Outcome of Babies Admitted with Hypoxic-Ischemic Encephalopathy in Neonatal Unit of Services Hospital, Lahore

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Objectives: To determine the outcome of newborns, admitted with different stages of HIE in Neonatal Unit, Services Hospital, Lahore. **Study design:** Descriptive Study. **Place and duration of study:** Neonatology Section, Pediatrics Department, Services Institute of Medical Sciences (SIMS) / Services Hospital, Lahore. Over a period of Six months, from 1st August 2005 to 31st January 2006. **Material & methods:** A total of 170 newborns having Apgar score less than 7 were included in the study. Babies with any congenital anomaly were excluded. **Results:** 80% were males. 17.64% had weight less than 1.5 Kg, 37.06% weight between 1.5 Kg to 2.5 Kg and 45.29% had weight more than 2.5 Kg. 90.5% of our babies were delivered in Services Hospital, Lahore. 77.64% babies were full term. Babies were divided into three groups; Group-I had Apgar score 0-3, Group-II between 4 & 5 and Group-III had Apgar score 6–7. In Group-I, 65% babies died, whereas 100% had any one of the complications, in Group-II, there were 22% deaths and no baby died from Group-III. **Conclusions:** Despite advanced technology, a high number of babies have HIE and its complications. It is better to prevent babies from HIE, because once HIE occur, you cannot save babies completely from its complications.
Key words: Hypoxic-Ischemic Encephalopathy, Birth Asphyxia.

In spite of major advances in monitoring technology and knowledge of fetal and neonatal pathologies, hypoxic-ischemic encephalopathy (HIE), remains a serious condition, causing significant mortality and long term morbidity in the past, the term HIE of the newborn and the perinatal asphyxia have been used, rather loosely, as synonyms. This misconception has led to HIE being considered a marker of perinatal obstetric mismanagement, one leading to many medico legal problems. The term birth asphyxia is also imprecise, and it use is not recommended because of the implication that intrapartum anorexia has occurred. Because the relationship between asphyxia and HIE cannot always be established, the newborn encephalopathy was proposed as an alternative to remove the medico legal implication of HIE[1,2].

Brain hypoxia and ischemia from systemic hypoxemia and reduced cerebral blood flow are the primary triggering events for HIE. HIE is diagnosed in 2 to 9 per 1000 term births, depending on how the clinical syndrome is defined[3,4,5]. Several systems have been created to measure the severity and monitor the progress of the encephalopathic signs and symptoms in neonates after a presumed hypoxic-ischemic insult. The system Sarnat and Sarnat created in 1976 is still one of the most popular and the basic for most modern systems.

In the last decade, infant morality has decreased along with decrease in incidence of HIE cases. It happened cause of improvement in antepartum and intrapartem medical management, demographic changes, along with factors associated with lower rates of infant mortality and morbidity, such as enhanced prenatal diagnosis and pregnancy termination for congenital anomalies[6,7,8], increased access to neonatal intensive care[9], and planned cesarean section for breach presentation.
In severe HIE, the mortality rate is as high as 50%. Half of the deaths occur in the first month of life. Some infants with severe neurological disabilities die in infancy from aspiration pneumonia and infections. Among infants, who survive severe HIE, the most frequent sequelae are mental retardation, epilepsy and cerebral palsy. Up to 80% of infants surviving severe HIE are known to develop serious complications, 10 – 20% develop moderately serious disabilities and up to 10% are normal. Among the infants, who survive moderately severe HIE, about 30-50% have serious long-term complications and 10-20% have minor complications. Infants with mild HIE tend to be free from serious CNS complications. Of school-aged children with a history of moderately severe HIE, 15–20% had significant learning difficulties, even in the absence of obvious signs of brain injury. Keeping view, these facts, study was planned to see immediate or short-term complications of HIE, in babies who were admitted in Neonatology section of Pediatric Department.

Materials and methods:
This was descriptive study and was conducted in the Neonatology section of Pediatric Department, SIMS/Services Hospital, Lahore, for a period of six months from 1st August 2005 to 31st January 2006. It's a Neonatal Intensive Care Unit and only sick babies are admitted. Most of our babies are delivered in any one of 4 units of Obstetrics of Services Hospital, Lahore, although, a major proportion is also referred from different private hospitals. All newborns, admitted with Apgar score of 7 or less were included in the study; however, any baby with congenital anomaly was excluded. Apgar score was calculated according to Table-I.

Researchers filled him a comprehensive questionnaire. Questionnaire has information about, mode of delivery, place of delivery, gestational age, Apgar Score, treatment during stay, duration of admission, any

complication and whether patient was shifted to any other hospital or left against medical advise.

