

Abstract.

The GAET Score: A Combination of Two Validated Scores, the Cormack and Lehane Score and the POGO Score.

Background.

Considering complexity of tracheal intubation, accurate description of laryngeal view remains necessary to analyze a difficult procedure specially when it is unexpected in patients without predictive criteria of difficult tracheal intubation at an era when direct laryngoscopy with a blade laryngoscope continue to be the first option for routine tracheal intubation despite video-assisted laryngoscopes. To accurately describe laryngeal view, Guerçi et al. used the POGO and Cormack and Lehane scores.(1-3) Therefore, we decided to pursue in the same vein by combining these two validated scores in one score, the glottis-arytenoids-epiglottis-tongue (GAET) score in seven grades as an ultimate and more discriminating extension of the Cormack and Lehane score destined not to be memorized but to be displayed to the nurse anesthetists or anesthesiologists after tracheal intubation. Moreover, we aimed to match the distribution of the GAET score to that of Yentis and Lee who previously proposed for more accuracy an extension of the Cormack and Lehane score in five grades like Wilson et al.(4-5)

Methods.

We built the GAET score by subdividing the whole glottis opening into four 25%-parts of glottis opening (POGO, percentage of glottis opening) because the human eye cannot distinguish even 5%-difference of POGO. For example, discriminating between 75% and 77%, 1% and 5%, or 100% and 95% was not worth considering. Each 25%-part represented a grade. Therefore, four visible parts (76% -100% of POGO) was grade 1 (GAET 1), three visible parts (51% - 75% of POGO) was grade 2 (GAET 2), 2 visible parts (26% - 50% of POGO) was grade 3 (GAET 3) and one visible part (1% - 25% of POGO) was grade 4 (GAET 4). The GAET score was extended to GAET 5 (only arytenoids were visible, POGO = 0), GAET 6 (only epiglottis was visible, POGO = 0) and GAET 7 (only tongue is visible, POGO = 0) (Figure 1).

