Delivery Room Resuscitation of Newborns with Congenital Anomalies

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Objectives

• Learners will be able to identify why newborns with congenital anomalies may require additional resuscitation measures

• Learners will be able to describe process to develop guidelines for delivery room resuscitation of newborns with congenital anomalies

• Learners will be able to recognize the need to benchmark and identify best practices for resuscitation of newborns with congenital anomalies
I believe that delivery room management can affect outcomes of newborns.

ILCOR
NRP
I believe that delivery room management can affect outcomes of newborns with congenital anomalies.
Early Neonatal Resuscitation
NRP Guideline Development

• International Liaison Committee on Resuscitation

• Expert consensus

• Evidence based
Development of NRP Guidelines

• Steering committee of NRP reviews ILCOR worksheets
• Develop national guidelines and resuscitation algorithm
The Beginning
Initial Steps

Only suction babies with obvious obstruction to spontaneous breathing or who require PPV
Evaluation and Next Steps

- Term gestation? Breathing or crying? Good tone? Yes, stay with mother
  - Warm, clear airway if necessary, dry, stimulate
    - HR below 100, gasping, or apnea? No
      - Labored breathing or persistent cyanosis? Yes
        - Clear airway, SpO₂ monitoring, Consider CPAP
      - Labored breathing or persistent cyanosis? No
    - HR below 100, gasping, or apnea? Yes
      - PPV, SpO₂ monitoring
  - Routine care
    - Provide warmth
    - Clear airway if necessary
    - Dry
    - Ongoing evaluation
What’s Missing

• Delivery room considerations for neonates with most anomalies
I believe that delivery room management can affect outcomes of newborns with congenital anomalies.
You are called to the delivery of a...

- 34 week male with a myelomeningocele

- 38 week female with left congenital diaphragmatic hernia with liver up, LHR of 0.9 and O:E of 0.27

- 37 week male with transposition of the great arteries and intact ventricular septum (TGA with IVS)
RESUSCITATION BUNDLE

RESUSCITATION BUNDLE

Standardize Care → Deliver Care → Evaluate Care → Outcomes
GUIDELINE DEVELOPMENT

Outcomes

- Standardize Care
- Deliver Care
- Evaluate Care
Goal of Guideline Development

• Identification of appropriate

  – Deviations from the NRP algorithm

  – Additions to NRP guidelines
APPROACH

• Review of existing evidence
• Expert opinion
• Consensus opinion
• Common sense
Evidence Base

• CDH EURO

Recommendations
• After delivery, the infant should be intubated immediately without bag and mask ventilation (grade of recommendation = D).
• The goal of treatment in the delivery room is achieving acceptable predural saturation levels between 80 and 95% (grade of recommendation = D).
• Ventilation in the delivery room may be done by conventional ventilator or ventilation bag with a peak pressure as low as possible, preferably below 25 cm H₂O (grade of recommendation = D).
• An oro-or nasogastric tube with continuous or intermittent suction should be placed (grade of recommendation = D).
• Arterial blood pressure has to be maintained at a normal level for gestational age. In case of hypotension and/or poor perfusion, 10–20 ml/kg NaCl 0.9% should be administered 1–2 times and inotropic agents should be considered (grade of recommendation = D).
• Sedatives and analgesics should be given (grade of recommendation = D).
• No routine use of surfactant in either term or preterm infants with CDH (grade of recommendation = D).

Reiss I, Neonatology 2010.
Evidence Base

• Infants with Prenatally Diagnosed Anomalies: Special Approaches to Preparation and Resuscitation

References: 61

Fetal diagnosis: 25

Prenatal Management: 4
Mode/Timing of delivery: 10
Post-natal Management/Outcomes: 15

DELIVERY ROOM MANAGEMENT: 0

KEY POINTS

• A multidisciplinary coordinated approach to care of the fetus is essential to optimize outcomes.
• Information gained during the prenatal period may have significant implications for the care the newborn receives once delivered.
• Data is available on the “best practices” for initial resuscitation and newborn care for many common anomalies.
• A comprehensive plan of the care a newborn with anomalies may be shared with families during prenatal consultation.

