

In-depth Analysis of Salivary duct carcinoma of the parotid gland : A Silent Warrior : case report

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Abstract- Background: A 65-year-old male from Chawla colony Panipat presented with swelling in left side of face since two years.

Case Presentation:- A 65-year-old male presented with progressive increasing left facial swelling. According to the patient he was apparently well two years back. He started to complain in swelling in left side of face and neck for two years, which was insidious in onset and gradually progressing in size. There was no previous history of a mass in the same area or the neck. Patient came to Prem hospital where patient's Fine Needle Aspiration Cytology (FNAC) and Computed Tonography (CT) were recommended. Computed Tonography (CT) on 29 April showed irregular mass in the parotid gland. After that, on the same day Fine Needle Aspiration Cytology (FNAC) from the left parotid gland was done and diagnosed as malignant tumor of parotid gland leading to surgical recommendation.

Treatment and Outcome: - A surgery named as left peritonectomy was performed on 30 April. After surgery physiotherapy management was advised from the next day.

Conclusion: - The patient journey through diagnosis, treatment and post surgical rehabilitation highlights the complexity of managing parotid carcinoma and the importance of a multi disciplinary approach, including oncological, pulmonological and physiotherapy approach. More studies are needed to understand the origin of these tumors.

Keywords: Fine Needle Aspiration Cytology (FNAC), Computed Tonography (CT, parotid gland, carcinoma.

INTRODUCTION

The salivary glands are the most important as they play cogitative role and are also classified as major and minor. The major salivary glands are parotid, sub mandibular, and sublingual while buccal and labial are the minor salivary glands^{1,2}. Their main function is to secrete saliva in large quantities which is serous and mucous in character. During a twenty four hour period, approximately 1–4 L³ or 6–16 L is secreted in sheep.^{4,5} Histologically parotid salivary gland seems a serous gland in man, rodents and in all domestic animals while adenomeres and carnivores may have a

few mucous cells.^{3,4,5} The parotid duct leaves the gland at its ventral and rostral surface, coursing along the ventral and rostral border of the masseter muscle, as it is located between the muscle and the facial vein. It enters the oral cavity and opens into the papilla salivalis opposite to the upper second molar tooth.^{4,6,7} Human parotid glands are largest major glands and divided into superficial and deep lobes.⁸

Among all salivary gland malignancies epithelial-myoepithelial carcinomas account for less than 1%. Epithelial-myoepithelial carcinomas are considered as low-grade malignancies. As per the literature, involvement of the parotid gland is most frequent, and the minor salivary glands is rare.⁹

In the salivary glands, high-grade malignant tumor foci may be differentiated from low-grade malignancies. The main reason for this differentiation is not known.^{10,11}

Among all tumors of the head and neck, salivary gland tumors are uncommon, accounting for less than 3% and 0.6% of all neoplasms of the body. 80% of all salivary gland tumors have been occurred in the parotid gland, followed by submandibular gland, sublingual gland, and minor salivary gland. Among parotid tumors, 80% are benign and the pleomorphic adenoma is the most common type, followed by Warthin tumor. Malignant tumors are comparatively rare, and among these the most common primary neoplasms are mucoepidermoid carcinomas followed by adenoid cystic carcinoma.^{12,13,14,15} In addition, it has been noticed that tumors can occur at any age between 40–60 but malignant tumors of head and neck are more frequent in old age and those occurring in the parotid space increase¹⁶

Parotid tumors can present with a variety of clinical features depending on whether they are benign or

malignant, their size, location, and whether they involve surrounding structures. Signs of facial nerve weakness occur when the tumor is large or if it undergoes malignant change. The most common initial symptom is a painless mass or swelling in the parotid gland area. Benign tumors, such as pleomorphic adenomas, often grow slowly over months or years. Malignant tumors may grow more quickly and be associated with other symptoms. Minor salivary gland tumors may present with a variety of symptoms, including dysphagia, hoarseness, dyspnea, difficulty in chewing, and epistaxis dependent on the site of the tumor.

Surgical options: Surgical resection followed by radiation is the treatment of choice; however, locoregional recurrences and distant metastases have frequently been reported¹⁷. Surgical options may involve: 1. Superficial parotidectomy- includes the removal of the superficial lobe of the parotid gland. 2. Total parotidectomy – the removal of entire parotid gland including both superficial and deep lobe. 3. Partial parotidectomy- removal of a part of the parotid gland where the tumor is localized. 4. Extended parotidectomy- involves the removal of parotid gland and surrounding tissues if the tumor has invaded adjacent structures.

Nonsurgical interventions include Radiation therapy that is a medical intervention that targets cancer cells with high-energy beams like protons or X-rays. It is frequently used to shrink tumors before surgery or to eliminate cancers that cannot be surgically removed. Another nonsurgical intervention includes chemotherapy and immunotherapy. Chemotherapy uses drugs to kill cancer cells throughout the body. It is not typically the first line of treatment for tumors but may be used for advanced or metastatic malignancies.

Commonly used drugs include cisplatin, carboplatin. In immunotherapy, drugs that help the immune system recognize and attack cancer cells.

The present case study reviews the clinical data of a patient with parotid carcinoma in the deep lobe of the parotid gland and discusses the relevant literature. Written informed consent was obtained from the patient.