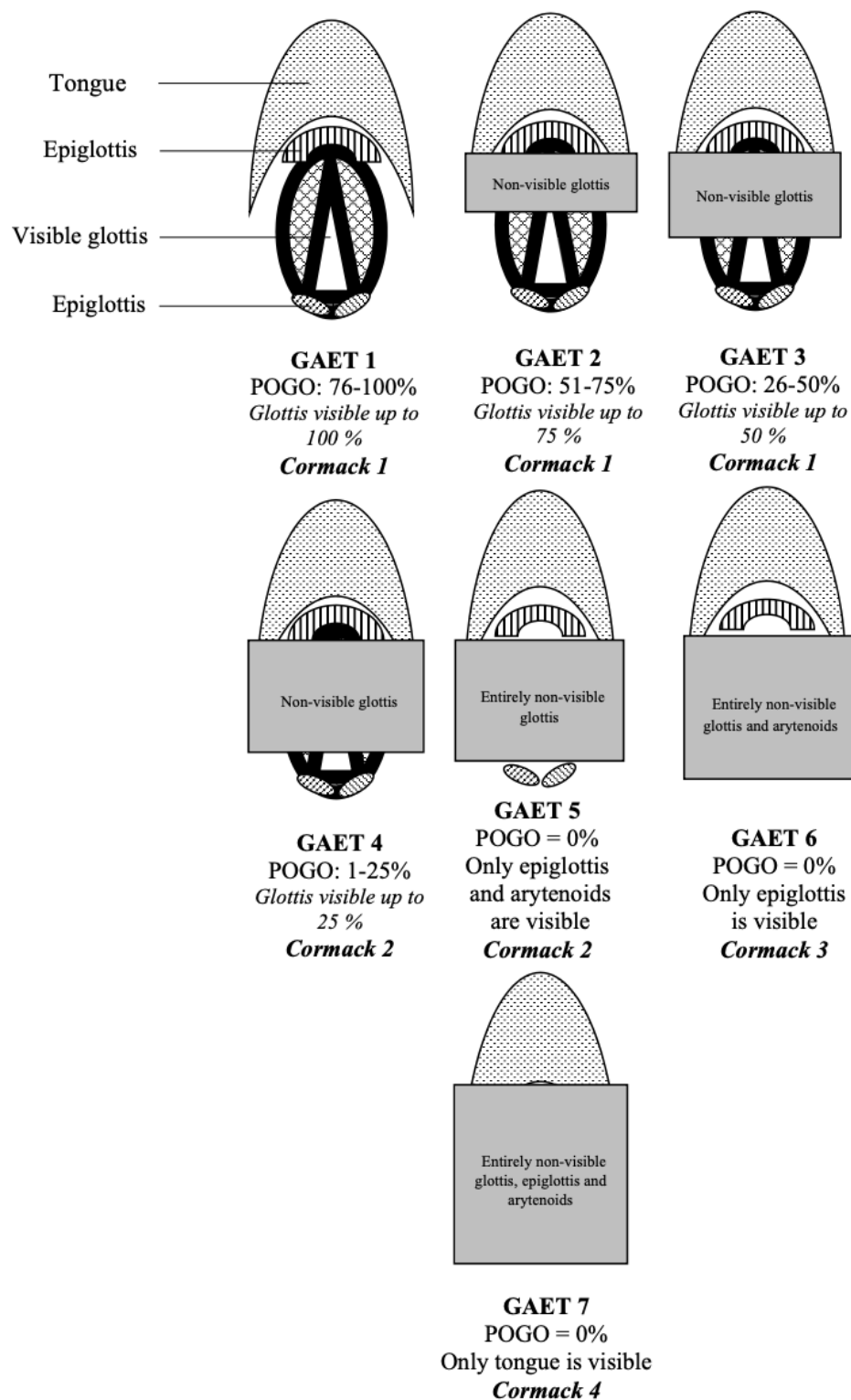


Figure 1. GAET score. A combination of Cormack – Lehane and POGO scores for accurate description of the laryngeal view during tracheal intubation and IDS calculation. IDS, Intubation Difficulty Score; POGO, Percentage Of Glottic Opening; GAET, Glottis-Arytenoids-Epiglottis-Tongue.