APPROACH

• Review of evidence
• Expert opinion
• Consensus opinion
• Common sense
Optimal Care Guidelines

• Disease specific
  – Congenital diaphragmatic hernia
  – Lung lesion
  – Omphalocele
  – Gastrochisis
  – Congenital heart disease
  – Sacrococcygeal teratoma
  – Myelomeningocele
Framework of Guidelines

• Prenatal history/evaluation

• Delivery room anticipation/considerations/preparation

• Delivery room resuscitation
Prenatal history/evaluation

• CDH: LHR, O:E

• CCAM: CVR, types

• MMC: fetal repair-patch, hindbrain herniation
Delivery room anticipation/considerations/preparation

• Respiratory distress
• Hypoxia

• Equipment
• How to dress omphalocele, MMC
• What to do with thoracoamniotic shunt
• Starting FiO2
Optimal Care Guidelines
Delivery Room Resuscitation

“Initial assessment of the neonate with...should evaluate respirations and heart rate according to NRP guidelines. The resuscitation goal is to establish an airway and hemodynamic stability, optimally within an hour of delivery.”
Acquisition and Maintenance Safety Techniques
Acquisition

• **Session 1**
  – Lecture 1
    • Basics of NRP
  – Simulation 1
    • Intro to simulation
  – Lecture 2
    • Cardiac deliveries
  – Simulation 2
    • Cardiac scenarios
Acquisition

- **Session 2**
  - Lecture 3
    - Lung lesions
  - Simulation 3
    - Congenital diaphragmatic hernia, Congenital cystic adenomatoid malformation
  - Lecture 4
    - Myelomeningocele, Bladder outlet obstructions, preterm issues
  - Simulation 4
    - Preterm, Bladder outlet obstruction with pulmonary hypoplasia
Acquisition

• **Session 3**
  – Lecture 5
    • Abdominal wall defects, sacrococcygeal teratomas
  – Simulation 5
    • Omphalocele, SCT scenario
  – Lecture 6
    • EX utero Intrapartum Treatment, critical airway
  – Simulation 6
    • EXIT scenario
Acquisition

• **Session 4**
  – Lecture 7
    • Question/answer
    • SDU procedures review
  – Simulation 7
    • Scavenger hunt, basic scenario
  – Simulation 8
    • Myelomeningocele, abruption in a patient with CHD, gastroschisis
Maintenance

• One 2 hour session every 6 months
• Scenarios
  – Staff requests
  – Actual experiences
Just-In-Time

• Rare cases
• Complicated cases
• Practice
Safety Techniques

SDU NEONATOLOGY TEAM BRIEF

Please do a team brief before every delivery with discussion of the points below:

- Introductions of all team members and disciplines (RN, RT, MD, NNP, PA)
- Patient situation (to include but not limited to):
  - relevant maternal history
  - diagnosis
  - gestational age
  - estimated weight
  - specific concerns
  - family issues
- Anticipated resuscitation steps with emphasis on steps that deviate from traditional NRP (to include but not limited to):
  - immediate intubation vs assess and intubate pm
  - positioning considerations of the baby
  - starting FiO2 (%)
  - location of placement of pulse ox
  - vascular access strategy (peripheral vs central) and prioritization
  - need and availability for extra help or consultants (ENT, Cardiology etc…)
- Assignment of roles and specific tasks:

REMINDEERS

- Start videorecording by pushing the green button that corresponds to the warmer the patient will be placed on.
- Ensure the room temperature is set to 78 °F
- Ensure the bed temperature is set to 37 °C
- If cardiac patient, remember to call CICU ASCOM to give update and to give full report before leaving SDU
- Obtain blood on newborn screen card
- Use the preterm checklist to ensure appropriate preparation for any neonate <1000g

SPECIAL EQUIPMENT CONSIDERATIONS

Please speak up…
Reflect, Review, Register, Research
Reflection

SDU Delivery Debriefing/QI Sheet

Patient Name: 

The purpose of this debriefing is to improve care for our patients by discussing our performance and learning why things go well, where we need to focus training to improve and where there are system issues that we need to address. This is a safe environment to discuss the team performance. We would like everyone to participate in the discussion. All data collected will be anonymous.

What went well and why?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

What could we improve on?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

System issues to be addressed:

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Review

• Quality Improvement
  – Multidisciplinary meeting
  – Video-review
Registry

• Can center variation in deliver room management explain outcome differences?
  – Identification of best practice centers
  – Database of delivery room care
Research

• Do neonates with congenital anomalies have specific identifiable delivery room needs/morbidities that can be anticipated?
Summary

• Objective: convince you that care in the delivery room impacts outcomes of neonates with congenital anomalies

• Perhaps not yet but if we don’t try then we will never know
“We are what we repeatedly do. Excellence, then, is not an act, but a habit.”

*Aristotle*