GAVIN PUBLISHERS

OPEN ACCESS

Journal of Orthopedic Research and Therapy

Panthi S, et al. J Orthop Res Ther 5: 1170.

DOI: 10.29011/2575-8241.001170

Research Article

Paediatric Orthopaedic Injuries at Western Region of Nepal: A Retrospective Study

Sagar Panthi[1*], Rishiswor Shrestha[1], Sachin Shah[1] and Sabal Krishna Gaihre[2]

[1]Department of Orthopaedics and Trauma Surgery, Rapti Academy of Health Science, Ghorahi, Dang, Nepal

[2]Consultant Orthopaedics and Trauma Surgeon, Rapti Provincial Hospital, Tulsipur, Dang, Nepal

[*]**Corresponding author**: Sagar Panthi, Department of Orthopaedics and Trauma Surgery, Rapti Academy of Health Science, Ghorahi, Dang, Nepal

Citation: Panthi S, Shrestha R, Shah S, Gaihre SK (2020) Paediatric Orthopaedic Injuries at Western Region of Nepal: A Retrospective Study. J Orthop Res Ther 5: 1170. DOI: 10.29011/2575-8241.001170

Received Date: 19 August, 2020; **Accepted Date:** 26 August, 2020; **Published Date:** 31 August, 2020

Abstract

Background: Paediatric injuries are one of the major cause of disability in children. The aim of this study is to determine pattern, cause, treatment and outcome of paediatric fracture in western region of Nepal.

Methods: This is a retrospective study done in Rapti Academy of Health Science from November 2018 to July 2020.

Results: A total of 380 paediatric patients were reviewed. Most common mechanism of injury was fall from height. Final outcome was good in 62% of cases, fair in 37.74% of cases and poor in 0.26% of cases.

Conclusion: Paediatric fracture unites in most of the cases with good functional outcome. Provision of safe environment and appropriate supervision is required.

Keywords: Conservative management; Fall; Fracture pattern; Paediatric injuries

Introduction

One of the important causes of childhood morbidity and disability is trauma [1,2]. There is an increasing loss of life in developing countries due to trauma [3]. In children, there is increasing incidence due to increased sports participation [4]. Paediatric trauma accounts for 10-15% of all injuries and among them 15-30% of injuries are physeal injuries [4]. Over 1.5 million childhood traumas occur yearly in United States [5]. In European region, 23% of death and 19% of disability-adjusted life years occurs due to trauma [6]. Proper knowledge regarding epidemiology, fracture pattern and outcome of fracture is required to reduce burden to community and healthcare [7]. In paediatric age group majority of fractures can be treated non-operatively with good outcomes. This is due to active remodelling potential of children's bone, which speeds up the fracture healing process [8]. Children lack understanding of risk and they are not under direct supervision while playing, which is the main reason of paediatric trauma [9]. Most common long bone fractures in children is forearm fractures, occurring with annual incidence of approximately 1.5 per hundred children per year that comprises 40% of all fractures [10]. Elbow injuries are common injuries in children and among them supracondylar fracture of humerus accounts for 16% of all paediatric fractures [10]. 60% of all paediatric elbow fractures occurs as a result of fall on an out stretched hand [11,12].

In developing countries like ours, health care is suboptimal, predisposing injured children to increased risk of carrying disabilities and other complications into adulthood [7]. The aim of this study is to evaluate demographic characteristics, incidence of fracture, patterns, causes, treatment and outcome of paediatric fractures in western region of Nepal.

Materials and Methods

This is a retrospective study conducted in Rapti Academy of Health Science, Ghorahi, Dang in between November 2018 to July 2020. Three hundred and eighty cases with paediatric trauma were included in our study. Soft tissue injuries, head injuries, blunt trauma abdominal injuries were excluded. Cases presenting to emergency and out-patient department with the age group between first days of life to 16 years of age were included in our study. From the collected data, we analysed demographic data, duration of injury to presentation, fracture characteristics, mechanism of injury, type of treatment and outcome of treatment at 6 months of follow-up. The outcome was evaluated as poor if there was malunion that couldn't be corrected by bone remodelling; acceptable when insufficient reduction was corrected by bone remodeling without resultant functional impairment and good when reduction was anatomical [13]. Ethical clearance was obtained from IRB of

Rapti Academy of Health Science and the data was analysed using SPSS version 22.

Results

Out of 380 cases there were 228 males (60%) and 152 females (40%). Right limb was involved in 210 children (55.26%) and left limb was involved in 170 children (44.74%) (Table 1). Mean age group was 7.5 years ranging from 6 months to 16 years. Fall from height was the common mechanism of injury seen in 120 children (31.57%) followed by RTA in 110 children (28.95%); sports injuries in 106 children (27.89%) and occupational in 44 children (11.59%) (Figure 1).

