CLINICAL EVALUATION OF SWALLOWING AND DYSPHAGIA MANAGEMENT IN A PATIENT WITH TOTAL MANDIBULECTOMY AND PRIMARY RECONSTRUCTION

[1]Manju Mohan, P., [2]Friji, M.T., [3]Dinesh Kumar, S., & [4]Deviprasad Mohapatra

Abstract

Dysphagia is an important postoperative problem in patients undergoing mandibulectomy. Mandibulectomy causes limitation of lip and jaw movements and subsequent slowing of oral stage of swallowing. Extensive resection of floor of mouth and bulky flap reconstructions also impair swallowing by reducing pharyngeal mobility and initiation of pharyngeal swallow. Radiotherapy (either pre- or post-op) may cause dryness of the mouth and fibrosis of the tissues which may further hinder swallowing and speech. Swallowing rehabilitation is a specialized area of speech pathology, but in the Indian scenario, practice in the realm of speech and swallowing management of head and neck cancer patients is limited. Efficient diagnosis and time bound goal directed therapy can improve the communication and swallowing problems in patients with total mandibulectomy and reconstruction. This article discusses the issues of swallowing in patients following total mandibulectomy and primary reconstruction that need to be addressed by SLP's.

Key words: *Speech Pathologists, Mendelshon Maneuver, Supersupraglottic Swallow*

Introduction

Speech and swallowing deficits are very often seen following the surgical and radiation treatment of head and neck cancer patients due to the disruption of physiologically and anatomically important structures of swallowing. Mandible or lower jaw is important for speech, chewing and swallowing as it provides a platform for the soft tissues that control speech and swallowing.

The extent of surgical resection of the mandible (mandibulectomy) is based on the size, location and depth of mandibular invasion of cancers into the oral cavity as well as the benign characteristic of the lesions involving mandible. Different names for mandibulectomy are used depending on whether all or part of the mandible is removed.

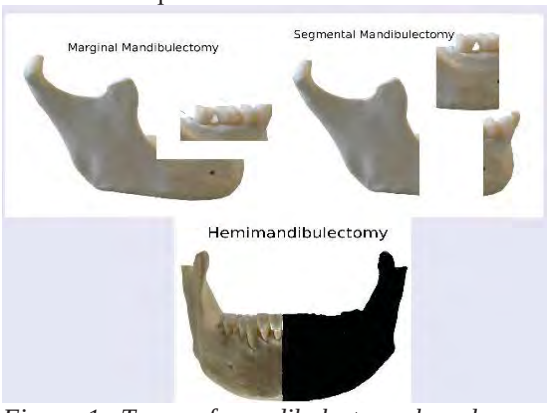

Figure 1: Types of mandibulectomy based upon the parts removed

Marginal mandibulectomy involves the removal of a part of the mandible without losing the continuity of the bone. On the other hand, segmental mandibulectomy leads to discontinuity of the lower jaw. Total mandibulectomy is the removal of the entire jaw and hemi-mandibulectomy is the removal of one half of the jaw. In addition to mandibulectomy, floor of the mouth resections also become necessary in certain cases for adequate tumor clearance. This affects the mobility of the tongue and often leads to significant morbidity, both in respect of chewing and speech. Continuity of the mandible should be maintained after surgical resection to preserve the balance and symmetry of mandibular function and also for cosmetic integrity.

Case Report

A 66 year old male patient came with the complaint of non-healing ulcer on the lower jaw for the past 6 months. On examination, there was an ulcero-proliferative lesion involving the midline of lower jaw and right side of the floor of mouth with multiple neck nodes palpable. CT scan showed lesion involving the right side of the alveolus with extension to midline and invasion to floor of mouth on right side.

Histopathology report showed moderately differentiated squamous cell carcinoma. The patient initially received a course of radiation therapy of 63.8 Gy over a period of 2 months and

[1]Manju Mohan, P., Speech Therapist, Department of Neurology, Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum-695 011, [2]Friji, M.T., [3]Dinesh Kumar, S. & [4]Deviprasad Mohapatra, Assistant, Professor, Dept. of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry-605 006.

later received 3 episodes of chemotherapy followed by surgical resection of the tumor.

Figure 2: CT scan showing lesion involving right side of the alveolus with extension to midline and invasion to floor of the mouth on right side

The patient underwent wide local excision with total mandibulectomy (with preservation of both condyles) for tumor clearance. Reconstruction of the defect was done with free fibula osteo-cutaneous flap and Pectoralis major myocutaneous flap. After surgery, the patient was fed through naso-gastric (NG) tube during which time assessement for for dysphagia and speech deficits was made.

