

STUDY OF INCIDENCE, RISK FACTORS AND TYPES AND OUTCOME OF BIRTH INJURIES IN A TERTIARY CARE HOSPITAL

R Shanthi¹, K.M. Senthil Kumar²

¹Assistant Professor, Department of Pediatrics, Govt Stanley Medical College, Chennai, Tamilnadu, India

²Associate Professor, Department of Pediatrics, Govt Stanley Medical College, Chennai, Tamilnadu, India

Received : 18/08/2022
Received in revised form : 27/09/2022
Accepted : 08/10/2022

Keywords:
Birth injuries,
Erb's palsy,
Cephalhematoma, Fractures.

Corresponding Author:
Dr. K.M.Senthil Kumar,
Email: dr.senthilkm@gmail.com
ORCID: 0000-0003-1830-5817

DOI: 10.47009/jamp.2022.4.5.117

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2022; 4 (5); 570-573



Abstract

Background: Birth injuries are defined as an impairment of the infant's body structure or part due to adverse influences that occurred during birth, which can be avoidable or inevitable. Hence, we are studying the incidence, risk factors, types, and outcomes of birth injuries in a tertiary care hospital. **Materials and Methods:** In this retrospective study, all neonates born in our hospital from June 2019 to June 2020 were included. The study group consists of 12221 live births at our centre. Data was collected for all the birth traumas, and the types of injuries were documented. Neonates were examined by the paediatricians and other concerned speciality consultants. In the case of fractures, radiography of the affected parts was taken, and relevant speciality consultation and proper management were carried out. **Result:** In parity, primiparity constitutes the majority of injuries with 27 (67.5%), whereas multiparity constitutes 13 (32.5%). There is a preponderance of vertex at around 65%, breech at 30%, and others like transverse lie at only 5%. The types of injury reported were Erb's palsy (30%), skin injuries like abrasions and lacerations (22.5%), and cephalohematoma (17.5%). The clavicle represented 10%, soft tissue injuries of 7.5%, and the femur and subgaleal hematoma were the reported fractures, constituting 2.5%. **Conclusion:** Regular antenatal checkups at health facilities, early identification and management of risk factors anticipated for a difficult delivery, The key factors in reducing birth trauma are the stoppage and avoidance of instrumental deliveries and traumatizing manoeuvres, early intervention; and the decision of LSCS whenever indicated.

INTRODUCTION

Birth injury is harm caused to a newborn during the birth process, most commonly during passage through the birth canal. Injury was suggested to be mostly due to difficult vaginal delivery, especially shoulder dystocia, extended arms in breech delivery, macrosomia & instrumentation like forceps during delivery. The average incidence of birth injury, in general, is 6 to 8 /1000 live births in world data.^[1] The birth injuries in neonates range from minor skin and soft injuries to long bone fractures, bleeds like cephalohematoma, subgaleal hematoma, intracranial hemorrhage, and nerve injuries. The present study focused on the incidence, risk factors, and outcome of birth injuries.^[2] The significance of birth injuries was analyzed through various articles regarding morbidity and mortality patterns throughout the world. In 1993, Perlow et al. revealed about 3.7 per 1000 live births.^[3] Rashmi et al. conducted a study earlier

in the 1990s that found 6.8/1000 live births.^[4] This clearly shows the decline in birth injuries due to the advancement of obstetrics in intervention and management, especially due to increased caesarean deliveries. Uhing et al. studied the birth traumas of around 0.6/1000 live births in the USA in 2010.^[5] The rate of birth trauma is around 2 to 3% in normal vaginal deliveries and 1 to 2% in caesarean deliveries. This showed clearly the decline of birth injuries in C-section deliveries.^[6] The birth injuries include small bruises, abrasions, laceration, petechiae, cephalohematoma, caput, intraventricular hemorrhage, and nerve injuries like Erb's palsy, Klumpke's palsy, facial nerve injury, recurrent laryngeal nerve palsy, fractures of bones, especially clavicle, humerus, and femur, mostly in breech extraction. Soft tissue injuries such as liver and spleen damage, as well as adrenal hemorrhage, are common in hie.^[7] Cephalohematoma and Erb's palsy; most studies favour a lower incidence in caesarean deliveries. To reduce the prevalence of

birth injuries, it is critical to identify birth injuries and implement early management. it will reduce the physical and neurodevelopmental handicaps in society.^[8,9]

Hence, the present study aimed to study the incidence, risk factors, types, and outcome of birth injuries in a tertiary care hospital, SNCU RSRM hospital, government Stanley medical college over one year from June 2020 to June 2021.

