

Traumatic Peripheral Neuropraxias in Neonates: A Case Series

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ABSTRACT

Traumatic peripheral nerve palsies in the newborn are uncommon but are a cause of severe anxiety in parents. Erb's palsy, brachial plexus, radial nerve and facial nerve are the common nerves affected. Perinatal injuries are the most frequent cause of traumatic peripheral neuropraxias / nerve palsies. Usually these neuropraxias are self-limited with good recovery with conservative management in majority of cases. Ten neonates with peripheral neuropraxias were included in this retrospective study based on a review of these cases over a period of three and a half years. Their clinical profile, presenting symptoms, predisposing factors and management were analyzed. We encountered five neonates with Erb's palsy, three with facial palsy and two had radial nerve affection. Risk factors in our series included large babies, prolonged or difficult labour, instrumental delivery and shoulder dystocia. All cases of peripheral nerve involvement were managed conservatively with physiotherapy. Nine neonates were discharged and showed gradual improvement and one patient unfortunately succumbed due to severe birth asphyxia. Parental counseling and rehabilitation play an important part in management of these cases.

Keywords: Birth trauma, Brachial plexus palsy, Erb's palsy, Facial palsy, Peripheral nerve injuries, Radial palsy, Traumatic neuropraxias

CASE REPORT

Our study was a retrospective analysis of ten neonates with peripheral neuropraxias / palsy admitted to our neonatal intensive care unit over a period of three and half years (January 2009 to August 2012). These neonates were born either at our hospital or had been referred from other maternity / private hospitals. A short synopsis including the clinical profile and outcome of all the cases is depicted in [Table/Fig-1]. Amongst our subjects, there were three neonates with facial palsy (30%); five with Erb's palsy (50%) and two had radial nerve affection [Table/Fig-2-7]. All were full term babies with three of them weighing > 3.5kg. Sixty percent neonates were females, while 40 % were males. Majority were born by vaginal delivery while 20% were born by caesarean section. Two neonates (20%) had associated humerus fracture also [Table/Fig-1]. Two patients were delivered by LSCS, four by forceps and one was breech delivery and two cases had shoulder dystocia. Nine of them had a history of prolonged or difficult labour. All our subjects were treated conservatively with physiotherapy and/or splinting and almost all of them showed complete recovery over a period of few weeks to few months. Nine neonates (90%) were discharged and showed gradual improvement and one patient with severe birth asphyxia succumbed due to associated morbidity.

DISCUSSION

The incidence of birth trauma and traumatic nerve palsies has reportedly decreased over time because of improvements in obstetric care and prenatal diagnosis however, it still occurs even in the presence of highly skilled obstetric and neonatal care [1,2]. Traumatic neuropraxias in neonates usually result from damage to individual nerves or nerve plexuses during the process of delivery of baby. Neuropraxia of the peripheral nerves is characterised by transient loss of motor and sensory function due to blockage of nerve conduction and usually it recovers in six to eight weeks.

Common traumatic nerve palsies in neonates with birth injury can occur in the form of Erb's palsy, brachial plexus palsy, radial nerve palsy and facial nerve palsy, followed by rare involvement of ulnar, phrenic or oculomotor nerves [3,4]. Brachial plexus injuries are the commonest traumatic nerve injury documented and the incidence

varies from 0.5-4.4 cases per 1000 full-term births [1,2]. The incidence of facial paralysis in live births is 0.8-2.1 per 1000 births and of these 67-91% are associated with forceps delivery [4]. The reported incidence of radial nerve palsy varies from 0.1%–4.0% of live births [5,6].

| Case No. | Sex | GA | Birth Weight | Predisposing factor | Neuropraxia / Palsy | Treatment | Outcome |
|----------|-----|----|--------------|---|--|---|------------|
| 1 | F | FT | >2kg | Breech presentation | Right Erb's Palsy | Physiotherapy | Discharged |
| 2 | F | FT | >2 kg | Forceps delivery | Facial palsy | Conservative | Discharged |
| 3 | M | FT | >2Kg | Difficult home delivery | Facial palsy | Conservative | Expired |
| 4 | M | FT | >2 KG | Forceps delivery | Facial palsy [Table/Fig-5] | Conservative | Discharged |
| 5 | M | FT | 4.75kg | Macrosomia with difficult delivery, Shoulder dystocia | Left Erb's palsy with fracture humerus | Splinting Physiotherapy [Table/Fig-3&4] | Discharged |
| 6 | F | FT | 3.77 kg | Forceps delivery | Right Erb's palsy, fracture humerus | Splinting Physiotherapy [Table/Fig-1&2] | Discharged |
| 7 | F | FT | >2kg | No Risk factor identified | Left Erb's palsy | Splinting, Physiotherapy | Discharged |
| 8 | F | FT | 3.66kg | Difficult delivery, Shoulder dystocia | Right Erb's palsy | Physiotherapy | Discharged |
| 9 | M | FT | 2.5 kg | Prolonged labour, needed LSCS | Right wrist drop | Physiotherapy [Table/Fig-6] | Discharged |
| 10 | F | FT | 2.85kg | Failed forceps, needed LSCS | Right wrist drop | Physiotherapy | Discharged |

