

# Determination and calibration in the airway of the Mallampati, Patil-Aldrete tests, sternomental distance, interincisive distance

## Summary

An analytical, cross-sectional study was carried out in patients undergoing major elective surgery under general orotracheal anesthesia, at the “Carlos Manuel de Céspedes” University Provincial Hospital of Bayamo, in the period from January to December 2018, with the objective of evaluating the effectiveness of predictive tests of difficult intubation: Mallampati, Patil-Aldrete test, sternomental distance, and interincisive distance. For the calculation of the sample, the professional statistical program Epidemiological Analysis of Tabulated Data was applied, resulting in 269 patients, who were selected in the anesthesia office and applied the tests, after signing the informed consent. For the information processing, descriptive and inferential statistics were used. According to the Youden index, the interincisive distance was unsurpassed in effectiveness in all the tests performed, following the sternomental distance; The Mallampati test was the one with the lowest predictive value. Combinations of tests can increase the diagnostic value compared to the value of each test alone.

**Keywords:** general orotracheal anesthesia, difficult intubation, easy intubation, predictive tests

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## Introduction

One of the responsibilities of the anesthesiologist is to establish and maintain the airway (V.A.) permeable in any clinical situation, which entails a commitment to it (anesthesia, emergencies, resuscitation, among others). The basic basis to achieve this is the systematic assessment of the V.A. and recognition of possible difficulties.<sup>1</sup>

A difficult airway (V.A.D) can be foreseen with the review of patient files when they are available; when finding information about previous techniques used, ease of ventilation with mask, type of laryngoscope blade, use of stylet, muscle relaxant use, visualization of the glottis and number of attempts. The preoperative interview can also provide important information; with respect to previous anesthetic experiences.<sup>2</sup> The American Association of Anesthesiology (ASA), for its acronym in English, defines as a difficult airway the existence of clinical factors that complicate ventilation administered by a facial mask or intubation performed by an experienced person. Difficult ventilation is defined as the inability of a trained anesthesiologist to maintain oxygen saturation above 90% using a face mask, with an inspired fraction of oxygen of 100% and difficult intubation is defined as the need for three or more attempts for intubation of the trachea or more than 10 minutes to get it.<sup>3-6</sup>

The main obstacle to overcome lies in the difficulties of predicting this problem, which makes one in three cases of difficult intubation not foreseen in the preoperative evaluation.<sup>2,5,6</sup>

Currently, endotracheal intubation is an essential part of the anesthesiologist's contribution to patient care. Continuous improvements in instruments, the use of muscle relaxants and technical skills, made intubation of the trachea a common practice in modern anesthesiology. However, we are sometimes surprised by

the difficulty or inability to do it, even in experienced hands. 3 The unexpected difficult airway has an incidence of 1/2230, according to the authors.<sup>4</sup> Difficult unintended intubation has a variable incidence in anesthesiology. In general, it ranges between 1 and 8.5 percent (for some authors, it can reach 13 percent or up to 18 percent).<sup>7,8</sup> The same proportion of cases would be observed in relation to difficult laryngoscopy.

For this reason, the evaluation of patients before surgery becomes one of the critical components of anesthetic practice. It must be performed on each patient who is going to undergo an anesthetic / surgical procedure in order to ensure a satisfactory result. The main objective of the preoperative evaluation is to pre-establish the risk to which the patient will be subjected and the elaboration of a consequent perioperative management plan for said risk. In the case of the airway, due to the relevance of complications resulting from improper management, it is essential to determine if the patient presents a high risk of difficulty in order to act accordingly.<sup>8,9</sup>

It is based on the hypothesis that if the predictive tests are applied: Mallampati, Patil-Aldrete test, Sternomental distance, and Interincisive distance to patients who are going to undergo surgical interventions, it will be possible to predict a difficult airway demonstrating its effectiveness.

### Goals:

#### General:

1. To assess the effectiveness of predictive tests of difficult intubation in patients who required general orotracheal anesthesia, treated in the operating room of the University Hospital “Carlos Manuel de Céspedes” of Bayamo from January to December 2018.

### Specific:

1. Describe the sociodemographic characteristics of the patients under study.
2. Determine the degree of difficult airway prediction for clinical airway assessment tests: Mallampati, Patil-Aldrete test, sternomentonian distance, and interincisive distance.
3. Determine the sensitivity and specificity of clinical airway assessment tests: Mallampati, Patil-Aldrete test, sternomentonian distance, and interincisive distance.

