

## ผลการผ่าตัดซ่อมแซมคอหอยหลังการผ่าตัดกล่องเสียงออกหمدในมะเร็งคอหอยส่วนล่าง: ประสบการณ์ 12 ปี ในโรงพยาบาลศรีนครินทร์

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## Results of Pharyngeal Reconstruction after Total Laryngectomy in Hypopharyngeal Cancer: A 12-year Experience in Srinagarind Hospital

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**หลักการและเหตุผล:** การซ่อมแซมคอหอยหลังการผ่าตัดกล่องเสียงออกหمدในมะเร็งคอหอยส่วนล่างเป็นประเด็นที่ท้าทายสำหรับแพทย์ผ่าตัดศีรษะและคอ ในโรงพยาบาลศรีนครินทร์ ได้มีการผ่าตัดชนิดนี้มานานมากแล้วแต่ยังไม่เคยมีการศึกษาเกี่ยวกับผลของการผ่าตัดชนิดนี้มาก่อน เราจึงมีจุดประสงค์ที่จะประเมินเกี่ยวกับผลการผ่าตัดนี้

**วิธีการศึกษา:** การศึกษาแบบเชิงพรรณนา รวบรวมข้อมูลผู้ป่วยที่ได้รับการวินิจฉัยเป็นมะเร็งคอหอยส่วนล่างและได้รับการผ่าตัดกล่องเสียงออกหمدโดยที่ไม่สามารถเย็บซ่อมคอหอยแบบปฐมภูมิได้ เราได้รวบรวมข้อมูลตั้งแต่วันที่ 1 มกราคม พ.ศ. 2530 ถึงวันที่ 31 ตุลาคม พ.ศ. 2552 ข้อมูลสำคัญที่รวบรวมได้แก่ อุบัติการณ์ของการเกิดการรั่วของคอหอยหลังการผ่าตัด วันที่เริ่มรับประทานอาหารทางปากได้ และระยะเวลาการนอนโรงพยาบาล

**ผลการศึกษา:** มีผู้ป่วย 26 รายที่ได้รับคัดเลือกเข้ามาศึกษา ผู้ป่วย 23 ราย ได้รับการทำ gastric pull-up และ 4 ราย (ร้อยละ 17.4) มีการรั่วของคอหอยหลังผ่าตัด ที่เหลืออีก 3 รายได้รับการทำ pectoralis major myocutaneous flap (PMMF) และ 2 ราย (ร้อยละ 66.6) มีการรั่วของคอหอยหลังผ่าตัด 3 ใน 6 รายที่มีการรั่วของคอหอยสามารถหายได้จากการรักษาแบบอนุรักษ์ ในขณะที่ที่เหลือต้องรักษาด้วยการผ่าตัด ภาวะแทรกซ้อนอื่นๆ ส่วนใหญ่เป็นภาวะแทรกซ้อนทางปอด แต่อย่างไรก็ตามไม่พบภาวะแทรกซ้อนในช่องท้องในการศึกษานี้เลย วันที่เริ่มรับประทานอาหารทางปาก และระยะเวลาการนอนโรงพยาบาลโดยเฉลี่ยเท่ากับ 24 วัน และ 84.33 วัน ในกลุ่มที่มีการรั่วเทียบกับ 12.65 วัน และ 28.45 วัน ในกลุ่มที่ไม่มีการรั่วอย่างไรก็ตามการศึกษาของเรามีความสามารถวิเคราะห์ถึงปัจจัยที่มีผลต่อความเสี่ยงของการเกิดการรั่วของคอหอยหลังผ่าตัดได้

**Background and objective:** Pharyngeal reconstruction after total laryngectomy in hypopharyngeal cancer is the challenge issue for head and neck surgeon. Srinagarind Hospital performed this procedure for a long time but it has never been studied about its results. We aim to evaluate the results.

**Methods:** This descriptive study collected data of patients who were diagnosed as hypopharyngeal cancer and underwent total laryngectomy which the pharyngeal defect couldn't be repaired by primary suture. We included patients from January 1<sup>st</sup>, 1997 to October 31<sup>st</sup>, 2009. The main data consisted of incidence of postoperative pharyngeal leakage, date of start oral feeding and length of hospital stay.

