



RESEARCH ARTICLE

IN HOSPITAL CLINICAL COURSE AMONG EXTREMELY LOW BIRTH WEIGHT BABIES ADMITTED IN A TERTIARY CARE CENTRE IN NORTH KERALA-A RECORD BASED STUDY

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Abstract

Extremely low birth weight (ELBW) newborns, those babies weighing less than 1 kilogram at birth belongs to a unique group with increased morbidity and mortality. A retrospective hospital record based study was conducted in a tertiary care center in North Kerala over a period of 2 months to study the immediate postnatal events among extremely low birth weight babies and their maternal risk factors. Among the 55 babies included in this study, the survival rate is 63.6 % which is comparable to other Indian studies. Most common morbidity observed is respiratory distress syndrome and second most common is neonatal jaundice. Among maternal risk factors, abnormal antenatal Doppler is the most frequent entity.

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Introduction:-

Neonatal death contributes 47 % of all death in children under 5 years of age world wide as per WHO data (1). Among this majority babies are born either as low birth weight or as preterm.

Extremely low birth weight (ELBW) newborns are defined as babies weighing less than 1 kilogram at birth (2). They belong to a unique group with increased morbidity and mortality. Several maternal factors are also responsible for being born with extremely low birth weight and also for the complications associated with these babies.

Through this study immediate morbidity and mortality are studied among ELBW babies along with maternal risk factors in a tertiary care centre in North Kerala.

Materials And Methods:-

A retrospective hospital record based study was conducted in a tertiary care centre in north Kerala over a period of 2 months. All consecutively born ELBW babies from January 2022 to December 2022 admitted in the Neonatal Intensive Care Unit of Government Medical College, Kannur, Pariyaram were included in this study. The antenatal, natal and postnatal details were collected from patient's and mother's medical records. Maternal factors studied are parity, previous preterm delivery, pregnancy induced hypertension (PIH), gestational diabetes mellitus (GDM), urinary tract infection (UTI), preterm premature rupture of membrane (PPROM), anaemia complicating pregnancy, abnormal Doppler study in antenatal Ultra sonogram and administration of antenatal (AN) steroids. Neonatal outcome included is post natal death occurred during hospital stay and the immediate postnatal events studied are respiratory distress syndrome (RDS), neonatal jaundice, shock, apnoea of prematurity, anemia, thrombocytopenia,

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Acute Kidney Injury(AKI),sepsis, necrotising enterocolitis, intraventricular haemorrhage, Patent Ductus Arteriosus, Hypoglycaemia, neonatal seizures, pulmonary haemorrhage, pneumothorax, polycythaemia, disseminated intravascular coagulation and Broncho pulmonarydysplasia. Maternal details and immediate postnatal events were entered in the profoma. Statistical analysis was done with SPSS version 26. Continuous variables were expressed as mean $\pm$ standard deviation and discrete variables as frequency and percentage. Statisticalsignificance was tested by chi square test and P value less than 0.05 were considered as statistically significant.

Results:-

Total of 55 ELBW were included in this study and all were admitted in NICU of GMC Kannur.

Among this 32 babies (58.2 %) were small for gestational age (SGA) and 23 were appropriate for gestational age (AGA). Babies born by vaginal delivery were 25(45.5%) and by lower segment caesarean section (LSCS) were 30 (54.5 %).Mean birth weight of babies included in this study was 791.91 $\pm$ 138.86 and the gestational age range from 25.60 weeks to 31.01weeks.

Among these ELBW babies 35 (63.6%) survived and 20 succumbed to death (36.4%).The mean NICU stay was 22.07 $\pm$ 18.23days.43(78.2 %) babies needed mechanical ventilation with mean duration of 3.44 $\pm$ 3.2 days in SIMV mode of ventilation. Average duration in CPAP was 3.76 $\pm$ 4.56days and there after 6.22 $\pm$ 6.66 days of O2 support was also needed for these babies. Amongst 51(92.7%) babies who developed RDS, 44 babies (80%) required surfactant therapy.

