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Helmet noninvasive ventilation compared to facemask noninvasive ventilation and high-flow nasal cannula in acute respiratory failure: a systematic review and meta-analysis

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Helmet NIV may reduce mortality and intubation when compared to facemask NIV; however, large, well-designed RCTs are needed on this topic <https://bit.ly/3i1rCnS>

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Abstract

Background Although small randomised controlled trials (RCTs) and observational studies have examined helmet noninvasive ventilation (NIV), uncertainty remains regarding its role. We conducted a systematic review and meta-analysis to examine the effect of helmet NIV compared to facemask NIV or high-flow nasal cannula (HFNC) in acute respiratory failure.

Methods We searched multiple databases to identify RCTs and observational studies reporting on at least one of mortality, intubation, intensive care unit (ICU) length of stay, NIV duration, complications or comfort with NIV therapy. We assessed study risk of bias using the Cochrane Risk of Bias 2 tool for RCTs and the Ottawa–Newcastle Scale for observational studies, and rated certainty of pooled evidence using the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) framework.

Results We separately pooled data from 16 RCTs (n=949) and eight observational studies (n=396). Compared to facemask NIV, based on low certainty of evidence, helmet NIV may reduce mortality (relative risk 0.56, 95% CI 0.33–0.95) and intubation (relative risk 0.35, 95% CI 0.22–0.56) in both hypoxic and hypercapnic respiratory failure, but may have no effect on duration of NIV. There was an uncertain effect of helmet NIV on ICU length of stay and development of pressure sores. Data from observational studies were consistent with the foregoing findings but of lower certainty. Based on low and very low certainty data, helmet NIV may reduce intubation compared to HFNC, but its effect on mortality is uncertain.

Conclusions Compared to facemask NIV, helmet NIV may reduce mortality and intubation; however, the effect of helmet NIV compared to HFNC remains uncertain.