



Perinatal Gazette



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Should High Frequency Ventilation Be Used in the Premature Infant from Birth?

Improvements in outcomes for premature infants have been linked to increased administration of antepartum steroids, early administration of surfactant, as well as advances in the modes and strategies of mechanical ventilation for these infants. Protective ventilatory strategies minimize barotrauma, volutrauma, and atelectrauma and theoretically minimize the inflammatory cascade that contributes to chronic lung disease (bronchopulmonary dysplasia-BPD).

The establishment of a functional residual capacity reduces the risk of acute lung injury from mechanical ventilation (see Figure).

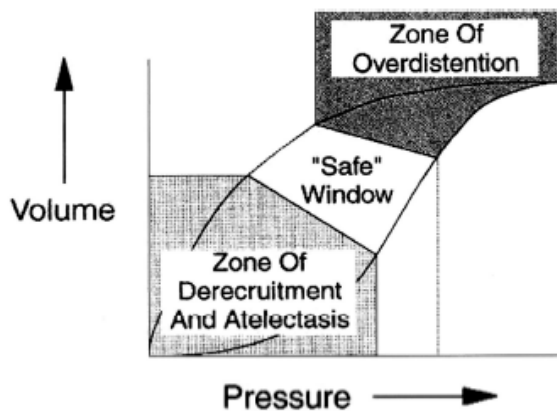
Functional residual capacity (FRC) is the volume of gas that remains in the lungs after the exhalation of a spontaneous or mechanically assisted breath. Surfactant deficiency in premature infants often leads to a lower FRC secondary to alveolar collapse. Continuous Positive Airway Pressure (CPAP), surfactant, and protective ventilation strategies such as alveolar recruitment may be useful in establishing and maintaining FRC in premature infants.

High frequency ventilation is a form of mechanical ventilation that uses small tidal volumes and rapid ventilator rates (240-900 breaths per minute). This enhances alveolar recruitment and maintains lung volume and protects from volutrauma and atelectrauma. This may also provide gas exchange using lower peak and mean airway pressures than conventional ventilation, resulting in reduced barotrauma to the lungs. Overall, high frequency ventilation may be more effective than conventional ventilation in establishing and maintaining FRC in premature infants.

There are several conditions in which high frequency ventilation is indicated. High Frequency Jet Ventilation (HFJV) is approved for air leak syndrome and meconium aspiration syndrome. Other pulmonary conditions may benefit from high frequency ventilation-either High Frequency Oscillatory Ventilation (HFOV) or HFJV- including: congenital diaphragmatic hernia, pulmonary hypoplasia, pneumonia, and sepsis. In these clinical conditions, infants may be placed on high frequency ventilation shortly after birth.

However, in the majority of premature infants, high frequency ventilation is often used as a rescue mode of therapy. This means that it is employed only after conventional ventilation fails to provide adequate oxygenation and ventilation. There is evidence that the *early* use of high frequency ventilation in premature

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infants may be beneficial. Animal studies of respiratory distress syndrome (RDS) show that ventilator-induced lung injury (VILI) is minimized. Some well-done animal trials show that early use of high frequency ventilation reduces pathologic lung changes that may be associated with the development of chronic lung disease. However, the caveat is that high frequency ventilation must be employed before these pathologic changes occur. Therefore, high frequency ventilation may have the capability of preventing the pathologic changes associated with VILI rather than reversing a preexisting injury.

The earliest clinical trial in premature humans comparing early high frequency ventilation with conventional ventilation was the HIFI trial (1989). The results of this trial showed that early high frequency oscillatory ventilation had no benefit on the outcome of chronic lung disease. Also, the patients receiving high frequency ventilation had an increased incidence of severe intracranial hemorrhage (ICH) and periventricular leukomalacia (PVL) compared to the conventionally ventilated infants. This trial was a huge setback for high frequency ventilation. However, thanks to ongoing animal trials, which continued to elucidate the optimal strategies for use of high frequency ventilation, resurgence for this type of ventilation occurred in the mid-1990s. It was learned that a lung recruitment strategy-which was not employed in the HIFI trial-is imperative in the use of high frequency premature infants. In retrospect, the HIFI trial was conducted before the era of antenatal steroids and exogenous surfactant-both are common therapies utilized today. Also, the practice of allowing permissive hypercapnia has since been adopted. Permissive hypercapnia may decrease VILI as well as contribute to improved neurologic outcomes in premature infants.

