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Extremely Low Birth Weight in Preterm Newborn: A Case Report

Winnie Choni Barawa[1], Joy Dama Lewa[2], Priscillah Kadziru Makazi[3]

[1]Department of Nursing, Kenya Medical Training College, Kenya

[2]High Dependency Unit, KEMRI Wellcome Trust, Kilifi Kenya

[3]Newborn Unit, Kilifi County and Referral Hospital, Kenya

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Abstract

Aim: The aim of the case report is to describe the management of Extreme Low Birth Weight Infant with presentations of prematurity, RDS and anemia.

Methodology: A 20-year-old primipara was admitted in our hospital at 24 gestational weeks. The mother had premature rupture of membrane with oligohydramnios which was confirmed through ultrasound. The labor was augmented and mother delivered via spontaneous vaginal delivery at 26 gestational weeks, a live female infant at 690g birth weight with APGAR of seven at 1 minute, seven at 5 minutes and eight at 10 minutes. The infant first examination showed chest indrawing, deep breathing (R=61cycles/min, Pulse=113b/mins) and prostration (++), blood sugar (8.6mmols) and temperature of 34.3oc. The child also developed jaundice and anemia. Child was managed on maintenance fluids, nasogastric tube feeds, oxygen therapy and antibiotics 1st line, expressed breast milk, kangaroo Mother care (KMC), IPC and vital monitoring. The child was discharged at 54th day of life stable with no noted developmental delays.

Findings: Specific problems that should be considered among the ELBW infants include thermoregulation, respiratory distress syndrome, cardiovascular problems, CNS, electrolyte imbalance, impaired glucose homeostasis, infection bronchopulmonary issues, ROP and anemia in prematurity. Our case had predominant presence of ineffective thermoregulation, RDS, electrolyte imbalance, anemia and risk for infections. Therefore, the survival and development of extremely low birth weight infants depends on holistic multidisciplinary approach during intrapartum, hospital stay and 1 year after discharge.

Unique Contribution to Theory, Policy and Practice: The case emphasizes on the need for early initiation of keen monitoring and implementation of holistic management on premature and ELBW babies to prevent complications and improve on survival rate and outcomes. The case report highlights key problems that are manifested among ELBW infants and proper initiation of management immediately after birth can improve outcome and survival of the infant.

Key Words: *Prematurity, Extremely Low Birth Weight (ELBW), respiratory distress syndrome (RDS), Anemia, Kangaroo Mother care (KMC).*

INTRODUCTION

Preterm babies are born before 37 weeks gestational age while extreme low birth weight infants are born with a birth weight of below 1,000g regardless of gestational age (WHO, 2024) and majority of these cases occur in low- and middle-income countries, (Berhane et al, 2019), (Devaguru et al, 2023). In Kenya, the prevalence of prematurity is estimated at 12 per 100 live births and 10.5% are reported cases of low birth weight in 2022 (KDHS). The incidence of low birth weight in Kilifi County was estimated at 32 per 1000 live births with a prevalence 15% according to Musau et al (2023).

In preterm babies, risks increase as the gestational week (GW) and birth weight (BW) decreases, (Yesinel et al, 2015). ELBW (<1000g) commonly occurs at 27 weeks' gestation or earlier with a survival rate of >80% for advanced gestations and >50% for 23-24 GW. Female gender, higher gestational age and birth weight are reported to be significant predictors of decreased morbidity in ELBW babies, (Cherepnalkovski et al, 2021). Complications of preterm birth and extreme low birth weight contribute to 25% - 50% of neonatal deaths globally. Additionally, preterm and ELBW infants have higher likelihood of developmental disabilities in their lifetime increasing incidences of chronic conditions such as obesity and diabetes during adulthood, (Grillo et al, 2022), (WHO, 2024). Little is known about best practices in treating extremely low birth weight (ELBW) babies for instance neonatal resuscitation for babies >22 gestational Age, (Shitara et al, 2021). Therefore, proper management and care of extremely low birth weight newborn, follow up and treatments by an experienced team is helpful to reduce mortality and morbidity. In this report, we present a case of extremely low birth weight (ELBW) female infant of whom survived and discharged from Kilifi County and Referral Hospital, Kenya.

Case Description

A 20-year-old primipara was admitted in our hospital at 24 gestational weeks. The mother had premature rupture of membrane with oligohydramnios which was confirmed through ultrasound. The labor was augmented and mother delivered via spontaneous vaginal delivery at 26 gestational weeks, a live female infant at 690g birth weight with APGAR of seven at 1 minute, seven at 5 minutes and eight at 10 minutes. The baby was immediately referred to high dependency unit (HDU) where she spent 38 admission days.

Initial examination revealed respiratory distress syndrome, prematurity and extremely low birth weight (<1000g). Child was bagged and admitted on high flow oxygen. Child had profound manifestations of chest indrawing, deep breathing (R=61cycles/min, Pulse=113b/mins) and prostration (++), blood sugar (8.6mmols) and temperature of 34.3oc. In HDU, the baby was initiated maintenance fluids, nasogastric tube feeds, oxygen therapy and antibiotics 1st line. On day 2 of life the baby developed jaundice++ which resolved on phototherapy after 1 week. The baby also developed anemia respectively (HB=8.5g/dl, wt=0.66kg, age= 15days) and was transfused 20 mls of whole blood, while second transfusion (HB= 8.02g/dl , wt=0.98kg, age=32 days)) and was transfused whole blood of 25mls. There

were no neurological problems noted during the stay in HDU. Upon attaining growth weight of 1140g the child was transferred to Newborn Unit with presentation of poor sucking reflex and diagnosis of prematurity, low birth weight (<2000g) and RDS.

