

## Case Report

### A Rare Event at Birth: A Case Report of Multiple Cranial Nerve Palsy

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#### Abstract

Post traumatic injuries of the lower cranial nerves are an infrequent event, especially as a result of birth trauma and obstetrical procedures. Literature has documented that this type of lesion is often found in the adult patient, as a consequence of medical and surgical interventions such as shoulder surgery, otorhinolaryngological procedures or airway manipulation, i.e. orotracheal intubation. Authors describe a case of multiple cranial nerve palsy, occurring in the IX, X and XII nerves, after forceps delivery in a newborn without airway manipulation, i.e. endotracheal intubation. We observed a complete neurological recovery. Patient's favorable evolution suggests neuropraxia as main mechanism, as a result of neural and brain stem compression or stretching.

**Keywords:** Birth trauma; Cranial nerves; Newborn; Palsy

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#### Introduction

There are neurological injuries afflicting a newborn that occur as a result of birth trauma and/or obstetric procedures used during labor [1,2]. The existing knowledge of this matter is restricted to case reports and small cohort studies, however, concerning general birth trauma, literature shows that it has an estimated incidence of 2% for singleton vaginal delivery and 1.1% for cesarean deliveries [1,3]. Vacuum and forceps deliveries are associated with higher rates of perinatal traumatic morbidity compared with caesarean delivery [3-5]. A Canadian retrospective study including 61,106 deliveries concluded that the rate of severe perinatal morbidity and mortality was 0.83% in deliveries with dystocia and this rate was higher in deliveries with fetal distress (1.83%) [5]. Birth trauma is four to five times higher with the use of forceps, eight to nine times higher when using vacuum, and 11 to 12 times higher with the use of forceps and vacuum in combination compared to unassisted deliveries [6].

These injuries seem to frequently occur during the second stage of labor, in which the fetus descends through the birth canal [2]. Various and complex mechanisms are accounted for as the basis of these complications, affecting mainly musculoskeletal structures, peripheral nerves and the spinal cord, through compression, uterine contractions, torques, stretching and a variable degree of hypoxia. The degree of severity can vary from neuropraxia and axonotmesis to severe paralysis [2]. Known risk factors can be divided into maternal, fetal and delivery mechanisms. Maternal risk factors include extreme maternal ages (less than 16 and greater than 35 years), primigravida, cephalopelvic disproportion, short maternal stature, diabetes, excessive maternal weight gain and maternal pelvic abnormalities. Fetal risk factors appear to be associated with in-utero malpresentation, prematurity, birth weight greater than 3500g and congenital anomalies. As for the delivery itself, mechanisms such as vaginal breech delivery, endogenous compression from bony pelvis and maternal expulsive efforts, passage through birth canal, fetopelvic disproportion, nuchal cord, vacuum or forceps-assisted delivery increase the risk of neurological lesion [4-7].

Post traumatic involvement of lower cranial nerves, which is by itself a rare event, is poorly described in literature as a postpartum complication. Injuries of the IX, X and XII nerves appear to arise in specific circumstances such as shoulder surgery, otorhinolaryngologic surgery or airway manipulation, i.e. orotracheal intubation [8,9]. Most of the written works on this topic highlight the benign clinical course, with complete neurological recovery in a period of only a few months. A favorable prognosis depends on a rapid multidisciplinary assessment and a structured physical rehabilitation program.

#### Case Report

Term newborn male (39 3/7), born to a mother whose medical records did not reveal any risk factor, such as maternal disease, weight alterations or a previous traumatic delivery. After dystocic delivery (forceps followed by vacuum extraction), Apgar scored seven at minute one, eight at minute five and nine at minute 10. He presented slow

and irregular respiration, facial cyanosis and an exuberant ecchymotic mask. Birth weight was 3300g, resuscitation was required with positive pressure ventilation, without endotracheal intubation or airway manipulation through laryngoscopy. Three hours after birth patient presented with inspiratory stridor, dysphonia and transient right-side deviation of nasolabial sulcus and tongue. During the first day of life, onset of breast feeding was difficult due to inability to suck and swallow, causing constant coughing and choking. Since he had respiratory distress and chest radiography well-suited with aspiration pneumonia, antibiotic treatment was initiated with ampicilin and gentamicin. Later respiratory secretions samples examined were positive for *E.coli*.

