

PATTERN OF BIRTH TRAUMA IN NEWBORN PRESENTING TO NEONATOLOGY UNIT OF A TERTIARY CARE HOSPITAL AT PESHAWAR

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ABSTRACT

Objective: To find-out the pattern and frequency of birth trauma in newborn presenting to neonatology unit, of tertiary care hospital at Peshawar.

Material and Methods: This hospital based descriptive study was conducted in Neonatology Unit, of MTI/LRH, Peshawar. All the neonates presented with birth trauma during the study period were included in the study.

Results: Out of 100 neonates, 51% males and 49% were females. Majority 83% neonates were in the weight range of 3.1-4.00 Kg. Maximum 60% neonates were delivered in hospital and normal vaginal delivery noted in 80% cases. Among birth trauma; Cephalhematoma was recorded in 25%, skin injuries in 23%, Caput succedaneum in 17%, bony fracture 13%, brachial plexus injury in 07% cases. Bony fracture and skin injury noted in 05%, cephalhematoma and bony fracture in 03%, cephalhaematoma and brachial plexus injury in 02%, cephalhaematoma and skin injury, cephalhaematoma and any other, caput succedaneum and bony fracture, caput succedaneum and skin injury, brachial plexus and skin injury were found in 01% case respectively

Conclusion: Cephalhematoma was the most common birth trauma recorded in 25% of cases. The mode of delivery i.e. normal vaginal delivery, instrumental delivery and cesarean section delivery, weight; place of delivery did not showed any strong association with birth traumas. Birth injuries were found in varying frequencies in this study.

Key Words: Birth trauma; injuries; newborn-neonates; mode of delivery.

INTRODUCTION

The term trauma of birth was first used in 1924 by Otto Rank and is defined as actual or threatened injury to the mother or baby by Beck and Watson.^{1,2} In other words birth injury is the structural destruction or functional deterioration of the neonate's body due to a traumatic event at birth. Some of these injuries are avoidable when appropriate care is available and others are part of the delivery process that can occur even when clinicians practice extreme caution.³

In the USA, birth injuries occur in about 20-30 per 1000 births.⁴ In Africa, statistics on birth injuries are not easy to come by; however, studies carried out in some regions revealed frequencies of 0.68% and 0.26% respectively and a survey on rural Egyptian birth attendants in different regions revealed the prevalence of birth injuries to vary from 7% to 17%.^{5,6} In a study from Cameroon, 14,284 newborns were received and 263

had birth injuries, having a hospital frequency of 1.84%.⁶ From Australia it is reported that up to 45.5% of women per year experience childbirth as traumatic.^{7,8} According to a WHO report, in Uganda, birth trauma (28.6%) was among the main causes of neonatal deaths in 2015.⁹

Birth trauma occurs in 2 to 7% of all deliveries, and that it is usually associated with an increase in both, mortality and morbidity.¹⁰ It is also reported from a center that about 80% of newborns suffer from birth traumas.¹¹ Results of another study showed that the rate of all birth trauma was 25.85 per 1000 births.¹²

There are known risks to mother and fetus during both vaginal and cesarean deliveries.¹² These risk factors includes; forcep delivery, vacuum extraction, breech presentation, macrosomia, Abnormal presentation (face, brow, transverse, compound), prematurity, Precipitous delivery and Forceps/vacuum/forceps vacuum.^{3,7,13} The majority of birth injuries are minor and often not reported; but birth injuries may be so severe as to be fatal or leave the child with a permanent disability.⁶ Difficulty can arise when the presentation is delayed given that some birth injuries may not be identified immediately on the initial neonatal clinical examination.¹⁴

Due to the significance of birth trauma in neonates, its associated complications in Pakistan, the present hospital based study was undertaken to know

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the pattern and frequencies of birth trauma in neonates admitted/presenting to Neonatal department, Medical Teaching Institute, Lady Reading Hospital, Peshawar.

MATERIAL AND METHODS

This Hospital based descriptive study was conducted in Pediatrics Department of Medical Teaching Institute, Lady Reading Hospital, Peshawar for one year from January 2016 to December 2016. A total of 100 neonates having birth trauma, were included in the study as per following inclusion/exclusion criteria:

Inclusion criteria:

1. Neonates with clinical signs and symptoms of having birth trauma.
2. Neonates having gestational age of 30-40 weeks.
3. Neonates of both sexes.

