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# Gastric pull - up reconstruction forlaryngopharyngectomy

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# Gastric pull - up reconstruction for laryngopharyngectomy

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**Objective** : *To study the treatment outcomes and their complications in a group of patients undergoing gastric pull-up reconstruction for laryngopharyngectomy.*

**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%*

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**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.*

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**ศิริพรชัย ศุภนคร, ทรงกลด เอี่ยมจตุรภัทร, เพิ่มทรัพย์ อิสีประดิฐ, วินัย แวดวงธรรม, กิตติชัย เหลืองทวีบุญ. การยกกระเพาะอาหารมาช่อมแซมทดแทนช่องในลำคอ และกล่องเสียงที่ถูกตัดออกไป. จุฬาลงกรณ์เวชสาร 2542 พ.ค; 43(5): 285-93**

**วัตถุประสงค์** : *เพื่อศึกษาผลของการรักษา และภาวะแทรกซ้อนที่เกิดขึ้นในผู้ป่วยที่ได้รับการผ่าตัดยกกระเพาะอาหารมาช่อมแซมทดแทนช่องในลำคอ และกล่องเสียงที่ถูกตัดออกไป*

**สถานที่ทำการศึกษา** : *ภาควิชาโสต นาสิก ลาริงซ์วิทยา คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย*

**รูปแบบการวิจัย** : *การศึกษาย้อนหลัง*

**ผู้ป่วยที่ทำการศึกษา** : *ผู้ป่วย 18 ราย เป็นมะเร็งบริเวณช่องในลำคอ กล่องเสียง หลอดอาหารส่วนต้น และต่อมไทรอยด์ ที่มารักษาในโรงพยาบาลจุฬาลงกรณ์ ระหว่างปี พ.ศ.2532 ถึง พ.ศ.2541*

**วิธีการรักษา** : *ศึกษาวิเคราะห์ผลการรักษาและภาวะแทรกซ้อนที่เกิดจากการรักษาในผู้ป่วยที่ได้รับการผ่าตัดยกกระเพาะอาหารมาช่อมแซมทดแทนช่องในลำคอ และกล่องเสียงที่ถูกตัดออกไป*

**ผลการศึกษา** : *อายุเฉลี่ยของผู้ป่วยเท่ากับ 58.78 ปี อัตราการมีชีวิตอยู่หลังผ่าตัดในระยะเวลา 1 ปี, 3 ปี และ 5 ปี เท่ากับ 70 % 50 % และ 40 % ตามลำดับ มีอัตราการเกิดภาวะแทรกซ้อน 50% และอัตราการตายเนื่องจากการรักษา 33.33 %*

**สรุป** : *การผ่าตัดกระเพาะอาหารมาช่อมแซมทดแทนช่องในลำคอ และกล่องเสียงที่ถูกตัดออกไป เป็นวิธีการรักษาที่มีอัตราเกิดภาวะแทรกซ้อน และอัตราการตายค่อนข้างสูง ดังนั้นควรเลือกใช้กับผู้ป่วยที่เหมาะสม และควรดูแลผู้ป่วยหลังผ่าตัดอย่างใกล้ชิด*

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.[1-3] 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,[9] has the advantage of using a long segment of the gastrointestinal tract with its own vascular pedicel interposed between the pharynx and the stomach.[10] The main disadvantage of colon interposition are the need for three intestinal anastomoses, breakdown of the suture line in the neck, or necrosis of the colonic segment due to it's 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.[11] 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.[12]

The use of the stomach for reconstruction, described by Turner[13] in 1936, was initially performed by Ong and Lee[14] in 1960 through a combined abdominal, right thoracic, and cervical approach. LeQuesne and Ranger[15] 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[16] Leonard and Maran,[17] Silver,[18] Akiyama et al,[19] Harison-Orringer,[20] Orringer,[21] and Spiro et al.[22]

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 diversion 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 58.78 . 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.

| Cell type/site | No. of patients |
|---|---|
| SCCA of hypopharynx | 8 |
| SCCA of larynx | 6 |
| SCCA of cervical esophagus | 2 |
| Mucoepidermoid CA of larynx | 1 |
| Anaplastic CA thyroid | 1 |

SCCA = squamous cell carcinoma

## Operation

Seven patients underwent total laryngo-haryngectomy-esophagectomy with gastric pull-up, 6 patients underwent total laryngopharyngectomy-esophagectomy with gastric pull-up with unilateral neck dissection, and 5 patients underwent total layngopharyngectomy - esopharyngectomy 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.

| Operative procedure | No. of patients |
|---|---|
| TLPEG + GP | 7 |
| TLPEG + GP + unilat. ND | 6 |
| TLPEG + GP + bilat. ND | 5 |

TLPEG = total laryngopharyngectomy - esophagectomy
GP = gastric pull-up reconstrution
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 usedfor 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 hemo-pneumothorax, 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.

| Complication | No. of patients |
|---|---|
| 1. **Early complication** | |
| Hemo-pneumothorax | 7 |
| Pneumonia | 3 |
| Infected wound | 2 |
| Sepsis | 2 |
| Wound hematoma | 1 |
| Hepato-renal failure | 1 |
| Congestive heart failure | 1 |
| Tracheo-innominate fistula | 1 |
| 2. **Late complication** | |
| Tracheostomal stenosis | 1 |

**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.[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.[26] 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]

| Authors | Percent mortality |
|---|---|
| Lam et al | 31 |
| Fredrickson et al | 0 |
| Silver | 33 |
| Peracchia et al | 16 |
| Spiro et al | 10 |
| Pradhan and Rajpal | 20 |
| Surkin et al | 8 |
| Krespi et al | 5.1 |
| Jones et al | 50 |
| Harrison and Thompson | 11 |

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[1] (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]

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