

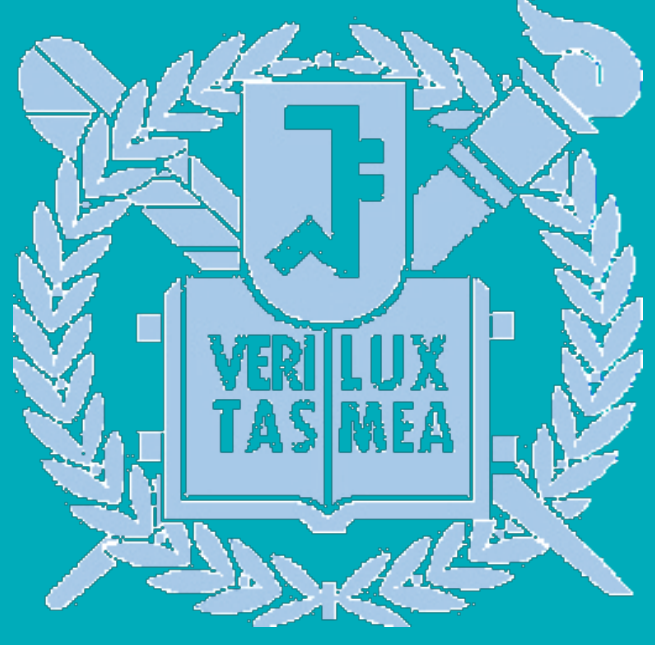
Quality Improvement Bundle for Reducing Exposure

To Mechanical Ventilation in Preterm infants

Susie Kang, M.D., Young Hwa Jung, M.D., PhD., Eun Song Bae, M.D.,

Mi Jin Kim, M.D., Hyo Ju Yang, M.D, Chang Won Choi, M.D., PhD.

Seoul National University Bundang Hospital



Abstract

Mechanical ventilation(MV) is a well-recognized risk factor for bronchopulmonary dysplasia (BPD) in preterm infants. We implemented a quality improvement (QI) bundle to minimize MV use in infants born before 32 weeks gestation or weighing less than 1500g, which included avoidance of intubation in delivery room, using minimally invasive surfactant therapy (MIST) in NICU, and performing daily assessments to determine extubation feasibility. The post-QI cohort exhibited lower intubation rates, increased MIST use, and significantly reduced duration of invasive MV during NICU admission. In conclusion, the implementation of a QI bundle was associated with reduced duration of mechanical ventilation during NICU admission.

Introduction

Exposure to mechanical ventilation (MV) is a well-known risk factor for bronchopulmonary dysplasia (BPD) in preterm infants. To reduce the incidence of BPD, we evaluated the impact of a quality improvement (QI) bundle aimed at minimizing exposure to mechanical ventilation in preterm infants with <32 weeks gestation or birth weight <1500g.

Methods

A multidisciplinary Quality Improvement (QI) project, initiated as part of the Korean Neonatal Network (KNN).

We introduced a QI bundle comprising as below,

- 1) Delivery room (DR): the avoidance of intubation during neonatal resuscitation
- 2) Neonatal intensive care unit (NICU): minimally invasive surfactant therapy (MIST)
- 3) If a patient required intubation, daily assessments to determine the feasibility of extubation

- Study design:
 - the duration of exposure to mechanical ventilation
 - historical pre-QI (January 2019-December 2021) vs. prospective post-QI (January 2022–December 2023) cohorts

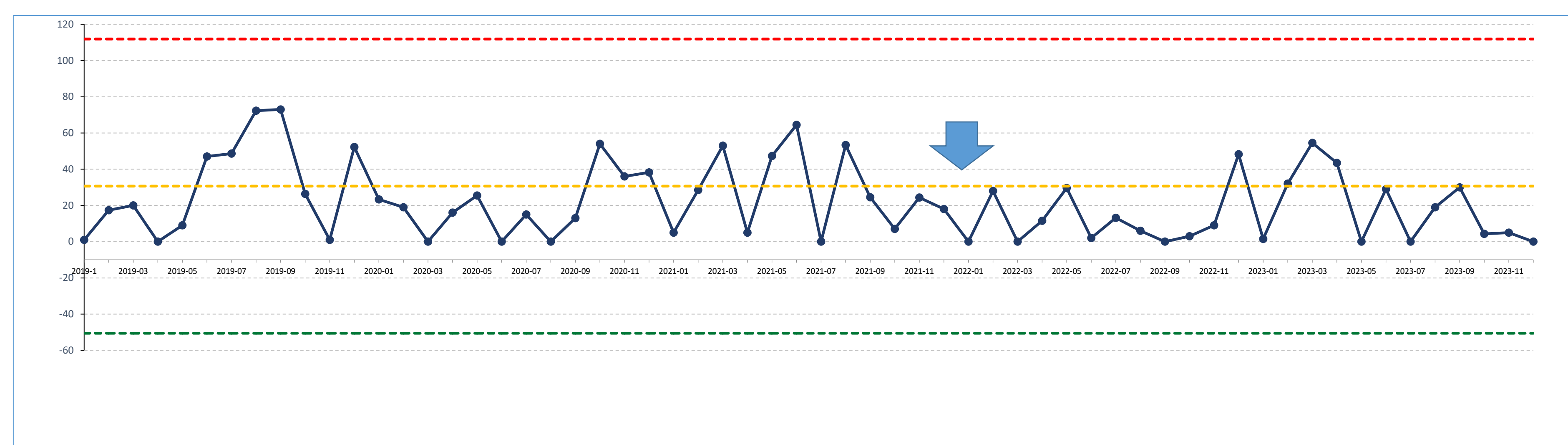
Results

- The pre-QI (n=215) and post-QI cohorts (n=181) were enrolled. The post-QI cohort exhibited decreased rates of intubation in the DR and an increased rate of MIST utilization. Throughout admission, the duration of invasive mechanical ventilation significantly decreased in the post-QI period.
- The results were consistent in subgroup analysis among preterm infants <28 weeks of gestation or birth weight <1000g.

- Table 1. Comparisons between pre-QI and post-QI cohorts based on QI bundle implementation

	Pre-QI period N=215	Post-QI period N=181	
Gestational age (days)	204.03 ± 20.86	205.63 ± 22.48	0.464
NRP_Intubation	81 (40.9)	39 (22.8)	<0.001
Surfactant instillation	126	93	
MIST/LISA or INSURE	43 (34.1)	52 (55.9)	0.02
Duration of invasive ventilatory supports	19.96 ± 41.03	10.45 ± 31.17	0.009

- Figure 1. P-chart of the Monthly Duration of Invasive Mechanical Ventilation from January 2019 to December 2023



Discussion

In this QI study, the implementation of a QI bundle involving the avoidance of intubation in the DR, utilization of MIST, and daily checklist for assessing extubation feasibility in preterm infants was associated with a reduction in the duration of MV during NICU admission.

References

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