall while playing sports, 4 had road traffic accidents and rest 3 had history of fall from height. Right forearm involvement 26 patients and left forearm in 4 patients. Based on Price *et al.*, criteria functional outcome was calculated which showed excellent results in 24 patients (80%), good in 4(13.33%), fair in 2(6.6%) and no poor results. All patients with excellent results had lost 10 degrees or less of forearm rotation. In four patients with good results, two had lost 11-30 degrees of forearm rotation while the other two had lost 10 degrees or less but grouped under good rather than excellent outcome since patients had mild complaints of pain and fatigue with strenuous activities.

Discussion

Both bone forearm fractures in paediatric age group can be managed conservatively inspite of the newer operative techniques. Their younger age and tremendous remodelling capability are the main advantages for them to heal successfully ^[5]. Given the excellent remodelling potential with younger patients, certain studies have argued that even with 100% displacement of the radius and ulna closed reduction and casting is an excellent treatment choice for children 9 years old and younger ^[6, 7]. Daruwalla *et al.* ^[8], reviewed 53 displaced forearm fractures in children with an average of three years follow-up and found that all the patients were asymptomatic and had no limitations in their activities even though 6% of them had lost more than 30 degrees of forearm rotation. This data was further supported

by Hogstrom *et al.* ^[9], and Morrey *et al.* ^[10], who described that with the limitation of 60 degrees or less in the range of pronation and supination, patients seemed to be unaware of their incapacity due to good compensation by shoulder motion. Sinikumpu *et al.* ^[11], reviewed 47 nonoperatively treated both-bone forearm shaft fractures in children and found that the pronosupination of the forearm was not decreased in the long term, the grip strength was also equally as good as in the controls and the patients were satisfied with the outcome.

Conclusion

Non-operative treatment of both-bone diaphyseal forearm fracture with closed reduction casting, has well to excellent functional outcomes in children in the age group of 4-15 years.

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