PMMC Patch Pharyngoplasty Reconstruction After Laryngectomy: Our Experience at a Regional Cancer Institute

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Abstract To evaluate our results of post laryngectomy pharyngeal defect reconstruction by pectoralis major myocutaneous (PMMC) flap. Retrospective analysis of 48 patients who underwent laryngectomy and PMMC patch pharyngeal reconstruction from year 2009 to 2013 was done. Patient and tumor characteristics were noted, CT scan and histopathology reports were reviewed. 46 (95.8 %) patients were male and 2 (4.2 %) were female. Mean age was 57.2 ± 8.5 years and mean postoperative stay was 22.6 ± 12.0 days. Most common complication was pharyngocutaneous fistula, seen in 13 (27.1 %) cases. Postoperative mortality was low (2.1 %). Post surgery rehabilitation in respect to swallowing and tolerance to radiotherapy was satisfactory in most patients. PMMC patch pharyngoplasty is a reliable option for pharyngeal reconstruction with acceptable complication.

Keywords Laryngectomy · PMMC patch pharyngoplasty · Pharyngocutaneous fistula

Introduction

Surgical resection for laryngeal and hypopharyngeal cancer leads to complex defects. A variety of reconstruction options are available ranging from primary closure to locoregional flaps and free flaps [1]. With the refinement of

tissue flap surgery as well as microsurgery, complex hypopharyngeal and esophageal defects can now be restored with minimal complications [2].

Since it was first reported by Ariyan [3] as an island pedicle flap in 1979, the pectoralis major flap has is commonly used for head and neck reconstruction. It is a stable flap and can be elevated both promptly and easily. In general, the pectoralis major flaps have a lower morbidity than other reconstructive options and allow functional swallowing [4].

Aims and Objective

Our aim of the study is to appreciate the significance of the pectoralis major myocutaneous (PMMC) flap in post laryngectomy reconstruction. We evaluated the feasibility of this technique for the range of the defects, and also its associated postoperative complications. We also tried to find the impact of this surgical option on post operative rehabilitation of patients in terms of patient tolerability to adjuvant treatment and swallowing functions.

Patients and Methods

Forty eight patients from January 2009 to December 2013, who required primary reconstruction with PMMC flap for laryngectomy defect, were studied retrospectively. Data was collected from the patients case records. Age and sex distribution, tumor characteristics like tumor location, clinical and pathological stage, extent and volume of disease in CT Scan, were recorded. Operative notes and histopathology reports were analysed. Postoperative complications including the pharyngocutaneous fistula

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were noted. Follow up period ranges from 6 months to 5 years.

Results

The study enrolled a total of 48 patients, who comprised 46 (95.8 %) males and 2 (4.2 %) females. The mean age of the patients was 57.2 ± 8.5 years with a range of 38 to 72 years (Table 1).

Almost two third of patients (66.7 %) had carcinoma pyriform fossa, and 29.2 % had supraglottic carcinoma. There was 1 (2.1 %) case of carcinoma glottis and 1 (2.1 %) case of carcinoma post cricoid (Table 2). 56.3 % tumors were right sided and 43.7 % were left sided. 18 (37.5 %) cases were stage T3 and rest 30 (62.5 %) were stage T4. Preoperative diagnosis was done by neck node FNAC in 25 (52.1 %) patients, biopsy from primary tumor in 22 (45.8 %) patients and by translaryngeal FNAC in 1 (2.1 %) patient.

Except 2 (4.2 %) patient where PMMC patch pharyngoplasty was done for salvage laryngectomy, other 46 (95.8 %) patients were primary laryngectomy cases. Mean post operative day for soft diet intake was 18.3 ± 8.75 (day $\pm$ SD), with range of 10–44 days. Mean postoperative hospital stay was 22.6 ± 12.0 days (range 12–75 days). 12 (25 %) patients underwent emergency tracheostomy before definitive surgery due to airway obstruction.

All patients had squamous cell carcinoma, where grade 1, 2, and 3 tumors were 10 (20.8 %), 31 (64.6 %), and 7 (14.6 %) respectively. Histopathological examination showed 31 (64.6 %) patients with negative margins, 9 (18.8 %) patients with close <5 mm margins. 4 (8.3 %) patients had positive margins and other 4 (8.3 %) patients showed dysplasia at margins.

There was 1 (2.1 %) post operative mortality where the patient died due to bleeding and subsequent sepsis on 17 postoperative day.

