

Improvement in Dysphagia with Swallow Therapy in Patients with Oral and Oropharyngeal Carcinoma who Underwent Surgery with or without Adjuvant Therapy.

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Abstract

Head and neck squamous cell carcinomas occur frequently with over 500,000 new cases diagnosed worldwide each year. Patients with cancers of the oral cavity, pharynx or larynx may be treated with surgery, radiotherapy, chemotherapy or combination of these modalities. Each treatment type may have a negative impact on post treatment swallowing function. Chemo radiation therapy (CRT) has become an increasingly used treatment modality for head and neck cancer. The presence of a tumor in the head and neck region often changes speech and swallowing prior to any treatment. The nature and severity of these changes vary with the tumor site and size. The therapeutic modalities used to treat head and neck cancers also cause alterations in speech and swallowing, which affect the patient's quality of life and ability to function in society.

Key words: Dysphagia; Swallow Therapy; Oral and Oropharyngeal Carcinoma; Adjuvant Therapy;

Dysphagia Treatment After Head and Neck Cancer

Patients with cancerous tumors of the oral cavity, pharynx, or larynx will usually be treated for their disease with surgical removal of the tumor, radiotherapy, chemotherapy, or a combination of these procedures. Each type of cancer treatment may result in some degree of dysphagia. The type and severity of dysphagia will depend upon the size and location of the original tumor, the structures involved, and the treatment modality used for cure.

Surgical management and Impact of dysphagia

Surgical removal of tumors of the head and neck is a long-standing and well-established treatment modality which is still in wide use today [1&2]. Swallow dysfunction is often observed after surgical excision of tumors in the head and neck; swallow disorders may occur in the oral preparatory, oral propulsive and pharyngeal stages of the swallow. The type and degree of swallow disorder will depend upon the site and stage of the tumor, the extent of surgical resection, and the nature of the surgical

reconstruction. In general, the larger the resection, the greater swallowing function will be impaired [3-10&11]. However, the degree of resection of structures vital to bolus formation, bolus transit and airway protection such as oral tongue, tongue base or arytenoid cartilages will have a greater impact on postsurgical swallow function than will the extent of involvement of other structures such as lateral floor of mouth or alveolar ridge [3,9,12&13].

Patients with resection of the tongue base may experience severe impairment of swallow function [10]. Those with resections of the tongue base have increased oral preparatory time, increased oral transit time, increased oral residue along with pharyngeal transit time increases increased pharyngeal residue, and reduced oropharyngeal swallow efficiency [5,8,11,19&20]. Resection of greater than 25% of the tongue base is associated with inability to trigger a pharyngeal swallow, difficulty clearing the bolus from the pharynx, and severe postsurgical aspiration [6&8]. Swallowing disorders tend to worsen for these patients as bolus viscosity increases [8&15].

Surgical excision of oropharyngeal structures that do not contribute to normal swallowing function have little impact on swallow in the postsurgical patient [21]. Resection of the floor of mouth has been found to have limited impact on swallowing function, except when the resection extends to the geniohyoid or mylohyoid muscles [3,5,12&13]. With the resection of the floor of mouth muscles, patients may experience problems with hyolaryngeal elevation, resulting in residue in the pyriform sinuses that may be aspirated after the swallow.

Some tumors may infiltrate the alveolar ridge and mandible, which will require resection for disease control. A rim or marginal resection of the mandible may be all that is required when tumor invasion is limited to the alveolar ridge. A marginal resection will not disrupt the continuity of the mandibular arch and has

little impact on swallowing function. More invasive tumors will require segmental mandibular resection, that is, removal of a section of the mandible that separates the remaining mandible bone into two sections. Although some investigators have found that the resected mandible is not functionally different from the intact mandible [22&23], more research indicates that segmental mandibular resection without reconstruction has a profound negative impact on oropharyngeal swallow efficiency and oral residue [13] as well as mastication [24-27].

Effects of Radiation on Swallowing

External-beam radiation has both early and late side effects that can impact swallowing function. Early effects include xerostomia, erythema superficial ulceration, bleeding, pain and mucositis [30,31]. These usually result in oral pain that may cause only minimal diet alterations, require prescription of pain medications or necessitate reliance on non-oral nutrition. Hypopharyngeal stricture may require dilation or surgery. Xerostomia is a side effect of treatment that persists for years and may worsen over time [32]. Late radiation effects may include osteoradionecrosis, trismus, reduced capillary flow, altered oral flora, dental caries, and altered taste sensation [30,31,33&36]. The late effect of reduced blood supply to the muscle can result in fibrosis, reduced muscle size and the need for replacement with collagen [37]. This can dramatically affect swallowing years after treatment with a fixation of the hyolaryngeal complex, reduced tongue range of motion, and reduced glottic closure and cricopharyngeal relaxation, resulting in potential for aspiration. Specific swallowing exercises have been shown to reduce these effects and improve prognosis for oral intake. These include jaw range of motion, tongue base range of motion exercises, and effortful swallow exercises, tongue holding maneuver, Mendelsohn maneuver, and super supraglottic swallow. Patients are encouraged to practice these exercises daily during and after treatment since effects of chemoradiation can occur long after treatment completion. As new delivery methods of radiation therapy are developed, such as shielding and intensity modulation, the negative effects of treatment should be reduced.

