

## Case Report

# Peripheral tactile stimulation for intractable apnea of prematurity: a case report

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### ABSTRACT

Apnea of prematurity (AOP) is an extremely common problem in preterm babies. Several invasive and non-invasive methods of treatment have been studied. We present a novel non-invasive method of managing intractable apnea in preterm neonates.

**Keywords:** Apnea, Prematurity, Tactile stimulation

### INTRODUCTION

Apnea of prematurity (AOP) is a frequent problem encountered in management of preterm neonate. Intractable apnea are observed in some babies requiring Methyl xanthine therapy, CPAP, Mechanical ventilation, Prone positioning and Kangaroo Mother care.<sup>1,2</sup> We report a case of apnea of prematurity responded with continuous peripheral tactile stimulation delivered by glove ventilation as a new innovative non-invasive technique.

### CASE REPORT

A 26-year-old Primigravida delivered a preterm male baby born to non-consanguineous parents, delivered at 27+5 weeks by spontaneous normal vaginal delivery with no antenatal medical illness. He had uneventful perinatal transition, but developed respiratory distress at birth with Downey score of 3/10, oxygenation requiring continuous positive airway pressure (CPAP). Intratracheal surfactant was given at 8 hours of life in view of persistent respiratory distress and chest X-ray suggestive of respiratory distress syndrome. IV fluids and antibiotics (ampicillin and gentamicin) and IV calcium were given. Second dose of surfactant was given at 28 hours of life due to poor clinical response. Septic screening and metabolic profile were

within normal limits. Developed recurrent apnea, hence loaded with IV caffeine. Antibiotics escalated to cefotaxime/amikacin due to multiple invasive procedures.



**Figure 1: Peripheral tactile stimulation of preterm baby by glove method ventilation.**

Due to recurrent apnea, he required mechanical ventilation till day 6 of life and CPAP for next 24 hrs. Apnea persisted, with good response to tactile stimulation. Repeat septic screening negative, blood cultures sterile, USG cranium no

e/o intraventricular hemorrhage, ECHO normal, metabolic parameters normal. Packed cell transfusion given in view of low Hb. He was given continuous peripheral stimulation at back and lateral chest wall by inflated glove, connected to the ventilator end limb with minimal settings (Figure 1).

He remained apnea free for next 3 days, hence glove ventilation was removed. He remained apnea free with oral caffeine, without any cardiorespiratory issues and on full feeds till discharge.

## DISCUSSION

Apnea of prematurity can be intractable in some preterm babies requiring invasive and non-invasive respiratory supports. Mechanisms involved in pathogenesis are (i) developmental immaturity of central respiratory drive, central and peripheral chemoreceptors, (ii) active reflexes involved by stimulation of posterior pharyngeal wall and (iii) impaired coordination of muscles of respiration with upper airway muscles. AOP is frequently mixed type with airway obstruction either preceding or following central apnea. Methyl xanthine therapy is an established treatment strategy<sup>3</sup>. Peripheral tactile stimulation is enough to revive from apnea mostly. Secondary causes like sepsis, PDA, intraventricular hemorrhage and metabolic abnormalities should be ruled out.<sup>2,3</sup> AOP is a common concern in premature infants. Routine clinical management of the obstructive subtype involves providing continuous positive airway pressure (CPAP) ventilation to prevent alveolar atelectasis and pharyngeal collapse, apart from prone positioning. In central apnea, methyl xanthine therapy is mainstay of treatment as it stimulates the central nervous system and respiratory muscle function.<sup>1</sup> Peripheral tactile stimulation is the most common intervention for AOP as it helps in reducing apnea episodes. It works by generating excitatory, nonspecific neuronal activity in the brainstem to stimulate respiration.<sup>2</sup> Tactile stimulation has the potential to substantially reduce the frequency of apnea.<sup>3</sup> Devices for stimulation like oscillating mattress which has been studied are not available in most of the neonatal intensive care units.<sup>4,5</sup> We recently managed a case of recurrent apnea in a preterm infant by providing peripheral tactile stimulation in a unique way by using glove ventilation was found beneficial in our baby. The baby was a 27+5-week-old preterm male neonate who developed recurrent apnea and required mechanical ventilation for the same, apart from intravenous caffeine, blood transfusion and intravenous antibiotics for infection. Baby was extubated but was still having apneic episodes, improved by tactile stimulation. We connected the end delivery limb of the ventilator tubing to a glove and the ventilator was started with average settings. Baby's lateral chest wall had contact with

the air-filled glove that provided repeated gentle stimulation. After providing tactile stimulation with this technique, the frequency of apnea reduced drastically. In next 96-hour period, baby had only 2 episodes of apnea, which also subsided on their own. Latha bhat and supriya bhist had reported a similar method by peripheral stimulation of foot unlike our study where we used peripheral stimulation of back and lateral chest wall and showed good results in controlling apnea.<sup>1</sup> We believe that it is an easy bedside method to provide gentle tactile stimulation, and can be tried in cases of intractable apnea. The rate of stimulation can be set as per the respiratory rate of ventilator. The impact can be set by setting Peak Inspiratory Pressure (PIP). We suggest that this method of providing tactile stimulation should be further tested in form of future research studies in this direction.

## CONCLUSION

Glove ventilation is one of the non-invasive method provides continuous peripheral tactile stimulation for recurrent apnea.<sup>1</sup> Since it is new initiative, the duration of treatment required, disadvantages associated with this are not clearly established. This method needs to be tested more in future to establish it as a useful strategy to manage recurrent intractable apnea in preterm babies.

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