OUTCOMES OF GASTRIC PULL-UP RECONSTRUCTIVE SURGERY FOLLOWING LARYNGOPHARYNGOESOPHAGECTOMY IN HYPOPHARYNGEAL AND UPPER ESOPHAGEAL CARCINOMAS

Muhammad Rashid, Humaira Saleem, Saeed Bin Ayaz, Asif Asghar*, Muhammad Ali*, Muhammad Wasif Siddiqui**

Combined Military Hospital Quetta Pakistan, *Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, **Combined Military Hospital Malir Pakistan

ABSTRACT

Objective: To determine the commonest stage of hypopharyngeal and upper esophageal carcinoma at presentation, common complications after surgery, perioperative mortality, and one-year survival rate after surgery.

Study Design: A descriptive prospective study.

Place and Duration of Study: Combined Military Hospitals, Rawalpindi, Lahore, and Malir, from Oct 2008 to Oct 2016.

Material and Methods: Through consecutive sampling, 25 individuals were sampled after staging disease through TNM classifications provided by the 1983 American Joint Committee on Cancer Classification for hypopharyngeal cancers. Total laryngopharyngoesophagectomy and gastric pull-up reconstructive surgery was performed by two teams. The total operation time in hours and the approximate blood loss in ml during the procedure was documented. The patients were monitored post-operatively for pulmonary (respiratory failure requiring ventilatory support, atelectasis, pneumonia, pulmonary embolism, pleural effusion/hemothorax, etc.), cardiac (arrhythmias, myocardial infarction, and congestive cardiac failure), and surgical complications (wound infections, anastomotic leak, and fistula formation). The patients were also followed-up for survival at 1st, 6th, and 12th month.

Results: There were 18 males and 7 females (mean age: 53 ± 14 years). Majority presented with T4N2M0-stage disease. The operation lasted for a mean time of 7.7 ± 1.3 hours (range: 6.3-11 hours) and a mean 1218 ± 338 ml (range: 590-2020 ml) blood was lost during the operation. The patients remained in the hospital for a mean 26 ± 16 days (range: 1-56 days). The commonest complication following operation was pleural effusion/hemothorax present in 72% of the patients. The perioperative mortality was 12% and one-year survival rate was 36%.

Conclusion: Majority of our sampled patients presented with T4N2M0-stage disease. The mean operation time in our sample was longer with an increased incidence of anastomotic leaks when compared to the international data. The other complications and perioperative mortality were comparatively similar while one-year survival rate was lower.

Keywords: Anastomotic leak, Complications, Gastric pull-up, Hypopharyngeal carcinoma, Perioperative mortality, Survival, Upper esophageal carcinoma.

INTRODUCTION

Hypopharyngeal cancers constitute approximately 7% of all cancers of the upper aerodigestive tract[1]. These cancers carry a bad reputation due to late presentation and poor prognosis. Majority of these patients present so late that all the treatment options are only palliative measures. In fact, T1 N02 cases account for only 1-2% of all patients presenting to the health care professionals[1]. As majority of patients present with advanced disease, it is not possible to differentiate between the primary hypopharyngeal or upper esophageal tumors. Furthermore, the treatment for both types of tumors remains similar.

Cancers of the hypopharynx and their treatments can significantly affect hypo-pharyngeal functions. Patients with advanced disease have to cope with a potential decreased

Correspondence: Dr Muhammad Rashid, Classified ENT Specialist, CMH Quetta Pakistan (*Email: mrjaggal86@gmail.com*)
Received: 18 Aug 2017; Revised received: 26 Oct 2017; Accepted: 22 Nov 2017

life span and a compromised quality of the remaining life. The decisions regarding treatment should also be made cautiously as the morbidity can significantly increase after treatment in terms of aspiration and airway obstruction, swallowing difficulty, bleeding, and pain[1].