Effects of Chemotherapy on Swallowing

Chemotherapeutic agents for head and neck cancer can also cause side effects that impact swallowing and nutrition [44]. They can cause nausea, vomiting, neutropenia, generalized weakness and fatigue. Anorexia and weight loss are common. Mucositis may cause sufficient pain to require non-oral supplementation. The incidence rate of mucositis has been reported to be approximately 40% for chemotherapy patients; however, it approximates 100% in patients receiving chemoradiation [42]. Symptomatically, mucositis manifests itself in odynophagia (pain) during mastication and swallowing, oral

bleeding, dysphagia, dehydration, heartburn, vomiting, nausea and sensitivity to salty, spicy and hot/cold foods. Stomatitis refers to chemotherapy-related oral cavity ulcers that result in eating difficulty. The cytotoxic agents most commonly associated with oral, pharyngeal and esophageal symptoms of dysphagia are the antimetabolites such as methotrexate and fluorouracil. The radiosensitizer chemotherapies, designed to heighten the effects of radiation therapy, also heighten the side effects of the radiation mucositis [43,44].

Considerable attention has been given to both prophylactic and treatment measures to counteract the adverse side effects of these medications. Prophylactic measures begin with an increased emphasis on improved oral hygiene. Oral cryotherapy, the therapeutic administration of cold, is a prophylactic measure for oral inflammation [45]. Cryotherapy can be provided in the form of ice chips just prior to chemotherapy and for 30 minutes after drug administration. A marked decrease in the incidence of stomatitis has been noted in patients utilizing cryotherapy. Therapeutic measures to control mucositis and stomatitis include the use of anesthetics, analgesics, anti-inflammatory agents, antimicrobial therapy and coating agents. Anesthetics are usually used in tandem with mouthwashes or rinses. An oral suspension of diphenhydramine, lidocaine and an antacid (Maalox) called "magic mouthwash" can be prescribed, which is swished and swallowed for symptom management.

Swallowing and Postoperative Radiation

While the extent, type, and location of the surgical resection play a major role in determining swallowing outcomes, the effects of postoperative radiation also may impact swallowing rehabilitation. Irradiated patients have significantly reduced oral and pharyngeal functions including longer oral transit times, increased pharyngeal residue and reduced cricopharyngeal opening times. Impaired function may be the result of radiation effects such as edema, fibrosis and reduced salivary flow. Delayed healing and fistula development are more common in radiated tissue.

Goals of Swallowing Rehabilitation

There are several goals in swallowing rehabilitation. The primary goals are to prevent malnutrition and dehydration and reduce the risk of aspiration. Re-establishment of safe and efficient oral intake, prevention of dysphagia prior to medical treatment and patient education regarding the specifics of their disorder are also important goals of intervention. Pretreatment counseling is beneficial in addressing the possibility that dysphagia may develop during or after the completion of the planned treatment. Individuals can be given strategies, recommendations or exercises prophylactically to reduce the chances of developing a problem.

Therapeutic Management

Aspiration may be eliminated by the use of postures, maneuvers and modifications to bolus size and consistency; however, until the swallow physiology can be improved, a patient

will need to use these techniques consistently while eating in order to maintain oral intake. There are active therapy procedures that have been designed to improve impaired swallow function after treatment for cancer of the head and neck (Table 1).

Table 1:

Swallow Exercises(ROM)	Postures	Swallow Maneuvers
Jaw ROM	Chin Down	Suraglottic Swallow
Tongue ROM	Chin Down towards RT/LT	Super-supra-glottic swallow
Tongue side -to-side Movement	Head Rotation towards Right	Effortfull swallow
Tongue posterior Movement	Head Rotation towards Left	Mendelsohn Maneuver
Laryngeal ROM		
Pharyngeal ROM		
Bolus Manipulation exercises		

Bolus Size and Consistency Modifications

Modification of bolus size and consistency may also be effective in eliminating aspiration in patients treated for head and neck cancer. These changes should be observed under fluoroscopy so the clinician can determine their impact on swallow physiology. For some patients, a larger volume bolus may be more effective at eliciting a more rapid pharyngeal swallow. Larger bolus volumes may provide greater sensory input for the patient and increase awareness of the bolus in the oral cavity . However, patients who require multiple swallows to clear a single bolus will probably benefit from smaller bolus sizes in order to reduce residue and the risk of aspiration.

Patients with oral stage problems such as reduced tongue range of motion, coordination or strength will have greatest difficulty with thick foods. Patients with a delayed pharyngeal swallow or reduced airway closure may benefit from eliminating thin liquids or thickening them to a more viscous consistency. Those with swallowing disorders that result in retention of bolus in the pharynx (such as reduced tongue base retraction, reduced laryngeal elevation, and cricopharyngeal dysfunction) will have greater difficulty with thicker, higher viscosity foods.

