



International Journal of Medical Anesthesiology

E-ISSN: 2664-3774
P-ISSN: 2664-3766
www.anesthesiologypaper.com
IJMA 2021; 4(3): 180-190
Received: 15-06-2021
Accepted: 18-07-2021

Dr. V Velkumar
Associate Professor of
Anesthesiology, Dhanalakshmi
Srinivasan Medical College
Hospital, Perambalur, Tamil
Nadu, India

Dr. K Rajachidambaram
Professor of Surgery,
Dhanalakshmi Srinivasan
Medical College Hospital,
Perambalur, Tamil Nadu,
India

Dr. S. Amrithkumar
IInd year M.S Post Graduate
Dhanalakshmi Srinivasan
Medical College Hospital,
Perambalur, Tamil Nadu,
India

Corresponding Author:
Dr. V Velkumar
Associate Professor of
Anesthesiology, Dhanalakshmi
Srinivasan Medical College
Hospital, Perambalur, Tamil
Nadu, India

A study of evaluation the of difficult endotracheal intubation in thyroid surgeries

Dr. V Velkumar, Dr. K Rajachidambaram and Dr. S Amrithkumar

DOI: <https://doi.org/10.33545/26643766.2021.v4.i3c.305>

Abstract

A prospective study to evaluate the incidence of difficult endotracheal intubation in thyroid surgery.

Materials and Methods

Type of study: It is a prospective study

Place of study: Department of Anaesthesiology, Dhanalakshmi Srinivasan Medical College Hospital. 100 adult patients satisfying inclusion criteria were enrolled in this study. General examination included examination for facial anomalies, temporomandibular joint pathology, anomalies of mouth and tongue, pathology of nose, pathology of palate. Height in metre and weight in kilograms were recorded and BMI calculated.

Observation and Result: Evaluation of the incidence of difficult endotracheal intubation in thyroid surgery was done and Body mass index, thyromental distance, interincisor distance were measured. Retrognathia, neck mobility, tracheal deviation and compression were also evaluated. All data were collected and tabulated.

Conclusion: The study concludes that the incidence of difficult endotracheal intubation in thyroid surgery is less. In this study population no specific predictive factors were found to be associated with difficult endotracheal intubation in thyroid swelling.

Keywords: Thyroid surgery, endotracheal intubation, difficult anesthesia

Introduction

This study was conducted in the department of Anaesthesiology, Dhanalakshmi srinivasan medical college – patients posted for elective thyroid surgery were selected and pre-operative assessment made with measurements BMI, TMD, IID, MMS, Neck mobility. Presence of retrognathia, tracheal deviation and compression were also noted. After induction IDS score was noted.

Statistical analysis showed that the incidence of difficult endotracheal intubation in thyroid surgery is less.

Aim of the study

A prospective study to evaluate the incidence of difficult endotracheal intubation in thyroid surgery.

Materials and Methods

It is a prospective study, conducted in Department of Anaesthesiology, Dhanalakshmi Srinivasan Medical College Hospital – GGH. 100 adult patients satisfying inclusion criteria were enrolled in this study.

Inclusion Criteria

1. Elective adult thyroid surgery patients requiring general endotracheal Anaesthesia.
2. Males and Females. Whose ASA physical status 1-2.
3. Age 18 years of age and older.
4. Who have given valid informed consent.

Exclusion Criteria

The patients with following conditions are not included in this study. Patients not satisfying inclusion criteria.

Patients requiring other techniques for intubation such as rapid sequence Induction.

Patients intubated prior to surgery.

Patients with severe cardiovascular, hepatic or renal disease and mental illness.

Are unconscious or very severely ill. Need for nasal intubation.

Materials

Macintosh laryngoscope – current standard device. Weighing machine calibrated to 1 kg.

Measuring tape calibrated to 0.5 cm Airway Assessment:

Previous anaesthesia records, H/O previous surgery, Trauma, Burns, Tumour in and around the oral cavity, Neck or cervical spine were asked in the history. H/O of systemic illness like diabetes, ankylosing spondylitis, rheumatoid arthritis were asked and recorded.

General examination included examination for facial anomalies, temporomandibular joint pathology, anomalies of mouth and tongue, pathology of nose, pathology of palate. Height in metre and weight in kilograms were recorded and BMI calculated.

Measurement of airway indices: Individual indices were measured.

Joint movement: Patient was asked to look the ceiling without raising eyebrow and range of movements measured.

Neck flexion

Patient was asked to touch the manubrium sterni with chin and the range of movements measured.

TMJ Function

Patient was asked to open his mouth wide open and the inter incisor distance measured. Examiners index finger was placed over the tragus and the thumb over the mastoid process and the patient was asked to open the jaw and the sliding function of the mandibular condyle was assessed.

Upper lip bite test

The patient was asked to bite the upper lip with the lower incisor and graded as follows:

Class 1: lower incisor can bite the upper lip above the vermilion line.

Class 2: lower incisor can bite the upper lip below the vermilion line.

Class 3: lower incisor cannot bite the upper lip.

Thyromental Distance

Distance between thyroid notch and mental symphysis when the neck was fully extended and mouth closed.

Sternomental Distance

Distance between the sternal notch and mental symphysis when the neck was fully extended and mouth was closed.

Examination of dentures

Abnormalities like cracking, bucking, loose, artificial and absence of incisors were examined and recorded

Neck Circumference

Patients with neck circumference >50 cm had a greater chance of difficulty in intubations than those with < 50 cm.

