

entation of the patients studied was also similar to that described earlier(4-6).

The prodromal symptoms were non-specific. However, during an epidemic a high index of suspicion even with non-specific symptoms is important to avoid provocative factors during this period. Provocative factors like trauma, intramuscular injections, tonsillectomy, etc. cause hyperemia of a particular segment of spinal cord thus increasing the concentration of the virus in that particular segment. These also disturb the blood brain barrier and enhance the possibility of paralytic manifestations(7). Intramuscular injection is the main provocative factor in rural areas. Nearly 37% of our cases had history of intramuscular injections, hence injudicious use of intramuscular injections should be avoided in an attempt to reduce or minimize paralytic poliomyelitis.

Since 5% of poliomyelitis cases were completely immunized, strengthening of the cold chain is necessary to ensure potency of the oral polio vaccine.

#### REFERENCES

1. Basu RN, Sokhey J. Prevalence of poliomyelitis in India. *Indian J Pediatr* 1984, 51: 515-519.
2. Basu RN. Poliomyelitis in India. *Indian Pediatr* 1991, 28: 589-592.
3. Saeed A, Kumar R, Srivastava AK, Rehoman H, Agarwal VK. An outbreak of poliomyelitis in Allahabad. *Indian Pediatr* 1980, 17: 757-761.
4. Sundaravali N, Narmada R, Sankar N, Mikandan P. Spurt in poliomyelitis in Madras. *Indian Pediatr* 1981, 18: 539-554.
5. Vijayan P, Mundan P, Shukoor AA, Panikar CKJ, Jacob John T. Epidemic poliomyelitis. *Indian Pediatr* 1981, 22: 569-573.
6. Deivanayagam N, Neduchelian K. Epi-

demiological and clinical features of acute poliomyelitis children admitted in an urban hospital. *Indian Pediatr* 1992, 1: 25-28.

7. Trueta G, Hoder R. Provoking and localizing factors in poliomyelitis an experimental study. *Lancet* 1954, 1: 998-1001.

## Iniencephalus Clauses

Raghavendra Rao  
Meenu Singh

Iniencephaly is a rare congenital malformation characterized by retroflexion of the head, severe defects of the spine, that always include an exaggerated cervicothoracic lordosis and often anterior or posterior spina bifida, and usually other internal anomalies(1). Three varieties of the condition are described; (i) iniencephalus clauses without encephalocele, (ii) iniencephalus apertus with a small encephalocele, and (iii) iniencephalus apertus with an encephalocele larger than the cranial contents. With rare exceptions, the condition is incompatible with life. We report here a case of iniencephalus clauses.

### Case Report

A full term boy was born to a 21-year-old primigravida by emergency Cesarean section. The antenatal period was unevent-

*From the Department of Pediatrics, Post Graduate Institute of Medical Education and Research, Chandigarh 160 012.*

*Reprint requests: Dr. Meenu Singh, Assistant Professor, Neonatal Unit, Department of Pediatrics, PGIMER, Chandigarh 160 012.*

*Received for publication: October 14, 1991;*

*Accepted: December 4, 1991*

ful. The baby was asphyxiated at birth and needed resuscitation. His birth weight was 2140 g and head circumference 35 cm. The head was retroverted with the face directed upwards. Neck was absent with scalp being continuous with the skin of the back, and the chin was small. Chest, abdomen and limbs were normal (*Fig.*). Radiological examination showed that vertebrae were reduced in number and some of them were fused.

Baby developed respiratory distress with cyanosis soon after birth and died 10 hours later. At autopsy the vault of the skull was normal but a large defect was found in occipital bone in the region of foramen magnum. Brain was normal but medulla and spinal cord were flattened anteroposteriorly. Both lungs were hypoplastic; the right lung being bilobed while the left lung was unlobed. A large atrial septal defect was present. Apart from normal spleen, a small splenunculus was present along the greater curvature of the stomach. The gastrointestinal tract and the genitourinary systems were normal.