The ideal treatment for hypopharyngeal carcinoma is dependent on stage of the disease. For early-stage disease, radiotherapy and surgery achieve similar results. Radical surgery followed by radiotherapy is advisable for patients with advanced-stage disease. After radical surgery, a low morbidity and dependable reconstructive strategy is crucial for an expedient reconstitution of speech and swallowing. Historically, various methods of reconstruction have been used after resection of the pharynx, hypopharynx, and cervical esophagus. Pectoralis major myocutaneous flaps, autografts using jejunum or colon, and tubed radial forearm flaps are in use but the gastric pull-up procedures remain the gold standard technique for reconstruction of the hypopharynx and cervical esophagus when the resection extends below the thoracic inlet[3]. In this study, we tried to observe the commonest stage of hypopharyngeal and upper esophageal carcinoma at presentation, the complications observed in patients after surgery, perioperative mortality, and the survival rate at one year among 25 patients.

MATERIAL AND METHODS

It was a descriptive prospective study carried out at the combined military hospitals of Rawalpindi, Lahore, and Malir from October 2008 to October 2016. The permission from the respective hospital ethical committees and written informed consent from every patient was acquired following the institutional scientific guidelines. A sample size of 6 was estimated via Epi Tools Epidemiological Calculators[4] while keeping level of significance 5%, confidence level 95%, estimated true proportion 0.0371%[5], and 5% of absolute precision. Twenty-five patients of hypopharyngeal and upper esophageal carcinomas who had to undergo total laryngopharyngoesophagectomy and gastric pull-up reconstructive surgery were consecutively sampled and included in this study. The TNM classifications provided by the 1983 American Joint Committee on Cancer

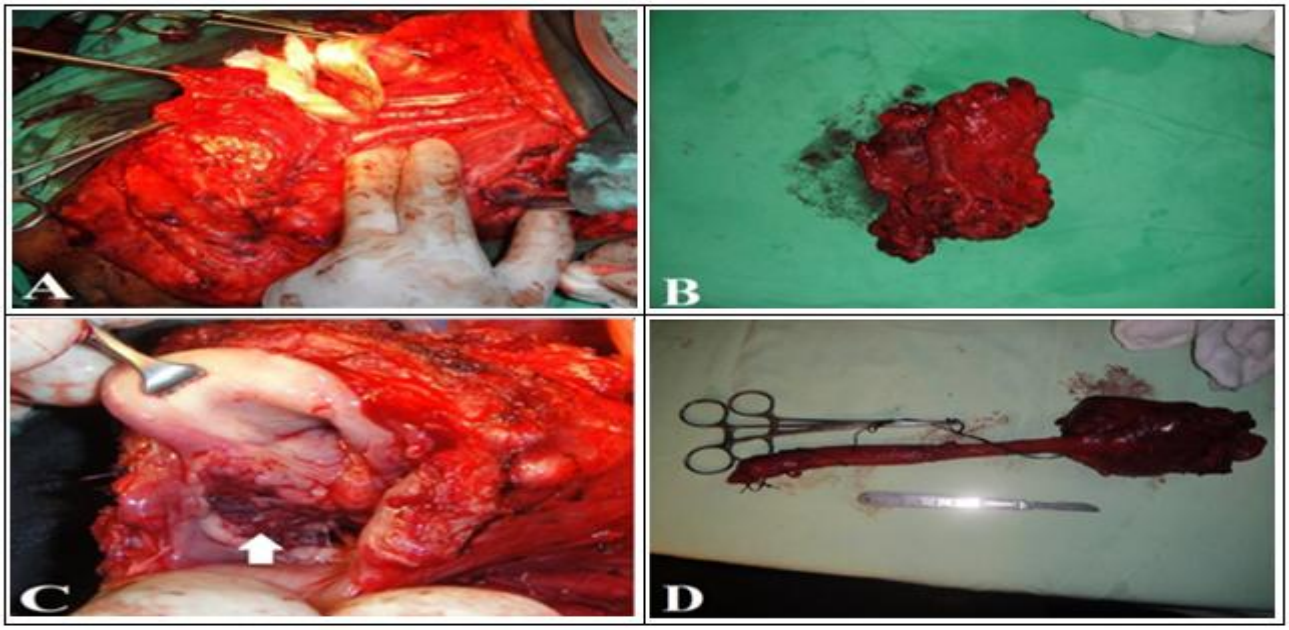

Figure-1: Figure showing (A) neck dissection (B) neck dissection specimen (C) growth in the piriform sinus (D) primary specimen of growth along with larynx, pharynx, and esophagus.

