PRIMARY LARYNGOPHARYNGEAL RECONSTRUCTION USING PECTORALIS MAJOR MYOCUTANEOUS FLAPS - OUR EXPERIENCE

Bipin T. Varghese¹, Paul Sebastian², C. M. Koshy³, Iqbal Ahammed⁴

ABSTRACT : *Twenty-one cases of laryngectomy/laryngopharyngectomy that required primary reconstruction with P. M. M. C flaps at the Division of Surgical Oncology, Regional Cancer Centre, Trivandrum were studied retrospectively from July 1995 to December 2000 and compared with the 10 cases where primary closure of the neopharynx was done. Four of the 21 cases developed post operative pharyngocutaneous fistulae PCF(19%) which healed completely within an average period of 1 week compared to 4 PCFs (40%) after primary closure (n=10), where the average healing time was 12.5 days, with 1 recurrence. The average duration of onset of fistula was relatively earlier in cases that required primary closure (11 days) compared to those cases where P. M. M. C flap was used for reconstruction (12.5 days). All complications were wound related and managed conservatively.*

Key Words : *P. M. M. C. flaps, laryngopharyngeal reconstruction, pharyngocutaneous fistula.*

INTRODUCTION

Incidence of Pharyngo cutaneous fistula (PCF) after laryngopharyngectomy (LP) is quite high especially among salvage cases. Replacing or supplementing potentially non-viable tissues with well vascularised tissues (like pedicled myocutaneous flaps) is the most logical means of solving this problem associated with laryngopharyngectomies. The present study aims at assessing the efficacy and viability of primary reconstruction of laryngopharyngeal defects with Pectoralis Major Myocutaneous (PMMC) flaps and to establish its possible role in preventing post laryngopharyngectomy PCFs.

PATIENTS AND METHODS

All cases of laryngectomy/laryngopharyngectomy that required primary reconstruction with P. M. M. C flaps were studied retrospectively from July 1995 to December 2000. The data was generated from the cases records of the patients and supplemented by postal enquiries. Site distribution, indications for reconstruction and complications were analysed and compared with those cases where the neopharynx was closed primarily-PCF were further analysed with regard to its time of onset and duration of healing. Follow up period ranged from 4 months to 5 years.

OBSERVATION AND RESULTS

Out of a total of 31 cases of laryngectomy/

laryngopharyngectomy with mean age of 55 years, 21 required reconstruction with P. M. M. C flaps. Thirty were males and 1 was a female. Twenty five cases had salvage surgeries and 6 had primary surgeries followed by R. T. All cases were either stage III or IV with T status above 2. Nodal status was either N₀ or N₁. Selective neck dissection was done for all N₁ cases requiring primary surgery and MND for all salvage cases with N₁ disease.

Site distribution and radiation status of all these cases are shown in table I. In the 3 cases of pyriform fossa tumors the flap was used to augment deficiency of neopharyngeal closure. Three out of 4 cases of post cricoid lesion required tubing of the P.M.M.C flap to restore pharyngoesophageal continuity. One case of posterior pharyngeal wall tumor, which extended to oropharynx required reconstruction with P. M. M. C flap after a wide excision of the tumor with part of oropharynx and a hemimandibulectomy. In the 8 cases of transglottic tumors, which would have otherwise allowed primary closure, reconstruction with P. M. M. C, flap was done to replace the irradiated (unhealthy) pharyngeal mucosa and thereby prevent the occurrence of a pharyngocutaneous fistula. In two cases, the PMMC flap was folded and cut into 2 skin paddles one of which was used for neopharyngeal lining and the other for replacement of irradiated unhealthy skin.