Tongue Epiglottis Glottis Arytenoids



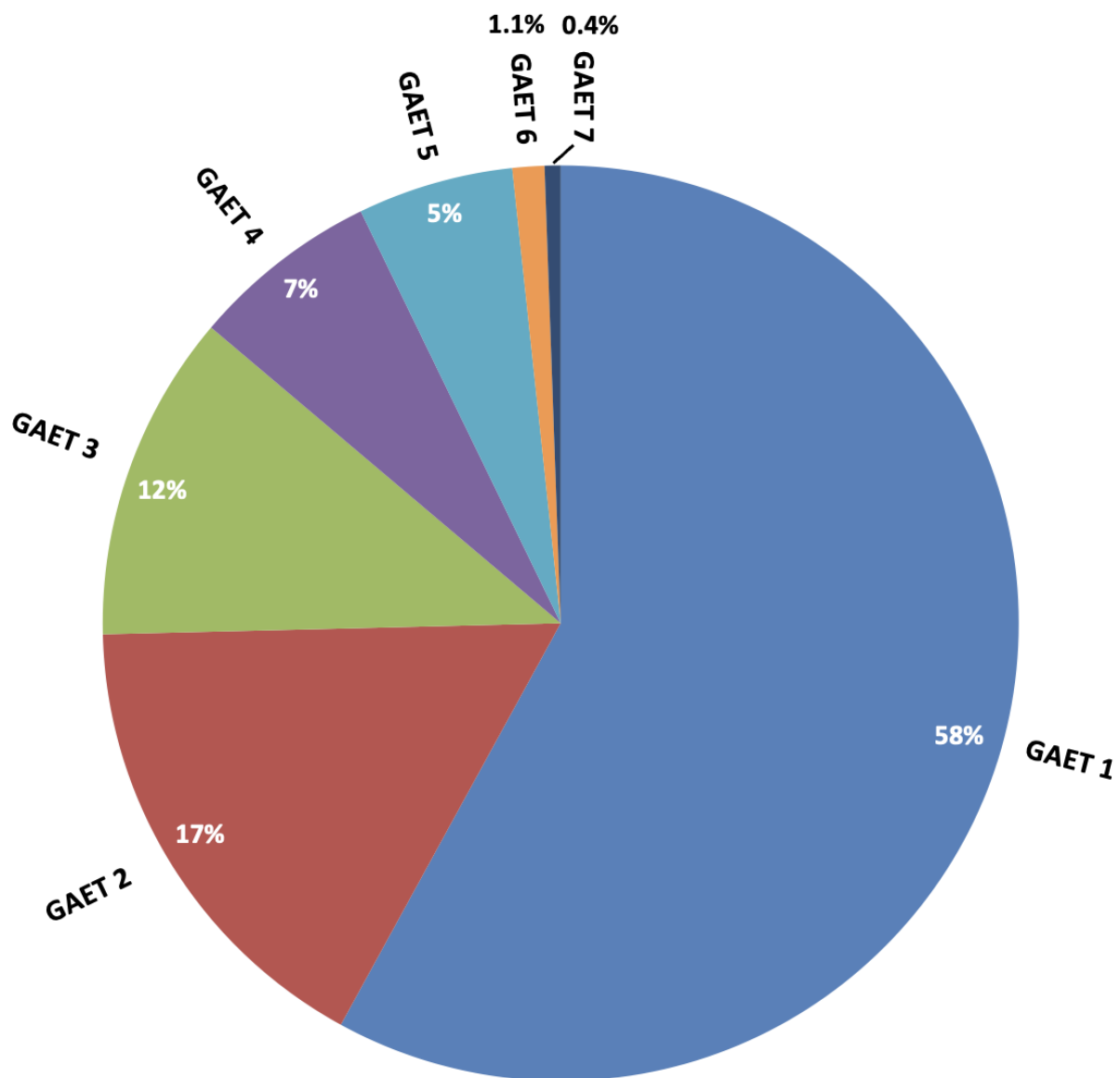


Figure 2. Distribution of laryngeal views described using the GAET score.

This distribution matched with that of Yentis and Lee. GAET 1, 2 and 3 are gathered in the grade 1 of both Cormack – Lehanne and Yentis and Lee scores.

Data were retrospectively extracted from patients of the trial of Lassouani et al. evaluating the protective effect of a potentially airway-protective 60-second step-limit tracheal intubation algorithm when performing tracheal intubation using a single-use plastic or reusable metal blade with a MacInstoh laryngoscope.(6)

We collected 709 laryngeal views during attempts performed by experienced nurse anesthetists or anesthesiologists when contractions of the adductor pollicis generated by a train of four electric stimulations (30 mA) on the ulnar nerve disappeared. Laryngeal view was optimized by extending neck, pressing down the larynx or changing quickly operator. To obtain an optimized view, we avoided to struggle with the laryngoscope using an excessive mandibular traction strength challenging the quick switching to alternative techniques protecting from injuries.

After tracheal intubation, a GAET score diagram (Figure 1) was displayed to the operator to provide the right laryngeal view they experienced. Thereafter, we make a matching of the GAET score grades obtained with the Cormack and Lehane score. For this matching, we assimilated the grades GAET 1, 2 and 3 to the Cormack and Lehane 1. GAET 4 and 5 corresponded to Cormack and Lehane 2. GAET 6 and 7 corresponded respectively to Cormack and Lehane 3 and 4.

Additionally, we did not correlate the GAET score to the Intubation Difficulty Score (IDS) to exhibit a difficult tracheal intubation related to a poor GAET score because the purpose of the GAET was not to predict difficult tracheal intubation.(7)

Results.

Frequency of each grade of the GAET score, from GAET 1 to GAET 7, describing laryngeal view of 709 attempts of laryngoscopy was distributed as follows: 411 (58.0), 117 (16.5), 81 (11.4), 46 (6.5), 43 (6.0), 8 (1.1), and 3 (0.4) (Figure 2). GAET 7 occurred in 3 patients and was managed with an Airtraq.

We noted that proportion of patient presenting GAET 1 to 4 was 655 (92.3%) and that of Yentis and Lee grades 1 to 2a was 612 (92.3%). Frequencies were comparable between GAET 5-6-7 and Grades 2b-3-4 of Yentis and Lee (Table 1). Frequency of GAET 1 was comparable to that of grade 1 of Wilson et al., 411 (58%) vs 401 (63.3). Frequency of GAET 3-4-5 was comparable to grades 2-3 of Wilson et al., 170 (23.9) vs 180 (28.4). The true grade 2 of the Cormack and Lehane score is lonely represented by the GAET 4.