Variables	Number	Percentage
Gender		
Male	228	60
Female	152	40
Total	380	
Side Affected		
Right	210	55.26
Left	170	44.74
Total	380	

Table 1: Gender and side affected.

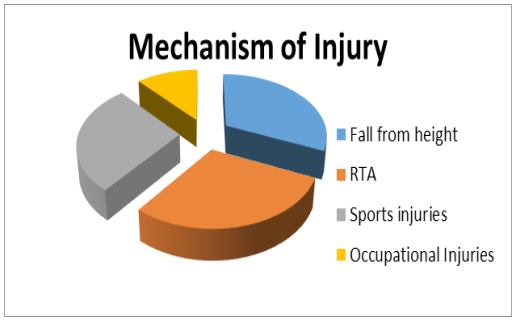


Figure 1: Mechanism of Injury.

Most of the fractures involved the upper limb in 312 patients (82.1%) and lower limb in 68 patients (17.9%) (Table 2). In upper limb, the common fracture was distal radius and ulna fractures that involve 23.72% of upper limb fractures.

Limb/Bone	Number	Percentage
Upper limb		82.1
Clavicle	50	
Proximal humerus	12	
Shaft of humerus	8	
Supracondylar fracture of humerus	57	
Lateral condyle fracture of humerus	20	
Medial epicondyle fracture of humerus	5	
Elbow dislocation	15	
Forearm fractures	35	
Distal Radius and Ulna fractures	74	
Hand Injuries	36	
Total	312	
Lower limb		17.9
Neck of femur	2	
Shaft of femur	30	
Distal femur	3	
Shaft of Tibia	28	
Ankle	5	
Total	68	

Table 2: Fracture distribution based on the limb and bone involved.

Transverse fractures occurs in 34% of cases, spiral fractures occurs in 30% of cases, oblique fractures occurs in 24% of cases and communited fractures occurs in 12% of cases (Figure 2).

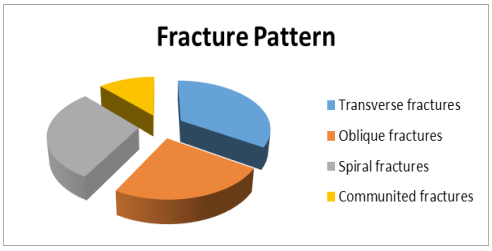
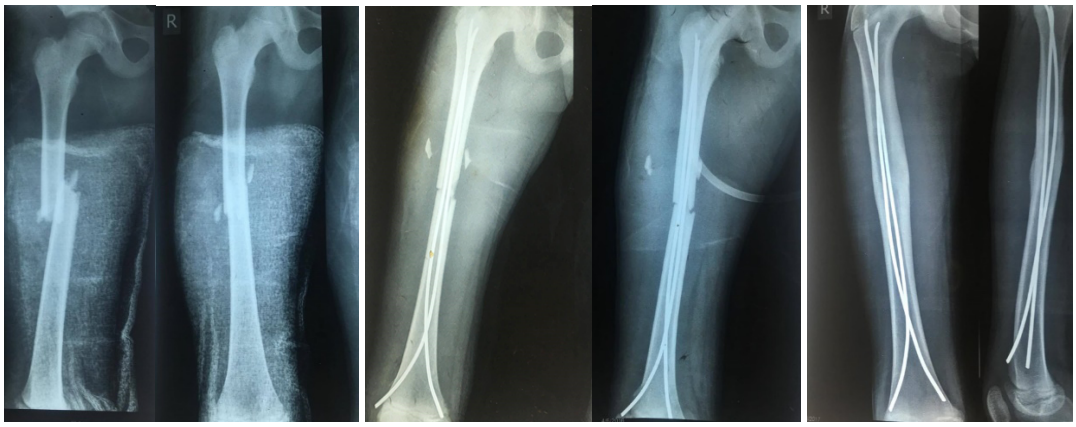