Total 11 (23 %) patients developed wound infection and out of them 7 (8.7 %) patients had wound dehiscence along

Table 1 Age Distribution

Age group (years)	No.	%
30–39	2	4.2
40–49	8	16.7
50–59	15	31.3
60–69	20	41.7
70–79	3	6.3
Total	48	100.0
Mean $\pm$ SD	57.2 ± 8.5	

Table 2 Location Distribution

Location	No.	%
Supraglottis	14	29.2
Glottis	1	2.1
Pyriform sinus	32	66.7
Post cricoid	1	2.1
Total	48	100.0

Table 3 Complications

	No.	%
Infection	4	8.3
Infection + Dehiscence	7	14.6
Pharyngocutaneous fistula	13	27.1
Hypo thyroidism	2	4.2
Bleeding	3	6.3
Stoma stenosis	1	2.1
Chyle leak	1	2.1
Hypo parathyroidism	1	2.1

with infection. 5 patients needed secondary suturing (Table 3).

Most morbid complication was pharyngocutaneous fistula which was observed in 13 (27.1 %) cases. Average day of detection of leak was 11.3 ± 4.32 day, (range 6–22 days). These patients had prolonged nasogastric feeding and post operative stay. Soft diet was started on average 13.8 ± 1.8 days in patients without any leak in comparison to 30.2 ± 8.5 days where patients had leak. Only 2 patients required revision surgery for pharyngocutaneous fistula by contralateral PMMC flap. Other patients were managed conservatively by prolonged nasogastric feeding. No case of flap necrosis was noted.

Clinically significant bleeding was seen in 3 (6.3 %) patients but only 1 patient required emergency neck reexploration. In 1 patient reexploration was done for chyle leak and chylothorax. Hypothyroidism and hypoparathyroidism were seen in 2 (4.2 %) and 1 (2.1 %) patient respectively. Postoperative dysphagia seen in 6 (12.5 %) cases, out of which 4 patients had history of leak.

Total 35 (73 %) patients received adjuvant treatment. 26 (54.2 %) patients received adjuvant RT, while 9 (18.8 %) patients received chemoradiotherapy. Almost all patients tolerated adjuvant treatment well.

3 (6.3 %) patients presented with locoregional recurrence, where 2 patients developed local recurrence (1 positive margin and 1 dysplasia at margin) and 1 patient had nodal recurrence. 1 patient developed second primary carcinoma at nasal cavity.

Discussion

The ideal method for laryngopharyngeal reconstruction should have the following attributes if possible: high success rate of tissue transfer, low donor site morbidity, low fistula and stenosis rates, restoration of the ability to swallow, and tolerance of postoperative radiotherapy.

PMMC flaps is the workhorse flap in major head and neck reconstructions including laryngopharynx at our centre [5]. This is a stable flap because of a definite reliable vascularity and has got certain advantages [6]. This flap can be tailored to suit the defect, the muscle pedicle of the flap protects the carotid against blow outs, less cumbersome and does not require the expertise of microvascular anastomosis and has less donor site morbidity.

Our practice is to assess the width of the unstretched remnant pharyngeal mucosa following total laryngectomy. If the width is less than 3.5 cm, patient is planned for PMMC patch pharyngoplasty. Flap is harvested and sutured with interrupted vicryl sutures. Neck drains are removed after trial feed on 8–10 postoperative day. If after trial feed no leak is noticed then soft diet is started from 10–12 postoperative day.

Our last 5 year experience showed the versatility of the PMMC flap for laryngopharyngeal defect closure. Mostly it is used for pyriform fossa and supraglottic carcinomas where primary closure of pharyngeal defect is not feasible. In females it is less preferred due to bulk of the breast tissue.

Most morbid complication was pharyngocutaneous fistula which not only increased the hospital stay but also delayed the oral feeding. In our series leak was seen in 27.1 % of cases. In literature review we found Stricture rates ranging from 12 to 27 %, with fistula rates of between 13 and 78 % [2, 4, 7, 8]. In most cases (96 %) leak was minor and managed conservatively. No direct mortality due to leak was seen.

Other significant postoperative complications were wound infection, dehiscence and bleeding. Post operative swallowing function was satisfactory in 87.5 % of cases

and only 12.5 % patients had dysphasia, especially in those who had previous leak.

All patients who received adjuvant treatment in the form of RT or CCRT, tolerated the treatment well.

Conclusion

We found that PMMC patch pharyngoplasty is a simple and reliable option for pharyngeal reconstruction. This surgical option has got a list of advantages but at a cost of significant morbidity. In our series majority of patients showed improved post operative and post treatment rehabilitation. Our results are improving over the period of time with accumulating experience.

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