

Original Research Article

# Surgical Management of Laryngeal and Hypopharyngeal Cancer in a Tertiary Care Centre

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## ABSTRACT

**Background:** Despite advances in techniques and dose regulation of chemoradiotherapy, surgery still plays great role in treating large fraction of well selected locally advanced laryngeal and hypopharyngeal carcinoma.

**Materials and Methods:** A retrospective study of 210 cases of surgically treated laryngeal and hypopharyngeal carcinomas from 2014 to 2015 was analysed.

**Results:** The most common sub site of involvement was hypopharynx (53.3%) followed by glottis (24.7%), supraglottis (15.7%), transglottic malignancy (4.7%), subglottis (0.95%), and for medullary carcinoma of the thyroid (0.47%) respectively. Total laryngectomy was carried out for 162 patients, 180 Of them required Modified radical neck dissection along with laryngectomy. Near total laryngectomy was done in 28 cases. Post-operative hospital stay was for an average of 14 days (range 10-33) after surgery. Histopathologically squamous cell carcinoma was the most common and 2 patients had spindle cell tumour. 180 patients were referred for adjuvant therapy with RT and of which 120 received both chemotherapy and radiotherapy and 60 defaulted from adjuvant therapy. Recurrences were noted both locoregionally and distant in 13.3% of cases. The mean follow up period was 15 months ranging from 2 months to 25 months.

**Conclusion:** Surgical modality as definitive treatment in well selected Indian population with locally advanced stage III and IV laryngeal and hypopharyngeal carcinomas, with adjuvant therapy when indicated, is a valuable option with less complications and morbidity achieving acceptable locoregional control. A regular follow up is warranted to detect the early locoregional and distant failures.

**Keywords:** Carcinoma larynx, Carcinoma hypopharynx, Total laryngectomy.

## INTRODUCTION

Squamous cell carcinoma (SCC) of the larynx continues to be the commonest cancer of the head and neck. [1] In India, the incidence of laryngeal cancer has been reported to be 1.26-8.18 per 100,000 populations in different regions in the country. [2]

Most of these patients, present in the locally advanced stage of stage III and IV. Treating this stage disease of hypopharynx and larynx poses a great challenge. The

dilemma of decision making lies between surgery and chemo radiation in terms of organ preservation if possible. [3,4] Despite advances in techniques and dose regulation of chemo radiotherapy, surgery still plays a great role in treating a large fraction of well selected cases. Whilst there are numerous studies comparing outcomes of different treatment arms for laryngeal and hypopharyngeal carcinoma, there are scarce Indian data on patients who have undergone surgery as primary modality, especially with

regards to long-term outcome and prognosis. [5,6] Moreover, outcome data would improve our ability to counsel these patients regarding important therapeutic decisions and end-of-life issues.

**MATERIALS AND METHODS**

A retrospective analysis of data was done on record of patients with hypopharynx and laryngeal carcinomas who had underwent primary surgery as definitive management. The study period was from 2014 to 2015. A total of 210 patients underwent surgical modality as primary treatment for carcinoma hypopharynx and larynx. All patients were staged according to the International Union against Cancer (UICC, 2010)/American Joint Commission on Cancer (AJCC, 2010) staging system. Preoperative staging of tumour was performed by endoscopy and radiological imaging.

The treatment modality and the type of surgical intervention was decided after clinical, radiological and pathological assessment of the tumour. General condition of the patient, performance status, extra laryngeal spread with invasion of thyroid cartilage, and patient’s option of surgery as definitive modality were taken into considerations and documented. Patients were counselled regarding available treatment options and informed consent for surgery was obtained. Speech prosthesis was not provided by the state health scheme and hence only affordable patients received a primary tracheoesophageal puncture and prosthesis. Selective neck dissection / functional neck dissection for N0 cases and Modified radical neck dissection for N+ cases were performed at the time of laryngectomy. Surgeries were performed by the faculty surgeons of the Head and neck oncology department. Postoperative adjuvant radiotherapy (RT) with or without chemotherapy (CT) if indicated, was given to the primary site and neck based on histopathological findings with respect to status of resection margins, perineural