Seventeen out of the 21 (81%) patients could be given

^{1,2,3,4}Regional Cancer Centre, Trivandrum - 695011, Kerala, India

Table-I : Site Distribution and Radiation status of the cases studied

Type of neopharyngeal reconstructions	Site of Cancer	Primary Surgery	Post RT (Salvage Surgery)
PMMC Flap reconstruction	Pyriform	1	7
	Fossa		
	Post Cricoid	-	4
	P.P.W	-	1
	Transglottic	2	6
Primary Closure	Total	3	18
	Pyriform	2	18
	Fossa		
	Transflottic	1	6
	Total	3	7

Table-II : Onset of fistulae and healing time among the cases studied

Case		I	II	III	IV	Average
Flap	PCF	11	13	12	14	12.5
Reconstruction	Onset					
N=21	Healin	8	7	8	5	7
	Gtime					
Primary	PCF	8	15	10	11	11
closure	onset					
N=10	Healin	21	7	15	7	12.5
	G time					

Table-III : Laryngopharyngeal Reconstruction Options

1. Viscera
Pedicled
Stomach
Colon
Free Jejunum
Ileum
2. Flaps
Pedicled
PMMC
LD (Latissimus Dorsi)
DP (deltopectoral)
Trapezius
Free
Radial forearm
Dorsalis pedis

liquid feeds on the 10th day with no pharyngeal leak. Four out of them (19%) developed leak after being fed with liquids, between 11th-14th postoperative day. Three out of the 21 (14%) patients developed immediate postoperative wound infection, 2 of them (10%) had stitch abscesses & 1 (5%) developed stomal stenosis on follow up visits. All these complications were effectively managed conservatively. All the fistulae healed within an average period of 1 wk with pressure dressings and supportive treatment. Wound infection was managed by pus culture and sensitivity and change in antibiotics. Stitch abscess settled with removal of the buried stitches. Stomal stenosis was managed by instructing the patients to wear metallic tracheostomy tube.

Two cases (29%) of salvage laryngectomy with primary closure developed leak, one on the 10th day requiring prolongation of R. T. feeds and pressure dressings for another 3 weeks and the other on the 15th day requiring the same management for 1 week. The fistula healed within 15 days in the 1st case and within 7 days in the 2nd case. Two (66%) cases of primary laryngectomy with primary closure developed leak, one on the 8th day and the other on the 11th day. Although the second case healed completely with conservative management within 1 week, the first case recurred after initial healing within 21 days when the postoperative radiotherapy was started. Although a fistula closure was attempted in the recurrent fistula using local flaps (hinge flaps for lining and rotation flap for cover), under Local Anaesthesia, it failed and he is being worked up for fistula closure with a folded Myocutaneous flap, either trapezius or P. M. M. C. Thus, it was observed that the average duration of onset of fistula was late and the average healing rate was much faster among those cases where the neopharynx was reconstructed using P. M. M. C. flap (table-III). Other minor complications among the 10 cases of primary closure included, 2 (20%) had immediate wound infection, 1 (10%) had stitch abscess & 1(10%) developed stomal stenosis.

All patients except 6, were disease free during the follow up period. Five patients developed locoregional recurrence and 1 patient had lung metastasis. Four had neopharyngeal, 1 had stomai, 1 had contralateral nodal recurrence. 6 patients were lost to follow up when the study was undertaken. Five patients were rehabilitated with electrolarynx. One patient developed good oesophageal speech, and 3 other patients are being worked up for

tracheo-oesophageal puncture after a favourable response for oesophageal insufflation test.

DISCUSSION

Pharyngocutaneous fistula is the single most important complication after primary closure of neopharyngeal defects particularly after irradiation in salvage laryngopharyngectomies where the frequency is as high as 50%⁵. Bringing in fresh viable tissues from a distant site to augment the closure is the most logical solution to combat this menace. Liberal use of P. M. M. C flaps in neopharyngeal reconstruction instead of a compromised primary closure with limited pharyngeal mucosa or badly irradiated (unhealthy) pharyngeal mucosa has significantly reduced the chances of fistula at our hands. There has been no case of persistent fistula among those cases that had undergone neopharyngeal reconstruction using P. M. M. C flap till date. It has also been observed in the 3 cases that developed leak post operatively that all of them developed it late, and healing time was much faster compared to those leaks that developed after primary neopharyngeal closure done by us. Extensive search of the literature has shown that these observations have been documented in the French literature⁵ and there is scope for further control studies.

