

Birth associated trauma

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ABSTRACT

Objective: To assess the incidence of birth-injuries seen at the King Fahd Hospital of the University, Al-Khobar, Kingdom of Saudi Arabia (KSA).

Methods: A retrospective analysis was carried out in 31028 consecutive deliveries between January 1986 and December 1996 at the King Fahd Hospital of the University, Al-Khobar, KSA. The study group was compared with a matched control group.

Results: There were 203 newborns with 208 injuries with an incidence of 6.70 per 1000 live births. The majority (55%) of the injuries was sustained during normal vaginal deliveries and the least were during cesarean section (5.2%). The average gestational age was 39 weeks (25-44 weeks) in the study group and in the control group was 38.84 (21-44 weeks).

The birth weight in the study group was 3323 gms (780-6190) and the control group was 3015 gms (790-6015) $p < 0.01$. The Apgar score in the study group was 7 and 9 at one and 5 minutes and in the control group was 8 and 9. There were 104 scalp injuries, 50 nerve injuries, 20 fractures (11 clavicle and 9 long bones) and 21 newborns had intracranial hemorrhage.

Conclusion: This study demonstrates a variety of birth related trauma at the teaching institution with a lower overall incidence as compared to reports from the literature. The only significant factor was that birth weight was higher in the study group as compared to the control group ($p < 0.01$). It is recommended that every effort be required to further decrease the incidence of birth injuries.

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Birth related injuries in the newborn are not uncommon. The incidence is directly related to many factors such as birth weight of the fetus, diseases in the mother and also on the Obstetrician's experience. Birth related trauma was suggested to be mostly associated with breech presentation, shoulder dystocia and delivery by forceps. Perlow et al¹ reported an incidence of 6 per 1000 live birth of trauma related to birth. Head injury,² brachial plexus,³⁻⁵ clavicle fractures,⁶⁻⁸ femoral fractures,⁹ and spinal cord injuries¹⁰ have all been reported due to birth trauma. Studies are few and far apart, which could assess the incidence of birth injuries in the Kingdom of Saudi Arabia (KSA) in general and at our teaching institution in particular. This study is undertaken to evaluate birth associated trauma among the newborn, at the King Fahd Hospital of the University, Al-Khobar, KSA.

Methods. We performed a retrospective review of the Medical Records of all deliveries and newborns between January 1, 1986 to December 31, 1996 at the King Fahd Hospital of the University, Al-Khobar, KSA. The hospital has 3 sources of the patient records, logbooks in the wards, labor and delivery rooms, and the operating rooms. The data is then integrated into the Ulticare operating system and coded as per the International Classification of Diseases 9th Revision (ICD9). The data was collected from the ulticare system where injuries are coded as per ICD9 and this data was cross-checked from the logbooks kept in the wards. The data of the mother and the baby was extracted concerning diseases from the mothers if any, gestational age, mode of delivery, delivering physician, weight of the neonate and Apgar score at one and 5 minutes. Routinely, all newborns were examined by a Consultant

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Neonatologist or a Senior Resident, as a policy of the hospital. On suspicion of injuries, the neonates were subjected to plain radiographs, computerized tomography and magnetic resonance imaging whenever necessary to confirm the injury. Scalp injuries included caput succedaneum, cephalhematoma and fascial injuries without fractures. Intracranial hemorrhage was defined as bleeding inside the cranium (extradural, intradural and intracerebral hemorrhage). The data was matched with the control group of neonates who had no birth trauma from the years of 1990-2001 for mode of delivery, gestational age, weight of the newborn and Apgar score. The data was analyzed by the χ^2 test for category variables and the student t-test for continuous variables. A value of $p < 0.05$ was considered statistically significant.

Results. During the study period, there were 31,028 live births and 203 newborns had 208 injuries an incidence of 0.7% or 6.7 per 1000 live births. The majority 116/203 (55%), of deliveries were normal vaginal delivery with and without episiotomy. Twenty-one were breech deliveries, 21 forceps and 29 by vacuum. Cesarean section was mode of delivery in 11 (5.2%) and the least injuries were sustained during this mode of delivery. The average gestational age of the study group was 39 weeks (25-44 weeks) and the control group 38.84 weeks (21-44 weeks). The maternal factors such as age, parity and associated diseases were not significant. The only significant difference $p < 0.05$ was the birth weight and there was no significance difference in Apgar score at one and 5 minutes (**Table 1**). **Table 2** gives the different injuries that the neonates suffered during the study period. The injuries occurred non-significantly among the various residents irrespective of year of training.