invasion, lymph node involvement and the presence of extracapsular nodal spread. The patients were discharged once oral feeding was started and Ryle’s tube removed. In case of any development of complications, the hospital stay continued till the complications were treated. Complications were categorised as early and late onset. The follow up regime in our institution is monthly review for 6 months and then 2 monthly for next 6 months, 3-monthly in the next year and 6-monthly thereafter.

**RESULTS**

The period of study was for 2 years. 210 patients (190 males, 20 females) were included in this study. The mean age of patients was 45years (range 27 - 80 years). The most common subsite of involvement was hypopharynx (53.3%) followed by glottis (24.7%), supraglottis (15.7%), transglottis (4.7%), subglottis (0.95%) and medullary carcinoma thyroid malignancy (0.47%) respectively (Table 1).

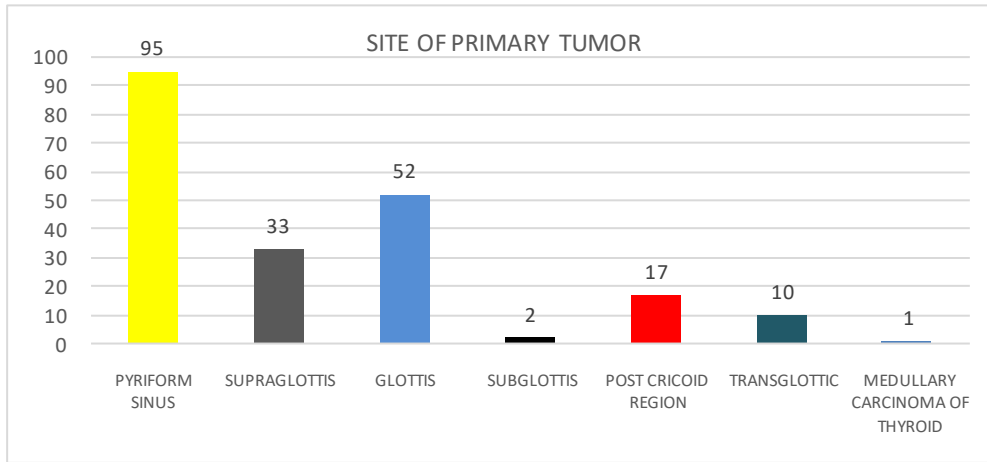
**Table 1: Demographic profile and staging of patients included in the study**

Characters	Numbers	Percentage
Sex		
Male	190	90
Female	20	10
Age		
>60yrs	78	37
<60yrs	132	63
Site		
Pyriiform sinus	95	45
Supraglottis	33	15
Glottis	52	25
Subglottis	2	1
PCR	17	8
Transglottis	10	5
Medullary carcinoma of thyroid	1	1

Majority of the patients presented with T3 (144) and T4a (50) disease (Table 2). Total laryngectomy was carried out for 162 patients. Out of these, 180 Of them required Modified radical neck dissection along with laryngectomy (Table 4). Near total laryngectomy was done in 28 cases after direct laryngoscopic evaluation to check the feasibility of the procedure. All the cases were rehabilitated with speech therapy in the postop period. In the hypopharynx lesions, 27 cases required

patch and pectoralis major myocutaneous flap was harvested to repair the defect .20 patients were provided with primary TEP. Two cases who had earlier been treated with radiotherapy had residual disease were

