

## Assessing the Dependence of Feeding Gastrostomy Tube in Patients of Head and Neck Carcinomas

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### ABSTRACT

**Objective:** To investigate the dependency on feeding gastrostomy tubes in patients with head and neck cancers treated with radiotherapy alone or concurrent chemo-radiotherapy.

**Study Design:** Retrospective longitudinal study.

**Place and Duration of Study:** Combined Military Hospital, Rawalpindi and Shaukat Khanum Hospital, Peshawar Pakistan, from Jan and Jul 2022.

**Methodology:** A total of 115 patients with head and neck cancers having no baseline dysphagia and having gastrostomy tubes were included. All had received an equivalent of 60 greys in 30 fractions or more of radiotherapy. Their swallowing was evaluated weekly during radiotherapy and then every 4–6 weeks on post-treatment follow-up. The total time duration of patient dependency on feeding gastrostomy tube after treatment completion was noted for each head and neck cancer subsite.

**Results:** Of a total of 115 patients, 49(43%) of the patients had nasopharyngeal cancers, 22(19%) had laryngeal, 29(24%) oral cavity, 7(6%) hypopharyngeal and 9(8%) had cervical esophageal cancers. Proportion retaining gastrostomy tube for more than six months of treatment was 8.7% (median duration of retention was five months) with hypopharyngeal, nasopharyngeal, oral cavity, and laryngeal cancer were 14%, 9%, 9% and 5%, respectively.

**Conclusion:** The proportion of patients with head and neck cancers requiring more than six months of a gastrostomy tube is 5-14%. Baseline assessment of swallowing and nutrition and prophylactic feeding gastrostomy can avoid treatment interruptions. Longer duration of retention of a gastrostomy tube is associated with poor quality of life in head and neck cancer patients receiving radiation or concurrent chemo-radiation.

**Keywords:** Esophagus, Radiotherapy, Neoplasms, Drug therapy, Gastrostomy, Head and neck neoplasms.

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### INTRODUCTION

Head and neck (H&N) cancers are universally the most frequently identified carcinomas, and in Southeast countries, they make up 8-10% of overall cancers.<sup>1</sup> Commonly involved factors leading to a dramatic increase in H&N cancers in Pakistan are unique demography, separate risk factors, distinctive eating patterns, peculiar family history, smoking of cigarettes, drinking of ethyl alcohol, chewing of betel nut and tobacco like answer, paan and gutka.<sup>2</sup> GLOBOCAN 2020 reported that head and neck cancers worldwide statistics are 1,518,133 per year, resulting in approximately 510,771 deaths per year. In Asia, there are approximately 944,946 head and neck cancers per year, resulting in 347,870 deaths per year.<sup>3</sup>

Malnutrition and weight loss in patients undergoing radiation or chemo-radiation in head and neck cancers are common clinical concerns.<sup>4</sup> Radiotherapy alone or with concurrent chemotherapy/systemic therapy (CST) can lead to a

long-term control or cure in head and neck cancer patients of different sites and stages but also can cause acute and late toxicities, for example, odynophagia and swallowing dysfunction that can result in either temporary or permanent dependence on enteral feeding such as gastrostomy tube.<sup>5</sup>

Interventions have been implemented to help decrease the impact of RT or CRT on weight loss and nutritional status.<sup>6</sup> These interventions include the insertion of a percutaneous endoscopic gastrostomy (PEG) tube or radiographically inserted percutaneous gastrostomy (RIG) tube or feeding jejunostomy before the start of the treatment.<sup>7,8</sup> Pain medicines, mouthwashes, etc., can give symptomatic relief. Multiple studies suggest that H&N cancer patients undergoing radiation and/or chemotherapy may benefit from pro-phylactic placement of feeding gastrostomy tubes.<sup>9,10</sup>

Oncologists in Pakistan are generally hesitant to get feeding gastrostomy intubation before radiotherapy of head and neck and oesophageal cancers. They consider it difficult to counsel patients for intervention. There is potential for complications and

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added cost of treatment. There is also a concern about long-term PEG dependency in these patients. Our study will add to the confidence of our oncologists in getting feeding gastrostomy intubation of their patients before the start of radiation. It will add to the existing knowledge of the benefits of feeding gastrostomy procedures performed in people with head and neck cancers. It will aim to determine the post-treatment dependency of our patients on gastrostomy tubes.

