Evaluation of the causes of upper airway obstruction leading to tracheostomy in Shiraz

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Abstract

Introduction: To determine the causes of upper airway obstruction leading to tracheostomy; endoscopic evaluation was done in Khalili Hospital, Iran.

Materials and Methods: During a 2 year period, 47 patients who underwent tracheostomy were evaluated endoscopically to determine the causes of airway obstruction leading to tracheostomy.

Results: Forty-seven cases were included in the study including 40 males and 7 females with mean age of 31.9 years. The most common cause of obstruction was subglottic stenosis (40.5%) and laryngeal carcinoma (38.3%). The cause of subglottic stenosis in the majority of the patients was prolonged endotracheal intubations (95%). Other less common causes were direct laryngeal trauma (4.5%), vocal cord paralysis (2.1%), supraglottitis (2.1%), tracheal foreign bodies (2.1%), severe trismus (2.1%), and status asthmaticus (2.1%).

Conclusions: Subglottic stenosis secondary to prolonged intubations is the major cause of upper airway obstruction leading to tracheostomy. Converting endotracheal intubations to tracheostomy in patients who need prolonged ventilator support may prevent subglottic stenosis and decrease the rate of serious complications following prolonged endotracheal intubations.

Keywords: Upper airway obstruction, Subglottic stenosis, prolonged intubations, Tracheostomy

Introduction

Upper airway obstruction has many causes. An otolaryngologist may be called to perform tracheostomy to save a patient in severe respiratory distress. Frequently direct laryngoscopic and bronchoscopic evaluation are performed to evaluate the cause of obstruction. In some of these patients, the underlying pathology of airway obstruction cannot be removed, and the patient may remain dependent on tracheostomy for a long time.

Tracheostomy is one of the oldest known operations dating back to ancient Egypt and India about 3,000 years ago. The indications for tracheostomy changed and expanded during the twentieth century. Today, owing to advancements in intensive care units and the wide spread use of mechanical ventilation, tracheostomy is one of the most commonly performed surgical procedures and is encountered by hospital physicians in all fields (1). Comparing tracheostomy with endotracheal intubations, tracheostomy has many advantages because it has less serious side effects (2).
It is reversible if the underlying pathology is eliminated. Endotracheal intubation is another way to secure a patent airway but it may have many serious sequela especially if performed for a long time. The most common complication is subglottic stenosis (2).

With conversion of intubations to tracheostomy at the proper time many of these sequela may be prevented.

In this study the causes leading to tracheostomy were evaluated in patients undergoing tracheostomy in Khalili Hospital, a referral Otolaryngology center in Shiraz, Iran.

Materials and Methods
During a 2-year period (1999-2000) all patients undergoing tracheostomy in Khalili Hospital (Shiraz, Iran) were evaluated endoscopically to determine causes of airway obstruction leading to tracheostomy. The data was gathered from history, physical examination and direct laryngoscopic and bronchoscopic examination. 47 patients were evaluated including 40 males and 7 females. The age of the patients were from 3.5 to 80 years old.

Results
Eighty-five percent of the patients were male, and 15% were female. Mean age of the patients was 31.9 years (Table1).

<p>| Table 1: Age distribution of patients |</p>
<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>8</td>
<td>17%</td>
</tr>
<tr>
<td>11-20</td>
<td>13</td>
<td>27.7%</td>
</tr>
<tr>
<td>21-30</td>
<td>4</td>
<td>8.5%</td>
</tr>
<tr>
<td>31-40</td>
<td>2</td>
<td>4.2%</td>
</tr>
<tr>
<td>41-50</td>
<td>6</td>
<td>12.8%</td>
</tr>
<tr>
<td>51-60</td>
<td>2</td>
<td>4.2%</td>
</tr>
<tr>
<td>61-70</td>
<td>6</td>
<td>12.8%</td>
</tr>
<tr>
<td>71-80</td>
<td>6</td>
<td>12.8%</td>
</tr>
</tbody>
</table>

The main reason of referral was respiratory distress. The most common cause of airway obstruction was subglottic stenosis (40.5%). 95% of patients had history of head injury and prolonged intubations.
In this group the mean age was 17.4 years and 85% of them were male.
Other causes of airway obstruction were laryngeal carcinoma (38%), direct laryngeal trauma (4.5%), vocal cord paralysis (2.1%), supraglottitis (2.1%), laryngotracheal foreign bodies (2.1%) trismus (2.1%), and status asthmaticus (2.1%) (Fig 1).

