

**TARGETED OXYGEN THERAPY FOR NON-TENSION PNEUMOTHORAX IN FULL-TERM NEONATE, A CASE REPORT****Haneen Namour\***

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**ABSTRACT**

Pneumothorax in neonates can lead to significant complications. While drainage is a common intervention, targeted oxygen therapy has emerged as a potentially effective, less invasive management strategy for hemodynamically stable infants. We present a case of a full-term neonate with a non-tension pneumothorax successfully treated with judiciously titrated supplemental oxygen, guided by continuous monitoring and clinical assessment. This approach avoided the need for needle aspiration or chest tube placement. Our report supports the use of targeted oxygen therapy as a valuable alternative for select cases of non-tension pneumothorax in full-term neonates, emphasizing individualized treatment planning.

**KEYWORDS:** Pneumothorax - targeted oxygen therapy – neonate.**INTRODUCTION**

Pneumothorax, the presence of air in the pleural space, represents a potentially serious respiratory complication in neonates, associated with significant morbidity and mortality.<sup>[1]</sup> Traditional management strategies often involve observation, needle aspiration, or chest tube insertion, each carrying its own set of potential risks and complications.<sup>[2]</sup> However, recent evidence suggests that targeted oxygen therapy can be a viable and less invasive alternative for managing pneumothorax in hemodynamically stable neonates.<sup>[3,4]</sup>

This approach leverages the principle that increasing the alveolar-to-capillary oxygen gradient accelerates nitrogen washout from the pleural space, thereby promoting pneumothorax resolution.<sup>[5]</sup> This case report presents a full-term neonate with a non-tension pneumothorax successfully managed with targeted oxygen therapy, highlighting the potential benefits of this approach in carefully selected cases.

**CASE REPORT**

A male neonate, born at 39 weeks gestation via spontaneous vaginal delivery with a birth weight of 3.2 kg, presented with mild tachypnea and intercostal retractions shortly after birth. Initial examination revealed normal vital signs except for a respiratory rate of 65 breaths per minute and oxygen saturation of 92% on room air. Chest X-ray confirmed a right-sided non-tension pneumothorax, estimated to occupy approximately 20% of the hemithorax. The infant was otherwise hemodynamically stable with no evidence of

respiratory distress requiring immediate intervention. Given the stable clinical condition and the absence of significant respiratory compromise, a decision was made to initiate targeted oxygen therapy. The infant was placed in an incubator with FiO<sub>2</sub> titrated to maintain oxygen saturation between 95-99%, starting at 30%. Continuous monitoring of respiratory rate, heart rate, and oxygen saturation was implemented. Subsequent chest X-rays were performed every 12 hours to assess pneumothorax resolution. The FiO<sub>2</sub> was gradually weaned as the pneumothorax resolved, and the infant remained clinically stable throughout the course of treatment. The pneumothorax completely resolved within 24 hours, and the infant was discharged home on day 3 of life in good condition.

**DISCUSSION**

This case report highlights the successful management of a non-tension pneumothorax in a full-term neonate using targeted oxygen therapy, thereby avoiding more invasive interventions like needle aspiration or chest tube placement. This approach aligns with increasing evidence supporting targeted oxygen therapy as a safe and effective alternative for select cases of neonatal pneumothorax, particularly in hemodynamically stable infants.<sup>[6,7]</sup>

The physiological basis for targeted oxygen therapy lies in its ability to enhance the absorption of pleural air. By increasing the inspired oxygen fraction (FiO<sub>2</sub>), a greater partial pressure gradient is established between the pleural space (containing nitrogen) and the pulmonary

capillaries. This promotes the diffusion of nitrogen from the pleural space into the bloodstream, leading to the resolution of the pneumothorax.<sup>[8]</sup> However, meticulous monitoring of oxygen saturation and clinical status is crucial to mitigate the risk of oxygen-induced complications such as oxidative stress and potential long-term pulmonary sequelae, even in full-term infants.<sup>[9]</sup>

While this case supports the use of targeted oxygen therapy, its limitations must be acknowledged. This strategy is most appropriate for non-tension pneumothoraxes in hemodynamically stable infants without significant respiratory distress. Tension pneumothoraxes or cases exhibiting substantial cardiorespiratory compromise necessitate immediate decompression via needle aspiration or chest tube insertion.<sup>[10]</sup> Furthermore, the optimal FiO<sub>2</sub> level, duration of oxygen therapy, and specific monitoring parameters remain areas for further investigation. Individualized assessment, continuous monitoring, and sound clinical judgment are paramount in guiding therapeutic decisions.

Our case contributes to the growing body of evidence advocating for targeted oxygen therapy as a viable first-line treatment for carefully selected neonates with non-tension pneumothorax. Future research should concentrate on establishing clear guidelines for patient selection, developing standardized oxygen titration protocols, and defining precise monitoring parameters to optimize the application of this promising therapeutic modality. Large-scale, randomized controlled trials are needed to further validate its efficacy and safety relative to traditional management approaches. Ultimately, the objective is to minimize invasive procedures and improve outcomes for neonates with pneumothorax, and targeted oxygen therapy represents a valuable approach towards achieving this goal.

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