HFOV Case Study
834 Gram Infant
Student Copy

1300 834 gram white female born via cesarean section at 27 weeks’ gestation secondary to maternal unstable pre-eclampsia. The patient’s mother was a 22 year old whose unstable pre-eclampsia was initially managed with magnesium sulfate. When this was unsuccessful in controlling the high blood pressure, she was taken to the OR for a C-section. Apgar scores were 5/8. An umbilical artery catheter was placed for arterial blood gas and blood pressure monitoring. An umbilical venous catheter was placed for IV access. Care plan included maintenance IV fluids, amp/gent.

CT: Possible diagnoses?

1330 Intubated with a 3.0 ETT/7cm at the lip | HR 180 | RR 78 | BP 44/24
CMV: PIP 20 | PEEP 5 | Rate 60 | IT 0.4 | FIO2 0.6
CXR = bilateral reticulogranular pattern, questionable rim of air on the right lower cardiac border

Surfactant was administered at this time—100ml/kg
ABG: 7.49/23/44/-3.2 | tcCO2 30 | O2 SAT: 80%
RN/RCP: discuss sat goals for patient; assess breath sounds, markedly diminished bilaterally
MD called: Rate 50, FIO2 0.7

CT: Response to vent order—What is VT?
What is the optimum lung inflation?
2000  CMV: PIP 20 | PEEP 5 | Rate 40 | IT 0.4 | FIO2 0.7 | tcCO2 70 | O2 SAT 60%
RN/RCP: Discuss possibilities of sudden change in vital signs
MD called to bedside
CT: Possible diagnosis?

2015  CXR: Right sided Pneumothorax

One chest tube placed. Four hours later, the patient developed acute distress requiring chest compressions, IV sodium bicarbonate and epinephrine was administered through the ETT.
**ABG: 7.0/65/27/-8** | **tcCO2 80** | **O2SAT 56%**
**CT: What’s happening with this patient? Note the acute onset of the code and follow up ABG.**
**CXR: Left sided tension Pneumothorax that has partially re-expanded after chest tube placement**

2025  MD: Order for HFOV
**CT: What would be the appropriate initial HFOV settings? Why?**
What are potential complications of HFOV?
What do we need before switching to HFOV?

2100  HFOV: FIO2 1.0 | MAP13 | Amp 20 | Hz 15
**CT: Response to HFOV?**

2210  CXR reveals changes consistent with pulmonary interstitial emphysema and bilateral pneumothoraces.

**0100  ABG: 7.44/46/89/+1** | **tcCO2 49** | **O2 SAT 91%**
**RN/RCP discuss the need for suctioning and agree to use closed suction maneuver**
MD: Wean FIO2 for sats >92%, adjust amp to keep PCO2 50 and for adequate CW
**CT: How long since surfactant was given?**
What are potential adverse effects of suctioning pt. on HFOV?
Why is the FIO2 being weaned before the MAP?
**48 hours old:**

HFOV: FIO2 0.4 | MAP 10 | AMP 18 | Hz 15

The patient was positioned with left side down because the air leak appeared on CXR to be worse there. Follow up CXR 12 hours later reflected dramatic improvement in the air leak and healing PIE.

**ABG:** 7.46/41/80/+1

**CT:** What assessments are needed at this time? What ventilatory changes need to be made?

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**76 hours old:**

CXR indicated almost complete resolution of the air leak on the left side.

HFOV continues to be weaned,

**CT:** When do we start thinking about changing back to conventional ventilation? What vent settings would you choose?

The use of a lower airway pressure with HFOV provided significant advantages for this patient. HFOV may be suggested not only to prevent, but also to resolve, air leak syndrome in neonatal patients with RDS. Perhaps the greatest lesson learned in HFOV research, to date, is the critical importance of proper ventilator-management strategy. Through their work with more than 400 critically ill neonates, Clark et al,9 identified four categories of illness to be supported using HFOV: diffuse homogeneous lung disease, non-homogeneous lung disease, lung hypoplasia syndrome, and air leak syndrome. Based on their experience, they advocated the use of a low-pressure management strategy for patients with severe air leak.

**References**


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These case studies are for reference only. Each patient is unique and may require different care.