

# Automatic regulation of the endotracheal tube cuff pressure with a portable elastomeric device. A randomised controlled study

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## Abstract

### Background

Intermittent manual correction of the endotracheal tube cuff pressure ( $P_{\text{cuff}}$ ) may delay the detection of underinflation (source of contaminated oropharyngeal content microaspiration) or overinflation (exposing to airway damage). Devices for automated continuous correction of  $P_{\text{cuff}}$  are appealing but some are inconvenient, expensive or even harmful. This prospective randomised controlled study tested whether the traco Smart Cuff Manager™ reduced the rate of patients undergoing  $\geq 1$  episode of underinflation ( $P_{\text{cuff}} < 20 \text{ cmH}_2\text{O}$ ), as compared with routine manual  $P_{\text{cuff}}$  correction. The rate of patients with  $\geq 1$  overinflation episode ( $P_{\text{cuff}} > 30 \text{ cmH}_2\text{O}$ ) and the incidence of under/overinflation were also compared.

### Methods

Patients with acute brain injury and likely to receive invasive mechanical ventilation for  $> 48$  h were randomly allocated to receive, during 48 h, automated  $P_{\text{cuff}}$  correction (combined with manual correction) or manual correction alone.  $P_{\text{cuff}}$  was measured with a dedicated manual manometer, at least every 8 h.

### Results

Sixty patients were included and randomised (32 patients with manual and 28 with automated  $P_{\text{cuff}}$  correction) for 506 measurements of  $P_{\text{cuff}}$  (269 and 237, respectively). Automated correction of  $P_{\text{cuff}}$  was associated with a lower rate of patients with  $\geq 1$  episode of underinflation (63% and 18%, respectively,  $P < 0.001$ ), a lower incidence of underinflation episodes (15% vs. 2%;  $P < 0.001$ ), a lower rate of manual corrections (77% vs. 58%;  $P < 0.001$ ). For overinflation, there were no significant between-groups differences (2% vs. 2%). The incidence of early respiratory infections was similar in both groups (29% vs. 25%,  $P = 0.78$ ).

## Conclusions

The adjunction of continuous  $P_{\text{cuff}}$  control with the Tracoe Smart Cuff Manager™ to routine manual intermittent correction reduced the incidence of  $P_{\text{cuff}}$  underinflation episodes without provoking overinflation.

## Trial Registration

ClinicalTrials NCT03330379. Registered 6 November 2017,  
<https://clinicaltrials.gov/ct2/show/NCT03330379>.

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