



An Idiopathic Acquired Supraglottic Web

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Abstract

Laryngeal webs are abnormal formation of an epithelium-covered fibrous tissue between two structures within the larynx (Pegg et al. in *Ear Nose Throat J* 90(10):486–488, 2011). Most of the laryngeal webs occurs at the level of glottic region which may extend till anterior 1/3rd of vocal cords, but it can also extend in to posterior glottis and inferiorly till subglottic region (Singh in *J Indian Assoc Pediatr Surg* 14(3):108–109, 2009). Acquired laryngeal webs are more common than congenital laryngeal web. Idiopathic supraglottic web is a rare entity and only one case have been reported worldwide (Table 1). We report a case of an idiopathic acquired supraglottic web in a 27-year-old man. The web was managed with CO2 laser excision under micro laryngoscopy guidance.

Keywords Supraglottic web · Idiopathic supraglottic web · Acquired supraglottic web

Introduction

The first case of laryngeal web was reported by Fleischmann in 27 days old infant after performing an autopsy in 1820 [1–3]. Zurhelle has described the first living case of laryngeal web in an 11-year-old boy by using indirect laryngoscopy in 1869 [3]. A significant number of cases have been reported since then, but laryngeal webs are yet an uncommon disease. Laryngeal webs are more common in sub glottis than supraglottic area. However, idiopathic supraglottic webs are rare entity. Acquired web may be due to endotracheal intubation and trauma [1, 4]. There have been cases reported with aetiology of Crohn's disease [5] and laryngopharyngeal reflux [6]. The severity of symptoms will be related to grading of web and degree of airway obstruction [7]. The symptom varies from weak cry in children to dysphonia, dyspnoea and stridor in adult (Table 1).

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Case Report

A 27-year-old male, engine room worker in a ship with no known co-morbidities, presented with history of difficulty in breathing for 06 months duration which was insidious in onset, gradually progressive, aggravated on exertion (while climbing stairs, parade and physical training). Related negative and family history were insignificant.

Local examination and fibre optic laryngoscopy revealed curled up epiglottis and enlarged ventricles (Fig. 1), No feature suggestive of aspiration. Rest of the clinical examination were nil significant. Based on clinical assessment, differential diagnosis of supra glottic web and laryngocele were considered.

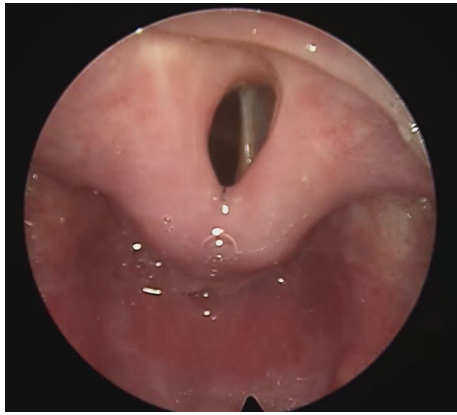
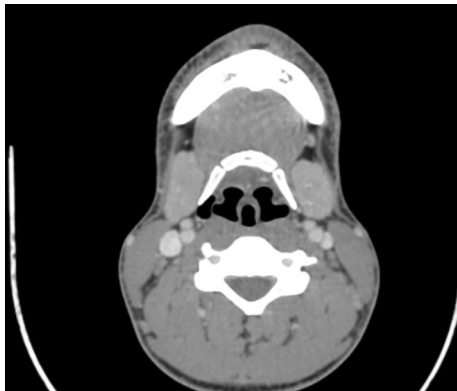
Investigations

Patient was further worked up contrast enhanced computed tomography scan (CECT scan) of base of skull to root of diaphragm, the findings of which revealed a dilated right laryngeal ventricle (Fig. 2) with maximum AP diameter of Rima glottis at the level of lesion being 11 mm with no constriction and 10×6×8 mm air pocket adjacent to the right pyriform fossa with no communication with the aerodigestive tract (Fig. 3).

Patient was investigated by following investigation (Table 2) and further evaluated by multi-disciplinary

Table 1 showing only one case report published about idiopathic supraglottic web

Sl no	Authour	Year	Journal	Case title	Presenting complaints	Management	Follow up	recurrence
01	David peg et al	2011	ENT-Ear-Nose-Throat journal	Idiopathic acquired supraglottic web	Dysphonia of 08-month duration	Dilatation and uni-lateral CO2 laser excision	09 months	Yes

**Fig. 1** Pre op picture showing enlarged ventricles and web like structure involving supraglottic region**Fig. 2** Contrast enhanced computed tomography scan (CECT scan) of base of skull to root of diaphragm showing dilated right laryngeal ventricle with maximum AP diameter of Rima glottis at the level of lesion being 11 mm with no constriction

committee which consisted of Pulmonologist, Rheumatologist, Cardiologist and gastro physician.