### METHODOLOGY

The retrospective longitudinal study was performed from August 2022 and January 2023 on patients treated between January 2021 and July 2022 at Combined Military Hospital (CMH) Rawalpindi and Shaukat Khanum Memorial Cancer Hospital, and Research Center (SKMCH&RC) Peshawar after Institutional review board permission (Reference number 345). This study included a total of 115 patients. The WHO sample size calculator was used for sample size estimation taking population proportion of feeding gastrostomy dependence for more than 01 years was 10.8%.<sup>11</sup>

**Inclusion criteria:** We included patients aged 18-70 years, having no baseline dysphagia (can have oral solids), having head and neck or cervical esophageal cancers, receiving an equivalent of 60 Gray (Gy) in 30 fractions (Fx) or more radiotherapy to head and neck area.

**Exclusion criteria:** We excluded patients receiving <60 Gy equivalent dose or having non-head and neck primary. All thoracic oesophagus primary patients were also excluded.

The sampling technique employed was consecutive convenience sampling. Written informed consent was obtained from all the participants of the study. A short history was taken before enrolment into the study. We assessed the total duration of the patient's dependence on feeding gastrostomy tubes after treatment. All patients included in the study were assessed for swallowing before initiating treatment. The swallowing was assessed weekly during radiotherapy and 4-6 weeks post-treatment follow-up. Following completion of treatment, they were assessed at regular intervals for oral intake. The total duration of retention of the feeding gastrostomy tube was noted. We also noted patient demographic characteristics, age, gender, primary sub-site of H&N cancer, total radiotherapy dose and radiotherapy technique.

Statistical Package for Social Sciences (SPSS) version 25.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was set as the cut-off value for significance.

### RESULTS

Three hundred eighty-two patients were analyzed, of which 115 underwent feeding gastrostomy tube insertion. The mean age of the participants was 48.21±15.15 years. Out of which 82 were males and 33 were females. Out of the total of 115 patients, 49(43%) of the patients had nasopharyngeal cancers, 22(19%) laryngeal, 29(24%) oral cavity, 7(6%) hypopharyngeal and 9(8%) cervical oesophageal cancers (Figure).

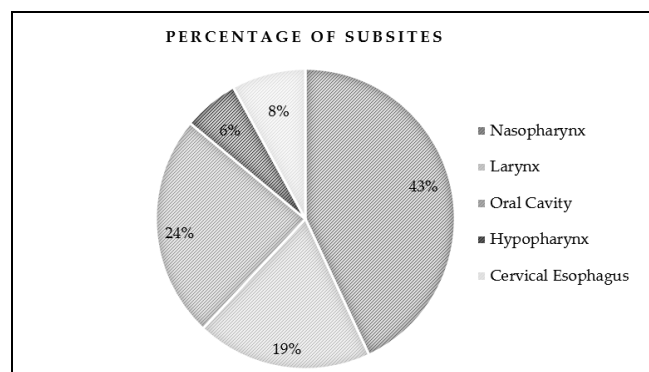


Figure: Distribution Patients Included by Subsite (n=115)

Regarding gastrostomy tube dependency as a whole, a total of 105(91.3%) patients got it removed within 6 months following treatment completion because they were able to have an adequate oral intake. Remaining 10(8.7%) got it removed in more than 6 months of treatment (median duration of 10 months). The frequency for use of gastrostomy tube for more than 6 months in nasopharyngeal, laryngeal and oral cavity cancer were 4(9%), 1(5%) and 3(9%) respectively. The time during which the patients continued to use PEG tube (with their tumor sub sites) is summarized in the Table.

### DISCUSSION

Three hundred eighty-two patients were analyzed, out of which 115 patients underwent PEG tube insertion. Of the total 115 patients, 43% of patients were nasopharyngeal, 24% oral cavity, 19% laryngeal,

**Table: Duration of Gastrostomy Tube Dependency as Per Subsite (n=115)**

Subsite	Total Number	PEG< 6 months	PEG>6 months
	n	n (%)	n (%)
Nasopharynx	49	45(91%)	4(9%)
Oral Cavity	28	25(91%)	3(9%)
Larynx	22	21(95%)	1(5%)
Cervical Esophagus	9	8(89%)	1(11%)
Hypopharynx	7	6(86%)	1(14%)
Total	115	105(91.3%)	10(8.7%)

\*Percutaneous Endoscopic Gastrostomy

8% cervical oesophageal and 6% hypo-pharyngeal cancers.

Regarding PEG tube dependency as a whole, a total of 105(91.3%) patients got it removed within the following six months of treatment completion. The remaining 10(8.7%) got it removed within more than six months of treatment completion. The frequency of use of PEG tubes for more than six months in Nasopharyngeal, laryngeal and oral cavity cancer were 9%, 5% and 9%, respectively.

