

Sinuscopic Laryngoscopy: Why We Do It

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Abstract

Objectives: To present advantages of laryngoscopy with 30° rigid sinuscope

Design: Case series report

Setting: University Hospital (KGMU) Lucknow India.

Participants: 100 patients in which indirect laryngoscopy failed to visualize full larynx.

Main outcome measures: extent of visualization of individual laryngeal structures.

Results: Sinuscopic laryngoscopy technique successfully visualized base tongue, valleculae and epiglottis in all the cases while full view of vocal cords could be appreciated in only 63 patients. The visualization of arytenoids and ary-epiglottic folds was possible in 89 cases while subglottis seen in just 75 patients. The addition of topical anesthetic spray further enhanced the visualization

Conclusions: Laryngoscopy with 30 degree 4 mm sinuscope is extremely cost effective, risk-free and simple office procedure to replace the routine simple mirror (indirect laryngoscopy) examination of throat.

Keywords: Laryngoscopy, 30 degree sinuscope, Office procedure.

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I. Introduction

A full view of larynx is an integral component of complete otolaryngological examination that is often not possible with simple indirect laryngoscopy mirror. In the developing world this is quite common in an extremely busy outpatient clinic with lack of infrastructure. Even after sufficient local anaesthesia to avoid gag reflex, the anterior part of larynx is often not visualized. An overhanging epiglottis can be a real obstacle at times. The cost-factor often prohibits the use of flexible endoscopes across most of the centres in the developing world and lack of sufficient trained staff to handle these costly equipments adds up to the problem. With the drastic reduction in the cost of rigid sinuscopes in the last decade, they are universally affordable. A 30-degree 4mm rigid sinuscope is not only best suited for nasal diagnosis but can also be used to visualize the full-larynx. This paper highlights our experience with a novel technique to overcome incomplete visualization of larynx with classical indirect laryngoscopy.

II. Material And Methods

The study is based on 100 patients who underwent fibreoptic laryngoscopy after incomplete visualization by classical indirect laryngoscopy. The fibreoptic examination was undertaken with a 30° sinuscope, the procedure of which is described below. Initially no topical anaesthesia was used but in an uncommon event when full visualization of larynx was not possible, xylocaine spray was used to abolish the gag reflex. Procedure: The prerequisites are 30° Sinuscope, cold light source with cable, 10% Xylocaine spray and savlon as anti-fogging agent. The position of the patient can be sitting or reclining. The right-handed physician stands in front of the patient. The tongue is held out gently through open mouth with a sterilized gauze piece, in the left hand and the illuminated sinuscope is introduced in the same way as the mirror. The sinuscope held with the right hand is negotiated along the angle of mouth into the oral cavity, oropharynx without touching the base tongue/posterior pharyngeal wall to avoid the gag reflex. The neck of patient is extended to 30° and the scope negotiated beyond epiglottis to visualize the larynx. At this point the negotiating-axis is inclined a bit downwards to visualize the anterior part of laryngeal inlet. By minimal manipulation at this stage the entire larynx can be easily visualised. In case of markedly overhanging epiglottis the negotiation of scope beyond it

may precipitate a gag reflex and hence necessitates topical anaesthesia unless any history of hypersensitivity to it contradicts the same. Accordingly the base of tongue, posterior pharyngeal wall and inlet of larynx are anaesthetized with 10% xylocaine spray. The vocal cord mobility is assessed by deep inspiration and by asking the patient to say 'eeee'. Whenever topical anesthetic is used the patient is restrained from any oral intake for next 40 minutes. The whole procedure takes not more than 10 minutes. To avoid fogging the tip of the scope can be immersed in either Savlon or can even be wiped against the dorsum of oral tongue during the procedure. Apart from age and sex, the following structures were noted regarding the completeness of their visualization both without and with local anaesthetic: (1) Base of tongue, (2) Valleculae, (3) Epiglottis, (4) Partial and complete view of true cords, (5) Aryepiglottic folds, (6) Arytenoids, (7) Subglottis. In addition the general condition and comorbidities were also noted.

