

External Laryngeal Manipulation for Better Laryngeal View

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Abstract

Purpose: External Laryngeal Manipulation (ELM) Is Used To Get Better Laryngeal View During Direct Laryngoscopy. This Study Was Designed To Test The Hypothesis That ELM Done By The Intubating Anesthetist (Laryngoscopist) Offers The Best Laryngeal View For Tracheal Intubation. **Materials And Method:** A Total Of 160 Patients Underwent Different Surgical Procedures Were Included In This Study. Percentage Of Glottic Opening (POGO) Score And Cormack And Lehane Scale Were Used As Outcome Measures For Comparison Between Different Laryngoscopic Views. Four Views Were Described; Basic Laryngoscopic View And Then Views After ELM Done By The Assistant, By The Laryngoscopist And Finally By The Assistant After The Guidance From The Laryngoscopist Respectively. The Last Three Views Compared With The Basic Laryngoscopic View. **Results:** ELM Done By The Laryngoscopist Or By The Assistant After Guidance From The Laryngoscopist Showed Significant Improvement Of Cormack Grades And POGO Scores Compared With Basic Laryngoscopic View. Number Of Patients With Cormack Grade I Increased From 39 After Direct Laryngoscopy To 97 And 96 Patients ($P < 0.001$ By Fisher's Exact Test), After ELM Done By The Laryngoscopist And That Done By The Assistant After Guidance From The Anesthetist Respectively. Furthermore, The Number Of Patients With POGO Scores Of 100% Increased From 39 After Direct Laryngoscopy To 78 And 61 ($P < 0.01$) Patients After ELM Done By The Laryngoscopist And That Done By The Assistant After Guidance From The Anesthetist Respectively. **Conclusion:** It Appeared From This Study That ELM Done By The Anesthetist Makes The Best Laryngeal View For Tracheal Intubation.

Keywords: Cormack And Lehane Scale, External Laryngeal Manipulation, Glottic Opening Score, Laryngeal View

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I. Introduction

Tracheal Intubation Is Considered The Gold Standard In Securing The Airway In A Variety Of Patient Populations And Operations. It Is Most Commonly Performed By Using Direct Laryngoscopy Technique. External Laryngeal Manipulation (ELM) Is A Simple Maneuver That Facilitates Laryngeal Visualization During Laryngoscopy.[1] It Coordinates The Operator's Right Hand With What It Is Being Simultaneously Visualized, Allowing Fine Tuning Of The Manipulation To Maximize The Laryngeal Exposure.[2]

ELM Has Been Shown To Improve Laryngeal Exposure And Makes Better Intubating Conditions.[3] ELM Is Done By The Intubating Person To Guide The Assistant To The Best Way Of Doing It To Maximize The Laryngeal View.

This Study Was Designed To Test The Hypothesis That ELM Done By The Operator Offers The Best Laryngeal View For Intubation.

The Aim Of This Study Was To Examine The Changes In Laryngoscopic Views After ELM Done By The Intubating Person With That Done By The Assistant With Or Without Guidance From The Intubating Anesthetist.

II. Methods:

After Local Research Ethical Committee Approval And Patients' Informed Consent 160 Patients Underwent

Different Elective Surgical Procedures Were Included In This Study. Patients Aged From 17 To 75 Years. Patients Requiring Direct Laryngoscopic Intubations Were Included In This Study. Patients Scheduled For Fiberoptic Intubation Were Excluded From The Study. All Patients Received The Same Anesthetic Technique. Patients Were Premedicated With Midazolam 1-2 Mg

Intravenously Approximately 10 Min Before Induction Of Anesthesia. Induction Of Anesthesia Was Done By fentanyl 1 Mg/Kg, Propofol 1.5-2 Mg/Kg And Cisatracurium 0.15 Mg/Kg. All Laryngoscopies Were Done By Five Experienced Anesthetists With Curved Macintosh Blades 3-5. Percentage Of Glottic Opening (POGO) Scores [4] And Cormack And Lehane Scale [5] Were Used As Outcome Measures For Comparison Between Different Views. POGO Ranged From 0% To 100%. A POGO Of 100% Denotes Full Visualization Of The Larynx From The

Interarytenoid Notch To The Anterior Commissure Of The Vocal Cords And A POGO Score Of Zero Means None Of The Glottis Opening Is Seen. [4,6] Cormack And Lehane Scale [5] Consisted Of Four Grades; Grade 1 Full View Of The Glottis, Grade 2 Partial

View Of The Glottis Or Arytenoids, Grade 3 Only Epiglottis Visible And Grade 4 Neither Glottis Nor Epiglottis Visible. POGO Scores And Cormack And Lehane Grades Were Recorded After Basic Laryngoscopic View, After ELM

One By The Assistant Without Guidance From Intubating Anesthetist, After ELM Done By The Intubating Anesthetist And ELM Done By The Assistant After Guidance From The Intubating Anesthetist.