MATERIALS AND METHODS

It is a retrospective study based on the medical records of all neonates born in our hospital from June 2019 to June 2020; all the case sheets were reviewed and analyzed. Data was calculated for all the birth traumas, and the types of injuries were documented. All the parameters, including mode of delivery, birth weight of neonates, gender of the newborn, and all the risk factors for mothers, presentation of the fetal part, shoulder dystocia, instrumentation, maturity of the baby, and LGA were recorded and analyzed. These neonates were examined by the paediatricians and other concerned speciality consultants. In the case of fractures, radiography of the affected parts was taken, and relevant speciality consultation and proper management were carried out.

Settings

SNCU is a level III tertiary care hospital.

Inclusion Criteria

From June 2019 to June 2020, all preterm and term live-born babies were delivered in our tertiary care hospital's NICU and postnatal ward, and newborn data were analyzed.

Exclusion Criteria

We didn't consider the neonates delivered from outside to calculate the incidence as this was calculated for 1000 live births in our institute. We had not considered the details of pathological fractures.

RESULTS

The study group consists of 12221 live births at our centre. Among these, 40 newborns were identified with birth injuries. The incidence was around 3.23 per 1000 live births. The gender ratio of the male to female was 22 vs 18; a slight male preponderance was seen at about 55%. In parity, primiparity constitutes the majority of injuries, with 27 vs. 13 of multiparity. In these 12 months, it is approximately 67.5%.

According to the birth weight criteria, out of 40, 25 were more than 2.5 kg, around 62.5%, between 1.5 and 2.5 kg, 20%, less than 1.5 kg, 17.5%, and LGA of more than 4 kg was about 10%. While considering the presentation of the fetus, our study showed the preponderance of the vertex at around 65%, the breech at 30%, and others like the transverse lie at only 5% [Table 1].

Considering types of injuries, in our study, the commonest being Erb's palsy at 30%, skin injuries like abrasions and lacerations were 22.5%, the next commonest being cephal hematoma, 17.5%, especially in normal vaginal deliveries and forceps deliveries. Then come fractures, the commonest being clavicle at 10%, soft tissue injuries at 7.5%, and the femur and subgaleal hematoma constituting 2.5%. This showed the commonest injury in our institution is Erb's palsy [Table 2].

According to the risk factors, the data analysis showed difficult deliveries and prolonged labour ending in forceps deliveries as per obstetric records constituting around 30% each and vacuum extraction of 20%. However, there is a surprising observation in the data that 0% were without any obvious antenatal risk factors. According to the mortality data analyzed, there was only 1 out of 40 due to severe perinatal asphyxia of forceps delivery [Table 3].

So in our study, it is proven that hard labor, instrumental deliveries, and malpresentation constitutes almost 30-35% of birth traumas. This infers that adequate and appropriate timely obstetric management and early interventions, the earlier decision of caesarean deliveries, thus avoiding instrumental deliveries, could further reduce the incidence of birth injuries.

Table 1: Distribution of sex, gravida, birth weight, presentation, mode of delivery and outcome of all cases.

Parameter	Observations	Number	Percentage
Sex	Male	22	55%
	Female	18	45%
Gravida	Primipara	27	67.5%
	Multipara	13	32.5%
Birth Weight	>2.5 Kg	25	62.5%
	1.5-2.499 Kg	8	20%
	1-1.499 Kg	7	17.5%
	<1 Kg	-	-
Presentation	Vertex	26	65%
	Breech	12	30%
	Others	2	5%
Mode of Delivery	LSCS	10	25%
	Normal	30	75%
	Assisted	Vacuum (8),	20%