In NBU, the baby was managed on expressed breast milk which increased gradually with increasing weight, routine blood works were conducted every 7 days to rule our anemia and infections, continued on supplements, implemented kangaroo Mother care (KMC), maintained IPC and stabilized vitals. The baby's condition improved on day 47 of life where she was transferred from Incubator to cot. On day 49 of life the child was initiated EBM cup feeding alternating with breast feeding with adequate retention. On day 50 of life the child was transferred to KMC room on exclusive breast feeding, vitally stable.

The baby was discharged after 54 admission days upon attaining weight of 1490g, vitally stable, established sucking reflex and no detectable developmental abnormalities. The child was prescribed the following discharge management: multivitamins, iron supplements and 2 weeks follow up schedule. The child is now 8 months, progressing well with no observable delays in milestones. She can see, hear, sit and crawl.

Table 1: Neonatal Characteristics

Characteristics	Findings
Gender	Female
Birth weight	690g
Birth length	32cm
Birth head circumferences	24cm
Gestational age	26 weeks
Outcome	Living
APGAR Score (1/5/10)	7/7/8
NG tube size	4
Peripheral intravenous catheter	+
Nasal catheter	+
Diagnosis	Prematurity, ELBW, RDS

FINDINGS

Prematurity and ELBW is a major global public health with significant impact on neonatal morbidity and mortality, (Rosca et al, 2023). The survival rates of ELBWIs have improved in the past decades mortality is still observed especially in male infants (Shitara et al, 2021), unfortunately ELBWs cases are rarely reported, (Kawano et al, 2020). Arimitsu et al (2021) reported the tiniest male infant in the world of 268g who survived without any serious complications except Retinopathy of Prematurity (ROP). Our case of female infant of 690g demonstrates that intact survival of extremely low birth weight infants is possible with proper

handling and management immediately after birth. The information will be valuable in contributing to neonatal care across the globe.

Berhane et al (2019) established that female sex had positive association to prematurity and ELBW. The factor which was strongly associated to the ELBW in our case is prematurity which was expected supported by Berhane et al who reported that mothers who delivered before 37 weeks were 24times likely deliver LBW babies. Yesinel et al (2015) stated that ELBW babies who were maintained on exclusive breast feeding and continuously can achieve growth rate similar to term babies which supports our management in this case where the infant was maintained on EBM firstly via NGT followed by cup feeding and finally independently once the sucking reflex was effectively established.

Cherepnalkovski et al (2021) stated specific problems that should be considered among the ELBW infants which include thermoregulation, respiratory distress syndrome, cardiovascular problems, CNS, electrolyte imbalance, impaired glucose homeostasis, infection bronchopulmonary issues, ROP and anemia in prematurity. Our case had predominant presence of ineffective thermoregulation, RDS, electrolyte imbalance, anemia and risk for infections. This was adequately managed by implementation of Kangaroo Mother care that ensures skin to skin contact between mother and baby leading to balanced temperatures and establishing mother child bonding. The child was administered oxygen via nasal prongs to eliminate instances of respiratory distress. Regular monitoring of glucose was done to prevent hypoglycemia which could lead to low metabolism. The child was put on antibiotics 1st line to clear any microbials in the body.

Anemia in prematurity is a condition attributed to combination of depleted iron stores, immature erythropoietic response, vitamin b12 and folate deficiency. To curb this, the baby was transfused whole twice at Hb levels of <8.5g/dl with 20mls and 25mls of whole blood.

Delayed breast milk initiation has been linked to increase risk of mortality and morbidity in preterm infants. Early enteral feeds (day 1 to 3 after birth) for preterm babies tend to improve outcome in ELWB infants with reduction in sepsis, hospital stay and mortality, (Chitale et al, 2022). The baby in this report was initiated EBM via NGT on the 2nd day of life.

Brumbaugh et al (2019) acknowledged that despite ELWB infants being at risk of significant morbidity and mortality, through active treatment and management there is survival to discharge up to 18 to 26 months. The child was discharged at 1490g and now at 8months with no detectable complications or delays in milestones.

CONCLUSION

The survival and development of extremely low birth weight infants depends on holistic multidisciplinary approach during intrapartum, hospital stay and 1 year after discharge. The case report highlights key problems that are manifested among ELBW infants and proper initiation of management immediately after birth can improve outcome and survival of the infant. Despite the risks involved due to the prematurity and ELBW, the baby was discharged

from the hospital to their home after 54 days of chronological age. There was no loss to follow up noted.

Clinical Significance

The clinical implication of case emphasizes on the need for early initiation of keen monitoring and implementation of holistic management on premature and ELBW babies to prevent complications and improve on survival rate and outcomes.

Ethical Considerations

Ethical review and approval were not needed for the study on human participants in tandem with institutional requirements. The patient provided their written consent to participate in this study, case report publication and any other data and images.

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