Editorial

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NIPPV: Where Are We Now?

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Acute respiratory failure (ARF)- hypoxic or hypercapnic- is a critical condition often necessitating intensive care and mechanical ventilation (invasive or non-invasive) (1).

Noninvasive Positive Pressure Ventilation (NIPPV) is increasingly used for specific forms of ARF because of its considerable advantages over invasive mechanical ventilation (IMV) for these conditions. Patients receiving NIPPV must be able to protect their own airway, enabling them to cough and clear secretions spontaneously, thus reducing the risk of hospital-acquired respiratory infections. IMV, on the other hand, bypasses the airway defense system, permitting the entry of irritants and pathogens into the lower airways, and necessitating the insertion of suction catheters that are uncomfortable and traumatic to the lower airways for clearance of secretions. Furthermore, NIPPV requires less sedation than IMV so that patients remain more interactive, retaining the ability to speak, express emotions and eat by mouth, thus reducing the feelings of isolation, powerlessness and anxiety that have been described with IMV (2,3).

Not only are complications such as hospital-acquired respiratory infections less common with NIPPV, but so are nosocomial infections generally such as sinusitis and catheter-related blood stream and urinary tract infections, because patients are less likely to have these invasive interventions (3). Moreover, costs associated with IMV including the hospital staff required, nurse working time, need for ICU admission and length of hospital stay are usually reduced by NIPPV (4,5). NIPPV also has a wide applicability within hospitals; for instance, locations that can accommodate this modality are more accessible and diverse than with IMV (Pulmonary wards, high-dependency units, post-surgical recovery, emergency rooms and even at home). NIPPV may be used to prevent disease exacerbation and the need for intubation in patients (1). Based on the available literature, use of NIPPV is easier, more affordable, more comfortable and safer for select patients.

NIPPV is not a new intervention. Descriptions of bellows-powered face masks date back to the early 1800s when Chaussier described such a device for use during resuscitation (6). Subsequently, tension pneumothoraces were described in dogs ventilated using bellows during experimental resuscitation leading authorities to discourage the use of such devices. This ushered in the era of negative pressure ventilators and other devices that avoided the application of positive pressure ventilation to the airway that served as resuscitation tools and ventilator assist devices for more than the next century. A few descriptions of the use of noninvasive positive pressure to treat pulmonary edema, pneumonia and asthma appeared in the

medical literature during the 1930s and 40s, but these approaches didn't gain wide acceptance for another several decades (7-9).

Technical advances in ventilator design and blood gas analysis led to the development of ICUs and the preference for IMV during the 1960s despite the advantages of NIPPV for certain acute conditions (10). In the 1980s, NIPPV experienced a resurgence for use in chronic conditions, beginning with the use of continuous positive airway pressure (CPAP to treat obstructive sleep apnea and followed soon thereafter by non-invasive positive pressure volume ventilation to treat chronic respiratory failure in neuromuscular diseases (11, 12). Consequently in this course, bi-level positive pressure devices with adjustible inspiratory and expiratory pressures (BiPAP) were soon manufactured (13).

At present, there are 3 widely accepted indications for NIPPV; for ARF associated with COPD exacerbations (14,15) or to facilitate weaning from IMV in such patients (15,16); cardiogenic pulmonary edema, and immunocompromised states. However, it must be emphasized that selection of patients for NIPPV is extremely important for optimal results. NIPPV is not a substitute for IMV – it is a modality used to prevent the need for intubation in patients selected on the basis of a favorable indication and the absence of contraindications. These include the inability to protect the airway, lack of cooperation, excessive medical instability (severe progressive sepsis, massive myocardial infarction requiring intervention, respiratory arrest) or inability to fit the mask. Using NIPPV for the wrong patient can be harmful.

In the relatively short period of time since the introduction of NIPPV in Iran, this method has not been well-established and a great number of specialists and other caregivers still need more education and experience with the technique. Most hospitals do not have the required technology for optimal application and this contributes to the lack of use.

NIPPV courses for physicians that provide training on indications, case selection and choices of ventilators, masks and settings for different cases can encourage the safer and more frequent application of NIPPV for appropriate patients in general hospitals.

Experienced and skilled personnel make it easier to use NIPPV with a high level of safety and confidence in its proper application. Insurance companies should allocate facilities and adequate budgets to hospitals to provide NIPPV to appropriate patients and make it more accessible for physicians. Insurance companies can further help by providing NIPPV at a lower price for use at home by patients and reduce the related costs by decreasing the duration and frequency of hospital stays.

Manufacturers are also encouraged to provide ventilators designed to facilitate the administration of NIPPV, thus making it accessible and affordable to a larger population of patients. Enhancing the proper use of NIPPV by encouraging use in appropriate patients, discouraging use in inappropriate ones and providing equipment such as comfortable masks that fit a variety of patients and ventilators designed to facilitate NIPPV applications will, in the end, lead to better patient care with improved outcomes at lower cost.

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