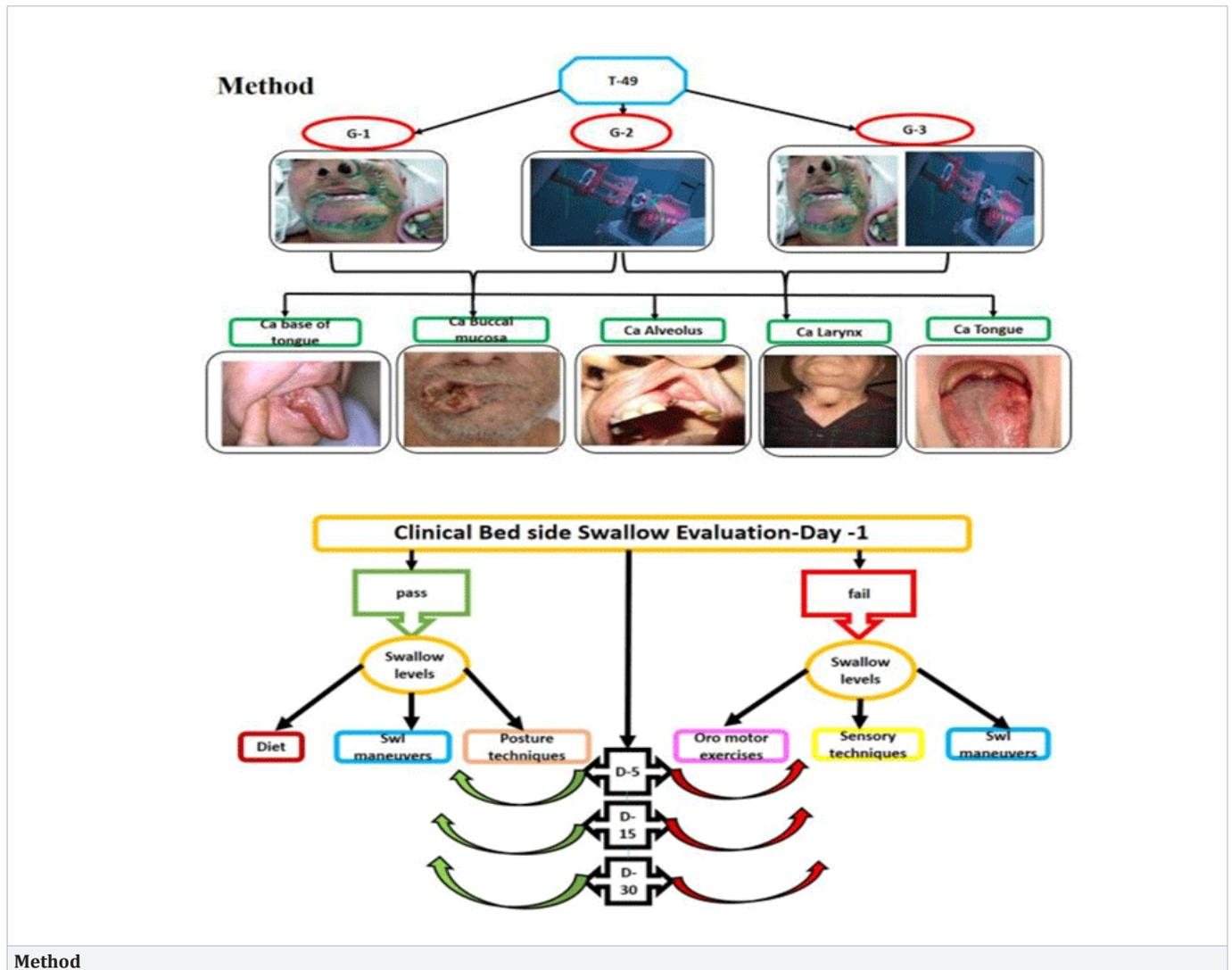
Removal of specific food consistencies from the diet should be the last strategy to be contemplated .Elimination of certain food consistencies from the diet such as liquids can be difficult for the patient and may have an impact on the patient’s nutritional status. Bolus consistency modifications should be considered when postures and maneuvers are not feasible or are unsuccessful.

Aim & Objectives

We aimed to analyse the advances in the swallow levels on Functional Oral Intake Scale(FOIS) with swallow therapy for patients who have undergone surgery with/without adjuvant

therapy and also to analyse how the site of carcinoma effects the swallow recovery (Method).

The data from December 2015 to June 2016, was analysed in which there are 49 patients were referred for Initial swallow Evaluation and management from Head And Neck Cancer Institute from Medanta the Medicity Hospital. These 49(100%) Cancer patients were divided into 3 Groups I.e., Group-1 patients who has undergone with surgery , Group-2 patients who received Chemo therapy/Radiation therapy and Group-3 patients who received all three Modalities. Later on this each particular group patients were sub-divided based on their site of carcinoma ,age, gender. All of them affected with oro-pharyngeal carcinoma at the Age of 50 years and above were reported in the study .The oro-pharyngeal carcinoma were diagnosed by head and neck surgeon, ENT/Otolaryngologist with complete head and neck examination and also may recommended for pharyngoscopy and larynscoy,biopsy for proper management. Later, after surgery /CT/RT the patients were recommended for Initial swallow Evaluation and they are graded with their Functional oral intake scale(FOIS) from Level -1 to Level -7. Cancer patients typically began the protocol with 5 ml of thickened liquids as this material afforded the best airway protection. If patient has no sings of choking or cough, the therapist would change properties of food which followed gradually according to standard guidelines. If patients failed in the swallow evaluation then immediate swallow therapy was started with oro motor exercises, swallowing maneuvers, postural techniques, sensory techniques and dietary modifications with the five consecutive days of swallow therapy with on and off for one or two days in a week period. Later intermittently swallow evaluation is done to upgrade the(FOIS) Levels and to check out the functional recovery period from day 3 to day 30 of the patient , and also to the durational period to reach the FOIS- Level -5 on follow up basics.



Method

Inclusion and Exclusion Criteria

The inclusive criteria in the present study were considered as recent Carcinoma patients who are visiting Medanta Hospital for primary treatment and has swallowing difficulty on functional oral intake scale (FOIS) and graded with the Level -1 in initial clinical swallow evaluation. The patients GCS should be E4 M6 at the time of initial swallow evaluation. All patient should have better cognition.

