



Brachial Plexus Injury Awareness

OBSTETRICAL BRACHIAL PLEXUS INJURY

The incidence of the OBPI varies widely in the medical literature. In the United States the incidence varies from 0.38 to 2.6 per 1000 live births. However, this rate is probably somewhat lower than the actual incidence, because some of the children that are affected are presumed to recover spontaneously and are never presented to a specialist. ⁽⁹⁾

ETIOLOGY OF OBPI

The etiology of Obstetric Brachial Plexus Injuries (OBPI) cases has been widely discussed in the medical literature. Some authors have suggested in utero causes, ⁽⁵⁾ others have found congenital malformations. ⁽⁶⁾ Although the theories on the etiology have proliferated, the most widely held view is that OBPI is purely a mechanical injury that is most commonly caused by lateral traction to the baby's head and neck during delivery. Usually this is done to release shoulder dystocia during birth. ⁽⁹⁾

Risk factors for OBPI include: large birth weight, maternal multiparity, delivery assisted by forceps or vacuum, shoulder dystocia in previous labors and siblings with obstetric palsy. ⁽⁹⁾ Shoulder dystocia is a medical emergency. The risk factors for shoulder dystocia include: maternal diabetes, fetal macrosomia, maternal obesity, operative delivery, prolonged labor, multiparity, history of macrosomic infants, shoulder dystocia in prior pregnancy and fetal truncal asymmetry. ^(2,3)

Research indicates ^(2,3) that some cases with exceptional risks for shoulder dystocia can be pre-determined through ultra scanning. An ultra scan which shows a difference between the fetus' abdominal diameter and the biparietal diameter can indicate high risk for shoulder dystocia.

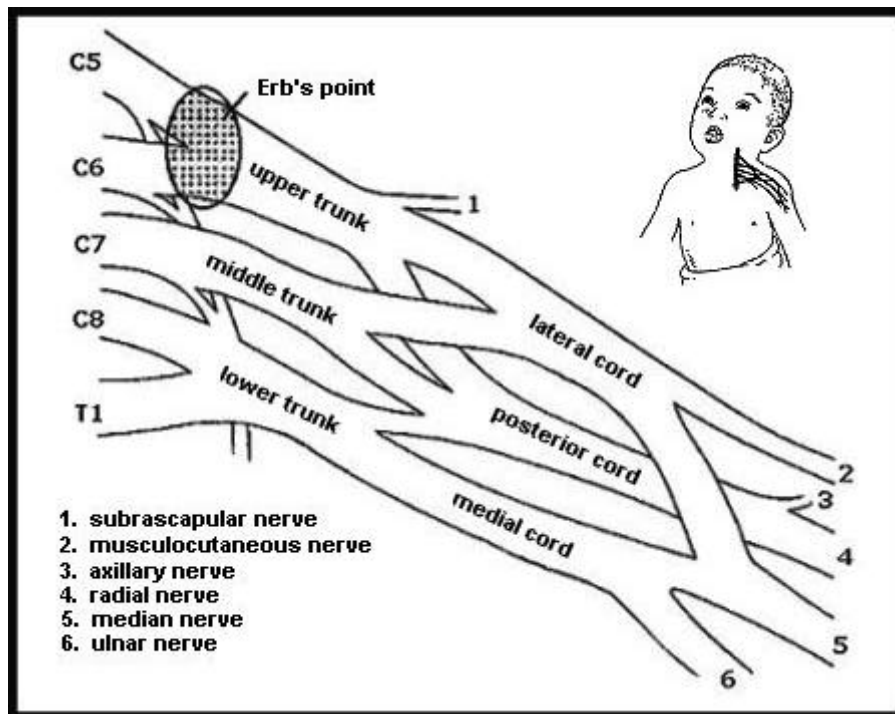
Diagnosis of OBPI

A brachial plexus injury is usually easily detected immediately following birth. The upper extremity is not actively moved and the passive range of motion is equal on both sides. ⁽⁷⁾ The clinician should examine the other limbs as well in order to rule out neonatal tetraplegia. ^(6,7)

A more precise diagnosis can be made 48 hours following birth. ⁽⁶⁾ The posture of the infant's arm can provide insight into details about the extent of the injury.

