

Resuscitation with Positive-pressure Ventilation and Endotracheal Intubation

Educational Focus

Scenario Outline

This case presents a pregnancy complicated by lack of prenatal care, maternal fever, and fetal tachycardia. After a vaginal birth, the term newborn requires PPV and endotracheal intubation. Learners are expected to prepare for the birth by asking the 4 pre-birth questions, assembling a resuscitation team based on assessment of perinatal risk and performing the equipment check.

Learning Objectives

Upon completion of the simulation, the learners will be able to:

- Demonstrate the ventilation corrective steps (MR. SOPA)
- Recognize the newborn that requires endotracheal intubation
- Demonstrate preparation for intubation, including choosing the correct-sized tube for the newborn's estimated weight and gestational age
- Demonstrate correct technique for placing an endotracheal tube (operator)
- Demonstrate the role of the assistant during intubation (assistant)
- Demonstrate strategies to determine whether the endotracheal tube is properly positioned in the trachea

Debriefing Points

Points for discussion during debriefing could include:

- Indications for endotracheal intubation during resuscitation
- Indications that determine correct placement of the endotracheal tube
- Use of NRP Key Behavioral Skills

Reference Materials

Textbook of Neonatal Resuscitation, 8th edition, Lesson 5: Endotracheal Intubation

Setup & Simulation

Equipment

For setup:

- Damp, lightly blood-stained blanket or towel
- Segment of simulated umbilical cord
- Simulated amniotic fluid or water
- Simulated blood

For use during simulation:

- All items included in the NRP Quick Equipment Checklist
- Umbilical cord clamps

Setup & Preparation

- Setting: Delivery room.
- Moisten the simulator's skin with simulated amniotic fluid and blood and insert the umbilical cord segment into the abdomen.
- Wrap the simulator in a damp, lightly blood-stained blanket or towel, without a diaper, and place it under a blanket or towel on the mother's abdomen.

Learner Brief

Provide this information to the participants as they enter the simulation:

You have been asked to attend a vaginal birth. The mother has had no prenatal care but believes the baby is term. The obstetric provider is present and the baby is coming soon. Please prepare for the birth.

Additional Information

Provide this information to the participants, if asked during simulation:

Gestational age:	40 weeks estimated by ultrasound
Amniotic fluid:	Clear
Additional risk factors:	No prenatal care. Category II fetal heart rate tracing. Mother has a fever and fetus is tachycardic.
Estimated fetal weight:	3500 g (7 lb 11 oz).
Umbilical cord management plan:	Plan to delay cord clamping for 30-60 seconds if baby is vigorous

Scenario Progression

Before delivery

Vaginal birth • 40 weeks gestation estimated by ultrasound
 • Clear amniotic fluid • No prenatal care.
 Category II fetal heart rate tracing. Mother has a fever and fetus is tachycardic • Estimated birth weight 3500 g
 • Plan to delay cord clamping for 30-60 seconds

The baby has been born

L2



Starts PPV

No change

Performs ventilation corrective steps, including endotracheal intubation



Provides 30 seconds of PPV that moves the chest

Discontinues PPV

L2

L3



Limp

Restarts PPV

Administers oxygen per target saturation table

L3



Limp

SpO₂
85

End of simulation

60 s

- Ask the 4 pre-birth questions to assess perinatal risk:**
 - What is the expected gestational age?
 - Is the amniotic fluid clear?
 - Are there additional risk factors?
 - What is our umbilical cord management plan?
- Conduct pre-birth team briefing:**
 - Assemble team based on perinatal risk
 - Identify leader
 - Assign tasks
- Perform equipment check**
- Apply gloves and personal protective equipment**

- Ask the 3 rapid evaluation questions:**
 - Term?
 - Good muscle tone?
 - Breathing or crying?
- Move infant to radiant warmer**
- Perform initial steps of newborn care:**
 - Provide warmth, dry (and remove wet linen), put hat on baby's head, and stimulate
 - Position head and neck in sniffing position
 - Clear secretions from mouth and nose with bulb syringe, anticipating PPV
- Evaluate breathing**
- Initiate PPV with 21 % oxygen within 60 seconds of birth**

- Attach pulse oximeter sensor to right hand or wrist**
- Request cardiac monitor (optional)**
- Document resuscitation events.** The scribe may note 30-60 second time intervals for checking HR and oxygen saturation
- Check HR after the first 15 seconds of PPV**
- Announce, "HR is less than 100 bpm, not increasing, and chest is not moving."**
- Start ventilation corrective steps (MR. SOPA):**
 - Mask Adjustment, Reposition head into sniffing position.
 - Attempt PPV (for 5 breaths). If no chest movement:
 - Suction mouth and nose, Open mouth. Attempt PPV (for 5 breaths). If no chest movement:
 - Increase peak inspiratory Pressure by 5-10 cm H₂O (to maximum of 40 cm H₂O) Attempt PPV for 5 breaths after each pressure increase. If no chest movement:
 - Intubate newborn with a size 3.5 endotracheal tube.
 - Confirm placement by observing for chest movement, bilateral breath sounds, color change on CO₂ detector (Instructor verbalizes or simulates CO₂ detector color)
 - Ensure proper depth by using NTL measurement or initial ET tube insertion depth table

- When chest movement is achieved, announce, "Chest is moving NOW. Continue PPV for 30 seconds."**
- Continue PPV that moves the chest for 30 seconds while securing the ET tube per protocol**

- Monitor HR and oxygen saturation**
- Administer oxygen per target oxygen saturation table**

- Re-assess HR after 30 seconds of PPV that moves the chest**
- Note oxygen saturation is not within target range and adjust oxygen concentration**
- Continue ongoing evaluation of newborn's breath sounds, chest movement, CO₂ detector color change, respirations, HR, oxygen saturation, tone and activity**
- Plan appropriate post-resuscitation care**
- Communicate effectively with the medical team and mother**
- Perform post-resuscitation debriefing**