Body Mass Index

Classification	BMI: KG.M2
Normal	18.5 – 24.9
Overweight	>25
Pre obesity	25 – 29.9
Obesity Class- I	30 – 34.9
Obesity Class- II	35 – 39.9
Obesity Class – III	>40

Samson & young modification of Mallampati grading

The patient is kept in sitting position with maximal mouth opening, protruding tongue, without phonation and the observer's eye in level with patients mouth. The degree to which faucial pillars, uvula, soft palate and hard palate were visible were recorded and classified as follows:

Grade I: faucial pillars, uvula, soft palate and hard palate

Grade II: uvula, soft palate and hard palate are visible

Grade III: base of uvula or none, soft palate and hard palate are visible

Grade IV: only hard palate visible after assessment patient shifted to operating room. Iv line started and monitors connected. Inj glycopyrolate 0.2 mg iv and Inj fentanyl 2ug/kg were given as premedication. Then preoxygenated with 100% oxygen for 3 mins.

Induction done with Inj thiopentone 5mg/kg. Intubation is done following non depolarising blocker Inj atracurium 0.5mg/kg or depolarising blocker Inj suxamethonium 2 mg/kg.

In case of non depolarising blocker, face mask ventilation is done for 3 minutes. Quick look laryngoscopy done with Macintosh laryngoscope and the Cook's modification of Cormack – Lehane grading and intubation difficult score was noted.

Cook's modification of cormack lehane grading and intubation difficulty score were noted as follows

Entire vocal cord visualized	:	Grade – 1
Posterior part of vocal cords seen	:	Grade IIa
Arytenoids only seen	:	Grade IIb
Epiglottis only seen (liftable)	:	Grade IIIa
Tip of epiglottis only seen/ adherent	:	Grade IIIb
No glottis structure seen	:	Grade IV

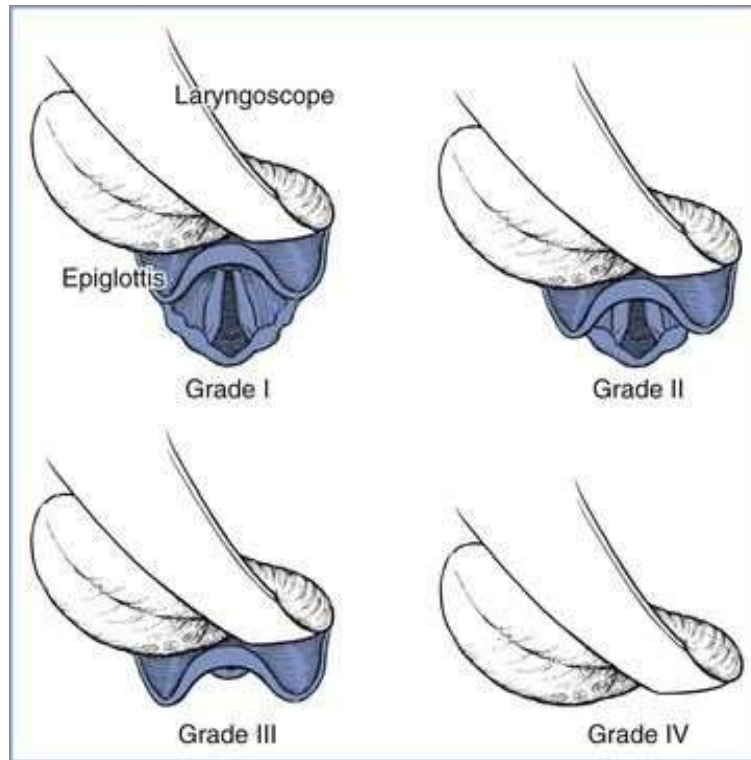


Fig 1: Cormack & Lehane Grading System

Intubation Difficulty Score

Seven variables are used:

- N1- Number of supplementary attempts. An attempt is defined as one advancement of tracheal tube in the direction of glottis during direct laryngoscopy.
- N2 – The number of supplementary operators directly attempting (not assisting)
- N3 – The number of alternative techniques used.
- N4 – Glottic exposure as defined by the Cormack grade minus one.
- N5 – Subjectively increased lifting force applied during laryngoscopy
- N6 – The necessity of external laryngeal pressure.
- N7 – Position of vocal cords. 0 – abduction, 1 – adduction

Apart from cormack- lehane and intubation difficulty score the following factor was also noted

Intubation time: Measured from entry of the device into the oral cavity until confirmation of proper placement of tracheal tube. Trauma during intubation is also noted.

Observation and Result

This is a prospective study to evaluate the incidence of difficult endotracheal intubation in thyroid surgery. Body mass index, thyromental distance, interincisor distance were measured. Retrognathia, neck mobility, tracheal deviation and compression were also evaluated. All data were collected and tabulated. The collected data

were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data, descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables.

Table 1: Statistics

	Age	BMI	TMD	IID
Valid N	100	100	100	100
Missing	0	0	0	0
Mean	39.18	24.0115	7.035	3.921
Median	40.00	23.9500	7.000	4.000
Std. Deviation	9.744	3.07052	.5999	.5711
Range	42	16.01	2.5	3.0
Minimum	18	16.39	6.0	3.0
Maximum	60	32.40	8.5	6.0

Demographic variables:

Age Distribution

Age group of patients range from 18 yrs to 60 yrs. Majority of study population were in 30 to 40 yrs age group.

