Concerns and controversial issues in non-invasive ventilation application

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As one of the most important progresses in mechanical ventilation, noninvasive positive pressure ventilation (NPPV) has been increasingly used in clinical management of acute and chronic respiratory failure in the last two decades. However, several important issues remained controversial.

Firstly, the best candidates (indications) for NPPV remain unclear. Although tachypnea (RR>24BPM), dyspnea with accessory muscle activation and respiratory acidosis with $PaCO_2$ > 55 mm Hg and pH<7.35 or oxygen index<200 mmHg were most commonly recommended, the criteria in different publications were variable. Criteria for NPPV in non-COPD patients are especially non-consistent.

Secondly, criteria for assessment of success of NPPV are unclear, although $PaCO_2$ reduction >16%, pH>7.30 and OI≥164mmHg have been suggested as the criteria of success of early response, but this criteria has not been fully evaluated.

Thirdly, the application procedure, mode selection and parameters setting are subject to the experience of the individuals rather than research evidence or consensus guideline. It seems necessary to develop proper NPPV application procedure in order to ensure the proper application of NPPV.

Fourthly, whether or not application of NPPV delays the intubation and has impact on the overall mortality is lack of sufficient evidence. It has not been adequately investigated that the higher mortality rate in NPPV failure group of hypoxemic respiratory failure patients is related to the underlying diseases or delayed intubation.

Fifthly, the criteria for switch from NPPV to intubation are not well established. These criteria are very important in preventing delayed intubation and over use of intubation. The most commonly recommended Criteria for Intubation are as one of the following: pH<7.20 and progressive increase of $PaCO_2$, or persistent hypoxemia (PaO_2<50mmHg with >8 LPM O_2 or FiO_2>0.5), lethargy, confusion or coma, cardio-respiratory arrest, respiratory depression (RR< 8 BPM) or severe dyspnea (RR> 40 BPM). These criteria still need adequate evaluation.

So, NPPV should be carried out with awareness above mentioned concerns. Adequate training for NPPV operators, close monitoring of the patient's response to the treatment and prompt decision to initiate intubation when necessary are important to maximize the advantages and minimize the drawbacks of NPPV.