**Results:** There were 26 cases included. Twenty three patients were reconstructed by gastric pull-up and 4 cases (17.4%) had postoperative pharyngeal leakage. The other 3 cases were reconstructed by pectoralis major myocutaneous flap (PMMF) and 2 cases (66.6%) had postoperative pharyngeal leakage. Three out of 6 cases who had pharyngeal leakage were resolved by conservative treatment while the others required surgical intervention. Other complications included mainly pulmonary complications. However there was no intraabdominal complication in this study. Average days which patient could start oral feeding and length of hospital stay were 24 days and 84.33 days in leakage group as compared with 12.65 days and 28.45 days in non-leakage group, respectively. However, our study could not analyze the factors which influence the risk of postoperative pharyngeal leakage.

**สรุป:** อุบัติการณ์การเกิดการรั่วของคอหอยจากการผ่าตัดซ่อมแซมคอหอยหลังการผ่าตัดกล่องเสียงออกหงดในมะเร็งคอหอยส่วนล่างเท่ากับ ร้อยละ 17.4 ในรายที่ซ่อมแซมด้วยการทำ gastric pull-up และร้อยละ 66.6 ในรายที่ซ่อมแซมด้วยการทำ PMMF ซึ่งมีเพียงร้อยละ 50 ของการรั่วเท่านั้นที่สามารถหายได้ด้วยการรักษาแบบอนุรักษ์ ที่เหลือต้องอาศัยการผ่าตัดแก้ไข

**Conclusion:** Incidence of pharyngeal leakage in case of pharyngeal reconstruction after total laryngectomy in hypopharyngeal cancer was 17.4% in cases whom underwent gastric pull-up and 66.6% whom underwent PMMF. There were only 50% of pharyngeal leakage-patients resolve by conservative treatment. The others required surgical procedure.

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## Introduction

After total laryngectomy in hypopharyngeal cancer, pharyngeal reconstruction is the challenge issue especially in cases whom the defect can't be repaired by primary suture. Myocutaneous flap, visceral transposition or revascularized free tissue transposition are options which is chosen according to types of pharyngeal defect. If tumor invades the esophagus and total esophagectomy is performed, gastric pull-up or colon interposition is indicated. If esophagus is preserved and only hypopharynx is resected, pectoralis major myocutaneous flap (PMMF), fasciocutaneous (radial forearm, anterolateral thigh) flap or jejunal free flap is performed.

Postoperative pharyngeal leakage is the main complication after pharyngeal reconstruction which we concern. The patients are suffering too much from this complication. They can't eat by mouth and need tube feeding. Pressure dressing is performed until the pharyngeal leakage is resolved, usually more than 1 week. Some patients require second times of surgery or more to repair the leakage. Of course, it affects the length of hospital stay. Moreover, it results in delayed postoperative irradiation which may affect risk of tumor recurrence.

This study aims to evaluate the results of pharyngeal reconstruction after total laryngectomy in hypopharyngeal cancer in Srinagarind Hospital. The study has never been done before. We mainly concerned about postoperative pharyngeal leakage. The result may be beneficial to predict outcome of pharyngeal reconstruction which affects to date of start oral feeding and length of hospitalization.

## Materials and methods

This descriptive study collected data from patients who was diagnosed as hypopharyngeal cancer and underwent total laryngectomy which couldn't be repaired the pharyngeal defect by primary suture. We included all patients who underwent surgery in the Department of Otorhinolaryngology, Srinagarind Hospital, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand since January 1<sup>st</sup>, 1997 to October 31<sup>st</sup>, 2009. The patients who underwent previous laryngeal surgery (e.g. conservation laryngectomy) or had recurrent tumor were excluded. We also included the patients who had received irradiation therapy before surgery. Data about sex, age, site of tumor, tumor staging, types of pharyngeal reconstruction, surgical complications especially pharyngeal leakage, length of hospital stay, date of start oral feeding, and times of reoperation were recorded.