Table 2: Age range

< 20 yrs	1
20 - 30 yrs	21
30 - 40 yrs	35
40 - 50 yrs	32
50 - 60 yrs	11

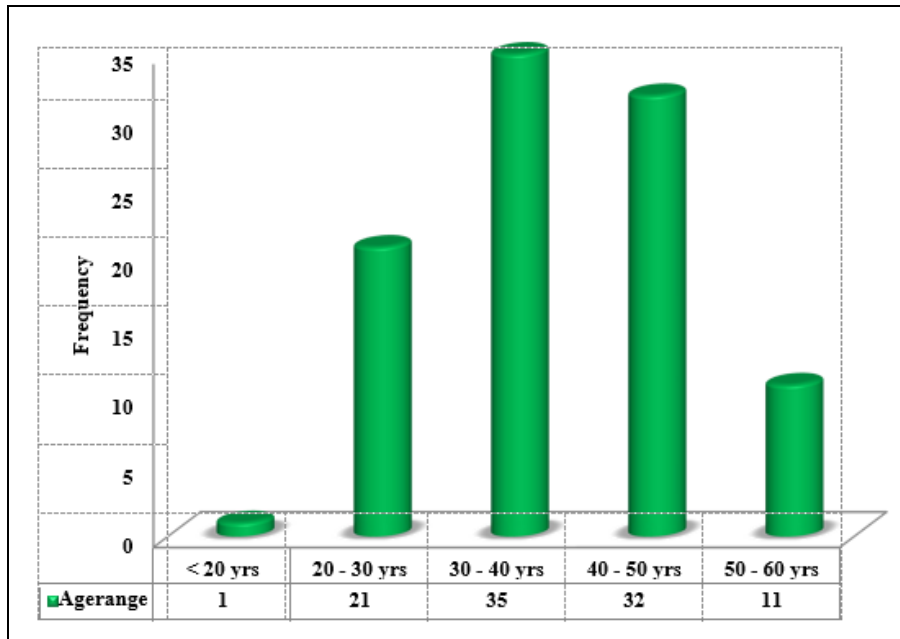


Fig 2: Age range

Sex Distribution:

Among the study population 10% were male and 90% were female.

Table 3: Sex Distribution

Female	90	90.0
Male	10	10.0
Total	100	100.0

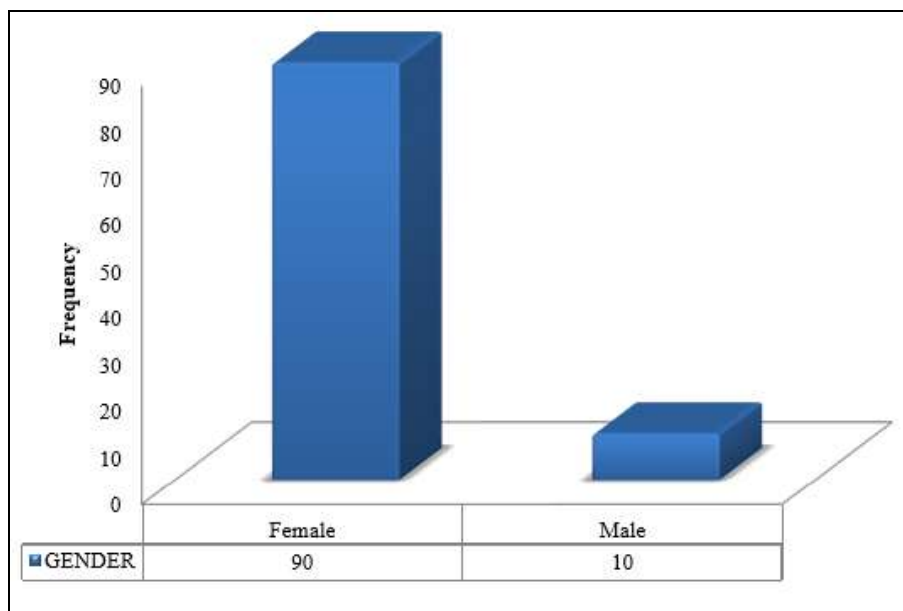


Fig 3: Gender

Body Mass Index

BMI of patients ranges from 18 to 35. Majority ranges from 21 to 25.

Table 4: Body Mass Index

	BMI	Percent
<= 20	11	11.0
21 - 25	58	58.0
26 - 30	28	28.0
31 - 35	3	3.0
Total	100	100.0

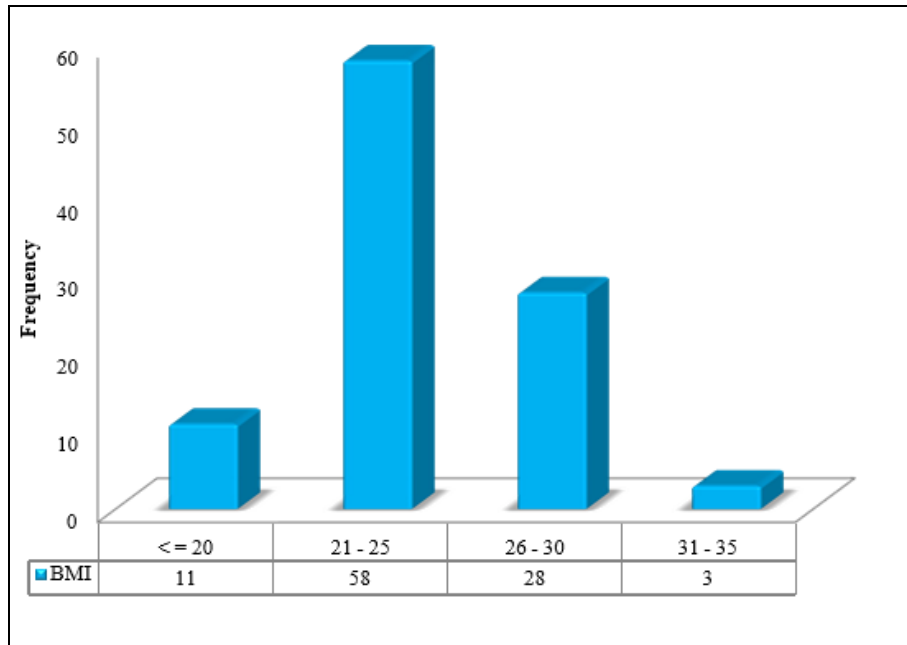


Fig 4: BMI

Modified mallampati classification

Modified Mallampati score distribution was 29% / 49% / 22%. In most of the study population MMS was II.

