Neonatal Resuscitation Program™

3

Resuscitation Requiring Positive-pressure Ventilation (PPV)

Educational Focus

Scenario Outline

This case presents a woman with term pregnancy complicated by gestational hypertension and fetal heart rate decelerations during labor. At birth, the infant appears term, has no muscle tone, and is apneic. The focus of this case is specifically on face-mask ventilation of the newborn. Learners are expected to be familiar with the setup and proper use of the self-inflating bag, and if used locally, the T-piece resuscitator and/or the flow-inflating bag.

Learning Objectives

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

- Identify the newborn that requires positive-pressure ventilation (PPV)
- Demonstrate correct technique for administering PPV
- Demonstrate the steps for assessing response to PPV
- Demonstrate the ventilation corrective steps (MR. SOPA)
- Identify indications and method for discontinuing PPV

Debriefing Points

Points for discussion during debriefing could include:

- Indications for use of PPV, supplemental oxygen, and CPAP
- Use of NRP Key Behavioral Skills

Reference Materials

Textbook of Neonatal Resuscitation, 8th edition, Lesson 4: Positive-Pressure Ventilation

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, 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 are called to attend a vaginal birth. The mother is a 20-year-old woman who has been admitted for induction of labor. The obstetric provider is present. Please prepare for the birth.

Additional Information

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

Gestational age:	40 weeks
Amniotic fluid:	Clear
Additional risk factors:	Gestational hypertension Category II FHR tracing (late fetal heart rate decelerations).
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

CRITICAL PERFORMANCE STEPS

Before delivery

Vaginal birth
40 weeks gestation • Clear amniotic fluid
Gestational hypertension and category II FHR tracing
Estimated birth weight 3500 g
• Plan to delay cord clamping for 30-60 seconds

- ☐ **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**

The baby has been born

L2

60 s

Does not start PPV | **Starts PPV**

L1 | No change

Starts PPV → **Starts ventilation corrective steps (MR. SOPA)**

Provides PPV that moves the chest

L3 — Weak cry

Continues PPV that moves the chest for 30 seconds

Restarts PPV

L2 | L4 — Strong cry

Abruptly discontinues PPV

Gradually discontinues PPV

End of simulation

- ☐ **Ask the 3 rapid evaluation questions:**
  - Term?
  - Good muscle tone?
  - Breathing or crying?
- ☐ **Move infant to radiant warmer for initial steps:**
  - 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):**
  - **M**ask Adjustment, **R**eposition head into sniffing position.
  - Attempt PPV (for 5 breaths). If no chest movement:
  - **S**uction mouth and nose, **O**pen mouth. Attempt PPV (for 5 breaths). If no chest movement:
  - Increase peak inspiratory **P**ressure by 5-10 cm H_2O (to maximum of 40 cm H_2O) Attempt PPV for 5 breaths after each pressure increase.

Note! The instructor may decide how many ventilation corrective steps the learners should go through before airway obstruction is turned off, but it should be off when pressure is increased at the latest, to keep focus on administering PPV via face-mask.

- ☐ **When chest movement is achieved, announce, "Chest is moving NOW. Continue PPV for 30 seconds."**

- ☐ **Continue PPV that moves the chest for 30 seconds**
- ☐ **Monitor HR and oxygen saturation**
- ☐ **Adjust oxygen concentration per target oxygen saturation table**
- ☐ **After 30 seconds of PPV that moves the chest, re-assess HR**

- ☐ **Stimulate infant and gradually decrease PPV rate and pressure as infant begins spontaneous breathing**
- ☐ **Discontinue PPV when infant's HR is consistently more than 100 bpm and infant has spontaneous respirations**
- ☐ **Continue ongoing evaluation of newborn's respirations, HR, oxygen saturation, tone, activity, and temperature**
- ☐ **Plan appropriate post-resuscitation care**
- ☐ **Communicate effectively with the medical team and parents**
- ☐ **Perform post-resuscitation debriefing**