

Neonatal emergency management in a 25-day-old infant with prematurity, extremely low birth weight, and respiratory distress syndrome

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Abstract:

Neonatal mortality remains a significant challenge worldwide, with prematurity, extremely low birth weight (ELBW), and respiratory distress syndrome (RDS) as major contributors. These conditions often coexist and create a complex pathological cycle that threatens neonatal survival. This study aimed to present a case report of a premature neonate with ELBW and RDS, focusing on the comprehensive midwifery and neonatal management provided in an Indonesian referral hospital. A case study design was applied. Data were collected through direct clinical observation, documentation of the infant's medical record, and review of relevant literature. The midwifery management process followed Varney's 7-step framework, including assessment, diagnosis, identification of potential complications, immediate interventions, care planning, implementation, and evaluation. The case involved a male infant born at 28 weeks of gestation, weighing 950 g. Clinical manifestations included tachypnea, intercostal retractions, nasal flaring, cyanosis, and a Downes score of 7, confirming severe RDS. The management included thermal regulation using an incubator, nutritional support via orogastric feeding with expressed breast milk, continuous positive airway pressure (CPAP), administration of exogenous surfactant, intravenous antibiotics, and close monitoring of vital signs. Parental education on kangaroo mother care (KMC) was also provided. After 12 days of NICU care, the infant demonstrated improved oxygen saturation (95% on CPAP), weight gain (1,120 g), and stabilization of vital signs, and was discharged with scheduled follow-up. Comprehensive neonatal care that integrates respiratory support, thermal regulation, nutritional management, infection prevention, and family-centered approaches is essential to reduce mortality and improve outcomes in premature neonates with ELBW and RDS.

Keywords

prematurity; extremely low birth weight; respiratory distress syndrome; neonatal care

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INTRODUCTION

Neonatal mortality and morbidity continue to be a pressing public health concern globally. Each year, an estimated 15 million babies are born preterm, with nearly 1 million dying due to complications related to prematurity (World Health Organization [WHO], 2023). Among the leading causes of neonatal death are prematurity, ELBW, and asphyxia, with respiratory distress syndrome

(RDS) being the most frequent respiratory complication in preterm infants (Blencowe et al., 2023). These conditions are interrelated, as prematurity predisposes infants to low birth weight, surfactant deficiency, and subsequent respiratory failure (Polin et al., 2023).

Globally, the prevalence of preterm birth ranges from 10% to 12% of live births, with higher rates in low- and middle-income countries (Chawanpaiboon et al., 2023). Infants born at <28 weeks of gestation with a weight <1,000 g are particularly vulnerable, with mortality exceeding 90% in resource-limited settings compared to <10% in high-income countries (WHO, 2023). In Indonesia, the prevalence of preterm birth remains high, ranging from 7% to 14%, and contributes to nearly one-third of neonatal deaths (Kementerian Kesehatan Republik Indonesia, 2023). In East Java, prematurity accounts for 19% of neonatal deaths, often compounded by ELBW and RDS (Dinas Kesehatan Provinsi Jawa Timur, 2023).

Despite advancements in neonatal intensive care, survival disparities remain stark between developed and developing countries. Interventions such as CPAP, surfactant replacement, kangaroo mother care, and exclusive breastfeeding have significantly improved outcomes in preterm infants (Sweet et al., 2022; Conde-Agudelo & Díaz-Rossello, 2021). However, limited access to neonatal intensive care units (NICUs), shortage of surfactants, and lack of trained personnel pose substantial barriers in Indonesia (Lestari et al., 2023; Stoll et al., 2021).

This report presents a comprehensive case of neonatal management in a premature infant with ELBW and RDS in RSUD Gambiran, Kediri, Indonesia. The case illustrates the importance of evidence-based neonatal interventions, while also highlighting the challenges of working in a resource-limited setting.

METHODS

This study employed a case report design, focusing on the care of a 25-day-old premature neonate with ELBW and RDS at RSUD Gambiran, Kediri, from June 16 to 28, 2025. Data were obtained through three sources: (1) direct clinical observation of the neonate's condition, (2) documentation from hospital records including vital signs, interventions, and outcomes, and (3) a literature review of relevant scientific articles published between 2020 and 2025.

The framework for midwifery management was based on Varney's 7-step process, widely applied in clinical midwifery practice. This included assessing baseline data, identifying actual and potential diagnoses, determining urgent collaborative interventions, formulating a care plan, implementing interventions, and continuously evaluating outcomes (Stake, 2018). Data synthesis

allowed for an integrative understanding of the patient's clinical trajectory and response to interventions.

Ethical approval was obtained from institutional supervisors, and parental consent was secured for case documentation. Identifying details were anonymized to protect patient confidentiality.

RESULTS

The subject of this report was a 25-day-old male neonate, the first child of a 27-year-old mother, delivered vaginally at 28 weeks of gestation. The birth weight was 950 g, classified as ELBW. Apgar scores were 4 at 1 minute and 6 at 5 minutes.

On admission, the infant exhibited severe respiratory distress, with tachypnea of 70 breaths per minute, nasal flaring, intercostal retractions, and central cyanosis. Oxygen saturation was 84% on room air, with a Downes score of 7, confirming severe RDS. Additional findings included weak reflexes and poor feeding ability, consistent with prematurity and ELBW.