Pharyngeal leakage was diagnosed if the medical record revealed (1) inflammation or injection of skin or subcutaneous abscess or fistula above tracheostoma, (2) presence of pharyngeal leakage on barium swallowing, or (3) delayed duration to start oral feeding or prolonged cervical pressure dressing without other obvious reasons.

The data were analyzed by descriptive statistics (number, percent, average).

## Results

There were 26 patients were included in this study, 17 were male and 9 were female. The average age was 56.4 years (range from 39 - 74 years). All were

squamous cell carcinoma. Nobody has received previous irradiation therapy. After total laryngectomy, there were only 2 types of pharyngeal reconstruction were performed, 23 were gastric pull-up and 3 were pectoralis major myocutaneous flap (PMMF).

Pharyngeal leakage was found in 6 cases (23.08%). Character of patients who had pharyngeal leakage was showed in Table 1.

Patients who underwent gastric pull-up had pharyngeal leakage in 4 cases (17.4%) and 3 of them developed gastrocutaneous fistula. Date of diagnosis ranged from 6-16 days after surgery (10 days in average). Only one case required surgical repair while the remainders resolved by conservative treatment. Date of start oral feeding ranged from 10-35 days after surgery (20 days in average) and length of hospital stay ranged from 42-117 days (89 days in average).

Other complications in patients who underwent gastric pull-up were pneumonia (4 cases), pneumothorax (3 cases), lung atelectasis (3 cases), and hemopneumothorax (2 cases). Each case might have more than one complication. Unfortunately, there was one case died due to tracheoinnominate artery fistula. However, nobody had any intraabdominal complications.

Three patients who underwent PMMF had pharyngeal leakage in 2 cases (66.6%). The first case was diagnosed on the fifth day after surgery and required 4 times for surgical repair. He could eat anything orally on 44<sup>th</sup> days. His length of hospital stay was 115 days. The other case had delayed leakage (14 days after surgery). He required another surgical repair and could eat on 18<sup>th</sup> day. His length of hospital stay was 35 days. No other serious complication was found in this group except lung atelectasis in one case.

Patients who had pharyngeal leakage had delay of time to start oral feeding (12<sup>th</sup> to 24<sup>th</sup> day in average) and had longer length of hospital stay (28.4 to 84.3 days in average) (Table 2)

## Discussion

Most of hypopharyngeal cancer is advanced stage and hypopharyngeal mucosa has to be resected a lot, so it has no enough mucosa to repair by primary suture. There are many methods for pharyngeal reconstruction such as myocutaneous flap (e.g. PMMF), visceral transposition (e.g. gastric pull-up) or revascularized free tissue transposition. However, each method has indication itself. In Srinagarind Hospital, only gastric

**Table 1** Character of patients who had pharyngeal leakage

Order	1	2	3	4	5	6
Sex	Male	Male	Male	Male	Male	Male
Age (y)	59	44	67	59	55	68
Type of reconstruction	GP	GP	GP	GP	PMMF	PMMF
Type of leakage	Fistula	Fistula	Leakage	Fistula	Fistula	Leakage
Criteria for diagnosis	Barium	Fistula	Inflame	Fistula	Fistula	Delay oral feeding
Date of diagnosis	10	16	6	7	5	14
Date of start oral feeding	21	10	35	16	44	18
Treatment	CTx	Sx (1)	CTx	CTx	Sx (4)	Sx (1)
LOS (day)	107	90	117	42	115	35

GP = gastric pull-up, PMMF = pectoralis major myocutaneous flap, CTx = conservative treatment, Sx (...) = surgical treatment (numbers of surgery), LOS = length of hospital stay

pull-up and PMMF were performed for pharyngeal reconstruction.

Most of the patients (23/26) required gastric pull-up as pharyngeal reconstruction because they had esophageal invasion and needed total esophagectomy. After esophagus was resected totally, stomach was pulled through the anterior mediastinum to anastomose with oropharynx superiorly. This technique resulted in increase risk to intraabdominal and intrathoracic complications. Although the incidence of anastomotic leakage was lower than PMMF reconstruction but it caused more severe complication due to acidity of gastric content which leak into the surrounding tissue.