III. Observations And Results

The distribution of patients was more or less equal across various age groups with maximum incidence seen in 3rd and 4th decades (table 1). In general the difficulty in visualizing full-larynx with classical mirror was less often seen in elderly than their younger counterparts. Males (73) predominated females (25). Two cases in this series had incomplete data-entry regarding their age and sex, while only 4 cases were non-compliant with sinuscopic-laryngoscopy (table 2). However another case with incomplete visualization had intolerance to topical anaesthetic spray (itching and choking sensation in throat) and hence the procedure could not be carried out thereafter.

Table 1: Age distribution

Age group	Number (%)
10-20	13
21-30	26
31-40	23
41-50	17
51-60	12
>60	7
Total	98

Table 2: Causes of non-compliance

S. No.	Causes	No.
1	Reaction to LA	1*
2	Phobia to lighted endoscope	1
3	Cervical spondylosis	1
4	Trismus	2

*only pre-LA data available

The sinuscopic-laryngoscopy without local anaesthetic spray revealed encouraging results in terms of completeness of visualization (table 3). The glottis was completely hidden in 20 cases while partial view of vocal cords was appreciated in 13 cases. Even posterior part of larynx seemed to be hidden by overhanging epiglottis in 7 cases that when touched precipitated a severe gag reflex. These latter cases were very apprehensive and 4 of them had symptoms suggestive of LPR.

Table 3: Laryngoscopy without topical anaesthesia

Site	Visualized (No.)	Not-visualized (No)
Base tongue	96	(4)
Valleculae	96	(4)
Epiglottis	96	(4)
False cords	76	20 + (4)
Full vocal cords	63	33 + (4)
Partial vocal cords	13	20 + (4)
Are-epiglottic folds	89	7 + (4)
Arytenoids	89	7 + (4)
Subglottis	75	21 + (4)

The sinuscopic-laryngoscopy with local anaesthetic spray showed extremely rewarding results (table 4). The full view of glottis could be appreciated in all except 9 cases of which a single case did not even provide a partial glimpse of the vocal cords. The latter case had sustained a blunt trauma of larynx distorting the normal anatomy with time. The view of posterior larynx (arytenoids & partial ary-epiglottic folds)⁷ was however possible in this later case. It is worth noting in tables 3 & 4 that the base of tongue, valleculae, and epiglottis could be easily visualized in all cases without the need of masking gag reflex.

Table 4: Laryngoscopy following local anaesthesia

Site	Not visualized Pre-LA (No)	Post-LA			
		Visualized		Not visualized	
		No	%	No	%
Base tongue	0	NA	NA	NA	NA
Valleculae	0	NA	NA	NA	NA
Epiglottis	0	NA	NA	NA	NA
False cords	20	18	90	1	5
Full vocal cords	33	23	70	9	27
Partial vocal cords	20	18	90	1	5
Are-epiglottic folds	7	7	100	0	0
Arytenoids	7	7	100	0	0
Subglottis	21	20	95	0	0

A single case with reaction to LA did not undergo laryngoscopy following LA.

An important observation is that the extension of neck beyond 30° does not provide any advantage in further visualizing the larynx; rather it adds additional stress on the cervical spine especially in elderly. The fibrotic-larynx following old trauma, obesity in younger patients especially those with sleep apnoea or snoring are likely to be the ones that would need maximum neck extension, epiglottis manipulation and topical-anaesthetic-assistance.