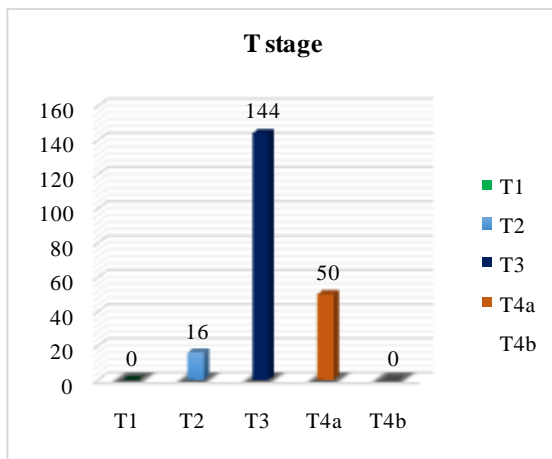
reassessed for operability and total laryngectomy with pectoralis major myocutaneous flap patch pharyngoplasty was performed.



Graph 1: site of primary tumour

Table 2: T staging of primary tumour

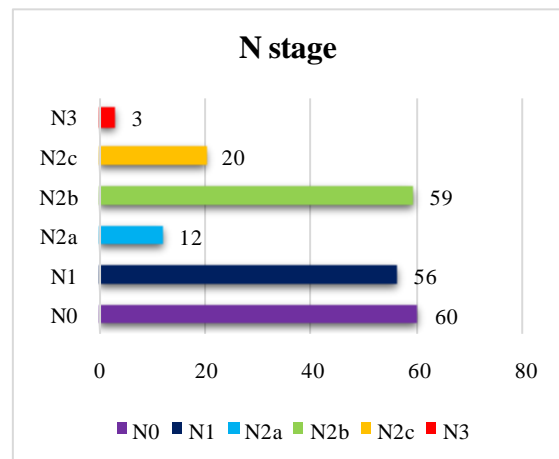
T STAGE	NUMBER OF PATIENTS	PERCENTAGE
T1	0	0
T2	16	7.61
T3	144	68.5
T4a	50	23.8
T4b	0	0



Graph 2: T staging of primary tumour

Table 3: N staging of Secondary lymph node

N STAGE	NUMBER OF PATIENTS	PERCENTAGE
N0	60	29
N1	56	26
N2a	12	6
N2b	59	27
N2c	20	10
N3	3	2



Graph 3: N staging of Secondary lymph node

Table 4: types of surgeries performed

Surgeries	Numbers	Percentage
Total laryngectomy(TL)	162	77.14
Neartotal laryngectomy(NTL)	28	13.3
TL+patch pharyngoplasty	29	13.8
Partial laryngectomy + CHEP	2	0.95
TL+Tracheoesophageal puncture	20	9.5
TL+MRND	130	61.9
TLPO + Gastric pull up	18	8.5

Patients stayed in hospital for an average of 14 days (range 10-33) after surgery. The most common early postoperative complication was haemorrhage where 3 patients developed haematoma in the immediate postop period within 24 hours which needed immediate re-

exploration and ligation. 16 patients developed pharyngocutaneous fistula and were treated conservatively. Out of this 6 patients, two patients had patch pharyngoplasty. This complication was the most common cause of long hospital stay in the postoperative period and delay in initiating the oral feeding and adjuvant treatment. All the patients who developed fistula had hypoproteinemia, comorbid conditions of diabetes mellitus. Flap necrosis in the suprastomal region was seen in 2 patients. One patient had ARDS on the 12th postop period and improved with conservative management and ventilator support. 6 patients developed lymphorrhoea and all of them were managed conservatively (Table 5).

**Table 5: Complications**

Complications	Numbers	Percentage
Haemorrhage	5	2.3
Pharyngocutaneous fistula	16	7.6
Chyle leak	6	2.8
Flap necrosis	2	0.95
ARDS	1	0.47

Squamous cell carcinoma was the most common histopathological variant found in 209 patients and 1 patient had spindle cell differentiation. Grade I squamous cell carcinoma was seen in 20 patients, Grade II was seen in 132 patients, Grade III seen in 57 patients. Perineural invasion, close or positive margins, extracapsular spread, multiple nodes, metastatic nodes > 3 cm were considered as risk factors for adjuvant therapy (Table 6).

