

Pattern of Fingertip injuries Amongst Patients Admitted at a Paediatric Hospital in Nairobi: A Retrospective Study.

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Background: Fingertip injuries are a common cause of unintentional trauma in children. The main aim of this study was to determine the epidemiology of fingertip injuries amongst children admitted at a paediatric hospital in Nairobi.

Methods: This was a retrospective hospital based multivariate survey conducted on fingertip injury patients aged 0 to 13 years over a five year period 2003 to 2007.

Results: A total of 1033 children were admitted with injuries of which cases with fingertip injuries were studied accounting for 51 cases (4.9%). The age range of the study population was 1 to 13 years. The majority of patients (29.4%) were aged between 1 and 2 years old. Males made up 62.7%. 78.4% of injuries took place at home and all were unintentional or accidental.

The fingers most commonly involved were the little finger (26.5 %), the middle finger (20.4%) and the thumb (16.3%). Majority were soft tissue injuries (74.5%) with a smaller number undergoing some degree of amputation (25.5%). Most patients underwent minor surgery (80.4%), 9.8% major surgery and for 2% no surgery was done.

Conclusion: Finger injuries are a common preventable cause of childhood morbidity. Measures should be instituted to reduce their incidence.

Key words: fingertip, injury, finger trapping, paediatric, children, Nairobi

Introduction

Unintentional injuries are a common cause of morbidity and mortality in children. They can generally be classified as fatal and non fatal with one cause of the latter being crushed finger injuries. Crushed finger injuries occur when fingers are caught between heavy objects which can occur during almost any activity. They result in damage to one or more fingers and frequently referred to as finger-trapping injuries. They range from soft tissue injuries to fractures of the phalanges and amputation. Children tend to be more vulnerable to this type of injuries due to their small size and their adventurous nature.

The morbidity attributed to crushed finger injuries is commonly immediate pain and inability to continue participation in activities with more serious injuries causing deformity and disability. As with most other unintentional injuries, crushed fingers usually don't result in hospital admission. Most of them are treated by the child's parent or care giver or as outpatients in Accident & Emergency departments. More serious injuries however require consultation with orthopaedic or general surgeons.

Patients and Methods

This was a retrospective hospital based multivariate survey covering a period of five years (2003 – 2007). After ethical approval data was extracted from hospital records of all patients aged 0 to 13 years who were admitted as a result of injury and entered into a structured questionnaire. This data was analysed using SPSS version 17 computer software.

It was conducted at a paediatric hospital in Nairobi, Kenya. This hospital is a busy non-profit making private institution managed by a trust. It is located about seven kilometres from the central business district. Children whose final diagnosis was not injury were excluded.

A structured questionnaire was used to collect data. The information within the questionnaire included demographic data, history of injury, drugs given, investigations carried out and the final diagnosis. The outcome of the patient both long term and short term was also included. Multiple variables; means, proportions, odds ratio and p-value were subsequently calculated from the data that satisfied the inclusion criteria. The data was cleaned to include only those aged 0 to less than 14 years and had an injury either intentional or unintentional.

All data was analysed using SPSS® computer software. P value less than (0.05) were taken as statistically significant.

Results

A total of 1033 admissions aged 0-13 years were registered between 2003 and 2007. Of these, fingertip injuries made up 51 of the 1033 (4.9%) admissions. Types of injury: The most common types of injury were soft tissue injuries (21.8%), burns (19.6%), fractures (18.2%) and head injuries (15.4%); others included foreign body, poisoning and crushed finger. Crushed finger injuries accounted for 51 of the 1033 cases (4.9%).

Thirty four (66.7%) of the patients were aged between 1 and 4 years old with ages 1-2 accounting for 15 (29.4%) of the 51 patients. There were no cases of aged under 12 months.

Table 1. Age Distribution Crushed Finger Injury Patients

Age (months)	Frequency	Percent	Cumulative Percent
12-23 months	15	29.4	29.4
24-35 months	9	17.6	47.1
36-47 months	10	19.6	66.7
48-59 months	6	11.8	78.4
60-119 months	7	13.7	92.2
120-167 months	4	7.8	100.0
Total	51	100.0	

Males accounted for the majority ((62.7%).) of cases of crushed finger injuries admitted. The Male to Female ratio was 1.9:1. The place of occurrence of injury was recorded in 45 out of 51 cases. Of these, 40 injuries (88.4%) took place at home and 5 injuries (9.8%) occurred in places other than the home.

