

Out-of-Hospital Continuous Positive Airway Pressure Ventilation Versus Usual Care in Acute Respiratory Failure: A Randomized Controlled Trial

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Objective: To determine whether patients in severe respiratory distress treated with CPAP in the out-of-hospital setting have lower overall tracheal intubation rates than those treated with usual care.

Study design: A prospective, randomized, controlled, non-blinded trial over a four-year period.

Inclusion criteria: Severe respiratory distress, accessory muscle use, hypoxia, respiratory rate >25, normal LOC, no chest pain, able to tolerate CPAP, and age >15.

Exclusion criteria: Respiratory arrest, respiratory rate <8, apnea, unable to protect airway, decreased LOC, cardiac ischemia, hypotensive, age<16, DNR.

Primary outcome: The need for tracheal intubation from the time of accessing medical care to inhospital death or discharge.

Secondary outcomes: Critical care unit length of stay, hospital length of stay (until death or discharge) and mortality.

Statistics: Multiple logistic regression modeling was performed to estimate adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the primary outcome.

Results: 69 patients analyzed, 34 in the usual care arm and 35 in the CPAP arm. Each treatment group was similar at baseline. Analysis was completed on an intention-to-treat basis.

- 17 of 34 (50%) patients were intubated in the usual care group versus 7 of 35 (20%) in the CPAP group (OR 0.25, 95% CI: 0.09-0.73).
- These data suggest that 3 (95%CI 2-12) patients in severe respiratory distress requiring out-of-hospital ventilatory support need to be treated with CPAP to prevent 1 intubation.
- Fewer CPAP patients died than usual care patients (5/35 [14.3%] versus 12/34 [35.3%] respectively; OR 0.3; 95%CI 0.09-0.99).

Summary: There was an absolute reduction in tracheal intubation rate of 30% and an absolute reduction in mortality of 21% in appropriately selected out-of-hospital patients received CPAP instead of usual care.