Patients who are received primary surgery,CT/RT and all three modalities.

The Exclusive criteria were as follows

- Patient GCS should not be less than E4 M6.
- Impaired communication ability due to cognitive deficit
- Other, systemic neurologic disorders ,trauma, facial fractures leading to swallowing difficulties.

- Past surgeries and radiations were excluded.
- Pneumonia or acute medical conditions.

Procedure

1. All patients with swallowing difficulty were selected from all oro pharyngeal carcinoma patients and they were categorised into three groups I, e... Group-1(surgery group) ,Group-2(CT/ RT group) and Ggroup-3(all three modalities) .
2. Later, all these 3 group patients were categorised based on their site of carcinoma, age and gender.
3. Later all patients were underwent with initial clinical bed side swallow evaluation with their function oral intake scale grading .All patients who are graded with Level-1 on th FOIS were immediately started with the swallow therapy for continuous five days with intermittent on and off in a week period .

4. The oro were used motor exercises, swallowing maneuvers, postural techniques, sensory techniques in swallow therapy for 30 minutes of duration period.
5. As the patient start with the oral intake the FOIS levels will upgraded regularly and the compensatory strategies and swallow maneuver were also provided in order to overcome the swallow difficulty. Dietary modifications were also recommended for the same. The compensatory techniques and swallowing maneuvers was based on the findings of clinical bed side swallow evaluation. This group patients was treated 3 times per week and with required number of sessions.
6. Later we check the Duration of swallow therapy and gradual functional recovery of swallowing based on the FOIS measurements until the patient reaches to level-5 in this study.

Outcome measures

The outcome measures were assessed as changes in functional oral intake, and complications related to treatment and the swallow therapies. The functional swallowing ability of each individual was estimated using the Functional oral intake scale (FOIS) a 7 – pointing rated scale reflecting the patients report of food/liquids safely ingested by mouth on a consistent basis. The scale has strong reliability and validity specific to stroke populations. Patient’s recordings of the daily diet level and method of intake (oral, non-oral, use of compensations) were determined and compared to FOIS scale results. Each patients report recorded the typical diet level along with any food modifications and/ behavioural compensations used during eating. Each patient’s diet level was documented at the onset of the therapy and again at the conclusion of the therapy and compared the scale. The duration period was calculated for each patients.

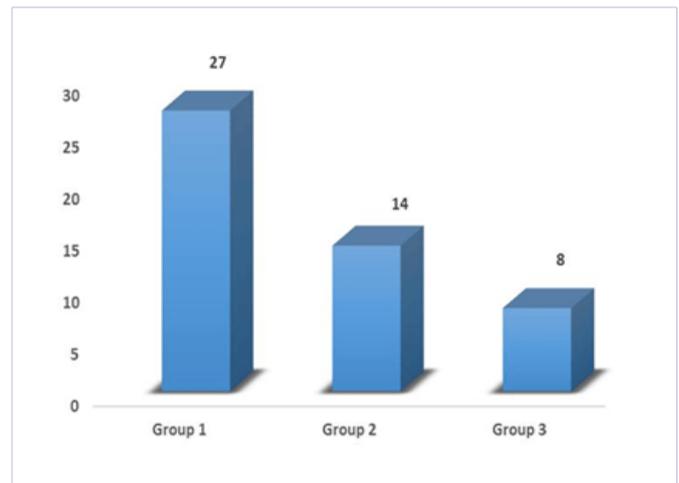
Statistical Analysis

The analysis were include profiling of patients on different Demographic, FOIS score type of carcinoma variables were evaluated between three group patients using the independent Student t- test (age, post-surgery/CT/RT & duration)and Chi square test were used to (gender , site of carcinoma).The total number of pre-therapy FOIS scores, and the durational period of the therapy sessions in particular type of carcinoma and post- therapy FOIS scores and mean changes in FOIS scores in swallow therapy between three groups along with the gender differentiation were evaluated with t- test . P -value < 0.05 is considered statistically significant. SPSS software Version 20.0 were used for statistical analysis.

Results

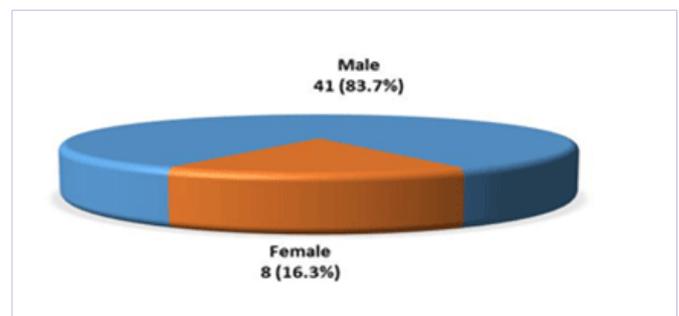
All 49(100%)patients with oral and oro pharyngeal carcinoma were undergone for swallow evaluation . All these

49 carcinoma patients were divided into three groups.Group-1 patients undergone with Surgery were (27(55.1%) ,Group-2 patients who have received Chemo therapy/Radiation therapy were (14(28.57%) and Group-3 patients who has received all three modalities like surgery/CT/RT were (8(16.32%).Later, all these three groups of patients were divided based on their site of carcinoma ,age and gender. Over all, there are (8(16.32%) with ca base of tongue, (7(14.28%) with ca buccal mucosa, (14(28.57%) with calarynx,(4(8.16%) with ca alveolus, and (16(32.65%) ca tongue (Graph-1).