Several well-done clinical trials have compared early HFOV *with* a lung recruitment strategy to conventional ventilation in premature infants. In reviewing all of the clinical trials comparing early high frequency oscillatory ventilation to conventional ventilation, only the HIFI trial showed adverse neurological outcomes. Conversely, no

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trial has shown an overwhelming advantage for the use of early high frequency ventilation with relation to chronic lung disease.

At the Regional NICU at Maria Fareri Children's Hospital, high frequency ventilation is primarily used as rescue therapy in the treatment of premature infants. If an infant on CPAP requires additional respiratory support, ventilation is usually initiated with conventional mechanical ventilation on assist-control mode. This modality allows for the infant to 'trigger' each ventilator-assisted breath. If the peak inspiratory pressure (PIP) requirements escalate, high frequency ventilation with either HFOV or HFJV can be initiated. With careful ventilator management and clinical monitoring, there is no adverse effect of using high frequency ventilation as the primary, initial method of ventilation. However, clinical trials have not demonstrated proven benefit of early high frequency ventilation with relation to chronic lung disease. Therefore, at present, use of early intention high frequency ventilation is a matter of choice.

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Important Questions!

The March Of Dimes recommends 9 questions for women contemplating pregnancy to ask their health care providers.

1. How can diabetes, high blood pressure, infections or other conditions affect my pregnancy?
2. How can certain medications (prescription, over the counter, or home remedies) affect my pregnancy?
3. How does taking a multi-vitamin with folic acid daily, especially before pregnancy, help me have a healthy baby?
4. What is my ideal weight?
5. How can I stay away from cigarettes, alcohol, and illegal drugs?
6. How can I manage the stress in my life?
7. How long should I wait between pregnancies?
8. What if premature birth runs in my family?
9. What are the signs of preterm labor and what should I do?

The Lower Hudson Valley Perinatal Network

Forty-Eight participants attended the LHVPN's 1st quarterly education and networking meeting for 2006. The meeting was held on January 24, 2006 at the Knights of Columbus, Haverstraw in Rockland County focused on Disparities in Breastfeeding. Sandy McInnis, Executive Director of the Black Women's Breastfeeding Alliance, Inc. led the discussion. Despite substantial increases in breastfeeding rates in the last decade, racial and ethnic disparities in breastfeeding are still wide spread. Special attention should be given to barriers to breastfeeding, especially for African American and other minority women. In the lower Hudson Valley region, in general, Hispanics have higher breastfeeding rates than non-Hispanics. Our data also demonstrates a need to focus efforts in the Black community for education and support of breastfeeding. This is supported by data from Westchester Medical Center where the presence of a lactation consultant made the biggest impact on Black women (45% before – 71% after lactation consultant). Additionally, high risk zip codes with lower breastfeeding rates according to Electronic Birth Certificate records include: 12522, 12538, 12601, 10701, 10703, and 10705.

Hospitals are encouraged to adopt the "Ten Steps to Successful Breastfeeding" as outlined by the United Nations Children's fund and the World Health Organization. According to McInnis, communities must develop social support and information resources for breastfeeding women such as hotlines, peer counseling, and mother-to-mother support groups. Materials that promote breastfeeding as normal, desirable and achievable for women of all cultures and socioeconomic levels. It is essential to collaborate with businesses to support breastfeeding in the workplace by making recommendations for flexible work schedules, adequate breaks during the day, milk storage, and breast pumps.

*Achieving an increase in the proportion of mothers who breastfeed their babies will require the collaboration of Federal agencies, State and local government's communities, health professional organizations, advocacy groups, industry, health insurers and the American People. Healthy People 2010 goals will be realized only when society is supportive of breastfeeding, and only when mothers, especially African-American mothers, have been reached with culturally appropriate information and support to breastfeed their infants.

MSSNY *e*news
Weekly Update for New York State Physicians



DOH Provides MSSNY with Q & A Regarding Forge-Proof Prescription Forms

On April 19, all prescriptions (both for controlled and non-controlled substances) written in New York State must be issued on an official New York State prescription form, the same form that was previously required for prescribing Schedule II and benzodiazepine controlled substances.

All physicians must be registered to receive official prescriptions. The DOH has asked us to pass on to our physicians the most asked questions about the prescription program.

If you have further questions, call 1-866-772-4683.

The URL is http://www.mssny.org/members_only/prac_man/PrescriptionForms/2006OffNYSPresForms.htm

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<http://www.nymc.edu/neonatology>

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