

Neonatal Femoral Fracture: 5 Years of Experience

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Abstract

Background: In the absence of any postnatal trauma, birth fractures are those that are identified within the first week of life. Infant birth-related injuries are generally infrequent and are caused by trauma during delivery, especially when the infant is particularly large or presented breech. **Methods:** This investigation was a retrospective cross-sectional study carried out at Bangladesh Shishu Hospital & Institute, Dhaka, in the department of Burn & Reconstructive Surgery. The study was carried out between June 2015 and July 2020. The study used a 21 neonates as sample basis. **Result:** In this retrospective study, the gestational age of 1 patient was 35 Weeks and followed by two were 36 weeks, 4 were 37 weeks, 6 were 38 weeks, 5 were 39 weeks, and 3 were 40 weeks. 11(52%) were female and 10(48%) were male. Majority 13(62%) patients fracture were right site and 8(38%) were left. 13 newborns, or 61.9% of them, were weighted ≥ 2500 g. Nine infants (42.9%) were delivered vaginally, while 12 (57.1%) underwent Caesarean sections. When the fetus was presented, it was cephalic in seven cases (33.3%) and breech in fourteen (66.7%). Depending on the fracture's location and angulation, the appropriate treatment option was chosen. Femoral shaft fractures were treated in a toe-groin cast, 5(23.8%), while subtrochanteric fractures were treated by strapping 16(76.2%) of the thigh to the abdomen. **Conclusion:** Even though femoral fractures now are uncommon, but after birth they should be watched for, especially in challenging caesarean sections.

Keywords: Neonatal Femoral fracture, Birth injuries.

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INTRODUCTION

In the absence of any postnatal trauma, birth fractures are those that are identified within the first week of life [1]. Infant birth-related injuries are generally infrequent and are caused by trauma during delivery, especially when the infant is particularly large or presented breech [2, 3]. The clavicle, humerus, and femur are the most frequent sites [4, 5]. These fractures have a varied and probably underestimated incidence between 0.1 to 10.5 per 1000 live births [4, 6]. According to results of another study, the incidence is less than 1% of live births [7]. Vaginal breech deliveries are thought to be responsible for 75 percent of all long-bone fractures that occur during childbirth [8]. However, there is disagreement over whether cesarean deliveries help prevent these injuries [9, 6]. According to Hannah *et al.*, multicenter study, scheduled cesarean

sections for breech presentations minimize the risk of long bone fracture from 0.5% to 0.1%, compared to planned vaginal deliveries for breech presentations [10]. Alexander *et al.*, revealed that 0.02% of long bone fractures and 1.1% of fetal injuries discovered after Caesarean sections, respectively, in earlier investigations [11]. A risk factor for neonatal mortality and morbidity is breech presentation, which occurs in 3-4% of births [12]. Femoral fractures result during vaginal breech delivery or from the infant's difficult delivery of the pelvis to the breech position, necessitating a forceful Caesarean extraction [13]. The orthopedic surgeon faces a severe issue when treating femoral shaft fractures in infants. While minimizing displacement and agony, immobilization of the fractured limb should provide access to the newborns' torsos and limbs for essential medical care. This study's

objective was to evaluate neonatal femoral fractures and treat them using various methods.

MATERIALS AND METHOD

This investigation was a retrospective cross-sectional study carried out at Bangladesh Shishu Hospital & Institute, Dhaka. The study was carried out between June 2015 and July 2020. The study used a 21 neonates admitted in the different words in the hospital. The demographic information that was gathered included details on gender, birth weight, gestational age, presentation and style of delivery, location of the fracture, additional injuries sustained, concurrent medical condition, and the type of treatment received. With the hips extended to 90 degrees on both legs, Bryant skin traction was used to treat all fractures. The standard nursery cots were used to house the infants. Instead of a unique bed frame, pulleys were attached to infusion stands, and weights were 100 ml bags of ordinary saline. The nursing staff received training on the symptoms of vascular compromise, and a pediatric orthopedic surgeon checked the infants every day for any indication of vascular compromise or skin peeling. All of the infants with femoral fractures were maintained in the hospital until the fracture became stable. No additional splinting or immobilization was

required following release from traction. All of the babies underwent physical examinations, radiography, and evaluation for deformity and function. The health condition of the infants was explained to the parents.