Discussion. This study describes the incidence of birth associated injuries during an 11-year period at a teaching institution. The overall incidence of these injuries was 0.7% or 6.7 per 1000 live births, which is lower than that reported in the literature 3-16%.¹¹ One would envisage that junior residents may cause more injuries than the seniors, but our experience does not

support this belief. Brachial plexus injuries due to birth trauma are one of the main causes of long-term morbidity of the newborn. The reported occurrence of such injury is 0.05-0.3%.¹²⁻¹⁴ Our analysis indicates that 0.1% of the newborn suffered brachial plexus injuries. For a long time, injury to brachial plexus has been blamed on shoulder dystocia.^{4,15,16} Our experience indicates that there are other causes for brachial plexus injury than shoulder dystocia alone and we support the view of Ouzolenion et al.¹⁷ Hankins and Clark¹⁸ and Dunn and Engle,¹⁹ and Ecker et al³ believed that birth weight is a predictor of brachial plexus injuries and similar was the opinion of Dawodu et al.²⁰ Our neonates with brachial plexus injury had significantly higher birth weight than the control group, $p < 0.01$. Injuries to the cervical spine and skull have been reported^{2,10,21-23} and the incidence of such injuries is decreasing due to liberal use of cesarean sections once any doubt of difficulty in vaginal delivery was on the horizon. Hughes et al² reported an incidence of 0.8% head and neck injuries and skull injuries were 61.8%. In our study, skull injuries (hematomas and intracranial hemorrhage) comprised 125/208 patients (60.1%). Even though the incidence is very similar to the literature, it should be of concern to obstetricians to reduce these injuries.

Bone injuries during delivery have been amply reported in the literature with varying incidence.^{6-9,24} Clavicular fractures were the most common with an overall incidence of 0.5-0.9%.⁶⁻⁸ Among the skeletal injuries, the incidence of clavicular fractures varied in different studies between 3-45.7%.^{6,11,24} We had an overall incidence of 0.6% of all fractures and clavicular fractures were 45.2%. Long bone fractures are a rare occurrence during birth and not enough literature is available on this. Nadas and Reinberg⁶ reported 10 long bone fractures whereas Bhat et al²⁴ in their series found 12 fractures (34.1%). In this study, long bone fractures were 9 (45%) which is marginally higher as compared to reports in the English language literature. Morris et al⁹ found that the fracture to femur occurred in 0.13 per 1000 live births and our review indicated that 0.12 per 1000 live births had long bone fractures. Bhat et al²⁴ reported marginally higher incidence of femoral fracture of 0.18 per 1000 live births.

Table 1 - Comparison of gestational age.

Parameters	Study group	Control group
Gestational age	39 weeks (25-44)	38 weeks (25-44)
Birth weight	3323 gms	3015 gms ($p < 0.01$)
Apgar score		
1 minute	7 (0-9)	8 (0-9)
5 minutes	9 (1-10)	9 (1-10)

Table 2 - Type of neonatal injuries.

Injuries	n
Scalp injuries (without fractures)	104
Nerve injuries	
Brachial plexus	39
Facial nerve	9
Other nerve	2
Fractures	
Clavicle	119
Long bones	99
Intracranial hemorrhage	21
Unspecified	13

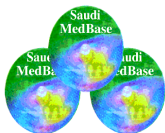
In conclusion, this study demonstrates the variety of birth-related trauma as seen at other centers. The overall incidence of these injuries were lower than reported. The statistical significant was for the weight of the neonates in the study group. Thus, suggesting the level of residents training had no impact on incidence of injuries, every attempt and care is needed to decrease the incidence of birth injuries to a minimum.

