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Case Report

Speech and swallowing rehabilitation of post-partial mandibulectomy: a case report

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ABSTRACT

Squamous cell carcinomas of the oral cavity require multiple treatment approaches such as chemotherapy, radiotherapy, and surgical treatment. Glossectomy and mandibulectomy are the most common surgical treatment procedures for oral carcinoma with pre-, and post-surgical chemo-radiotherapy depending on the stage of cancer. The patients with glossectomy and mandibulectomy are at risk of developing a wide range of impairments in speech and swallowing functions due to surgical procedures and post chemo-radiation therapy (trismus and xerostomia). The present case report describes a 52-year-old male who had a history of oral squamous cell carcinoma and underwent wide excision of maxillar and mandibular regions who presented with severe speech and swallowing impairments. On examination of speech and swallowing functions, the patient exhibited oral dysphagia of moderate severity and poor speech intelligibility. The patient had undergone 50 speech and swallow therapy sessions over two months duration and post-therapy evaluation showed improvements in speech and swallowing functions. The patient had exhibited improvements in quality of life on various physical and functional domains post-rehabilitation. However, the improvements were limited due to the presence of trismus and hypernasality due to maxillar resection. This case report describes the importance of speech and swallowing rehabilitation to improve the post-surgical impairments in speech and swallowing functions and also the overall quality of life of patients with oral cancers.

Keywords: Oral cancer, Dysphagia, Speech therapy, Mandibulectomy, Quality of life

INTRODUCTION

Oral carcinoma is one of the most commonly reported type of carcinomas in the Indian subcontinent due to excessive use of tobacco and poor oral hygiene.[1] Partial or total glossectomy or mandibulectomy severely affects the speech and swallowing functions resulting in speech sound disorders, reduced speech intelligibility, dysphagia along with poor quality of life.[2] Rehabilitation plays a key role in restoring or improving speech and swallowing functions, however, the level of improvement may vary depending on several factors. However, limited studies are available on the effectiveness of speech and swallow rehabilitation in patients who had undergone wide excision of oral structures.[2,3] Hence, the present study was carried out to discuss the outcomes of speech and swallowing rehabilitation of a patient with partial mandibulectomy and maxillectomy and compare the quality of life across pre-, post-surgery, and post-rehabilitation.

CASE REPORT

AB, a 52-year-old Indian male presented to the clinic with a complaint of difficulty in speaking and swallowing for six months followed by partial mandibulectomy and reconstructive surgery. Medical history of AB revealed the

presence of squamous cell carcinoma at oropharynx and soft palate (CT2N0M0) in the year 2016 subsequently the patient was treated with chemoradiation therapy for approximately two months and was inserted with a PEG tube. In July 2020, patient was diagnosed as having recurrence of malignancy in the right posterior maxillary alveolus associated with bony erosion (2.6×1.8×1.8 cm) and left upper buccal mucosa, gingiva-buccal sulcus and left maxillary alveolar mucosa (3.2×2.6×2.1 cm) (CT4aN0M0) and was treated with composite resection of the lesion with left partial maxillectomy, left segmental mandibulectomy, excision of the left commissure + left modified neck dissection + tracheostomy + free fibular flap reconstruction surgery.

Post-surgical speech and swallowing examination

AB was evaluated for speech and swallowing abilities using oral-peripheral mechanism examination, articulation skills, speech intelligibility, swallowing assessment using the Gugging swallowing screen, consensus auditory-perceptual evaluation of voice (CAPE-V).[4,5] The results of oral-peripheral mechanism examination (OPME) revealed an absence of teeth except a few incisors and premolars; movements of jaw were restricted with asymmetry and the jaw opening was limited to 10 mm; labial asymmetry; reduced lingual strength and range of movements with xerostomia. Laryngeal examination revealed normal voice quality with reduced maximum phonation time (09 seconds) and severe hypernasality.

Articulation assessment revealed substitution errors (/ʊiːgə/ for /biːgə/, /əlılu/ for /əl̪ılu/, etc) followed by distortions (/r/ in /reːd̪ɪjo/) and omissions (/l/ in /pensıl/). The patient exhibited more speech sound errors on bilabials, palatals, retroflex, and velars in all the positions of the words with cluster reduction (/suːtɪ/ for /skuːʈɪ/, devoicing (/k/ for /g/ in /ʊiːsəŋɪkɛ/ for /biːsəŋɪgɛ/), and nasal assimilation (/muːg̃u/ for /muːgu/. The scores on intelligibility, speech sound disorders, and voice evaluations are given in Table 1. Swallowing examination revealed impairments in oral and oral preparatory phases of swallowing with poor vegetative skills and bolus preparation and propulsion. However, the pharyngeal and esophageal phases of swallowing were found to be normal with adequate gag reflex, normal laryngeal elevation, and without aspiration and choking for all consistencies of food. The results of the GUSS scale indicated moderate oral dysphagia.[4] The patient was evaluated for quality of life using wide range of scales and the results are given in Table 2.[6,7]