Table 5: Modified mallampati classification

	MMS	Percent
I	29	29.0
II	49	49.0
III	22	22.0
IV	0	0.0
Total	100	100.0

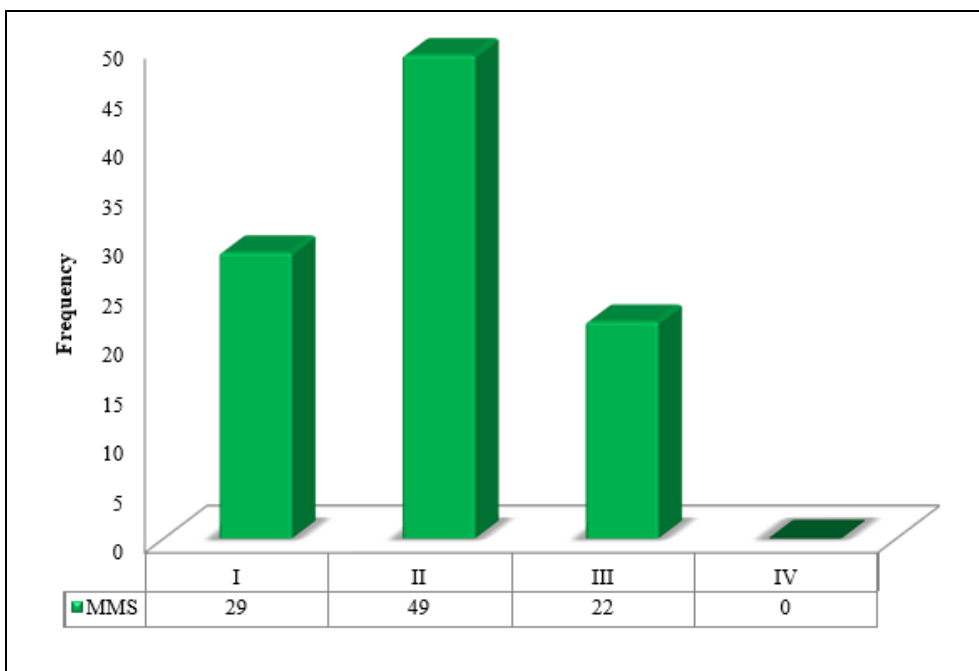


Fig 5: MMS

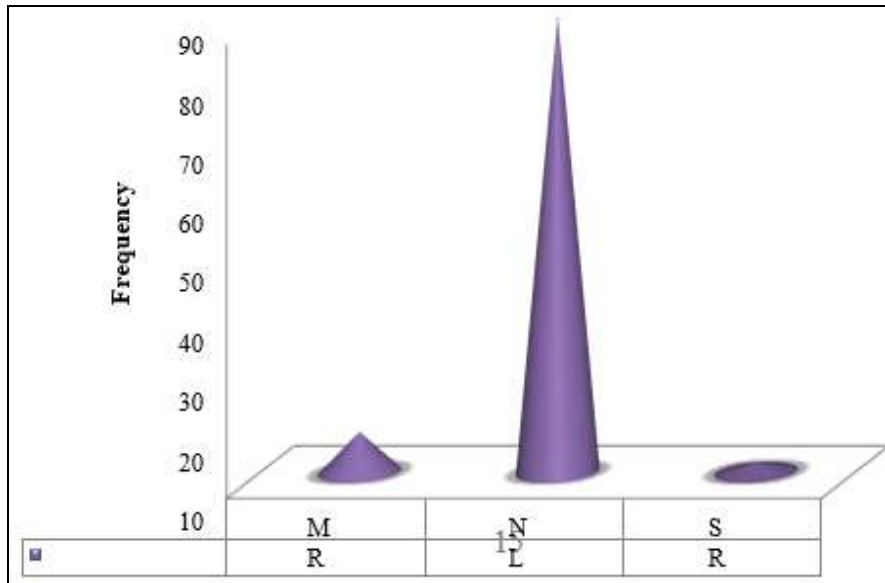


Fig 6: Neck Mobility

Retrognathia

99% of population.

