

Tertiary Care Referrals for Fractures in Children

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Purpose: *With limited local access to pediatric subspecialty care outside major metropolitan areas, tertiary care hospitals treat many children originally seen at outside facilities for relatively brief but urgent surgical procedures. This referral-based care imposes significant financial and psychological stress on the families.*

Design: *Prospective, survey methodology was used.*

Methods: *Families of children aged 0-18 years admitted to the St. Louis Children's Hospital for surgical repair of fractures were surveyed. The questionnaire was developed by the research team and measured a variety of fields.*

Findings: *The operative procedure in the majority of these children was relatively brief in both groups, often less than one hour. The time of injury to their discharge from our hospital, however, extended to 36 hours. Families missed several days of work. Many children were kept NPO longer than needed.*

Conclusions: *Our preliminary evaluation suggests that a relatively minor unexpected surgery of a child can impose significant financial, organizational, and psychological burden on the family.*

Keywords: *pediatrics, tertiary care referrals, orthopaedics.*

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THERE ARE A VARIETY of injuries in children that require the expertise of a pediatric orthopaedic surgeon and referral to a pediatric hospital for definitive surgical management. For many children who sustain fractures, the time from their initial injury until

their definitive surgical repair is often delayed because of the need for transfer from their local emergency room (ER). Supracondylar fractures are a common pediatric elbow injury that are historically associated with increased morbidity because of the type of fracture, neurovascular complications, and compartment syndrome, all important reasons to consider repair at a pediatric hospital.^{1,2} In conducting preoperative assessments of these children, our impression was that many of the children and families had experienced a relatively prolonged interval between injury and their surgical treatment. Although a variety of studies are available that describe the impact on children and their families of more critical pediatric illnesses and injuries, relatively few studies are available that describe the impact of injuries that require brief operations.^{3,4} In many urban settings, these are frequently accomplished in an outpatient setting without the need for admission to the hospital.

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Conflict of interest: None to report.

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The purpose of this study was to assess the care of children who sustained an extremity fracture and compare those children who required transfer from an outside hospital to children who arrived directly at our ER. Our goal was to determine whether transfer from an outside hospital altered the delivery of care and lengthened the duration of hospitalization. Our longer-term goal was to better understand the impact and to potentially develop strategies that might be implemented to improve the care and hospital experience of children and their families.

Methods and Design

To assess the impact of the injury, we developed a parental survey. Questionnaires are widely used data collection methods. The purpose of the questionnaire was to compare the impact on the child and family of those who were transferred from an outside hospital to those children and families who arrived directly to our ER. The questions used in the survey were divided into questions about the management of the child before their arrival at our hospital and questions about the impact of the hospitalization on the family including work, other children and their ability to be with their hospitalized child. The questionnaire was trialed at our institution; both the validity and reliability of the questionnaire were assessed. The validity of the questions was assessed by asking parents whether there were important questions that were missing on the questionnaire. The reliability of the questionnaire was assessed by determining if the families' answers to the written questions were similar to their answers in an interview setting. The 38-items on the survey included demographic information about the family, questions about the child's care from the time of injury until their arrival at our hospital, and a third set of questions about the care after their arrival at our tertiary care hospital.

The goal of the questionnaire was to determine the time between the child's injury and arrival at our hospital, but also to evaluate patient care after arrival at the hospital, as well as to determine some additional family factors associated with the injury including the amount of time missed from work, the support available to the families, impact on siblings, as well as some of the details of the child's care from arrival to discharge.

After obtaining approval from our institutional review board and informed written parental consent, the families of 51 children admitted with fractures participated in the study. The parents were approached for consent after their admission to the hospital when the operation was scheduled. In addition to the survey, we also reviewed the child's hospital record to determine information related to their stay. The chart review included a variety of times recorded at our hospital including the time of arrival in the ER, time of admission to the hospital, time to operation, duration of operation, as well as time to discharge after operation. The chart review included the child's pain management, the duration of fasting, and any perioperative complications.

Findings

Fifty-one parents of patients aged 0 to 18 years agreed to participate in the study and responded to the survey. The children had a variety of injuries in different age groups. The most common injury requiring transfer was a supracondylar fracture (Table 1).

Fifty-seven percent of the children ($n = 29$) came by private car with the remaining 43% ($n = 22$) arriving by ambulance. The children who were initially evaluated at an outside hospital were for the most part from a greater distance from our hospital; the majority of these families took at least 4 hours to reach the St. Louis Children's Hospital (Figure 1).

Table 1. Fracture Types

	Outside Hospital	Pediatric Hospital
Age, y		
Mean	9.567	9
Standard deviation	4.25	4.74
Type of injury		
Supracondylar, humerus/olecranon, elbow	16	11
Radial/ulnar, forearm, arm	4	4
Femur, tibia/fibula, ankle	10	6
Clavicular	1	0
Finger	0	1

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