SYMPOSIUM 4

RESPIRATORY PAEDIATRICS

S4.3

HOME VENTILATION: PRACTICAL ISSUES

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Ventilation in the home can be delivered invasively (via tracheostomy) or noninvasively (via mask using either positive or negative pressure devices). Noninvasive ventilation (NIV) is not new. It has been used since early 20th century using “iron lung” during poliomyelitis epidemics. There has been a substantial rise in the number of home ventilator-dependent patients since 1980s-1990s due to increase number of patients surviving critical illnesses and technological advances of non-invasive ventilation. Reports in 1990s reflect the shift from invasive to non-invasive techniques, particularly in children with neuromuscular disease. Although NIV has been used for many years in children, studies comparing different ventilator techniques in this group are lacking.

The common types of NIV are CPAP (continuous positive airway pressure) and BiPAP (Biphasic positive airway pressure). BiPAP is a trademark term, other terms used are VPAP, Bilevel etc. NIV are used to treat a very wide variety of conditions from very acute diseases to the chronic diseases. This presentation will focus on the use of NIV in chronic patients, particularly those with neuromuscular disease.

The mechanism of action of NIV include improved respiratory muscle function, increased sensitivity of central chemoreceptor, reduced mechanical load and improved sleep quality. Mechanism of action varies between obstructive and restrictive lung disease patients or the underlying pathophysiology.

The indications of NIV include chronic upper airway obstructions, eg OSAS (obstructive sleep apnoea syndrome), severe laryngomalacia, neuromuscular disease, craniofacial disorders, restrictive lung diseases eg thoracic cage abnormality, scoliosis etc, can be used during weaning from invasive ventilation or used in acute hypoxemic respiratory failure patients. Sometimes, NIV can be used in chronic respiratory patients who has acute exacerbation to facilitate mucous drainage and during pulmonary rehabilitation.

The contra-indications of NIV include any patients who is unable to protect their own airway eg decreased LOC, patients with compromised cough and secretion clearance, recent gastrointestinal surgery requires closer monitoring as these patients are at risk of stomach distension and vomiting, patients with pre-existing bullous lung disease eg. Emphysema, patients with a pre-existing or susceptible pneumothorax and patients with facial bone fracture.

The equipment needed before starting NIV are suitable portable positive pressure ventilators (different kinds and brands are available), disposable circuit, bacterial filter (disposable), appropriate interfaces and head straps, humidifier and external battery (if required). There are different kinds of masks and head straps available in the market including Total face mask (TFM) (covers entire face-mainly used in adults) or full face mask (FFM) (covers nose and mouth only), nasal mask (covers nose only-mostly used in children) or nasal pillows.

This presentation will also address the practical issues pertaining to selection of patients for home mechanical ventilation and timing of initiation, and the risk-management in ventilator dependent patients at home. Other issues like source of funding, how to improve acceptance and compliance and problems that may occur especially with mask NIV, will also be discussed.