Intraoperative Cuff Pressure Measurements of Supraglottic Airway Devices in the Operating Theatres of an Australian Tertiary Hospital

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Introduction
Supraglottic airway device (SAD) cuff pressure is a parameter that may be overlooked in daily anaesthetic practice1. Correct intracuff pressures (PINTRACUFF) are required to ensure adequate ventilation and also to avoid complications such as cuff hypoinflation leading to a risk of aspiration, or cuff hyperinflation with a risk of causing airway and oral tissue trauma, leading to a sore throat, dysphagia or dysphonia1.

Normal occlusive PINTRACUFF should be between 40 and 60cmH2O for SADs. Manual palpation of the cuff, listening to the disappearance of an audible air leak or injection of a standard volume of air into the cuff via a pilot balloon are common practices which do not guarantee optimal PINTRACUFF.

Aims
The aim of this study was to establish the values of exact PINTRACUFF in SADs among patients from an Australian tertiary hospital and to compare these values with recommended evidence-based standards.

Methods
This prospective study included 191 patients undergoing elective or emergency surgery during anaesthesia (without the use of nitrous oxide) with a SAD in situ. PINTRACUFF values were categorised into three groups: <40cmH2O, 40-60cmH2O and ≥60cmH2O. Patient demographic and clinical characteristics were compared between these three groups of patients using Kruskal-Wallis test statistics.

Adjusted odd ratios (95% CI) of the PINTRACUFF were calculated for SAD size and type using the multinomial logistic regression. Statistically significant association of SAD size and type on the PINTRACUFF observed in the univariate analysis was included in the multivariable model to determine the independent effect of these factors.

Results
SAD PINTRACUFF was measured for 191 patients with a mean age of 45.5 years (±SD 17.5). 57% of them were male patients, and the average body mass index (BMI) was 27.0kg/m2 (±SD 6.1). In this study, 57.6% of patients received a size 4 SAD and 57.6% received a Supreme SAD. To measure the PINTRACUFF, only the auditory method was used among 76.3% of patients and the tactile method was used in 9.5% of patients. Following induction of anaesthesia, the median PINTRACUFF was 50.0cmH2O (IQR 36.0 - 70.0).

Only 38.2% of patients had a PINTRACUFF within the recommended range (40-60cmH2O). During surgery with a SAD, PINTRACUFF was less than 40cmH2O for 56 patients (29.3%) and exceeded 60cmH2O for 62 patients (32.5%). Patients who had a size 4 SAD were 3 times (95% CI: 1.3, 6.9) more likely to have a PINTRACUFF less than 40cmH2O compared to patients who had a size 5 SAD (p-value 0.012). Patients who had a silicone SAD (Classic/Ultimate or Proseal®) were 2.8 times (95% CI: 1.2, 6.8) more likely to have a suboptimal PINTRACUFF of less than 40cmH2O compared to PVC SADs.

Conclusions
Even though the median PINTRACUFF was within the recommended range, 32.5% of the patients studied, had an PINTRACUFF exceeding the recommended value, whilst 29.3% had an PINTRACUFF which was inadequate to prevent aspiration. This demonstrates that replacing subjective estimation methods with mandatory PINTRACUFF measurement can prevent potential adverse effects of suboptimal cuff inflation. The results suggest that PINTRACUFF should be routinely measured to maintain the recommended evidence-based standard.

References

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