RESULT

In this retrospective study, the gestational age of 1 patient was 35 weeks and followed by two were 36 weeks, 4 were 37 weeks, 6 were 38 weeks, 5 were 39 weeks, and 3 were 40 weeks [Figure 1]. 11(52%) were female and 10(48%) were male [Figure 2]. Majority 13(62%) femoral fracture were right site and 8(38%) were left [Figure 3]. 13 newborns, or 61.9% of them, were weighted ≥ 2500 g. Nine infants (42.9%) were delivered vaginally, while 12 (57.1%) underwent Caesarean sections. When the fetus was presented, it was cephalic in seven cases (33.3%) and breech in fourteen (66.7%). Depending on the fracture's location and angulation, the appropriate treatment option was chosen. Femoral shaft fractures were treated in a toe-groin cast, 5(23.8%), while subtrochanteric fractures were treated by strapping 16(76.2%) of the thigh to the abdomen. One newborn's fractured humerus was treated with limb-body strapping (keeping the arm by the side of the body with a strap) [Table I].

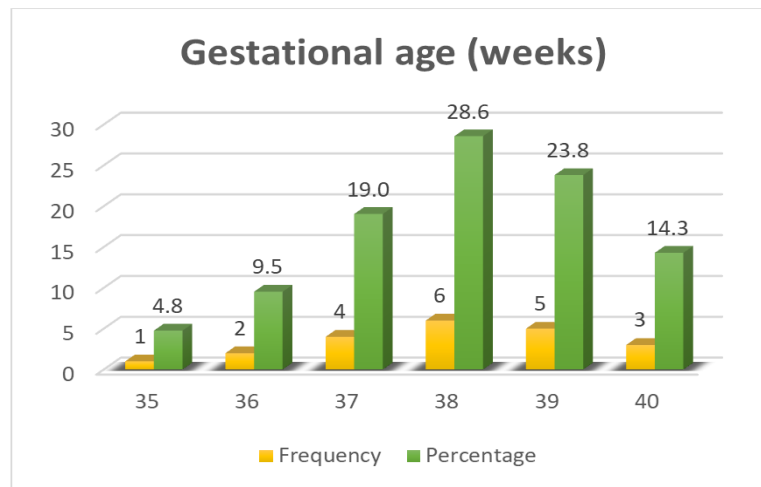


Figure 1: Gestational age of the study patients

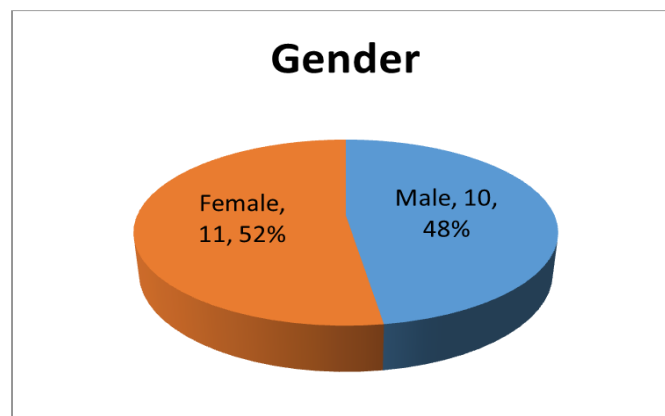


Figure 2: Gender distribution of the study patients

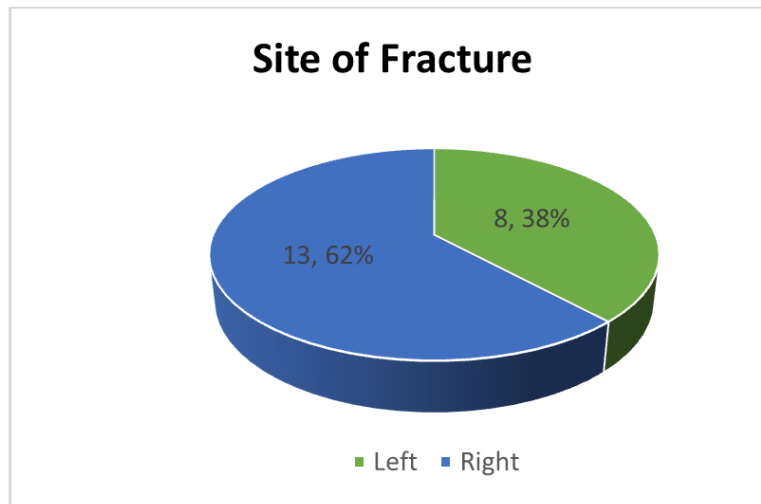


Figure 3: Site of fracture among the study patients

Table I: Clinical Characteristics among the study patients

Birth weight (g)	Frequency	Percentage
<2500 g	8	38.1
≥ 2500 g	13	61.9
Mode of delivery		
Vaginal	9	42.9
Caesarean	12	57.1
Presentation		
Cephalic	7	33.3
Breech	14	66.7
Time to diagnosis (days)		
1	9	42.9
2	6	28.6
3	3	14.3
4	2	9.5
5	1	4.8
Treatment		
Cast	16	76.2
Strapping	5	23.8

DISCUSSION

Significant mechanical pressures can cause fractures at any stage throughout the birthing process. The clavicle fracture is the most typical fracture that is seen. Femur fractures in neonates are infrequent and have been linked to challenging births. Following a challenging breech birth, the first instance of femoral shaft fracture in a neonate was documented in 1922 [14]. Since then, a lot of material has been written about the potential causes, risk factors, and treatment of this injury. With vaginal birth, the mechanisms of femur damage have been clearly documented. It could occur in the event of a macrosomic kid, low birth weight, malpresentation, or a difficult or hurried delivery [6]. It is believed that a caesarean section lowers the chance of fractures. Numerous studies in the literature have formally addressed this issue [9]. The frequency of infant injuries after Caesarean sections may increase as a result of the common usage of low segment vertical incision to decrease maternal morbidity combined with