### Methodological design

#### General conception

An analytical, cross-sectional study was carried out in patients undergoing major elective surgery under orotracheal general anesthesia, at the “Carlos Manuel de Céspedes” University Provincial Hospital in Bayamo, in the period from January to December 2018. The study universe consisted of 2,800 patients surgically operated in the general surgery room during the study period. For the calculation of the sample, the professional statistical program Epidemiological Analysis of Tabulated Data (EPIDAT) was applied through the following details:

Expected proportion: 90.0%

Confidence level: 95.0%

Design Effect: 1.0

Absolute accuracy: 9%

Resulting in a sample size of 269 patients.

#### Sample selection criteria

The selection of patients was performed in the anesthesia office, once their surgical intervention was announced, through interrogation and physical examination, review of complementary exams in order to detect function of organs and systems and detect any abnormality in them. They were also given a brief explanation about the difficult airway assessment tests; In addition to performing the application of the Mallampati, Patil-Aldrete, Sternomentonian Distance and Interincisive Distance tests.

#### Inclusion criteria

- a) Age  $\geq$  18 years; to which it was possible to perform all the predictive tests.
- b) Patients who required general orotracheal anesthesia for surgical intervention.
- c) Patients with physical condition I, II or III according to the classification of the American Society of

#### Anesthesiology (ASA)

- d) Patients who gave their consent to integrate the study (Annex 2).

#### Exclusion criteria

- a) Pregnant patients.
- b) Patients who did not cooperate with the physical examination.
- c) Anatomical alterations of the face and frontal relief, and oral cavity, tumors and neck deformities.

The apnea period and degree of difficulty for tracheal gold intubation with direct laryngoscopy were presented and recorded by patients who underwent surgery for major elective surgery under general orotracheal anesthesia. The pre-anesthetic visit sheet is reviewed and the pertinent data will be recorded to: number of medical history, age in years of age of the patient, sex, weight in kg, difficult airway predictive scales recorded in the questionnaire; If none of them is counted, the evaluation will be carried out at that time prior to the start of the planned anesthetic technique. Once the anesthetic induction has been performed by the anesthesiologist responsible for the patient and the patient is in the intubation plane, the measurement and consignment will be made in the apnea period form in seconds, understood as the period of time elapsed since the introduction of the laryngoscope, the passage of the endotracheal tube through the vocal cords until insufflation of the endotracheal tube balloon, for this the time elapsed with a stopwatch will be measured. The direct laryngoscopy or Cormack test is the direct visualization of the larynx and its structures, the classification that gives responsible anesthesiologist of the patient in patients intubated by conventional laryngoscopy will be recorded. Oxygen saturation at the time of intubation will be recorded in all patients undergoing tracheal gold intubation with conventional laryngoscopy and the value set by the pulse oximeter of the anesthesia machine at the time of insufflation of the endotracheal tube balloon will be considered. The degree of difficulty for intubation is understood as the number of attempts made to pass the endotracheal tube through the glottic ring, if the number of attempts is greater than three, indicate in numbers how many attempts were made. It will be indicated if intubation was achieved in a simple way, in which the anesthesiologist did not need any external help, or was assisted in which an assistant or assistant performs movements or maneuvers designed to facilitate the vision of the vocal cords. The data obtained will be collected in a questionnaire form for later tabulation and analysis.

#### Operationalization of the variables:

} Dependent variable. Difficult airway (qualitative ordinal). Existence of clinical factors that complicate ventilation administered by a face mask or intubation performed by an experienced person.<sup>2</sup>

- True positive: difficult intubation that was predicted as difficult.
- False positives: an easy intubation that was predicted as difficult.
- True negative: an easy intubation that was predicted as easy.
- False negative: a difficult intubation that was predicted as easy.

} Independent variables.

- Sex.
- Age.
- Type of patient.
- Oral opening.
- Condition of the teeth.
- Modified Mallampati
- Sternomentonian distance.
- Interincisive distance.
- Patil-Aldrete.

### Tabulation plan and data analysis

Based on the data collected from the study sheets and using the SPSS Statistical Software, v. 23, for Windows, the quality control of the recorded data and the relevant statistical analysis were carried out through customized tables, by measuring the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) with the following formulas: sensitivity:  $VP / (VP + FN)$ , specificity:  $VN / (VN + FP)$ , positive predictive value:  $VP / (VP + FP)$ , negative predictive value:  $VN / (FN + VN)$ .

