Surgery for Traumatic Injury of the Trachea and Bronchus

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Surgery for Traumatic Injury of the Trachea and Bronchus

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Surgery for traumatic disruption of the trachea and the bronchus was evaluated with respect to the surgical outcome in three with tracheal injury and four with bronchial injury. In this series, the results were satisfied except for one who underwent delayed operation. Experience seems to indicate that the primary care to ensure security of air way is of great value in life-saving and guarantee of the outcome including pulmonary function following surgery. In conclusion, it is emphasized that the fortuitous result and preservation of pulmonary function are mandatory for pertinent treatment with expeditiously precise diagnosis.

Introduction

In recent year, an increase in traffic accident has brought on catastrophic event. One of the most severe injuries is a traumatic rupture of the trachea and bronchus directly related to life-saving. The optimal cares of the first aid necessitate to persist life-saving and to ensure better outcome. As far as injury to intrathoracic trachea and bronchus is severe, early precise diagnosis and emergency operation are inevitable for life-saving.

The aim of this study is to clarify the validity of surgical management of traumatic injuries to the trachea and bronchus and to know how to effectively treat on the basis of a result of our clinical experience.

Patients

During the past ten years from January, 1983 to December, 1992, at the First Department of Surgery, Nagasaki University School of Medicine, we experienced three patients with tracheal injuries and four with bronchial one (Table 1, 2). The ages of patients with tracheal injuries ranged from 19 to 26 years. The symptoms included bloody sputum, chest X-P findings, endoscopy findings, operation, and outcome. Table 2 shows the patients with bronchial injuries and the symptoms and outcomes for each case.

Patients

<p>| Table 1. Patient with tracheal disruption |</p>
<table>
<thead>
<tr>
<th>age</th>
<th>symptom</th>
<th>chest X-P</th>
<th>endoscopy</th>
<th>operation</th>
<th>outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>bloody sputum, subcutaneous emphysema</td>
<td>first rib fracture</td>
<td>hematoma</td>
<td>direct suture</td>
<td>fair</td>
</tr>
<tr>
<td>24</td>
<td>bloody sputum, subcutaneous emphysema</td>
<td>widened mediastinum</td>
<td>not visible with blood</td>
<td>direct suture</td>
<td>fair</td>
</tr>
<tr>
<td>19</td>
<td>aphone</td>
<td>mediastinal emphysema</td>
<td></td>
<td>direct suture</td>
<td>fair, recurrent nerve paralysis</td>
</tr>
</tbody>
</table>

<p>| Table 2. Patients with bronchial disruption |</p>
<table>
<thead>
<tr>
<th>age</th>
<th>symptom</th>
<th>chest X-P</th>
<th>injured site</th>
<th>op. procedure</th>
<th>outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>dyspnea, bloody sputum</td>
<td>r-pneumothorax</td>
<td>r-main bronchus, r-upper lobe laceration</td>
<td>bronchoplasty, upper lobectomy</td>
<td>fair</td>
</tr>
<tr>
<td>5</td>
<td>dyspnea</td>
<td>bilateral pneumothorax</td>
<td>r-upper and middle bronchus</td>
<td>bronchoplasty</td>
<td>fair</td>
</tr>
<tr>
<td>58</td>
<td>bloody sputum</td>
<td>r-pneumothorax</td>
<td>r-main bronchus, mediastinal emphysema</td>
<td>bronchoplasty</td>
<td>fair</td>
</tr>
<tr>
<td>49</td>
<td>dyspnea, bloody sputum</td>
<td>l-pneumothorax</td>
<td>l-main bronchus</td>
<td>l-pneumonectomy</td>
<td>fair</td>
</tr>
</tbody>
</table>
to 26, showing younger ages. On the other hand, the ages of patients with bronchial injuries distributed from 6 to 58 of age with a wide range. In patients with trauma to the trachea, it was indicated that injured sites in this series were limited to the neck and injuries were directly caused by a high power-force. In contrast, injuries to the bronchus was due to blunt chest trauma by forceful power. The initial symptoms were similar, bloody sputum and dyspnea in both injuries to the trachea and the bronchus. The findings of chest x-ray were characteristic of subcutaneous emphysema and widened mediastinal shadow in case of tracheal injury and unilateral or bilateral pneumothorax in bronchial injury. In those patients, endoscopic examination failed to provide adequate information because of restriction of visual field by bloody sputum and time limitation of endoscopy for dyspnea.

Surgical treatments were mandated in all patients. In tracheal injury, surgery was indicated as soon as a diagnosis was made. On the other hand, in bronchial injury, the time applying surgery varied from 17 hours to 41 days. The surgical procedure used was direct suturing in all of tracheal injury. In contrast, in bronchial injury, the right main bronchus was injured in three and the left main bronchus was affected in the other one. The main bronchi are usual fortuitous site of injury. The bronchoplastic procedure was indicated in three in whom the right main bronchus was damaged and left pneumonectomy was carried out in one whose diagnosis was delayed to result in pulmonary suppuration on day 41 after trauma. The surgical outcome was satisfied and returned to life in society. Preservation of pulmonary function is mandatory for and confined to prompt diagnosis and surgical management.

Discussion

The majority of tracheobronchial laceration are caused by penetrating traumas. As reported by Kelly et al (1), only six patients were caused by blunt chest trauma out of 106 experienced during the 20 year duration. It is generally accepted that an increase in traffic accidents and plant calamity has been accompanying increasing tracheobronchial injury. However, it remains dubious how many patients with tracheobronchial injury are treated because grave accidents cause deaths directly before precise diagnosis. Ecker et al (2) reported seventy percent of chest trauma patients are death on arrival (DOA). Needless to say, deaths in the majority of the patients are in association with concurrent injury involving great vessels. Even in case without concomitant injury, the mortality rate accounts for approximately 30 percent (3-5).

In this series, the reason for obtaining a good result for patients with tracheal trauma is that the injured trachea confined to the cervical portion. Concern has been raised regrading difficulty in the treatment of injury to intratho-

References