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SCIENTIFIC ARTICLE

Does ultrasonographic volume of the thyroid gland correlate with difficult intubation? An observational study☆

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KEYWORDS
Ultrasonography;
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Abstract
Background and objectives: Preoperative ultrasonographic evaluation of the thyroid gland done by surgeons could let us foresee airway management challenges. The aim of this observational study was to evaluate the effects of thyroid-related parameters assessed preoperatively by surgeons via ultrasonography and chest X-ray on intubation conditions.
Methods: Fifty patients undergoing thyroid surgery were enrolled. Thyromental distance, Mallampati score, neck circumference and range of neck movement were evaluated before the operation. Thyroid volume, signs of invasion or compression and tracheal deviation on chest X-ray were also noted. The intubation conditions were assessed with Cormack and Lehane score and the intubation difficulty scale. Statistical analyses were done with SPSS 15.0 software.
Results: The mean thyroid volume of the patients was 26.38 ± 14 mL. The median intubation difficulty scale was 1 (0–2). Thyromental distance ($p = 0.011$; $r = 0.36$; 95% CI 0.582–0.088), Mallampati score ($p = 0.041$; $r = 0.29$; 95% CI 0.013–0.526), compression or invasion signs ($p = 0.041$; $r = 0.28$; 95% CI 0.006–0.521) and tracheal deviation on chest X-ray ($p = 0.041$; $r = 0.52$; 95% CI 0.268–0.702) were correlated with intubation difficulty scale. Also patients were classified into two groups related to their intubation difficulty scale (Group I, $n = 19$: intubation difficulty scale = 0; Group II, $n = 31$: $1 <$ intubation difficulty scale ≤ 5) and difficult intubation predictors and thyroid-related parameters were compared. Only Mallampati score was significantly different between groups ($p = 0.025$).

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Conclusion: The thyroid volume is not associated with difficult intubation. However clinical assessment parameters may predict difficult intubation.

PALAVRAS-CHAVE
Ultrassonografia;
Manejo das vias aéreas;
Glândula tireoide

Existe correlação entre o volume ultrassonográfico da glândula tireóide e intubação difícil? Um estudo observacional

Resumo
Justificativa e objetivos: A avaliação ultrassonográfica pré-operatória da glândula tireóide feita por cirurgiões pode prever desafios no manejo das vias aéreas. O objetivo deste estudo observacional foi avaliar os efeitos de parâmetros relacionados à tireoide investigados pré-operatoriamente por cirurgiões mediante ultrassonografia e radiografia de tórax em condições de intubação.
Métodos: Cinquenta pacientes submetidos à cirurgia de tireoide foram inscritos. Distância tireomentoniana (DTM), escore de Mallampati, circunferência do pescoço e amplitude de movimento do pescoço foram avaliados antes da operação. Volume da tireoide, sinais de invasão ou compressão e desvio da traqueia na radiografia de tórax também foram registrados. As condições de intubação foram avaliadas com o escore de Cormack e Lehane (CL) e a escala de intubação difícil (EID). Análises estatísticas foram realizadas com o software SPSS 15.0.
Resultados: A média do volume da tiroide dos pacientes foi de $26{,}38 \pm 14$ mL. A mediana da EID foi 1 (0-2). DTM ($p = 0{,}011$; $r = 0{,}36$, IC 95% 0,582-0,088); escore de Mallampati ($p = 0{,}041$; $r = 0{,}29$, IC 95% 013-0,526); sinais de compressão ou invasão ($p = 0{,}041$; $r = 0{,}28$; IC 95% 0,006-0,521) e desvio da traqueia na radiografia de tórax ($p = 0{,}041$; $r = 0{,}52$, IC 95% 0,268-0,702) foram correlacionados com a EID. Os pacientes foram classificados em dois grupos também relacionados à EID (Grupo I, $n = 19$: EID = 0; Grupo II, $n = 31$: $1 < \text{EID} \leq 5$), e os preditivos de intubação difícil e os parâmetros da tiroide relacionados foram comparados. Apenas o escore de Mallampati foi significativamente diferente entre os grupos ($p = 0{,}025$).
Conclusão: O volume da tireoide não está associado à intubação difícil. Contudo, os parâmetros de avaliação clínica podem prever intubação difícil.

Introduction

Airway management is one of the most important first concern in the operating room not only for anesthesiologists but also for surgeons who are going to operate close to the airway, as failed intubation is associated with severe morbidity and mortality. Preoperative evaluation of the airway by physicians with objective parameters is therefore essential in all cases. Thyroid surgery is a common surgical procedure of the neck region and an enlarged thyroid gland could yield a risk factor for difficult airway management.[1] However routine physical examination fails to predict actual size of the enlarged thyroid gland. On the other hand ultrasound provides relatively more accurate size estimation and patients who will undergo a thyroidectomy are almost always preoperatively examined by ultrasonography of the thyroid gland and chest X-ray by their respective surgeons. Thus, at the time of preoperative evaluation for thyroid surgery results of these examinations are already available for almost every patient. Considering this, some objective data from these already obtained preoperative investigations could also be used by the interdisciplinary physician team for the preoperative risk calculation of difficult airways among this group of patients.

As the ultrasonographic volume of the enlarged thyroid gland and its impact on the airway management is still not truly appraised, the primary aim of this study was to evaluate the impact of the thyroid gland volume estimated by ultrasonography on the endotracheal intubation conditions. Nearby, the secondary aim was to correlate these parameters with classical indicators like Mallampati classification, thyromental distance (TMD), neck circumference and movements for predicting difficult endotracheal intubation.

Methods

After the approval of the University Research Ethics Committee and after obtaining informed consent from every individual patient, fifty consecutive ASA physical status I and II female patients undergoing thyroid surgery were enrolled to this study. Patients with history of difficult intubation, Body Mass Index more than 35 and having malformation of the airway (not due to thyroid enlargement),