**Table 6: Histopathology**

Pathology grading	Number	Percentage
Squamous cell carcinoma	209	99.5
Grade I	20	9.5
Grade II	132	62.5
Grade III	57	17.6
Spindle cell carcinoma	01	0.47

180 patients were referred for adjuvant therapy with RT and of which 120 received both CT and RT and 60 defaulted from adjuvant therapy. Adjuvant Radiotherapy in the form of EBRT ranging from 40-65Gy was administered. Adjuvant CT IN the form of 6 cycles of CDDP was

administered. The follow up visit was done for every month in the first 6 months, once in 2 months for next 6 months 3 monthly in the next year and for every 6 months thereafter to find residual or recurrent disease locoregionally and to rehabilitate them with speech, swallowing and lifestyle modification. The mean follow up period was 15 months ranging from 2 months to 25 months.

Nodal recurrence encountered in 16 patients, usually presented within a year of surgery with 6 patients developing in the first three months of surgery who successively underwent radical neck dissection. 8 patients with nodal recurrence defaulted from adjuvant therapy. 10 cases developed distant metastases 8 in the lungs and 2 developed metastases in liver, within 1-2 years of definitive treatment. 2 cases had stomal recurrence, they were tracheotomised before surgery. Both the cases were treated with salvage surgery. One patient who underwent patch pharyngoplasty developed neopharyngeal recurrence.

## DISCUSSION

India has very high incidence of head and neck malignancies and with lack of sufficient medical facilities at rural areas early detection and treatment is hardly a rule at present scenario. With tobacco usage in rural areas and lack of education adds on to the problem with medical attention seeking. This gives rise to a huge burden of advanced cancers. Not only it affects the early medical evaluation it also affect the follow up adherence on long run. In the setting of an advanced cancer this makes obvious choice of one shot treatment which is surgery.

The incidence and site of cancers in India varies from area to area. Mizoram has highest incidence of cancer of hypopharynx (11.5 per 100,000 people). [7,8] And in our study the most common subsite was hypopharynx especially the pyriform sinus. This is because of genetic makeup of lineages and exposure of different

carcinogens and different forms of using habits.

International Agency for Research on Cancer - World Health Organization: IARC-WHO. According to this database in India larynx (ASR - 9.7) has the highest incidence of cancer and tongue and oral cavity (ASR - 9.3) standing second to it. [2] Hypopharynx ranks third with an ASR of 7.6. In our study the most common subsite of involvement was hypopharynx (53.3%) followed by glottis (24.7%), supraglottis (15.7%), transglottis (4.7%), subglottis (0.95%) and medullary carcinoma thyroid malignancy (0.47%) respectively. However the above data is with different cancer registry in India with highest of rates mentioned. Bangalore based cancer registry shows hypopharyngeal malignancy rates still high. [9] This matches with our finding. Laryngeal cancer contributes to approximately 3-6% of all cancer in males and only about 0.2-1% of all cancers in females. [2] In our study we encountered 20 female patients.

Due to anatomical reasons glottis carcinomas are earliest to present whereas hypopharyngeal cancers present late. Especially with the upper parts of pyriform sinus. In our study maximum number of patients fell under T3 (60%). The most common type of malignancy encountered was squamous cell type with only 1 case of spindle cell carcinoma. Grade II Broder's was the most common differentiation (62.5%).

Early stage hypopharyngeal cancer amenable to larynx preservation (most T1N0 and selected T2N0 tumors) may be treated by definitive RT alone or partial laryngopharyngectomy. [10,11] Concurrent CRT or induction chemotherapy, followed by CRT, is recommended for T4b or unresectable tumors. [12]

The locally advanced resectable hypopharyngeal cancer, that has several treatment options with no clear advantage of one treatment modality over another. In our institution, those cases which underwent surgical modality of treatment were mostly

T4a stage with extralaryngeal spread and some T3 diseases with subglottic extension, airway compromise and good lung reserve. The patients were given the options of both RT and surgery in case of T3 diseases and counselled about the speech and life style rehabilitation postoperatively.