- \* VP: true positives.
- \* FP: false positives.
- \* FN: false negatives.
- \* VN: true negatives.

According to the nature of each of the variables (qualitative) and guided by the commitment that was defined in each of the specific objectives, the comparative analyzes corresponding to the nominal, ordinal and / or numerical variables were performed, including: (a) The frequency analysis and (b) the descriptive statistics according to each case. In addition, graphic analyzes of the type were performed: (a) 3D bars to compare percentages of each value.

Operational definitions True positive (VP): A difficult laryngoscopy that was predicted as difficult. False positive (FP): An easy laryngoscopy that was predicted as difficult. True Negative (VN): An easy laryngoscopy that was predicted as easy. False negative (FN): A difficult laryngoscopy that was predicted as easy. Sensitivity (S): percentage of difficult laryngoscopes correctly predicted of all laryngoscopes that were really difficult. ( $S = VP / VP + FN$ ) Specificity (E): percentage of easy laryngoscopes correctly predicted of all that were really easy. ( $E = VN / FP + VN$ ) Positive predictive value (PPV): percentage of difficult laryngoscopes correctly predicted of all predicted as difficult. ( $VPP = VP / VP + FP$ ) Negative predictive value (NPV): percentage of easy laryngoscopes correctly predicted of all predicted as easy. ( $VPN = VN / FN + VN$ ).

From the inferential statistics, the non-parametric Chi square test was used, estimating that if  $p > 0.05$  the differences are not significant, if  $p < 0.05$  was considered significant differences and if  $p < 0.01$  the differences were called very significant. To calculate the effectiveness

(sensitivity and specificity, positive and negative predictive values and positive and negative likelihood ratio) of the predictive tests as predictive methods of difficult intubation, 2 x 2 tables were formed taking into account their results compared with the results. Intubation results, obtaining automated processing with the use of the Epidat 3.1 statistical package (program for epidemiological analysis of tabulated data).

### Results

A total of 269 patients undergoing elective procedures in the specialties of surgery and traumatology, ASA I-III were included, and between the ages of 18 and 70, an average age of  $37.46 \pm 12.80$  and which were 60.59% (n = 163) female sex and 39.4% (n = 106) male sex showing statistically significant difference to present difficult airway ( $p < 0.05$ ), results shown in the table 1. In relation to anesthetic risk, ASA I patients prevailed: 116 (43.12%), 111, followed by ASA II (41.26%) patients, ASA IV-V patients were excluded from this study (Table 2).

The physical characteristics evaluated were the following: condition of the teeth finding 1% with prominent upper incisors, 22% with partial dentition and 11% presented anodontics; In relation to the neck, 11% were reported with a wide neck and 11% with a short neck. In addition, it was reported in 3% of patients with the presence of macroglossia and 4% with micrognathia. These mentioned characteristics must be related to decide the risk of finding an early difficult airway and in case of encountering this it is recommended to follow the ASA guidelines for airway management (Table 3 & 4).

Of the patients reviewed, 39.78% (n = 107) were difficult intubations, against 60.22% (n = 162) of which were easy, of which 31.23% were predicted in advance as routes difficult airs and 43.49% were predicted in advance as easy airways. In no case was any failed intubation recorded, in 3% (n = 3) difficulty was reported for intubation with facial mask, guide was used to perform intubation in 6% (n = 6) and in 16% (n = 17) had to change operators (See Table 5).

Table 6 shows the results of the Youden index that allows us with greater certainty to order the tests performed according to effectiveness, regardless of the prevalence of what is evident: the interincisive distance was unsurpassed in the set of tests performed 0, 88; following the sternomentonian distance; The 0.71 Mallampati test was the one with the lowest predictive value.