Treatment

Based on the clinico-radiological and multi-disciplinary workup, probable diagnosis of idiopathic supraglottic laryngeal web was made. The patient was counselled and an informed consent was taken for surgical correction of his condition. Patient underwent Micro laryngoscope assisted

**Fig. 3** Contrast enhanced computed tomography scan (CECT scan) of base of skull to root of diaphragm showing 10×6×8mm air pocket adjacent to the right pyriform fossa with no communication with the aerodigestive tract

CO2 laser excision (continuous, super pulse 0.7 mm, circular shape, 10 Watt) of the web under general anaesthesia.

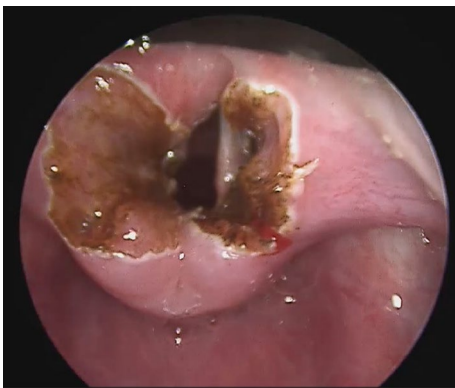
General anaesthesia was induced and Apnoea-Intermittent ventilation technique was utilized via 5.5 size micro laryngoscope endotracheal tube to keep the patient ventilated throughout the procedure. Intra operatively, a curled-up epiglottis was noted with membranous and cartilaginous web involving supraglottic region; Under microscopic vision the membranous & cartilaginous portion of supra glottic web excised using CO2 laser (Fig. 4), and the sample of excised tissue was sent for histopathological examination. The pathology report of tissue section showed strips of stratified squamous epithelium with foci of respiratory lining with no features of atypia or malignancy.

Outcome and Follow Up

The post operative period was uneventful with improvement in symptoms (Fig. 5). Patient was followed after 06 months in the outpatient department, where in he gave no fresh complaints and on evaluation with Fibreoptic laryngoscopy showed no signs of recurrence.

Table 2 showing investigations carried out for the patient

Investigation	Value	Normal range
Hemoglobin	13.6 g/dl	13–17 g/dl
WBC-	6100 cells	4000–11000 cells
Platelet	2.7 lakhs	1.5 to 4.5 lakhs
Urea	26 mg/dl	15–39 mg/dl
Creatinine	0.7 mg/dl	0.7–1.3 mg/dl
Total protein	6.5 g	6–8.3 g
Albumin	3.1 g	3.5–5 g
Globulin	2.5 g	2–3.5 g
SGOT	29IU	15–37 IU
SGPT	48IU	16–63 IU
PT	12 s	11–13.5 s
INR	1.0	0.8–1.1
Sodium	138 Meq/l	135–145 Mwq/l
Potassium	4.8 Meq/l	4.5–5.5 Meq/l
CRP	0.3 mg/dl	0.3–1.0 mg/dl
Serum angiotensin converting enzyme	63 U/L	8–52
Anti ds DNA	30 IU/ml	0–200
Serum ANA	Positive	–
	Nuclear speckled pattern	
	Dilution-1:100	
X-RAY chest	Normal study	–
X-RAY cervical spine	Normal study	–
Upper GI endoscopy	Normal study	–
2D ECHO-	Normal study	–
Spirometry	Normal expiratory loop, flattening of inspiratory loop. suggestive of extra thoracic obstruction	–
CECT CHEST	Normal study	–
PET-CT-	Suggestive of no abnormal FDG lesion suggestive of inflammatory or mitotic aetiology in the scanned region of the body	

**Fig. 4** Intra operative picture showing web was released using CO2 laser**Fig. 5** showing post operative fiberoptic laryngoscope picture of web release and visibility of both vocal cords

Discussion

Laryngeal webs are either congenital or acquired. Congenital webs are uncommon and represent less than 5% of congenital anomaly. The prevalence of acquired web worldwide is 1.5 per every 10,000 births [1, 7]. Laryngeal webs are common in glottic region and sub glottic region. Supraglottic web is a rare entity and yet an uncommon disease. The acquired web may occur due to endotracheal intubation, Crohn's disease and secondary to Laryngopharyngeal reflux disease [4–6].

