Gastric pull-up reconstruction for laryngopharyngectomy

Sriripornchai Supanakorn*  
Songklot Aeumjaturapat*  
Permsarp Isipradit*  
Winai Wadwongtham*  
Kitchai Launghaveeboon**


<table>
<thead>
<tr>
<th>Objective</th>
<th>To study the treatment outcomes and their complications in a group of patients undergoing gastric pull-up reconstruction for laryngopharyngectomy.</th>
</tr>
</thead>
</table>
| Setting            | Division of Head and Neck Surgery, Department of Otolaryngology  
                     Head and Neck Surgery, Faculty of Medicine, Chulalongkorn University. |
| Design             | Retrospective study                                                                                                                |
| Patients           | From 1989 to 1998, eighteen adult patients who underwent gastric pull-up reconstruction for laryngopharyngectomy were enrolled in this study. |
| Methods            | All patients received gastric pull-up reconstruction by Transhiatal nonthoracic blunt esophagectomy technique with transposition of the stomach into the cervical area. |
| Result             | The mean age was 58.78 years old. Survival rates were 70% 1-year, 50% 3-year and 40% 5-year, the complication rate was 50% and the mortality rate 33.33% |

* Department of Otolaryngology, Faculty of Medicine, Chulalongkorn University  
**Department of Surgery, Faculty of Medicine, Chulalongkorn University
Conclusion : Gastric pull-up is a procedure with high rates of morbidity and mortality. Careful patient selection and excellent intensive care facilities are essential to minimize morbidity and mortality.

Key words : Laryngopharyngectomy, Gastric pull-up.

Reprint request : Supanakorn S, Department of Otolaryngology, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Received for publication. February 13, 1999.
ศิริพงษ์ ศุภณัต, ทรงวดี เที้ยมจุฬาวัตร, เพ็ญพรพ. อิสระติเตย, วินัย วงษ์ธรรม, กิตติยา
เนลธิศวิบูญ, การยกการพยายามทางอาการแบบแผนแผนностиในลัก cunt และกลิ่นสีที่ถูกต้อง
ออก อยู่. ชูกำลังผนวชสาร 2542 พ.ศ.; 43(5): 285-93

วัตถุประสงค์ : เพื่อศึกษาผลของการรักษาและการแพร่กระจายที่เกิดขึ้นในผู้ป่วยที่ได้รับการ
ประจำการพยายามทางอาการแบบแผนแผนในการลัก cunt และกลิ่นสีที่ถูกต้อง
ออก อยู่.

สถานที่ทำการศึกษา : ภาควิชาโสต นารี ศัลยศาสตร์ คณะแพทยศาสตร์
จุฬาลงกรณ์มหาวิทยาลัย

รูปแบบการวิจัย : การศึกษาลักษณะ

ผู้ป่วยที่ทำการศึกษา : ผู้ป่วย 18 ราย เป็นมะเร็งบริเวณช่องในลัก cunt กลิ่นสีที่ถูกต้อง และติดต่อช่อง
ที่เกิดขึ้นในโรงพยาบาลจุฬาลงกรณ์ ระหว่าง
ปี พ.ศ. 2532 ถึง พ.ศ. 2541

วิธีการรักษา : ศึกษาวิเคราะห์ผลการรักษาและการแพร่กระจายที่เกิดจากอาการรักษา
ในผู้ป่วยที่ได้รับการรักษาในอาการทางอาการแบบแผนแผนในการลัก cunt
และกลิ่นสีที่ถูกต้องออก อยู่.

ผลการศึกษา : อายุเฉลี่ยของผู้ป่วยเท่ากับ 58.78 ปี อัตราภูมิพิษต่อผู้ป่วยหลังการรักษาในระยะ
เวลา 1 ปี, 3 ปี และ 5 ปี เท่ากับ 70 % 50 % และ 40 % ตามลำดับ
มีอัตราการเกิดการแพร่กระจาย 50 % และอัตราการตายเนื่องจากการรักษา
33.33 %

สรุป : การผ่าตัดกระเพาะอาการแบบแผนแผนในการลัก cunt และกลิ่นสีที่ถูกต้องออก อยู่เป็นวิธีการรักษาที่มีการ
ควบคุมการกระจาย และมีการควบคุมการ
ตายค่อนข้างดี ดังนั้นควรเลือกใช้กับผู้ป่วยที่เหมาะสม และควรติดตามผู้ป่วย
หลังการผ่าตัดอย่างใกล้ชิด.
Despite continuing improvement in treatment of hypopharyngeal carcinoma, the prognosis remains poor. The 5-year survival rate has been below 25% irrespective of therapeutic modality used, and most patients of advanced disease die within 18 months of diagnosis. The poor prognosis is a function of several factors: 71% of the patients are presented with stage III or IV disease and 24% already have metastatic disease.