**Table 1** Clinical tests of preoperative airway assessment for the prediction of a difficult airway. Percentage according to sex and Average age according to sex

VARIABLE	Women (n=163)			Mem (n= 106)			TOTAL (n= 269)		p
	Media	DE	%	Media	DE	%	Media	DE	
EDAD	37,50	12,90	60,59	38,01	13,51	39,4	37,46	12,80	0,03

DE, standard deviation

**Table 2** Clinical tests of preoperative airway assessment for the prediction of a difficult airway. Assessment of anesthetic risk

ASA Classification	Frequency (n=269)	%
I	116	43,12
II	111	41,26
III	42	15,61

**Table 3** Clinical tests of airway assessment preoperatively for the prediction of a difficult airway. Evaluation of the main characteristics for intubation examined by sex

Variable	Characteristics	Sex				Total	%
		Women (n=163)		Men (n= 106)			
		No	%	No	%		
Condition of the Teeth	Incisors	3	2	0	0	3	1
	Superior	38	23	22	22	60	22
	Prominent	19	12	11	10	29	11
	Partial dentition	103	63	72	68	175	65
Neck	Short	24	15	5	5	29	11
	Broad	24	15	5	5	29	11
	Normal	115	70	96	90	211	79
Tongue	Macroglosia	6	4	0	0	6	3
	Normal	157	96	106	100	263	97
Chin	Micrognathia	8	7	3	10	11	4
	Normal	155	93	103	90	258	96

**Table 4** Clinical tests of airway assessment preoperatively for the prediction of a difficult airway. Airway prediction

Sex	Difficult VA n (%)		Easy VA n (%)		TOTAL
	Anticipated	No Anticipated	Anticipated	No Anticipated	
Men	36(13,38)	7(2,60)	43(15,98)	20(7,43)	106
Women	48(17,84)	16(5,95)	74(27,51)	25(9,29)	163
<b>TOTAL</b>	<b>84(31,23)</b>	<b>23(8,55)</b>	<b>117(43,49)</b>	<b>45(16,73)</b>	<b>269</b>

VA, airway

**Table 5** Clinical tests of airway assessment preoperatively for the prediction of a difficult airway. Analysis of the effectiveness of orotracheal intubation according to the use of predictive methods

Indicator	VA Difficult	
	Frequency	%
Face mask ventilation	3	3
More than 3 intubation attempts	0	0
More than 10 minutes to achieve intubation	0	0
Use of guide	6	6
Use of Laryngeal Mask	0	0
More than two laryngoscopies	7	6
Operator change	17	16

VA: Airway

**Table 6** Clinical tests of airway assessment preoperatively for the prediction of a difficult airway. Predictive values, sensitivity and specificity of the airway assessment scales

Tests	Total	S	E	VPP+	VPN-	Validity	RV +	RV-	Index of Youden
Mallampati	269	76,47	94,52	76,47	94,52	91,11	13,96	0,25	0,71
Distance externomentonian	269	82,35	96,63	93,33	96,00	98,56	6,12	0,18	0,81
Patil-Aldrete	269	94,12	83,56	57,14	98,39	85,56	5,73	0,07	0,78
Interincisor distance	269	88,24	100,0	100,0	97,33	97,78	-	0,12	0,88

## Discussion

Every patient who undergoes surgery has the possibility of presenting a problem in the proper control of the airway during the anesthetic - surgical. The main consequences of improper management of the patient's airway range from trauma to the respiratory tract, brain or myocardial damage and even death; Therefore, the proper management of the airway is of vital importance in the practice of anesthesiology.<sup>10,11</sup> Several studies have tried to find the best clinical tools to efficiently predict a difficult airway. The application of various predictive tests or the combination of these have not been able to solve the problem of low positive predictive value or low sensitivity of these tests. The low prevalence of difficult airway in patients makes it unlikely to find more accurate clinical prediction tools.<sup>12-14</sup>

The airway management strategy should consider the possible occurrence of cases of unanticipated difficulty, despite an appropriate preoperative evaluation.<sup>14</sup> Therefore, in an inalienable way, there must be pre-established strategies to solve the problems of difficult unanticipated airway, strategies that will continue to appear and in which anesthesiologists should train periodically.<sup>5,6</sup> This does not mean abandoning the preoperative evaluation of the airway, on the contrary, we must be more rigorous in its application. Probably the combination of an adequate clinical history of the airway, with a physical examination finished in search of predictors of difficulty and assessment based on clinical experience, continue to be the best weapons to prevent the occurrence of complications of our patients in this area. Two When reviewing other studies, 1 it is observed that sex is not a widely explored variable in terms of predictors of difficult airways, but the prevalence of easy airway predictions with respect to difficult female patients has been confirmed, although It was considered a difficult route the existence of clinical factors that complicate the ventilation administered by a facial mask or when intubation performed by an experienced person when the insertion of the endotracheal tube with conventional laryngoscopy requires more than three attempts or more than 10 min for its realization , use of instrumentation (guide or laryngeal mask) which regardless of the characteristics of the patient was influenced by the abilities of the person who performed the intubation and his experience in the face of difficult intubations; taking into account that the first evaluation made by any of the academic levels was taken as correct: anesthesiologists, and residents according to years.