Classification for hypopharyngeal cancers was used to stage the disease[2].

Total laryngopharyngoesophagectomy and gastric pull-up reconstructive surgery was performed by two teams (fig-1 & 2). The main tumor removal and neck dissections were carried out by otolaryngologists while the dissection of the esophagus and gastric pull-up surgery was done by the thoracic surgery team. The total operation time in hours and the approximate blood loss in ml during the procedure was documented. After operation, the patients underwent gastrografin studies to check integrity of anastomosis. The patients were monitored post-operatively for pulmonary (respiratory failure needing ventilatory support, atelectasis, pneumonia, pulmonary embolism, pleural effusion/hemothorax, etc.), cardiac (arrhythmias, myocardial infarction, and congestive cardiac failure), and surgical complications (wound infections, anastomotic leak, and fistula formation). All patients who recovered well from the surgery underwent radiotherapy also. The patients were also followed-up for survival at 1st month (perioperative mortality)[6], and for survival and tumor recurrence at 6th and 12th months.

The Statistical Package for Social Sciences (SPSS) version 20.0 was used for the statistical analysis. Means and standard deviations were calculated for quantitative variables and frequencies/ percentages were calculated for the qualitative variables.

RESULTS

The age of the patients ranged from 16 to 75 years with a mean age of 53 ± 14 years and a median age of 55 years. There were 18 (72%) males and 7 (28%) females. Majority of the patients presented with T4N2M0-stage disease (table). The operation lasted for a mean time of 7.7 ± 1.3 hours (range: 6.3-11 hours) and a mean 1218 ± 338 ml (range: 590-2020 ml) blood was lost during the operation. The patients remained in the hospital for a mean 26 ± 16 days (range: 1-56 days). The perioperative mortality was 12% and only 9 (36%) patients survived at 12 months. The commonest complication following operation was pleural effusion/hemothorax present in 72%