Laryngeal injuries after endotracheal intubation were well studied and documented in literature. The risk of developing laryngeal injuries were related to the duration of endotracheal intubation. Anterior glottic webs were more commonly seen in patients, intubated short term period for surgical procedures [4]. Chron's disease is an inflammatory disease which primarily affects the gastrointestinal tract. Extra intestinal manifestations of Chron's disease, involvement of head and neck region, are uncommon and rare. Incidence of Chron's diseases in head and neck ranging from 0.5% to 13%. Laryngeal involvement of Chron's disease is rare and it involves mainly supraglottic and hypopharynx region. The main findings with laryngeal Chron's disease are oedematous supraglottic region which is more localized to arytenoids, other findings include ulceration, granuloma and limited vocal cord mobility [5]. Laryngopharyngeal reflux influences the occurrence of complications after upper airway surgeries. Laryngopharyngeal reflux increases web formation in larynx with incidence of 7% to 47%. Laryngeal web involves both anterior and posterior commissure of vocal cord [6].

The presenting symptoms vary from children to adult depending upon the size, thickness and location of web. There have been cases reported as symptoms free adult patient, incidentally detected during intubation. The presenting complaints usually weak cry, soft husky cry and absent cry in children. Adult patient presented with dysphonia, dyspnoea on exertion and stridor (Biphasic and during exertion). Fibreoptic endoscopic evaluation to look for submucosal cleft, abnormal pulsation from medialised internal carotid artery to ruled out congenital web and associated syndromes. Laryngeal evaluation include size, thickness of web, vocal cord mobility, narrowing of subglottic lumen and posterior cleft in inter arytenoid notch [3].

Benjamin's classification defines four degrees of laryngeal stenosis according to their anatomical localization. This classification consists of glottic webs, subglottic webs, congenital inter-arytenoid fixation, and supraglottic webs [3].

The differential diagnosis includes laryngocele, laryngeal stenosis. The initial diagnostic evaluation should aim

to (1) confirm the presence of web in larynx and, if so, (2) whether the web is congenital or acquired and, (3) to decide the best surgical options with or without reconstruction [3]. Diagnosis based on the image studies, endoscopic and micro laryngoscope evaluation. Contrast enhanced CT scan is with fine and axial cut will reveal the presence of any subglottic lumen narrowing and any other associated anomalies. The patient should be evaluated thoroughly by multi-speciality team consist of cardiologist, gastro physician and pulmonologist to rule any associated anomalies or acquired cause for web. The treatment aim should be removal of airway obstruction, providing a serviceable voice and functional larynx. Several options are available depending upon the degree of web and airway obstruction which includes observation, endoscopic or microscopic approach and open approach [3].

Surgery for laryngeal web was evaluated historically by saving life followed by quality preservation. Von Schroetter, who tried to treat a laryngeal web using hard rubber tube. In 1935, Iglauer attempted to insert a ring in the anterior commissural region. Thereafter various other materials with different configuration and shape such as tantalum, silastic and polyethylene used as keels to prevent reformation of web. In 1975, Walsh Waring proposed insertion of silastic keel with long term tracheostomy is the best treatment outcome for laryngeal web with airway obstruction. In 1983, a case series reported by Benjamin, who treated 29 patients of congenital web by various method (incision, dilatation). In 1972, Jako developed the Corban dioxide (CO₂) laser for laryngeal surgeries. The CO₂ laser is an efficient tool which accurately ablate the web tissues with very minimal damage to adjacent structure. New flexible delivery system of CO₂ laser is available for alternative to complex original CO₂ delivery system. The surgical option with laser was further expanded by availability of solid state KTP Laser (Potassium-Titanyl-Phosphate) and thulium laser. Laryngotracheal reconstruction with cartilage graft is a recent advance technique available for laryngeal web management which was originally developed for laryngeal stenosis treatment by Cotton and Widely. Application of Mitomycin-C is first described by Kunimoto and Mori in pterygium patient for scar control and prevention. Mitomycin-C is an anti-tumour antibiotic which derived from streptomycetes. It acts by inhibiting RNA and protein synthesis. Ward introduced to laryngeal surgery in 1988 to prevent scarring effects [3].

Speech analysis to be carried out pre-op and post operative period to provide a functional voice. Speech therapist should be involved throughout management of the patient (Fig. 6).



Fig. 6 showing post operative fiberoptic laryngoscope picture of larynx and vocal cord

Learning Points

Supraglottic web is rare condition which involve the larynx. Idiopathic acquired web is an extremely rare condition. It manifests as dysphonia, dyspnoea and stridor. The treatment should aim to relieve airway obstruction and preservation of functional voice. CO2 laser excision is an accurate and excellent tool for laryngeal surgeries which results in minimal damage to the surrounding structures.

Author Contributions Dr DKG, Dr SM, Dr PM and Dr VB were the primary treating team. This case report was drafted by Dr PM under the guidance of Dr DKG.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Informed Consent Informed consent was obtained from the individual participating in the study.

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