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Original Research Article

Patterns of Radius-Ulna Fractures at Tertiary Care Center Among Pediatric Patients

Nithin Gangadharan

Assistant Professor, Department of Orthopaedics, KMCT Medical College, Manassery, Mukkam, Kozhikode, Kerala

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Corresponding author: Dr. Nithin Gangadharan
Conflict of interest: Nil

Abstract

Background: The pediatric radius-ulna fractures are managed by conservative treatment methods such as closed reduction and casting and other methods are operative fixation with flexible plates and nails. In previous studies it was reported that radius-ulna fractures are usually occurred probably due to poor bone mineralization, Vitamin D deficiency and due to decreased physical activity.

Material & Methods: 50 Patients below 18 years of the age and presented at hospital with radius-ulna fracture were enrolled from emergency and outdoor departments by simple random sampling. Institutional Ethics Committee Clearance was obtained before start of study and written and informed consent for the procedure was obtained from all the patients.

Results: In the present study, out of the total study participants, most of the cases had middle third fractures among 29 (58%) patients which was followed by fractures of proximal one third in 12 (24%) patients and fractures of distal one third was found among 09 (18%) patients. All of the total study participants had radial fractures at the presentation of primary fracture. Out of the total study participants 38 (76%) patients had associated ulna fracture. Out of the total study participants Radius was reported to be involved in all patients of re-fractures. Out of the total study participants, tricortical union was seen in all patients at the end of 8 weeks. In the present study, out of the total study participants, none of the patients developed post-operative infections and neurologic deficits.

Conclusion: We concluded from the present study that pediatric radius-ulna fractures can be managed by both conservatively and operatively with good outcome and results were similar to the treated primary fractures.

Keywords: Radius-ulna fracture, Pediatric fracture, Re-fracture.

Introduction

The pediatric radius-ulna fractures are managed by conservative treatment methods such as closed reduction and casting and other methods are operative fixation with flexible plates and nails [1]. These flexible implants are usually removed by six months to one year of duration as compared to older patients, in which removal are delayed by 18 months to 2 years of duration [2]. Various studies reported that radius-ulna fractures are among the most common fractures among

pediatric fractures accounting for 40% of the total fractures. Out of them refracture is the commonest complication of treated pediatric radius-ulna fractures [3]. In previous studies it was reported that radius-ulna fractures are usually occurred probably due to poor bone mineralization, Vitamin D deficiency and due to decreased physical activity [4].

Re-fracture is denoted as second fracture which occurred in united bone within 18 months of previous fracture. Re-fracture can of two types namely early forms and late forms. However, some studies reported that the radius-ulna re-fracture rate accounting for 5% [5]. The early form of re-fracture usually is presented through the immature callus and seen during short period of immobilization. The Late form of refractures usually presented through the remodeled bone and directly related to patient's activity [6]. In previous studies it was reported that radius-ulna refractures are incomplete immobilization and inadequate healing. In previous studies it was reported that there are no definitive guidelines for management procedures of radius-ulna refracture and implant removal among pediatric age group [7]. However, management of refracture is still a matter of research with various managements procedures. We conducted present study for evaluation of patterns of radius-ulna fractures at tertiary care center among pediatric patients.

Methodology

The present prospective study was conducted at department of orthopedics of our tertiary care hospital. The study duration was of one year from June 2018 to July 2019. A sample size of 50 was calculated at 95% confidence interval at 5% of maximum allowable error. Patients below 18 years of the age and presented at hospital with radius-ulna fracture were enrolled from emergency and outdoor departments by simple random sampling. Institutional Ethics Committee Clearance was obtained before start of study and written and informed consent for the procedure was obtained from all the patients. Strict confidentiality was maintained with patient identity and data and not revealed, at any point of time.

