SUMMARY

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Artificial ventilation of the lungs refers to any method of breathing in which a mechanical apparatus is used to augment or satisfy entirely the bulk flow requirements of a patient's breathing. It can be given by positive or negative pressure. It is indicated when the patient's spontaneous breathing is not adequate to sustain life or when it's necessary to take control of the patient's ventilation to prevent impending collapse of other physiologic functions. Elective mechanical ventilation during general anaesthesia and the instance of a refractory patient with status asthmaticus who has a Pa CO_2 rising into the normal rang or higher are examples of the latter.

Until the mid-1950s mechanical ventilators used for continuous ventilation were predominantly of the negative pressure variety. The iron lung or tank ventilator, was the most familiar of these. Bulk flow is mobilized into the patient's lungs by cyclically creating a Subatmospheric pressure around the patient's chest; in actuality, only the patient's head was not enclosed in the negative pressure chamber. Variations of the tank ventilator are still used especially in children and in adults with stable respiratory failure secondary to neuromuscular disease, chest wall disorders (e.g., kyphoscoliosis) and chronic obstructive pulmonary disease.

Positive pressure ventilators periodically create a pressure gradient between the machine circuit and alveoli that results in inspiratory gas flow, exhalation occurs passively. Ventilators and their control mechanisms can be powered pneumatically (by a pressurized gas source), electrically, or by both mechanisms. Gas flow is either derived directly from the pressurized gas source or produced by the action of a rotatory or

linear piston. This gas flow then either goes directly to the patient (single-circuit system) or more commonly compresses a reservoir bag or bellows that is part of the patient circuit (double circuit system).

All ventilators in clinical use are classified into, cycling (change over from inspiration to expiration), inspiratory flow waveforms and microprocessor controlled ventilators .

Ventilatory modes are : controlled mechanical ventilation, Assist control ventilation, intermittent mandatory ventilation, synchronized intermittent mandatory ventilation, pressure support ventilation, Airway pressure release ventilation, pressure control ventilation, Inverse I : E ratio ventilation, positive end-Expiratory pressure, continuous positive Airway pressure, Mandatory Minute ventilation, High-Frequency ventilation and Non-invasive ventilation.

There are other new techniques of ventilation and oxygenation as prone ventilation, liquid ventilation, extracorporeal Co_2 removal and intravenous oxygenation .

Mechanical ventilation is accompanied by alterations in the pulmonary excretion of Co_2 , in oxygenation of pulmonary capillary blood, in central hemodynamics as well as peripheral blood flow. To evaluate these alterations adequate monitoring of ventilation, oxygenation and circulation must be instituted whenever mechanical ventilatory support is administered.

When the condition that necessitated mechanical ventilation has improved or resolved, the patient should be evaluated for weaning from the ventilator. Weaning criteria are used to assess the ability of the patient to oxygenate and ventilate without the mechanical ventilator . A variety of criteria are in common use for assessing a patient's ability to adequately ventilate without mechanical ventilation should be considered.