

# THE ROLE OF LOCOREGIONAL MUSCLE FLAP IN PREVENTION OF PHARYNGEAL FISTULA AFTER SALVAGE LARYNGECTOMY: A RANDOMIZED CONTROLLED STUDY

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## INTRODUCTION

The treatment paradigm for cancer of the larynx has changed from surgical approaches to laryngeal preservation modalities, including radiotherapy and concurrent chemoradiotherapy. This has led to relegating total laryngectomy to cases with extra laryngeal spread or salvage cases. Salvage total laryngectomy is carried out for residual tumors after finishing treatment, recurrent tumors, or a non-functioning larynx due to radiotherapy or chemoradiotherapy. It is well established that both local and systemic complications have a higher incidence after salvage laryngectomy. PCF is the most common and most annoying complication. It increases patient anxiety, morbidity, hospitalization time, and expenses. It also complicates wound healing and delays the start of oral feeding leading to long-term dependence on feeding tubes. It may rarely cause vascular blowouts by eroding the large vessels of the neck and mediastinum, leading to dangerous outcomes and even death. Fibrosis and endarteritis obliterans caused by radiotherapy and augmented by chemotherapy impair wound healing. In order to decrease the risk of this complication, vascularized flaps such as the anterolateral thigh free flap and pectoralis major flap have been used as overlay flaps to augment the neopharyngeal closure. Pectoralis major flaps are the most frequent flaps to be utilized for the fulfillment of this purpose. It can be harvested either as a myofacial or mycutaneous flap.

## AIM OF THE WORK

The aim of this study was to compare the incidence of pharyngocutaneous fistula between patients who underwent salvage laryngectomy with reconstruction using a locoregional flap and those without reconstruction, using a randomized controlled clinical trial design.

## SUBJECTS AND METHODS

**Subjects:** The current study was conducted at the Otorhinolaryngology Department, Faculty of Medicine, Alexandria University. All patients underwent a salvage total laryngectomy for residual, recurrent laryngeal cancer or chondroradionecrosis of the larynx following radiotherapy or chemoradiotherapy. Preoperative assessment included demographic data collection (e.g., age, sex, etc.), full history taking, a complete head and neck examination, general assessment for any systemic disease, recent CT neck and upper chest with IV contrast, recent diagnostic laryngoscopy assessment, metastatic workup and routine preoperative laboratory workup, including hemoglobin level, thyroid function tests, albumin level, blood sugar levels, etc. The exclusion criteria included patients who were candidates for primary total laryngectomy (large volume tumors with extralaryngeal spread and massive cartilage destruction) and those who underwent salvage total laryngectomy when direct closure of the pharynx was not possible due to excessive lateral pharyngeal extension.

**Methods:** This research has been a prospective study. All patients have been block-randomized into two groups:

**Group I:** Patients who underwent a salvage total laryngectomy without reconstruction by a locoregional flap (15 patients)

**Group II:** Patients who underwent a salvage total laryngectomy with reconstruction using a locoregional flap (15 patients).

A routine total laryngectomy with or without partial pharyngectomy or neck dissection when indicated was performed. When the skin was invaded by the tumor, it was removed in an en bloc resection with the larynx. The pharyngeal defect was closed with a T-shaped, two-layer technique. The pectoralis major myofascial flap was raised from the chest wall and tunneled into the neck. The muscle and its overlying fascia were sutured to the tongue base, constrictor muscles, and prevertebral fascia in group II patients. When there was a cervical skin defect, the cutaneous paddle of the flap was used for skin defect reconstruction. In some cases, a fasciocutaneous supraclavicular flap was used for skin closure.

**Postoperative:** Nasogastric tube feeding was started on the first postoperative day. If there were no signs of a fistula tract or pus in the drains, a blue dye test was performed on days 7-10 postoperatively. When no dye was observed from the wound or in the drainage tube, the patient was instructed to start a liquid and soft diet in the following days after doing the barium swallow test. The drainage tubes were removed after starting the soft diet. The use of perioperative intravenous antibiotics was adopted. The patients were monitored for the possible occurrence of pharyngocutaneous fistula. Management of PCF and duration of hospital stay were assessed.

## RESULTS

As regarding the incidence of PCF, 5 patients (33.3%) in group I versus 4 patients (26.7%) in group II developed PCF, with no statistical difference between both groups ( $p = 1.000$ ). (**Table 1**)

**Table 1:** Comparison between the two studied groups according to the incidence of PCF

	Group I (n = 15)		Group II (n = 15)		P
	No.	%	No.	%	
<b>PCF</b>					
<b>No</b>	10	66.7	11	73.3	<sup>FE</sup> p= 1.000
<b>Yes</b>	5	33.3	4	26.7	

**Table 2:** Comparison between the two studied groups according to management options and duration of hospital stay

	Group I (n = 15)		Group II (n = 15)		P
	No.	%	No.	%	
Management	(n = 5)		(n = 4)		FEp= 1.000
Conservative	3	60.0	2	50.0	
Failed conservative	2	40.0	2	50.0	
Duration (days)	(n = 5)		(n = 4)		0.037*
Min. – Max.	38.0 – 100.0		25.0 – 40.0		
Mean ± SD.	68.20 ± 28.09		33.25 ± 6.40		
Median (IQR)	75.0 (40 - 88)		34.0 (28.5 - 38)		

The current study revealed that operating patients during the first year after completion of radiotherapy is a significant risk factor for PCF ( $p = 0.014$ ).

## CONCLUSION

- PCF after a salvage laryngectomy is a bothersome complication that exhausts medical resources and lengthens the duration of the hospital stay.
- Using the onlay pectoralis major muscle flap in cases of salvage laryngectomy reduces the incidence of PCF, but not to a statistically significant level.
- Using the pectoralis major muscle flap in cases of salvage laryngectomy shortened the duration of fistula healing and the hospital stay significantly.
- The number of complications related to the pectoralis major muscle was low, and they were tolerable and manageable.
- The advantages of the pectoralis major muscle flap outweigh its complications. Its use in the salvage laryngectomy may have a role.
- The use of the pectoralis major muscle as an onlay flap in high-risk salvage patients not only reduces the incidence of PCF but also makes the fistula heal faster and shortens hospital stay.