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References

1. 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: 754-760.
2. Hughes CA, Harley EH, Milmo G, Bala R, Martorella A. Birth trauma in the head and neck. *Arch Otolaryngeal Head Neck Surgery* 1999; 125: 193-199.
3. Ecker JL, Greenberg JA, Norwitz ER, Nodel AS, Repke JT. Birth weight as a predictor of brachial plexus injury. *Obstet Gynecol* 1997; 87: 643-647.
4. Gilbert WM, Nesbitt, TS, Danielsen B. Associated factors in 1611 cases of brachial plexus injury. *Obstet Gynecol* 1999; 93: 536-540.
5. Sandmire HF, DeMott RK. Erb's palsy causation: A historical perspective. *Birth* 2002; 29: 52-54.
6. Nadas S, Reinberg O. Obstetric fractures. *Eur J Pediatric Surgery* 1992; 2: 165-168.
7. Chez RA, Carlan S, Greenberg SL, Spellacy WN. Fractured clavicle is an unavoidable event. *Am J Obstet Gynecol* 1994; 171: 797-798.
8. McBride MT, Hennrikus WL, Mologne TS. Newborn clavicle fractures. *Orthopedics* 1998; 21: 317-319.
9. Morris S, Cassidy N, Stephens M, McCormack D, McManus F. Birth-associated femoral fractures: Incidence and outcome. *J Pediatric Orthopedics* 2002; 22: 27-30.
10. Menticoglou SM, Perlman M, Manning FA. High cervical spinal cord injury in neonates delivered with forceps. Report of 15 cases. *Obstet Gynecol* 1995; 85: 589-594.
11. Salomen IS, Uusitalo R. Birth injuries: Incidence and predisposing factors. *Z Kinderchir* 1990; 45: 133-135.
12. Walle T, Hartikainen-Sorri AL. Obstetric shoulder injury. Associated risk factors, prediction and prognosis. *Acta Obstet Gynecol Scand* 1993; 72: 450-454.
13. McFarland LV, Raskin M, Daling JR, Benedetti TJ. Erb/Duchenne's palsy: A consequence of fetal macrosomia and method of delivery. *Obstet Gynecol* 1986; 68: 784-788.
14. Levin MG, Holroyde J, Woods JR, Siddiqi TA, Scott M, Miodornick M. Birth trauma: Incidence and predisposing factors. *Obstet Gynecol* 1984; 63: 792-795.
15. Graham EM, Forouzan I, Morgan MA. A retrospective analysis of Erb's palsy cases and their relationship to birth weight and trauma at delivery. *J Matern Fetal Med* 1997; 6: 1-5.
16. Jennett RJ, Tarby TJ, Kreiniek CJ. Brachial plexus palsy: An old problem revisited. *Am J Obstet Gynecol* 1992; 166: 1673-1676.
17. Ouzolenion JG, Korst LM, Phelan JP. Permanent Erb palsy: A traction-related injury. *Obstet Gynecol* 1997; 89: 139-141.
18. Hankins GD, Clark SL. Brachial plexus palsy involving the posterior shoulder at spontaneous vaginal delivery. *Am J Perinatal* 1995; 12: 44-45.
19. Dunn DW, Engle WA. Brachial plexus palsy: Intrauterine onset. *Pediatr Neurol* 1985; 1: 367-369.
20. Dawodu A, Sankaran-Kutty M, Rajan TV. Risk factors and prognosis for brachial plexus injury and clavicular fractures in neonates. A prospective analysis from the United Arab Emirates. *Ann Trop Pediatr* 1997; 17: 195-200.
21. Lanska MJ, Roessmann V, Wiznitzer M. Magnetic resonance imaging in cervical cord birth injury. *Pediatrics* 1990; 85: 760-764.
22. Lasker MR, Torres-Torres M, Green RS. Neonatal diagnosis of spinal cord transection. *Clin Pediatr* 1991; 30: 322-324.
23. Pampllett R, Cola A. Spinal cord injury after forceps rotation. The role of glioneuronal heterotropics. *Aust N Z J Obstet Gynecol* 1993; 33: 91-93.
24. Bhat BV, Kuwar A, Onmachigui A. Bone injuries during delivery. *Ind J Pediatr* 1994; 61: 401-405.

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Abstract

Head injuries during birth are usually the result of a traumatic procedure, like forceps or vacuum delivery or a precipitate labor. Skull vault depression with or without fractures may occur also in spontaneous deliveries and cesarean sections. These are of importance as they may cause unnecessary alarm to the treating physician, without there being any pathology. Two of such cases are reported here.