CASE DESCRIPTION: A 65-year-old male presented with swelling in left side of face for two years. According to patient’s statement he was apparently well two years back when he started to complain in swelling in left side of face and neck for two years which was insidious in onset and gradually increasing in size. There was no previous history of a mass in the same area or the neck. The patient came to prem hospital where patient’s fine-needle aspiration cytology (FNAC) and an enhanced computed tomography (CT) scan was recommended. An enhanced computed tomography (CT) examination was performed after admission on 29th April 2024, and there was a soft and irregular tissue shadow next to the left masseter muscle, involving the masseter muscle and the left parotid gland, considering the possibility of a malignant occupational lesion of salivary gland origin. The patient also underwent fine-needle aspiration cytology (FNAC), and the puncture fluid was sent for pathologic examination. The pathology report showed that the tissue sent for examination showed malignant tumor of parotid gland leading to surgical recommendation. On 30 April, a surgery called total parotidectomy (left) is conducted under general anesthesia. After surgery, physiotherapy management was recommended beginning the next day.

	Outcome Measures	Baseline Values	Post-Intervention		
1	Visual Analogue Scale (VAS)	2/10	6/10		
Shoulder Range Of Motion (ROM)					
2		Baseline Values (Lt)	Post-Intervention (Lt)	Baseline Values (Rt)	Post-Intervention (Rt)
a)	Shoulder Flexion	0-50°	0-100°	0-50°	0-160°
b)	Shoulder Extension	0-20°	0-35°	0-20°	0-50°
c)	Shoulder Abduction	0-60°	0-120°	0-60°	0-160°
d)	Shoulder Adduction	0-40°	0-40°	0-40°	0-40°
e)	Shoulder External Rotation	0-20°	0-40°	0-20°	0-80°
f)	Shoulder Internal Rotation	0-30°	0-50°	0-30°	0-80°

g)	Horizontal Abduction	0-40°	0-60°	0-40°	0-130°
h)	Horizontal Adduction	0-30°	0-50°	0-30°	0-80°
i)	Circumduction	0-120°	0-180°	0-120°	0-260°
3	Manual Muscle Testing				
a)	Pectoralis Major	3/5	4/5	4/5	4/5
b)	Pectoralis Minor	3/5	4/5	4/5	4/5
c)	Trapezius	3/5	4/5	4/5	4/5
d)	Rhomboids	3/5	4/5	4/5	4/5
e)	Levator Scapulae	3/5	4/5	4/5	4/5
f)	Deltoid	4/5	4/5	4/5	4/5
g)	Rotor Cuff	4/5	4/5	4/5	4/5
4	Assessment				
a)	Broncho-Pulmonary Auscultation	Baseline		Post Intervention	
		Vesicular		Vesicular	
b)	Oxygen Saturation	93		97	
c)	Respiratory Rate	18		20	
d)	Chest expansion	Inspiration	Expiration	Inspiration	Expiration
		2 cm	1 cm	3cm	2cm

POST-OP REHAB PRPTOCOL

Soon after parotidectomy, physiotherapy treatment began. One of the two main objectives of treatment is

recovery from recent surgery and impairments before surgery and other is two weeks physiotherapy treatment was provided to the patient. Intervention regimen is listed below in the table.

Week One	<ul style="list-style-type: none"> ➤ Chest PT and Shoulder PT Encourage deep breathing exercise Take deep breaths through nose and exhale through themouth hold each breath for 2-3 second, repeat for 5-10 minutes) (and percussion to prevent pulmonary complications. ➤ Stick exercises for mouth opening Exercise thrice a day. Increase the number of sticks as per the progression. ➤ Active Range of Motion Exercises for the shoulder joint mobility Full range shoulder mobility exercises and scapular movements. Aset of 20 reps thrice a day. ➤ Spirometry(10 -15 repetition 3-5 time per day)
Week two	<ul style="list-style-type: none"> ➤ Stick exercises for mouth opening Exercise thrice a day. Increase the number of sticks as per the progression. ➤ Shoulder joint stretches A set of 10 reps twice a day. ➤ Shoulder joint strengthening using weight cuffs 2 sets of 20 reps with 1 kg weight- twice a day. ➤ Home exercise program (At the time of discharge) Advice to follow the above protocol at home. Start with chewing light to hard substances from the affected side.

DISCUSSION

Parotidectomy is the surgical removal of cancerous tissue in the parotid gland. A 65-year-old man with malignant carcinoma of the parotid gland was recently operated and was referred to a physiotherapist for complaints of restricted mouth opening, difficulty in breathing, pain, reduced movements at the shoulder joint. Only a few

approaches had been shown to be beneficial in this condition, but a comprehensive treatment plan was necessary for a full recovery.

In current cases, physical therapy emphasizing chest physiotherapy and therapeutic exercise has shown significant results in patients with Carcinoma of parotid gland. The intervention aimsto reduce pain, increase shoulder range of motion, mouth opening, and prevent pulmonary complication and to promote

functional independence. As a result, we endeavored to merge these different approaches with the others to create an integrated therapeutic plan.

CONCLUSION

This case report provides an integrated detailed week-by-week physiotherapy rehabilitation programmed for patients who developed parotid gland carcinoma following parotidectomy. When the before and after treatment outcomes were compared, the physical therapy plan provided favorable results, which will help such patients recover sooner in the future. The commencement of the protocol early after the surgery aids in the patient's recovery from the surgery's secondary effects and allows him to soon regain his social life

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