![Figure 1: The causes of tracheotomy](image)

Successful decannulation was done in 4.5% of the patients, total laryngectomy was done in 38% and tracheoplasty in 2.1% of the patients. In 46.4% of the patients attempts for treating the underlying pathology and decannulation failed, and they remained dependent on tracheostomy for adequate ventilation.

Discussion and conclusion
Tracheostomy is one of the most frequently performed surgical procedures in the critically ill patient. It is frequently performed as an elective therapeutic procedure and sometimes as an emergency procedure. Complications occur in 5% to 40% of tracheotomies depending on the study design, patient follow-up, and the definition of different complications (3).
Indications for tracheostomy are conditions such as subglottic and tracheal stenosis, respiratory papillomatosis, caustic alkali ingestion and craniofacial syndromes (4). Conditions in which tracheostomy is less commonly indicated are subglottic hemangioma and laryngeal clefts (4).

The commonest indication for tracheostomy in the 1970s was acute inflammatory airway obstruction such as acute epiglottitis and laryngotracheobronchitis (5,6). Recent series have shown that prolonged ventilation or Subglottic stenosis are now the most common indications (4-7).

This study was performed to determine the causes of upper airway obstruction leading to tracheostomy in patients undergoing tracheostomy in Khallili Hospital, a tertiary Otorhinolaryngology hospital in Shiraz, Iran. The majority of our patients (60%) were less than 45 years old and 85% were male.

The most common cause of airway obstruction in our patients was subglottic stenosis following prolonged endotracheal intubations (40.5%). Most of these patients were referred from the Neurosurgery ward after failure to decanulate tracheostomy tube. In the study performed by Simma et al(8), the most common indication of tracheostomy was acquired subglottic stenosis followed by bilateral vocal cord paralysis and congenital airway malformation.

In the study performed by Puhakka et al (9), subglottic stenosis and respiratory distress syndrome and prolonged endotracheal intubation were the common indications of tracheostomy.

This study showed that the main group of patients needing tracheostomy in our center were young men needing ventilatory support following head injury. Laryngeal trauma from prolonged endotracheal intubation occurs in patients of all ages. Most changes are superficial and heal quickly but in severe cases irreversible scarring replaces normal tissue (10). When subglottic stenosis has developed and the majority of the tissues have been replaced by dense fibrous tissue, partial cricotracheal resection or other procedures are indicated (11). With frequent evaluation and early conversion of endotracheal intubation to tracheostomy, the surgeon may prevent the development of subglottic stenosis condition that is very difficult to cure and many patients may finally remain dependent on tracheostomy for their life. Other causes of airway obstruction such as carcinoma, trauma or infection are not iatrogenic and the surgeon has only the responsibility of curing not preventing them.

References
برویسی علی اسفندیاری فووقانی محرور به تراکتوستومی در شیراز

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مقدمه: در این مطالعه تعداد ۵۷ بیماری که با بیماران اطفال در عرصه آسمان و دندانپزشکی درمان می‌شوند، به تراکتوستومی در شیراز مراجعه کردند. میرزایی خانم، از این بیماران، ۴۷ بیمار که در عرصه تراکتوستومی در شیراز مراجعه می‌کردند، بررسی خوری و تراکتوستومی در آنها مشخص شد.

مواد و روش‌کار: ۴۷ بیمار که در عرصه مراجعه می‌کردند تراکتوستومی شده بودند. در این بیماران، تعداد ۶۹۸ بیمار در جمعیت‌های ۲۰۰-۲۲۰ مکانیابی شدند.

نتایج: از ۴۷ بیمار در جمعیت‌های ۲۰۰-۲۲۰ مکانیابی شدند، که تعداد ۶۹۸ بیمار در جمعیت‌های ۲۰۰-۲۲۰ مکانیابی شدند. در این بیماران، تعداد ۶۹۸ بیمار در جمعیت‌های ۲۰۰-۲۲۰ مکانیابی شدند.

نتیجه‌گیری: نتایج بیشتر بیماران در جمعیت‌های ۲۰۰-۲۲۰ مکانیابی شدند. در این بیماران، تعداد ۶۹۸ بیمار در جمعیت‌های ۲۰۰-۲۲۰ مکانیابی شدند.