CASE REPORT

Skeletal muscle metastasis of early glottis laryngeal carcinoma: a case report

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Abstract

Glottis cancer, a prevalent subtype of laryngeal malignancies, is frequently encountered in clinical practice in LMIC (Lower Middle Income Countries). This case report presents an extraordinary occurrence of T1 glottis cancer, shedding light on a rare clinical scenario. Typically, early-stage glottis cancers, including T1 tumours, exhibit a remarkable rarity of occult lymph node involvement, with estimates indicating a prevalence of less than five percent. However, in this significant case, seen at the Cyberknife and Tomotherapy Centre, Jinnah Postgraduate Medical Centre (JPMC), Karachi, in 2022, the patient faced a recurrence of the disease, manifesting within the sternocleidomastoid muscle—a highly unusual presentation. Notably, this recurrence occurred without any discernible involvement of cervical nodes or primary site, i.e. larynx.

Keywords: Glottic, Carcinoma, Radiation, Skeletal metastasis.

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Introduction

Glottis cancer represents the most prevalent sub-site of laryngeal carcinoma, accounting for nearly 75% of all cases. Early-stage glottis tumours, specifically those classified as T1, T2, and node-negative, are typically managed with radiation therapy (RT) alone, often utilising a hypo-fractionation regimen. Notably, early-stage glottis cancers exhibit a low prevalence of occult lymph node involvement, estimated to be less than five percent.[1] This case is reported due to the rare occurrence of skeletal muscle metastasis in early-stage glottis cancer, highlighting the need for continued surveillance even in low-risk cases.

Case Report

A 65-year-old male presented in September 2021 to the radiation oncology clinic at the Cyberknife and Tomotherapy Centre, Jinnah Postgraduate Medical Centre (JPMC), Karachi, with the chief complaint of progressive hoarseness persisting for four months, severely impacting his ability to speak. Notably, there was no history of dysphagia or weight loss.

Physical examination of the patient did not show any lesion in the oral cavity and, on palpation, there was no lymphadenopathy in both sides of the neck.

Fibre-Optic-Direct-Laryngoscopy (FODL) showed a lesion in left vocal cord characterised by intact mobility of both the vocal cords. Subsequently, a biopsy of the left vocal cord lesion confirmed a well-differentiated keratinising squamous cell carcinoma (SCC). A contrast-enhanced Computed Tomography (CT) scan of the neck revealed an 11x8mm ill-defined lesion on the left vocal cord, with subtle post-contrast enhancement. Notably, this lesion did not involve anterior commissure of the vocal cords. Furthermore, examinations of the pharynx and epiglottis showed no abnormal findings. However, CT-scan revealed an enlarged thyroid gland with ill-defined nodules. There was no adenopathy and the chest was clear on scan.

Considering T1 glottis lesion, the patient received definitive RT, delivered in a hypo-fractionated regimen of 65 Gray over 29 fractions using cobalt. This treatment was successfully completed in January 2022. Subsequent three-month post-treatment follow-up, including FODL and CT scan of head and neck with contrast, yielded normal results. The patient was placed on surveillance protocol involving FODL and CT scans every three months.

In October 2022, the patient presented with a small pea-sized nodule on the left side of the neck, prompting a CT of the neck. The CT scan identified sub-centimetre-sized non-specific bilateral cervical lymph nodes, with one on the left side measuring 2.1×0.8cm. An ultrasound-guided needle biopsy of the largest visible node confirmed metastatic SCC. The patient was evaluated by Head & Neck surgeon and was planned for neck dissection. Intraoperative findings revealed deposit embedded in the sternocleidomastoid muscle. He then underwent bilateral neck dissection along with resection of the skeletal

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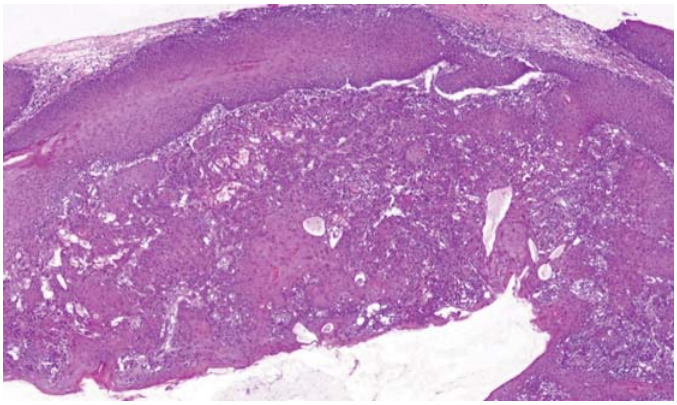

Figure-1: Histopathological slide with low power magnification showing clusters of malignant squamous cells infiltrating the stoma..

muscle mass. The final histopathology report indicated absence of metastasis in the bilateral neck nodes but revealed SCC originating from the larynx within skeletal muscle (Figure 1).