Results:

A total of 170 newborns were included in the study. 80% were males (Table-I), 17.64% (30/170) had weight less than 1.5 Kg, 37.06% had weight between 1.5 to 2.5 Kg and 45.29% had weight more than 2.5 Kg (Table-II). As for as mode of delivery is concerned, 17.6% were delivered morally, whereas 64.1% were delivered by caesarian section (Table-III), 90.5% (154) of our babies were delivered in Services Hospital and only 2.3% (4) were delivered at home (Table-IV), 77.64% babies were full-term and 20% (34) were pre-term (Table-V). According to Apgar score at 5 minutes, babies were delivered into three groups. Group-I had Apgar score 0-3, Group-II between 4 and 5 and Group-III had Apgar score 6-7. Group-I had 11.76% (20) babies, whereas, Group-II and III had 40% and 48.2% babies respectively (Table-IV). 78.8% babies (134) were discharged and 16.47% died (28) (Table-VII). Stay in days in hospital varied in different groups (Table-VIII). Important complications observed were convulsions, Apnea, Necrotising enterocolitis (NEC), along with deaths. In Group-I, 13 (65%) babies died, whereas, 20 (100%) had one of the above complications, whereas, in Group-II, there were 15 deaths (22%) and no baby died from Group-III (Table-IX). In Group-I, all the babies had complications, like, convulsions in 18 babies, Apnea in 14 and NEC in 3 babies. In Group-II, only 12 had convulsions and 8 had Apnea, whereas, in Group-III, one baby had convulsions and one had Apnea (Table-X).

Table-I: Sex distribution

Sex	Number	%age
Male	136	80
Female	34	20

Table-II: Weight distribution

Weight	Number	%age
<1.5 Kg	30	17.64
1.5 – 2.5 Kg	63	37.06
>2.5 Kg	77	45.29

Table-III: Mode of delivery

Mode of Delivery	Number	%age
Normal	30	17.6
Episiotomy	27	15.8
Forceps	4	2.3
Caesarian	109	64.1

Table-IV: Place of delivery.

Place	Number	% age
Services Hospital	154	90.5
Private Hospital	12	7.05
Maternity Center	-	0
Home	4	2.3

Table-V: Gestational Age

Gestation	Number	% Age
Full Term	132	77.64
Pre-term	34	20
Post-term	4	2.35

Table-VI: Distribution according to Apgar score.

Group	Apgar Score at 5 Minutes	Number	%Age
Group-I	Apgar Score 0 – 3	20	11.76
Group-II	Apgar Score 4 – 5	68	40
Group-III	Apgar Score 6 – 7	82	48.2

Table-VII: Outcome of babies

Outcome	Number	%Age
Discharged	134	78.8
Shifted	3	1.76
Death	28	16.47
LAMA	5	2.94

Table-VIII:Outcome of babies according to groups (Apgar Score)

Groups	Duration of Admission				
	24 hours	1-3 days	4-7 days	8-14 days	> 14 days
I	-	-	1	11	8
II	8	-	22	30	8
III	31	18	6	18	9

Table-IX: Deaths

Groups	Deaths	% Age
I	13	65%
II	15	22%
III	Nil	Nil

Table-X: Complications

Groups	Complications	No.	%age
I	Convulsions	18	90
	Apnea	4	20
	NEC	3	15
II	Convulsions	12	17.65
	Apnea	8	11.7
	NEC	1	1.47
III	Convulsions	1	1.22
	Apnea	1	1.22
	NEC	-	-

Discussion:

Hypoxic Ischemic Cerebral injury that occurs during the perinatal period is one the most commonly recognized causes of severe, long-term neurological deficits in children. The principal mechanism underlying most of the neuropathology attributed to interpartum hypoxia ischemia is impaired cerebral blood flow. It had a wide range of complications and outcome is variable in developed countries as compared to poor countries[10]. In our study 80% were males, whereas 54.7% were low birth weight babies. ^4% of our babies were delivered by caesarian section, whereas, 17.6% were delivered normally, which is

quite different from a study conducted by Chishty et al., in children hospital, where, 84% born vaginally and 16% through C-section. 44% were born at home and 23% at different hospitals. This may be cause of the fact that Services Hospital had four units of Gynae and Obstetrics, whereas, in Children Hospital, all babies are referred from different areas. Mortality rate in their study is higher than our, may be cause of the reason that only very sick patients are referred to Children Hospital (II). Convulsions as complication occurred in (31/170) of babies, which is consistent with study conducted by Khreisat and Habehbeh at Prince Ali Ben Hussain Hospital, Jordan, who studied 9602 deliveries having Apgar score <7 at 5 minutes and documented incidence of convulsions in 12 out of 97 newborns. In his study, asphyxial deaths occurred in 22 out of 97 newborn infants[12]. In our study 77.64% babies were full term, this is consistent with the study conducted by Abbasi et al., in Children Hospital, Larkana. They have studies 150 cases of asphyxia. They observed that 81% babies were full term. They also observed higher incidence in males and their mortality rate was 25%[13]. Similar results were observed in a study at Bangladesh as well[14]. In our study apnea was found in (23/170) babies, which was also observed by Volpes in his study (15). In our study, we had Necrotising enterocolitis in four babies. Another important complication was prolonged stay in nursery of these babies. HIE has both immediate and remote complications. Our study had quite a good number of babies but it was limited to immediate complications. Unfortunately, our patients do not turn up regularly on follow-up so we could not extend our study to include long-term problems and complications. However, one thing is clear that depending upon severity of asphyxia, frequency of comp lications increases and mortality rate is very high in babies having 5 min Apgar score less than 3.

Conclusions:

- Despite advanced technology, a high number of babies have HIE and its complications.
- Prevent babies from HIE, because once HIE occur, you cannot save babies completely from its complications.
- A study should be planned, to follow the babies over years to observe the long-term sequelae/complications of HIE.

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