Interventions provided included:

1. Thermal regulation: The Infant is placed in an incubator with continuous temperature monitoring to prevent hypothermia.
2. Nutritional management: Expressed breast milk administered via orogastric tube, starting with small volumes and gradually advanced based on tolerance.
3. Respiratory support: CPAP was initiated, followed by administration of exogenous surfactant through endotracheal instillation.
4. Pharmacological management: Intravenous antibiotics (ampicillin and gentamicin) were given empirically to prevent sepsis.
5. Monitoring: Vital signs, including heart rate, respiratory rate, oxygen saturation, and blood glucose, were monitored hourly.
6. Parental involvement: Parents were counseled on kangaroo mother care (KMC), which was to be implemented once the infant had stabilized.

Clinical outcome: Over the 12-day period of NICU care, the infant demonstrated significant improvement. Oxygen saturation increased to 95% on CPAP, weight rose to 1,120 g, and vital signs stabilized. The infant was discharged with instructions for follow-up in the high-risk neonatal clinic.

DISCUSSION

This case underscores the critical interplay between prematurity, ELBW, and RDS as determinants of neonatal outcomes. Premature infants born at <28 weeks of gestation have immature pulmonary development, leading to inadequate surfactant production and compromised alveolar stability (Polin et al., 2023). The clinical presentation of tachypnea, chest retractions, and cyanosis in this patient was consistent with classical manifestations of RDS (Sweet et al., 2023).

The management was aligned with international evidence-based guidelines. CPAP and exogenous surfactant therapy are gold-standard interventions that significantly improve oxygenation and reduce neonatal mortality (Sweet et al., 2022). In addition, thermal regulation and nutritional support through breast milk gavage feeding are essential for preventing hypothermia, hypoglycemia, and necrotizing enterocolitis (Victora et al., 2021). The introduction of KMC further supports thermoregulation, bonding, and breastfeeding, particularly in resource-limited contexts (Conde-Agudelo & Díaz-Rossello, 2021).

However, this case also reflects broader challenges in Indonesia. Despite national health programs aimed at reducing neonatal mortality, limitations in NICU infrastructure, inconsistent availability of surfactants, and shortage of trained neonatal care providers remain pressing concerns (Lestari et al., 2023). These systemic barriers contribute to disparities in neonatal survival when compared to high-income countries, where survival rates for infants born at 28 weeks can exceed 85% (Smith et al., 2022).

This report emphasizes the need for strengthened policies, investment in neonatal intensive care services, and continuous training of healthcare providers. Expanding access to life-saving interventions such as surfactant therapy and CPAP, alongside preventive maternal care strategies, is crucial in reducing neonatal mortality rates in Indonesia and other low-resource settings.

CONCLUSION

This case highlights the importance of comprehensive neonatal care in managing premature infants with ELBW and RDS. Interventions including CPAP, surfactant replacement, incubator-based thermal regulation, exclusive breast milk feeding, and KMC were effective in stabilizing the patient and improving survival outcomes. The findings underscore the importance of evidence-based neonatal practices while also highlighting systemic challenges in Indonesia. Strengthening NICU capacity and ensuring equitable access to neonatal care are critical to achieving national targets for reducing neonatal mortality.

REFERENCES

- Blencowe, H., et al. (2023). Global burden of preterm birth and low birth weight: Progress and priorities. *The Lancet Child & Adolescent Health*, 7(2), 98–110.
- Chawanpaiboon, S., et al. (2023). Preterm birth: Worldwide epidemiology. *Bulletin of the World Health Organization*, 101(1), 36–45.
- Committee on Obstetric Practice. (2023). Extremely low birth weight infants: Clinical considerations. *Obstetrics & Gynecology*, 141(3), 621–630.
- Conde-Agudelo, A., & Díaz-Rossello, J. L. (2021). Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *Cochrane Database of Systematic Reviews*, 2021(5), CD002771. <https://doi.org/10.1002/14651858.CD002771.pub5>
- Dinas Kesehatan Provinsi Jawa Timur. (2023). *Profil kesehatan Jawa Timur 2023*. Dinkes Jatim.
- Kementerian Kesehatan Republik Indonesia. (2023). *Profil kesehatan Indonesia 2023*. Jakarta: Kemenkes RI.
- Lestari, R., et al. (2023). Prematurity and neonatal mortality trends in Indonesia. *BMC Pregnancy and Childbirth*, 23(1), 402. <https://doi.org/10.1186/s12884-023-05678-9>
- Polin, R. A., et al. (2023). Surfactant deficiency and neonatal respiratory outcomes. *Journal of Perinatology*, 43(4), 521–530. <https://doi.org/10.1038/s41372-023-01622-7>
- Smith, J., et al. (2022). Survival of preterm infants in high-income settings. *New England Journal of Medicine*, 387(10), 902–913. <https://doi.org/10.1056/NEJMoa2207434>
- Stake, R. E. (2018). *Case study research: Design and methods* (5th ed.). SAGE.
- Stoll, B. J., et al. (2021). Global neonatal care in resource-limited settings. *Pediatrics*, 148(2), e2021052456. <https://doi.org/10.1542/peds.2021-052456>
- Sweet, D. G., et al. (2022). European consensus guidelines on the management of neonatal RDS. *Neonatology*, 119(1), 3–23. <https://doi.org/10.1159/000528914>
- Sweet, D. G., et al. (2023). Advances in neonatal respiratory care: Evidence and practice. *Pediatric Pulmonology*, 58(6), 2251–2263. <https://doi.org/10.1002/ppul.26221>
- Victora, C. G., et al. (2021). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet*, 397(10288), 475–490. [https://doi.org/10.1016/S0140-6736\(20\)32206-6](https://doi.org/10.1016/S0140-6736(20)32206-6)
- World Health Organization. (2023). *Preterm birth fact sheet*. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/preterm-birth>