Retrognathia was present in 1% of population and absent in

Table 6: Retrognathia

Retrognathia	No of persons	Percent
NIL	99	99.0
Present	1	1.0
Total	100	100.0

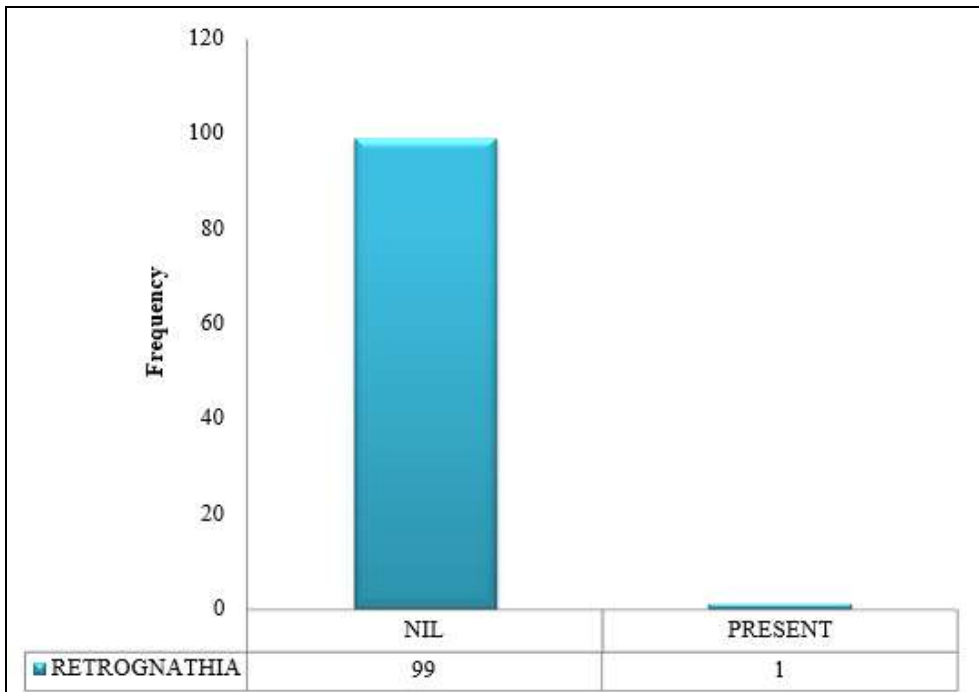


Fig 7: Retrognathia

Diagnosis

Regarding diagnosis of the study population, Solitary nodular goitre was present in 48% of population Multinodular goitre was present in 25% of population Toxic multinodular goitre was present in 11% of population Follicular carcinoma thyroid was present in 9% of

population Papillary carcinoma thyroid was present in 2% population Medullary carcinoma thyroid was present in 2% population MNG with retrosternal extension was present in 1%population Graves disease was present in 1%population Goitres disease was present in 1%population.

Table 7: Diagnosis

Diagnosis	Percentage	No of persons
Medullary ca	2.0	1
Mng with retrosternal extension	1.0	1
Pap ca	2.0	2
Goitres disease	2.0	2
Follicular ca	9.0	9
Toxic mng	11.0	11
Mng	25.0	25
Sng	48.0	48
Graves disease	1.0	1

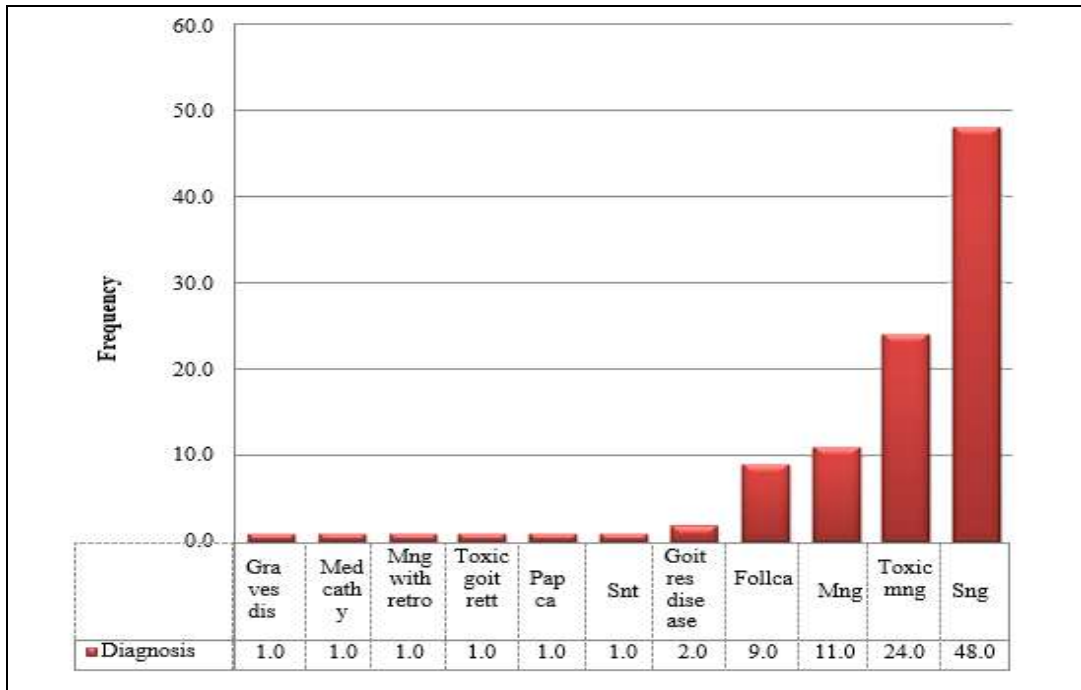


Fig 8: Diagnosis

Surgery

Total thyroidectomy was the surgery done in the study population.

Table 8: Surgery

TT	Frequency	Percent
	100	100.0

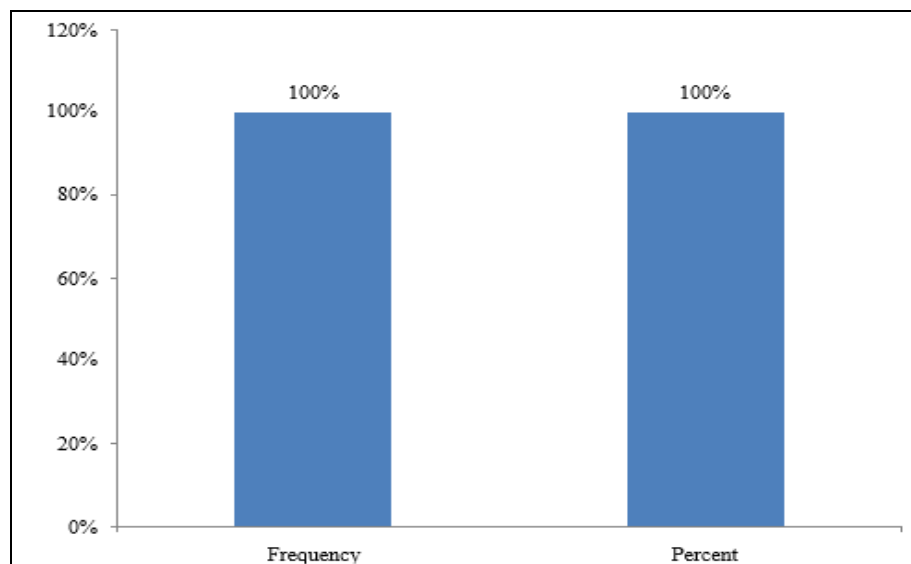


Fig 9: Surgery

Tracheal Deviation

Trachea was in midline in 96% of population. It is deviated to left in 1% of population and to right in 3% of population.