All 51 of the crushed finger injuries were recorded as unintentional or accidental. The fingers most commonly involved were the little finger in 13 cases (26.5 %), the middle finger in 10 cases (20.4%) and the thumb in 8 cases (16.3%). The index finger and the fourth finger were injured in 7 cases each, multiple fingers were injured in 3 cases and in 1 case it was recorded that the 6th finger was injured. In

2 cases it was not recorded which finger was involved. The actual cause of the injury was recorded in 46 cases. Doors were the most common cause of injury accounting for 31 cases (67.4%). Less common causes were gates in 5 cases and swings in 2 cases. 89% of the injuries occurred in the home.

First aid offered was recorded to have been administered in only 8 cases. In 1 out of the 8 cases, it was done by the parents, in 3 at a nearby clinic or health centre, in 2, it was done at a hospital elsewhere, and in 2 cases the person who administered the first aid was unknown

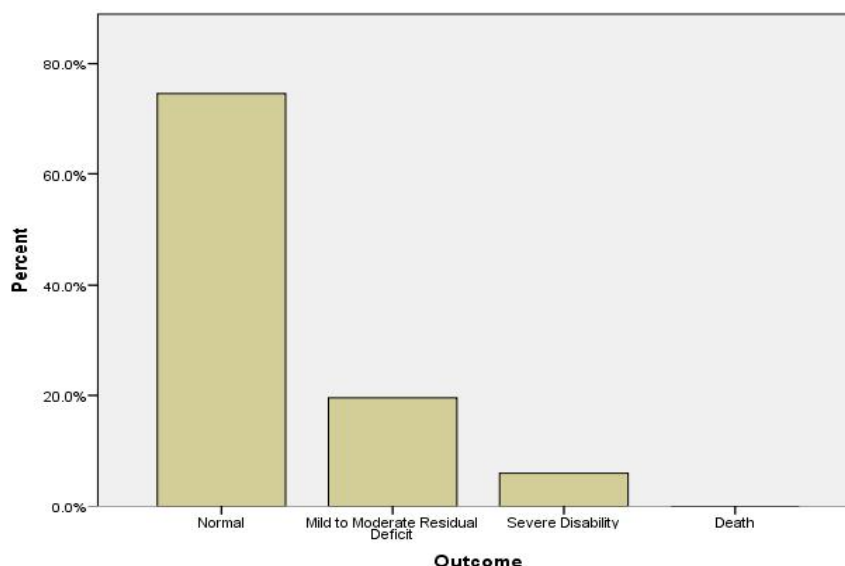
The mode of transport used to hospital was recorded. Twenty four (47.1%) of the patients were transported by private cars. Other modes of transport included taxi for 7 (13.7%) and public transport for 2 cases (3.9%). Mode of transport was unknown in 18 cases (35.3%).

Nature of injury and Surgical Treatment: Thirty eight (74.5%) had soft tissue injuries while 13 (25.5%) suffered from some degree of amputation. Partial amputation and total amputation were done in 5 patients each. In 3 patients, the nature of the traumatic amputation was not recorded.

Forty one (80.4%) of the patients underwent minor surgery 5 (9.8%) underwent major surgery and 1 patient had no surgery. In four cases, it was not known whether or not surgery was done. Of the actual surgical procedures performed, surgical toilet and debridement was done in 20 cases and surgical toilet and debridement and reconstruction were performed in 11 cases. Other surgery performed included reconstruction, terminalisation and repair.

Outcome: Information on outcome was subjective. It was either the opinion of the parent or attending doctor and was not collected by a validated instrument. Almost three quarters (74.5%) of the children had a good outcome with what the parents termed as normal. Interestingly although 24.6% had partial amputation of the digits less than 10% considered their children disabled.

Figure 1. Outcome of Management of Fingertip Injuries



Discussion

Crushed finger injuries were common comprising 51 of the admissions (4.9%) within the study period (2003-2007). This was much larger than the 1.8% of workload in the children's hospital in Glasgow¹ accounted for by finger injuries. The true incidence of these injuries is likely to be higher as they

usually do not result in hospital admission as most minor injuries are treated by the child's care giver or in outpatient departments.