Graph 1: Site of carcinoma and along with groups.

Later, all these patients were sub-divided based on their age and gender factor. Over all, there are (41(83.7%) males and (8(16.3%) females. In Group- 1 there are (23(85.1%) males and (4(14.8%) females , in Group -2 there are (12(85.7%) males and (2(14.28%) females and in Group-3 there are (6(75%)males and (2(25%)females. There are (4(50%) males and (4(50%) females in ca base of tongue, (7(100%)males in ca buccal mucosa, (11(78.5%)males and (3(21.42%) females in ca larynx , (4(100%) males in ca alveolus and (15(93.75%) males and (1(6.25%) female in ca tongue (Graph-2).



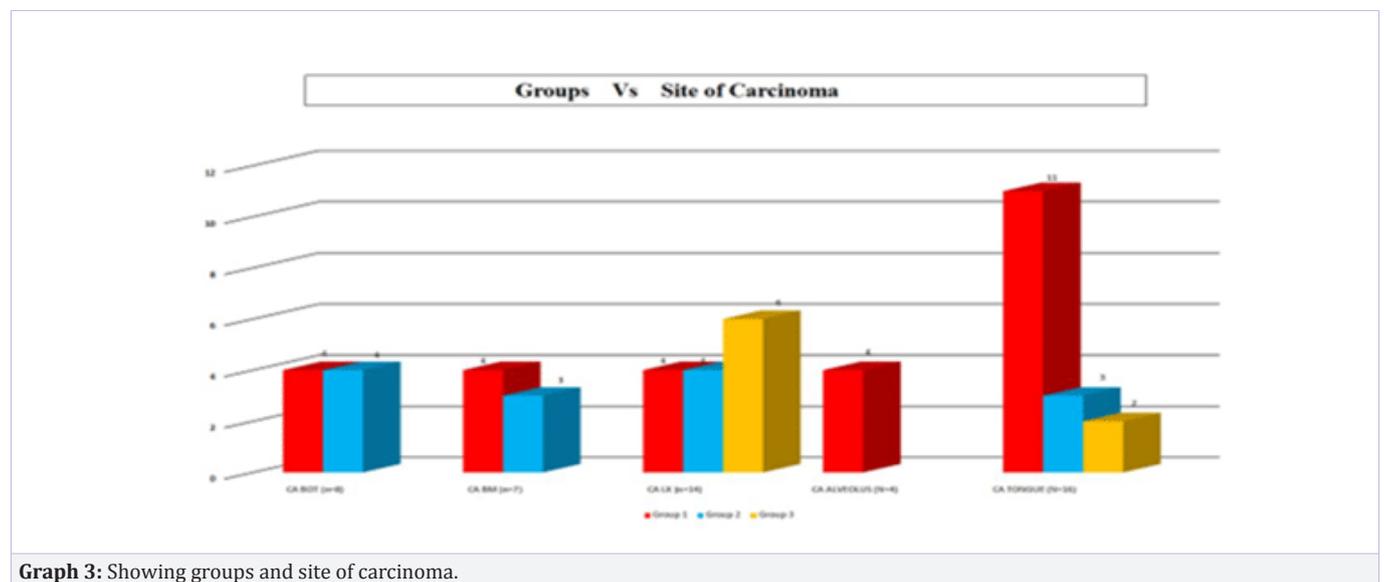
Graph 2: Male and Female ratio in relation with swallow and groups and diagnosis

GROUP-1 SURGERY GROUP: In this there are 27 (55.1%) patients who received only surgery .Among them there are (4(14.8%) with ca base of tongue ,(4(14.8%) ca buccal mucosa, (4(14.85%), ca larynx, and (11(40.7%) ca tongue. After initial clinical Bed side swallow evaluation there are (27(100%) with Level-1 and after few intensive swallow therapy sessions there are (18(66.6%) patients with Level-2, (18(66.6%) with Level-3 and (12(44.4%) Level- 5 which was graded based on FOIS.

GROUP-2 CT/RT GROUP: In this there are (14(28.57%) patients who received primary chemo and or Radiation therapy .Among them there are (4(28.5%) with ca base of tongue ,(3(21.4%) ca buccal mucosa, (4(28.5%)ca larynx, and (3(25%) ca tongue. After initial clinical Bed side swallow evaluation there are (

14(100%) with Level-1 , and after few intensive swallow therapy sessions there are (11(78.5%) patients with Level-2, (10(71.4%) with Level-3 and (6(42.85%) Level- 5 which was graded based on FOIS.

GROUP-3 SURGERY& CT/RT GROUP: In this there are (8(16.32%) patients who received all three modalities like combined surgery and chemo/radiation therapy .Among them there are (6(75%) with ca larynx, and (2(25%) ca tongue. After initial clinical Bed side swallow evaluation there are (8(100%) with Level-1 , and after few intensive swallow therapy sessions there are (7(87.5%) patients with Level-2, (4(50%) with Level-3 and (3(37.5%) Level- 5 which was graded based on FOIS. All of these patients were received intensive swallow therapy (Graph-3).



Graph 3: Showing groups and site of carcinoma.