Table 10: Tracheal Deviation

	Tracheal	Percent
NIL	96	96.0
To left	1	1.0
To right	3	3.0
Total	100	100.0

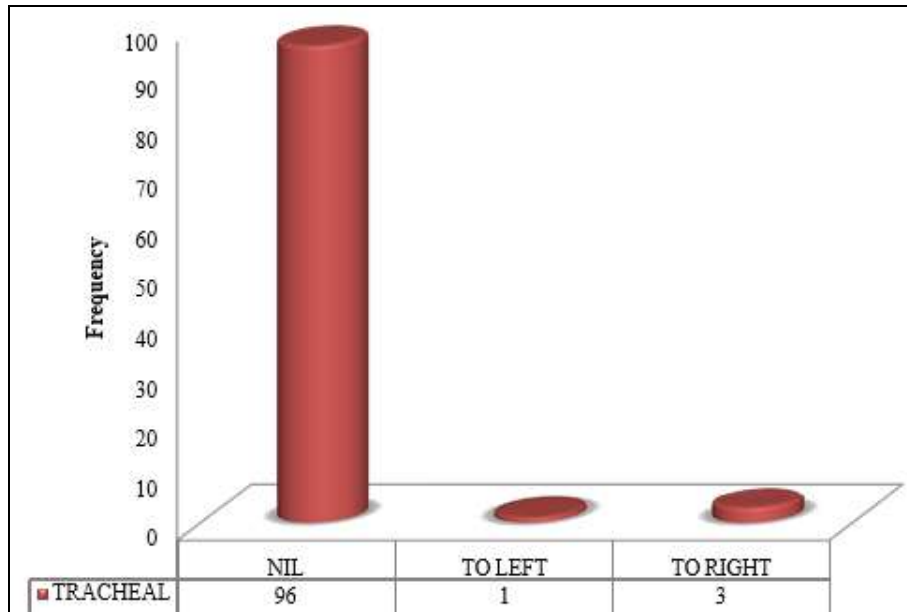


Fig 10: Tracheal

Tracheal Compression

present in 3% of Population.

Tracheal compression was absent in 97% population and

Table 11: Tracheal Compression

	Compression	Percent
NIL	97	97.0
Present	3	3.0
Total	100	100.0

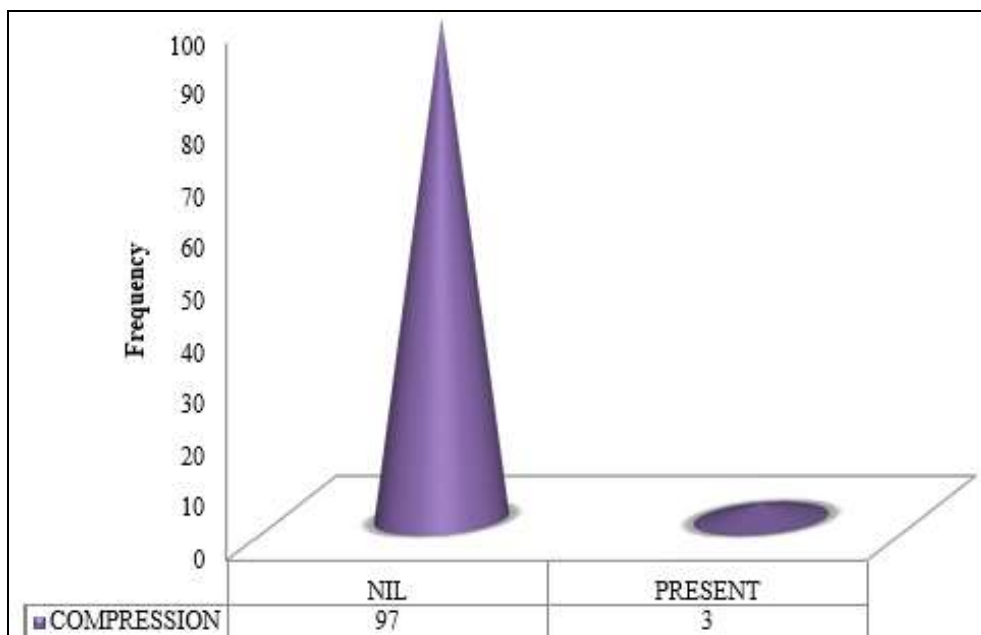


Fig 11: Compression

Duration of Intubation

Regarding duration of intubation, 67% of population was intubated within 10-15 seconds, 29% of population was

intubated within 16 – 20 seconds, and in 4% of population intubation duration was more than 20 seconds.