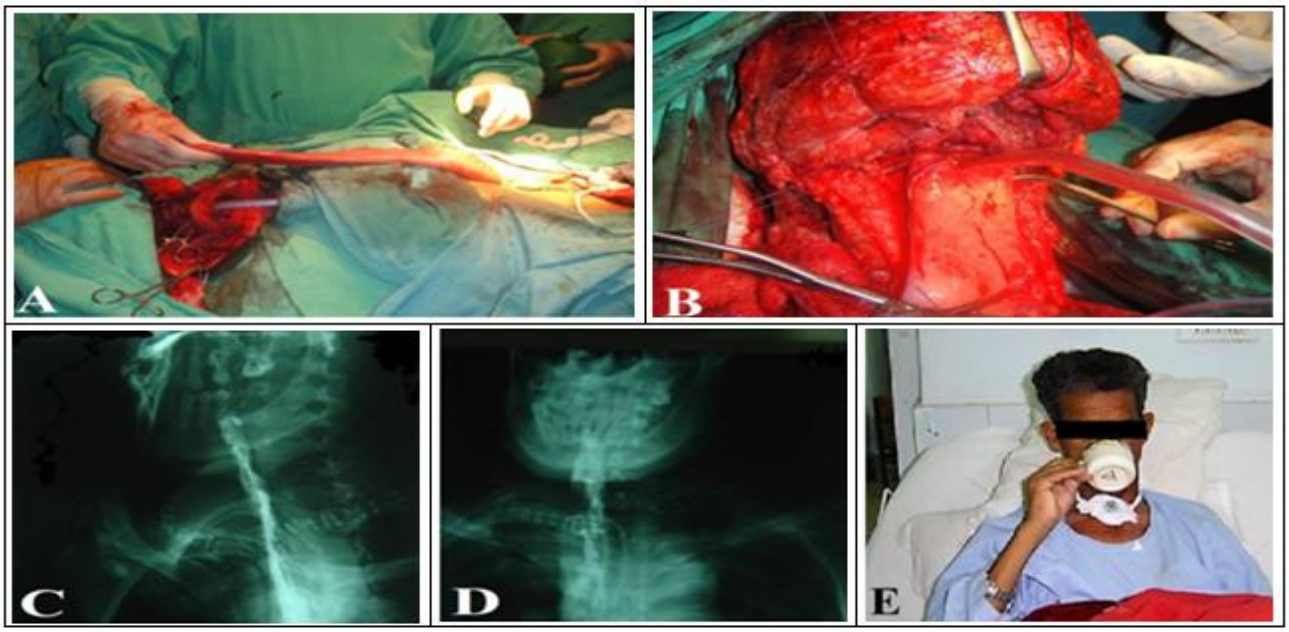

Figure-2: Figure showing (A) preparation of stomach tube (B) stitching of stomach tube in the pharynx (C & D) gastrograffin studies to check integrity of anastomosis (E) swallowing evaluation post-operatively.

of the patients. In majority of the patients (53.3%) the tumor remained well-controlled.

DISCUSSION

Gastric tube interposition has been shown to be a reliable method of reconstruction for circumferential defects of the pharyngoesophagus. Turner first described a pull-through esophagectomy with use of the stomach as a method of reconstruction[3]. Since then, several surgeons have modified the techniques and reported successful reconstructions of the pharyngoesophagus, with acceptable morbidity and mortality rates i.e. 5-31% and 5-55%, respectively[7-13]. The stomach is the preferred alimentary organ to replace esophagus because it has an excellent blood supply (so that failure due to necrosis is very rare); it is relatively easy to prepare, and swallowing after the operation is better because of low rates of stricture and fistula formation[14].

In Pakistan, cancer of the oral cavity and pharynx are amongst the commonest type of cancers. In certain areas, like Karachi, where chewing tobacco and betel nut is a social norm, the oral cavity cancers rank second in both males and females[15]. Despite an increased incidence, majority (88%) of our sampled patients presented very late i.e. in T4N2M0 stage and in poor general health condition. This is because these cancers are commonly seen in patients belonging to the low socioeconomic group[16]. Poverty, poor education and awareness, and lack of medical insurance prohibits these patients from timely pursuance of medical advice. Cancers in advanced stages present unique surgical challenges in term of excision of

Table: Table showing the clinical characteristics of the sample.

Characteristics	n (%)	Characteristics	n (%)
TNM Staging		Post-op complications	
TX	-	Respiratory failure needing	9 (36)
T0	-	ventilatory Support	
Tis	-	Atelectasis	3 (12)
T1	-	Pneumonia	2 (8)
T2	-	Pulmonary Embolism	2 (8)
T3	3 (12)	Pleural Effusion/hemothorax	18 (72)
T4	22 (88)	Arrhythmias	8 (32)
NX	-	Myocardial infarction	1 (4)
N0	3 (12)	Congestive cardiac failure	3 (12)
N1	5 (20)	Anastomotic leak	4 (16)
N2	16 (64)	Wound Infection	7 (28)
N3	1 (4)	Sinus / Fistula	3 (12)
M0	25(100)		
M1	-		
Tumor		Post-op deaths in months	
Recurrence		≤1	3 (12)
Primary tumor	1 (6.7)	>1 to 6	6 (24)
Lymph nodes	3 (20)	>6 to 12	7 (28)
Primary tumour + Lymph nodes	3 (20)		
None	8 (53.3)		
Missing	10		

the primary tumor and neck and restoration of the alimentary tube with gastric tube.

