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A RETROSPECTIVE OBSERVATIONAL STUDY TO ASSESS THE ROLE OF FUROSEMIDE IN PREVENTION OF BRONCHO-PULMONARY DYSPLASIA IN PRETERM INFANTS(28-32WKS).

Neonatology

Dr. Sankar Narayan Mishra* Post Graduate Trainee, BMCH. *Corresponding Author
Dr. Kaustav Nayek Prof And Head, BMCH.
Dr. Taraknath Ghosh Prof., BMCH.
Dr. Mukut Banerjee Associate Prof., BMCH.
Dr. Jonaki Pal Post Graduate Trainee, BMCH.

ABSTRACT

1. BACKGROUND OF THE STUDY: Bronchopulmonary dysplasia (BPD) is the most common pulmonary morbidity associated with prematurity and pre- mature infants with BPD are at an increased risk of death and severe developmental disability .Despite the devastating impact of BPD on premature infants, there are currently no therapies labeled by the US Food and Drug Administration to prevent BPD. Neonatologists commonly use furosemide as off-label in premature infants.
2. OBJECTIVE: A. To evaluate the role of Furosemide in prevention of Bronchopulmonary Dysplasia in preterm infants.
3. METHODOLOGY: Details of total 350 babies admitted to SNCU and NICU of BMCH with gestational age between 28-32 weeksare included in this study for last 2 years (Nov,2019—Nov 2021). The data regarding exposure to Furosemide are searched retrospectively from medical records of the hospital.
4. RESULTS: Details of total 350 babies are taken in this study and among the total study population 47 babies died within 36 weeks of PMA of any cause . The percentage of BPD was found to be higher in non exposed group which is 43% in comparison to exposed group With 17% and which is statistically significant(p-0.0028).Odds of furosemide exposure among BPD cases is less than non BPD cases.(OR=0.26).83% babies weaned off from oxygen/CPAP/ventilator from 7th day to 36 weeks of PMA in exposed group in comparison to non exposed group(57%).
5. CONCLUSIONS: We found that a lesser percentage of Broncho-Pulomonary Dysplasia in the babies exposed to furosemide between birth to 36 weeks of PMA in premature infants. These results provide important preliminary data to support the development of prospective studies to evaluate the safety and efficacy of furosemide for the prevention of BPD in premature infant.

KEYWORDS

INTRODUCTION:

Bronchopulmonary dysplasia (BPD) is the most common pulmonary morbidity associated with prematurity, and pre- mature infants with BPD are at an increased risk of death and severe developmental disability. For infants with BPD who survive, the costs of the disorder are measured inimpaired child-hood health and quality of life, family stress and economic hardship, and increased healthcare costs.

Despite the devastating impact of BPD on premature infants, there are currently no therapies labeled by the US Food and Drug Administration to prevent BPD. Off-label therapies shown to decrease the risk of BPD have limitations, including the need for further studies to determine optimization of timing and duration of therapy. Neonatologists commonly use furosemide as off-label in premature infants. Furosemide is a loop diuretic that inhibits the reabsorption of sodium and chloride in the kidney's proximal tubules, distal tubules, and Loop of Henle.

Previous small studies have suggested that furosemide improves lung compliance, airway resistance, and oxygenation in premature infants, but no randomized, controlled trials of furosemide to prevent BPD have been performed. The objective of this study was to evaluate whether furosemide exposure is associated with a decreased risk of BPD in premature infants.

OBJECTIVE:

1. To evaluate the role of Furosemide in prevention of Bronchopulmonary Dysplasia in early preterm infants(28wks-32wks).
2. To estimate the burden of Bronchoulmonary Dysplasia in early preterm infants.

METHODOLOGY:

Type of study: Hospital based retrospective observational study
Place of the study: SNCU and NICU of Burdwan Medical College and Hospital
Sample Size: 350 babies with gestation age between 28-32 weeks .
Study period: Nov,2019—Nov, 2021
Study Population: Babies admitted to SNCU/NICU of BMCH with gestation age between 28-32 weeks are included in this study for last 2 years. The data regarding exposure to Furosemide are searched retrospectively from medical records of the hospital.

Inclusion Criteria:

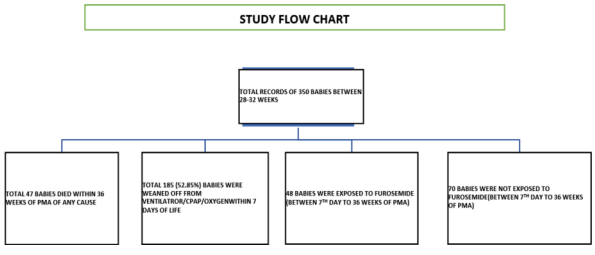
1. We Considered Minimum 5 Days Furosemide Therapy As Exposure Among The Babies Between 7th Day Of Life To 36 Weeks Of Pma/discharged.