All Data Were Analyzed With Statistical Package For The Social Sciences (SPSS) Version 13 For Windows (SPSS Inc., Chicago, IL). Data Was Presented As Numbers, Percentages, Mean (SD Or 95% Confidence Interval) Unless Otherwise Stated. Wilcoxon Signed Ranks Test Was Used For Comparison With Baseline

Values. Fisher's Exact Test Was Used For Analyzing The Number Of The Patients Having Better Laryngeal View After ELM. $P < 0.05$ Was Considered As Significant.

III. Results:

A Total Number Of 160 Patients Were Included In This Study. Demographic Data Presented In Table 1.

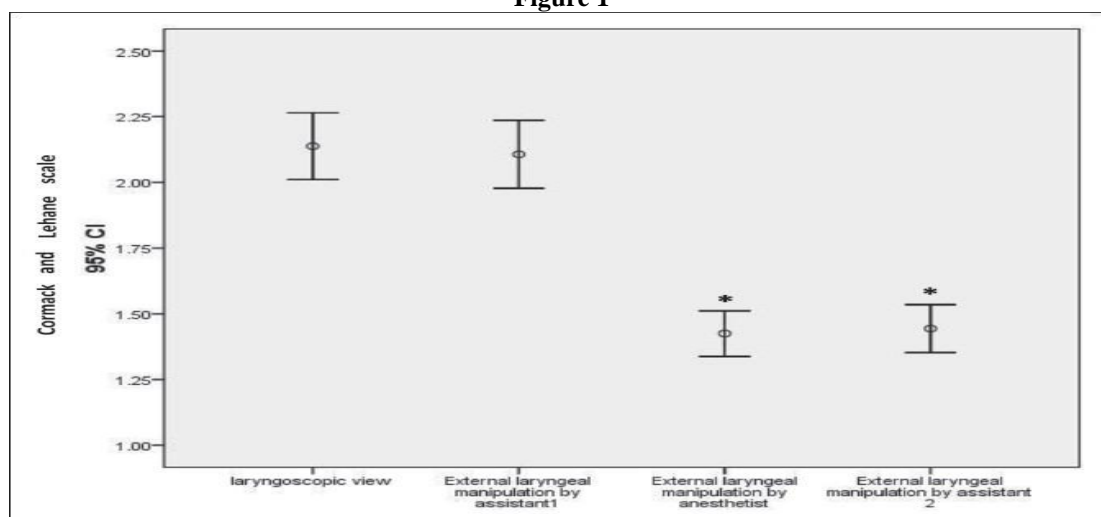
Table 1

Variables	Mean (SD)
Age	35.06 (11.05)
Weight	105.48 (27.36)
Height	163.54 (13.36)
Sex (M/F)	56/104

SD: Standard deviation

There Was No Significant Difference In Mean Cormack And Lehane Scale Between Baseline Laryngoscopic View And ELM Done By The Assistant Without The Guide Of The Laryngoscopist [Figure 1]. However, A Significant Improvement In Mean Cormack And Lehane Scale After ELM Done By The Laryngoscopist And That Done By Assistant After Guidance From The Laryngoscopist Compared With Baseline Laryngoscopic View [Figure 1].

Figure 1



Mean And 95% Confidence Interval Of Cormack And Lehane Scale. * $P < 0.05$ By Wilcoxon Signed Ranks Test Compared With Laryngoscopic View
 Number Of Patients With Cormack Grade1 Increased From 39 After Direct Laryngoscopy To 97 And 96 Patients Respectively ($P < 0.001$ By Fisher's Exact Test) And The Number Of Patients Cormack Grade 3 Significantly Decreased After ELM Done By The Laryngoscopist And That Done By The Assistant After Guidance From The Laryngoscopist Respectively [Table 2].

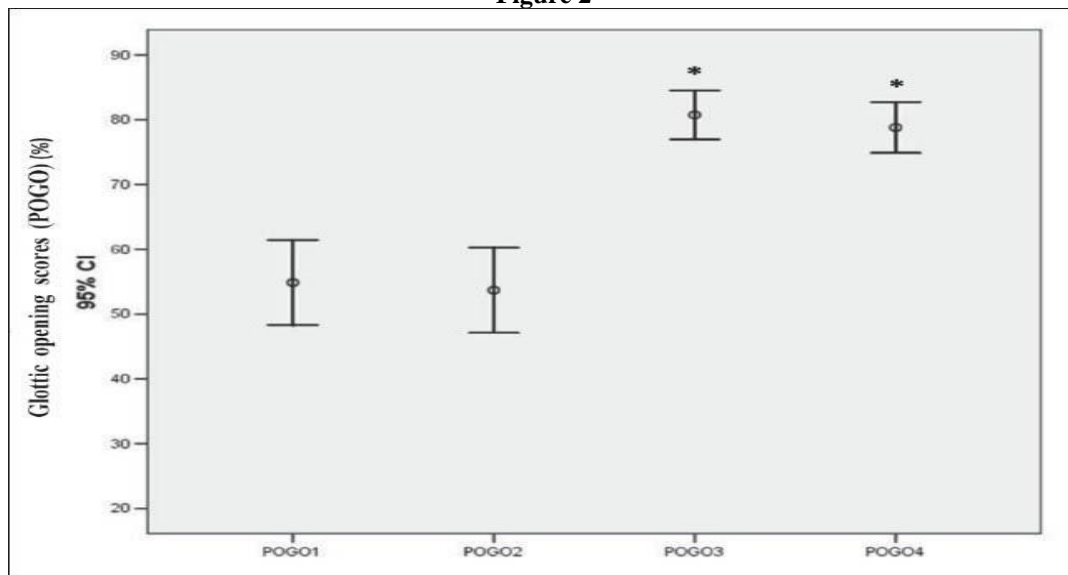
Table 2
 Number Of Patients With Different Cormack Grades

