

Clinical parameters alerting treatment failure in critical patients with high-flow oxygen therapy

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Aims

To describe the clinical outcomes of critically unwell patients using high-flow oxygen therapy (HFOT) and establish clinical parameters that identify high-risk patients likely to fail or deteriorate on HFOT.

Methods

We conducted a retrospective observational study on the use of HFOT (Optiflow; Fisher & Paykel Healthcare, Auckland, New Zealand) in an intensive care unit (ICU) setting within our district general hospital (Newham University Hospital) in London, UK. We included 97 consecutive patients who were identified as having either type 1 respiratory failure (T1RF) or type 2 respiratory failure (T2RF). We collated their vital signs and arterial blood gases before initiation of HFOT and 1 hour afterwards, and their outcomes (improvement, non-invasive ventilation (NIV), intubation or palliative). Statistical analysis was performed using Microsoft Excel and SPSS.

Results

Our population consisted of 97 patients (n=97): 55 males (56.70%) and 42 females (43.30%) with an average age of 63±17 years. T1RF was the reason for admission in 46 patients, while 51 patients had T2RF. We observed an improvement in vital signs with statistical significance ($p<0.005$) in both T1RF and T2RF. HFOT was used successfully with patient discharge from ICU in 62 patients (63.92%). Failure of HFOT was considered when intubation or NIV was required, which occurred in nine (9.28%) and 18 (18.56%) patients, respectively. Palliative care was given to eight patients (8.25%). In both types of respiratory failure, it was observed that poorer outcomes were associated in patients with an acidosis prior to HFOT ($\text{pH} \leq 7.30$) and tachypnoea (respiration rate ≥ 30). Particularly for patients with T2RF with these clinical parameters, it was observed that 55% required NIV and 18% required intubation.

Conclusions

In our population of critical patients, HFOT was shown to be a good respiratory support for management of T1RF and T2RF, with favourable outcomes. However, it was observed that poorer outcomes were associated when HFOT was initiated with a $\text{pH} \leq 7.30$ or/and a respiration rate ≥ 30 . Failure to improve in patients with these clinical parameters suggests a high probability of therapy failure and a need for treatment escalation. The recognition of these parameters can allow for development of an algorithm that will alert clinicians to patients for whom HFOT should be initiated with caution. ■

Conflict of interest statement

None declared.

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