

Paediatric fractures: Epidemiological trends in a tertiary care hospital

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Abstract

Background: Trauma is reported to be an important cause of childhood morbidity and mortality. The aim of this study was to identify the epidemiology of paediatric fractures in a tertiary care hospital setting and formulating preventive strategies to decrease the incidence of such injuries.

Methods: This study included 720 cases of paediatric fractures attending our hospital. All the cases were initially assessed and resuscitated in the emergency ward. Radiograph of affected parts were taken, apart from the trauma series radiographs, to classify fractures based on their anatomical site.

Results: A total of 720 patients were included in the study. There were 504 (70%) male and 216 (30%) female patients. According to age groups 13.33% patients were < 5 years, 29.17% were 5-9 years, 37.5% were 10-14 years and 20% were in age group of 15-19 years. Most of the patients sustained injury due to fall from trees 300 (41.67%) followed by fall from height 180 (25%), fall due to slipping 120 (16.67%), Road traffic accident 96 (13.33%) and bicycling accidents 24 (3.33%). Upper extremity was involved in 52.5% patients; lower extremity

in 41.67% patients, spine fractures in 5.83% patients and 15% patients had associated injuries.

Conclusion: Paediatric fractures are frequently associated with morbidities. The burden of such trauma can be reduced by implementation of safety programmes, public education, mass campaigns and changes in lifestyle. Playgrounds and other recreational facilities should be made available by the government bodies to reduce the incidence of injuries related to fall from heights.

Keywords: Fall, Paediatric Fractures, Tertiary Care, Kashmir, Epidemiology.

Introduction

Trauma is reported to be an important cause of childhood morbidity, and mortality in developed countries while causing an increasing loss of life in developing countries [1]. In the USA, trauma is the leading cause of death in children after the first year of life, accounting for 50% of mortality, with an injury occurring every 4 minutes and death every 6 minutes [2]. Falls are the leading cause of unintentional injury in children and the second leading cause of death from unintentional injury after motor vehicle crashes [3]. The majority of fall-related fatalities among children are associated with falls from heights, most from 3 stories or higher. Falls from 1 or 2 stories are

more frequently nonfatal, but second-story falls may cause serious injuries [4, 5].

Fractures are extremely common in the paediatric age group, representing a major public health problem [6]. Few data are available regarding the epidemiology of fractures in childhood. Most information comes from Scandinavian studies that have reported that the risk of sustaining a fracture from birth to 16 years of age is 42% among boys and 27% among girls [7]. The peak age of occurrence is earlier in girls (11 years) than among boys (14 years) [8].

In developing countries, children generally contributed a higher proportion of the total population. Although one would expect more admissions due to medical conditions like infection and gastroenteritis, trauma related problems are still common due lack of safety awareness and poorly equipped public recreational or sports facilities [9].

There is deficiency of published data regarding paediatric fractures in our state. The aim of this study is to identify the epidemiology of paediatric fractures in our setting. The study results will help in formulating preventive strategies to decrease the incidence of such injuries and establishment of advanced treatment protocols appropriate for age.

Materials and Methods

The present study titled “Paediatric fractures: Epidemiological trends in a tertiary care hospital” was a prospective study which commenced on August 2017 and was terminated on March 2019. Permission was taken from ethical committee for this study. Informed consent was obtained from all the patients and/or their parents or guardians after explaining the details of study in local language.

This study included 720 cases of paediatric fractures attending our hospital. The patients were divided into four age ranges; <5 years, 5-9 years, 10-14 years and 15-19

years respectively. Patients with pathological fractures, chronic diseases and neurological disorders were excluded from this study. Patients with soft tissue injuries without fractures and dislocations were also excluded from study. All the cases were initially assessed and resuscitated in the emergency ward as per Paediatric Advanced Life Support protocol. The affected part/limb was splinted. Radiograph of affected parts including one joint above and below in anteroposterior and lateral projection were taken, apart from the trauma series radiographs, to classify fractures based on their anatomical site. All fractures were tabulated as injuries to upper limbs, lower limbs and spine in each age group.

As per severity of injury and management, patients were divided into three groups. In group A; patients were operated immediately after resuscitation in emergency operation theatre. This group included patients with head injury, chest and abdominal visceral injuries and open fractures. In group B were included cases requiring brace treatment or closed reduction of fractures and discharged within 24 hours of admission. Group C included patients who required internal fixation of fractures, were shifted to ward and operated in elective operative theatres.

The patient’s demographic data, extremity involved, fracture type, mechanism of injury, history of intervention and type of intervention, associated injuries, other clinical and radiological findings were recorded.