Cormack Grade	Laryngoscopic view	ELM 1	ELM2	ELM3
Cormack Grade 1	39	43	97*	96*
Cormack Grade 2	64	61	58	57
Cormack Grade 3	53	52	5*	7*
Cormack Grade 4	4	4	0	0

* $P < 0.05$ by Fisher's Exact test compared with direct laryngoscopic view;
 ELM1: External laryngeal manipulation done by the assistant without guidance from the laryngoscopist; ELM2: External laryngeal manipulation done the laryngoscopist; ELM3: External laryngeal manipulation done by the assistant after guidance from the laryngoscopist

Also, POGO Scores Were Significantly Improved After ELM Done By The Laryngoscopist And That Done By The Assistant After The Guidance From The Laryngoscopist Compared With The Baseline Laryngoscopic View [Figure 2]. While There Was No Improvement In Mean POGOScores After ELM Done By The Assistant Without Guidance From The Laryngoscopist Compared With Baseline Laryngoscopic View [Figure 2].

Figure 2



Mean And 95% Confidence Interval Of Glottic Opening Scores (POGO) (%). * $P < 0.05$ By Wilcoxon Signed Ranks Test Compared With Laryngoscopic View (POGO1)

- POGO1 Is Percentage Of Glottic Opening During Laryngoscopy
- POGO2 Is Percentage Of Glottic Opening During External Laryngeal Manipulation Done By The Assistant Without The Guide From The Laryngoscopist
- POGO3 Is Percentage Of Glottic Opening During External Laryngeal Manipulation Done By The Laryngoscopist
- POGO4 Is Percentage Of Glottic Opening During External Laryngeal Manipulation Done By The Assistant After The Guide From The Laryngoscopist

Furthermore, More Patients Significantly Had Better POGO Scores After ELM Done By The Laryngoscopist And That Done By Assistant After The Guide From The Laryngoscopist Compared With Baseline Laryngoscopic View [Table 3].

Table 3
Number Of Patients With Different Glottic Opening Scores (POGO) (%)

Percentage of POGO	POGO1	POGO2	POGO3	PoGO4
0	56	58	2*	5*
10	0	0	0	1
20	2	0	8	5
60	1	7	44*	46*
70	18	25	9*	6*
80	44	29	2*	2*
90	0	0	17*	34*
100	39	41	78*	61*

* $P < 0.05$ by Fisher's Exact test compared with POGO scores after direct laryngoscopy: POGO1: Percentage of glottic opening during laryngoscopy; POGO2: Percentage of glottic opening during external laryngeal manipulation done by the assistant without the guide from the laryngoscopist; POGO3: Percentage of glottic opening during external laryngeal manipulation done by the laryngoscopist; POGO4: Percentage of glottic opening during external laryngeal manipulation done by the assistant after the guide from the laryngoscopist

IV. Discussion

Our Study Showed Improvement Of Cormack Grades And POGO Scores With Better Intubating Conditions after ELM Done By The Laryngoscopist Or ELM Done By Assistant After the Guidance From The Laryngoscopist. However, ELM Done By The Assistant Without Guidance From The Laryngoscopist Did Not Differ From The Basic Laryngoscopic View. Direct Laryngoscopy Has Been Used As A Standard Technique For Tracheal Intubation. ELM Has Been Used As A Simple Maneuver To Get Good Laryngeal View For Tracheal Intubation. ELM Used To Be Done Initially By the Operators' Right Hand Then The Assistant Used To Take The Hand Over From The Operator To Free The Operators' Right Hand For Intubation. However, Different

Intubating Views Obtained After Doing ELM By the Assistant Or The Operator Have Not Compared In Previous Reports.

ELM Helps The Laryngeal Exposure By Improving The Alignment Of The Larynx With The Line Of Vision, Elevating The Epiglottis And Reducing The Anterior Tilt Of Larynx. [7, 8] Optimal

ELM Can Be Done By Identifying The Exact Area On The Neck By The Laryngoscopist And The Amount Of Pressure With His Own Free Right Hand. Our Study Showed Marked Improvement In Cormack Grades And POGO Scores After ELM Done By

Laryngoscopist And That Done By The Assistant After Guidance From The Laryngoscopist.

Lack Of Improvement Cormack Grades And POGO Scores After ELM Done By The Assistant Without Guidance From The Intubating Anesthetist May Be Due To Inability To Identify The Exact Area Of Doing ELM Or Due To Improper Pressure Over The Larynx. Our Results Supports The Hypothesis That ELM Laryngoscopist Makes The Best Laryngeal View And Offers Better Intubating Condition.

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