Speech and swallowing rehabilitation

AB underwent a total of 50 speech and swallow therapy sessions of one-hour duration over two months. The goals for speech and swallowing rehabilitation focused on improving oral motor skills, articulation skills, and speech intelligibility along with swallowing. Oral motor exercises (isometric and isotonic) were carried out to improve the strength and range of movements of the tongue, jaw, and lips. Isotonic exercises involving active and passive stretching and strengthening the muscles of mastication to increase the range of motion of temporomandibular joint were carried out using Orabite as part of trismus rehabilitation along with tactile stimulation; similarly, tongue exercises such as lateral movements, elevation, and protrusion activities were undertaken. To improve the intraoral breath pressure, AB was given tasks such as blowing, whistling, and sucking, etc. along with activities for oral sensitivity (iced cheek technique, and tongue tickles). Traditional approach and phonetic placement approach along with articulation drills were used to improve the articulation skills and speech intelligibility. Upon the improvement of tongue movements after approximately 27 sessions, patient was started with oral feeding of thick liquids and pureed foods with assistance and change in the position. Masako maneuver (dry and wet) and effortful swallow was practiced as part of the tongue exercises to propel food bolus to posterior parts of the oral cavity to improve the oral phase of swallowing.

DISCUSSION

Post-therapy performance on speech and swallowing functions

Post therapy evaluation on the OPME revealed improvements in range of movement and strength of jaw with a jaw opening of 12 mm; lip spreading and closure; improved tongue range of movements. Articulation assessment revealed lesser substitution errors on bilabials, palatals, velar sounds with increased distortions due to the presence of hypernasality. Post-therapy swallowing assessment revealed improved vegetative skills and in swallowing of all consistencies of food with poor spice tolerance. However, the patient was finding it difficult in bolus preparation due to tooth agenesis with an inability to clear the food in the oral cavity due to restricted tongue movements with xerostomia and GUSS scale revealed slight oral dysphagia.[4] The scores of pre-therapies and post-therapy on various speech and swallowing measures are given in Table 1.

Comparison of quality of life across pre-surgical, post-surgical and post-therapy

The results of quality-of-life measures across pre-surgery, post-surgery and post-therapy are given in Table 2. The patient had shown significant improvement in the quality of life as depicted in Table 2 on physical, functional, emotional and social aspects post speech and swallowing rehabilitation compared to pre-surgery and post-surgery.

The pre- and post-therapy scores of AB on various quantitative and qualitative measures of speech and swallowing functions have shown improvements following rehabilitation.[2,3] However, the improvements in few domains of speech and swallowing are limited due to various factors such as the presence of trismus,

xerostomia, and missing teeth. Trismus is commonly reported in patients with oral cancer post-surgically and can affect oral hygiene, speech, and swallowing functions. Further, trismus can be a major hurdle to the prosthetic management of these patients resulting in reduced articulation skills, and speech intelligibility. [9]

Table 1: Pre- and post-therapy scores of AB on speech and swallowing scales.

Measurement	Sub domains	Pre-therapy	Post-therapy
Tongue ROM assessment scale[8]	Overall score	31.25/100	56.25/100
Percentage of consonants correct (PCC)	Percentage	57%	60.66%
	Severity	Moderate to severe	Moderate to severe
Speech intelligibility	Rating	Can be understood with effort if context is known	Can be understood with concentration and effort by a sympathetic listener, requires two to three repetitions
Perceptual voice assessment	CAPE-V	Mildly deviant	Mildly deviant
Swallowing evaluation	GUSS	14/20 (moderate dysphagia with aspiration risk)	19/20 (slight dysphagia with aspiration risk)

Table 2: Pre-surgery, post-surgery, and post-therapy scores of AB on quality-of-life measures.

Measurement	Sub domains	Max. score	Pre-surgery	Post-surgery	Post-rehabilitation
UW-QOL[6]	Physical score	100	100	22.5	43.33
	Emotional score	100	95	40	60.83
EORTC – H&N35 (symptom subscale)[7]	Pain score	100	0	25	0
	Senses score	100	0	50	50
EORTC – H&N35 (functional subscale)	Swallowing score	100	100	50	50
	Speech score	100	100	0	12
	Social eating score	100	100	0	17
	Social contact score	100	100	34	47

Intensive speech and swallowing rehabilitation focusing on improving strength and range of oral structures can result in improving speech and swallowing abilities further in patients with head and neck cancer following surgery.[2,3] Presence of hypernasality in AB is one of the major causes for poor articulation skills and speech intelligibility, however, due to the presence of trismus, the palatal prosthesis could not be fitted to reduce hypernasality.[10]

The patient has exhibited in the overall quality of life in post-therapy evaluation as observed in the results on University of Washington – quality of life (UW-QOL) scale and EORTC head and neck 35 scales. The patient has reported improvements in the domains of physical, emotional sections of UW-QOL and has shown improvements in social eating score and social contact scores from post-surgery to post-rehabilitation phases. The patient also reported improvements in overall speech scores of EORTC-H&N 35 scale although it is negligible. The results indicate that the factors such as emotions, physical (appearance, swallowing, and speech production) and social contacts play an important role in improving the quality of life of patients underwent mandibulectomy surgery.[3]

CONCLUSION

The present study aimed at describing the speech and swallowing functions and quality of life of a patient with wide excision of mandibular and maxillary regions following oral cancer across pre-therapy and post-therapy. The present study reported the effectiveness of speech and swallowing rehabilitation in patients with partial mandibulectomy and maxillectomy in turn improving the overall quality of life. As the present study is limited to a single participant, further studies are warranted to establish evidence-based practices in speech and swallowing rehabilitation on a large population with head and neck cancers.

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