Results

A total of 735 paediatric patients presented with fractures during the study period. Of these, 15 patients were excluded from the study as they didn’t meet the inclusion criteria and hence 120 patients were included in the study. There were 504 (70%) male and 216 (30%) female patients. According to age groups 96 (13.33%) patients were < 5 years, 210 (29.17%) were 5-9 years, 270 (37.5%) were 10-14 years and 144 (20%) were in age group of 15-

19 years. The demographic features are shown in Table I. Male children were at a higher risk of fractures than female children.

Most of the patients sustained injury due to fall from trees, especially fruit trees 300 (41.67%) followed by fall from heights other than trees 180 (25%), fall due to slipping 120 (16.67%), Road traffic accident 96 (13.33%) and bicycling accidents 24 (3.33%) Table II. Fall from peach tree 90 (12.5%) represented most common cause of injury among those who fall from trees while fall from windows 42 (5.83%) dominated among the cases who sustained injury due to fall from height.

In males most of the fractures occurred due to fall from trees while in females home represented the most frequent location of trauma.

The total number of injuries sustained by 720 children was 828. Upper extremity was involved in 435 (52.5%) patients, lower extremity in 345 (41.67%) patients, spine fractures in 48 (5.83%) patients and 124 (15%) patients had associated injuries Table III.

In upper extremity supracondylar fracture of humerus 90 (12.5%) was most predominant injury followed by fracture of both bones forearm 60 (8.33%). In lower extremity fracture shaft of femur 78 (10%) predominated followed by distal tibia and ankle injuries 60 (8.33%) Table IV.

Out of 720 fractures 150 (20.83%) were open injuries. Out of these, 54 were Gustilo-Anderson Type I fractures, 42 were Type II, 30 were Type III A, 18 were Type III B and 6 patient had Gustilo-Anderson Type III C fracture respectively.

12 children presented with compartment syndrome of leg and three patients had traumatic amputation at mid- thigh level following road traffic accident.

Associated injuries were seen in 108 (15%) patients. 24 (3.33%) patients had head injury, 6 (0.83%) patient had

maxillofacial injury, 30 (4.17%) had chest trauma, 36 (5%) had abdominal injury and 12 (1.67%) patients had urinary tract injuries.

In upper extremity 156 (21.67%) patients were treated surgically and 222 (30.83%) patients were treated non-surgically. In lower extremity 192 (26.67%) patients required surgical intervention and 108 (15%) patients were treated non-surgically.

Most of the patients belonged to Anantnag 96 (13.33%), Budgam 96 (13.33%) and Baramulla 96 (13.33%) districts of Kashmir division as these regions dominate among fruit growing regions of Jammu and Kashmir Table V.

Discussion

In many developed countries, trauma is a major cause for childhood morbidity and admission to hospitals [10, 11]. To date, most of the information on this subject appearing in the literature is based on studies conducted on a Western population [8, 11, 12]. In developing countries, children generally contributed a higher proportion of the total population [9].

Boys predominated this study and results were comparable to studies done by other authors like Tandom, Simon, and Mervyn [13, 14, 15]. The predominance of boys is presumed to be related to higher level of activity. School going children dominated among all groups which was comparable to study of Valerio et al [6].

Most of the patients sustained injury due to fall from trees, especially fruit trees 41.67% followed by fall from heights other than trees 25%, results were consistent with the studies of Shoaib, Tripathi and Randazzo [3, 16, 17]. However, many studies showed RTA as most common mode of paediatric trauma. The reason may be low traffic load in our streets plus children in our setup prefer orchids for playing because of lack of recreational facilities.

The fracture pattern shows the predominance of upper limb fractures (52.5%), followed by lower limb fractures

(41.67%). Fractures around elbow dominated among upper limb fractures in preschool children and fractures of radius and ulna dominated in school children. Similar fracture patterns have been reported in studies of Tripathi, Tandom and Saw [9, 13, 17].

In upper extremity 21.67% patients were treated surgically and 30.83% patients were treated non-surgically. In lower extremity 26.67% patients required surgical intervention and 15% patients were treated non-surgically. Overall, patients requiring surgical intervention were on slightly higher side than patients managed conservatively but difference was not statistically significant. Studies done by Simon and Shoaib also showed similar patterns [15, 16].

An effective accident prevention programme requires participation of both national and local communities to make changes in lifestyle and environment [18, 19]. In developing countries, campaigns to overcome obstacles such as ignorance, illiteracy, and inadequate resources are needed [13]. Measures to reduce the problem should start at home with higher awareness in injury prevention among the parents. In addition, the government should also play an important role in disseminating injury prevention awareness campaigns [9]. They also should be active in implementing programs to improve the quality and availability of well-designed public recreational and sports facilities [9].

Conclusion

Paediatric fractures are frequently associated with morbidities. The burden of such trauma can be reduced by implementation of safety programmes, public education, mass campaigns and changes in lifestyle. People should be educated regarding the consequences of management of fractures by traditional bone setters. Playgrounds and other recreational facilities should be made available by the government bodies to reduce the incidence of injuries related to fall from heights.

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