

EPIDEMIOLOGICAL STUDY OF CHILDREN DIAPHYSEAL FEMORAL FRACTURES

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ABSTRACT

Objective: To evaluate the personal, fracture, treatment and complication characteristics among patients with pediatric femoral shaft fractures attended at the pediatric orthopedic service of the Joana de Gusmão Children's Hospital. **Methods:** This was a retrospective cross-sectional study on a population consisting of patients with femoral shaft fractures, aged between birth and 14 years and 11 months, who were divided into four age groups. Information was obtained from medical records and was transferred to a survey questionnaire to present personal, fracture, treatment and complication variables. **Results:** The study population consisted of 96 patients. Their mean age was 6.8 years. The cases were predominantly among males, comprising closed fractures on the right side, in the

middle third with a single line. Regarding fracture etiology, traffic accidents predominated overall in the sample. Most of the patients (74 to 77.1%) presented femoral fractures as their only injury. Conservative treatment predominated in the group younger than six years of age, and surgical treatment in the group aged 6 to 14 years and 11 months. The complications observed until bone union were: discrepancy, infection and movement limitation. The mean time taken for consolidation was 9.6 ± 2.4 weeks, varying with age. **Conclusion:** The features of these fractures were similar to those described in the literature and the treatment used showed good results. The Joana de Gusmão Children's Hospital has used the treatment proposed in the literature for pediatric femoral shaft fractures.

Keywords – Femoral Fractures; Child; Retrospective Studies

INTRODUCTION

Pediatric diaphyseal fractures account for 1.4% to 1.7% of all fractures in the pediatric population⁽¹⁾. They are more prevalent among males, with a ratio of 2.6:1. The distribution of the incidence is bimodal: the first peak between two and four years of age and the second during adolescence. There is also a seasonal distribution, with greater incidence during the summer months⁽²⁾.

Regarding etiology, the most frequent causes are traffic accidents and falls from a height⁽³⁾. Among younger children who still cannot walk, 80% of the injuries are caused by mistreatment, decreasing to 30% after they start to walk. During adolescence, around 90% of femoral fractures are caused by accidents with motor vehicles⁽²⁾. Increasing incidence of fractures caused by interpersonal violence has been

observed, most specifically among adolescents, such that occurrences of fractures caused by firearms is increasingly frequent in emergency services⁽³⁾.

The different treatment methods are dictated by the patient's age, characteristics of the trauma, conditions of the fracture and the family's social situation. Over the last decade, there has been a tendency towards surgical stabilization, particularly among children over the age of 10 years, in relation to nonsurgical treatment (traction and plaster-cast immobilization), given that the latter is associated with complications such as loss of reduction and shortening of the affected limb⁽⁴⁻⁶⁾. Surgical treatment (intramedullary nails and plates) has the aim of diminishing the hospital stay and social losses experienced by patients and members of their families, but this method is limited by the morbidity resulting from its complications,

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such as infections and growth plate lesions⁽⁷⁾. External fixation is indicated in cases of exposed fractures, large soft-tissue injuries, multiple trauma (especially in cases that are hemodynamically unstable), extensive comminution and burns⁽²⁾.

The present study had the aim of evaluating the characteristics of pediatric patients with fractures of the femoral diaphysis who were attended at the Pediatric Orthopedics Service of the Joana de Gusmão Children's Hospital, with regard to the following variables: age, sex, side, etiology, exposure, location, associated lesions, fracture line and treatment type.

MATERIAL AND METHODS

This was a retrospective cross-sectional study approved by the Research Ethics Committee of the Joana de Gusmão Children's Hospital.

The study population was composed of patients aged between birth and 14 years and 11 months who presented femoral diaphyseal fractures.

The inclusion criteria for this study were the following: 1) the patients should present femoral diaphyseal fractures in the proximal, middle or distal third; 2) the patient's ages should be between birth and 14 years and 11 months; 3) sufficient data had to be available in the medical files; 4) two years of follow-up was required; and 5) adequate radiographic documentation needed to be available.

The patients were divided into four age groups in accordance with the divisions proposed by Kasser and Beaty⁽²⁾: group I, formed by patients aged between birth and six months; group II, between six months and six years; group III, between six and 12 years; and group IV, between 12 years and 14 years and 11 months.

The information was obtained from the medical files and was transferred to the research questionnaire. The following variables were analyzed: name, medical file number, age, sex, etiology, side, exposure, associated lesions, fracture line, treatment type, complications, time taken to achieve consolidation and clinical-radiographic assessment after consolidation.

The fracture classification was done by applying the AO fracture classification system, thus categorizing the fracture line as simple, wedge or complex⁽⁸⁾.

After two years of clinical-radiographic follow-up, it was considered acceptable for children up to two years of age to present angulation of up to 30° in the frontal plane and 30° in the sagittal plane, with up to 15 mm

of shortening; between two and five years, 15° frontal, 20° sagittal and 20 mm shortening; between six and ten years, 10° frontal, 15° sagittal and 15 mm shortening; and between 11 years and 14 years and 11 months, 5° frontal, 10° sagittal and 10 mm shortening⁽²⁾.

The data obtained were entered into an electronic database. All the variables were distributed in the form of simple frequencies. For the numerical variables (age and time taken to achieve fracture consolidation), the central trend measurements (mean and median) were calculated. Comparisons between the proportions were given by the chi-square test. The significance level for all the analyses was 0.05.

RESULTS

Between January 2004 and December 2009, 139 patients with femoral diaphyseal fractures were treated. Forty-three patients for whom insufficient data were available in the medical files, insufficient follow-up had taken place over the first two years after the fracture event and inadequate radiographic documentation was available were excluded. Thus, the study population was composed of 96 patients (Table 1).

The mean age found was 6.8 years, with a standard deviation of 4.7 years and median of 5.8 years.

Regarding the fracture etiology, traffic accidents predominated overall and in groups II, III and IV. Falls were responsible for the majority of the fractures in group I (Table 2).

In all the age groups, closed fractures predominated. There were 10 cases of open fractures: two in group III and eight in group IV. The open fractures were related to traffic accidents, firearm projectiles and falls from a height.

Fractures in the middle third of the femoral diaphysis predominated overall and in all the age groups. Group I included eight fractures in the middle third and six in the distal third. Group II presented 10 fractures in the proximal third, 20 in the middle third and four in the distal third. In group III, eight fractures were located in the proximal third, 16 in the middle third and two in the distal third; and in group IV, six were located in the proximal third, 12 in the middle third and four in the distal third.

Fractures with a simple line predominated overall and in all the age groups. In group I, all the patients present a simple fracture line. In group II, 30 patients

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