Case Report

Surfactant Induced Pulmonary Haemorrhage Leading to Respiratory Failure in Neonates – A Rare Case Report

Dr Nikhil Mujbaile[1], Mr Piyush Nama[2]*

1. Junior Resident 3, Department of Pharmacology, Government Medical College and Hospital, Nagpur, India.
2. Pharmacovigilance Associate, ADR Monitoring Centre, Department of Pharmacology, Government Medical College and Hospital, Nagpur, India.

***Corresponding author's E-mail:** piyushnama@gmail.com

Received: 08-04-2025; **Revised:** 26-06-2025; **Accepted:** 05-07-2025; **Published online:** 15-07-2025.

ABSTRACT

The clinical effect of the use of surfactant in a patient with severe unilateral pulmonary hemorrhage in Pediatric cardiac intensive care unit of a tertiary care hospital is well understood. The surfactant was given by Intratracheal instillation of 4 mL (100 mg) of surfactant (Survanta) per kilogram of body weight. This case demonstrates that although surfactant has good safety profile and is known to be relatively well tolerated, clinicians should be aware of the severe adverse reactions, including a potential respiratory distress syndrome and respiratory failure from surfactant use.

Keywords: Pulmonary haemorrhage; surfactant, respiratory failure.

INTRODUCTION

The benefits of surfactant therapy in decreasing mortality and air leak are well established.[1]

Surfactant treatment in preterm babies at risk of respiratory distress syndrome indicated by lung maturity tests.[2]

The administration of exogenous surfactant is not without harm. Examples include risks associated with instillation (bradycardia, hypoxemia, blockage of endotracheal tube), pulmonary hemorrhage, lung overdistension and hyperventilation [3]

Infants delivered preterm have been known to have respiratory distress syndrome (RDS). The immature development of type II pneumocytes, which start producing surfactant at about 20 weeks gestation, is the reason for the inadequate generation of surfactant . [4]

Surface tension rises and pulmonary compliance decreases when there is insufficient surfactant.[5,6]

This case is related to the adverse effect of surfactant, despite various therapeutic uses and advantages in the pulmonary hemorrhage.

CASE REPORT

A 1 day year old male neonate was admitted in NICU on 02/10/2023. Neonate was born of LSCS and was preterm with low birth weight (2.10kg), as dichorionic diamniotic twin. LSCS was performed in view of twin pregnancy, inactive labour, previous LSCS with premature rupture of membrane.

Neonate was admitted in view of lethargy not accepting oral feeds with low birth weight. APGAR score at 1 min was 6/10 and at 5 min was 8/10.

At the time of admission General Condition is moderate, euglycemic, Heart rate is 146/min, Respiratory Rate is 52/min, Spo_2 is 92% on Room Air and 96% on O_2 by prongs.

Patient developed respiratory distress on day 2 of admission. In view of respiratory distress patient was advised Inj Surfactant. Patient was intubated and has Spo_2 of 88% on mCPAP at Fio_2 100%.

The surfactant was administered @50mg/kg doses in 4 divided doses

The vitals were described below as follows

Vitals	Pre-surfactant	Post- Surfactant
Heart Rate	142/min	156/min
Respiratory Rate	48/min	42/min
Spo_2	89%	88%

Upon administration of Inj. Surfactant therapy on suctioning of blood. Patient was diagnosed with pulmonary haemorrhage more often than expected.

The general condition is not satisfactory, and pulse is feeble. There was tachycardia, Severe Pallor and frank bleed on Endotracheal Tube Suctioning. Sensorium was depressed, Pupils dilated not reacting to light. Spo2 was non-reactive on mechanical ventilation. Heart rate was also non-reactive and Respiratory rate was gasping.

Patient gradually developed respiratory distress syndrome with respiratory failure and the patient declared as dead on Day 2.

DISCUSSION

The American Academy of Paediatrics notes that surfactant replacement is beneficial for bigger and more mature preterm newborns with established RDS, but it also strongly advises surfactant delivery to infants under 30 weeks GA

who are on mechanical ventilation due to severe RDS.[7] The literature on neonates has long supported the use of surfactants in the treatment of respiratory distress. By lowering surface tension, surfactant stabilises the alveoli and lessens breathing effort. Mean airway pressures are lowered, the alveolar-arterial oxygen ratio is enhanced, and the need for ventilation is decreased. In the neonatal critical care unit, surfactant is often used to treat respiratory distress despite current worries that it may cause pulmonary haemorrhage.[8]

This case demonstrates that although surfactant has good safety profile and is known to be relatively well tolerated, and clinicians should be aware of the severe adverse reactions, including a potential respiratory distress syndrome and respiratory failure from surfactant use.

Declaration of the patient consent

The authors ensure that informed assent forms have been obtained. On the form, the patient's mother consented for clinical information to be reported in the research journal. The patient's mother understands that the name and initials will not be published and reasonable efforts will be made to conceal the patient's identity, but anonymity cannot be guaranteed.

Acknowledgment

I express my thanks to National Coordination Centre - Pharmacovigilance Programme of India (PvPI), Indian pharmacopoeia commission, Ministry of health & Family welfare, Govt. of India for their guidance and support.

Also, the Department of Paediatrics, Government Medical College and Hospital, Nagpur for their support throughout the case.

Financial support and sponsorship

The author(s) received no financial support for the research, authorship, and/or publication of this article

Conflicts of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

1. Suresh, G. K. & Soll, R. F. Overview of surfactant replacement trials. J. Perinatol. 2005;25:S40–S44.
2. Avery ME, Mead J. Surface properties in relation to atelectasis and hyaline membrane disease. AMA Journal of Diseases of Children 1959;97(5):517–23. [PUBMED: 13649082]
3. Lopez E, Gascoin G, Flamant C, Merhi M, Tourneux P, Baud O. Exogenous surfactant therapy in 2013: what is next? Who, when and how should we treat newborn infants in the future?. BMC Pediatrics 2013;13:165. DOI: 10.1186/1471-2431-13-165; PUBMED: 24112693
4. Burri PH. Fetal and postnatal development of the lung. Ann Rev Physiol 1984; 46: 617-28.
5. Clements JA. Surface tension of lung extracts. Proc Soc Exp Biol Med 1957; 95: 170-2
6. Avery ME, Mead J. Surface properties in relation to atelectasis and hyaline membrane disease. AMA J Dis Child 1959; 97: 517-23.
7. Polin RA, Carlo WA. Surfactant replacement therapy for preterm and term neonates with respiratory distress. Pediatrics 2014;133:156-63.
8. Raju TN, Langenberg P. Pulmonary hemorrhage and exogenous surfactant therapy: a metaanalysis. The Journal of pediatrics. 1993 Oct 1;123(4):603-10.