

Intraventricular Haemorrhage Amongst Preterm Babies-Preventive Role of Dexamethasone

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ABSTRACT

Objective: To determine the antenatal use of dexamethasone in preventing intraventricular haemorrhage (IVH) in preterm newborns. **Setting & Study Design:** Descriptive Case series study done in a prospective fashion at the Neonatal Unit (NNU) of the Department of Paediatrics in collaboration with the Department of Obstetrics and Gynaecology, Sheikh Zayed Hospital, Lahore. **Patients and Methods:** 210 women from the Obstetrics and Gynaecology Department, who gave birth to preterm babies from 01-05-2009 till 30-04-2010 were included in this study. They received dexamethasone, I/M, 6mg, in 4 doses, 12 hourly, antenatally. Deliveries were attended by trained paediatricians and new borns were followed up for any physical stress and birth asphyxia. The newborns were brought to NNU for postnatal care. Cranial ultrasonography (USG) was performed on these babies at 72 hours after delivery, at 1 week and then at 2 weeks of life. Outcome was recorded regarding presence or absence of IVH on cranial ultrasound at the end of 2 weeks. **Results:** The mean age of the mothers was 28.1 ± 4.3 years. The mean gestational age of the patients was 33.6 ± 1.6 weeks. In 191 (91%) neonates IVH was not present while IVH was present amongst 19 (9%) neonates. There were 6 (3%) patients of IVH Grade I, 10 (5%) patients of IVH Grade II and 2 (1%) patient of IVH Grade III. **Conclusion:** Dexamethasone is useful in prevention of IVH in preterm babies when it is used in the antenatal period.

Key Words: Intraventricular haemorrhage, dexamethasone, preterm deliveries.

INTRODUCTION

Any new born delivered before 37 completed weeks of gestation is considered preterm.¹ Globally approximately 7% of all babies delivered are preterm.² In Pakistan low birth weight (LBW) rate is around 21% out of which 30% are preterm.³ The rate of preterm birth has remained constant over the last 20 years.

Prematurity and its complications are major contributors to perinatal mortality.⁴ Complications associated with prematurity especially in very low birth weight infants *i.e.* <1500 gm are IVH 25%, periventricular leukomalacia (PVL), respiratory distress syndrome (RDS) 50%, necrotizing enterocolitis (NEC) 8% and patent ductus arteriosus (PDA) 20%.⁵ Brain injury in preterm infants result from IVH, periventricular haemorrhage and post-haemorrhagic hydrocephalus.⁶ The rate of IVH

varies between 15-25% and is static over the last decade.⁷ The risk of Intracranial haemorrhage decreases with increase in gestational age. Almost 75% cases occur between birth and 3rd day of life.⁸

IVH has four grades classified according to severity, and prognosis depends upon gestational age and severity of hemorrhage.⁹ As the survival of preterm infants has greatly improved in recent past, prevention of IVH and other complications is very important to improve the quality of life in these newborns.¹⁰

Both dexamethasone and betamethasone are used to prevent complications of prematurity.¹¹ As far as prevention of IVH is concerned dexamethasone is effective in 93.9% cases if given before delivery.^{12,13}

Intraventricular-periventricular hemorrhage (IVH-PVH) is the most frequent type of intracranial hemorrhage in premature infants and the major

cause of neurodevelopmental disabilities in children too. Antenatal corticosteroid treatment of premature infants reduced the incidence of IVH-PVH significantly.¹⁴

In Pakistan prematurity rate is quite high. The scientific evidence of efficacy of dexamethasone in preventing the complications of prematurity is not available in our set up. This study is therefore carried out to prove the usefulness of dexamethasone to prevent IVH in preterm babies in our set up.

Objective

To determine the antenatal use of dexamethasone in preventing IVH in preterm neonates.

Study design & setting

Descriptive Case series done in a prospective fashion at the NNU of Department of Paediatrics in collaboration with the Department of Obstetrics & Gynaecology, Sheikh Zayed Hospital.

PATIENTS AND METHODS

This study was conducted over a period of one year, from 01-05-2009 till 30-04-2010. The calculated sample size was 210 cases with 5% magnitude of error, 95% confidence level taking expected percentage of prevention of IVH with dexamethasone *i.e.* 93.9%. Non-probability purposive sampling technique was employed.

Preterm was defined as any new born delivered before 37 completed weeks of gestation. IVH was defined as haemorrhage into and around the ventricular system as assessed by Cranial Ultrasound. IVH was divided in four grades.