Exclusion criteria:

1. Neonates having other types of traumas other than birth.
2. Neonates of less than 30 weeks of gestational age.
3. Neonates in which place and mode of delivery was not known.

DATA COLLECTION PROCEDURE

All neonates with history of birth trauma brought to OPD or brought from Gyne Units or from any place to neonatal Unit of the hospital. After admission, an informed consent was taken from the parent for detailed history of birth trauma, physical examination and relevant investigations were done. All these neonates were observed during their stay in hospital for any further complications.

All the studied variables including demographic features, place and mode of delivery, birth trauma were analyzed for descriptive statistics. For gestational age, weight of neonates, mean, \pm standard deviation was calculated. Male to female ratio was calculated for gender-wise distribution. The results were expressed/presented through frequency tables. All the study data was analyzed by using computer program SPSS version 21 for windows.

RESULTS

In this study a total of 100 neonates having birth trauma were admitted to Neonatal unit. Out of 100 neonates, 51 (51%) were male and 49 (49%) were females with male to female ratio of 01.04: 1. A majority, 87 (87%) babies were in the period of gestation of 36-40 weeks and 13 (13%) were in the period of gestation from 30-35 weeks with mean of 36.80+1.5634 weeks of period of gestation.

Maximum of the neonates 83 (83%) were in the weight range of 01-3.00 Kg, 17 (17%) were in the weight range of 3.1-4.00 Kg (Table 1). Most of neonates 60 (60%) were delivered in hospital, 31 (31%) were delivered in private clinics and 9 (9%) were born in their homes. The mode of delivery of neonates with birth trauma was normal vaginal delivery in 80 (80%) cases, instrumental delivery (mostly forceps) in 12 (12%) of the cases, and cesarean section delivery was noted in 8 (8%) cases (Table 2).

Among the birth injuries, cephalhematoma was the commonest birth injury with the frequency of 25 (25%), followed by skin injuries representing 23 (23%). Caput succedaneum 17 (17%), bony fracture 13 (13%), brachial plexus injury 07 (07%) were found in various cases. Among multiple injuries, bony fracture and skin injury was noted in 05 (05%) cases, cephalohematoma and bony fracture was recorded in 03 (03%) cases, cephalo-haematoma and brachial plexus injury in 02 (02%) cases, cephalo-haematoma and skin injury, cephalo-haematoma and any other, caput succedaneum and bony fracture, caput succedaneum and skin injury, brachial plexus and skin injury were found in 01 (01%) case respectively (Table 3).

Table 1: Various features of neonates (n=100)

Features	No. of patients	Percentage	Ratio
Gender distribution:			1.04:1
Male	51	51%	
Female	49	49%	
Period of gestation:			Mean \pm S.D. 36.80+1.5634
30-35 weeks	87	87%	
36-40 weeks	13	13%	
Weight ranges (K.g.):			2.8420 \pm 0.2843
01.00-03.00 Kg	83	83%	
03.1-04.00 Kg	17	17%	

Table 2: Place and mode of delivery (n=100)

Features	No. of patients	Percentage
Place of delivery:		
Hospital	60	60%
Private clinic	31	31%
Home	09	09%
Mode of delivery:		
Normal vaginal delivery (NVD)	80	80%
Instrumental (mostly forceps)	12	12%
Cesarean section	08	08%

Table 3: Birth Trauma in neonates (n=100)

Birth Trauma	No. of patients	Percentage
Cephalo-hematoma	25	25%
Skin injuries	23	23%
Caput succedaneum	17	17%
Bony fracture	13	13%
Brachial plexus injury	07	07%
Bony fracture and skin injury	05	05%
Cephalo-hematoma and bony fracture	03	03%
Cephalo-hematoma and brachial plexus injury	02	04%
Cephalo-hematoma and skin injury	01	01%
Cephalo-hematoma and any other	01	01%
Caput succedaneum and bony fracture	01	01%
Caput succedaneum and skin injury	01	01%
Brachial plexus and skin injury	01	01%

