Original Article

CLINICAL COURSE AND OUTCOME OF INTRAVENTRICULAR HAEMORRHAGE IN HIGH RISK NEONATE

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ABSTRACT:

Objective: To ascertain the clinical course of intracranial haemorrhage and to determine the short-term outcome of the affected baby.

Design: This is a cross sectional prospective study.

Setting: Neonatal Ward of Khulna Medical College Hospital for a period of 15 months from January 2002 to March 2003.

Subjects: All the high-risk newborns admitted in Khulna Medical College Hospital were enrolled for this study. Low birth weight and perinatal asphyxia were regarded as the high risk factors.

Main outcome variables: Clinical features in relation to severity of haemorrhage and short term outcome.

Results: Twenty-one children (17.8%) out of 118 high-risk newborn developed intraventricular haemorrhage. Among 81 low birth weight babies 19 (23.5%) suffered from intraventricular haemorrhage. The commonest symptoms were refusal to suck; lethargy and signs were poor reflex and convulsion. Ten babies (47.6%) died within first two weeks of life and five recovered fully. The remaining 6 (28.6%) babies developed neurological sequleae.

Conclusion: The natural course and prognosis of babies with intraventricular haemorrhage can be monitored with clinical feature along with the aid of cranial ultrasound.

KEY WORDS: Intraventricular haemorrhage, Clinical course, Outcome.

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INTRODUCTION

Intraventricular haemorrhage (IVH) in newborn usually results from prematurity or perinatal asphyxia without apparent trauma.[1,2] Improvement in perinatal and neonatal care have increased the survival of high risk newborn which means there are more infants who are candidates to develop IVH than 20 years ago.[3]

Premature infant with IVH gradually deteriorates in first few days of life. Periods of apnea, pallor, cyanosis, high-pitched cry, muscular twitching, paralysis usually precedes coma.[4] Severe haemorrhage leads to neurodepression progressing to coma. Periventricular leukomalacia is asymptomatic until late infancy to present as spastic diplegia. Hypoxic Ischemic Encephalopathy (HIE) may be the cause or result of intraventricular

haemorrhage. The neuropathology depends on gestational period and levels of hypoxia. Infants demonstrate focal or multifocal cerebral infarcts that produce focal seizure and hemiplegia[5]. Most infants with IVH do not develop post haemorrhagic ventricular dilatation. Ten to twenty percent of Low Birth Weight neonates with severe IVH have hydrocephalus. IVH with intraparenchymal haemorrhage are associated with higher mortality and high incidence of motor and cognitive depression.[6] Detection of IVH through scanning of brain can be done by several ways. Currently ultra-sonography is the cheapest and most sensitive method of detecting IVH in newborn.[7,8]

The literature on IVH from developed countries are abundant but no such study has been done in Bangladesh.[9.10] The objective of this study was to ascertain the clinical course in relation to severity of IVH and to determine the short-term outcome of the affected baby.

PATIENTS AND METHODS

This study was conducted in Khulna Medical College Hospital for a period of 15 months between January 2002 to March 2003. All the admitted children in neonatal ward with low birth weight and perinatal asphyxia had undergone ultra-sonography. The cases having IVH of different grades were included for follow up.

Ultra-sonography of all high-risk cases was done on third day of life. Low birth weight (LBW) and perinatal asphyxia (PNA) were regarded as the high risk factors for this study. Newborn below 2.5 kg. were considered as LBW.[4] Cranial ultrasound scan were carried out via the anterior fontanelle in standard coronal and parasagittal sinus. IVH was graded as per volpes classification Grade I -Germinal matrix haemorrhage. Grade II – small IVH occupying 10-50% of ventricles. Grade III – Large IVH occupying >50% of ventricles and Grade IV – IVH with periventricular echodensity.[11]

Clinical features of these patients were noted in the predesigned proforma. Daily progress report was noted for this patient up to four weeks of age and status at discharge were recorded. Outcome was measured by fatality and clinical feature at the time of discharge. Treatment was mostly symptomatic. Anticonvulsants for convulsion, Blood transfusion for shock and sodabicarb for acidosis were used. Serial lumber puncture were not tried for anyone but osmotic diuresis were done in severe degree (Grade III & IV) of haemorrhage.[12]

Date after extrapolations were positioned in broadsheet and were transferred to tables and figures using descriptive analysis. Significance was mostly shown in percentage.

RESULTS

A total of 118 babies were observed out of which 81 (68.6%) were LBW (Table-I). Majority (54.3%) of them were female. Among the total cases 21(17.8%) babies had IVH (Table-II). Nineteen (23.5%) out of 81 LBW babies suffered from IVH.

