



Squamous Cell Esophageal Cancer: A Peculiar Case and Pattern of Metastasis to the Ring Finger

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Abstract

This manuscript presents a patient with squamous cell carcinoma of the esophagus with metastasis to the right ring finger. Bony metastasis is a rare yet well-established occurrence in esophageal cancer; this literary search procured nine other published case reports of isolated ring finger metastases from esophageal cancer. In addition to the patient's hospital course, report will discuss the diagnostic and prognostic implications of his unusual clinical finding, deliberate upon the proposed mechanisms of metastasis in the current medical literature, and *via* analysis of other published cases, this case report highlight a predilection of esophageal cancer metastasis to the ring finger.

Introduction

The incidence of esophageal cancer in the US remains relatively low, ranking as the 18th most common cancer diagnosis (1%), however often portending a very poor prognosis when diagnosed, with the overall 5-year survival estimated only at 19.2% [1]. While many risk factors contribute to developing esophageal cancer, the ingestion of tobacco, especially of nitrosamines, is believed to have the highest correlated risk of esophageal cancer, both in the number and the duration of cigarettes smoked [2].

Esophageal cancer metastasis of the bone particularly that of acrometastasis; is presumed to be the rarest of their kind [3]. As such, the pathophysiology of esophageal cancer and its presentation in the phalanges is limited in the medical literature, and warrants further explanation. These unexpected metastases to the hand and phalanges are more commonly from lung tumors and less likely to originate from the gastrointestinal system.

These lesions can masquerade in a variety of clinical presentations, from fungating masses, cystic lesions, to herpetic whitlow. And their clinical significance can vary anywhere from firm to soft, tender or non-tender, asymptomatic to functionally debilitating. As a result, acrometastases lend themselves to diagnostic puzzles. X-ray findings have shown completely dissolved bone, which may be a hallmark of this type of metastasis. Here we present a case where esophageal metastasis to the right ring finger was found on exam as firm, non-tender and erythematous mass around the proximal interphalangeal joint.

Case Presentation

A middle-aged man with a past medical history of 10 pack-years of cigarette use was evaluated for dysphagia of two month's duration. CT scan of his chest showed a right subcarinal and paraesophageal mass measuring 6.5 cm × 2.9 cm × 5.4 cm which was biopsied *via* bronchoscopy. His lymph node excisional biopsy showed poorly differentiated squamous cell carcinoma and his right endobronchial mucosal biopsy showed rare focal atypical cells.

Squamous cell esophageal carcinoma was initially diagnosed as cT4bN2M0, but due to his calf and ring finger erythema and swelling which were later confirmed to be metastases, he was actually cT4bN2M1-stage IV-B at diagnosis [4]. Figures 1 and 2 shows the radiographs displaying expansile; destructive mass lesions within the right fibula and right fourth middle phalanx.

In addition, he had two bronchoesophageal fistulas which required esophageal stenting *via* esophagogastroduodenoscopy, which showed two ulcerated mucosal defects noted at 27 cm and 33 cm from the incisors, as well as mucous seen oozing from these sites which confirmed the fistula locations. A non-obstructing Schatzki ring was also present during the examination.

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Figure 1: Right lower extremity radiograph.



Figure 2: Right hand radiograph.

His case was discussed with our multidisciplinary tumor board and was recommended for treatment with concurrent chemoradiotherapy. His oncologist planned to start treatment, however the patient soon developed acute hypoxic respiratory failure requiring intubation and was admitted to the medical intensive care unit. Emergent bronchoscopy demonstrated near-complete neoplastic occlusion of the distal right mainstem bronchus which caused a post-obstructive pneumonia. A second tracheobronchoscopy was performed to dilate the right mainstem bronchus as well as debulk some of the invading tumor. Figure 3 depicts a patent right mainstem bronchus status-post airway dilation and tumor debulking.

He was extubated, treated for the pneumonia, and discharged home. His family was eager to start chemotherapy with 5-fluorouracil and cisplatin, however, due to the rapid progression of his disease and subsequent loss of airway anatomy, hospice was recommended.