- **Grade I:** Bleeding confined to the germinal matrix subependymal region or to less than 10% of ventricle.
- **Grade II:** Intraventricular bleeding with 10-50% filling of ventricles.
- **Grade III:** More than 50% involvement with dilated ventricles.
- **Grade IV:** Grade III plus Intraparenchymal hemorrhage. Efficacy of antenatal use of dexamethasone was labeled if there was no

IVH on cranial USG at the end of 2 weeks.

Patients included in the study were pregnant women with singleton pregnancy between 30-37 weeks of gestation with onset of labor pains and receiving tocolytics and parity (P1, P2). Women having history of premature rupture of membranes. Intrauterine infections any comorbid illness like diabetes mellitus evaluated on the basis of history and blood sugar monitoring were excluded from the study. Those women were also excluded whose fetus had any congenital anomaly on antenatal scan.

Two hundred and ten women delivered at Sheikh Zayed Hospital Lahore who fulfilled the inclusion criteria were included in this study. An informed consent was taken regarding use of dexamethasone and using their personal data for the study purpose and the patients were assured that these details will be kept confidential. They received dexamethasone as per protocol in dosage of 6 mg, 4 doses 12 hours apart through intramuscular route.

Delivery was attended and newborns were followed up for any physical stress and birth asphyxia. Cranial ultrasound (USG) was done at 72 hours of life, at 1 week and then at 2 weeks of life. Outcomes were recorded regarding presence or absence of IVH on cranial ultrasound at the end of 2 weeks.

Statistical analysis

The collected data was entered into SPSS version 16 and analyzed through its statistical package. The demographics like age, maternal age, parity and gestational age were presented as mean and standard deviation. The final outcome, the development of IVH (present, absent) was presented by calculating frequency and percentage. Data was stratified for grades of IVH.

RESULTS

210 women delivered at Shaikh Zayed Hospital Lahore and fulfilled the inclusion criteria were included in this study.

The mean age of the mothers was 28.1 ± 4.3 years. There were 10 (5%) patients in the age range of 18-20 years, 46 (22%) patients in the age range of 21-25 years, 97 (46%) patients in the age range of

26-30 years, 51 (24%) patients in the age range of 31-35 years and 6 (3%) patients in the age range of 36-40 years (Table 1).

Table 1: Distribution according to the age of mother, parity, gestational age of the babies, presence/absence of IVH and grade of IVH.

Parameters	Number	Percent
Age of mothers (years)		
18-20	10	5.0
21-25	46	22.0
26-30	97	46.0
31-35	51	24.0
36-40	6	3.0
Mean±SD	28.1±4.3	
Parity		
Primigravida	48	23
Gravida 1-2	162	77
Mean±SD	1.2 ±0.8	
Gestational Age (weeks)		
30-32	52	25.0
32-35	139	66.0
35-36	19	9.0
Mean±SD	33.6±1.6	
IVH & Grades		
Absent	191	91.0
Present	19	9.0
I	6	3.0
II	10	5.0
III	3	1.0

In the distribution of patients by parity, there were 48 (23%) patients of primi parity, 162 (77%) patients of para 1 and para 2 (Table 1).

The mean gestational age of the patients was 33.6±1.6 weeks. There were 52 (25%) patients in the gestational age range of 30-32 weeks, 139 (66%) patients in the gestational age range of more than 32-35 weeks and 19 (9%) patients in the gestational age range of more than 35-36 weeks (Table 1).

In the distribution of neonates by IVH, there were 191 (91%) neonates in which IVH was not present and 19 (9%) neonates in which IVH was present (Table 1).

In the distribution of Grades of IVH, there were 6 (3%) patients of IVH Grade I, 10 (5%) patients of intraventricular haemorrhage Grade II

and 3 (1%) patient of intraventricular haemorrhage Grade III (Table 1).

While correlating IVH with parity it was found that 6 (31.58%) babies had IVH born to primi gravida mother while 13(68.42%) had IVH born to mothers with parity 1 & 2 (Fig.1).

When correlating between the incidence of IVH and the gestational age of the neonates, it was found that IVH was present in 13(68.42%) patients between 30-32 weeks of gestation, 6(31.58%) babies had IVH between 32-34 weeks of gestation (Fig. 2).

