



Case Report

# Compound Pelvic Muscle Metastasis in Laryngeal Carcinoma

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## Abstract

Laryngeal carcinoma is a prevalent neoplasm affecting the respiratory tract and it typically occurs in the primary tissues of the larynx. Laryngeal cancer can spread through metastasis, direct extension, or bloodstream. Head and neck squamous cell cancer is a collective term for carcinoma of mucosal epithelium in oral cavity, pharynx, and larynx. We report a case of a 50-year-old man who initially presented with hip pain from an iliopsoas abscess and was found to have an uncommon presentation of head and neck squamous cell cancer spreading from bone to the compound pelvic muscle iliopsoas.

**Keywords:** Psoas abscess; Metastatic tumor; Head; Neck squamous cell cancer.

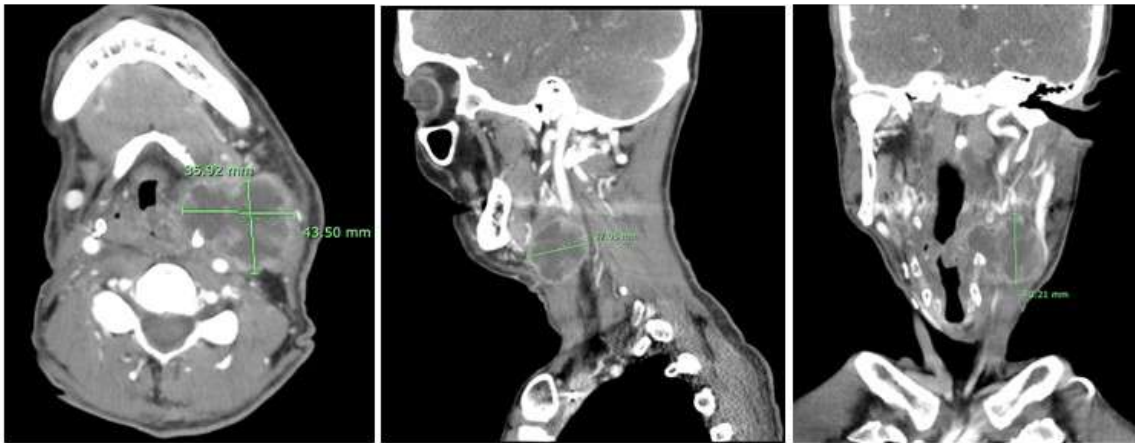
## Introduction

Head and neck squamous cell carcinoma (HNSCC) is a collective term for carcinoma of mucosal epithelium in oral cavity, pharynx, and larynx. In 2023, HNSCC accounted for approximately 4.5% of cancer diagnoses and deaths [1]. Distant metastases in HNSCC have an incidence around 10% at initial clinical presentation, with an additional 20-30% of patients developing distant metastasis as the disease progresses [2]. Metastasis of HNSCC often spreads to the nearby lymph nodes in the neck [3]. However, it may also, although less commonly, spread to distant organs such as the lungs, bones, and liver via hematogenous spread [3]. There have only been a handful of cases previously reported per literature review for patients with head and neck squamous cell carcinoma with skeletal muscle metastasis resulting in poor clinical outcomes [4-6]. Although skeletal muscle is most abundant tissue in the body, metastasis is very rare with the prevalence from 0.03 to 17.5% [7]. The psoas muscle is less

commonly associated with tumoral involvement and is more commonly linked to infectious processes such as abscess formation [8]. Early recognition and appropriate management are essential in these cases. The case presented here highlights the importance of considering rare metastatic sites in patients with head and neck squamous cell carcinoma. Clinicians should maintain a high index of suspicion for unusual presentations to ensure timely diagnosis and appropriate treatment.

## Case Presentation

A 50-year-old male with a past medical history of metastatic HNSCC with papillary thyroid carcinoma status post thyroidectomy, acquired hypothyroidism, gastroesophageal reflux disease and nephrolithiasis presented to the clinic with increased right hip pain and discomfort. At this time patient already had HNSCC had metastasized to liver, spine, lymph nodes and bone, including most recently tibia and right iliac region. CT soft tissue neck with contrast showed worsening malignancy causing mass effect on the airway, as seen in Figure 1.



**Figure 1:** CT Soft tissue Neck with contrast showing large necrotic left neck mass (green indicator) with significant displacement and mass effect on adjacent airway.

Magnetic resonance imaging (MRI) of the pelvis was done for the hip pain. It showed a 7-centimeter fluid collection that did not enhance, running down the right iliopsoas tendon. In addition, a 1.2cm non-enhancing hypointense lesion was discovered in the right posterior iliac bone, however this lesion had remained stable for two years. As a result, the likelihood of recurring malignancies was deemed to be extremely low.

Given the persistent hip pain, patient was sent to the hospital for interventional radiology (IR) guided fluid drainage that had extravasated into the iliopsoas muscle. A total of 15 cubic centimeters (ccs) of fluid was successfully drained without the presence of pus. Several days after the procedure, the patient continued experiencing heightened hip pain, accompanied by chills and a fever reaching a maximum temperature of 105°F. Hence, he was advised to return to the hospital for further evaluation.

In the emergency room, he was tachycardic with a heart rate of 119 beats per minute (bpm), and the complete blood count revealed leukocytosis of  $25.2 \times 10^3/\mu\text{L}$  with a left shift. The blood cultures showed no evidence of bacterial development; however, the fluid cultures from the drainage revealed the presence of red blood cells (RBCs) and white blood cells (WBCs). The patient was admitted to the hospital and started on ceftriaxone 1g and vancomycin 1g. CT abdomen and pelvis upon admission revealed a significant mass that had grown to a size of 8.7 x 6.2 cm, as seen in Figure 2.