Exclusion Criteria:

1. Babies Died Within 36 Weeks Of Post Menstrual Age.
2. Already Weaned Off Rom Oxygen/cpap/ventilator Within 7 Days.

	Gestational Age	
	< 32 weeks	≥32 weeks
Time of assessment	36 weeks PMA or discharge	>28 days and <56 days postnasal age or discharge
	Treatment with oxygen >21 % for 28 days	
Mild BPD	Room air at 36 weeks PMA/discharge	Room air at 56 days postnatal age/discharge
Moderate BPD	Need <30% O_2 at 36 weeks PMA/discharge	Need <30% O_2 at 56 days postnatal age/discharge
Severe BPD	Need ≥30% O_2 and/or positive pressure ventilation at 36 weeks PMA/discharge	Need ≥30% O_2 and/or positive pressure ventilation at 56 days postnatal age/discharge

Table;the Definition Of Bpd Used In This Study: Given By Nih:



RESULTS:

1. Total 13.42% babies died out of 350 babies taken into the study. Total 185(52.85%) babies weaned off from oxygen/ CPAP/ ventilator within seven days of life.
2. In our study , In exposed group 44% were boys and 56% girls and in non-exposed group 48% were boys and 52% were girls.(p value-0.5848).
3. Mean gestational age In exposed group is 30.1 weeks in comparison to non-exposed group(29.8 weeks).(p value- 0.11).
4. The mean birth weight of exposed group is 1.29 KG and mean Birth weight for non-exposed group is 1.31 KG.(p- 0.5312).
5. 87% of babies from exposed group and 89% of babies from non-exposed group were given lung surfactant during first 48 hours of life.(p value: 0.8282).
6. 100% babies received injection caffeine citrate during the period of hospital stay.
7. Among exposed group 20.83% had Patent Ductus Arteriosus and in non exposed group that is 16%.(p-0.6371). 8.40% babies from exposed group and 45% to babies from non-exposed group had RDS(Respiratory Distress Syndrome).(p value-0.7053).
9. 93% of babies from exposed group and 96% of babies from non-exposed group had history of antenatal steroid injection to mother.(p value-0.5371).
10. 31% baby had Birth Asphyxia in exposed group and 36% of babies had Birth Asphyxia in non exposed group (p value :0.69).
11. From exposed group 29% of babies and from not exposed group 20% of babies had illnesses other than RDS and Birth Asphyxia. (p value: 0.2765).
12. The percentage of babies weaned off fromth oxygen/ CPAP/ ventilator from 7day to 36 weeks of PMA/ discharged (Less than four weeks of postnatal oxygen therapy) is 83% in exposed group in comparison to non- exposed group and that is 57.14%.(Odds ratio is 3.75, P value is 0.0028.The association is statistically significant.
13. The percentage babies exposed to furosemide developed Bronchopulmonary dysplasia is 17% in exposed group in comparison to non-exposed group and that is 43%.(odds ratio is 0.26, P value is 0.0028. This association is statistically significant.
14. The Mean age at which the babies were weaned off from oxygen/CPAP/ventilator between 7th day to 36 weeks of PMA(less than four weeks of oxygen therapy) in exposed group is 13 days and in non-exposed group it is 22 days.(p value-0.0001). This association is statistically highly significant.

VARIABLES	EXPOSED TO FUROSE MIODE	NOT EXPOSED TO FUROSEMIDE	ODDS RATIO	p-VALUE
Weaned off from oxygen/cpap/ventilator from 7Th day to 36 weeks of PMA(LESS THAN 4 WEEKS OF OXYGEN THERAPY)	**40**	**40**	**3.75**	**0.0028**
Diagnosed to have Broncho-pulmonary Dysplasia	**8**	**30**	**0.26**	**0.0028**
MEAN DAY OF OXYGEN REQUIREMENT	**13**	**22**		**0.0001**

TABLE- RESULTS:

DISCUSSION:

We found that a lesser percentage of Broncho-Pulomonary Dysplasia in the babies exposed to furosemide between birth to 36 weeks of PMA in premature infants.

These results provide us important preliminary data to support the development of prospective studies to evaluate the safety and efficacy of furosemide for the prevention of BPD in premature infants.

INTERPRETATION:

The risk factors for Bronchopulmonary Dysplasia are prematurity, VLBW and ELBW babies, more days spent in mechanical ventilation or oxygen therapy causing barotrauma or atelectrauma , associated heart disease, inadequate antenatal steroid.

Though Furosemide has several side effects like hyponatremia, hypokalemia, alkalosis, azotemia ,

hypocalcemia, hypercalciuria, cholelithiasis, renal stones, nephrocalcinosis and Ototoxicity on long term use.

We have to assess the risk benefit ratio of giving furosemide to early preterm infants as Bronchopulmonary Dysplasia has dreaded consequences.

Further prospective study may resolve the issue.

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