[Table/Fig-1]: Case Profile of Traumatic Neuropraxia Neonates



[Table/Fig-2]: Case six with right Erb's palsy and fracture humerus **[Table/Fig-3]:** Case six showing recovery of right Erb's palsy after one month **[Table/Fig-4]:** Subject five of shoulder dystocia with fracture humerus and left Erb's palsy



[Table/Fig-5]: Subject five of shoulder dystocia and left Erb's palsy radiograph reveals fracture humerus **[Table/Fig-6]:** Subject four reveals left facial palsy **[Table/Fig-7]:** Subject nine has right radial palsy showing wrist drop

The risk factors for nerve injuries in neonates include maternal diabetes, large-for-date infants (> 4000 g), instrumental deliveries, especially forceps (mid cavity), or vacuum, vaginal breech delivery, precipitous labour, various obstetric version manoeuvres and abnormal or excessive traction during delivery, prolonged or too short labour and maternal pelvic anomalies. Elective caesarian section provides some protection but does not completely eliminate the risk of nerve injuries [3]. Radial nerve palsy in neonates can also occur due to abnormal intrauterine positioning of hand with pressure on the flexed hand either due to pathological Bandl's ring or pelvic disproportion, rarely due to involvement of radial nerve at the site of bony fracture [7]. Very often other associated birth injuries (not causative) along with peripheral neuropraxias occur like clavicular and humeral fractures, torticollis, cephalohematoma and subgaleal bleeds.

Clinical presentation of brachial plexus palsy (BPP) depends on site and severity of injury to the nerves. Injuries of the brachial plexus may be mild, with only temporary sequelae, or devastating, leaving the child with a flaccid, insensate arm. Severity depends on the number of nerves involved and the degree to which each level is injured. The basic types of BPPs include the Erb's palsy (C5 and C6), Klumpke palsy (C8 and T1) and total BPP affects nerves at all levels (C5-T1) [6]. Neonates with Erb's palsy classically have a policeman's tip clinically characterized by the affected arm adducted and internally rotated, elbow extended, forearm pronated, wrist flexed and hand in a fist. In contrast in Klumpke's palsy arm is supinated, elbow flexed and wrist extended. Most infants with obstetrical brachial plexus paralysis demonstrate spontaneous improvement in upper extremity function and do not require surgical management. Spontaneous complete recovery rates have been reported as high as 93% by age four months [4]. Recovery rates and extent depend on the injury type and severity. Isolated radial nerve palsy in the newborn although uncommon has been reported to occur following difficult delivery [7]. Radial nerve palsy presents as wrist drop, difficulty in straightening the arm at the elbow. A number of infants improved without any intervention such as splinting or physiotherapy.

Facial nerve palsy following birth trauma in neonates presents as lower motor type of lesion with following features of inability to close

ipsilateral eye, deviation of angle of mouth to opposite side, loss of forehead wrinkling on same side and difficulty in feeding [6,8]. A traumatic aetiology often reveals a unilateral facial paralysis with ecchymosis, hemotympanum, facial swelling, and severe head molding [8]. The extracranial course of the facial nerve as it leaves the stylomastoid foramen is very superficial and it might easily be injured / contused, particularly in the event of a difficult birth, with impaction of the head against the pelvic outlet or due to incorrect application of forceps for either traction or rotation [9,10].

Diagnosis of most cases of peripheral neuropraxias is usually clinical. Radiological investigations like X-rays, USG, CT or MRI may be done in complicated cases to look for associated injuries or fractures. Most cases of brachial plexus palsy are transient with full recovery in first week. Some cases need physiotherapy and occupational therapy. Rare cases in which weakness persists need electrical stimulation, botulinum toxins or surgical intervention in form of tendon transfers [9]. Neonates with radial nerve injury recover with splinting of hand in slightly dorsiflexed position. Medications like analgesics to reduce pain and steroids to reduce nerve oedema can be used during acute phase. In most cases of facial nerve injury also recovery is usually complete within a mean of four months with conservative management. Cases of permanent facial nerve palsy usually have other associated congenital anomalies, requiring plastic surgery in later life [9,10].

Prevention of traumatic peripheral nerve injuries is one of the most important aspects in management of such cases. Detection of cephalopelvic disproportion and abnormal lie in the third trimester and their appropriate management in the form of avoiding instrumental deliveries and considering elective cesarean section would decrease their incidence to a significant extent.

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