Forty-eight hours after birth observation by otorhinolaryngologic and nasofibrolaryngoscopy was performed, revealing left vocal cord and glottis paresis; diagnosis of IX, X (no established lateralization) and left XII cranial nerves was admitted, possibly as a consequence of brain stem transient injury. He was also examined by a pediatric neurologist, carefully excluding other neurological deficits. Meticulous central nervous system imaging comprised cranial ultrasonography and Magnetic Resonance Imaging (MRI) of brain, brainstem and spinal cord. Cranial ultrasonography on first day of life showed normal periventricular and subcortical white matter, normal posterior fossa, no hydrocephalus and resistive index of 0.65. MRI examination, only performed at day six of life due to administrative contingencies, included coronal, axial and sagittal sections in T<sub>1</sub>, T<sub>2</sub>, flair and the thin sliced DWI. The brainstem was highlighted. Overall it didn't reveal changes compatible with ischemic injuries, cerebral edema, hydrocephalus or intracranial space occupying lesions. Thin views of brainstem showed no asymmetries or injuries.

Seventy-two hours after birth patient started physical rehabilitation with speech therapy, and enteral feeding, interrupted at day one, was restarted with increasing ability. Neurological outcome was favorable since he was able to tolerate breast feeding, with good suck and swallow reflexes. Patient was discharged at day 14 of life, breast-fed with feeding autonomy, besides manifesting a discreet tongue deviation and intermittent stridor. Outpatient medical recommendations did not include physical rehabilitation. Follow-up by neurology, otorhinolaryngology and physical rehabilitation was kept until four months of age when he presented with complete clinical resolution; pediatrics continued until 12 months.

## Discussion

Delivery and birth are complex processes, that predisposes the newborn to neurological complications, most frequently affecting brachial plexus, the V and VII pairs [1,2,6]. Injury to laryngeal recurrent (IX), pneumogastric (X) and hypoglossal (XII) nerves has been reported in the adult patient following surgery (shoulder or posterior cervical spine surgery), ear-nose-throat interventions (such as rhinoplasty) or after orotracheal intubation. Simultaneous XII and unilateral X cranial nerves palsy is recognized as Tapia's Syndrome [1]. The cause is believed to be a neuropraxic reaction resulting from pressure and compression of larynx's structures against the posterior part of the thyroid cartilage and from nerve stretching. It may happen due to an excessively inflated cuff or a displaced tube, erroneous positioning of the laryngeal mask and neck hyperextension in a mispositioned patient [8,9]. Likewise, in the case of this newborn, nerve damaged possibly occurred due to neuropraxia after obstetric trauma. As a presumed mechanism, hyperextension, rotation and lateral flexion of head and neck, causing nerve stretching and compression against

the transverse apophysis of the atlas vertebra. Fetal positioning and compression by pelvic bones during expulsive period may also have contributed. It is worth noting that this is a rare event, especially in the neonatal period, and to our knowledge, we found only one similar case report of multiple palsy following obstetric trauma [10].

Cranial nerves injury related to obstetric trauma is infrequent, especially in an era of great awareness related with obstetric quality care, and is mostly limited to facial or external oculomotor nerves.

This newborn presented with respiratory distress, but upon physical evaluation there were no asymmetric arm or hand movements, paradoxical respiratory movements nor hem diaphragmatic elevation on chest X-ray, therefore excluding brachial plexus and phrenic nerve injuries [11].

Despite clinical presentation's magnitude, we emphasize the complete resolution of all neurological deficits, in agreement with what is described in the literature for traumatic lesions of these cranial nerves. Conservative management, which is enough in most cases, may include steroids and vitamins together with speech and swallowing therapy. Rare patients will need supportive gavage feeding and interim tracheostomy [1].

## Conclusion

Multiple cranial nerve palsy, as a result of traumatic obstetric procedures is a rare event, especially when it comes to lower cranial nerves. To our knowledge, there was only one case similar to ours reported so far. As described in the literature for other neural injuries, recovery is favorable since the main mechanism appears to be neuropraxia. We emphasize the importance of a timely multidisciplinary approach, which is essential for diagnostic investigation, early rehabilitation and a favorable outcome.

## Disclosures

This case describes a patient born at Hospital de Cascais (Portugal) Neonatology Unit.

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