Can the intra-cuff pressure be estimated by palpation of the pilot balloon?

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Background: We sought to determine the accuracy of estimating endotracheal tube intracuff pressure by palpation of the pilot balloon by anesthesiologists, anesthesia residents, pediatric anesthesia fellows, certified nurse anesthetists, and student nurse anesthetists.

Methods: A tracheal simulation model was constructed with three different diameters of polyvinylchloride tubing. Three different sized endotracheal tubes (4.0, 5.0 and 6.0 mm) were then placed into the tubes and the cuffs inflated to various pressures. Each participant was given 3 different scenarios of cuff pressure for each endotracheal tube size for a total of 9 scenarios per practitioner. By feeling the pilot balloon, the anesthesia provider was asked to estimate whether the cuff pressure was greater than 30 cmH2O, 20-30 cmH2O or less than 20 cmH2O. The cuff pressure was then measured using a manometer to determine whether they had correctly estimated the intracuff pressure or if it was high or low.

Results: A total of 106 anesthesia providers participated in the study. Participants were able to estimate the correct intracuff pressure with palpation of the pilot balloon 45% of the time. In the remaining cases, the intracuff pressure was overestimated 29.4% of the time and underestimated 25.7% of the time. The intracuff pressure was correctly identified 44.4% of the time by attending physicians, 55.6% of the time by anesthesia residents or fellows, 50.6% of the time by certified nurse anesthetists, and 38.4% of the time by student nurse anesthetists.

Conclusion: Participants from all the groups were unable to reliably estimate endotracheal intracuff pressure from palpation of the pilot balloon. Given the potential injury from excessive intracuff pressures, other techniques are necessary to ensure that excessive pressures are not present. The current study clearly demonstrates that anesthesia providers were able to correctly estimate the intracuff pressure less than half of the time.