Average maternal age of this cohort is 26.91 $\pm$ 5.35 years. Among the studied maternal risk factors, an abnormal Doppler study in ante natal USG is the most frequent entity (28 and 50.9%) and second is PIH (26 and 47.3%).

32(58.2%) mothers were given antenatal steroids and it had a significant effect on morbidities but not on survival. Among babies born to mothers who received antenatal steroids,22 babies survived and only 13 babies survived in the other group (P=0.352).But a significant association existed between AN steroids and need for mechanical ventilation (P= 0.046) and administration of surfactant (P=0.013).

Through this study no association could be proved for PPROM and culture positive sepsis. Maternal anaemia does not have any association with anaemia in new born suggested by a P value of 0.479.

Data was analysed for assessing neonatal morbidity (table 2). The most frequent outcome in a newborn with ELBW in this study is development of RDS as 92.7% babies had this condition. Next to this comes development of neonatal jaundice (74.5%) during the NICU stay. Among the 35 babies who had survived, 11(31.4%) developed Retinopathy of Prematurity (ROP) and 4 babies required laser treatment.

Discussion:-

Extremely low birth weight babies comprises a small proportion of total live births, but constitute majority of NICU admissions.This is mainly due to the expected morbidities associated with these cohort. Optimal care in new born nurseries, more knowledge about the pathology of their clinical conditions, in utero transport to higher centres and better availability of ventilatory support and surfactant therapy drastically improved the outcome.

In this study survival among ELBW neonates is 63.6 % .Similar studies conducted in tertiary care centres in India during the last 20 years showed survival rates ranging from 52-62 % (3,4,5,6).But a study conducted in South India during 2017-18 showed survival up to 75.5%(12). Our survival rate is also comparable to a study done in China (55.11% survival rate) during 2008-17 (14).In the present study SGA babies constitute 58.2 %, whereas in other Indian studies it ranges from 36%-63 % (4, 7).

Most common morbidity in this cohort is RDS (92.7%) in which majority required therapy with exogenous surfactant. It can be mainly because of the associated prematurity in ELBW babies. A similar study on low birth weight neonates conducted in Telangana, most common morbidity was neonatal jaundice and second to that is RDS (8). A study conducted in a tertiary care centre in North India revealed respiratory distress syndrome (n = 132, 57%), moderate-to-severe bronchopulmonary dysplasia (n = 62, 26.8%) and hemodynamically significant patent ductus arteriosus (n = 65, 28%) as the major morbidities among ELBW babies(3).

Maternal clinical profile and its effects on survival of the ELBW babies are also an important aspect of this study. 47.3 % of mothers had PIH and 20% had GDM, both these factors can be a cause of LBW babies proven in previous studies (9). 23.6 % mothers included in this study are anaemic, but it doesn't have any significant effect on anaemia in newborns. Some studies suggest maternal anaemia as a cause of low birth weight (9).

It is an established fact that antenatal corticosteroids will decrease the possibility of RDS (10, 11). A large prospective cohort study conducted in 2009-13 also proved the lower mortality and morbidity associated with exposure to antenatal steroids (13). Maternal antenatal steroids and its positive impact on requirement for mechanical ventilation and surfactant therapy is reconfirmed in this study. But our study could not establish significant relation between antenatal steroids and mortality.

Table 1:- Maternal clinical profile.

Maternal profile	Frequency	Percentage
Previous preterm gestation	12	21.8
Primi	26	47.3
Multiple pregnancy	11	20
PIH	26	47.3
GDM	11	20
UTI	15	27.3
PPROM	20	36.4
Anemia	13	23.6
Abnormal Doppler	28	50.9
Antenatal steroid	32	58.2

Table 2:- Immediate postnatal events.