DISCUSSION

The frequency of birth trauma has been decreased with the passage of time due to improved obstetric care and early perinatal diagnosis.¹⁵ The incidence of birth trauma varies based on type of delivery, fetal presentation, and types of injury and is reported to be between 0.2 and 41.2 per 1000 birth.¹⁶⁻¹⁹ It seems that the rate of neonatal trauma will never be zero because birth injury will occur in the optimal condition, best obstetrical care and diagnosis, and even in the absence of any risk factors.²⁰

Birth related fractures are avoidable or unavoidable injuries which occur during the process of labor and delivery. The prevalence of these fractures is related to many factors including maternal, fetal and skills of the obstetrician. It has been reported between 2 to 7 per 1000 live birth.^{21,22} Birth related trauma was reported to be mostly due to difficult vaginal delivery especially with the shoulder in the vertex presentation and extended arms in a breech delivery, shoulder dystocia, and use of forceps instruments. However, such fractures may also occur when a baby is of average weight and the delivery is not complicated.^{23,24}

Results of a local study reported that a total of 10722 live birth newborn took place in two centers. There was 7822 newborn with vaginal and 2899 others by caesarian section. Twenty one newborns were diagnosed to have a BF and all were the results of vaginal delivery giving an incidence of 0.196% or 1.96 per 1000 live births. There were 15 (71.4%) males and 6 (28.6%) females.²⁵ Similarly in our study there were 51% males and 49% females with a male to female ratio of 01:04:1.

Macrosomia has been a well-known risk factor for traumatic birth injury. The degree of risk changes with the degree of macrosomia. If the birth weight is 4,000 to 4,500 g, the risk of birth injuries increases two fold. If the weight is 4,500 to 4,900 g, the risk increases threefold, and if the weight is more than 5,000 g, the risk increases more than 4.5-fold. Poorly controlled maternal diabetes is one of the major causes of macrosomia.^{3,26} In few studies the main risk factors were fetal weight at birth, instrumental delivery, fetal presentation, parity and maternal age.^{27,28}

In a local study most of the infants with brachial plexus injury weighed more than 3,000 g, but the number of macrosomic babies in the overall study population was 4.2%, and none of these had brachial plexus palsy (BPP), which implies a decrease in the number of macrosomic babies in our population.²⁹

The other local study reported that average birth weight of the newborns without fracture was 3735 (SD=485), and for newborns with bone fracture, brachial plexus palsy was 3850 grams (SD=425) of the clavicular fractures.²⁵ The results of our study showed that mean weight of neonates having birth trauma was 2.8420 ± 0.2843 Kg.

Mode of delivery seemed to have no bearing on risk of injury, with 16 cases being normal vaginal delivery (VD), one case being Cesarean section (CS) and the other three cases being instrumental (vacuum) delivery (ID). Thus, the majority of the clavicle fractures occurred with normal VDs, which makes this injury difficult to predict.³⁰ A higher number of previous deliveries to the mother appear to decrease the probability of a newborn having upper limb trauma at birth.³¹ Rate of birth trauma is about 2% in normal vaginal delivery (NVD) with cephalic presentation and 1.1% in cesarean section (C/S).^{20,32}

A local study reported that although 40.4% of all newborns were delivered by CS, two cases of brachial plexus palsy (BPP) still occurred with this mode of delivery. Hence, despite the large number of CS, birth trauma to the upper limb still occurred.²⁹

Rates of severe birth trauma were similarly higher in attempted forceps (1.0%) and attempted vacuum deliveries (1.0%) compared with caesarean delivery (0.3%). Sequential midcavity instrument use was associated with the highest rates of severe birth trauma and any birth trauma (11.6% versus 1.2% in caesarean

deliveries). Attempted midcavity forceps and vacuum were also associated with significantly higher rates of respiratory distress and all birth trauma.³³ In our study Normal vaginal delivery (NVD), Instrumental (mostly forceps) and cesarean section were 80%, 12% and 08% respectively. In these mode of delivery almost all kind of birth trauma were occurred with varying frequencies, which are also according to literature reported worldwide.

Some studies^{19,27,34} have shown lower risk of birth trauma for C/S delivery. Identification of birth injuries and related factors is necessary to implementing treatment procedures and determine prognosis as well as their diagnosis and use of appropriate methods of obstetric cares and timely C/S, which can prevent and reduce the prevalence of these injuries.

