A Non-invasive Ventilation (NIV) program for patients with hypercapnic respiratory failure

Ng SW(1), Suen KM(1), Chan YY(1), Poon CL(1), Choi MW(1), Chan PF(1), Tsang WY(1), Cheng SL(1), Chan LV(1), Leung WS(1), Tang SK(2), Chu CM(1)
(1) Respiratory Division, Department of Medicine & Geriatrics, United Christian Hospital (2) Department of Medicine & Geriatrics, United Christian Hospital

Keywords:
Non-Invasive Ventilation
Nursing Care

Introduction
NIV has been shown to reduce intubation and in-hospital mortality in patients with acute exacerbation of COPD complicated by acute respiratory failure. It has been shown that patients requiring NIV would have better clinical outcomes if they were located in specialty areas and cared by trained healthcare personnel. In order to enhance the nursing care for patients on NIV, a NIV program was initiated in a specialty unit of a district hospital where NIV

Objectives
1. To establish a NIV program
2. To enhance care of patients requiring NIV treatment with minimal discomfort and for prevention of complications
3. To preliminarily evaluate the effectiveness of the program

Methodology
The key components of the program are designated beds, guideline, staff competence, monitoring capability and evaluation as below. Designated beds Four designated beds for patients on NIV were allocated in a specialty unit. The cases were cared by trained respiratory nurses with enhanced monitoring capability. Guideline A guideline had been developed with reference to HAHO’s Nursing Specialty Guideline and update evidence in 2013. Competency enhancement Four identical training sessions with 2.5 CNE (Continuous Nursing Education) points provided were conducted in July to August 2013. Pre and post training assessment and, workshop were conducted according to agreed competency checklist with reference to guideline of British Thorax Society 2008. Monitoring capabilities and respiratory related devices The types of respiratory equipments were assessed, prepared and maintained according to patient’s needs, including different designs of
mask, mask related pressure relief dressing, blood gases monitoring devices, designated NIV machine with different modes and physiological monitor. Evaluation The acute NIV service was audited for the compliance with the standard practices between designated beds and non-designated beds for NIV in the Department of Medicine & Geriatrics. The prevalence of mask related skin problems and healthcare utilization were also evaluated.

**Result**

Results There were 29 cases and 25 consecutive cases audited in designated NIV beds and non-designated NIV beds respectively in December 2013. The means score of the knowledge level of all 26 nurses in the specialty unit was enhanced by 21% from 9.65 to 11.67 (p-value< 0.05). The compliance rate with the guideline was 99% verse 83% for designated NIV beds and non-designated NIV beds. The complications of mask related skin lesion, and self-reported adverse effects was, 3.8% verse 12.5% and 9.11% verse 12.17% for designated NIV beds and non-designated NIV beds respectively. The length of hospital stay, NIV days and NIV hours were 8.28 verse 10.28, 6.04 verse 6.38 and 58.45 verse 91.18 verse for designated NIV beds and non-designated NIV beds respectively. Conclusion The patients suffered from acute hypercapnic respiratory failure would have better clinical outcomes, include less complication and minimized discomfort during the NIV treatment if they were located in designated NIV beds with trained healthcare workers and enhanced monitoring capabilities.