

Pediatric Trauma Audit and Outcome of Limb Fractures in Children

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ABSTRACT

Objectives: To audit the pediatric trauma and evaluate the outcome of fracture management and formulate preventive measures to decrease trauma in children.

Material and method: This study was conducted from July 2012 to June 2013. Children with traumatic injuries were admitted to the unit and prospectively studied. Data collection was done in a prescribed proforma.

Results: Total of 940 children with orthopedic trauma received out of which 869 had fractures and 71 had soft tissue injuries. Most of the fractures were close 854 while 15 were open fractures. Upper limb fractures accounted for 73% of the cases. Fractures sustained from falls were 513 (59%) and from road traffic accidents 301 (35%) and sports injuries were 46(5%). Most of the fractures (86% of total cases) were treated conservatively with MUA and pop or traction. A particular problem was identified in the audit; risk of displacement of displaced fractures of the upper limb, which were managed conservatively, was quite high i.e. 17%. On the other hand there was no revision done in those managed with open reduction internal fixation.

Conclusion: Pediatric trauma is associated with high morbidity, preventive measures at community and national level should be taken to educate the parents and children. A more specialized supervision of primary treatment of pediatric trauma is required to decrease the rate of readmission and reoperation.

INTRODUCTION

In the united states one cause of death in children is the injury between the ages 1-14 years, head injury (38%) as the leading cause of all pediatric injuries^{1,2}. Fractures due to trauma are the common adversarial events in their lives. Urban setting is correlated with overpopulation and increased danger to the lives of children. However there have been studies on pediatric fractures in an urban setup of a developing country³⁻⁶. Keeping in mind the above mentioned facts, an audit of pediatric limb fractures at orthopedic and trauma B unit of Khyber teaching hospital, was conducted to evaluate; a) the annual workload arising from pediatric limb fractures, b) mechanism of injury, type of fractures and their management, and c) areas where preventive measures are needed and improvement in management could be devised.

Pediatric trauma has low priority and as such has been given little attention. The aim of this study is to audit the pattern of pediatric trauma, their management and formulation of preventive measures.

MATERIALS AND METHODS

Between July 2012 and 2013 inclusive, 940 trauma patients aged 0 to 15 years presented to the accident and emergency or orthopedic out-patient departments

The exclusion criteria included children with pathological fractures of limbs, skull, spine, pelvis and rib fractures, severe injuries admitted under general surgery and those who were transferred to tertiary centers.

The following variables were assessed for each patient: Age, Sex, Admission date, Admission route, Diagnosis, primary treatment, Mechanism of injury, Operation date and Discharge date.

Management was audited by studying the primary conservative and operative treatment methods employed. The relative success or failure of treatment was evaluated in terms of need for secondary operative treatment, salvage internal fixation and radiological outcome.

RESULTS

During the period of one year from July 2012 to July 2013, 940 children (642 (68.3%) boys and 298 (31.7%) girls) received to the orthopedic "B" unit of Khyber teaching hospital Peshawar with traumatic injuries. In all, 94% presented via the accident and emergency (A&E) department, 4% through

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outpatient department and 2% after direct referral from the general practitioner and 2% transferred from other hospitals and departments. Significant seasonal variation in admission rate was observed over the year, with a peak admission rate in months of summer and a decline in winter (Fig. 1). Variation of admission rate was also observed with the age and sex of the patients (fig 2).

In 940 children with orthopedic trauma 869 had fractures and 71 had soft tissue injuries. Most of the fractures were close 854 while 15 were open fractures. Radius and ulna were the most commonly involved bones 391(45%) out of which distal radius was frequently involved 252(29%) followed by shaft 113(13%) and proximal radius and ulna 26(3%). Others most commonly involved bones were lower end of humerus 191(22%), shaft of humerus 51 (6%), femur 96(11%), tibia 44(5%) and other fractures of the hand, foot, ankle and dislocations accounted for 96(11%) cases (fig.3).