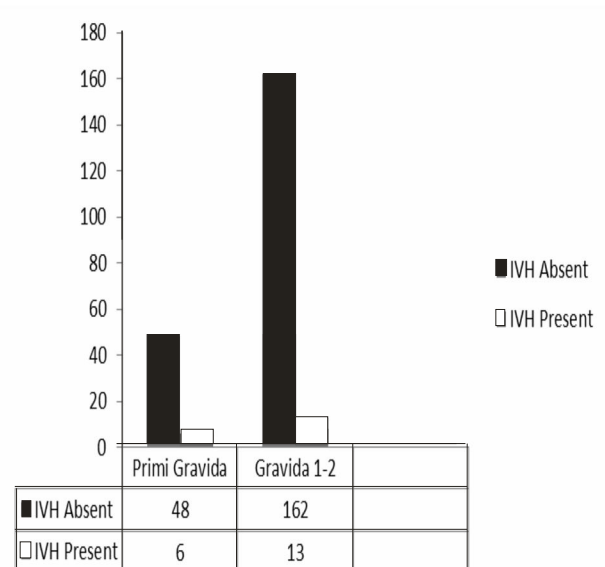


Fig. 1: Correlation between the parity of the mother and the incidence of IVH.

DISCUSSION

Approximately 7% of all babies delivered are preterm.² In Pakistan low birth weight rate is around 21% out of which 30% are preterm.³ The rate of preterm birth has remained constant over the last 20 years.

Prematurity and its complications are major contributors to perinatal mortality.⁴ Complications associated with prematurity especially in very low birth weight infants *i.e.* <1500 gm are IVH 25%, PVL, RDS 50%, NEC 8% and patent PDA 20%.⁵ Brain injury in preterm infants result from IVH, PVL and post-haemorrhagic hydrocephalus.⁶ The rate of IVH varies between 15-25% and is static

over the last decade.⁷ The risk of IVH decreases with increase in gestational age. Almost 75% cases occur between birth and 3rd day of life.⁸

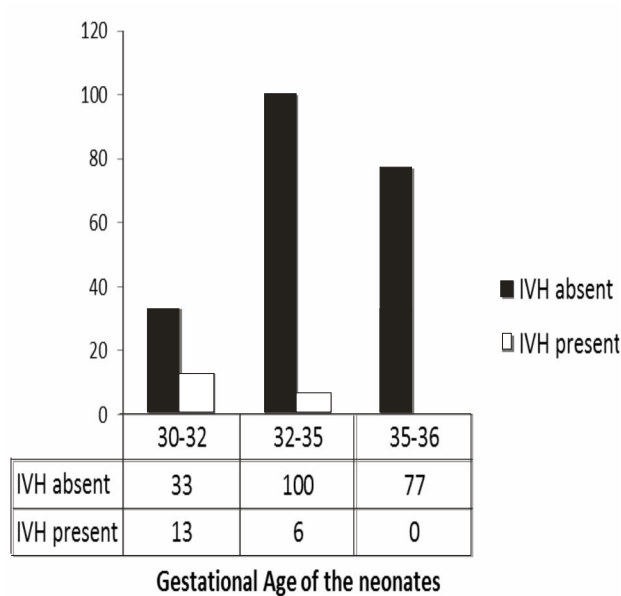


Fig. 2: Correlation between the gestational age of the neonates and the incidence of IVH.

IVH has four grades classified according to severity, and prognosis depends upon gestational age and severity of hemorrhage.⁹ As the survival of preterm infants has greatly improved in recent past, prevention of IVH and other complications is very important to improve the quality of life in these newborns.¹⁰

Both dexamethasone and betamethasone are used to prevent complications of prematurity.¹¹ As far as prevention of IVH is concerned dexamethasone is effective in 93.9% cases if given before delivery.^{12,13}

Intraventricular-periventricular hemorrhage (IVH-PVH) is the most frequent type of intracranial hemorrhage in premature infants and the major cause of neuro-developmental disabilities in children too. Antenatal corticosteroid treatment of premature infants reduces the incidence of IVH-PVH significantly. There is no statistically significant difference in Apgar score after 5 minutes, maternal parity, mean gestation age and mean birth weight between the experimental and

control group of IVH-PVH prematures.¹⁴

In our study, the use of dexamethasone prevented IVH in 91% cases when given before delivery. As compared with the study of Feldman et al¹² dexamethasone is effective in 93.9% patients in preventing IVH, while it was given before delivery, which is comparable with our study.

In our study 9% neonates had IVH, in which 3% had IVH grade I, 5% had IVH grade II and 1% had IVH grade III. As compared with the study of Sanghvi et al¹⁵, of which Grade I IVH occurred in 9, Grade II in 14, Grade III in 2 and Grade IV in one infant, which is comparable with our study.

CONCLUSION

It is concluded from the results of this study that dexamethasone can be used for prevention of IVH if given before delivery.

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