*Fig. Photograph of the child with iniencephaly.*

## Discussion

Iniencephaly or deformity of the inion (nape of the neck) and brain is a rare congenital anomaly with less than 100 cases reported(1). It is thought to be due to some disturbance during the presomite-early somite stages of embryogenesis. During the third week of embryogenesis there is a concavity in the back between head and tail folds. Exaggeration of this concavity leads to approximation of head and tail folds resulting in iniencephaly. Simultaneous effect on other developing organ systems results in associated congenital anomalies(2).

The baby under discussion had iniencephalus clauses since no defect could be seen externally. However, a large defect in the region of foramen magnum was present which is a hallmark of this condition. This defect opens into a common cephalo-rachidian cavity containing both brain and spinal cord(2). In addition to retroflexion of head, defects of vertebrae and spinal cord are always present in iniencephaly. Vertebrae were reduced in number and some were fused in this case while the spinal cord was antero-posteriorly flattened. Hypoplastic lungs as seen in our case, are the commonest internal anomaly present in this condition. Other anomalies that have been described are anencephaly, hydrocephalus, cleft lip and palate, bifid uvula, deformed ears, fusion or defects of ribs, diaphragmatic hernia, single umbilical artery, omphalocele, situs inversus, horse shoe or polycystic kidneys(1), cyclopia, tracheo-esophageal fistula, abnormal location of thymus, single ventricle(3), Sprengel's deformity and club foot(4). Accessory spleens, as seen in our case, also are common. Even though most of the babies with iniencephaly are either still born or die soon after birth, survival beyond neonatal

period is known(4,5). We are not aware about the recurrence of this condition in subsequent pregnancies, though being a neural tube defect, such a possibility exists. Hence, appropriate antenatal screening for neural tube defects in subsequent pregnancies is warranted.

## REFERENCES

1. Winters RM. Malformations of the central nervous system. *In: The Malformed Fetus and Stillbirth: A Diagnostic Approach.* Ed Winter RM. New York, John Wiley and Sons, 1988, pp 109-112.
2. Willis RA. Iniencephaly and associated malformations. *In: The Borderland of Embryology and Pathology*, 2nd edn. Ed Willis RA. London, Butterworth and Company Ltd, 1962, pp 157-159.
3. Bhandari B, Tak SK, Mehta R, Agarwal RK. Iniencephaly with several rare associated anomalies. *Indian Pediatr* 1982, 19: 722-724.
4. Anand R, Sharma PP, Ratan ML, *et al.* Iniencephaly. *Indian Pediatr* 1988, 25: 692-694.
5. Mehta MH, Patel RV. Iniencephalus apertus. *Indian Pediatr* 1990, 27: 637-638.

## Causes of Early Neonatal Mortality

Y.S. Chavan  
M.S. Dattal  
V.V. Khadilker  
V.Y. Kshirsager  
A.V. Walimbe  
S.B. Shetti

Early neonatal period extends upto the 7th day or 168 hours of life(1). This period is very important in infant's life, because

75% of infant deaths occur within the first 28 days of life and most of them occur within the first 7 days(2).

This study was undertaken to find out causes of early neonatal mortality which are amenable to prevention and to know the present early neonatal mortality rate in the South West parts of India.

## Material and Methods

This is a retrospective hospital based study undertaken from 1-6-1987 to 31-5-1990. This data was obtained from Neonatal Care Section of Krishna Hospital attached to Krishna Institute of Medical Sciences, Karad, District Satara (M.S.). This teaching institute receives both booked and unbooked pregnant cases as well as high risk pregnant patients referred from periphery.

Karad is situated in South Western Maharashtra. This area is located in the sugarcane belt and the main profession of the villagers is agriculture. Most of the villagers are from the low socio-economic group. The females in rural areas have poor educational status. The literacy rate among Maharashtra females is 35% which is much lower than Kerala(3). Most of the deliveries in this area are conducted by the untrained Dais under unhygienic conditions.

The early neonatal mortality rate (ENMR) was defined as neonatal death of babies weighing over 1000 g during first 7 days per 1000 live births(1).

*From the Department of Pediatrics, Krishna Institute of Medical Sciences, Karad, District, Satara, (M.S.) 415 110.*

*Reprint requests: Dr. Y.S. Chavan, D-25, K.I.M.S., Karad, District Satara (M.S.) 415 110.*

*Received for publication : March 11, 1991;*

*Accepted : December 16, 1991*