IV. Discussion

The history of laryngeal examination initiated in rather a crude way 1806 when Bozzini fashioned an angled speculum with a mirror insert for examination of various body cavities, including the larynx^{1,2}, that was later redesigned by Desmoreaux, the “father of endoscopy” in 1853¹. In 1854 Manuel Garcia a voice teacher visualized his own larynx through mirrors making use of reflected sunlight¹. Adolph Kussmaul², is credited for studying the technique of sword swallowing with reflected light and hence observations could be later made on neck position relative to that of trunk and head. Turck, Czermak and Morel MacKenzie¹ in early 19th century contributed to further refinements in indirect as well as direct laryngoscopy. The earlier version of direct laryngoscopes consisted of a distal light source usually a bulb driven by a set of batteries. The current telescopic rod lens system developed by Professor H.H. Hopkins³ has revolutionized the field of endoscopy, and minimally invasive surgery. These telescopes have been modified to view structures at various angles, i.e., 30°, 45°, 70°, 90°, 120° degree. Accordingly a rigid direct but angled-visualization of larynx⁵ with angular viewing telescope may lessen the strain on the cervical spine⁶ and hence can be adapted as an office procedure. The advantages and disadvantages of using our technique is as follows:

V. Advantages

1. This procedure is extremely cost-effective as the 30-degree 4mm sinuscope is universally available. It bypasses the requirement of additional instruments such as flexible scopes or a 90-degree rigid-laryngoscope.
2. It is purely an office procedure done under topical anaesthesia without premedication.
3. It can be carried out in any position of the patient (sitting, reclining, lying down)^{9,10,11}.
4. Visualization is done directly through sinuscope, while camera and recording facility may or may not be added as per the requirement (documentation or teaching purpose).
5. A few hidden areas of larynx (laryngeal surface of epiglottis, ventricle and subglottis) can be visualized which may not be possible by indirect laryngoscopy with simple mirror.
6. The paediatric larynx can also be assessed in cooperative children.
7. This procedure is highly effective in manipulating overhanging of epiglottis for a better access. Application of a topical anaesthetic spray in such a situation eases the manipulation.
8. Even biopsy is feasible with additional use of malleable giraffe-forceps that corresponds to the visualization-axis of the 30° -scope.

VI. Disadvantages

1. Full view is often not possible in severe trismus⁴ and marked ankyloglossia / swelling of tongue base.
2. Severe limitations are seen with severe cervical spondylosis⁶ and ankylosing spondylitis⁸. These limiting cases are best dealt with flexible fibreoptic visualization.
3. The appearance of a rigid lighted sinuscope is considered to be potentially troublesome by some apprehensive patients who interpret a painful insertion and very rarely even a proper counselling is not sufficient to convince such a patient.

4. A rare event of reaction to local anaesthetic may be kept in mind especially with any such past history.

Being the cheapest diagnostic office procedure, the indirect laryngoscopy-mirror is maximally used by otolaryngologists in rural-India. It has limitations of visualizing hidden areas of larynx and often non-compliant in older children or with exaggerated gag reflex. The use of flexible or 90⁰-rigid endoscope overcomes this limitation but adds to the cost of investment. Currently with wide availability of 30⁰ sinuscope the otolaryngologist can use it for direct laryngeal examination without much training. We routinely use sinuscopes for laryngoscopy in our facility particularly in difficult cases with rewarding results. Hence we recommend that the use 30⁰ sinuscope for laryngeal diagnosis be universally adapted especially in low-resource centres to reduce the cost of investment and improving the 'larynx-care'.

VII. Conclusion

Laryngoscopy with 30 degree 4 mm sinuscope is extremely cost effective, risk-free and simple office procedure to replace the routine simple mirror (indirect laryngoscopy) examination of throat. It is also effective in documentation and as a teaching aid for ENT trainees. This procedure is hence recommended for routine laryngoscopy.

VIII. Bullet Points

1. Full view of larynx is often not possible by mirror-examination that is the usual tool in the third-world medical centres that cannot afford expensive flexible scopes.
2. Laryngoscopic examination by a 30-degree 4mm sinuscope is extremely cost-effective office procedure with full visualization of hidden areas (laryngeal surface of epiglottis, ventricle and subglottis) especially with the use of topical anaesthesia.
3. Even biopsy is feasible with additional use of malleable giraffe-forceps that corresponds to the visualization-axis of the 30⁰ -scope
4. However full visualization is often not possible with severe trismus and marked ankyloglossia / swelling of tongue base while severe limitations are seen with severe cervical/ankylosing spondylitis¹².

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