

Erb's Palsy - an overlook lesion of the upper extremity

Abstract

Erb's palsy is the most common form of obstetrical brachial plexus palsy. The infant's upper extremity hangs floppily from the shoulder with flexion of the wrist and fingers due to paralysis of muscles innervated by C5 and C6 cervical nerve roots. Lack of long term studies fails to delineate the natural course of the disease. Erb's palsy has better prognosis than complete brachial plexus palsy. Timely intervention results in good functional recovery. The case presented here not only highlights rarity of the lesion but also its delayed presentation to the clinician and its difficult diagnosis and henceforth consequent overlook on the part of parents and clinician, especially in developing countries.

Keywords: Erb's palsy, obstetrical, shoulder dystocia, macrosomia, gestational diabetes.

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Introduction

Erb's palsy is at the outset scary, both for the parents and the treating clinician. The infant's upper extremity hangs floppily from the shoulder with flexion of the wrist and fingers due to paralysis of muscles innervated by C5 and C6 cervical nerve roots.^{1,2} It is the most common and specific form of obstetrical brachial plexus palsy.² There is a wide variation in the frequency of its occurrence, with incidence varying from 0.4 to 5.1 cases per 1000 live births.¹⁻⁷ The risk factors associated are macrosomia, shoulder dystocia, gestational diabetes, breech presentation, forceps delivery.^{2,5,6,8,9} Lack of long term studies fails to delineate the natural course of the disease.¹⁰ In Erb's palsy, injured roots are C5-C6.^{1,2} The higher location of C5-C6, predisposes them to be involved in forceful separation of neck and shoulder,¹²⁻¹⁵ thereby causing tension on these roots. The mechanism is also consistent with development of injury to upper roots. Erb's palsy has better prognosis than complete brachial plexus palsy. Recovery time depends on the severity of the lesion. Usually neuropraxia and axonotmesis results in full improvement, while neurotmesis and root avulsions results in enduring loss of upper extremity function. Management is based on the severity of the lesion.^{4,13} Almost all affected infants recover within first few months. Surgical exploration is required in some infants who fail to recover by six months. Significant disability is infrequently seen.¹

In literature case studies are reported, highlighting the various aspects of palsy including anatomical variations, clinical presentation and management. We believe that the case presented here deserves reporting not only because of the rarity of the lesion but also due to its difficult diagnosis at presentation and henceforth consequent overlook on the part of parents and clinician, especially in developing countries. An attempt is also made to do brief literature review.

Case study

Six months old male baby was brought to our paediatric orthopaedic clinic by his parents with complaints of restriction of movements of the left shoulder, elbow, wrist and fingers with persistent close approximation of upper extremity with the trunk (Figure 1). They further added that the child is having difficulty in holding the objects with the left hand. The patient was their second child with one female sibling without any such complaints. There was no history of consanguinity. The baby was full term, delivered at home with difficulty, through vaginal route. There was no history suggestive of any maternal infection or any exposure to teratogenic agents throughout the antenatal period. However, the mother was known diabetic for last 5 years. There was no history suggestive of delayed crying or any developmental delay (delayed milestones). No history of any other joint involvement or other systemic illness. Clinical examination revealed internal rotation and adduction at shoulder, extended elbow, palmar flexed wrist and fingers (policeman's tip hand deformity or waiter's tip hand deformity, Figure 1). On giving painful stimulus, there was visible contraction of deltoid muscle, but no active abduction of the shoulder was noted. Right upper extremity was absolutely normal. There were no other skeletal abnormalities. Furthermore, no definite syndromic features were noted. Systemic examination was unremarkable. A diagnosis of left sided Erb's palsy was made. In the present circumstance, management was aimed to provide functional range of motion at shoulder, elbow, wrist and fingers. Patient was advised MRI to ascertain the nature of lesion and its severity. Meanwhile the patient was put on stretching exercises of shoulder, elbow, wrist and fingers, especially to prevent the deformity to become fixed. Night splinting was also promoted to prevent development of contracture. Parents were communicated about the need of regular follow-up for proper treatment and rehabilitation

of child, least as the child would grow there will be limitations of activities which require coordinated movement of shoulder, elbow, forearm, wrist and hand like buttoning, unbuttoning, tying shoe laces, maintenance of hygiene and others. However the parents never turned up again subsequent to their first appointment, highlighting the overlook of the deformity.



Figure 1 Clinical photograph of the patient showing persistent close approximation of the left upper extremity with internal rotation and adduction at shoulder, extended elbow, palmar flexed wrist and fingers (policeman's tip hand deformity or waiter's tip hand deformity).

Discussion

Erb's palsy results from injury to nerve roots C5-C6, as suggested by Adson AW by excessive widening or separation of the angle between the head and shoulder.¹⁶ The classical sign of Erb's palsy is the waiter's tip hand or policeman's tip hand deformity. The arm hangs floppily in attitude of internal rotation by the side of trunk with flexion of wrist and fingers. Typically the muscles involved are Deltoid, Supraspinatus, Infraspinatus, Biceps, Brachioradialis, Supinator, Extensors of wrist and fingers.^{1,15} However, Erb's palsy should be differentiated from pseudoparalysis caused by fracture or infection of the bones around the shoulder joint.¹⁷⁻¹⁹ The severity of the lesion ranges from neuropraxia to neurotmesis, which can be delineated by MRI.¹ It is usually supposed that the Erb's palsy is the result of application of too much lateral traction during delivery. The risk of Erb's palsy is markedly reduced with caesarean section, although it does occur.^{20,21} The physical examination is of paramount importance in clinching the diagnosis of Erb's palsy; however MRI of the brachial plexus and cervical cord is probably the investigation of choice for knowing the level and severity of the lesion. As far as the treatment is concerned, immobilization of the affected extremity is generally advised initially, followed by active and passive range of motion exercises. Night splints are also advocated to prevent flexion

contractures of the wrist and fingers.^{1,5,9,22} Surgical intervention is required for optimal rehabilitation of children with residual deficits. The nature of surgery ranges from exploration of the brachial plexus to muscle or nerve transfers.^{1,23}

