



## LARYNGOTRACHEAL STENOSIS

## Otolaryngology

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## ABSTRACT

**Introduction:**

Laryngotracheal stenosis can be defined as a partial or circumferential narrowing of the airway and may be congenital or acquired. Sites involved are supraglottis, glottis, or sub glottis. Most common site of involvement is the subglottis. Most of the patients presented with tracheostomy. Treatment options range from conservative short-term therapies to definitive surgical procedures. Definitive surgical procedures that have been used involve either cartilage grafts to enlarge the laryngotracheal lumen or segmental laryngotracheal resection with primary end-to-end anastomosis.

**Aims and Objectives :**

- To know the most common aetiology.
- To know the most common site
- To study the incidence of laryngo tracheal stenosis in various age group and gender.
- To study efficacy of Laser.
- To evaluate all management protocols.
- To study efficacy of various treatment modalities

**Materials and Methods:**

It is study of 30 cases of laryngotracheal stenosis which was done over a period of 3 year between 2014 to 2017. Detailed history of patients was taken. All patients suspected of laryngotracheal stenosis were investigated for CECT neck and thorax scan and then included in study.

**Results:**

In our study, 12 patients were females and 18 patients were male, with majority of them presenting in 21-30 age group. 90 percent of the patients in our study presented with complaints of Respiratory Distress, and rest presented with Difficulty in Swallowing.

Various causes of laryngotracheal stenosis are:

Intubation was commonest cause of laryngotracheal stenosis, followed by Trauma, Something ingestion, autoimmune disease or granulomatous disease in same order. Majority of the the patients who presented with subglottic stenosis, presented with Cotton Myer's Grading II. 60% of the patients had stenosis at Subglottic level, with it being the most common site. 9 patients underwent Bougie dilatation, 10 patients underwent LASER excision, while 2 patient underwent End-to-end anastomosis and 1 patient underwent Tracheal reconstruction. Saggital view in CECT neck is best for assessing laryngotracheal stenosis.

**Conclusion:**

- In our study male had higher incidence .
- More commonly between 21-30 yrs of age.
- The most common etiological factor is Post-intubation.
- Congenital tracheal agenesis is usually associated with multiple organ anomalies.
- Most common site of stenosis: Subglottis.

## KEYWORDS

laryngotracheal stenosis, tracheostomy, cotton myer grading

**INTRODUCTION**

Laryngotracheal stenosis can be defined as a partial or circumferential narrowing of the airway and may be congenital or acquired. Sites involved are supraglottis, glottis, subglottis or trachea. Most common site of involvement is the subglottis. Most of the patients presented with tracheostomy.

**MATERIALS AND METHODS**

It is study of 30 cases of laryngotracheal stenosis which was done over a period of 3 year between 2014 to 2017. Detailed history of patients was taken. All patients suspected of laryngotracheal stenosis were investigated for CECT neck and thorax scan and then included in study.

**Exclusion criteria:**

- Patients with evidence of malignant lesion.
- Patients with bilateral vocal cords palsy

Apart from all general examination and comprehensive ENT examination, special emphasis was given on vocal cord examination.

After written and informed consent flexible bronchoscopy was done in all patients and all were posted for direct laryngoscopy under general anesthesia for evaluation of the airway to reconfirm

- Vocal cord mobility
- Site of stenosis
- Type of stenosis
- Granulations

Patients who presented with fibrous or membranous type of stenosis, within one month of symptoms, single dilatation has the improved the outcome in patients. Patients with Fixed vocal cords were managed by conservative management, and tracheostomy was done. There were no patients with unilateral vocal cord palsy. Patients presented with

tuberculosis have granulations.

Depending on circumference of Stenotic segment in the subglottic region, stenosis was graded according to Cotton-Myer's classification in our study.

**RESULTS**

In our study, 12 patients were females and 18 patients were male, with majority of them presenting in 21-30 age group. 90 percent of the patients in our study presented with complaints of Respiratory Distress. Most common site is subglottis and most common cause for laryngotracheal stenosis is intubation. Sagittal view in cect neck is the gold standard investigation.

**DISCUSSION**

Laryngotracheal stenosis is seen more commonly in the age group 21-30 years. In our study of 30 patients, 12(40%) were female and 18(60%) were male showing male dominance. Median age being 28.2 years in our study was significantly lower than the study done by wang et al (29) which was 47 years. Subglottis is the most common site for stenosis which technically refers to narrowing just below the vocal cords (32), which is similar to our study which showed subglottis in 18(60%) patients, followed by supraglottis which was seen in 6(20%) patients.