Table 12: Duration of Intubation

	Duration%
10 to 15 sec	67
16 to 20 sec	29
>20 sec	4

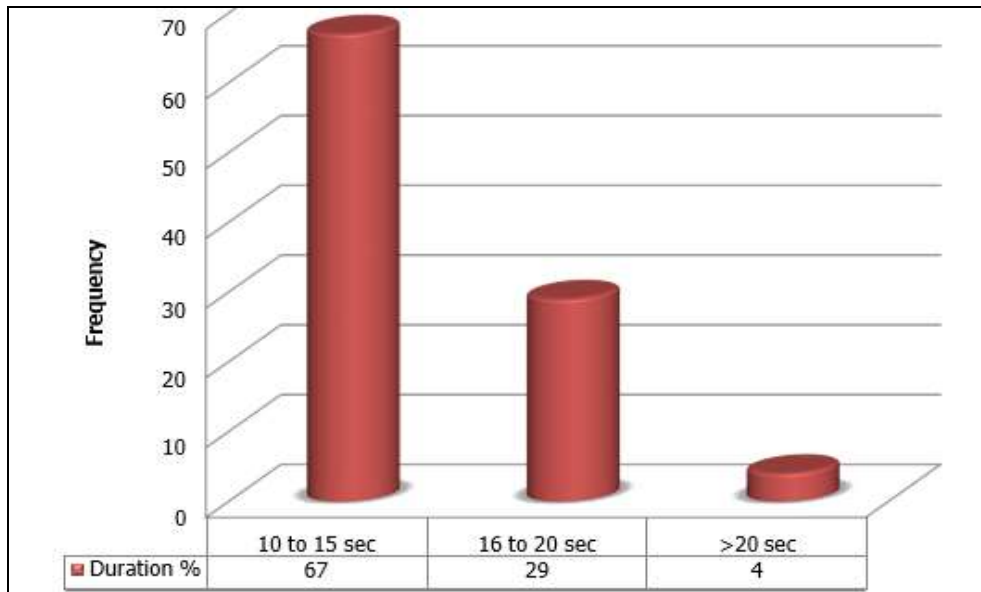


Fig 12: Duration

Trauma during Intubation

Regarding trauma during intubation, trauma to pharynx was

present in 2% of population and trauma to lips was present in 1% of population.

Table 13: Trauma during Intubation

	Trauma
Pharynx	2
Lips	1
Dentures	0
Tongue	0
Palate	0
Epiglottis	0
Larynx	0

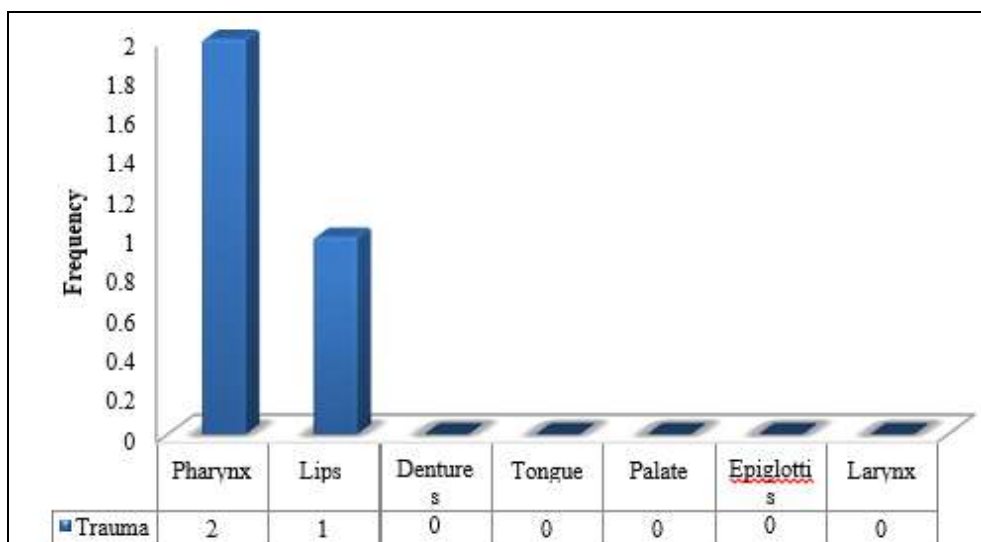


Fig 13: Trauma

IDS

Regarding IDS score, easy intubation was found in 62% of

the population, slight difficulty in 35% of population and moderate difficulty in 3% of population.

Table 14: IDS

	IDS Score	Percent
Easy	62	62.0
Slight	35	35.0
Moderate - severe	3	3.0
Total	100	100.0

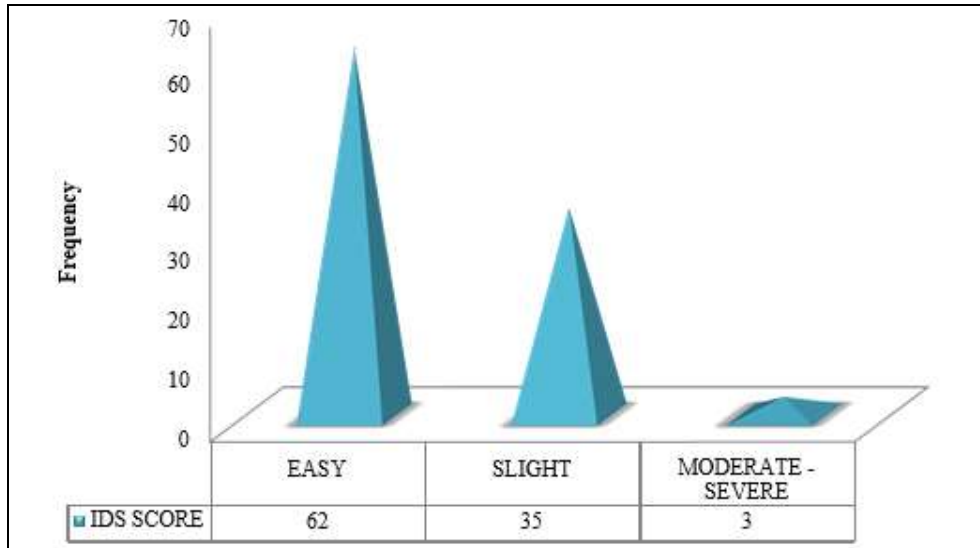


Fig 14: IDS Score

CL Grading

Regarding CL grading 59% of population had grade I, 19%

of population had grade 2A, 18% of population had grade 2B, 4% of the population had grade 3A