In the study Chirino et al.<sup>15</sup> an incidence of difficult intubation was observed, with a predominance in females and more frequent among those over 60 years. These results are similar to those reported by other authors such as Rivero<sup>16</sup> who performed a physical analysis and mathematical model of the airway; and those obtained in the present investigation. On the other hand, Ríos and Reyes<sup>16</sup> report that of the 90 patients included in their study, the female sex prevailed and that within the age distribution they were in a range of 17-88 years, finding that 14 were difficult intubations and 76 They were easy, stating that in no case was any failed intubation recorded, nor had to change the intubation technique and that in 9 cases there was a second attempt at intubation.<sup>17</sup> Results similar to those found in the present investigation. Pérez Santos<sup>18</sup> points out that difficult unforeseen intubation has a variable incidence. In his study he was predicted by the tests applied. Age by groups showed no differences. significativas aunque la media fue mayor en los pacientes con VA difícil, lo que se explica en parte por los cambios degenerativos articulares que se incrementan con la edad.

Moon<sup>19</sup> realizar un estudio para comparar la incidencia de vía aérea difícil según grupos de edad, agruparon a los participantes

en tres grupos denominados jóvenes (<40 años), de mediana edad (40-59 años) y mayores (60 y más años), encontrando que con el envejecimiento disminuyen los movimientos de la cabeza y el cuello, la distancia tiromentoniana y la distancia interincisivos, así como la calidad de la dentición.

Difficult unanticipated intubation has a variable incidence, in general it ranges between 1 and 8.5%, but can reach 18%; In the present study it was reported that in 8.5% of the patients they were not anticipated as difficult airways, which is consistent with the literature reviewed although it is necessary to make the clarification that the present study has as limitation that it was carried out in a university hospital and the first evaluation was taken as correct.<sup>1</sup> The high percentages of the use of guidance and change of operator for intubation may be due to the experience of the person who performed it. The Mallampati test, initially described by Mallampati in 1985 using a classification divided into 3 degrees, and subsequently modified by Samsoun and Young, adding a 4th degree of intubation difficulty, is based on the vision of the pharyngeal structures with the mouth open to maximum and tongue sticking out. Mallampati tries to correlate between the visibility of the oropharyngeal structures and the degree of difficulty in laryngeal exposure during direct laryngoscopy, concluding that poor visualization can be predicted by visual assessment of VA. This test is perhaps the most used. Mallampati studied 210 patients susceptible to general surgery, 28 of whom were considered with the Cormack test as grades higher than 2. The results showed good sensitivity, specificity and predictive values.<sup>20-22</sup>

The anterior space of the larynx is measured as the thyrometric distance, if it is larger than 6 cm, the laryngoscopy is relatively easy. Some authors suggest the sternomental distance as a more specific and sensitive test than the thyromentonian distance and the Mallampati index. Thyromentonian distance less than 6 cm is not a good predictor of ID, which is comparable to one study, where the positive predictive value was low (20%) and the negative predictive value was high (89%).<sup>23</sup> Other studies they show higher specificity values (80%-93%), but similar positive and negative predictive values.<sup>24</sup> High specificity and negative predictive value were observed, and low sensitivity in both, as well as a low negative predictive value for the sternomental distance.<sup>2,3,25</sup>

The mouth opening refers to the distance between the upper and lower incisors with the mouth open, if it is larger than 3 cm a laryngoscope blade can be introduced more easily. When there is presence of prominent incisive teeth or absence of incisors there is difficulty in endotracheal intubation. In a published paper, an oral opening smaller than 4 cm is identified as a predictor of difficult IOT; However, others showed that in patients in whom the interdental distance was less than 5 cm, laryngoscopy was significantly difficult. This test proves to be a good predictor of easy IOT, but does not meet the objective of predicting an ID; Therefore, it can be expressed that, as in the Anglo-American population, the test is deficient in the prediction of a VAD, however it was the one with the highest sensitivity and predictive values, the specificity was also high.<sup>20</sup> According to Carlson et al.,<sup>26</sup> for the prediction of difficult intubation, the modified Mallampati test was a good predictor, but not the conventional test. Both versions of the Mallampati test were poor predictors of difficult ventilation with bag and mask facial. The authors conclude that used alone, the Mallampati test has only limited utility to predict difficult VA, results similar to those obtained in the present investigation. However, Ríos and Reyes<sup>17</sup> find in their results that the greatest sensitivity was for Mallampati, followed by distance for Bellhouse-Dore, sternomental distance and finally the mouth opening.