The main cause for tracheal stenosis was found to be Post-intubation which was seen in 14 (46.6%) patients followed by Post-trauma in 7(23.3%) patients, something ingestion in 5(16.6%) patients, congenital in 2(6.6%) patients, granulomatous disease(TB) in 1(3.3%) ,autoimmune (pemphigous) in 1(3.3%) which was similar to study of Gelbard et al which stated Post-intubation to be the most common cause of tracheal stenosis (33). Major presenting feature in our study was respiratory distress. Patients become typically symptomatic when their airway is reduced by more than 50% (30), which is similar to our finding. Majority of the patients with subglottic stenosis presented with Cotton Myers grading stage II followed by stage IV and stage I & III in equal numbers. Our preoperative evaluation includes thin-slice spiral CT imaging to characterize stenotic segment of the airway (35), which has also been the gold standard radiological investigation in our study. Our next line in investigation was flexible bronchoscopic evaluation of the airway to identify proximal and distal extent of involvement like in other studies of Wang et al (35). Optimal management of laryngotracheal stenosis depends mainly on type of stenosis(36). Out of 30 patients, we managed 22(73.3%) patients with surgical line of management, and 8(26.6%) patients were managed conservatively. Treatment depends on etiology of tracheal stenosis. Kochs and pemphigus (autoimmune) patients were better managed conservatively. Tracheal dilatation using rigid bronchoscope and bougie was used to enlarge the airway in 9(40.9%) patients. The effect of dilatation lasted from few days to 6 months and as a result of mechanical dilatation there was a high rate of recurrence noted in several studies (36). We also treated stenosis by endoscopic excision with laser in 10(45%) patients. In 2(9%) patients, tracheal end-to-end anastomosis was also done, and in 1(4.5%) patient, laryngofissure technique was used. These treatment modalities are consistent with other studies(37,38,39,40). In our study, 5(23%) patient underwent decannulation and showed no subsequent need for reintervention till now out of all patients managed surgically. We can though having used multiple modalities in which we had 3 case of open surgery can compare our study with Smith et al in which 24 patients had undergone open surgery and 15 underwent decannulation (41).

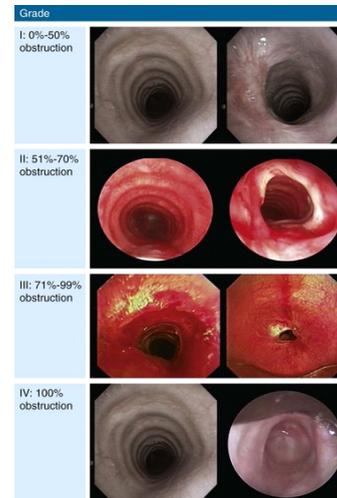
Treatment option for each case depends on its etiology. For traumatic and OP poisoning cases it depended on the status of vocal cord whereas in granulomatous diseases such as in tuberculosis one or two dilations gave good results. In autoimmune cases patients with mobile vocal cord were managed with tracheostomy. Like all previous studies, many patients were lost in the follow up. In our 1st follow up, 16 patients showed. In 2nd follow up, 12 patients showed. In 3rd follow up, only 5 patients showed. Depending on their improvement in symptoms and Hopkins examination and wherever possible, CT scan &/or flexible bronchoscopy was done.

**CONCLUSION**

- Male had higher incidence of laryngotracheal stenosis.
- The most common etiological factor is Post-intubation and most common site of stenosis is Subglottis.
- CECT neck and thorax scan is Gold standard investigation and sagittal cuts were most informative. Thin-slice spiral CT imaging

are used to characterize stenotic segment of the airway. If superadded with virtual bronchoscopy it gives excellent details of the different planes without loss of resolution.

- A single treatment protocol cannot be recommended. Multiple protocols are frequently required.
- Results of CO2 LASER for tracheal stenosis is doubtful. Other management protocols like end-to-end anastomosis looks promising
- Patients were also satisfied with regaining of speech after T tube insertion.
- most common complications after any treatment modality is relapse and restenosis with recurrence within 1–3 months .



endoscopic view of Cotton Myers Grading.

History	No of Patients
Intubation	14 (46.66%)
Trauma	07 (23.33%)
Something Ingestion	05 (16.66%)
Congenital	02 (06.66%)
Autoimmune	01(3.33%)
Granulomatous isease	01(3.33)
Total	30(100%)

Figure 1 showing History wise Distribution of the patients

Cotton Myer's Grading	No of Patients
I	01 (03.33%)
II	08 (26.66%)
III	01 (03.33%)
IV	04 (13.33%)
NA	16 (53.33%)
Total	30 (100%)

Figure 2 showing Cotton Myer's Grading(In cases of Subglottic stenosis, other cases have been referred to as NA)

Site Of Stenosis	No of patients
Subglottic	18 (60.00%)
Supraglottic	06 (20.00%)
Laryngotracheal	05 (16.66%)
Tracheal Agenesis	01 (03.33%)
Total	30 (100%)

Figure 3 showing Site Of Stenosis

Surgical Management	No. of Patients
Bougie Dilatation	9(40.9%)
LASER	10 (45%)
Laryngofissure	1 (4.55%)
End-to-end anastomosis	2 (9%)
Total	22

**Figure 4 showing Type of Surgical procedure used.**

Figure showing Virtual Bronchoscopic picture with significant luminal narrowing at the level of thyroid cartilage and aryepiglottic fold.

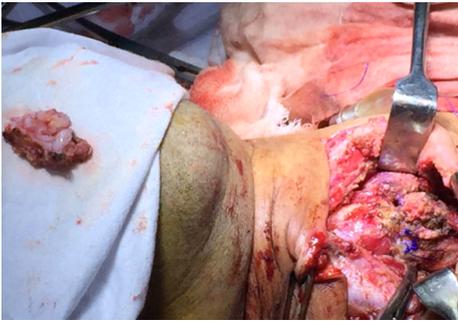


Figure showing Intra-op photograph of patient during end-to-end anastomosis

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