During the past four decades, varying techniques designed to bridge this gap have included skin tubes and flaps, myocutaneous flaps, colon interposition and free jejunal autografts. All have had a high incidence of failure owing to anastomotic leaks, fistulas, strictures and necrosis of the interposed segment.

Colon interposition, described by Golligher and Robin in 1954, has the advantage of using a long segment of the gastrointestinal tract with its own vascular pedicle interposed between the pharynx and the stomach. The main disadvantage of colon interposition is the need for three intestinal anastomoses, breakdown of the suture line in the neck, or necrosis of the colonic segment due to its tenuous blood supply.

Jejunal autografts have recently been used to bridge the gap between the pharynx and the cervical esophagus because they provided a good size match, have a better muscular component than the colon, and the repair may be accomplished in a single stage. However, the difficult arterial and venous anastomoses can lead to a significant rate of bowel necrosis and anastomotic breakdown, with fistula and subsequent stricture formation.

The use of the stomach for reconstruction, described by Turner in 1936, was initially performed by Ong and Lee in 1960 through a combined abdominal, right thoracic, and cervical approach. Lequesne and Ranger performed the first transhiatal nonthoracic blunt esophagectomy with transposition of the stomach into the cervical area. The resultant gastric pull-up procedure was later modified and optimized by Stell Leonard and Maran, Silver, Akiyama et al, Harison-Orringer, and Spiro et al.

During a ten year period at our institution, we performed gastric pull-up reconstruction for laryngopharyngeal esophagectomy by a transhiatal nonthoracic blunt esophagectomy technique with transposition of the stomach into the cervical area in 18 patients. This paper describes the treatment outcomes and their complications.

Materials and Methods
Patient population
During a ten year period from 1989 to 1998, total laryngopharyngectomy-esophagectomy with gastric pull-up reconstruction was performed in 18 patients. Their records were reviewed in our study.

Technique
A two-team approach is used. One team performs the pharyngolaryngectomy with or without a radical neck dissection. The second team, after giving the surgeons operating upon the neck an appropriate start, performs an upper midline laparotomy and commences mobilization of the stomach. In this mobilization, the right gastroepiploic and right gastric vessel are carefully preserved as
are the vascular arcades along the greater and lesser curvatures. The left gastric and gastroepiploic vessels are divided, and the mobilization continues through the esophageal hiatus with division of the peritoneum, vagus nerve and phrenoesophageal ligaments. The hiatus is enlarged significantly to accommodate passage of the surgeons’ hand as well as the stomach itself into the posterior mediastinum. A generous Kocher maneuver facilitates full mobility of the stomach. A Heineke-Mikulicz pyloroplasty is performed.

The normal thoracic portion of the esophagus can be totally resected by blunt dissection working from the abdominal and cervical approaches without performing a thoracotomy. Most of this dissection is done digitally.

With the esophagus and stomach now completely mobilized, the fundus is gently guided through the enlarged esophageal hiatus by the abdominal surgeon, while the neck surgeon puts steady traction on the esophagus. In this manner, the entire stomach is delivered into the posterior mediastinum. Continued appropriate traction eventually enables the fundus to reach the stump of the oropharynx easily, at or above of the level of the resected hyoid bone. The lower part of the esophagus is transected, and the cardioesophageal junction is closed over a clamp with continuous suture. An incision is made in the fundus, and a two-layer pharyngogastric anastomosis is performed.\(^{(18)}\)

Results

The patients included in this series ranged in age from 30 to 76 years and the average age was 59.78. Men predominated in this series with only 4 of the 18 patients being women. The results of primary tumor site and cell types are summarized in table 1. The hypopharynx was the most common primary site and squamous cell carcinoma was the most common cell type. Of these 18 patients, 37.50% were stage III, while 62.50% were stage IV.

Table 1. Cell type and site of primary tumor.