		Forceps(12)	80%
Outcome	Death	1	2.5%
	Discharged	39	97.5%

Table 2: Types of injuries in observed in different cases of newborns delivery

Type of Injury	No.	Percentage
Skin injuries (abrasions,laceration)	9	22.5%
Soft Tissue Injuries	3	7.5%
Injury to Eye	1	2.5%
Fractures	-	-
Clavicular	4	10%
Humerus	2	5%
Femur	1	2.5%
Tibia	-	-
Neurological Injuries		
Facial Palsy	-	-
Erb's Palsy	12	30%
Bleeds		
Cephal-hematoma	7	17.5%
Subgaleal-hematoma	1	2.5%

Table 3: Major risk factors involved in birth injury

Risk Factors	Number	Percentage
Vacuum	8	20%
Forceps	12	30%
Difficult Labour	12	30%
None	8	20%

DISCUSSION

During this study, there were 12221 live births at our centre, and among these, 40 neonates were delivered with birth injuries. Hence, the incidence was 3.23 per 1000 live births, as per Nasab et al. 2011.^[10] This is very low compared to the study of Rashmi et al. which was 6.8%^[4]. This difference might be due to the modern era of improvement in obstetric care, monitoring equipment, etc. In American study conducted by Uhing et al. it was only 0.6/1000.^[5] This shows we have a long way to improve and prevent birth injuries. The male preponderance of 55 vs. 45 females is on par with Hughes et al.^[11] The parity index of primi was more than multiparity, which was very low compared to Padmini et al.^[12]

According to birth weight criteria, around 62.5% is between 2.5 to 4 kg, and more than 4 kg 10%, which contrasts with Cloherty et al. This might be due to planned caesarean sections given LGA cephalopelvic disproportions rather than trial vaginal deliveries.^[13]

In terms of presenting part during delivery, the vertex accounts for approximately 60% of birth injuries in our institution, compared to 30% in Al Habdan et al., which was vice versa.^[14] In comparison to most studies and Fabamwo et al., the instrumental deliveries in our study were around 35%.^[15]

At 30%, Erb's palsy is the commonest injury in our study, and next comes cephalhematoma at 17.5%, comparable to Wegemen et al.^[16] Finally, clavicular fractures were around 10% of all bony injuries, which was much more common than fractures of the femur at 7.5%, due to difficult labor in vertex presentation, particularly shoulder dystocia and

breech presentation, which was much more comparable to most studies worldwide.^[17]

The fracture of the skull was not noticed in the present study. Contrary to the frequently cited belief, the incidence of facial palsy was not observed in infants delivered with the aid of forceps. Nerve injuries though uncommon, facial nerve palsy related to forceps application, and brachial plexus injuries due to shoulder dystocia and breech extraction occur.^[18]

Instrumental deliveries are in difficult labor, leading to forceps delivery, especially for shoulder dystocia and LGA babies, which predispose to birth injuries by around 30%. This indicates that the effective management of prolonged and difficult labor by adequately monitoring the progress of labor and early decision making of C-section deliveries will surely reduce further birth injuries and their incidence in a tertiary care hospital.^[19,20]

Mortality is only 2%, not due to birth injury alone but to severe perinatal asphyxia.^[1] To reduce morbidity, regular audits of delivery practices are performed, and greater care is taken to exclude Cephalo pelvic disproportion. Accurate timing of use of forceps and vacuum is also recommended. Furthermore, strict scrutiny of risk factors antenatally and identification of complications during delivery would reduce the incidence and severity of disability in newborns.

CONCLUSION

Because we are a tertiary care hospital with a skilled obstetric and neonatal team in our institution, our hospital's incidence of birth injuries is much lower than the average of most developing countries. However, we still have to improve the effective

management of birth injuries to decrease the incidence and prevalence of handicapped people in society as in developed countries. Birth injuries are a great concern for the parents and treating doctors. Such incidents can lead to litigation and legal action against the medical fraternity. Hence, proper counseling and communication by the hospital staff is a must. In addition, strict obstetric protocols should be followed.

Limitation of Study

The present study had a few limitations. First, it would have been worthwhile to identify the proportion of birth trauma following an emergency cesarean section. Second, the exact correlation could not be assessed due to the small sample size.

