Apply the Multidisciplinary Team and Innovative Quality Improvement to Reduce Hypothermia in Premature Infants

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ABSTRACT

The post-natal treatment process for high-risk newborns is related to the future development of neonates. In high-risk neonatal populations, less than 37 weeks are defined as premature infants. The normal body temperature range of premature infants should be maintained at the core body temperature, and the rectal temperature is 36.5-37.5˚C, if it is less than 36.5 degrees, it is considered as hypothermia in premature infants. Although premature infants have been routinely given body temperature maintenance care, there are still about 40-50% of premature infants who have hypothermia after birth. Therefore, we give the best care during the treatment process, it is expected to reduce the incidence of hypothermia in premature infants, to avoid other complications or reduce the prognosis due to hypothermia.

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INTRODUCTION

Despite the use of current heat preservation strategies, moderate hypothermia at birth is common in premature infants and is associated with increased mortality and morbidity. Thermal protection of the newborn remains a global health concern and a challenge to health care providers despite advanced technology in minimizing hypothermia after birth. The aim of this study was to explore a novel multidisciplinary teamwork to maintain the rectal temperature of preterm infants above 36.5˚C before leaving delivery room and at 1 hour after birth.

METHODS AND MATERIALS

A multidisciplinary team including medical and nursing staff from neonatology, obstetrics, quality management center and anesthesiology was assembled to implement breakthrough series model and quality improvement tools practice Plan-Do-Study and Check-Action cycle. Infants at 23 to 36 weeks' gestational age and/or with a birth weight less than 2500 g born at the Cathay General Hospital were enrolled. First, we evaluated and improved the clinical operations related to hypothermia in premature infants after birth and performed education training to all the staff(Fig 1-3). Second, we introduced novel implementations including 3M™ bear hugger therapy with a forced air warming underbody series blanket(Fig 4), and an invention of plastic curtain surrounding the open environment(Fig 5). Third, we enhanced the process of standby by the practice of team resource management.

RESULTS

This study period from March 2018 to July 2021. The new born baby case numbers were 742, 743, 719 and 345 respectively. We monitored the infants suffered from hypothermia at the time before leaving delivery room and 1 hour after birth, respectively. The infants suffered from hypothermia at the time before leaving delivery room hypothermia incidence average 100% reduce to 16%. And 1 hour after birth hypothermia incidence average 100% reduce to 33%. In addition, the indicators of each unit are regularly monitored, and in-depth analysis of cases without related comorbidities.

GRAPHS AND TABLES


Fig.1


Fig.2


Fig.3


Fig.4

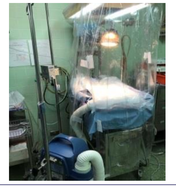


Fig.5

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DISCUSSION

We has confirmed that the use of a transparent insulation cover can effectively increase the environmental temperature of premature infants after birth. The cost is not high and it is sterilized. I hope that there will be opportunities to popularize the use of medical images in the future, so that all institutions can recognize this action. The inability to increase the temperature around the delivery room or operating room makes it difficult to maintain the body temperature of preterm infants. It is also hoped that in the future, by providing a number of innovative preterm infants to prevent hypothermia treatment measures, the mortality rate of preterm infants and the complications related to hypothermia will be reduced. Including acidemia, intraventricular hemorrhage, respiratory distress, etc., it is believed that the improvement of hypothermia can further improve the medical standards in Taiwan, hoping to achieve the goal of zero hypothermia in preterm infants.

CONCLUSIONS

We had demonstrated that moderate hypothermia in preterm infants after delivery can be minimized with a multifaceted team approach. The essential elements for success of this quality improvement initiative included the application of forced air warming underbody blanket and the novel invention of the surrounding plastic curtain. And improve compliance of clinical standard operating procedures and reduced risks for all premature care processes.