

Birth-Related Fractures of Long Bones

Ibrahim Al-Habdan

College of Medicine, King Faisal University, King Fahd Hospital of the University, Al-Khobar, Saudi Arabia.

Abstract. Objective : Birth-related fractures of the long bones are not rare. **Methods :** This study presents a retrospective analysis of birth-related fractures of long bones seen at the King Fahd Hospital of the University, Al-Khobar, Saudi Arabia. **Results :** There were 21 fractures (clavicle 11, femur 6, humerus 3 and radius 1) during the 10-year period, with an overall incidence of 0.67 per 1000 live births. Neonates with fractures had higher birth-weight ($p < 0.001$) as compared to the control group and other parameters like gestational age and mode of delivery were not significant. **Conclusion :** It is recommended that neonates with fractures must have quicker appointments in the outpatient clinics to prevent deformities and secondly those with fracture clavicles should be thoroughly evaluated to rule out damage to brachial plexus as well. [Indian J Pediatr 2003; 70 (12) : 959-960] E-mail: ihabdan@yahoo.com

Key words : Fractures; Long bones; Neonates

Birth-related fractures are not uncommon. Injuries have been related to birth-weight, gestational age, maternal diseases and the level of experience of the obstetrician. The reported incidence varies from < 1 to $6/1000$ live births.^{1,2} In spite of the advances in the obstetric management and liberal cesarean sections in the event of difficulties, it was assumed that such fractures may not occur during birth.³⁻⁵ Fractures in the neonates unite very quickly and malunion of fractures is expected to occur if adequate care is not taken. Reports on birth-related fractures are few hence the present study is undertaken to describe fractures which occurred during birth and any associated factors which could predict fracture during birth and methods of prevent malunion and deformities.

MATERIALS AND METHODS

A retrospective review was conducted of all live births between January 1, 1986 to December 31, 1996 at King Fahd hospital of the University, Al-Khobar, Saudi Arabia. The hospital is a 500-bed tertiary care center for the region and a teaching institution. The data extracted was gestational age, birth weight, mode of delivery, Apgar scores and birth-related injuries. All neonates were routinely examined by a neonatologist and in the event of a fracture, was referred to the pediatric orthopedic surgeon. A group of neonates without any birth injuries were taken as a control group. During the study period there were 31,028 live births. The medical records and the radiographs were studied in depth to extract the information required, and the babies were followed up in the out patient clinics till the fractures united.

Reprint requests : Dr. Ibrahim Al-Habdan, P O BOX 40071, King Fahd Hospital of the University, Al-Khobar-31952, Saudi Arabia. Fax : 966-3-8971013.

RESULTS

Twenty-one birth-related fractures occurred in 31,028 live births with an incidence of $0.67/1000$ live births. Fracture of the clavicle were the commonest and majority occurred during vaginal delivery (Table 1). The average birth-weight in the study group was 3635 gm (1050-6190), as compared to control group 3015 gm (790-6015) ($p < 0.001$). The mode of delivery was vaginal delivery 13, (breech 4, shoulder dystocia 3 and forceps 2) and cesarean section 8. Out of 21 fractures, 11 (52%) were diagnosed immediate after birth and the rest the delay was between 3-7 days. In 3 of the 11 fracture clavicles, an associated brachial plexus injury was found. Two (9.9%) of the fractures—1 femur and 1 humerus—united in unacceptable rotation which needed corrective procedures.

DISCUSSION

Birth-associated trauma is not rare and the reported incidence varies between 2-16 per 1000 live birth.^{2,6,7} Bone injuries occur 1 per 1000 births⁸ and fractured clavicle is the most common of all fractures.⁹⁻¹⁰ In this study the incidence of bony injuries were 0.67 per 1000 live births and clavicular fractures were 52%. Bhat *et al* (1994) reported in their study an incidence of 45.7% of clavicular fractures. Nadas and Reinberg (1992)¹¹ found in their study of 28 obstetric fractures the most common fractures were of long bones rather than clavicle. Hedberg (1946) initially reported an incidence of fracture clavicle to be 3.3% but over the years with improvements in the obstetric management the incidence of such injuries dropped to 0.2% - 0.5%.^{1,13,14} The association of fracture clavicle and brachial plexus injury has not been clearly described. In this study three neonates with fracture

TABLE 1. Comparison of the Study and Control Groups.