In upper root palsies the arm is internally rotated at the shoulder and the forearm is pronated. The elbow is extended in C5-C6 palsies, and when the C7 root is involved it can be slightly flexed. The wrist may be flexed, the classic “waiters tip” posture. The fingers may also be flexed and sometimes they will not extend. ^(4,6,7)

Upper root palsies are the most common type of brachial plexus birth injury and occur in 73% - 86% of the cases. ⁽⁴⁾



Total Plexus palsy is the most devastating injury to the brachial plexus. The arm is totally flail and the hand is clawed and without tone. The arm is anesthetic, pinching produces no reaction. Injury to the lower roots (Klumpke's palsy), which affects the muscles of the hand, is very rare. ⁽⁴⁾ Other injuries associated with OBPI include: fractures and luxations of the bones in the upper extremity (clavicle, humerus and metacarpal bones). ⁽⁷⁾ There may also be soft tissue injuries such as torticollis.

Trauma to other nerves can accompany the OBPI. Injuries to the upper (C5-C6) roots can damage the ipsilateral phrenic nerve, affecting the movement of the diaphragm on that side. Lower root palsies can affect the sympathetic nerve and cause Horner's syndrome, resulting in ptosis of the eyelid and pupil dilation.

If the injury seems severe other diagnostic tools are used as well, such as EMG, CT-myelography or MRI.

PROGNOSIS

Prognosis of the OBPI depends on the severity of the lesion. It is difficult to predict the scale of the lesion because these conditions vary individually. The reported incidence of full spontaneous recovery varies greatly in medical literature. The reported incidence has varied between 12% - 80%⁽⁷⁾, while some authors have reported full recovery in 90-95% of cases.^(4,9,11)

The C5-C6 root lesions have the most promising prognosis. When the C7 root is involved, the prognosis is less favorable. The most discouraging prognosis involve global lesions, when the arm is completely flaccid and the child has Horner's syndrome.^(7,11)

When the child has some contraction by the first month and a normal contraction by the second month, full spontaneous recovery can be expected.^(6,12) Good results can be expected when the child has some contraction of biceps and deltoid at the third month and full function by the fifth month.⁽⁶⁾ There can be residual weakness of the external rotation of the shoulder and slight weakness of elbow flexion and shoulder abduction.⁽¹²⁾ When contraction has not been observed by the third month, function will not usually recover to normal. These children will generally have some level of permanent disability.

Some authors have found that the root involvement level does not fully reflect the degree of disability.⁽⁸⁾ In particular, the eventual outcome of upper root lesions appears to be more complex than is previously believed.

The effects of limited shoulder movements on hand positioning appear to affect the hand functions as well. A recent study revealed the following: Even in the best group of children, those with no visible deficit by age 3 months, 30% will have residual, noticeable deficits by age 5 years. Those with visible deficits by the age of 3 months will have a 95% incidence of residual problems by age 5 years. Even in the best case scenario, where no obvious deficits remain by the age of 3 months, fully 3 out of 10 children will have significant functional deficits by the age of 5 years if untreated. In children with remaining problems after the age of 3 months, over 9 out of 10 children will have residual deficits by 5 years. Overall, 66% of children, or 2 out of 3, had severe problems by the age of 5 years.⁽⁸⁾

TREATMENT OF OBPI

The most important treatment is the Range Of Motion (ROM) exercises that parents do at home. Also physio therapy and occupational therapy play a important role in OBPI rehabilitation. Surgical intervention may be necessary if spontaneous recovery is not fast and complete enough. There has been a great deal of discussion regarding the timing of surgical intervention.

At one end of the spectrum, those with an aggressive approach to treating this injury favor operating at the age of three months if there has been no sign of biceps and deltoid contraction.⁽⁶⁾ More conservative authors have suggested that one can wait for recovery until the fifth, sixth⁽¹²⁾ or even ninth^(1,10) month of life before surgical intervention is recommended. When there is global

lesion, possibly with Horner's syndrome, most authors favor earlier reconstruction at the age of 1-3 months. There is little hope of spontaneous recovery in global lesions and early timing of the surgery can lead to better hand function. ⁽¹¹⁾

SEQUELAE DEFORMITIES

Sequelae deformities are due primarily to muscle imbalance and contractures in the upper extremity. The most common sequelae deformities may include: dislocation of humerus due to imbalance in the muscles of the shoulder area; forearm deformities - pronation or supination contractures; dislocations of the radial head; winging of the scapula; and hypoplasia of the bones in the upper extremity. Some of these deformities may need surgical correction.

In OBPI cases and in cases where the injury has occurred in childhood, length differences between the upper extremities may be observed.

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