<table>
<thead>
<tr>
<th>Cell type/site</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCA of hypopharynx</td>
<td>8</td>
</tr>
<tr>
<td>SCCA of larynx</td>
<td>6</td>
</tr>
<tr>
<td>SCCA of cervical esophagus</td>
<td>2</td>
</tr>
<tr>
<td>Mucoepidermoid CA of larynx</td>
<td>1</td>
</tr>
<tr>
<td>Anaplastic CA thyroid</td>
<td>1</td>
</tr>
</tbody>
</table>

SCCA = squamous cell carcinoma

Operation

Seven patients underwent total laryngopharyngectomy-esophagectomy with gastric pull-up, 6 patients underwent total laryngopharyngectomy-esophagectomy with gastric pull-up with unilateral neck dissection, and 5 patients underwent total laryngopharyngectomy - esophagectomy with gastric pull-up with bilateral neck dissection, as shown in table 2. Intercostal drainage was performed in 16 patients, 9 patients interoperatively and 7 postoperatively. Operation time ranged from 4 to 8 hours (median 6 hours). Blood replacements required from 400 to 2,000 ml. (median 1,080 ml.). The duration of hospitalization from surgery to discharge was 14 to 84 days (median 41 days) and from surgery to death was 3 to 70 days (median 19 days).
Table 2. Surgical procedure.

<table>
<thead>
<tr>
<th>Operative procedure</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLPEG + GP</td>
<td>7</td>
</tr>
<tr>
<td>TLPEG + GP + unilat. ND</td>
<td>6</td>
</tr>
<tr>
<td>TLPEG + GP + bilat. ND</td>
<td>5</td>
</tr>
</tbody>
</table>

TLPEG = total laryngopharyngectomy - esophagectomy
GP = gastric pull-up reconstruction
Unilat. ND = unilateral neck dissection
Bilat ND = bilateral neck dissection

Adjuvant therapy

Adjuvant radiotherapy and chemotherapy were administered in the majority of cases. 80% of the patients received postoperative external radiation beam therapy, 13.3% received preoperative radiotherapy and adjuvant chemotherapy was used for 1 patient (6.7%).

Complications and mortality

A total of 19 complications occurred in 9 patients. Most of these were directly related to technique aspects of the surgical procedure (Table 3). The most common complication was hemothorax, follow by pneumonia and infected wounds. An incidental splenectomy was necessary in 3 patients because of problems encountered during mobilization of the stomach. Six patients died as a result of postoperative complications. These included 1 patient from congestive heart failure, 1 patient from pneumonia, 1 patient from hepato-renal failure, 1 patient from sepsis and 2 patients from sudden cardiac arrest. Two patients died on postoperative months 1 and 9. The cause of death was lung metastasis. Two patients had cervical lymph node recurrence at 10 and 12 months postoperatively and neck dissection was performed. Primary site recurrence had not occurred in our series.

Table 3. Post-operative complications.

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Early complication</td>
<td></td>
</tr>
<tr>
<td>Hemo-pneumothorax</td>
<td>7</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>3</td>
</tr>
<tr>
<td>Infected wound</td>
<td>2</td>
</tr>
<tr>
<td>Sepsis</td>
<td>2</td>
</tr>
<tr>
<td>Wound hematoma</td>
<td>1</td>
</tr>
<tr>
<td>Hepato-renal failure</td>
<td>1</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>1</td>
</tr>
<tr>
<td>Tracheo-innominate fistula</td>
<td>1</td>
</tr>
<tr>
<td>2. Late complication</td>
<td></td>
</tr>
<tr>
<td>Tracheostomal stenosis</td>
<td>1</td>
</tr>
</tbody>
</table>

Survival rate

Survival rates were low, as would be expected in any group of patients with advanced head and neck cancers. These were 70%, 50%, 40% for 1, 3, 5-year survival rates respectively.

Discussion

Which technique is preferred for reconstruction of the laryngopharyngectomy-esophagectomy patient. Surkin et al. pointed out that the optimal reconstruction should provide the lowest morbidity and mortality, the shortest hospitalization and the highest rate and most rapid interval to successful alimentation. Several types of reconstruction methods were compared, included tube skin flaps, gastric pull-up, free jejunal transfer, and colon interposition.\textsuperscript{24}
Mehta SA et al. suggested that patients in good condition and without cardiorespiratory problems are suitable to undergo gastric pull-up following laryngopharyngectomy-esophagectomy for hypopharyngeal cancer. The low incidence of fistula formation, anastomotic stricture, and the short hospitalization make the procedure well worth the effort.\(^{(23)}\)

Patients in this study were in advanced stage (III and IV). The overall complication rate of 50% is quite high compared to the study of Cahow CE\(^{(20)}\) with a 32% complication rate, but is nearly the same as in the study of Spiro RH\(^{(22)}\) with a 55% complication rate.

Our mortality rate was 33.33%, which is not so high as compared with reports from other centers in table 4.

