A BPD Prevention Bundle for infants born at less than 33 weeks gestation

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Aims

1. Prevent and decrease rates of bronchopulmonary dysplasia in infants less than 33 weeks
2. Optimize and standardize the care of preterm infants with established or evolving BPD to improve their short-term and long-term outcomes

Importance

BPD remains a major cause of mortality and early morbidity in extremely low birth weight infants, with a concomitant increase in later neurodevelopmental impairment. BPD is one of the most common complications of extreme preterm birth.

PDSA cycle/Change Plan

June-Oct 2021
- Establishment of QI Working Group (RTs, RN's, Neos)
- Priorities identified:
  - MIST protocol
  - Intubation/extubation criteria and InSurE guidelines

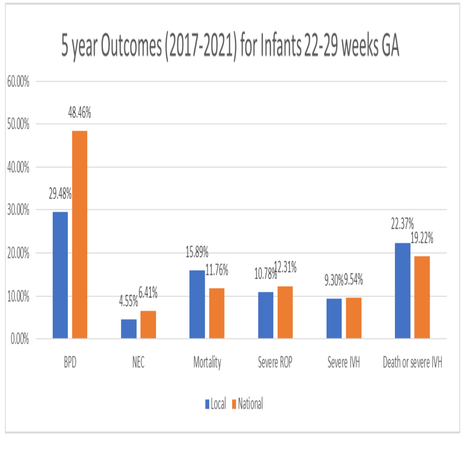
March 2022
- Education and Simulation of MIST procedure
- Ongoing review of BPD Bundle

May 2022
- First MIST procedure completed
- Exploration of adding early low-dose hydrocortisone to BPD Bundle – Medical student research project

January 2023
- Review of MIST procedures to date
- Data collection for early low dose hydrocortisone started

Driver for Change

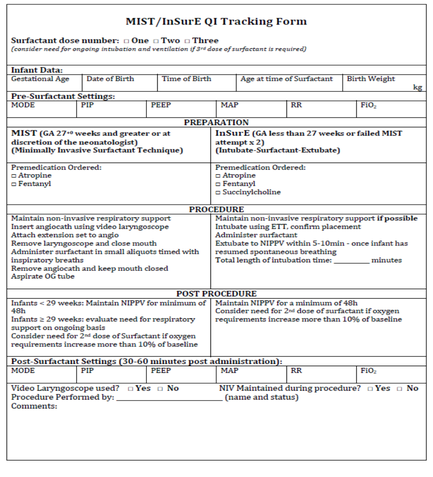
Although local rates have been consistently lower than national averages, preterm infants who develop BPD at the JCHC site continue to make up a significant proportion of morbidity at time of discharge, particularly for infants 22-29 weeks



Data / Results

May 2022-Jan 2023:
- 7 procedures – 6 successful (86%)
- FiO2 decreased in all cases (avg 50% to 30%)
- 6/6 did not need further intubation at any point

Learning curves/complications:
- Video laryngoscope blade size for larger babies
- Difference in technique using angiocath vs ETT
- Apnea in 2 babies during procedure



MIST/InSurE QI Tracking Form

Surfactant dose number: ☐ **One** ☐ **Two** ☐ **Three**
(consider need for ongoing intubation and ventilation if 3rd dose of surfactant is required)

Infant Data:

Gestational Age	Date of Birth	Time of Birth	Age at time of Surfactant	Birth Weight kg

Pre-Surfactant Settings:

MODE	PIP	PEEP	MAP	RR	FiO_2

PREPARATION

MIST (GA 27+0 weeks and greater or at discretion of the neonatologist) (Minimally Invasive Surfactant Technique)	**InSurE (GA less than 27 weeks or failed MIST attempt x 2) (Intubate-Surfactant-Extubate)**
Premedication Ordered: ☐ Atropine ☐ Fentanyl	Premedication Ordered: ☐ Atropine ☐ Fentanyl ☐ Succinylcholine

PROCEDURE

Maintain non-invasive respiratory support Insert angiocath using video laryngoscope Attach extension set to angio Remove laryngoscope and close mouth Administer surfactant in small aliquots timed with inspiratory breaths Remove angiocath and keep mouth closed Aspirate OG tube	Maintain non-invasive respiratory support **if possible** Intubate using ETT, confirm placement Administer surfactant Extubate to NIPPV within 5-10min - once infant has resumed spontaneous breathing Total length of intubation time: _____ minutes

POST PROCEDURE

Infants < 29 weeks: Maintain NIPPV for minimum of 48h Infants ≥ 29 weeks: evaluate need for respiratory support on ongoing basis Consider need for 2nd dose of Surfactant if oxygen requirements increase more than 10% of baseline	Maintain NIPPV for a minimum of 48h Consider need for 2nd dose of surfactant if oxygen requirements increase more than 10% of baseline

Post-Surfactant Settings (30-60 minutes post administration):

MODE	PIP	PEEP	MAP	RR	FiO_2

Video Laryngoscope used? ☐ **Yes** ☐ **No** NIV Maintained during procedure? ☐ **Yes** ☐ **No**
Procedure Performed by: _____ (name and status)
Comments:

Lessons Learned / next stage/plan

- Spring 2023: Continued review of BPD bundle, education and implementation
- Summer 2023: Continued data collection for low dose hydrocortisone project, education and implementation
- Ongoing: Continued review of MIST and InSurE procedures, adherence to intubation/extubation criteria