

# TREATMENT OF ACUTE RESPIRATORY FAILURE WITH CPAP HELMET ASSOCIATED WITH HFNC (HIGH FLOW NASAL CANNULA)

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Argomento: Insufficienza respiratoria acuta e ventilazione meccanica

Advantages of helmet for CPAP in acute hypoxiemic respiratory failure are well known. However, in prolonged and continuous treatment, disadvantages may be greater than benefits: use of dry gas flow, increase of  $PCO_2$ , difficulties during daily nursing and patients discomfort may even lead to failure of the treatment. High-flow nasal cannula (HFNC) deliver a uniform and continuous flow of heated oxygen, usually well-tolerated, that can even wash out an amount of  $CO_2$  and provide a low level of PEEP. We use HFNC applied to the patient inside the helmet, to minimize the disadvantages of the two devices. In our ICU we regularly use the association of the two devices in respiratory failure.

Here we relate a case series of eight severely hypoxiemic patients with acute respiratory failure (3 women, 5 men, aged from 38 to 75 y/old) treated with the association of continuous HFNC and CPAP helmet, trying to prevent intubation or re-intubation. We positioned CPAP helmet (DIMAR CPAP COMFORT ZIP HELMET) with AMBU PEEP valve at 10-15  $cmH_2O$ , in association with HFNC (OPTIFLOW™, Fisher&Paykel Healthcare),  $FiO_2$  50-60% ( $O_2$ /AIR flowmeter), flow 60 L/min, heated at 31-33 °C (humidifier HAMILTON H900, Hamilton Medical). Mean  $PaO_2/FiO_2$  before treatment was 80 (48 - 150).

Four patients were treated only with continuous CPAP+HFNC for an average period of 17,5 days; four other patients were intubated for an average period of 4 days; after extubation CPAP+HFNC were positioned, preventing re-intubation. They have all been discharged successfully from ICU with low-flow oxygen therapy. Mean ICU stay was 30 days (21 - 50).

In these patients we successfully combined advantages of HFNC (heated and humidified gas and  $CO_2$  removal) with the high PEEP level of CPAP, allowing tolerability of the helmet for a long and continuous period.