

COMPARATIVE EVALUATION OF 70° AND 90° RIGID ENDOSCOPE IN SUCCESSFUL VISUALIZATION OF THE HIDDEN AREAS OF LARYNX

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ABSTRACT

Objective: To compare the success rate of 70° and 90° rigid endoscopies in successful visualization of the hidden areas of the larynx.

Material And Methods: A randomized control trial at Otorhinolaryngology-Head and neck surgery department PIMS Islamabad from May to November 2018. Written informed consent from 582 patients fulfilling the inclusion criteria was enrolled from the outpatient department (291 in each group). They were randomized into two groups using a computer-generated table. Patients in Group A underwent the procedure using 70° rigid telescopes and those in Group B using 90° rigid telescopes. The following parameters were evaluated: anterior commissure, the laryngeal surface of the epiglottis, and subglottis.

Results: A total of 582 patients were included in the study. The mean age (years) of patients was 38.88+12.71. 267 (group A) and 251 (group B) patients successfully visualized the subglottic area, whereas 261 and 239 patients from group A and B respectively, were successfully visualized with anterior commissure. Similarly, the successfully visualized laryngeal surface of the epiglottis is 273 and 240 respectively for 70° & 90° scopes.

Conclusion: The study findings concluded that the rate of success of 70° rigid endoscopes was more successful in the visualization of the hidden areas of the larynx as compared to 90° rigid endoscopes.

Keywords: Full Visualization of Subglottic, Anterior Commissure, Laryngeal Surface of Epiglottis, telescope, 70°, 90° endoscopes

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INTRODUCTION

Laryngeal framework is complex which is anatomically comprised of several mucosal folds, elastic membranes, ligaments, and muscles constructed on the cartilaginous framework. In modern health care, pathologies of the upper aerodigestive tract represent the main problem.¹ To establish an exact histopathological diagnosis, diagnosis of laryngeal pathology including its site, size, extensions, and adequate tissue for biopsy is required². Malignant lesions require correct staging and it carries great importance in treatment planning.¹ In order to detect the pathology in the larynx various procedures can be used like Indirect Laryngoscopy, Direct Laryngoscopy,

and Endoscopic examination. For evaluation of laryngeal lesions, indirect laryngoscopy has the main role in identifying glottic and supraglottic lesions, but there are some areas that are not optimally examined, so examination remains less accurate and incomplete³. Direct laryngoscopy can be used for biopsy it requires general anesthesia, and depends on the surgeon's expertise¹. Endoscopic tools for examination of the upper aerodigestive tract have undergone significant developments in recent years and have revolutionized the way of diagnosis and management of upper aerodigestive pathologies.⁴⁻⁶

In the study by Jun Shao, Jennifer Stem, Zheng-Min et al⁷ the 70-degree scope provided successful visualization of the subglottic area in patients (91.7%), of Anterior commissure in (92.6%) and on the laryngeal surface of the epiglottis in (94.2%). The 90-degree scope provided successful visualization of the subglottic area (85.1%), of the anterior commissure, (82.6%), and the laryngeal surface of the epiglottis in (84.3%). Endoscopic techniques are a big advantage in modern surgery and diagnostic medicine. Their advancement in the last decades has opened new possibilities for the development of numerous min-

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imally invasive observations and surgical manipulations, resulting in minimal traumatism, faster patient recovery, and fewer postoperative complications.⁶

The rationale of the study is that after conducting this study we will be able to select only one better scope out of these scopes to be used on patients rather than using two different scopes in order to reduce examination time and patient discomfort.

MATERIAL AND METHODS

A randomized control trial was done at the department of Otorhinolaryngology, Head & Neck Surgery department, PIMS, Islamabad for a period of 6 months from 22nd May 2018 to 22nd Nov 2018. A total of 582 patients were included in the study, who were divided into two groups i.e. group A (291), who underwent 70° rigid endoscopy while group B (291) underwent 90° endoscopy. The sampling technique was non-probability purposive sampling. Patients between 18 and 60 years of age of both genders who were willing for examination, were included. Patients with the overhanging epiglottis increased body mass index, patients having exaggerated gag reflex, those having trismus/ laryngeal pathology were not comfortable with the procedure and were excluded. Parameters that were evaluated during the endoscopies of both groups included successful visualization of the subglottic area, anterior commissure, and the laryngeal surface of the epiglottis. Successful visualization was taken into account, the ability to obtain a recording of the full region of interest.

