O Adi ; S Salleh  
Raja Permaisuri Bainun Hospital, Emergency & Trauma Department, Ipoh, Perak, Malaysia

Introduction:  
CPAP is used to improve oxygenation in patient with ARF. We aimed to determine non-inferiority (NI) of helmet CPAP to facemask in ARF based on physiological (heart rate (HR) and respiratory rate (RR)) and blood gas parameters (PaO2 and PaCO2). We also compared patients’ perception in dyspnea improvement after CPAP using dyspnea scale (visual analogue scale (VAS)) and Likert score.

Methods:  
We randomized 123 patients to helmet (n=64) and facemask (n=59) with 71.7% of ARF was due to acute pulmonary edema. CPAP was applied for 60 minutes. Patients’ physiological and blood gas parameters were recorded before and after intervention. Patients then marked on dyspnea scale and Likert score. NI of helmet would be declared if confidence interval (CI) of mean difference between groups (helmet’s mean minus facemask’s mean) in improving physiological, blood gas parameters and dyspnea scale was no worse than predetermined non-inferiority margin (NIM). Secondary outcome was to compare incidence of discomfort and mucosal dryness between groups.

Results:  
Both intention to treat and per protocol (PP) analysis showed mean difference for HR, RR and dyspnea scale were above NIM thus conclude helmet (NI) to facemask. PP analysis of mean differences for HR, RR and dyspnea scale as followed: HR mean difference was -4.43 beats per minute (upper bound 97.5% CI 1.43), mean difference of RR was -0.41 breaths per minute (upper bound of 97.5% CI 0.48) and mean difference of dyspnea scale was 10.98mm (lower bound 97.5% CI 1.94). Both PaO2 and PaCO2 level improved in helmet, but it was inferior. Analysis of Likert score for dyspnea improvement also conclude helmet was better than facemask (mean rank 67.81 vs 55.69, p=0.04). Incidence of discomfort and mucosal dryness was significantly lower with helmet.

Conclusion:  
CPAP delivered by helmet improves HR, RR and dyspnea in ARF with less discomfort and dryness of mucosa and it is the alternative for patients who are unable to tolerate facemask.
Mean difference between helmet and facemask for heart rate (HR), respiratory rate (RR) and dyspnea scale.

*Mean difference between helmet and facemask for heart rate, respiratory rate and dyspnea scale*