In our case, the predictive value of the Mallampati test improved when combined with the rest of the classifications, which coincides with the results reported by: Sánchez and collaborators,<sup>27</sup> Eiamcharoenwit and collaborators,<sup>28</sup> Karakus and collaborators,<sup>29</sup> who in their studies demonstrated the low utility of the oropharyngeal class of Mallampati as a single test in the prediction of difficult intubation. Ríos García<sup>17</sup> showed that the highest sensitivity was recorded in the group that only underwent Mallampati, as well as the most specific and with the highest prognostic value were four predictive tests grouped (thyromentonian distance, extension of the atlanto-occipital joint, distance sternomentonian, and interincisive distance) which together make a more adequate prognostic assessment.

Mills<sup>1</sup> in his study conducted in patients undergoing elective surgical intervention of the surgery and traumatology specialties of the Regional Hospital of Cuilapa, Santa Rosa de Guatemala, in the period from January 2011 to October 2013; He obtained that of the determinants evaluated, he found that the Thyromentonian distance presented the greatest specificity and sensitivity with respect to the other 84% and 59%, respectively. It is concluded that the unique use of each difficult airway assessment test by itself is limited due to the high presence of false positives (56.07%), being performed together and with greater experience of the anesthesiologist, higher percentages of successful intubation are achieved. The results of the specificity and the negative predictive value were high for all the tests carried out, resulting in the highest values for the sternomentonian distance, resulting in the test of greater positive predictive value and sensitivity, demonstrating that said test can correctly predict difficult intubation Shah et al.<sup>30</sup> when carrying out a study with 480 patients of both sexes and characteristics similar to the sample of the present study (ASA Classification I and II) demonstrate when comparing the different predictive tests, which in response to sensitivity, specificity and positive predictive values and Negative, the mandibular protrusion and the proportional height of the thyromentonian distance (Patil test) obtained the highest values with respect to those observed in the measurement of the thyromentonian distance, the Mallampati test, interincisive distance and measurement of head movement the neck; results similar to those found in the present study.

In the present investigation the measurement of the interincisive distance from values smaller than 2.6 cm corresponded with difficult intubation, finding a percentage of easy intubation in classes 1 and 2. The above showed an extreme specificity, which entails a High positive predictive value. Finally, given the low prevalence of cases of difficult airway in practice, the Youden index applied is acceptable in the clinical context, as noted by other authors.<sup>16</sup> Although a 40% casuistic incidence of difficult airway was found, which is not related to data recorded in routine anesthesiology practice of 3 to 18%; This may be due to the experience of who performed the intubation and that the first intubation was taken as correct. It is important to have the knowledge of these tests since they are easy to assess and apply since if they are used in a timely manner, patients who need specialized airway management can be detected, this being of vital importance in our hospital because it is counted A program of postgraduate studies and the correct management of the airway is dependent on the level of experience by the anesthesiologist, the greater the cases of difficult airway that are determined in advance, they can provide comprehensive care to patients who they will be operated surgically and in this way reduce the risk of fatal complications.<sup>31,32</sup> The ideal airway assessment test to predict a difficult intubation must have a high sensitivity, so that it will identify the majority of patients in whom intubation will actually be difficult (true positives) and on the

other hand it must have with a high positive predictive value, so that only a small proportion of patients are labeled as difficult to intubate, when in reality intubation is easy on them, concluding various authors. 30-34 The most recommended in terms of the use of the different evaluations of the difficult airway, is first of all to be applied as described, applied in a timely manner and as none is decisive or definitive, to get used to a joint use with at least three of these assessments and that in this way are fundamental tools for timely and prognostic detection, reducing the risk of patients presenting complications in their management.<sup>33-37</sup>

## Conclusion

1. According to the Youden index, the interincisive distance was unsurpassed in effectiveness in all the tests performed, following the sternomentonian distance; The Mallampati test was the one with the lowest predictive value.
2. Combinations of tests can increase the diagnostic value compared to the value of each test alone.

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