Majority of patients were aged between 1 and 4 years old (66.6%) with ages 1-2 accounting for the majority (29.4%) possibly due to the adventurous nature of toddlers as well as the small size of their fingers which increases the risk of getting entrapped between two objects. It may also be an indicator of the need for increased quantity and quality of child supervision. There were no cases of children less than 12 months old possibly due to their reduced mobility and activity compared to older children. A study done in the USA produced similar results with majority of the cases (41.6%) also involving children below 4 years of age. A study done in Glasgow (1) also was in keeping with this as majority of the children (38%) were less than 5 years of age.

As with other studies^{1,2}, boys were more commonly involved (62.7%) in crushed finger injuries than girls. This is also in keeping with other studies^{3,4} on unintentional childhood trauma. This may be due to the more playful nature of male children compared to their female counterparts. In keeping with the study done in Glasgow¹, majority of injuries occurred in the home. This suggests that home safety is a potential point of intervention for reduction of incidence of crushed finger injuries. In all the cases, the injuries were unintentional which implies that they are avoidable and thus largely preventable as suggested in a study done on finger trapping³.

The fingers most commonly involved were the little finger, the middle finger and the thumb. An Isaac Newton quote states that 'In the absence of any other proof, the thumb alone would convince me of God's existence' ...this is a summary of the importance of the thumb and the great impact of injuries involving this finger. The importance of reducing the incidence of crushed finger injuries is thus reinforced.

First aid was recorded to have been administered in only 8 cases, 5 of which took place in a nearby clinic, health centre or at another hospital. In only 1 out of the 8 cases it was done by the parents. This indicates a need for training of the primary care giver on first aid measures especially since most crushed finger injuries are minor and best managed outside the hospital set up.

Majority was by private car comprising 24 cases (47.1%). The other common modes were taxi for 7 cases (13.7%) and public transport for 2 cases (3.9%). Mode of transport was unknown in 18 cases (35.3%). The main mode of transport to the hospital was via a private car (71.9%) with a very small percentage using an ambulance (3.8%). This is similar to findings in the Kampala study³ where only 4.6% of patients used an ambulance. This is indicative of lack of adequate accident and emergency services within the region and should be looked into as a cause of increased morbidity and mortality due to lack of quality transport.

Doors were the most common cause of injury accounting for 31 cases (67.4%). This in keeping with studies done in Glasgow and in the USA^{1, 2}. Both studies went on to further elaborate on the mechanism of injury particularly the part of the door involved and the nature of interaction with the door respectively^{1,2}. This should be considered in further research done on this topic to enable further comparison with the results of other studies. Possible preventive measures as indicated by a study on finger trapping⁵ include locking of high risk doors, briefing children regularly on the risks of finger trapping and fitting of finger trapping prevention equipment.

Majority of patients (89.8%) underwent some form of surgery. Of the actual surgical procedures performed, surgical toilet and debridement and reconstruction were the most common. These results show that crushed finger injuries amongst admitted patients generally range from moderate to severe and thus prevention is a worthwhile undertaking.

Limitations

The study had a few limitations. There was considered to be an underestimation of the actual number of children injured. This is due to the limitations of the community in seeking health care caused by social-cultural barriers, lack of knowledge, financial and transport barriers. It was considered that if the above limitations were not present the number of patient admitted due to burn injuries would be higher. Due to the fact that the study was retrospective, recall bias and missing records were also considered as barriers.

Conclusion

This study shows that childhood crushed finger injuries are a challenging problem in our setting and an important cause of unintentional paediatric trauma. Children aged four years and below are commonly affected with a male predominance. All of these injuries were unintentional, mostly occurring in the home setting with soft tissue injuries comprising the majority with amputation injuries making up a smaller percentage. Although most of these injuries are relatively minor, those resulting in admission largely require surgical management. Crushed finger injuries are painful and may lead to disability ranging from temporary inability to participate in activities to long term effects on functionality. Issues of cosmesis may also arise, particularly in the cases of amputation, and are likely to have negative psychological effects on the child.

Based on the patterns of crushed finger injuries shown by the results of this study, prevention may take the form of home safety measures. This includes this may take the form of health and safety education to parents and other care givers with the aim of improving safety in the home environment as well as quality of child supervision. First aid administration is a necessary skill for all individuals to have and may reduce morbidity as well as enable appropriate and timely treatment of these patients.

There is a paucity of data on crush injuries. More extensive research on the patterns of these injuries can enable development of targeted preventative measures.

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