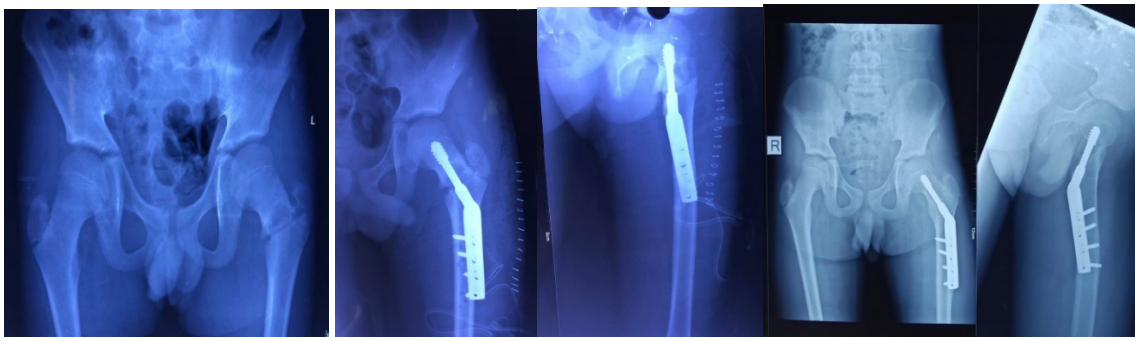
Figure 2: Fracture pattern.

Mean duration of presentation in hospital was 2.47 days ranging from 1 to 45 days. Among all fractures, 64% were managed conservatively and 36% were managed operatively. Outcome was good in 62% of cases, fair in 37.74% of cases and poor in 0.26% of cases (Figures 3,4).



A **B** **C**

Figure 3: Shaft of femur (A) Preop (B) Immediate postop (C) 6 months follow up.



A **B** **C**

Figure 4: Neck of Femur (A) Preop (B) immediate postop (C) 6 months follow up.

Discussion

Children lack understanding of risk and they are not under direct supervision while playing, which is the main reason of paediatric trauma [14,15]. In our study, males were more affected than females which is a similar to study done by Chapp-Jumbo AU et al, Valero et al in Italy and Tandon et al in India with a ratio of 1.2:1 [16-18]. Fall from height was the most common mechanism of injury seen in 31.57% of cases followed by RTA in 28.95%, sports injuries in 27.89% and occupational in 11.59%. Being a low/middle income country and rural area most of the children are involved in agriculture and fall from height and fall from tree are the common mechanism of injury. However, the study done by Elachi et al and Nwadinigwe et al they showed the road traffic crash is the main cause of paediatric injury [19,20]. In our region income resources is very poor and due to poverty, they lack education and many children are bound to work in factories that results in occupational injuries which is seen in 11.59% of children.

Distal radius and ulna fractures occur in 19.48% of cases. This occurs due to its attempts at breaking the falls in such children which is similar to study done by Tolulope o. Ogunrewo, et al. [21]. As the study done by Karki DB et al they illustrated both bone forearm fractures were more common type of injuries and accounts for 34.82% however in their study they didn't categorized distal radius and ulna fracture separately [22]. Transverse fractures occurs in 34% of cases however greenstick fractures and epiphyseal injury are the most common fracture patterns and the study was done by Peter warlock and his colleague [23]. Certain fractures involving the physis and articular surfaces results in significant morbidity but most of the paediatric fractures heal well without

long term complications.

64% of all fractures were managed conservatively. Forearm fractures were managed with closed reduction and cast application. If reduction fails then operative management was carried out. Torus fractures were managed conservatively but displaced distal radius and ulna fractures including physeal injuries were managed with closed reduction and percutaneous pinning. Displaced Type IIB and III supracondylar fracture were managed with closed reduction and percutaneous pinning in 40 cases. In 5 cases closed reduction failed so open reduction were carried out. Non-displaced lateral condyle fracture of humerus were treated conservatively in 3 cases whereas displaced fracture were treated operatively. Similarly, all cases of femoral neck fracture were managed with closed reduction on fracture table followed by paediatric sliding hip screw fixation. Shaft of femur fracture below 5 years were managed conservatively in 4 cases and in age above 5 years were managed with closed reduction and internal fixation with elastic nail. In 2 cases open reduction and internal fixation with DCP were carried out for proximal one third of femur fracture. Most of the tibial shaft fracture with acceptable alignment were managed conservatively in 8 cases whereas failed reduction were managed operatively. Clavicular fracture were managed conservatively in all cases whereas all hand injuries were treated operatively. Proximal humerus and shaft of humerus fractures were managed conservatively.

Even with conservative management the outcome of paediatric fracture was good in majority of cases that suggests the children can remodel fractures as they grow, especially those in the plane of motion of adjacent joint. One cases of supracondylar fracture of humerus presented 40 days after trauma was managed with physiotherapy. Patient developed cubitus varus deformity in subsequent follow-up. No cases of non-union were seen in our series.

Conclusion

Paediatric fractures unite readily with good functional outcome following both conservative and operative management. Provision of safe environment for children with adequate and appropriate supervision will minimize paediatric trauma.