challenging criteria such breech presentation or obstructed labor [9]. This is equally clear from the evidence in our study, where 57.1% of Caesarean sections occurred, with breech presentation being the most common. Osteogenesis imperfecta, disuse osteoporosis following protracted immobility, and osteopaenia of infancy are additional risk factors connected to this injury [6]. The best course of therapy was determined by the angulation and location of the fracture. Five (23.8%) femoral shaft fractures were treated with a toe-groin cast; sixteen (16.2%) subtrochanteric fractures were treated with limb-body strapping; and one baby with a broken humerus was treated with limb-body strapping (keeping the arm by the side of the body with a strap). However, due to the small sample size, we were unable to examine the impact of maternal comorbid conditions on the risk of fracture. The existing evidence does not evaluate how gender affects fracture risk. The majority of the neonates ($n = 7$) in the analysis of 11 cases by Givon *et al.*, [15] were female. We also had more girl ($n = 11$)

than boy (n = 9), though. 13 infants, or 61.9% of them, were under 2500 g in weight. In our series, the majority of the fractures were of the same kind. When the breech position is fixed at the pelvis during vaginal delivery, significant traction on the leg may result in femoral shaft fracture. Although a caesarean delivery was first thought to reduce this pattern of harm [16], numerous reports to the contrary have revealed a reversal occurrence [6, 9]. The reduced room for maneuverability of obstetric treatments in these patients [17] may be one factor. Insufficient delivery procedures, a tiny incision, and poor relaxation are possible additional factors. In this investigation, many therapy techniques were employed. These are based on the tight immobilization of the femoral shaft as its fundamental basis. If the proximal piece of the femur sustains a subtrochanteric fracture, it is flexed, abducted, and externally rotated. In our situation, simple thigh strapping to the trunk achieves reduction by bringing the distal and proximal fragments into line, much like a Pavlik harness. Strapping thus offers the benefits of being inexpensive, simple to use, adjustable, and simple to reduce. In most cases, little angulation of the femur shaft results in fractures, which are treated with a toe-groin cast until the fracture becomes adhesive. This clearly shows how these fractures have a fair prognosis and do not cause long-term disability. There are certain limitations to our investigation. The majority of our instances weren't identified until the neonatologists gave us a consult based on their suspicions, which raised the chance of missing an occult fracture. In the event of a challenging birth, a thorough screening protocol by the neonatologist would be very beneficial. Our patient sample size wasn't representative of the general community because our hospital is a tertiary institution with a selective admissions policy. Our results might not be applicable to all patients due to the small patient sample size.

CONCLUSION

Even though femoral fractures are now uncommon, but after birth they should be watched for, especially in challenging caesarean sections. In the incident of an unstable presentation, a thorough clinical examination and appropriate pediatric orthopedic consultation would be beneficial. These fractures have a relatively favorable prognosis and completely heal when immobilized.

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