Following surgical intervention and discovery of SCC within skeletal muscle, the patient was advised to receive adjuvant RT targeting the neck, as the neck had not been previously addressed with radiation treatment. However, due to affordability constraints, the patient had to wait for his radiation treatment turn in a welfare setup. Within just six weeks of surgery, the patient developed swelling on the left side of the neck. A positron emission tomography (PET) scan of the entire body was conducted. This scan revealed a significant fluorodeoxyglucose (FDG) avidity with an SUV of 15.7 in the region of the left para-laryngeal lesion, extending superiorly up to the oropharynx. The mass extended craniocaudally approximately 6.3cm. However, no notable hyper metabolic cervical lymphadenopathy was observed, and no uptake was detected at the primary site of the larynx (Figure 2). The complex case was thoroughly reviewed by site-specific multidisciplinary tumour board. After extensive deliberation, the board reached a consensus to proceed with a biopsy of para-laryngeal lesion to confirm histopathology. The biopsy results confirmed presence of SCC.

Given the progression of the disease and confirmed histopathology, further resection was not possible so the patient underwent a comprehensive radiation treatment plan delivered via Helical Tomotherapy with Volumetric Modulated Radiotherapy, divided into three phases: Phase I targeted the whole pharynx, covered bilateral neck levels IB-V, and carefully spared the larynx to prevent toxicity from re-radiation; Phase II focused on the ipsilateral neck; and Phase III specifically targetted gross disease. The patient received a cumulative total dose of 70Gy to gross disease, distributed over three treatment phases with Phase I of 50Gy and Phase II of 16 Gy. Throughout the radiation treatment, the patient concurrently received weekly Cisplatin as a radio sensitizer, augmenting efficacy of RT. During the course of treatment, the patient experienced development of skin nodules. This unexpected development necessitated a re-evaluation of the treatment plan. Subsequently, re-

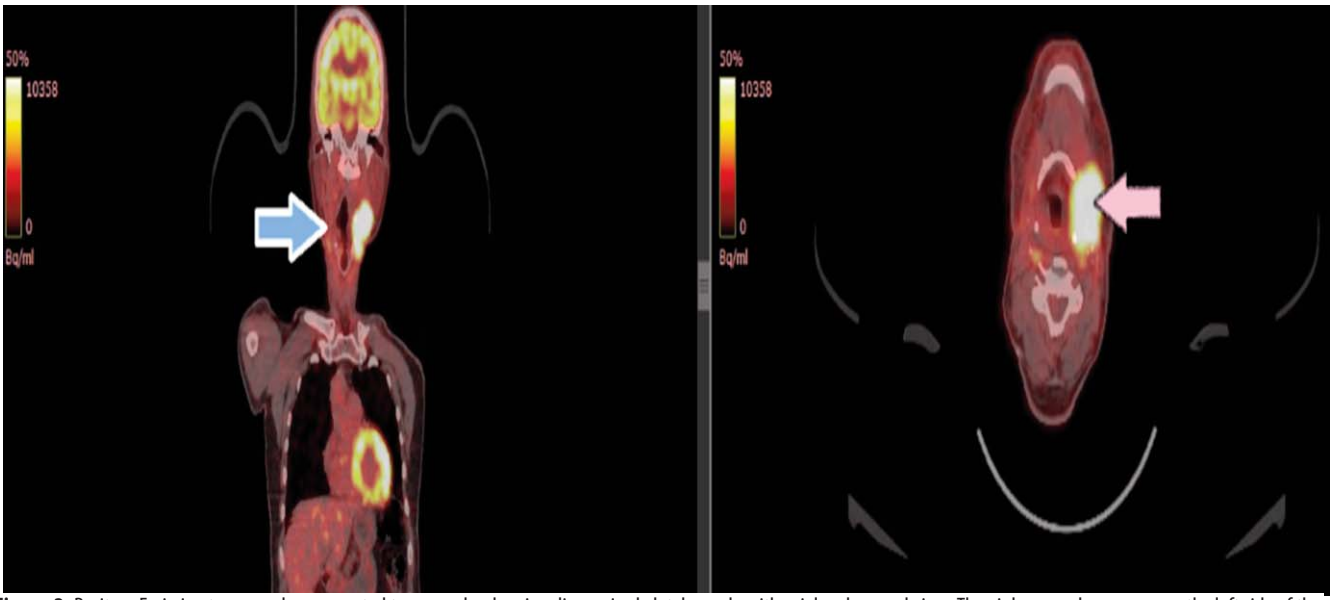

Figure-2: Positron Emission tomography–computed tomography showing disease in skeletal muscle with axial and coronal view. The pink arrow shows mass on the left side of the neck with FDG avidity. Blue arrow shows there is no disease in the primary site that is larynx.

planning was undertaken to incorporate coverage of these newly identified skin nodules within boost volume of 4 Gy.