Lassouani et al.		Yentis and Lee		Wilson et al.		Matching POGO score	Matching Cormack and Lehane score
The GAET score		Modified Cormack and Lehane score		Wilson grading system			
N = 709		N = 663		N = 633			
n (%)		Matching Grades	n (%)	Matching Grades	n (%)		
Grades							
	279 (39.3)	1	450 (67.8)			100% <i>only</i>	1
GAET 1	411 (58.0)	2a	162 (24.4)	1 Almost all of cords	401 (63.3)	100% (to 76%)	“1”
GAET 2	117 (16.5)					75% (to 51%)	“1”
GAET 3	81 (11.4)			2 Only half of cords	121 (19.1)	50% (to 26%)	“1”
GAET 4	46 (6.5)					25% (to 1%)	2
GAET 5	43 (6.0)	2b	43 (6.5)	3 Only arytenoids	59 (9.3)	0	“2”
GAET 6	8 (1.1)	3	8 (1.2)	4 Only epiglottis	50 (7.9)	0	3
GAET 7	3 (0.4)	4	0 (0.0)	5 Not even epiglottis	2 (0.3)	0	4

Table 1: Frequency of laryngeal view in different attempts of extending the Cormack and Lehane score. POGO, Percentage Of Glottic Opening; GAET, Glottis-Arytenoids-Epiglottis-Tongue.

Discussion and Conclusion.

The distribution of the GAET score grades matched those reported by Yentis and Lee and Wilson et al. Yentis and Lee score proposed 5 grades. Grades 2a corresponded to the sum of GAET 1, 2, 3, and 4. Grades 2b, 3 and 4 perfectly matched GAET 5, 6, and 7. However, it was worthy to discriminate the grade 2 of Cormack and Lehane that matched the combination of GAET 4 and 5 which were two quite different laryngeal views in clinical practice. Likewise, the grade 1 of Cormack and Lehane deserved to be subdivided in pertinent routine clinical laryngeal views (GAET 1, 2 and 3).

Displaying a GAET score diagram to the operator after tracheal intubation make the GAET score simple and comprehensive as expected by anesthesiologists around the world and suggested by Yentis and Lee. Furthermore, Krage et al have demonstrated that anesthesiologists poorly memorized laryngeal view grading systems like the Cormack and Lehane score.(8)

The GAET score was reserved primarily for scoring laryngeal views and calculating IDS accurately and recording it, especially favorable grades of the GAET score, GAET 1, 2 or 3. Laryngeal view is only one of the multiple characteristics used to describe tracheal intubation, especially difficult tracheal intubation, in addition to tracheal intubation duration, mandibular traction strength, pressure on the larynx, vocal cords abduction, induced injuries, and IDS, which includes Cormack and Lehane score for laryngeal view graduating.(1-2, 7). Indeed, poor laryngeal view during procedure announces difficult tracheal intubation that must lead quickly to switch the initial technique, the blade laryngoscope, to the most appropriate technique so that to facilitate tracheal intubation and avoid prolonged duration, oxygen desaturation, and injuries as demonstrated by Lassouani et al.(6)

We did not correlate the GAET score to the Intubation Difficulty Score (IDS) because multiple factors in addition to laryngeal view could predict a difficult tracheal intubation like fragile teeth, prominent incisors, receding mandible, retrognathia, limited mouth aperture, high mandibular traction strength, absence of muscle relaxation exhibited by vocal cords adduction. The Intubation Difficult Score quantifies the level of difficulty.(7) The items accounted in the IDS described quite accurately how the tracheal intubation has been difficult. Wilson et al. in a five-grades scale of laryngeal view tried to predict difficult tracheal intubation.(5) They recognized, the method was restrictive because it did not take in account the other factors.

Finally, this seven-grades laryngeal view score, the GAET score, appeared to be equilibrated and seemed to be the ultimate proposition to accurately describe laryngoscopy and then, allow precise calculation of the IDS and facilitate comparison of the laryngeal views between studies in regard of its greater laryngeal view discriminating ability. However, this retrospective data extraction may not be sufficient to validate the GAET score which needs further studies to be validated, generalized and implemented in operating rooms as a diagram displayed to nurse anesthetists and anesthesiologists.

References

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