Spinal Cord Injury in Cephalic Presentation

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Association between difficult delivery and spinal cord injury (SCI) at birth has been known since 1870(1). Majority of such injuries are seen following difficult breech extractions but SCI in cephalic deliveries are rare(2). With the improvement in obstetrical care, SCI have become rare and often uncertainty about its diagnosis exists during the early postnatal period. We report two cases of SCI in cephalic presentation and describe certain diagnostic and prognostic features that would help in the care of these infants.

Case Reports

Case 1: A male baby weighing 1964 g, 33 weeks gestation was born by low mid-cavity forceps because of fetal distress and abruptio placentae. He cried immediately at birth but thereafter, had poor respiratory efforts with weak cry and absent sponta-neous limb movements and deep tendon reflexes. He had a large caput with ecchymosis over right ear. His pupils were of normal size, reaction and extraocular movements were normal. He was provided ventilatory support soon after birth because of inadequate respiratory efforts. X-ray of the cervical spine showed doubtful distortion of the atlanto-occipital joint. Ultrasound of the cervical spine was reported as normal. There were no fractures. He was ventilated for 18 days with no improvement in muscle power and died of *Pseudomonas* septicemia.

At autopsy, the atlanto-occipital joint was torn with the underlying dura being visible. The atlas vertebra was displaced posteriorly. Microscopically, neutrophilic infiltration in the periphery of the spinal cord with small areas of necrosis was present:

Case 2: A second gravida at 40 weeks period of gestation was admitted to the hospital with the fetal head impacted at mid-pelvis. Attempts to deliver the head using vacuum and forceps failed and 3800 g, male baby was delivered as breech by cesarean section. There was no spontaneous respiration and he was given intermittent positive pressure ventilation. Examination revealed a large caput and an occipital cephalhematoma. Pupils were mid-dilated but reacting to light and extraocular movements were present. There was generalized flaccidity with absent tendon reflexes. There was alternate mottling and flushing of the skin all over the body. X-ray of the cervical spine showed fracture of the odontoid process.

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Cranial ultrasonography revealed a hemorrhage in the region of left thalamus and midbrain. The baby died at 16 hours of age without showing any improvement in the neurological condition. Autopsy confirmed fracture of odontoid process. In addition, there was posterior displacement of atlas with narrowing of the spinal canal and kinking of the underlying spinal cord.

Discussion

The newborn spinal column differs from the adult. The vertebral bodies are a series of elastic cartilages surrounded by inelastic tissue. Autopsy studies have shown that, while the spinal column can be stretched by as much as 2 inches without rupturing, the spinal cord gets ruptured when stretched beyond 1/4 inch(3). During delivery, if excessive traction is applied, especially if accompanied by lateral rotation, the entire spinal column may be stretched to the point of rupture of meninges and the spinal cord. The dura and leptomeninges rupture earlier than the spinal cord and damage to bony column is rare because of non-ossified vertebiae(l,3).

. According to level of injury and its effects on breathing, SCI are classified as: (a) upper cervical (above C_4), *(b)* cervicothoracic (C_4 to T_4), and (c) thoracolumbar (T_n to L_5)(4). Both the infants in the present report presented with apnea characteristic of upper cervical spinal cord injury since the lesion is above the spinal roots of phrenic nerve. Severe injury to spinal cord during cephalic delivery is distinctly a rare event. The injury in such cases is due to torsion and in most of the cases, there is history of forceps application or undue haste in the delivery of the head. The unstable atlantooccipital joint and other associated congenital malformations of the spinal column may also predispose to upper cervical SCI during cephalic delivery. Unphysiological forces may be delivered to the spinal column during labor if there is fetal maiposition(5). In both of our cases, forceps application was present and although the second case was delivered as breech during cesarean section, it was the earlier attempts with forceps which most probably resulted in SCI, since upper cervical SCI is extremely rare in breech deliveries. Thoracolumbar SCI is the commonest area of involvement following excessive traction in such cases(l,5).

At birth, it is often difficult to diagnose SCI, partly because of unawareness and also because of the associated intracranial lesions which may mask the characteristic physical features. Hemorrhages were present in the left thalamic and midbrain regions in case 2 and neurological obtundation could have been partly due to this. A history of something snapping during a difficult delivery may be present in some cases(l). The baby will be flaccid with absence of limb movements and deep tendon reflexes. Pupillary response and extra ocular movements will be normal and the baby will be alert unless there is significant intracranial pathology. Respirations could be absent (upper cervical SCI), paradoxic (cervicothoracic SCI) or normal (thoracolumbar SCI)(4). There is loss of grimace response to painful stimuli below the level of lesion. Autonomic disturbance in the form of alternate mottling and flushing as seen in case 2 and priapism are also seen in these babies(5). Some of the presenting clinical features may be due to spinal shock and would recover by 3 weeks of age and recovery beyond 3 months of age is unlikely (4).

Diagnostic imaging is essential both for

diagnosis and prediction of recovery. Among the various modalities of imaging, spinal ultrasound appears to be very promising and hence is recommended as the first modality of imaging(4). However, it should be remembered that changes are known to occur in the lesion over time and a single ultrasound may not pick up all lesions. Hence, it is not surprising that ultrasound of the cervical spine was found normal in *Case 1.* If ultrasound findings do not correlate with the clinical features, a second imaging technique such as MRI should be done. Skeletal lesions seen on plain radiograph of the spine or CT are relatively uncommon(l,4).

Infants with upper cervical SCI need long term life support for survival. Prediction of long term outcome is important before exercising the option of sustained life support measures, especially when resources are limited. From long term follow up studies of patients with upper cervical SCI, MacKinnon *et al.* (4) have found that those who are likely to recover fully will do so rapidly (usually by 3 weeks). Patients with very slow or no recovery of breathing or limb movements at 3 months of age, usually have a poor outcome. Associated intracranial lesions and infection, as in *Case 1,* also adversely affect the outcome.

REFERENCES

1. Stern WE and Rand RW. Birth injuries to the spinal cord: A report of two cases and review of literature. Am J Obstet Gynecol 1959, 78: 498-512.
2. Norman MG, Wedderburn LCW. Fetal spinal cord injury with cephalic delivery. Obstet Gynecol 1973, 42: 355-358.
3. Leventhal HR. Birth injuries of the spinal cord. J Pediatr 1960, 56: 447-453.
4. MacKinnon JA, Perlman M, Kirpalani H, Rehan V, Sauve R, Kovaes L. Spinal cord injury at birth: Diagnostic and prognostic data in twenty-two patients. J Pediatr 1993,122: 431-437.
5. Shulman ST, Madden JD, Esterly JR, Shanklin DR. Transaction of spinal cord: A rare obstetrical complication of cephalic delivery. Arch Dis Childhood 1971, 46: 291-294.

Congenital Gingival Granular Cell Tumor of Newborn

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Congenital granular cell tumor is a rare benign tumor involving gingiva in the neonatal period(l-3). The tumor has characteristic large granular cell histology, without any potential for recurrence or metastasis. Simple excision is the treatment of choice, however, spontaneous regression

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