Discussion

Metastases to the hand are uncommon in all cancers. It is estimated that only 0.1% of metastatic disease originating from any type of neoplasm reveals itself in the hand [5]. This is likely because the hand bones are distally located, contain little red marrow, have minimal capillary networks, and sluggish blood flow [6]. Esophageal carcinoma most commonly metastasizes to liver, bones, lungs, adrenal glands, and brain. In one review of unexpected esophageal cancer metastases by Shaheen et al. [7], approximately 9% of published cases had metastases to the extremities. The 60% of extremity metastasis cases were squamous cell carcinomas, and tended to be later stage cancers with 80% at stage III or IV at time of diagnosis.



Figure 3: Rigid and flexible tracheobronchoscopy- right mainstem bronchus.

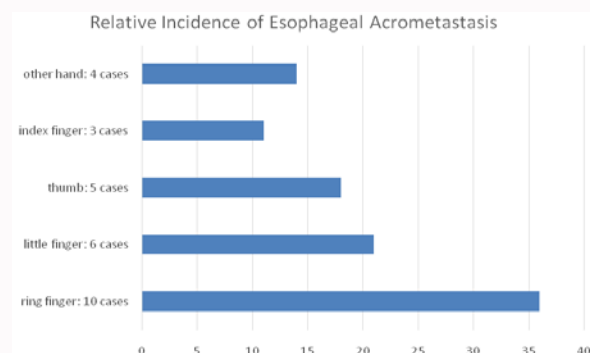


Figure 4: Chart depicting percentage of the relative incidence (x-axis) of esophageal acrometastasis by location (y-axis).

The pathophysiology of bone metastasis in esophageal cancer warrants further elucidation. In a 2013 review of 221 reported cases of metastases to the hand by Afshar et al. [6], 72 originated from the lungs and 55 originated from gastrointestinal tumors (esophageal, stomach, or colorectal). In 30% of reported cases, hand metastasis was present at the time of diagnosis. The occurrence of unexpected metastasis to distal anatomy like the fingers is not fully explained by lymphatic or venous routes alone. Although tumors almost always metastasize *via* veins rather than arteries, the unexpected presentation of these metastases may be explained by an arterial route. The esophagus is supplied by three groups of arteries, the inferior thyroid artery, thoracic aortic branches, and the gastric artery, which offer several metastatic routes. Another proposed mechanism of metastasis to the hand is from pre-existing lung involvement with the primary esophageal tumor. Compared to other organs, the lungs contain the most extensive access to the systemic arterial supply, whereas in non-pulmonary cancers, hepatic and pulmonary capillary beds usually prevent the hematogenous spread of cancer [6]. Thus, our patient's lung involvement may have been a major contributor to his acrometastasis. Another interesting proposed mechanism of acrometastasis is the predilection of distal anatomic structures to trauma, especially the hand. Trauma releases chemotactic factors and prostaglandins which may make the digits more hospitable to metastasis.

Considering these pathways helps one understand the way in which acrometastasis from esophageal cancer can occur in the fingers and hand. After review of established case reports, there appears to be a peculiar, preferential pattern of esophageal metastasis to the ring finger, as shown in Figure 4. This is observed in our patient as well as in nine other case reports [3,6,8].

The detection of distant soft tissue and bony metastasis may

have both diagnostic and prognostic implications. It may serve as a diagnostic sign for esophageal cancer in patients who present with other red flag symptoms, such as unintentional weight loss, symptomatic anemia, hematemesis, dysphagia, or persistent vomiting. Unfortunately, acrometastasis signifies a more disseminated disease process and is a major cause of treatment failure in these patients [9]. And because bone metastasis is believed to portend a poor prognosis in comparison to other metastatic sites, the therapeutic goal of palliation is warranted, which may include analgesia, radiation or even amputation [5]. Although further validation is needed, the clinical presentation of digital metastasis, particularly to the fourth metacarpal, may be an indicator of esophageal cancer with lung involvement.

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