Clinical features in relation to grade of haemorrhage are shown in Table-III. The commonest symptoms were refusal to suck, lethargy, and signs were poor reflex, convulsion. The features also had direct relation with the magnitude of haemorrhage. Table-IV displays short-term outcome of the babies. Ten babies (47.6%) died and five recovered fully. The bad prognosis was again directly related to the degree of haemorrhage. However two fatal cases developed additional problem, such as septicemia with grade III haemorrhage and Respiratory distress syndrome with grade IV haemorrhage.

Table-I: Distribution of newborn on birth weight and gender

Birth weight	*Male*	*Female*	*Total (Percentage)*
NBW	17	20	37(31.4)
LBW	37	44	81 (68.6)
Total	54	64	118(100)

(NBW – Normal birth weight, LBW – Low birth weight)

Table-II: Intraventricular haemorrhage in study cases (n=118)

Birth weight ± PNA	*Total cases*	*IVH*	*Percentage*
NBW+PNA	37	02	5.4
LBW	47	08	17.0
LBW+PNA	34	11	32.4
Total	118	21	17.8

(PNA – Perinatal asphyxia)

Table III: Clinical features of IVH in relation to grade of haemorrhage (n=21)

Symptoms/ Signs	*Grades of Haemorrhage (No. of Cases)*				*Total*
	I (2)	*II(6)*	*III(7)*	*IV (6)*	
Refusal to suck	2	4	5	5	16
Lethargy	2	4	4	5	15
High pitched cry	2	3	4	3	12
Apnea	0	2	3	1	06
Poor Reflex	1	2	3	3	09
Convulsion	1	2	3	2	08
Poor muscle tone	1	2	2	2	07
Bulging fontanelle	0	0	2	3	05

Table-IV: Short-term outcome of IVH in newborn (n=21)

Discharge Status	*Grades of Haemorrhage (No. of Cases)*				*Total (%)*
	I (2)	*II (6)*	*III (7)*	*IV (6)*	
Full Recovery	02	02	01	-	05 (23.8)
Partial Recovery	-	01	03	02	06 (28.6)
Death (Percentage)	- (0)	03 (50)	03 (42.9)	04 (66.6)	10 (47.6)

DISCUSSION

Intracranial haemorrhage is a common condition in premature infants but its incidence in mature asphyxiated baby is much less.[1] Although sub-dural haemorrhage is the best-described haemorrhagic lesion associated with birth asphyxia in full term infants, haemorrhage may occur in the ventricles from choroid plexus. Other predisposing factors for IVH include respiratory distress syndrome, pneumothorax and hypertension.[4] Immature blood vessel in the highly vascular periventricular area may be subjected to various forces that together with poor tissue support predispose the premature infants to IVH. It is diagnosed on the basis of history, clinical manifestation, transtentorial cranial ultrasonography, computed tomography and knowledge of the birth weight specific risk of the type of haemorrhage.[9,13]

In premature infants with intraventricular haemorrhage there is often a precipitous deterioration on the 2nd or 3rd day of life. Periods of apnea, cyanosis, failure to suck, abnormal eye sign and muscular twitching may be the first indication.[4] Severe intraventricular haemorrhage may lead to coma without any clinical manifestation.[10] Periventricular Leukomalacia (PVL) appears as white spot at the boundary zone of cerebral circulation in the immature brain. It is usually asymptomatic until the white matter necrosis manifest in later infancy as spastic diplegia. Sonographically PVL may present as echo dense phase (3-10 days of life) followed by the typical echolucent cystic phase (14-20 days of life).[14,15]

LBW and HIE are two major birth hazards in Bangladesh.[16] In our study we got 21 cases of IVH in high risk neonates (118) which represent 17.8% of total. The IVH in term baby with HIE was 5.4% but that in LBW cases was 23.5%. LBW with different grades of birth asphyxia (32.4%) suffered more than LBW alone (17.0%). Volpes in his study observed apnea and convulsion as commonest symptoms and signs respectively.[11] Our findings are quite

similar except that refusal to suck and poor reflex were the commonest feature.

Prognosis of IVH depends on gestational age and the severity of haemorrhage.[9] Gestational age could not be determined with accuracy so this attempt was abandoned. Ten babies (47.6%) died and all of them within first two weeks of life. Grade IV haemorrhage had maximum (66.6%) fatality. Although supportive treatment has been given, uncertainty remains about its impact. The associated problems in a few cases were septicemia and respiratory distress syndrome which is fairly common in LBW babies.[16] It is difficult to determine their contribution in clinical course and prognoses.

Murphy in his study found that IVH is the major predictor of short term outcome as indicated by death and disability.[1] Post haemorrhagic ventricular dilatation has gained much attention now a days as it is usually related with severe degree (Grade III & IV) of haemorrhage.[3] We could not follow up the cases beyond one month so long term fate could not be ascertained.

In conclusion, since mortality and handicap is an enormous problem in newborn with IVH, prognosis in these children can be better monitored by clinical feature along with cranial ultra-sonographic examination.

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