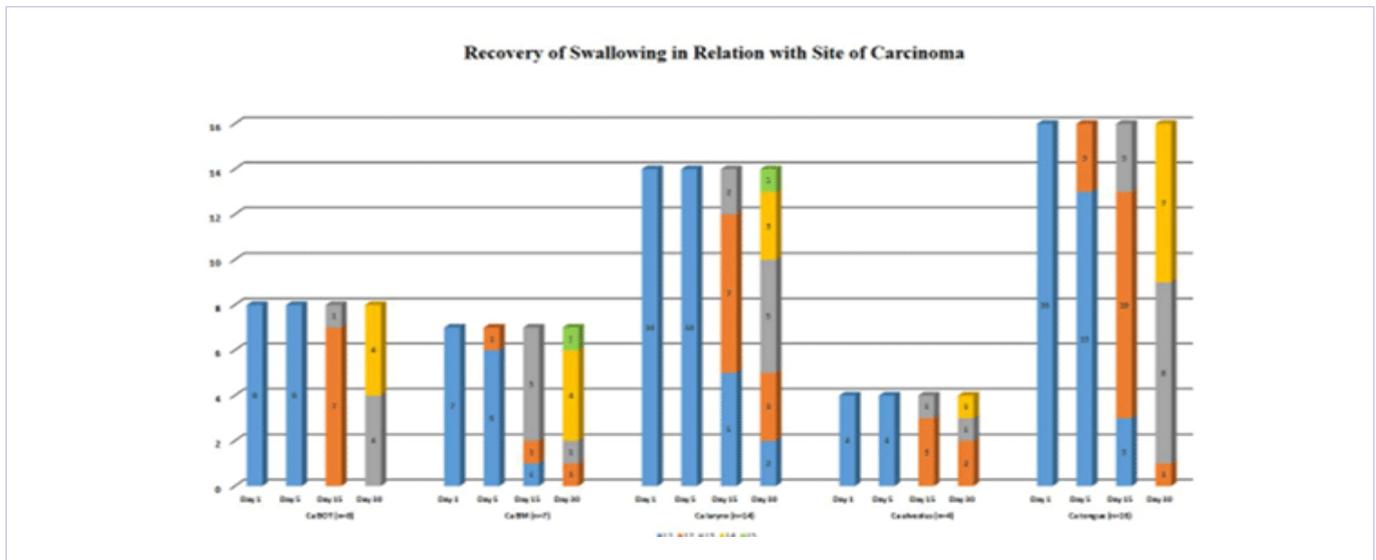
In patients with Ca Base of Tongue there are 8 patients and all were on RTF till Day 5 with Level-1 ,and on Day -15 there are 7 patients with Level-2 and 1 patient was on Level-3 .On Day 30 there are 4 patients with Level-3 and 4 were on Level-4 based on FOIS. In patients with Ca Buccal Mucosa there are 7 patients on Level-1 on day 3 and 6 patients on Level-1 and 1 patient was upgraded with Level-2 on day -5 .On day 15 1 patient was on RTF with Level-1 and 1 was on Level-2 and 5 patients were on Level-3 .Later on Day-30 1 patient was on Level-2 and 1 was on Level-3 ,4 patients were on Level-4 and 1 patient was on Level-5 based on FOIS.

In patients with Ca Larynx, there are 14 patients on Level-1 on day 3 and Day -5 and 5 patients on Level-1 and 7 patient was upgraded with Level-2 and 2 patients with Level-3 on day -15 . Later on Day-30 , there are 2 patient was on Level-1 I,e still on RTF and 3 was on

Level-2 , 5 Patients on Level-3, and 3 patients were on Level-4 and 1 patient was on Level-5 based on FOIS.

In patients with Ca Alveolus there are 4 patients on Level-1 on day 3 and Day -5. 3 patients were upgraded with Level-2 and 1 patient was upgraded with Level-3 on day -15 . Later on Day-30, 2 patient was on Level-2 and 1 was on Level-3 ,1 patients were on Level-4 based on FOIS.

In patients with Ca Tongue there are 16 patients on Level-1 on day 3 and 13 patients on Level-1 and 3 patient was upgraded with Level-2 on day -5 .On day 15, 1 patient was on RTF with Level-1 and 10 patients was on Level-2 and 3 patients were on Level-3 .Later on Day-30, 1 patient was on Level-2 and 8 was on Level-3 ,7 patients were on Level-4 and 1 patient was on Level-5 based on FOIS (Graph-4).



Graph 4: Recovery of Swallowing patterns based on NOMS in Relation with site of Carcinoma.

Duration and Recovery pattern of Swallowing in patients with Oral and Oro pharyngeal carcinoma