Jun Won Kim et al made a comparison between larynx preserving CRT and radical surgery followed by adjuvant RT. They concluded in hypopharyngeal cancer with impaired laryngeal function at presentation, laryngopharyngectomy with pharyngeal reconstruction is a preferred option permeating aspiration-free deglutition and prosthetic voice instead of leaving intact but functionless larynx. [12] A large study of treatment of laryngeal cancer in the United States confirmed higher survival when patients had primary laryngectomy. [13]

Total laryngectomy was performed in most (77.4%) of the cases. Near total laryngectomy has been attempted in 13.3% with the purpose of voice preservation. However, these limited surgery options should be explored with caution, especially in locally advanced cancer of the hypopharynx. [14-16] In this study, the outcome of patients treated with near total laryngectomy was good compared to the outcome of total laryngectomy.

Wulff NB et al retrospectively analysed data of total laryngectomy and found overall postoperative complications, fistula formation, wound infection, bleeding and wound necrosis within one year after total laryngectomy occurred in 56.6%, 42.3%, 31.0%, 11.3% and 9.2% of patients, respectively. Stenosis of the pharynx/oesophagus and stoma shrinkage within five years after surgery were each seen in 18.2% of cases. [17]

The surgical success depends not only on disease clearance but to have a complication less postoperative period. A Study conducted by Devendra A. Chaukar et al had comparatively higher complications. Reconstruction flap necrosis was the highest with the PC fistula at

18.5%. [18] A study by R.A. Dedivitis et al showed Pharyngocutaneous fistula to be the most common complication after total laryngectomy at 12.7%. [19] In our study the most common complication after surgery was pharyngocutaneous fistula (7.6%). These patients had comorbid conditions like diabetes mellitus. The average hospital stay of the patient was 14 days. The most common complication of fistula formation remains the major factor for increased hospital stay and delayed oral feeding and adjuvant therapy.

Pathological staging and the final report guides the need for any adjuvant therapy. Several groups have identified pathological factors based on available literature which enable classification of patients postoperatively into high, medium and low risk disease [20,21] The presence of nodal disease with extracapsular spread is considered in all the systems as a marker of high risk disease where postoperative radiotherapy is mandatory. [20] In our study, extra capsular spread, multiple nodal involvement, T4 disease, perineural spread, close and or positive margins, preoperative tracheostomy were considered risk factors and stratified into low, medium and high risk to provide adjuvant postop radiotherapy and chemotherapy.

Follow up is primarily intended to identify locoregional failure and second primary cancers, provide supportive care, and facilitate rehabilitation. Accordingly, symptom review, careful clinical examination of the primary site and neck, supplemented with appropriate imaging based on patient symptoms or examination findings represent the cornerstones of follow-up. The average follow up in our study was 15 months ranging from 2 months to 25 months. Locoregional control with the surgical modality was found in 90% in our study with 10 cases (4.76%) failing in the distant site. An analysis of the natural history of hypopharyngeal cancers from Canada reports upto 20 percent of patients after curative treatment had residual disease, recurrences tended to appear in the first year

and 50 per cent of recurrences included distant metastases. Overall, 47 patients were disease free at 3 years, but eventually 64 per cent died of cancer. [22] This study reported few failures at locoregional site with 16 failing at the neck and 2 at the stoma. Distant metastases was found in 4.76%

## CONCLUSION

Surgical modality as definitive treatment in well selected Indian population with locally advanced stage III and IV laryngeal and hypopharyngeal carcinomas, with adjuvant therapy when indicated, is a valuable option with less complications and morbidity achieving acceptable loco regional control. A regular follow up is warranted to detect the early loco regional and distant failures.

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