SURGICAL MANAGEMENT OF SUPRAGLOTTIC STENOSIS

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Supraglottic stenosis repair is a difficult and challenging job. In our study, five patients of supraglottic stenosis of various etiologies were taken. In all cases the stenosis was severe enough to warrant a tracheostomy. All cases underwent a definitive open surgical procedure (excision of the stenosis with repair of the supraglottis). All patients have been successfully decannulated. In this study the male: female ratio was 3:2, trauma: others causes ratio 3:2. The time for which endolaryngeal stent were kept varied from 1 month to 5 months the average being 3 months. The time from first surgery to successful decannulation varied from 1 year to 5 years.

Anatomically, supraglottis is the region extending from the epiglottis to the ventricle. Stenosis of this region usually occurs following blunt trauma to the neck as in an automobile accident, strangulation injury (accidental, suicidal or homicidal), following other trauma such as corrosive intake (both acid and alkali), iatrogenic (following laryngeal surgery), perforating trauma (bullet wound) and due to inflammatory lesions (tuberculosis). Stenosis occurs as a late sequel to trauma and is usually not limited only to the supraglottis but also can involve the glottis, subglottis and trachea.

Clinical Data and Results

Over the past 5 years we have treated 5 cases of supraglottic stenosis without associated glottic or subglottic stenosis at the All India Institute of Medical Sciences (Table 1).

Case Report

Case 1
A 14 year old female presented to us with history of difficulty in breathing following blunt trauma to the neck sustained seven months earlier. A tracheostomy was done at another hospital and then referred to us. After admission, a microlaryngeal examination was done, it showed a large web at the level of false cords and ary-epiglottic folds compromising the view of the true cords, however, the arytenoids appeared mobile. A diagnosis of a large supraglottic web was made and the patient was taken up for surgery under general anesthesia. A laryngofissure was performed. The stenosis was seen at the level of the false cord, the true cord appeared free of the stenosis. An excision of stenosed part was undertaken and a keel was inserted. The patient was then sent home. A repeat microlaryngeal examination was done after four months which showed edema of the arytenoids and infected granulation tissue around the keel. The keel and the granulation tissues were removed. A part of an endotracheal tube was inserted to act as a stent (fig 1). The patient was then reviewed after two months. At this time the patient could successfully cork the tracheostomy tube and perform normal activity. The stent was removed under general anesthesia. The patient was further observed for two weeks. The patient was then decannulated and a primary closure of the tracheostome undertaken. (fig 2).

Case 2
A 25 year old male presented to us with history of difficulty in breathing following trauma to the neck three years ago in a motorcycle accident. The patient had also undergone a tracheostomy following the accident for severe stridor. A microlaryngeal examination revealed a stenosis at level of false cords with restricted right cord mobility. He was taken for surgery under general anesthesia and a laryngofissure was performed. The fibrous band was released and a keel inserted. The patient was reviewed after five months for keel removal. Microlaryngeal examination showed an inferiorly displaced keel with a fibrous ring at the level of false cords. The keel was removed, the fibrous ring released anteriorly and posteriorly via laryngofissure operation and a naso-tracheal tube was inserted.

Case 4
A 20 year old girl presented to us with history of difficulty in breathing and swallowing following corrosive intake. Examination showed a long esophageal stricture with supraglottic stenosis. (epiglottis was plastered to posterior pharyngeal wall). The patient underwent an elective tracheostomy preoperatively. She was first taken up for esophageal repair for which she underwent a total esophagectomy.
Surgical Management of Supraglottic Stenosis—Kacker et al.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age in yrs.</th>
<th>Sex</th>
<th>Mode of Injury</th>
<th>Site of Stenosis</th>
<th>Tracheostomy</th>
<th>Repair</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>Female</td>
<td>blunt trauma</td>
<td>supraglottic</td>
<td>yes</td>
<td>excision + keel x 4/12</td>
<td>extubated stent x 2/12</td>
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<td>blunt trauma</td>
<td>supraglottic</td>
<td>yes</td>
<td>excision + keel x 5/12</td>
<td>extubated stent x 1/12</td>
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<tr>
<td>3</td>
<td>10</td>
<td>Male</td>
<td>blunt trauma</td>
<td>supraglottic</td>
<td>yes</td>
<td>excision + stent x 5/12</td>
<td>extubated</td>
</tr>
<tr>
<td>4</td>
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<td>Female</td>
<td>acid intake</td>
<td>supraglottic &amp; esophagus</td>
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</tr>
<tr>
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<td>Male</td>
<td>alkali intake</td>
<td>supraglottic &amp; hypopharynx</td>
<td>yes</td>
<td>excision + stent x 2/12</td>
<td>extubated</td>
</tr>
</tbody>
</table>

* This patient underwent Gastric pull-up surgery prior to supraglottic repair

Case 5

A 17 year old male presented to us with history of difficulty in breathing and swallowing following accidental ingestion of caustic soda six months earlier. The patient had severe dyspnoea and was taken up for emergency tracheostomy. A subsequent direct laryngeal and hypopharyngeal examination under general anesthesia showed a fibrotic web in the supraglottis extending from the region of the epiglottis to the posterior pharyngeal wall with a vertical slit like opening flanked by two pouches. No epiglottis could be identified. This slit performed as an opening to the larynx and the esophagus. A C.T. scan was done which confirmed our findings (fig 3). A barium swallow showed a normal esophagus. A diagnosis of supraglottic and hypopharyngeal stenosis was made. He was then taken up for surgery via anterior pharyngotomy and laryngofissure and the septum like stenosis excised using electrocautery. Following which two stents were inserted, one in the supraglottis and the other in the hypopharynx. A Teflon tube was passed and kept for feeding. The supraglottic stent was anchored in place using thin steel wire (fig 4). The patient was then sent home and asked to follow up after eight weeks. He underwent a microlaryngeal examination and stent removal after which he could tolerate tracheostomy tube closure and his dysphagia improved.

Discussion

Supraglottic stenosis has dogged the otolaryngologist since the beginning. Changes which have come are in the etiology and management concepts. The common causes of laryngeal stenosis have changed from inflammatory pathology to traumatic causes (blunt trauma to the neck, iatrogenic, corrosive intake). The better first aid available to trauma victims has led to higher survival rates as also higher rates of late complications such as supraglottic stenosis. All cases in this series were the sequelae to blunt trauma to the neck or corrosive intake (both acid and alkali). The most important aspects in management of these cases are the accurate pre operative assessment of location, extent of lesion, severity of stenosis and function of the true cord. In all patient soft tissue X-ray were obtained. From these the site, length and severity of stenosis were ascertained. All patients but one underwent C.T. Scan which provided us with a better anatomical

Fig. 1. Shows the first patient with endolaryngeal stent anchored with steel wire with the tracheostomy tube in situ.