REFERENCES

- Papanagioutou P, Rohrer T, Roth C, Politi M, Zimmer A, Reith W. Cranial birth trauma. *Radiologie*. 2009;49:913-7
- Mehta SH, Blackwell SC, Bujold E, Sokol RJ. What factors are associated with neonatal injury following shoulder dystocia? *J Perinatol*. 2006;26(2):85-8. doi: 10.1038/sj.jp.7211441.
- Perlow JH, Wigton T, Hart J, Strassner HT, Nageotte MP, Wolk BM. Birth trauma. A five-year review of incidence and associated perinatal factors. *J Reprod Med*. 1996;41(10):754-60.
- Rashmi A, Guha D, Kochhar M. Birth injuries. *Indian J Pediatric*. 1970; 37(268): 185-91
- Uhing M. Management of birth injuries. *Pediatric Clin North Am*. 2004;51(4):1169-96
- Baskett TF, Allen VM, O'Connell CM, Allen AC. Fetal trauma in term pregnancy. *Am J Obstet Gynecol*. 2007;197(5):499.e1-7. doi: 10.1016/j.ajog.2007.03.065.
- Mosavat SA, Zamani M. The incidence of birth trauma among live born term neonates at a referral hospital in Rafsanjan, Iran. *J Matern Fetal Neonatal Med*. 2008;21(5):337-9. doi: 10.1080/14767050801927921.
- Sauber-Schatz EK, Markovic N, Weiss HB, Bodnar LM, Wilson JW, Pearlman MD. Descriptive epidemiology of birth trauma in the United States in 2003. *Paediatr Perinat Epidemiol*. 2010;24(2):116-24. doi: 10.1111/j.1365-3016.2009.01077.x.
- Warke C, Malik S, Chokhandre M, Saboo A. Birth injuries-a review of incidence, perinatal risk factors and outcome. *Bombay Hosp Med J*. 2012;54(2):202-8
- Nasab SA, Varziri S, Arti HR, Najafi R. Incidence and associated risk factors of birth fractures in newborns. *Pak J Med Sci*. 2011;27(1):142-4.
- Hughes CA, Harley EH, Milmo G, Bala R, Martorella A. Birth trauma in the head and neck. *Arch Otolaryngol Head Neck Surg*. 1999;125(2):193-9. doi: 10.1001/archotol.125.2.193.
- Padmini R, Bhat BV, Puri RK. Birth injuries--incidence, causative factors and outcome. *Indian Pediatr*. 1988;25(8):770-4.
- Graham EM, Forouzan I, Morgan MA. A retrospective analysis of Erb's palsy cases and their relation to birth weight and trauma at delivery. *J Matern Fetal Med*. 1997;6(1):1-5.
- Al-Habdan I. Birth-related fractures of long bones. *Indian J Pediatr*. 2003;70(12):959-60. doi: 10.1007/BF02723819.
- Okonkwo NS, Ojengbode OA, Morhason-Bello IO, Adedokun BO. Maternal demand for cesarean section: perception and willingness to request by Nigerian antenatal clients. *Int J Womens Health*. 2012;4:141-8. doi: 10.2147/IJWH.S10325.
- Wegeman ME. Annual summary of vital statistics 1981. *Pediatrics*. 1982;70:835-43
- Rehm A, Promod P, Ogilvy-Stuart A. Neonatal birth fractures: A retrospective tertiary maternity hospital review. *J Obstet Gynaecol*. 2020;40(4):485-90.
- Hailu D, Worku B. Birth trauma among live born term neonates at a referral hospital in Addis Ababa, Ethiopia. *Ethiop Med J*. 2006;44(3):231-6.
- Linder N, Linder I, Fridman E, Kouadio F, Lubin D, Merlob P, et al. Birth trauma--risk factors and short-term neonatal outcome. *J Matern Fetal Neonatal Med*. 2013;26(15):1491-5. doi: 10.3109/14767058.2013.789850.
- Awari BH, Al-Habdan I, Sadat-Ali M, Al-Mulhim A. Birth associated trauma. *Saudi Med J*. 2003;24(6):672-4.