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ORIGINAL ARTICLE

Prevalence of Intraventricular Hemorrhage in Preterm Neonate

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ABSTRACT

Objective: This study was conducted to explore the incidence of Intraventricular Hemorrhage in preterm neonate.
Method: The study was conducted in the neonatal unit of the department of Pediatrics. It included all the preterm neonates under 36 weeks of gestational age who were admitted in neonatology unit. The study included both male and female babies. The age of babies at time of admission was <24 hrs. Cranial USG was done at the age of 1, 3, and 7 days.
Results: The incidence of IVH in these patients turned out to be 55%. According to age, patients less than 24hrs were 30(54.54%), patients between 24hrs to 72hrs were 17(30.90%) whereas patients between 72hrs to 7days were 7(12.72%).
Conclusion: The incidence of IVH in these patients turned out to be 55%.

INTRODUCTION

In preterm neonates, intraventricular hemorrhage and hemorrhage in germinal matrix tissue of developing brain with possible rupture into ventricular system and parenchyma remains a major problem.[1,2]

Especially in premature infants or with very low birth weight, intraventricular hemorrhage is particularly common.[3] The cause of IVH in premature infants is rarely due to trauma, unlike among older infants, children or adults. Instead, IVH resulted from alterations in complex structure of cells exists in the developing brain, amplified by the cerebral circulatory system's immaturity, that particularly susceptible to hypoxic ischemic encephalopathy. The death of cells is based on the deficiency of blood supply which later in deteriorates the walls of blood vessels resulted in bleeding. Although, such sort of bleeding can cause more injuries but it is also an indicator of present injury. It is found that most of the time, intraventricular hemorrhages take place after birth within 1st 72 hours.[3] In preterm newborn, the risk of intraventricular hemorrhage increases due to extracorporeal membrane oxygenation use.[4] Bleeding amount varies moreover. IVH is frequently defined in 4 grades:

- Grade I – germinal matrix bleeding
- Grade II – ventricular bleeding, however not enlarged
- Grade III – enlargement of ventricles due to the accumulation of blood
- Grade IV – extension of bleeding into the brain tissues around the ventricles.[4]

The clinical condition varieties from quick corrosion for instance, coma, decerebrate posturing, hypoventilation, fixed pupil, bulging fontenelle, hypotension, acute drop in hematocrit, acidosis to a more regular corrosion with more delicate neurologic alterations to lack of any neurologic and physiologic marks.[5]

There is a need to explore the incidence as well as the risk factors associated to IVH incidence in preterm neonates in Lahore as limited literature has been cited on this specific topic.

MATERIAL AND METHODS

This was prospective study conducted in the neonatal unit of a tertiary care hospital of Lahore. Data was collected in 9months from January 2021 to September 2021. Sample of the study was 100 patients among which 50 patients were admitted under IVH.

All preterm neonates under 36 weeks of gestational age admitted in NNU of the Department of Pediatrics of tertiary care hospital and both genders were included. A proforma was made which included weight, gestational age, delivery mode, antenatal, natal, and postnatal history. Neonatal examination was also performed.

Evaluation criteria: Intraventricular Hemorrhage was classified in to 4 grades of severity on the basis of cranial USG:

Grade 1; Subependymal (germinal matrix) hemorrhage with minimal or no intraventricular hemorrhage

Grade 2; Definite intraventricular hemorrhage but with neither ventricle filled with blood.

Grade 3; Intraventricular hemorrhage that completely fills and distends at least one lateral ventricle.

Grade 4; A germinal matrix hemorrhage with extension into the adjacent white matter and associated with intraventricular hemorrhage and ventricular enlargement.[4]

Data was entered in SPSS version 24.0. Frequency and percentage was calculated.

RESULTS

A total of 100 patients were included in the study among which 55% patients were admitted under IVH. Among those 55% patients, 58.18% patients were females whereas 41.81% were males.

Table 1: Incidence of Intraventricular Hemorrhage

Total no. of pts studied	100
Total no. of pts with IVH	55
%age of pts with IVH	55%

According to age, patients less than 24hrs were 30(54.54%), patients between 24hrs to 72hrs were 17(30.90%) whereas patients between 72hrs to 7days were 7(12.72%).

Table 2: Incidence of IVH according to age of patient

Age of patient	No. of cases with IVH	%age
< 24 hrs	30	54.54%
24 hrs – 72 hrs	17	30.90%
72 hrs – 7 days	7	12.72%

IVH occurred in 55 patients among which only 8 patients developed grade1 hemorrhage later on progressed to grade 2. In 2 patients, grade 2 hemorrhage progressed to grade 3. Whereas, no patient of grade 3 progressed to grade 4 until 7th day of life.

Table 3: Incidence of progression of IVH

Grade of IVH	No. of cases	%age
Grade 1 – 2	8	14.54%
Grade 2 – 3	2	3.63%
Grade 3 to 4	0	0%

Out of 55 patients in which IVH occurred, 8 patients developed unilateral IVH but rest of patients developed bilateral IVH. The incidence of bilateral IVH was significantly higher than unilateral IVH.

Table 4: Incidence of IVH in one lateral ventricle compared with IVH in both lateral ventricle

Total no. of patients with IVH	55	100%
no. of pts with unilateral IVH	8	14.54 %
No. of pts with bilateral IVH	47	85.45%

DISCUSSION

IVH is a common complication of prematurity.[3] Intraventricular hemorrhage occurs in 60 – 70% of neonate weighing 500 – 1000 gm and 10 – 20% of those weighing 1000 – 1500 gm.[6,7] In our study, the overall incidence of IVH turned out to be 45%. In one study most of IVH occurred by the third day of life.[3] In our study 97% of IVH occurred by third day of life. It means that incidence of IVH is inversely proportional to the gestational age.

In two similar studies, 43.5% of very low birth weight infant had evidence of IVH.[8,9] In our study incidence of IVH in babies weighing 1 kg and below was 93.75%, from 1.1 kg to 1.5 kg was 37.5 % and from 1.6 kg to 2.5 kg was 34.5%. It means that weight is a good predictor of IVH. According to one study done in 2009, prematurity and low birth weight are most important risk factors for grade 4 hemorrhage[9,10] which are in accordance with the finding of current study. RDS, sepsis/shock, hypoxic ischemic encephalopathy and pneumothorax were also recognized as contributory factors next to prematurity and low birth weight.[11]

Davies and Bilson showed that 90% of IVH occurred by 3rd day of life. 30% of hemorrhage increase in size in first week of life.[12] In our study 90% of IVH occurred by 3rd day of life. Only minor percentage of IVH occurred after 3rd day of life. Careful timing and management of delivery to avoid trauma and immaturity is important in prevention of IVH.[13] This is because prematurity and low birth weight are most important factors to cause IVH.

To conclude, the overall incidence of IVH under 36 weeks of gestational age is 55%. The lesser the gestational age, more is the incidence of IVH. The mortality rate is higher among babies with IVH especially of grade 2 or more. The factors like RDS, sepsis/shock, birth asphyxia and pneumothorax are important predisposing risk factors in causing IVH. RDS is most common risk factor attributed in causing IVH followed by sepsis/shock. The incidence of IVH can be decreased by preventing the risk factors and avoiding prematurity by delaying the labour. The risk factors can be decreased by judicious management of labour, avoiding RDS by administration of steroids to the mother, appropriate treatment of RDS and practicing aseptic techniques to prevent sepsis.

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