Instrumental deliveries such as forceps and vacuum extraction are also major risk factors for birth injuries. Forceps use is associated with a fourfold increase in the chance of birth injuries and vacuum extraction with a threefold increase compared to unassisted vaginal deliveries. Demisse et al³⁵ stated that the risk for cephalohematoma increases with the use of instruments; it is 4 to 5 times higher with the use of forceps, 8 to 9 times higher with the use of vacuum, and 11 to 12 times higher with use of forceps and vacuum in combination compared to unassisted deliveries. Lyons et al³⁶ stated that the rate of birth injuries for infants with breech presentation born by cesarean delivery without a trial of labor is 6 per 1,000 live births, by cesarean delivery with labor is 10 per 1,000 live births, and by vaginal delivery is 30 per 1,000 live births. Vaginal delivery is a substantial risk factor for specific, as well as all cause, birth injury. In a study the three cases of humerus fractures were from normal VDs, and all with cephalic presentation. One infant was macrosomic, whereas the other two were within the birth weight range 3,500-4,000 g. All three were full term.²⁹

There are more risk factors for birth injuries, such as gestational age at delivery, preterm rupture of membranes (PROM), academic degree of birth attendance, induction of labor, neonatal weight, height, and head circumference, prolonged labor, breech delivery, maternal pelvic abnormalities, parity, and maternal age etc.^{19,27,34,37-39}

Birth injuries include soft tissue injuries (bruises, petechiae, subcutaneous fat necrosis, ulceration, and perforation), cephalohematoma, caput succedaneums, spontaneous intracranial hemorrhage, spinal cord injury, brachial plexus injury (Erb's palsy and Klumpke's paralysis), facial nerve palsy, musculoskeletal injury (clavicular fracture and torticollis), and hypoxic-ischemic injury.³¹ In most studies^{19,27,39} cephalohematoma and clavicular fracture were the most frequent birth injuries. In our study cephalo-hematoma was the commonest birth injury with the frequency of 25% cases. Among multiple injuries, cephalo-hematoma and bony fracture

was recorded in 03% cases, cephalo-haematoma and brachial plexus injury in 02% cases, cephalo-haematoma and skin injury, cephalo-haematoma and any other was recorded in 01% case respectively.

Some other injuries includes facial nerve injuries, depressed skull fracture, subgaleal hemorrhage, Cephalohematoma, intracranial hemorrhage, shoulder dystocia, retinal hemorrhages, brachial plexus palsy, gluteal lacerations, long bone fractures, clavicle and rib fractures, caput succedaneum, excessive bruising, lacerations, bruising.³ Ocular injuries associated to birth trauma have been documented in the literature due to assisted vaginal delivery.⁴⁰

Results of a study²⁹ showed that of the injured newborns, 20(74%) patients had clavicle fracture, 3(11.1%) each had brachial plexus injuries and fractures to the humerus, and 1(3.7%) had olecranon fracture, translating into an incidence of 3.97, 0.6 and 0.2 per 1,000 live births respectively. In 16(80%) clavicle fractures and 1(33.3%) humerus fractures, the injury was not diagnosed at the time of delivery.

Similarly in our study results showed that skin injuries were found in 23%. Caput succedaneum in 17%, bony fractures in 13%, brachial plexus injury in 07% cases. Among multiple injuries, bony fracture and skin injury was noted in 05% cases, caput succedaneum and bony fracture, caput succedaneum and skin injury, brachial plexus and skin injury were found in 01% case respectively.

CONCLUSION

According to our results, it is concluded that:

Majority of the birth injuries are preventable in a skilled and competent obstetric care. Birth injury occurred more frequently than previously reported in the literature. The mode of delivery of neonates with birth trauma, like normal vaginal delivery, instrumental delivery and cesarean section delivery did not show any strong association with birth traumas.

Birth injuries, like cephalo-hematoma, skin injuries, caput succedaneum, bony fracture, brachial plexus, bony fracture and skin injury, cephalohematoma and bony fracture, cephalhaematoma and brachial plexus, cephalhaematoma and skin injury, cephalhaematoma and any other, caput succedaneum and bony fracture, caput succedaneum and skin injury, brachial plexus and skin injury were found in descending order of frequency.

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