RESULTS

A total of 582 patients were included according to the inclusion criteria of the study. Patients were randomly divided into two equal groups. Patients in Group A underwent the procedure using 70° rigid telescopes and those in Group B underwent using 90° rigid telescopes. Statistics of the age (years) of patients were also calculated in terms of mean and standard deviation. The mean age (years) in the study was 38.88+12.71, as shown in Table. I. Distribution of gender of patients was calculated in terms of frequency and percentage of male and female patients. There were 196 (67.4%) male and 95 (32.6%) female patients who presented in group A, whereas 245 (84.2%) male and 46 (15.8%) female patients presented in group B, as shown in Table. II. There were 267 (91.8%) and 251 (86.3%) patients in groups A and B respectively, who successfully visualized (subglottic area) was seen which was statistically significant (p-value 0.034), as shown in Table. III. Similarly, there were 261 (89.7%) and 239 (82.1%) patients among both the groups with successfully visualized anterior commissure which was statistically significant (p-value 0.009), as shown in Table. III Comparison of success rate among both the groups was assessed in terms of successfully visualized laryngeal surface of the epiglottis as 273 (93.8%) and 240 (82.5%)

respectively, which was statistically significant (p-value 0.000), as shown in Table. III.

Table 1: Descriptive statistics of Age (years) of patients

Age in Years	Mean	SD +_
Total	38.88	12.71
Group A	39.21	12.94
Group B	38.56	12.48

Table 2: Distribution of Gender

Gender	Group A	Group B	Total
Male	196 (67.4%)	245 (84.2%)	441 (75.8%)
Female	95 (32.6%)	46 (15.8%)	141 (24.2%)
Total	291	291	582

Table 3: Comparison of Successful Visualization Hidden Areas of Larynx

Hidden Area	Group A	Group B	p-Value
Subglottis	267 (91.8%)	251 (86.3%)	0.034
Ant Commissure	261 (89.7%)	239 (82.1%)	0.009
Laryngeal surface of epiglottis	273 (93.8%)	240 (82.5%)	0.000

DISCUSSION

To evaluate laryngeal lesions indirect and fiber-optic laryngoscopy has a key role, but there are certain areas which are difficult to examine. Direct visualization and biopsy can be done by direct laryngoscopy but it is invasive, general anesthesia is needed and it depends on the surgeon's expertise. In addition to this, viewing is limited to the lumen and transmural evaluation is restricted, also the larynx has a complex anatomy and multiple regions such as ventricle, commissures, and subglottic areas, which are difficult to examine⁸⁻¹¹.

Various diagnostic radiological imaging methods e.g. CT and MRI are now available and it makes it possible to diagnose laryngeal lesions¹². In otolaryngology outpatient clinics rigid endoscopes are used for examination of the larynx with some advantages, as the image is clear, large, and bright, which allows early diagnosis. Some patients are unable to tolerate rigid laryngoscopy, especially, those with a sensitive gag reflex, patients with limited jaw or neck mobility, or patients suffering from stridor. It can be performed with difficulties in infants and children¹³⁻¹⁵.

Joachim Kettenbach et al.¹⁶⁻²¹ demonstrated, that rigid endoscopes in high-risk patients have limited clinical application as the patient may require general anesthesia, while an experienced endoscopist and a cooperative patient both are required for successful examination by a flexible endoscope. The information which cannot be obtained by endoscopic laryngeal examination, cross-sectional imaging using spiral CT or MRI, and post-processing

of imaging data sets, may offer an additional evaluation tool. In our study, the mean age (years) in the study was 38.88±12.71. While another Study⁹ it was found that the mean age was 36 years in their sample. In our study, there were 67.4% male and 32.6%¹²female patients presented in group A whereas 84.2% male and 15.8% female patients presented in group B. A study conducted by Raghebet al⁹ enrolled 14 patients in the study group, 75% males and 25% females. In our study, the success rate of 70° and 90° rigid endoscope in successful visualization of the hidden areas of the larynx were 91.8% and 86.3% in patients it was successfully visualized (subglottic area) was seen among both the groups. Whereas another study conducted by Jun Shao, Jennifer Stern, Zheng-Min et al⁷ provided a successfully visualized the subglottic area in patients i.e. 91.7% and 85.1% in both groups respectively. In our study, there were 89.7% and 82.1% patients among both the groups which were successfully visualized with anterior commissure. Whereas another study conducted by Jun Shao, Jennifer Stern, Zheng-Min et al⁷ provided successful visualization of the anterior commissure in 92.6% and 82.6% of patients in both groups respectively. In our study, the comparison of success rate among both the groups was assessed in terms of successfully visualized laryngeal surface of the epiglottis as 93.8% and 82.5% in both groups. Whereas another study conducted by Jun Shao, Jennifer Stern, Zheng-Min et al⁷ provided successful visualization of the laryngeal surface of the epiglottis in 94.2% and 84.3% of patients in both groups respectively.

CONCLUSION

The study findings concluded that the rate of 70° rigid endoscope was more successful in the visualization of the hidden areas of the larynx as compared to 90° rigid endoscope.

RECOMMENDATION

Further studies at multiple setups must be conducted to adopt a uniform protocol regarding the usage of one endoscope rather than using two different scopes, to reduce examination time and patient discomfort.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Junaid M: Manuscript writing, concept, Study Design

Roohullah M: Data collection

Din IU: Manuscript writing, concept, Study Design

Hussain A: Study design, overall supervision, and approval of the final version.

Khan MA: Data collection, helping in manuscript writing

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.