Comparing international data, the percentage of patients presenting in advanced stage of the disease is quite low. From China, Jiang et al[17]. reported a percentage of 33% (35/105) for patients with a T4-stage disease of hypopharyngeal and cervical esophageal carcinomas. From Saudi Arabia, Al Ghamdi[18] reported a percentage of 29% (2/7) and from Bosnia and Herzegovina, Krdžalić and Brkić[19] reported a percentage of 25% (1/4).

The mean operation time of 7.7 ± 1.3 hours in our study was a little longer than 7.02 ± 0.9 hours reported by Ferahkose et al.[20] This was because the change-over time between the two teams was longer in our cases and the majority of tumors were in more advanced stages and needed extensive surgical intervention. The mean blood loss in our study was 1218 ± 338 ml blood and it was comparable to 1240 ± 536 ml blood loss reported by Ferahkose et al[20].

Pulmonary complications were the commonest complications observed by us in our study. The complication observed in a descending order were pleural effusion/ hemothorax (18/25), respiratory failure needing ventilatory support (9/25), atelectasis (3/25), pneumonia (2/25), and pulmonary embolism (2/25). Other studies have also reported pulmonary complications to be the most prevalent among operated cases of hypo-pharyngeal carcinoma. Al Ghamdi[18] reported pneumothorax in 4/15 and pneumonia in 3/15 patients. Techabunyarat et al.[21] reported pneumonia in 4/23 cases, pneumothorax in 3/23 cases, lung atelectasis in 3/23 cases, and hemopneumothorax in 2/23 cases. Elfeky et al.[22] observed pulmonary complications in 10 out of 33 patients, while Ferahkose et al.[20] observed pulmonary complications in 11 out of 38 patients.

The cardiac complications (arrhythmias, myocardial infarction, and congestive cardiac failure) were observed in 32%, 4%, and 12% of our sample. The reported cardiac complications in other studies have been 10.5%, 9.1%, and 40.6%[17,20,22]. The significant increase in the incidence of arrhythmia is believed to be caused by the surgical procedure e.g. a nick in the diaphragm and by dilatation of the stomach in thoracic cavity if gastric emptying is delayed that compresses the heart and the pulmonary tissue, and compromises circulation thus induces arrhythmias[17].

The incidence of clinically or radiologically significant anastomotic leakage was 25% in our study. The prevalence reported by the previous literature is on the lower side. The reported prevalence rate has been between 3-21.9%[3,17,21,23]. The reason for this increased incidence is because microvascular anastomotic techniques are still at their early stages in the military hospitals and are not available even at some tertiary care hospitals. The microvascular anastomosis achieves additional blood flow and prevents anastomotic leakage. The wound infection was noted in 25% of our sample, similar to 25% of the study by Krdzalić[19] and more than 18.8% of the study by Jiang[17]. Wound infection, early radiation, and technique of pharyngeal reconstruction are the factors that influence occurrence of anastomotic leakage[24].

We observed perioperative mortality as 12%. The reported perioperative mortality in the literature is as low as 4.83 to as high as 31%[25]. The survival rates at one year reported for the hypopharyngeal and upper esophageal carcinomas are 61% (men) and 62% (women) by Triboulet et al.[3] and 93.8% by Jiang et al.[17] In our series, the one-year survival rate was 36%. This increase in mortality rate can be attributed to late presentation of our patients with advanced-stage tumors.

CONCLUSION

Majority of our sampled patients with hypo-pharyngeal and upper esophageal carcinomas presented with T4N2M0-stage disease. The mean operation time in our sample was longer with an increased incidence of anastomotic leaks, a comparable perioperative mortality, and a low

one-year survival rate, as compared to the international data, that was linked to delayed diagnosis in these patients. Increased awareness among the general population and the general practitioners may facilitate early diagnosis of patients with hypopharyngeal and upper esophageal carcinomas and reduce the morbidity and mortality of the surgical procedures considerably.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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