All the study participants who had open and closed fractures were included. Patients who had congenital and metabolic bone diseases, patients with muscular dystrophies, and patients with neurologic disorders were excluded from the study. Operative procedure selection for refractures at proximal, middle and distal radius-ulna shaft was closed reduction and cast and intramedullary nailing. Patients were assessed post-operatively for regular follow up was done at 1st week, 2nd weeks, 6th weeks, 6th months and after 1 year. Radiographs were also taken at 6th weeks and bony union was analyzed. Functional outcomes were assessed by applying Price et al criteria [1]. Data were entered in the MS office 2010 spread sheet and Epi Info v7. Data analysis was carried out using SPSS v22. Qualitative data was expressed as percentage (%) and Pearson's chi square test was used to find out statistical differences between the study groups and sensitivity, specificity, positive predictive value and negative predictive value were calculated. If the expected cell count was < 5 in more than 20% of the cells then Fisher's exact test was used. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05 and highly significant if p value less than 0.01.

Results

In the present study we enrolled 50 Patients below 18 years of the age and presented at hospital with radius-ulna fracture were enrolled from emergency and outdoor departments by simple random sampling. The age of study participants was ranged from 6 years to 18 years. Among the total study participants, 21 (42%) patients were in the age group of 6-10 years, 16 (32%) cases were in the age

group of 10-15 years and 13 (26%) patients were in the age group of 15-18 years. The mean age of study participants was 9.1 ± 3.4 years. Out of the total study participants, 34 (68%) patients were male and 16 (32%) patients were female. However, this distribution was statistically non-significant (P value >0.05). In the present study, out of the total study participants, 42 (84%) patients had closed fractures and 08 (16%) patients had type 1 open fractures. (Table 1)

Table 1: Age and gender wise distribution of the study participants.

Parameters			**p value**
Age (Years)	6-10	21 (42%)	>0.05
	10-15	16 (32%)	
	15-18	13 (26%)	
Mean age (Years)		9.1 ± 3.4 years	
Gender	Male	34 (68%)	>0.05
	Female	16 (32%)	
Type of fracture	Closed	42 (84%)	
	Type I open	08 (16%)	

Table 2: Site of fracture wise distribution of the study participants.

Parameters		
Site of fracture	Proximal 1/3	12 (24%)
	Middle 1/3	29 (58%)
	Distal 1/3	09 (18%)
Radius fracture		100%
Associated ulna fracture		38 (76%)

In the present study, out of the total study participants, most of the cases had middle third fractures among 29 (58%) patients which was followed by fractures of proximal one third in 12 (24%) patients and fractures of distal one third was found among 09 (18%) patients. All of the total study participants had radial fractures at the presentation of primary fracture. Out of the total study participants 38 (76%) patients had associated ulna fracture. Out of the total study participants Radius was reported to be involved in all patients of refractures. Out of the total study participants, tricortical union was seen in all patients at the end of 8 weeks. In the present study, out of the total study participants, none of the patients developed post-operative infections and neurologic deficits.

Discussion

In the present study we enrolled 50 Patients below 18 years of the age and presented at hospital with radius-ulna fracture were enrolled from emergency and outdoor departments by simple random sampling. Institutional Ethics Committee Clearance was obtained before start of study and written and informed consent for the procedure was obtained from all the patients. The age of study participants was ranged from 6 years to 18 years. Among the total study participants, 21 (42%) patients were in the age group of 6-10 years, 16 (32%) cases were in the age group of 10-15 years and 13 (26%) patients were in the age group of 15-18 years. The mean age of study participants was 9.1 ± 3.4 years. Out of the total study participants, 34 (68%) patients were male

and 16 (32%) patients were female. However, this distribution was statistically non-significant (P value >0.05). Similar results were obtained in a study conducted by Arunachalam V et al among refracture cases in children and reported similar findings to the present study [8]. Similar results were obtained in a study conducted by Bould M et al among refracture cases in children and reported similar findings to the present study [9].

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Conclusion

We concluded from the present study that pediatric radius-ulna fractures can be managed by both conservatively and operatively with good outcome and results were similar to the treated primary fractures. We found that average of 2 to 3 weeks of immobilization more than primary fracture in cases of refracture.

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