A detailed subjective clinical swallowing examination was carried out along with a thorough oromotor examination. The oromotor examination revealed asymmetry of the lips at rest as well as during repeated movements. Lip closure was inadequate, and was affected more on left side. Difficulty was observed with the oromotor movements associated with cheek and lips. On retraction, the movement was restricted on right side. Patient had trismus with mouth opening of around 2 finger width and post-irradiation sequelae of dry mouth due to reduced salivary secretion. Patient was edentulous as dental extractions were done prior to radiation therapy. Tongue movements were restricted in strength, speed and range which led to inadequate tongue palate contact. Velar movements were normal. Laryngeal elevation and excursion were limited and volitional cough appeared weak. The bulk of the flap limited the adequate visual and digital inspection of the thyroid notch. After oromotor examination, swallowing was evaluated using different consistencies of food like thin liquids, thick liquids and solids. Patient was given half tea spoon water (thin liquid) which was administered using a spoon and fed by the clinician. There was loss of liquid through the lip corners and following the liquid intake the patient demonstrated spontaneous cough which threw light on the possibility of aspiration of the bolus. Patient failed to push the thick and solid food boluses, which were the other two food consistencies tried, at the oral preparatory stage itself due to severely restricted tongue movements. Thus the patient's poor ability for bolus propulsion, maintaining lip closure and reduced rate of mastication resulted in increased number of swallows per bolus. Overall, the clinical swallowing examination gave the impression of oropharyngeal dysphagia.

Therapy for dysphagia started with counseling the patient about the various techniques and the rationale behind using each of them. To improve swallowing, direct techniques (lingual control exercises, resistance and range of motion exercises for active articulators), compensatory techniques (postural adjustments, diet alterations, and food presentation strategies) and swallowing maneuvers were employed. Direct lingual control exercises, resistance and range of motion exercises for active articulators (lips, tongue and jaw) along with thermal and tactile stimulation were taught to the patient so as to address lip closure, tongue and jaw movement difficulties respectively, and to improve the post radiation/chemo therapy effects on oromotor physiology. Head back position reduces oral transit time and relies on gravity to clear the bolus from the oral cavity (Logemann, 1983). Thin liquid diet was advised as a compensatory technique under bolus control strategy as the patient could not push thicker bolus into the pharynx with his tongue. A head back position (compensatory positional strategy) was advised to facilitate bolus propulsion from oral to pharyngeal level since the spontaneous bolus movement was inadequate. As laryngeal elevation and excursion were restricted, the administration of thin liquids and a head back position was combined with supersupraglottic swallow. The patient was taught supersupraglottic swallow so as to bring the laryngeal inlet to a maximally closed position before swallowing (Logemann, Barbara, Alfred, & Laura, 1997).The patient was initially taught to hold the breath with the open mouth posture which was trained for two days. Next he was taught to bear down while holding the breath to help improve the closure effort and laryngeal excursion. Subsequently patient was trained on dry swallow attempts followed by immediate voluntary coughing which helps to clear the residue present, if any. The supersupraglottic strategy was taught in steps as the patient found it difficult to fully understand and follow the steps in the first sitting. Patient took 3 days to fully understand and use the technique completely.

Shaker exercises were not advised as the floor of the mouth muscles were involved in resection. Instead, Mendelsohn maneuver was recommended to improve the laryngeal elevation during swallow. The Mendelsohn maneuver is reported to improve the tongue base to pharyngeal contact, laryngeal elevation and subsequent opening of the cricopharyngeus muscle (Kahrilas, Logemann, Krugler, & Flanagan, 1991; Lazarus, Logemann, & Gibbons, 1993). Manual push up of the larynx was advised for the patient as he was finding it difficult to feel the laryngeal movements. Use of Mendelsohn Maneuver is also reported to improve the synchronization of pharyngeal swallowing mechanisms and airway closure. This technique can thus compensate for the structural and functional changes in oropharyngeal swallowing mechanism following reconstructive surgery for patients with head and neck cancer (Lazarus, Logemann, & Gibbons, 1993). Thus a combination of direct lingual control exercises, resistance and range of motion exercises for active articulators, thin liquid bolus control strategy, head back positional strategy, supersupraglottic swallow and Mendelshon maneuver were incorporated in dysphagia management for the patient. This highlights that combining various strategies is necessary in any dysphagia management programme. The regular practice of these techniques along with adequate motivation has helped our patient to learn the new swallowing method which enabled him to take oral feeds safely.

