Summary and Recommendation

SUMMARY AND RECOMMENDATION

Noninvasive ventilation (NIV) is the delivery of ventilatory support using a mask or similar device without the need for an invasive artificial airway. NIV refers to noninvasive positive pressure ventilation and less commonly negative pressure ventilation.

NIV is now considered the ventilatory support of first choice in selected patients with acute exacerbations of chronic obstructive pulmonary diseases (COPD), acute pulmonary edema, severe community acquired, varicella pneumonia or for pneumocystis pneumonia in immunosuppressed patient, NIV has become a standard treatment for hypoxic patients. Although NIV has been successfully used in several cases of acute asthma, cystic fibrosis, brochiectasis and acute respiratory distress syndrome, it should not used routinely. The role of NIV in the facilitation of weaning patients from invasive mechanical ventilation is to permit earlier removal of invasive airways and to prevent reintubation in patients developing post-extubation respiratory failure and to serve a prophylactic role in postoperative patients especially solid organ transplant recipient who are at high risk for pulmonary complications . For chronic respiratory failure, NIV is the ventilatory support of first choice for patients with neuromuscular diseases and chest wall deformities, central hypoventilation and failure of obstructive sleep apnea also considered acceptable indications. There is a growing experience in the use of NIV in the management of children with chronic respiratory fialure at home as home ventilation is possible practically .

Noninvasive negative pressure ventilation work by intermittently applying a subatmospheric pressure to the chest wall and abdomen, increasing transpulmonary pressure and causing atmospheric pressure at the mouth to inflate the lungs. Expiration occurs passively by elastic recoil of the lungs and chest wall as pressure within the device rises to atmospheric levels . A variety of ventilators can be used for negative pressure such as iron lung , jacket ventilators , pulmo-wrap , cuirass ventilators and pnumobelt .

Noninvasive Positive pressure ventilation (NPPV) is an emerging modality in critical care practice and home , it assists ventilation by delivering pressurized gas to the airways via a full-face, naso-oral or nasal mask, increasing transpulmonary pressure, and inflating the lungs, expiration then occurs by means of elastic recoil of the lungs and any active force exerted by the expiratory muscles . A variety of ventilators can be used for NPPV, from conventional units and sophisticated ICU models to small portable ventilators whose performance is satisfactory in spite of their simplicity . Traditionally , ventilators are volume limited , pressure limited or simple portable bi-level device . Various modes can be used during application of NPPV which include pressure controlled , assisted controlled, pressure support, continous airwy pressure (CPAP), bilevel positive airway pressure (BiPAP), and proportional assist ventilation (PAV) mode .

The Initiation of NPPV requires knowledge and skills with technical aspects of mechanical ventilation as will as patience and ability

to select appropriate patients to adapt to the mask and ventilator, location and personnel for initiation, an interface and ventilator .

Few complications are associated with NPPV. The most common problem is local damage to facial tissue , mild gastric distension , eye irritation and sinus pain or congestion, modest air leaks at the facial seal . Adverse hemodynamic effects resulting from NPPV are unusual, although preload reduction and hypotension may occur .

Contraindications of NIV include coma or confusion, respiratory arrest, sever acidosis, life-threatening refractory hypoxemia, inability to protect the airway, excessive respiratory secretions or vomiting , hemodynamic instability or life-threatening arrhythmia, recent facial upper airway, or upper gastrointestinal surgery, recent facial trauma or burn, uncooperative patient, undraind pneumothorax .

There is no doubt that NIV has a future ,and we should not forget that its future is in our hands. All has not yet been said on the matter of indications for NIV. We can expect that a greater number of patients in a variety of clinical situations will benefit from NIV techniques and that they will be considered for application at earlier stages of diseases. The use of NIV should be accompanied by the planning of rigorously designed trials , giving more work to those who work to this area **(Gabrielli et al , 2003)** . Patients , in turn , are going to live longer , leading to the maintenance of therapies like NIV until , very advanced stages of disease , thereby engendering ethical dilemmas in which the common sense of health caregivers will have to come to the forefront . the increasing importance of

chronically ill patient will be felt by the health care system . The patient does not now die from a disease but rather lives with it and its consequences . the disease is not cured but rather managed , and this is going to pose the problem of how far to go and up to what point we should treat **(Bach ., 2003)** NIV , which is complex but not aggressive as its name implies , is going to be a point of contention among various caregivers , patients and relatives if we do not establish protocols for how to proceed with the consensus of all parties involved . The patient will have much to say about what she or he expects of the doctors responsible for care in the decision making process and about the therapeutic measures available **(Tzeng and Bach.,2000).**

The spreading use of NIV inside hospitals (respiratory medicine wards, intermediate care units, bronchoscopy units, operating theaters and recovery wards , ICUs , emergency services, day hospitals, and more) and outside (out-of-hospital emergency units and ambulance services) will broaden horizons beyond what we can presently imagine, favoring the creation, of new jobs for NIV specialists. The immediate future will involve helping pulmonologists , opinion leaders, and health care managers to understand the need to support intermediate respiratory care units and take up the challenge of their planning and creation, without scrimping on the necessary resources. The growth of NIV will be closely linked to the encouragement of these special care units **(Lobato and Alises.,2003).**

The application of technology to the creation of new interfaces and ventilators will allow us to enhance tolerance of the technique and

minimize adverse effects , leading to improved adherence to treatment and the achievement of better results .

NPPV has emerged as the noninvasive ventilation mode of first choice over alternatives such as negative pressure ventilation or abdominal displacement ventilators. However, these latter techniques are still used in some areas of the world and may be effective for patients who fail NPPV because of mask intolerance. Noninvasive ventilation has undergone a remarkable evolution over the past decade and is assuming an important role in the management of both acute and chronic respiratory failure.

Appropriate use of noninvasive ventilation can be expected to enhance patient comfort, improve patient outcomes, and increase the efficiency of health care resource utilization. Over the next decade, continued advances in technology should make noninvasive ventilation even more acceptable to patients. Future studies should better define indications and patient selection criteria, further evaluate efficacy and effects on resource utilization, and establish optimal techniques of administration.

All staff involved in an acute NIV service should receive training appropriate to their baseline knowledge and role in providing the service. Training in NIV should be available for consultants in respiratory medicine and should be included in all specialist registrar training programmes.

A training programme for the provision of an NIV service should provide a combination of knowledge based learning supported by clinical experience in the workplace. This should include:

- Understanding of normal respiratory anatomy and physiology
- Understanding of the pathophysiology of respiratory failure
- Understanding of treatment options available to the relevant patient population
- Awareness of signs demonstrating worsening respiratory failure
- Understanding of the operation, maintenance, and troubleshooting of NIV equipment
- Knowledge of patient interfaces used in NIV
- Knowledge of selection criteria for NIV
- Ability to interpret all relevant data (saturation monitor, blood gas analysis, etc)