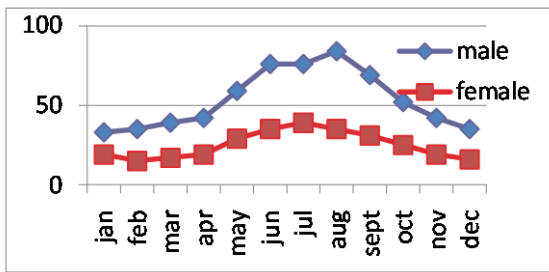


Fig. 1:

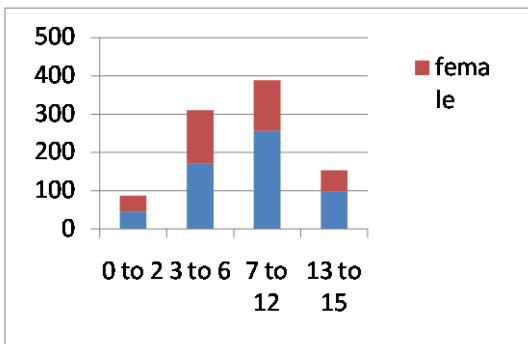


Fig. 2:

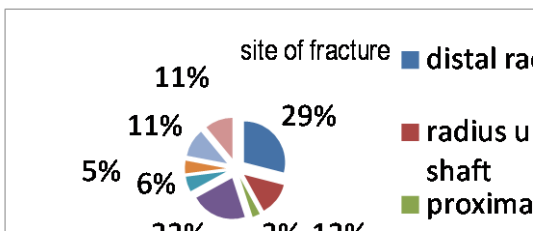


Fig. 3:

Mechanism of injury was diverse, most of the fractures were sustained from falls 513(59%) followed by road traffic accidents 301(35%) and sports injuries 46(5%)(fig.4).

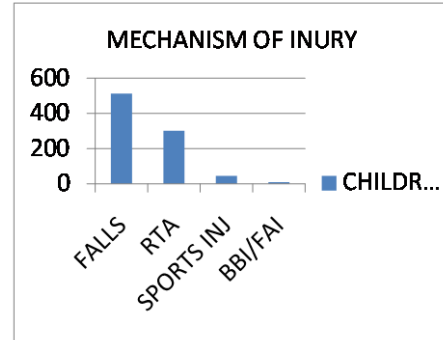


Fig. 4:

In our study the initial orthopedic management was operative in 733(78%) children which usually required general anesthesia. The injuries in 207 children (22%) were managed conservatively with elevation, splintage, traction and plaster casts. There was a zero mortality rate and all 940 children were discharged. 57 children, 6% of total admissions were admitted for management of an open wound or soft tissue injury. These were treated by wound debridement under general anesthesia and primary or delayed closure with or without soft tissue coverage. All the patients were discharged without any complications.

Over the year of study 150 children (17%) were readmitted who required re-manipulation and/or internal fixation after failure of manipulation under anesthesia and cast immobilization. The highest rate of readmission was observed in distal radius fracture followed by distal humerus and radio ulna diaphysial fractures.

Table 1:

Primary Management	No of children	Re-operation %
MUA + POP	549	126 (23%)
Pop Alone	171	15 (9%)
Internal Fixation	123	0
Traction	26	9 (34%)
Total	869	150 (17%)

Internal fixation was done in 196 patients using different operative methods, instrumentation systems and implants. Out of internal fixation procedures 73 (37%) were performed as “salvage” after failure of conservative treatment. All the

readmissions and salvage internal fixations were unplanned and resulted in extra burden on the available resources.

DISCUSSION

Trauma is the commonest cause of morbidity and mortality in a population age less than 19 years⁷. It is really difficult to assess the true incidence of limb fractures in children admitted for definitive management due to problems in data collection from hospital inpatient records. The audit identified a marked seasonal variation in the admission rates, which have important implications in staffing and bed availability. The audit further demonstrates an increase in admission during the summer with a trough in winter, which is also reported in other studies, where a correlation between admission of children with fractures and sunshine hours has been documented⁸⁻¹⁰.

The fracture pattern shows the predominance of upper limb fractures (73%), of which 45% were forearm fractures followed by lower limb fractures accounting for (27%), then fractured femoral shaft (11%), followed by fractured tibia (6%). Similar fracture patterns have been reported in other studies^{8,9}.

High incidence of salvage internal fixation has been the most important problem in our study. In common with recent outcome studies the audit has identified a particular problem in the treatment of displaced fractures of the distal radius and distal humerus, with up to 17% risk of re-displacement after initial conservative treatment^{11,12}. The problems of re-displacement and the need for subsequent readmission and salvage internal fixation should be reduced through the selective use of primary percutaneous K-wire stabilization of the displaced fracture in the older child.

CONCLUSION

The burden of pediatric fractures in Pakistan is frequently associated with morbidities. These are mostly preventable injuries and pediatric trauma prevention programs should be initiated directed at parents and children with changes in lifestyle and campaigns at community and national level are

needed to overcome obstacles such as ignorance, illiteracy and inadequate resources.

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