Primary reconstruction of major defects after laryngopharyngectomy is indeed a challenge to the Head and Neck Surgeon¹. Gastric transposition is widely used for reconstruction when a primary (neopharyngeal) closure is not feasible, because of need of a single anastomosis (pharyngogastirc) only². However, very often these procedures are overdone and unnecessary. Myocutaneous flaps especially the pectoralis major myocutaneous (PMMC) flap can 'tackle' most of the situations necessitating laryngopharyngeal reconstruction³. Primary reconstruction of a laryngopharyngeal defect is indicated in the following situations.

1. Tumor involvement of apex of pyriform fossa.
2. Involvement of post cricoid region.
3. Lesions of laryngopharynx crossing the midline i.e., where the available pharyngeal mucosa is less than 50%.
4. Posterior pharyngeal wall tumors

To this list we would like to add our blanket indication viz. Laryngopharyngectomies after Radical Radiotherapy

to replace irradiated (unhealthy) pharyngeal mucosa or to augment neopharyngeal closure with irradiated pharyngeal mucosa.

Options for laryngopharyngeal reconstruction are either viscera or flaps in the form of pedicled transfer or free tissue transfer⁴ (Table II). PMMC flap is a simple option in laryngopharyngeal reconstruction used in a wide variety of situations.

1. Patch pharyngoplasty after resection of carcinoma of posterior pharyngeal wall.
2. Augmentation of deficiency in neopharyngeal closure.
3. Restoration of pharyngo-oesophageal continuity (using tubed P. M. M. C flaps).
4. Reconstruction of persistent pharyngocutaneous fistula.
5. Reconstruction of neopharynx in selected cases of pharyngectomy (preserving the larynx).
6. Replacement of irradiated skin or skin involved by tumor extension.

PMMC flaps are frequently used for laryngopharyngeal reconstruction^{6,7}. It is the workhorse flap in major head and neck reconstructions including laryngopharynx at our centre. Distinct advantage of P.M.M.C flaps over the widely accepted gastric pull up^{8,9} in laryngopharyngeal reconstruction are :-

1. Flap can be tailored to suit the defect, obviating the need for extensive removal of normal oesophagus.
2. Storage function of stomach is maintained.
3. Larynx can be preserved in selected cases of partial pharyngectomies, where the tumor is approached for removal either via a mandibulotomy, hemi-mandibulectomy approach or via a lateral pharyngotomy approach.
4. Less chance of fistula compared to a primary closure in post irradiated laryngopharynx.
5. The muscle pedicle of the flap protects the carotid against blow outs when a neck dissection has been done on the same side.
6. The same flap can provide both mucosal lining and skin cover in full thickness defects (Bipaddled P.M.M.C. flaps).

Compared to a jejunal, ileal or colonic interpositional graft (both pedicled or vascularised) P.M.M.C. is less cumbersome and doesn't require the expertise of microvascular anastomosis and in full thickness defect the former will require an additional flap cover for outer skin defect. P.M.M.C. on the other hand is simple and

versatile and the same flap can provide both lining and cover for full thickness defects.

The use of P.M.M.C. flap with split skin graft has been described to salvage necrotic wounds after laryngectomies by Goldstein et al¹⁰. We have used the same concept prophylactically to avoid a bad wound related complication post operatively, especially in salvage laryngectomies. We have further modified the technique by folding the flap and providing both lining and cover, in full thickness defects.

CONCLUSION

P.M.M.C flap is simple and versatile in its use for primary reconstruction of laryngopharyngeal defects. Liberal use of the flap in post-irradiated partial laryngopharyngectomy defects could reduce the chances of post operative persistent pharyngocutaneous fistula.

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Address for Correspondence :

Dr. Paul Sebastian
Associate Professor or surgical Oncology
Regional Cancer Centre
Trivandrum - 695 011
Kerala, India