**Table 4. Published results of pharyngogastric anastomosis.\(^{(23)}\)**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Percent mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lam et al</td>
<td>31</td>
</tr>
<tr>
<td>Fredrickson et al</td>
<td>0</td>
</tr>
<tr>
<td>Silver</td>
<td>33</td>
</tr>
<tr>
<td>Peracchia et al</td>
<td>16</td>
</tr>
<tr>
<td>Spiro et al</td>
<td>10</td>
</tr>
<tr>
<td>Pradhan and Rajpal</td>
<td>20</td>
</tr>
<tr>
<td>Surkin et al</td>
<td>8</td>
</tr>
<tr>
<td>Krespi et al</td>
<td>5.1</td>
</tr>
<tr>
<td>Jones et al</td>
<td>50</td>
</tr>
<tr>
<td>Harrison and Thompson</td>
<td>11</td>
</tr>
</tbody>
</table>

Survival rates for the groups are 70% 1-year, 50% 3-years and 40% 5-years. The overall survivals compared favorably with reports from Pingree et al\(^{(9)}\) (65% 1-year, 33% 3-years and 25% 5-years) and from Spiro et al\(^{(22)}\) (37% 3-years, 27% 5-years).

Gastric pull-up reconstruction for laryngopharyngectomy-esophagectomy has the advantage of being a one-stage operation that uses two teams of surgeons and one intestinal anastomosis. The disadvantages of this operation are the technical difficulty, relatively high morbidity and mortality and the need for the abdominal operation. It is, however, not recommended for the "occasional gastric pull-up surgeon" nor would it be advisable to perform this surgery in a center that lacks excellent intensive care facilities.\(^{(23)}\)

References


6. Baek SM, Lawson W, Biller HF. Reconstruction of
hypopharynx and cervical esophagus with
pectoralis major island myocutaneous flap.
7. Hueston JT, McConchie IH. A compound pectoral
8. Shan JP, Haribhakti V, Lorenz TR, Sutaria P. Compilations of
the pectoralis major myocutaneous flap in head and neck reconstruction.
9. Goligher JC, Robin IG. Use of left colon for reconstruc-
Nov; 42: 283-90
10. Surkin MI, Lawson W, Biller HF. Analysis of the
May-Jun; 953(5): 70
11. Gluckman JL, McDonough J, Donegan JO. The
role of the free jejunal graft in reconstruction of
the pharynx and cervical esophagus. Head Neck Surg 1983
May-Jun; 4(5): 360-9
12. Ferguson JL, DeSanto LW. Total pharyngectomy
and cervical esophagectomy with jejunal
auto-transplant reconstruction: complications
and results. Laryngoscope 1988 Sep; 98(9):
911-4
13. Turner GG. Carcinoma of the esophagus: the
question of its treatment by surgery. Lancet
1936 Jan 11; 1:130 - 4
14. Ong GB, Lee TC. Pharyngogastic anastomosis
after esophagopharyngectomy for carcinoma
of the hypopharynx and cervical esophagus.
Br J Surg 1969; 56: 98-103
15. Lequesne LP, Ranger D. Pharyngolaryngectomy
with immediate pharyngogastic anastomo-
16. Stell PM. Esophageal replacement by transposed
stomach. Following pharyngolaryngogastric
esophagectomy for carcinoma of the cervical
esophagus. Arch Otolaryngol 1970 Feb;
91(2): 166-70
17. Leonard JR, Maran AG. Reconstruction of the
cervical esophagus via gastric anastomosis.
18. Silver CE. Gastric pull-up operation for
replacement of the cervical portion of the
esophagus. Surg Gynecol Obstet 1976 Feb;
142(2): 243-5
19. Akiyama H, Hiyama M, Miyazona H. Total
esophageal reconstruction after extraction of
547 - 52
20. Harrison DF. Surgical repair in hypopharyngeal
and cervical esophageal cancer: Analysis of
Jul - Aug; 90(4 pt 1): 372-5
21. Orringer MB. Technical aids in performing
transhiatal esophagectomy without thoracot-
128-32
22. Spiro RH, Bains MS, Shah JP, Strong EW. Gastric
transposition for head and neck cancer: a
345 - 52
23. Mehta SA, Sarkar S, Mehta AR, Mehta MS.
Mortality and morbidity of primarily pharyngo-
gastic anastomosis following circumferential
excision for hypopharyngeal malignancies.
J Surg Oncol 1990 Jan; 43(1): 24 -7
24. Schusterman MA, Shestak K, deVries EJ, Swartz