Table 15: CL Grading

CL grading	
1	59
2A	19
2B	18
3A	4
4	0

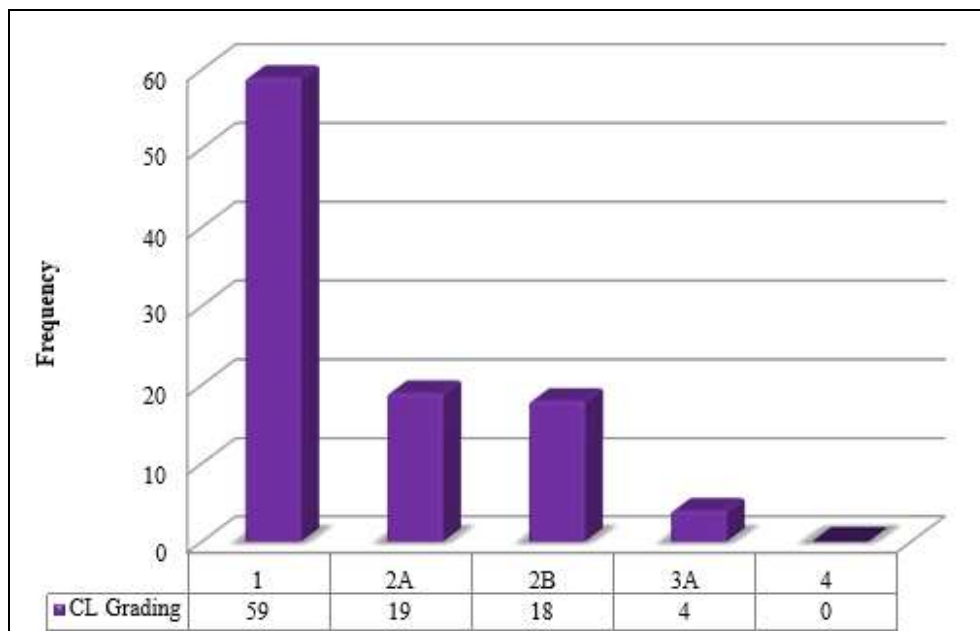


Fig 15: CL grading

Conclusion

It is concluded that the incidence of difficult endotracheal intubation in thyroid surgery is less. In this study population no specific predictive factors were found to be associated with difficult endotracheal intubation in thyroid swelling.

References

1. Abderrahmane Bouaggad, Sif Eddine Nejmi, Moulay Ahmed Bouderkha, Omar Abbassi. Department of Anesthesiology and Intensive Care, CHU Ibn Rochd Casablanca, Morocco. Prediction of Difficult Tracheal Intubation in Thyroid Surgery.
2. Voyagis GS, Kyriakos KP. The effect of goiter on endotracheal intubation. *Anesth Analg* 1997;84:611-12.
3. Arne J, others, "preoperative assessment for difficult intubation in general and ent surgery - predictive value of a clinical multivariate risk index". *British Journal of Anaesthesia* 1998;80(2):140-146.
4. Predicting difficult intubation in apparently normal patients: A meta-analysis of bedside screening test performance. *Anesthesiology* 2005;103:429-37.
5. Toshiya Shiga, *et al.* A systematic review (meta-analysis) of the accuracy of the mallampatti tests to predict the difficult airway *Anaesth Analg* 2006;102:1867-78.
6. Anna Lee, *et al.* A combination of wilson sum score and combination of mallampatti, thyromental distance and sternomental distance for predicting difficult intubation. *Macedonian journal of Medical sciences* 2009;2(2):XX-XX. Rudin Domi MD, MSc. Prediction of difficult tracheal intubation in thyroid surgery.
7. Bouaggad A1, Nejmi SE, Bouderkha MA Abbassi O. *Anesth Analg* 2004;99:603-6.
8. Chaves A, Carvalho S, Botelho M. Difficult Endotracheal Intubation in Thyroid Surgery: A Retrospective Study. *The Internet Journal of Anesthesiology* 2008;22:1.
9. El-Ganzouri AR, McCarthy RJ, Tuman KJ, Tanck EN, Ivankovich AD. Preoperative airway assessment: predictive value of multivariate risk index Morbid obesity and tracheal intubation.
10. Brodsky JB, Lemmens HJ, Brock-Utne JG, Vierra M, Saidman LJ. *Anaesth analg* 2002;94(3):732-6.
11. Adnet F, Borrow SW, Racine SX, Clemessy JL, Fournier JL, Pliaisance P, *et al.* The Intubation Difficulty scale (IDS): Proposal and evaluation of a new score characterizing the complexity of endotracheal intubation. *Anesthesiology* 1997;87(6):1290 -7.
12. Kim WH, Ahn HJ, Lee CJ, Shin BS, Ko JS, Choi SJ, *et al.* Neck circumference to thyromental distance ratio: a new predictor of difficult intubation in obese patients: *British Journal of Anaesthesia* 2011;106(5-1):743-74.
13. Samsoun GLT, Young JRB. Difficult tracheal intubation: a retrospective study. *Anaesthesia* 1987;42:487-490.
14. Banister FB, Mc Beth RG. Direct laryngoscopy and tracheal intubation. *Lancet* 1964;2:651.
15. Bellhouse CP, Dove C. Criteria for estimating likelihood of difficulty of endotracheal intubation with the Macintosh laryngoscope. *Anaesth intensive care* 1988;16:329.
16. Allan Klock Jr. P, Jonathan Benumof L. Chapter 7. Definition and incidence of the difficult airway, Benumof's Airway management., 2nd edition 218-219.
17. James Berry M. Chapter 16. Conventional laryngoscopic orotracheal and nasotracheal intubation (single lumen tube), Benumof's Airway Management., 2nd edition 381.
18. Robert Krohner G, Sivam Ramanathan. Chapter 1. Functional Anatomy of Airway, Benumof's Airway management, 2nd edition 3-18.
19. Section IV, Chapter 33. Pharynx, Gray's anatomy. 40th edition 561-568.