	Study group	Control group	p Value
Gestational age	39 weeks (25–44)	38–44 weeks (21–44)	Non-Significant
Birth weight	3635 grams (1050–6190)	3015 grams (790–6015)	p<0.001
Mode of delivery	Vaginal 11 Cesarean 9	Vaginal 15 Cesarean 6	Non-Significant

clavicle had brachial plexus injury and similar was the experience of Al-Qattan *et al* (1994)¹⁵ and Al-Rajeh *et al* (1990)¹⁶ but other studies have denied this association.^{17,18}

Fractures of the limb bones particularly femur and humerus are uncommon in the neonate, as the force required to break the long bone is much higher. Morris *et al* (2002)¹⁹ reported 8 femoral fractures in 56,296 deliveries—an incidence of 0.13 per 1000. Bhat *et al* (1995) reported 0.10 per 1000 and the incidence in the present study was 0.19 per 1000 live births. The mode of delivery in our patients with fracture femur was breech presentation in the majority, rather than cesarean section as reported by Morris *et al*. Management of fracture femur in neonates is always conservative and all our patients were managed accordingly. Our experience concurs with recommendation of Morris *et al* (2002) and Nadas and Reinberg (1992), but a note of caution is needed as fractures in neonates unite quite early hence they should be seen often to prevent malunion and impending deformities. Two of our patients were discharged from the nursery and by the time they presented to the outpatient clinics on the 9th day the fractures had already united in unacceptable rotation. There were two reasons for the malunion which had occurred in our patients, a delay in the follow-up and secondly as there are no conventional splints available in smaller sizes and in improvised splints the fractures displaced.

CONCLUSION

This study indicates that long bone fractures were seen in neonates with higher birth weight. Method of delivery and gestational age were not inoculated with increased incidence of fractures in the present study. When expecting a heavier baby, utmost care should be taken to avoid fractures. Neonates with fractures should be seen on a weekly basis to prevent malunions and secondly in newly born with clavicular fractures a thorough neurological examination should be done to rule out any injury to the brachial plexus.

REFERENCES

1. Perlow JH, Wigton T, Hart J, Strassner HT *et al*. Birth trauma.

A five-year review of incidence and associated perinatal trauma. *J Reprod Med* 1996; 41(10) : 754-760.

2. Salomen IS, Uusitalo R. Birth injuries: Incidence and predisposing factors. *Z Kinderclir* 1990; 45(3) : 133-135.

3. Banagale RC. Neonatal fracture and cesarean section. *Am J Dis Child* 1983; 137 : 505.

4. Curran JS. Birth-associated injury. *Clin Perinatal* 1981; 8 : 111-129.

5. Bistoletti P, Nissell H, Palme C, Lagercrantz H *et al*. Term breech delivery. Early and late complications. *Acta Obstet Gynecol Scand* 1981; 60 : 165-171.

6. Padmini R, Bhat BV, Puri RK. Birth injuries. Incidence, causative factors and outcome. *Indian Pediatr* 1988; 25 : 770-774.

7. Behrman RE, Vaughan VC, Nelson WE, eds. *Textbook of Pediatrics*, 14th edn. Philadelphia. WB Saunders and Co. 1992: 453-458.

8. Bhat BV, Kumar A, Onmachigni A. Bone injuries during delivery. *Indian J Pediatr* 1994; 61(4) : 401-405.

9. Chez RA, Carlan S, Greenberg SL, Spellacy WN *et al*. Fractured clavicle is an unavoidable event. *Am J Obstet Gynecol* 1994; 171 : 797-798.

10. Hsu TY, Hung FC, Lu YJ, Ou CY *et al*. Neonatal clavicular fracture: Clinical analysis of incidence, predisposing factors, diagnosis and outcome. *Am J Perinatology* 2002; 19(1) : 17-21.

11. Nadas S, Reinberg O. Obstetrics fractures. *Eur J Pediatr Sug* 1992; 2:165-68.

12. Hedberg GT. Clavicle fracture of the newborn in vertex presentation. *Acta Obstet Gynecol Scan* 1946; 26 : 321-328.

13. Levine MG, Holroyde J, Woods JR, Siddiqi TR . Birth trauma: Incidence and predisposing factors. *Obstet Gynecol* 1984; 63 : 792-795.

14. McBride MT, Hennrikus WL, Mologne TS. Newborne clavicular fractures. *Orthopaedics* 1998; 21(3) : 317-319.

15. Al-Qattan MM, Clarke HM, Curtis CG. The prognostic value of concurrent clavicular fractures in newborns with obstetric brachial plexus palsy. *J Hand Surg [Br]* 1994; 19(6): 729-30.

16. Al-Rajeh S, Corea JR, Al-Sibai MH, Al-Umran K *et al*. Congenital brachial plexus palsy in the Eastern province of Saudi Arabia. *J Child Neurol* 1990; 5(1):35-8.

17. Turpenny PD. Fracture clavicle of the newborn in a population with a high prevalence of grand-multiparity: Analysis of 78 consecutive cases. *Br J Obstet Gynecol* 1993; 100 : 338-341.

18. Oppenheim WL, Davis A, Growdon WA, Dorey FJ *et al*. Clavicle fractures in the newborn. *Clin Orthop* 1990; 250 : 176-180.

19. Morris S, Cassidy N, Stephens M, McCormack D *et al*. Birth-associated femoral fractures: Incidence and outcome. *J Pediatr Orthop* 2002; 22 : 27-30.