Our study showed that the median time of removal of the PEG tube post-radiotherapy was five months. Multiple studies suggest that H&N cancer patients undergoing radiation and/or chemotherapy may benefit from prophylactic placement of feeding gastrostomy tubes.<sup>12</sup> According to one study, at the time of the last follow-up at 48 months, 26% of the head and neck cancer cohort patients were noted to be having a dependency on feeding gastrostomy tubes.<sup>13</sup> In another trial (the GORTEC 99-02)<sup>17</sup>, which compared different radiotherapy schedules for locally advanced H&N cancers, there were different rates of feeding tube requirement. About 60% of patients in the conventional fractionation radiotherapy group needed feeding gastrostomy.<sup>14</sup>

Similarly, 64% of patients in the hyperfractionated arm and 70% of patients receiving an accelerated radiotherapy regimen required a gastrostomy tube. After a follow-up of 5 years, the proportion of feeding tube-dependent patients was 12% on conventionally fractionated radiotherapy versus 25% of the much-accelerated radiotherapy cohort ( $p=0.027$ ).<sup>15</sup> A retrospective study with a small sample size demonstrated that prophylactic gastrostomy tube placement had poorer results (HR: 11.62; and  $p$ -value=0.011).<sup>16,17</sup> Long-term dependence on feeding gastrostomy tube setubes is a basic element in defining survival. Overall survival (OS) may decrease if we only include patients having a compulsion to feed gastrostomy before the start of treatment, as

compulsion means a very advanced disease at the outset. However, if we include all patients requiring or not requiring gastrostomy and pass prophylactic gastrostomy, then survival should not decrease.

One of the study published in 2020, showed a gastrostomy tube dependence in these patients for considerably longer time leads to decreased overall survival (OS). However, different methods can be adopted to support these patients to maintain oral feeding and may lead to better outcomes.<sup>18</sup> At a median follow up for 48 months after radiation (with a range from 7.6-235 months) authors noted that gastrostomy tube dependent personnel had a decreased overall survival (A median survival of 6.54 years with PEG tube dependence vs 9.39 years with PEG tube independence [95% CI: 7.90-NA]). Five years overall survival in the PEG tube dependent patients was 64.3% versus 86.1% for patients who were not gastrostomy tube dependent ( $p=0.022$ ), this may be due to recurrence leading to prolonged gastrostomy dependence.

All oncology centres should have a department of diet and nutrition and dieticians who have almost half the time for patients with head and neck cancers. They should have adequate training and knowledge of feeding by tubes and liquid or semisolid diets. All patients should be assessed for nutrition and support using any validated scoring system. All patients with H&N cancer should have readily accessible dieticians for all stages of treatment and even after that. Further extension of this support to the primary care level is recommended.<sup>17</sup>

Strategies can be adopted to lower the dose to pharyngeal constrictors so that dysphagia either does not happen or reduces in frequency and duration after completion of radiotherapy. The median time of removal of the PEG tube in our study was five months, compared to other studies mentioning a median time of 48 months. This may be due to high mental strength, family support, determination to get rid of tubings and the strong will of our patients.<sup>18</sup>

Our study can be a milestone in assessing post radiotherapy dependency on gastrostomy tube feeding. In the future, we propose to conduct prospective clinical trials, especially the use of modern radiotherapy techniques in sparing swallowing muscles, which will improve quality of life indices after radiotherapy in head and neck cancer patients. This study will enhance the confidence of our oncologists in getting gastrostomy tubes placed before

the start of radiation in our head and neck cancer patients.

### CONCLUSIONS

This study showed that with an appropriately planned treatment approach and technique, a gastrostomy tube is not required for a longer period of time. Baseline assessment of swallowing is an important tool for selecting patients requiring gastrostomy tube insertion. With radiotherapy, mucositis, odynophagia, and dysphagia can occur, which, without a gastrostomy tube, can lead to malnutrition and treatment interruptions. Longer duration of gastrostomy tube feeding is associated with poor quality of life in head and neck cancer patients receiving radiation alone or concurrent chemo-radiation as part of their treatment. They have poor nutritional status and deficiency of micronutrients, rendering decreased overall survival. Baseline swallowing assessment, advanced radiotherapy technique and lower doses to organs at risk are associated with good quality of life. Strategies can be adopted to lower the dose to pharyngeal constrictors so that dysphagia either does not happen or reduces in frequency and duration after completion of radiotherapy.

**Conflict of Interest:** None.

### Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

RS & JL: Conception, study design, drafting the manuscript, approval of the final version to be published.

MSN & NK: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MFUQ & IH: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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