PMMF reconstruction was indicated in cases that esophagus was preserved but had no enough pharyngeal mucosa to primary closure. We can also design the flap as tube flap to reconstruct whole hypopharyngeal defect in cases that undergo total hypopharyngectomy. Because this technique creates multiple sites of anastomosis (3 or 4 sites), while

gastric pull-up makes only one anastomotic site, it results in high risk of leakage. However, leakage of PMMF reconstruction contains saliva which less tissue irritation than gastric content.

Our incidence of pharyngeal leakage was rather high when compared to the previous studies<sup>1-14</sup> (Table 3). Previous radiation, wound infection, tension of sutured pharynx and technique of pharyngeal reconstruction were suggested to be the factors influenced the occurrence of pharyngeal leakage<sup>4</sup>. Unfortunately, we had not adequate data for analysis the effect of these factors. However, principle of anastomosis technique, such as tensionless of anastomotic site, infection control, suture technique, etc., should be keep in mind and strictly consider. Residual cancer at anastomotic site is one of the causes of anastomotic leakage which we have to recognize although there is no such condition in our study.

All cases of pharyngeal leakage were treated conservatively first and following by surgery if conservative

**Table 2** Comparison of characteristics of patients who were with or without no pharyngeal leakage

Character	Patients with leakage (6)	Patients without leakage (20)	Total (26)
Male	6	11	17
Female	0	9	9
Age (average)	44-68 (58.7)	39-74 (55.7)	39-74 (56.4)
Date of start oral feeding (average)	10-44 (24)	6-27 (12.6)	6-44 (15.3)
Length of hospital stay (day)	35-117 (84.3)	12-180 (28.4)	12-180 (41.3)

**Table 3** Incidence of pharyngeal leakage, length of hospital stay and date of start oral feeding: comparison between this study and other literatures

	Other literatures		This study	
	Gastric pull-up	PMMF	Gastric pull-up	PMMF
Incidence of pharyngeal leakage (%)	2.4-17.2 <sup>1-10</sup>	0-54.5 <sup>8,11-14</sup>	17.4	66.7
length of hospital stay (day)	16-4 <sup>1,2,4-8,10</sup>	14-26 <sup>12-14</sup>	42-117	35-115
date of start oral feeding (day)	13-19.7 <sup>1,2,6</sup>	13.5-20 <sup>11,13</sup>	10-35	18-44

treatment failed. Conservative treatment of pharyngeal leakage consists of pressure dressing, intravenous antibiotics, NPO and NG feeding. Result of treatment was assessed by clinical examination or barium swallowing. Success rate was generally about 66.7 – 89%<sup>15-17</sup>.

In this study, 4 of 23 cases who underwent gastric pull-up had pharyngeal leakage and 3 of them healed by conservative treatment. But all of two cases who had pharyngeal leakage after PMMF failed to conservative treatment and required surgical treatment. Multiple sites of anastomosis and availability of PMMF may be the main factors of treatment failure.

Time for date of start oral feeding was the final outcome of pharyngeal reconstruction. Patients with pharyngeal leakage had delay oral feeding time (24 days compared with 12.6 days) (Table 2). Moreover, when compared with other literatures, our study also had longer delay oral feeding time<sup>1,2,6,11,13</sup> (Table 3). And this was correlated with length of hospital stay<sup>1,2,3-8,10,12-14</sup> (table 3). Their causes were not clear. It might result from other simultaneous complications.

Other postoperative complications of gastric pull-up and PMMF reconstruction were mainly pulmonary complications such as pneumonia, pneumothorax, lung atelectasis, etc. We believed that it may be the important reason of long hospitalization. The serious complication in our study was tracheoinnominate artery fistula which was the cause of death in one patient. Mortality rate was 3.84% compared with 15% of previous study<sup>18</sup>. Although there was no immediate intraabdominal complications in our study, delayed or long term intraabdominal complication, such as gut obstruction, etc., should be recognized.

## Conclusion

Incidence of pharyngeal leakage in case of pharyngeal reconstruction after total laryngectomy in hypopharyngeal cancer was 17.4% in cases whom underwent gastric pull-up and 66.6% whom underwent PMMF. There were only 50% of pharyngeal leakage-patients resolve by conservative treatment. The others required surgical procedure.

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