Furthermore, it also showed an abscess in the right psoas muscle in the right iliac fossa, with necrotic tissue at the center. A scan-guided puncture biopsy of the psoas muscle mass revealed that the metastatic etiology of the tumor was squamous cell carcinoma. The metastatic psoas muscle mass was determined

to be a result of supraglottic carcinoma originating from the head and neck. Patient was already being treated with radiation and cabozantinib with pembrolizumab for the HNSCC.



**Figure 2:** CT Abdomen Pelvis on admission showed an increase in large mass measuring 8.7 x 6.2 cm indicating a right psoas muscle abscess in the right iliac fossa with central necrosis.

The infectious disease team was consulted. Patient was transitioned to IV ertapenem 1g and IV daptomycin 500 mg daily.

Salvage therapy with Palbociclib (IBRANCE) with cetuximab and radiation therapy to pelvis was done as the right hip mass was confirmed metastasis. Despite the right psoas drain, repeat CT scan of the abdomen and pelvis revealed regrowth of an abscess in the right iliopsoas muscle, measuring up to 15.5 cm, as see in Figure 3. The patient and his family refused chemotherapy or radiation at this time. The patient was transitioned to palliative care to manage his symptoms and improve his quality of life, despite the recurrence of the metastatic mass.



**Figure 3:** Repeat CT Abdomen and Pelvis showing a right psoas drain (yellow arrow) and a 7.1 x 10.2 x 15.5cm complex bilobed rim enhancing fluid collection within right iliacus and iliopsoas muscle. This shows that the fluid collection has increased in size.

## Discussion

The metastasis of HNSCC often extends to the adjacent lymph nodes in the neck. However, it may also, although less often, disseminate to remote organs such as the lungs, bones, and liver [9]. Although skeletal muscle is most abundant tissue in the body, metastasis are very rare with the prevalence from 0.03 to 17.5% [7]. There have been very few cases previously reported per literature review for patients with head and neck squamous cell carcinoma with skeletal muscle metastasis [4,5].

Explaining the scarcity of metastases in skeletal muscle is challenging due to the high vascularity of skeletal muscle and its composition, which makes up over 50% of the body's overall mass [9]. There is one hypothesis suggesting that the synthesis of lactic acid by skeletal muscle impedes the growth of tumor cells [9]. Another proposition is that the circulation in blood vessels and shifting tissue pressures in skeletal muscle, regulated by beta adrenergic receptors, could influence tumor implantation [9]. Lastly, the muscle contains proteases and other inhibitors that successfully impede the invasion and development of tumors [9]. According to the available literature, there are three important pathophysiological mechanisms that explain the causes of muscular metastasis. First proposed mechanism states that muscular metastases can develop by hematogenous spread through arterial vessels [8]. Second proposed mechanism states that malignant tumors can metastasize into the musculature via venous vessels, especially through the paravertebral venous plexus. The paravertebral veins exhibit many connections to both the inferior vena cava and the mesenteric venous system [10]. Finally, the third proposed mechanism states that muscular metastasis can originate in intramuscular aberrant lymph nodes, especially in the psoas muscle [10].

In our case, the iliopsoas abscess presented in the setting of metastases. An iliopsoas abscess can be classified as primary or secondary. A primary iliopsoas abscess makes up 30% of all cases and usually happens when bacteria spread from a hidden source through the blood or lymphatic system [11]. Secondary cases emerge as the result of local diffusion from adjacent infected tissues [11]. The microbes commonly responsible include *Staphylococcus aureus*, *Escherichia coli*, *Bacteroides* species, and *Mycobacterium tuberculosis* [11]. The most frequently observed diseases associated with secondary iliopsoas abscess are Crohn's disease, appendicitis, ulcerative colitis, diverticulitis, colorectal carcinomas, urinary system infection and instrumentation, vertebral infections and osteomyelitis, and septic arthritis [11]. Muscle metastases are rare in all types of primary cancer. The muscles that are often most impacted are the iliopsoas and paraspinous muscles [12]. The presence of these metastases suggests the very aggressive character of the underlying tumor [12]. It has been reported in patients with multiple sites of metastasis, the prognosis will not exceed 5 years; however, patients with a solitary muscle metastasis tend to have a more favorable survival outcome [12]. The management of muscle metastases is not well standardized due to infrequency of the diagnosis. If there is a single metastatic lesion, the recommended course of action is to surgically remove it, along with the administration of further chemotherapy as a supplementary treatment. Alternatively, combining excision and/or local radiation with adjuvant chemotherapy has shown favorable outcomes in terms of patient survival [12]. Overall, the treatment approach for muscle metastases should be individualized based on the patient's specific circumstances and overall health. Collaborating with a multidisciplinary team can help optimize outcomes and provide the best possible care for these patients.

## Conclusion

Metastasis of skeletal muscle in head and neck squamous cell carcinoma is rare but can occur and present with symptoms such as muscle pain or weakness. It is important to monitor for any signs of metastasis to distant organs in patients with head and neck squamous cell carcinoma, as it can impact treatment decisions and prognosis. This case highlights the importance of thorough evaluation and consideration of all possible metastatic sites in patients with advanced cancer and timely follow up.

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**Ethics approval statement:** Not applicable

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**Clinical Trial Registration:** Not applicable.

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