References

1. Oboirien M (2013) Pattern of paediatric trauma in Sokoto, North West Nigeria. Afr J Paediatr Surg 10: 172.
2. Simon R, Gilyoma JM, Dass RM, Mchembe MD, Chalya PL (2013) Paediatric injuries at Bugando Medical Centre in North Western Tanzania: a prospective review of 150 cases. J Trauma Manag Outcomes 7: 10.
3. Katherine K, Anne MW, Harold S, Jeffrey CG (2002) Is a complete trauma series indicated for all paediatric trauma victims? Paediatr Emerg Care 18: 75-77.
4. Egol KA (2015) Pediateric orthopedic surgery: General Principle. 5th edition. Hand Book of Fracture 2015: 509.
5. Guyer B, Freedman MA, Strobino DM, Sondik EJ (2000) Annual summary of vital statistics: trends in health of Americans during the 20th Century. Pediatr 106: 1307-1317.
6. Osinaike B, Amanor-Boadu S (2006) Paediatric trauma admissions in a Nigerian ICU. Internet J Emerg Intensive Care Med 9: 2.
7. Marc Leroy Guifo, Joel NoutakdieTochie, Blondel Nana Oumarou (2017) Pediatric Fractures in sub-Saharan Tertiary care center: A cohort study analysis of demographic characteristic, clinical presentation, therapeutic patterns and outcomes. Pan African Medical Journal 2017: 1-7.
8. Ndoma Ngatchoukpo V, Gaudeuille A, Journeau P (2014) Traitementorthopédiques des fractures déplacés du quart inférieur du radius chez l'enfant. Rev Cames Sante 2: 9-13.
9. Hulme P (2010) Mechanisms of paediatric trauma at a rural hospital in Uganda. Rural Remote Health 10: 1376.
10. Kasser JR, Beaty JH (2001) Supracondylar fractures of the distal humerus. In: Rockwood and Wilkins' Fractures in Children, 5th, Beaty JH, Kasser JR. (Eds), Lippincott Williams & Wilkins, Philadelphia 577.
11. Villarin LA, Belk KE, Freid R (1999) Emergency department evaluation and treatment of elbow and forearm injuries. Emergency Medicine Clinics of North America 17: 843-858.
12. Campbell CC, Waters PM, Emans JB, Kasser JR, Millis MB (1995) Neurovascular injury and displacement in type III supracondylar humerus fractures. Journal of Pediatric Orthopaedics 15: 47-52.
13. Guifo ML, Tochie JN, Sosso MA (2017) Paediatric fracture in sub-saharan tertiary care center: a cohort analysisof demographic characteristics, clinical presentation, theraputuc pattern and outcomes. Pan Afr Med J 27: 46.
14. Adensunkanmi AR, Oginni LM, Oyelami AO (1998) Epidemiology of childhood injury. J Trauma Inj Infect Crit Care 4: 506-511.
15. Gediu E (1994) Accidental injuries among children in Northwestern Ethiopia. East Afr med J 71: 807-810.
16. Chapp-Jumbo AU, Adisa AC (2009) Pattern of trauma among paediatric in- patients-The Abia State University teaching hospital experience. Eur J Sci Res 29: 411-414.
17. Valerio G, Galle F, Mancusi C, Onofrio DV, Colapietro M, et al. (2010) Pattern of fractures across pediatric age groups: analysis of individual and lifestyle factors. BMC Public Health 10: 656.
18. Tandon T, Shaik M, Modi N (2007) Paediatric trauma epidemiology in an urban scenario in India. J Orthop Surg 15: 41-45.
19. Elachi IC, Yongu WT, Kortor JN, Mue DD, Abah RO (2018) Characteristics and Outcome of Paediatric Long Bone Fractures Managed in a University Teaching Hospital. J Biomedical Res Clinic Prac 1: 124-128.
20. Nwadinigwe CU, Ihezie CO, Iyidiobi EC (2006) Fractures in children. Niger J Med 15: 81-84.
21. Tolulope O. Ogunrewo, Olugboyega A. Oyewole, Richard A, et al. (2020) Balogun, Michael O. Okunola. Incidence of pediatric long bone fractures at the university college hospital Ibadan. Int J Res Orthop 6: 655-659.

22. Karki DB, Rokaya PK, Rawal M, Bhandari PB, Limbu D, et al. (2018) Cause, Pattern and Outcome of Fractures Occurring in the Pediatric Population of Rural Tertiary Health Care Center of Nepal. JKAHS 2:5-8.

23. Worlock P, Stower M (1986) Fracture patterns in Nottingham children. J Pediatr Orthop 6: 656-660.