Our patient had Erb's palsy with associated risk factors consisting of difficult home delivery and maternal diabetes mellitus. The lesion was initially overlooked by the parents and the caregivers, which resulted in delay in diagnosis and treatment. Furthermore the parents never turned up instead of repeated counseling for the need of optimal management.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

References

1. M Chater, P Camfield, C Camfield. Erb's palsy - Who is to blame and what will happen? *Paediatr Child Health*. 2004;9(8):556-560.
2. Alanen M, Halonen JP, Katevuo K, et al. Early surgical exploration and epineural repair in birth brachial palsy. *Z Kinderchir*. 1986;41(6):335-337.
3. Vaz DV, Mancini MC, Do-Amaral MF, et al. Clinical changes during an intervention based on constraint-induced movement therapy principles on use of the affected arm of a child with obstetric brachial plexus injury: A case report. *Occup Ther Int*. 2010;17:159-167.
4. Hulleberg G, Elvrum AKG, Brandal M, et al. Outcome in adolescence of brachial plexus birth palsy: 69 individuals re-examined after 10-20 years. *Acta Orthop*. 2014;85:633-640.
5. Tchagbele OB, Segbedji KA, Belo M, et al. Obstetric paraphysis of the brachial plexus: Epidemiological and therapeutic aspects of 65 cases collected in three years at the CHU Sylvanus Olympio de Lome (Togo). *J Pediatr Childcare*. 2013;26:141-145.
6. Malik S, Bhandekar HS, Korday CS. Traumatic peripheral neuropraxias in neonates: A case series. *J Clin Diagn Res*. 2014;8(10):10-12.
7. Hale HB, Bae DS, Waters PM. Current concepts in the management of brachial plexus birth palsy. *J Hand Surg Am*. 2010;35(2):322-331.
8. Srilakshmi D, Chaganti S. A holistic approach to the management of Erb's palsy. *J Ayurveda Integr Med*. 2013;4(4):237-240.
9. Al-Qattan M, El-Sayed A, Al-Zahrani A, et al. Obstetric brachial plexus palsy in newborn babies of diabetic and non-diabetic mothers. *J Hand Surg Am*. 2010;35(5):362-365.
10. Pondaag W, Malesy MJ, Van Dijk JG, et al. Natural history of obstetric brachial plexus palsy: A systematic review. *Dev Med Child Neurol*. 2004;46(2):138-144.
11. Nelson MR, Armenta AH. Birth brachial plexus palsy update. *Curr Phys Med Rehabil Rep*. 2014;2:79-85.
12. Ogumike OO, Adeniyi AF, Badaru U, et al. Profile of children with new-born brachial plexus palsy managed in a tertiary hospital in Ibadan, Nigeria. *Niger J Physiol Sci*. 2014;29(1):1-5.
13. Yang LJS. Neonatal brachial plexus palsy-Management and prognostic factors. *Semin Perinatol*. 2014;38(4):2222-2234.
14. Romana MC. Obstetrical brachial plexus palsy. *Arch Pediatr*. 2005;12(6):792-793.
15. Boyd M, Usher R, McLean F. Fetal macrosomia: Prediction, risks, proposed management. *Obstet Gynecol*. 1983;61(6):715-722.

16. Adson AW. The gross pathology of brachial plexus injuries. *Surg Gynecol Obstet.* 1922;34:350–357.
17. Peleg D, Hasnin J, Shalev E. Fractured clavicle and Erb's palsy unrelated to birth trauma. *Am J Obstet Gynecol.* 1997;177(5):1038–1040.
18. Gabriel SR, Thometz JG, Jaradeh S. Septic arthritis associated with brachial plexus neuropathy. A case report. *J Bone Joint Surg Am.* 1996;78(1):103–105.
19. Clay SA. Osteomyelitis as a cause of brachial plexus neuropathy. *Am J Dis Child.* 1982;136:1054–1056.
20. Evans-Jones G, Kay SP, Weindling AM, et al. Congenital brachial palsy: Incidence, causes and outcome in the United Kingdom and Republic of Ireland. *Arch Dis Child Fetal Neonatal Ed.* 2003;88(3):F185–F189.
21. Al-Qattan MM, el-Sayed AA, al-Kharfy TM, et al. Obstetrical brachial plexus injury in newborn babies delivered by caesarean section. *J Hand Surg Br.* 1996;21B(2):263–265.
22. Ramos LE, Zell JP. Rehabilitation program for children with brachial plexus and peripheral nerve injury. *Semin Pediatr Neurol.* 2000;7(1):52–57.
23. Price A, Tidwell M, Grossman JA. Improving shoulder and elbow function in children with Erb's palsy. *Semin Pediatr Neurol.* 2000;7(1):44–51.