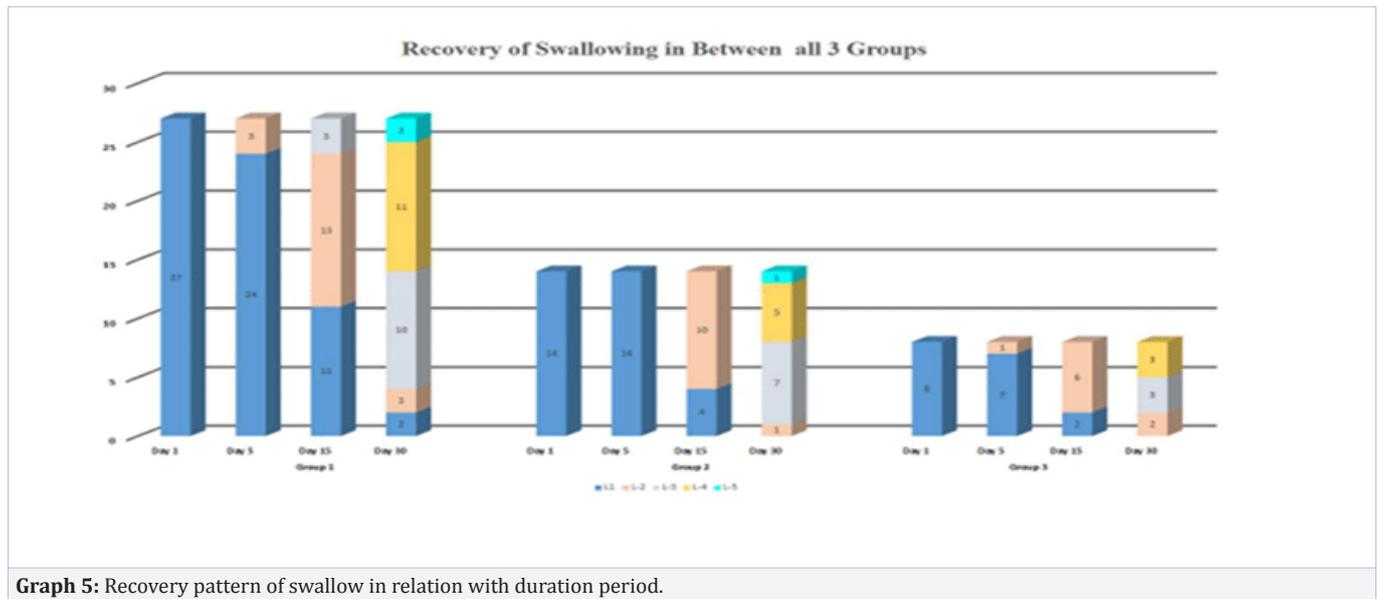
All patients have received Initial clinical bed side swallow evaluation on the Day 3 of their Surgery and graded accordingly based on the FOIS. All patients who are graded with with Level -1 based on FOIS were received intensive swallow therapy which includes all oro motor exercises , swallow maneuvers, postural techniques, sensory techniques and dietary modifications were done for the patients who cleared their swallow evaluation and recommend for oral diet and also graded with FOIS. Later, intermittent swallow re-evaluation was done on Day -5 and graded accordingly and patients who has cleared the swallow test was upgraded with oral diet along with swallow maneuvers and dietary modifications. The same has been repeated on the Day 15 and Day 30 with follow up sessions and all were recommended accordingly based on their requirement and recommended to continue the exercises.

In Group-1 on Day -3, there are 27 patients with Level-1 I,e on RTF based on FOIS and all were received immediate intensive swallow therapy . On Day-5 there are 24 patients on Level-1 and 3 patients were upgraded with Level-2 and on Day-15 there are 11 patients with Level-1, 13 patients with Level-2 and 3 patients with

Level-3. Later on Day -30 all these patients were re-evaluated , in which there are 2 patients on Level-1 and 2 patients on Level-2 and 10 patients on Level-3 ,11 patients on Level-4 and 2 patients on Level-5 based on their FOIS.

In Group-2 on Day -3, there are 14 patients with Level-1 I,e on RTF based on FOIS and all were received immediate intensive swallow therapy and On Day-5 also all 14 patients were on RTF I,e on Level-1 and on Day-15 there are 4 patients with Level-1, 10 patients with Level-2 ..Later on Day -30 all these patients were re-evaluated, in which there are 2 patients on Level-2 and 7 patients on Level-3 and 5 patients on Level-4 ,1 patient is on Level-5 based on their FOIS.

In Group-3 on Day -3, there are 8 patients were on Level-1 I,e on RTF based on FOIS and all were received immediate intensive swallow therapy . On Day-5 there are 7 patients on Level-1 and 1 patient was upgraded with Level-2 and on Day-15 there are 2 patients with Level-2, 6 patients with Level-3. Later on Day -30 all these patients were re-evaluated , in which there are 2 patients on Level-2 and 3 patients on Level-3 and 3 patients on Level-4 based on their FOIS (Graph-5).



Graph 5: Recovery pattern of swallow in relation with duration period.

Discussion

The results of the study supports the effects of swallow therapy and the recovery of dysphagia in patients with Head and Neck cancer patients who underwent with surgical / Adjuvant / combined modalities. Swallowing also depends on ROM of these structures, as oral tongue pressure against the palate and contact of the tongue base with the posterior pharyngeal wall are critical to moving food through the mouth and pharynx. Surgical procedures to remove cancers in the oral cavity and oropharynx typically restrict the motion of remaining lingual and oral tissues. It is not surprising, then, that ROM exercises are more significantly correlated with improvement in speech and swallowing than are other types of exercises. It is interesting but not surprising that ROM exercises affected both speech and swallowing functions, as both functions require ROM of the oral, pharyngeal, and laryngeal structures. Clearly, to prevent formation of restrictive scar tissue, it is particularly critical to begin ROM exercises in the early postoperative period.[31]. By considering these statement, in this study all patients were received Intensive Swallow therapy with ROM Exercises Before and after surgical management, chemo-radiation therapy and with combined modalities along with swallow maneuvers and diet modifications. Surgical removal of tumors - It is a long-standing and well-established treatment modality in HNC. Swallow dysfunction is often observed after surgical excision of tumors and the difficulty may occur at any stage of swallowing phases. Severity of swallowing is depends up on the site and size of the resection of tumor. I.e., the more extensive resection, the worse the swallowing. In contrast to surgical procedure, the application of radiation/chemotherapy to oral cavity may also lead swallow difficulty (ex. Xerostomia, Fibrosis). Patients with large oral and oro-