Swallowing rehabilitation was carried out for a period of 8 days (12 sessions of 30 minute duration). Following this, the patient could demonstrate safe swallow of thin liquids.

Discussion

Treatment for head and neck cancer usually involves surgery/ radiotherapy or combination of both. This usually results in speech and/or swallowing difficulties (Perry & Frowen, 2006). Although microsurgical reconstruction techniques have improved the quality of mandibular reconstruction and dental rehabilitation, effects on speech and swallowing function is less predictable. The extent of resection and the type of reconstruction are the major variables that would predict the functional outcomes after surgery (Perry & Frowen, 2006). Seikaly, Maharaj, Rieger and Harris (2005) have reported excellent functional outcomes like no significant swallowing difficulty and no instances of aspiration in cases of primary mandibular defects reconstruction with free fibula flap. However, in majority of post-mandibulectomy patients, limitations in the movements of the active articulators results in significant communication impairments and swallowing difficulties. Resection of the floor of mouth and removal of geniohyoid and myelohyoid muscles and bulky flap reconstruction significantly impair swallowing function due to tethering of tongue and increase the risk of aspiration due to reduced laryngeal elevation (Hirano, Kuroiwa, & Tanaka, 1992; Langton, 1992). Radiotherapy may further complicate the swallowing function due to xerostomia and post-radiation fibrosis.

Treatment options should be evaluated and selected based on the functional outcomes and quality of life. In this context, the need to include speech language pathologists to the medical team caring for head and neck cancer patients becomes necessary. In a head and neck cancer patient who has undergone surgery, the long term goals will be to improve the speech of the patient as well as to improve his/her swallowing capability. In addition, speech pathologists can also be consulted to recommend the optimal time for the removal of nasogastric tube and the subsequent initiation of oral feeds. But in our country there is lack of awareness as well as huge scarcity of manpower involved in swallowing therapy. Considering this we have attempted to detail out the subjective clinical evaluation of dysphagia along with its management. In the current patient, dysphagia management goals included were oromotor exercises, thin liquid bolus and head back position along with supersupraglottic swallowing maneuver and Mendelshon maneuver.

Conclusion

Mandibulectomy patients present with different types of dysphagia. Speech Language Pathologists should be sensitized towards the surgical procedure undergone by the patient along with the reconstructive procedures, which will help them in deciding the appropriate combination of strategies to be used for a particular patient. The current study discusses the possibility of pharyngeal dysphagia along with oral dysphagia in patients who have undergone resection of the whole mandible and floor of mouth. Also, the study highlights the necessity of combining swallowing maneuver with head back and thin liquid bolus strategy while advising dysphagia therapy for patients with total mandibulectomy and floor of the mouth resection.

References

Hirano, M., Kuroiwa, Y., Tanaka, S., Matsuoka, H., Sato, K. & Yoshida, T. (1992). Dysphagia following various degrees of surgical resection for oral cancer. *Annals of OtoRhinoLaryngology, 101,* 138-141.

Kahrilas, P. J., Logemann, J. A., Krugler, C., & Flanagan, E. (1991). Volitional augmentation of

upper esophageal sphincter opening during swallowing. *American Journal Physiology Gastrointestinal Liver Physiology, 260(3)*, G450–G456.

Lazarus, C., Logemann, J. A., & Gibbons, P. (1993). Effects of maneuvers on swallowing function in a dysphagic oral cancer patient. *Head & Neck, 15(5),* 419–424.

Langton, S. G. (1992). Management of Dysphagia after surgery for oral malignancy. *British Journal of Oral Maxillofacial Surgery, 30(1),* 8-13.

Logemann J A. (1983). Evaluation and treatment of swallowing disorders. San Diego: College Hill Pr.

Logemann, J. A., Pauloski, B. R., Rademaker, A. W. and Colangelo, L. A. (1997), Super-supraglottic swallow in irradiated head and neck cancer patients. Head Neck, 19: 535–540. doi: 10.1002/(SICI)10970347(199709)19:6<535::AID-HED11>3.0.CO;2-4

Perry, A. & Frowen, J. (2006). Speech and swallowing function in head and neck cancer patients: what do we know? *Cancer Forum, 30(3),* 178-183.

Seikaly, H., Maharaj, M., Rieger, J. & Harris, J. (2005). Functional outcomes after primary mandibular resection and reconstruction with the fibular free flap. *Journal of Otolaryngology, 34(1)*, 25-28.