
SUMMARY

The most common cause of starting assisted ventilation in neonates is respiratory failure, which may be manifested as apnea or an alteration in gas exchange with acidosis, hypercapnia and hypoxemia.

A scoring system is used for selecting patients by blood gas analysis. However, the infant's age, weight and disease pathology are also factors that should be considered in determining criteria for respiratory failure.

Decisions to institute assisted ventilation should be made after weighing the risk/benefit ratio, instead of strict adherence to blood gas criteria.

The use of continuous distending pressure in the treatment of arterial hypoxemia is one of the most important advances in neonatal respiratory therapy. It is used to correct ventilatory insufficiency characterized by atelectasis, where its early use has proven, more beneficial than late application as it prevent further alveolar collapse when alveoli are still open early in the course of the disease. However, it is associated with complications on cardiac output, renal blood flow and intracranial pressure which may be avoided by careful monitoring of distending pressure.

Positive pressure mechanical ventilation is achieved by either pressure or volume ventilators, but pressure ventilators are the most widely used in neonatal intensive care units. The specific ventilator

controls located on the device are discussed in details as clinicians must be aware with them.

Intermittent mandatory ventilation is used to allow the infant to breath spontaneously between ventilator breaths, thus allowing a lower ventilator rate while the infant contributes some of the ventilation on his own.

Arterial blood gases provide the most accurate quantitative assessment of the effectiveness of ventilation.

So, clinicians must be aware of which ventilator settings will correct specific blood gases.

Although mechanical ventilation constitute an important life saving procedure in the respiratory therapy of critically ill neonates, it is not without risks.

Pneumothorax and pulmonary interstitial emphysema occurs in about one of every four neonates who required assisted ventilation. Bronchopulmonary dysplasia occurs in 40% of neonates whose birth weight was less than 2000 gm who require ventilation with an incidence of 15% of all infants who managed with mechanical ventilation.

Because barotrauma is important in the occurrence of these complications, ventilatory modes that decrease airway pressures may prevent these complications.

New therapies as patient triggered ventilation, have evolved through efforts to reduce the incidence of air leak, cerebral injury and chronic lung disease that are sequelae of ventilating infant by conventional mechanical ventilation.

Negative extrathoracic pressure is a treatment option but remains an outlier in clinical treatment strategies, practiced only in a few major centers.

High frequency ventilation is a new mode of therapy that allow gas exchange with pressure much lower than that required for conventional ventilation and may decrease the incidence of barotruma and chronic lung diseases.

Its potential usefulness in the treatment of pulmonary hypoplasia, respiratory distress syndrome and persistent pulmonary hypertension remain to be shown, and complication occur with this technique may limit its potential usefulness.

It has been most useful in treatment of interactable pulmonary air leaks in neonates.

Extracorporeal membrane oxygenation can successfully support newborns with severe respiratory failure. It was better than mechanical ventilation for selected patient and it should be considered a therapeutic technique when conventional medical, pharmacological and ventilatory therapy are not successful or are predicted to fail.

The use of nitric oxide decrease pulmonary vascular resistance in infants with pulmonary hypertension. It has shown promise perhaps more for idiopathic persistent pulmonary hypertension of newborn and sepsis than for respiratory distress syndrome and meconium aspiration.

Nitric oxide remain under clinical investigation in randomized studies to answer questions of efficacy and safety in all causes of persistent pulmonary hypertension of neonates, including lung hypoplasia syndrome such as congenital diaphragmatic hernia, where it can be used with high frequency oscillatory ventilation and surfactant if needed.

Liquid ventilation is presently undergoing clinical trials, has improved oxygenation and ventilation, and has increased static pulmonary compliance and acid-base balance at lower and safer alveolar pressures than gas ventilation.

Liquid ventilation shows further promise for lung lavaging procedures, pulmonary image enhancement, pulmonary administration of drugs and as a technique to increase functional residual capacity in lung hypoplasia syndromes.

The challenge to physician to day is to understand the cause of respiratory failure, apply the appropriate therapy, and know when to move on the next mode of therapy or refer to a center that offer it.