The patient successfully completed the course of concurrent chemo-radiation; however, despite these efforts, the skin nodule continued to advance, extending all the way to the chest region. Unfortunately, the patient succumbed to relentless progression of the disease, passing away four months after the conclusion of chemotherapy and radiation treatment.

Informed consent from the patient and approval from the head of the department was obtained for publishing this study.

Discussion

Head and neck cancer is the seventh most common type of cancer and accounts for 4% of all cancer cases in the United States.[2] The overall prevalence of head and neck cancer in Pakistan was 18.7% in 2014.[3] In 2020, 49,127 cases of laryngeal cancer were reported in south-central Asia out of which 4,370 cases were recorded in Pakistan.[4]

Laryngeal cancer is more commonly reported in males due to substantial exposure to carcinogens like tobacco and alcohol.[5] Glottis cancer, a variant of laryngeal cancer, is a malignant lesion that arises from true vocal cords and anterior and posterior laryngeal commissures, has a comparatively better prognosis with minimal risk of local, nodal, and distant metastasis.[6] Early-stage glottis SCC is routinely treated with altered fractionation. It has been highly successful in controlling disease locally, with a toxicity profile similar to standard fractionation. In our case, the patient when diagnosed with T1 glottis cancer was treated with the same hypo-fractionated regimen as quoted in literature.[7]

Head and neck cancers commonly metastasise to the lungs, bones, and liver; however, glottis cancers have a comparatively negligible risk of metastatic spread, especially those in the early stages. These cancers metastasise to cervical lymph nodes. Distant metastasis in locally advanced laryngeal cancer is reported in 17% of the cases, lung being the most common site.[8] Globally, very few cases of early-stage glottis cancer with distant metastasis have been reported. In a case reported in 2014, the patient had locally advanced glottic cancer with cervical lymph node metastasis and extra-capsular extension. It was staged 4a and was treated with surgical excision initially. Approximately two months later, the patient presented with bilateral thigh masses, which upon further evaluation were diagnosed as metastatic lesions.[9] In a similar case reported in 2015, the primary lesion was treated with surgical resection and adjuvant radiotherapy. Post-operatively, the patient exhibited drowsiness and hypo-logia. CT-scan, and chest X-ray were all normal. However, MRI of the head revealed multiple enhancing lesions; hence, the patient was diagnosed with leptomeningeal spread. To the best of our knowledge, none of previous studies have ever demonstrated cases of skeletal muscle metastasis in neck secondary to early glottis laryngeal cancer.[10]

Skeletal muscle metastasis is extremely rare with a prevalence of about 0.1% clinically and 0.8% in autopsy studies.[3] Lung cancers are most common cancers to invade skeletal muscles, making up about 25% of skeletal muscle metastasis, followed by gastrointestinal cancer (21%), urological tumours (13%), genital tumours (9.3%), and breast cancer (8.2%). Recurrence of early glottis cancer in skeletal muscle is a rare phenomenon as reported in our case and has a dismal outcome. Treatment is tailored and an aggressive approach is used with curative intent if there is no metastatic lesion.

Recurrences in patients previously treated with radiotherapy are treated aggressively with re-irradiation. In this therapeutic approach, radiation is delivered via advanced and conformal technique such as Intensity-modulated RT (IMRT). IMRT is now being commonly used in practice due to its decreased toxicity profile and enhanced treatment efficacy in comparison to conventional radiotherapy.

Conclusion

A comprehensive and multidisciplinary approach is required for the management of glottis cancer. It underscores the need for ongoing surveillance, even in cases with a relatively favourable prognosis, to ensure early detection of any recurrence or metastasis.

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AUTHOR'S CONTRIBUTION:
FS: Idea, concept, design, data acquisition, analysis, interpretation and final approval.
DK: Writing, drafting and revision.
YA: Data interpretation and final approval.
SFAH: Drafting and revision.
TM: Agreement to be accountable for all aspects of the work