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Short Report

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An innovative oxygen delivery method with the help of pacifier assembly for infants

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Background

Infants have an intense need to suck since birth and often cry because of various reasons including cry, anger, frustration etc, the situation become more challenging when kids are admitted in hospitals. Some babies may cry more often than others, even when there is nothing wrong. They are not mature neurologically and are often calmed by sucking. Some of the suggested methods to soothe infants include holding up, rocking in baby carriers, talk a walk in a stroller, breast feeding, get support from family, or trying a baby pacifier. Pacifiers are referred to any object which helps children adjust to new situation or calm them or relieve their stress. 75-85% of kids use pacifiers in western countries and hospital nurseries commonly give them to newly born babies. Although breastfeeding is the most effective way to calm infants, and often kids have reflex to place their hands or thumbs in their mouths, pacifiers can be very helpful for discontented or cranky babies who cannot or will not suck their thumbs or fingers.

Innovation

Infants have a natural need to suck. It is a known fact that pacifiers can help fussy or cranky babies to relax them, or calm them and control their feelings by making them feel secure. There is now a large variety of available pacifier clips and straps to hold the pacifier in place. The infant's Pacifier Clips or straps are stylish and practical attachments for pacifiers, prevent the pacifier from being lost or dropped on the floor, and allow easy access when babies need to self-soothe (Figure 1). Our innovation lies in fact, that we can attach the oxygen tubing, coming out from the strap/clip of pacifier near the infant's nostril to allow an infant to breathe oxygen-rich air. We have used this innovation in 5 small infants in age group 2 months to 6 months, and oxygen could be easily administered to them without any discomfort or challenges. We recommend to use this assembly in infants who use pacifier with pacifier straps attached around face to allow oxygen tubing to be kept near nostril, as depicted in Figure 1. The peripheral saturation was maintained in the

range of 98-99% in all kids and oxygen flow could be adjusted based on peripheral saturation and arterial blood gas parameters. We used lowest flow of oxygen in the range of 2-4 L/minute to attain our target of oxygenation.

Figure 1: The kid is a 2 month infants in post operative intensive care unit, and was operated for cardiac surgery (Ventricular septal defect), is sleeping comfortably with the help of pacifier, pacifier strap can be seen connected around face and oxygen tubing can be seen near one nostril.

Discussion

Oxygen is the most widely used therapy in the post-operative surgical period, especially in pediatric cardiac surgical patients to prevent post-operative hypoxemia. The ultimate goal of oxygen therapy is to attain adequate oxygenation using the lowest fraction of oxygen. Satisfactory oxygenation balances oxygen delivery and oxygen consumption rate, intending to achieve adequate tissue oxygenation. Various factors can curtail sufficient oxygen delivery, and most important of which is the use of an oxygen delivery system. However, this is often challenging to achieve in paediatric age group, especially infants. The commoner methods of non-invasive oxygen delivery types of equipment's used in infants include oxygen hoods, face masks, nasal cannulas, nasal catheters, and nasopharyngeal catheters. The system used to provide supplemental oxygen must conform appropriately to the patient's size and clinical condition to meet the physiological needs and therapeutic goals. The consequences of not meeting oxygen requirements lead to tissue hypoxia, which ultimately leads to localized vasodilation, pulmonary vasoconstriction, tissue necrosis, and metabolic acidosis, all of which are harmful to patients for cardiac surgery in the post-operative period.

Challenges with routine oxygen delivery devices in infants

Babies in the age group 2 weeks to 4 months are the most challenging kids to manage, as they often cry the most during these months. Some babies may cry more often than others, even when there is nothing wrong. The causes of cry maybe hunger, feeling hot/cold, wet/soiled clothes, spitting/vomiting, sick, has a fever, or perhaps because of surroundings, such as intensive care unit/high dependency unit/wards. At a young age, this is an odyssey full of challenges and achievements. As babies grow, so do their motor skills. Kids go through a developmental milestone in which they throw everything on the floor and watch if it breaks, makes a sound, or stay the same. This can often also be a sign of anger, frustration, or sadness. They answer their doubts by repeated measures, i.e. they will throw the object until they get their answers. This curious nature, which we often see in infancy, and usually they throw the nasal prongs, face masks, catheters, become cranky and it becomes a challenging task, to provide oxygen therapy to these small kids.

Soothing measures

Babies under 3-4 months of age are not mature neurologically and are often calmed by sucking.

Some of the suggested methods to soothe infants include holding up, rocking in baby carriers, talk a walk in a stroller, breast feeding, get support from family, or trying a baby pacifier. The American Academy of Paediatrics (AAP) recommends use of pacifiers in infants one month or old to reduce the risk of sudden infant death syndrome [1].

The innovation can be a boon for kids who are very fussy/cranky and often calmed by use of pacifiers and oxygen can be given with the help of pacifier strap with tubing kept near infant's nostril. However, we recommend cleaning of infant pacifiers with the help of boiling or washing in dish washer.

References

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