Outcome	Frequency	Percentage
RDS	51	92.7
Neonatal jaundice	41	74.5
Shock	40	72.7
Apnea of prematurity	36	65.5
Post natal death	29	52.7
Anemia of prematurity	27	49.1
Thrombocytopenia	27	49.1
Blood transfusion	27	49.1
AKI	21	38.2
Probable Sepsis	20	36.4
DIC	15	27.3
High TSH	14	25.5
NEC	13	23.6
PDA	12	21.8
IVH	12	21.8
Hypoglycemia	9	16.4
Pulmonary Haemorrhage	8	14.5
Pneumothorax	7	12.7
Culture positive sepsis	6	10.9
BPD	6	10.9
Neonatal seizures	5	9.1
Polycythemia	1	1.8

Limitation

It is a hospital record based study and hence it cannot be generalised to the general population. The relatively large number of SGA babies compared to other studies may be because it was done in a tertiary care hospital. There was no long term follow up done through this study, so only immediate post natal events could be studied.

Conclusion:-

ELBW babies are associated with increased risk of mortality and morbidity. The survival rate of ELBW babies in this study is 63.6 %, which is comparable to other Indian studies. Most common morbidity observed is RDS, however need for ventilation was lesser in babies of mothers who received antenatal steroids. The second frequent morbidity was neonatal jaundice. Among maternal risk factors, abnormal antenatal Doppler is the most frequent entity.

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Conflict of interest:

None declared.

Ethical Approval:

Obtained from institutional ethical committee.

Reference:-

- 1.WHO. Neonatal mortality. WHO. http://www.who.int/gho/child_health/mortality/neonatal_text/en/.
- 2.Steven A.Ringer.Cloherly and Stark's manual of neonatal care.8th edition:Wolters Kluwer,2017.p158
- 3.Sahoo T, Anand P, Verma A, Saksena M, Sankar MJ, Thukral A, et al. Outcome of extremely low birth weight (ELBW) infants from a birth cohort (2013-2018) in a tertiary care unit in North India. J Perinatol [Internet]. 2020;40(5):743–9
- 4.Sehgal A, Telang S, Passah SM, Jyothi MC. Maternal and neonatal profile and immediate outcome in extremely low birth weight babies in Delhi. Trop Doct. 2004;34(3):165–8.
- 5.Mukhopadhyay K, Louis D, Mahajan R, Kumar P. Predictors of mortality and major morbidities in extremely low birth weight neonates. Indian Pediatr. 2013;50(12):1119–23.
- 6.Tagare A, Chaudhari S, Kadam S, Vaidya U, Pandit A, Sayyad MG. Mortality and morbidity in extremely low birth weight (ELBW) infants in a neonatal intensive care unit. Indian J Pediatr [Internet]. 2013;80(1):16–20.
- 7.Narayan S, Aggarwal R, Upadhyay A, Deorari AK, Singh M, Paul VK. Survival and morbidity in extremely low birth weight (ELBW) infants. Indian Pediatr. 2003;40:130–5.
- 8.Pabbati J, Subramanian P, Renikuntla M. Morbidity and mortality of low birth weight babies in early neonatal period in a rural area teaching hospital, Telangana, India. Int J Contemp Pediatr. 2019;6(4):1582
- 9.Pawar A, Kumar D. Maternal factors associated with low birth weight: a case control study in rural Kerala. Int J Community Med Public Health. 2017;4(10):3793
- 10.Heljić S, Maksić H, Kalkan I, Krdalić B. The effects of antenatal corticosteroids and surfactant replacement on neonatal respiratory distress syndrome. Bosn J Basic Med Sci [Internet]. 2009;9(3):225–8.
- 11.McGoldrick E, Stewart F, Parker R, Dalziel SR. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. Cochrane Database Syst Rev [Internet]. 2020;12(2):CD00445
- 12.Venkataramana KPN, Kumar VH, Kumar NC, Sundaram S, Dhanalaksmi A. Survival and neurodevelopmental outcome of extremely-low-birth-weight infants at one year of age—A prospective, descriptive study. Indian J Pediatr
- 13.Travers CP, Clark RH, Spitzer AR, Das A, Garite TJ, Carlo WA. Exposure to any antenatal corticosteroids and outcomes in preterm infants by gestational age: prospective cohort study. BMJ
- 14.Jia C-H, Feng Z-S, Lin X-J, Cui Q-L, Han S-S, Jin Y, et al. Short term outcomes of extremely low birth weight infants from a multicenter cohort study in Guangdong of China. Sci Rep [Internet]. 2022;12(1).