pharyngeal tumours(T3&T4) currently receive multimodality treatment (I.e., radiation therapy following surgical procedure) they exhibit more difficulty with their speech and swallowing. Mangar et al. in 2006 - stated that treatment for oropharyngeal dysphagia is different from esophageal dysphagia. While there are some drugs and surgical procedures to improve esophageal swallowing process but for oro-pharyngeal swallowing there is only rehabilitation management. Later, Kulbersh BD et.al in 2006-did a study and stated that patients who receive early swallow exercises may improve dysphagia where as delayed swallow therapy achieves only minor benefits. In same year Rosenthal DI et al- gave a statement, that maximal swallowing recovery by 6 months post-CRT, but randomized trials are required and also recommended for therapeutic intervention before, during and after swallow

By Considering all these recent advanced studies in this study we investigated the effects of swallow therapy and the recovery pattern of swallowing along with their duration period based on FOIS with 7- point rating scale. The results in this study showed that Rehabilitation swallow therapy has significant improvement on clinical FOIS scores.

Levendag et al 2007 he did a study on patients with platinum- based CRT, the 5 years actuarial rates of overall late RTOG/EORTC grade 3 and grade 4 toxicity were 52% and 25%, respectively. Radiological evaluation after medication follow up of 44 months demonstrated impaired swallowing in 57% 23% has silent aspiration and 15.6% are on oral diet. Later, Frowen et.al in 2010 stated that patients with oropharyngeal /laryngeal tumours are expected to have aspiration/penetration of liquids. At 6 months post treatment, few patients may still experience moderate-severe degree of limitation. For 50% of patients, enteral nutrition was still required.

In contrast with other studies Logemann he stated that patients with oropharyngeal tumors reportedly have significantly worse recovery for semi solids than patients laryngeal tumors($p=0.01$), particularly at 3 months post treatment. After 6 months it may reduce to some point. Levendag et al 2007 he did a study on patients with platinum- based CRT , the 5 years actuarial rates of overall late RTOG/EORTC grade 3 and grade 4 toxicity were 52% and 25%, respectively. Radiological evaluation after medication follow up of 44 months demonstrated impaired swallowing in 57% 23% has silent aspiration and 15.6% are on oral diet. In addition to the above study future more evidences were added and they stated that in RTOG randomized trial, the incidence of severe (grade3,4) dysphagia increased in CT with 24% and 19% and in RT with 43% and 35%,concomitant CRT, although skin effect were not altered (7% vs 9%).In EORTC, incidence of severe functional mucosal effects increased with CRT from 21% to 41% and dysphagia 15% to 25 % .

In Contrast with all these studies , the present study was aimed to analyse the advances of swallow level on FOIS in relation with swallow therapy in head and neck cancer patients. In these study there are (27(67.5%)) of patients who underwent surgery and (14(35%)) patients with chemoradiation therapy and (8(20%)) with combined modalities . All these patients have received Intensive swallow therapy before and after surgical/adjuvant therapy. Over all, all patients have improved their swallowing with no significant difference between their age and gender and site of carcinoma but there is a significant difference between their duration of swallow therapy and between the groups (surgical/adjuvant/combined).The good progress and the early recovery with Level-5 based on FOIS was seen in patients who received surgical management and a better clinical improvement was seen in patients who received chemo-radiation therapy when comparing with the other group in which who have received all three modalities . Expert consensus support the use of manoeuvres such as chin tuck when swallowing , head turn was mostly used with this patients . ROM Exercises were recommended before 1 /2 days prior to the surgery were as the other group (chemo – radiation & combined modalities) were received intermittently before 1 day / after 5 days maximum which was like a drawback of the study with a strong evident stating that patients who receive swallow therapy before the surgery/ adjuvant therapy have a better recovery in swallowing when comparing with the patients who received late. By considering this point as a statement the next researcher can work up on same for a continuity .

In summary, swallow therapy have therapeutic effects on improving the swallowing function based on the clinical FOIS-Level-7 in Head and neck cancer patients with dysphagia. There is a significant difference between both the groups, but the duration

of recovery pattern was long in patients with Group—2& 3 than in patients with Group-1 In present study all patients were considered only till Day -30 with maximum FOIS score-5 .Next researcher can focus pre-swallow therapy modalities in all different group patients with head and neck cancer who are undergoing with surgery/adjuvant therapy individually along with their duration period ,recovery pattern of swallowing based on FOIS till they reach Level-6 / 7 to give a detail investigation in head and Neck cancer patients with Oro-pharyngeal dysphagia.

Conclusion

By Considering the results of this study we conclude that there was no statistically significant difference was noted in between age, Gender and site of lesion in relation with swallow recovery. But, there was a statistically significant difference was present in patient with group -1(surgery group) when comparing with other group patients with ($p<0.004$) difference. Hence, swallow therapy shows a greater effect in surgery group patients when comparing with other group patients with adjuvant therapy. Later, further researcher can focus on the current study and can plan for - Day 90 Follow up - with patients who received swallow therapy before, during and after CT/RT and Surgery along with their duration of swallow levels Based on NOMS in relation with their site and size of lesion.

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