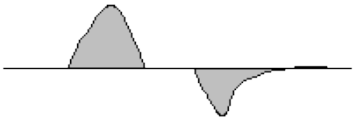
Newborn Critical Care Center (NCCC) Clinical Guidelines

Guidelines for Initial Ventilation of Infants < 30 Weeks
(During the First Seven Days of Life)

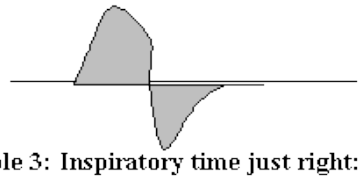
I. Initial Mode and Settings

A. AC/VG
B. Vt: 5 mL/kg
C. RR 40
D. PEEP 6
E. I-Time: 0.25-0.3
    a. P-max limit setting: 26
    b. Evaluate flow-time curve to determine sufficiency of Ti
        i. If Ti is too long, flow ends but desired volume will remain until expiration
        ii. If Ti is too short, flow is interrupted and desired volume not reached.

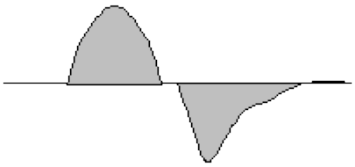
Example 1: Inspiratory time too long:



Example 2: Inspiratory time too short:



Example 3: Inspiratory time just right:



II. Increase Ventilation (PaCO2 > 50 mmHg first 72 hours, >55 after 72 hours)

A. Important to first assess the infant's breath sounds, chest movement, and evaluate pressure readings and pressure/flow/volume tracings on the ventilator. Also take into account recent chest radiographs.
B. Is the infant breathing above the ventilator?
    a. If yes:
        i. If eligible for surfactant consider administering
        ii. Consider the presence of a metabolic acidosis which is causing respiratory compensation via tachypnea
        iii. If no acidosis then consider increasing Vt 0.5 mL/kg (max 7)
    b. If no:
        i. Consider increasing the rate to a maximum of 50
        ii. Consider Increasing Vt 0.5 mL/kg (max 7)

III. Decrease or Wean Ventilation (PaCO2 < 50 mmHg in first 72 hrs, <55 after first 72 hrs)

A. Important to first assess the infant's breath sounds, chest movement, and evaluate pressure readings and pressure/flow/volume tracings on the ventilator. Also take into account recent chest radiographs.

B. Is the infant tachypneic (RR > 75)?

a. If yes:

i. Consider the presence of a metabolic acidosis which is causing respiratory compensation via tachypnea

ii. If no acidosis then consider extubating if meets criteria, or otherwise:

1. Changing mode of ventilation (consider SIMV-VG or PSV-VG)

b. If no:

i. Consider weaning VT by 0.5 mL/kg

ii. Minimum VT (mL/kg):

1. <1 kg: 5
2. ≥1 kg: 4.5

IV. If PIP is reading > 26 or at maximum settings (PIPs of up to 28-30 may be appropriate after a team discussion) and PaCO2 > 60, consider High Frequency Jet Ventilation

V. Poor Oxygenation (FIO2 ≥ 0.35)

A. Important to first assess the infant's breath sounds, chest movement, and evaluate pressure readings and pressure/flow/volume tracings on the ventilator. Also take into account recent chest radiographs looking specifically at expansion. Consider suctioning.

B. If eligible for surfactant administer surfactant

C. If not eligible for surfactant individually consider

a. Increasing PEEP 1 cm H2O (max 8)

b. Increasing iTime 0.05 s (max 0.35)

c. Increasing VT 0.5mL/kg (max 7)

VI. If FiO2 < 0.35

A. If FiO2 < 0.25 decrease PEEP by 1 if normal work of breathing to minimum of 5

B. If FiO2 0.25-0.34 then monitor

VII. Extubation Criteria

A. Consider extubation if ALL of the following criteria are met:

a. Patient receiving Caffeine

b. Hemodynamically stable

c. MAP 8-10 cm H2O

d. PEEP 5-6 cm H2O

e. FiO2 < 0.35

f. Rate ≤ 20 bpm

g. pH ≥ 7.25

h. pCO2 ≤ 55 mmHg

Mechanical ventilation within first 7 days of life in infants < 30 weeks GA with RDS

UNC HEALTH CARE

Assist Control with Volume Guarantee (AC/VG)

Initial Settings:
Tidal volume (V_T): 5 mL/kg
PEEP: 6 cm H_2O
Inspiratory time (iTime): 0.25 s
Respiratory rate (RR): 40 bpm

UNC HEALTH CARE Children's

Ventilation

$PaCO_2 \leq 55$ mmHg
* < 50mmHg if < 72hrs

Tachypneic? (>75 bpm)

NO → Consider weaning V_T by 0.5 mL/kg
Minimum V_T (mL/kg): <1 kg
- 5 (SIMV)
- 4.5 (AC-VG or PSV-VG with spon I-time > 0.2)

YES

$PaCO_2 > 55$ mmHg
* > 50mmHg if < 72hrs

Breathing above ventilator?

NO → Increase the set rate (max 50 bpm)

Or

YES →

Consider the following:
1) If breathing above vent; is there a metabolic acidosis?
2) If not consider:
   1. Increase V_T 0.5 mL/kg (max 7)
   2. Increase PEEP 1 cm H_2O (max 8)[2]
   3. Increase iTime 0.05 s (max 0.35)

PIP > 26 *or* at maximum settings *and* $PaCO_2$ > 60 mmHg

Change to HFJV per guidelines

Consider extubation if ALL of the following criteria are met:
- Patient receiving Caffeine
- Hemodynamically stable
- MAP 8-10 cm H_2O
- PEEP 5-6 cm H_2O
- $FiO_2 < 0.35$
- Rate ≤ 20 bpm
- pH ≥ 7.25
- $pCO_2 \leq 55$ mmHg

Oxygenation

FiO2 ≥ 0.35

Eligible to receive surfactant?[1]

NO → Consider the following:
1) If breathing above vent; is there a metabolic acidosis?
2) If not consider:
   1. Increase V_T 0.5 mL/kg (max 7)
   2. Increase PEEP 1 cm H_2O (max 8)[2]
   3. Increase iTime 0.05 s (max 0.35)

YES → Give surfactant

FiO2 < 0.35

FiO2 ≤ 0.25 → Consider decreasing PEEP by 1 cm H_2O if work of breathing normal (min 5)

FiO2 0.25-0.34 → Continue to monitor

Notes:
[1] Eligibility for additional surfactant within first 72 hours of life: PIPs consistently > 15 cm H_2O ***or*** FiO2 ≥ 0.35
[2] Goal 8-9 ribs expansion