

## **A late-presenting deltoid metastasis in a male in his 30s with an adenocarcinoma of the colon, a case report**

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**ABSTRACT: Introduction:** Adenocarcinoma of the colon is the 4th most common malignancy globally with an age-standardized incidence rate of 6.1/100.000 males in South-Central Asia. The most common sites of metastasis for colorectal adenocarcinoma are the liver, lung, peritoneum and bone via lymphatic, hematogenous or direct spread. Metastases to skeletal muscles are rare and estimated to constitute less than 1% of all

metastases. We present a case of a delayed adenocarcinoma of the colon metastasis in the left deltoid muscle.

**Case presentation:** A man in his 30s, presented at our hospital with right lower quadrant abdominal pain, and weight loss. Biopsy showed a poorly-differentiated mucin-secreting adenocarcinoma which was treated with chemotherapy and a hemicolectomy. Seven years later, he presented with complaints of left shoulder pain and swelling. Biopsy of the deltoid muscle showed a pathology report consistent with the previous malignancy in the caecum; metastatic poorly-differentiated adenocarcinoma. A surgical wide marginal excision of the lesion with therapeutic intent was performed.

**Conclusion:** Metastases to skeletal muscles are rare and their detection and timely treatment depend highly on provider's index of suspicion. The presence of a painful muscle mass in a patient with a prior history of a carcinoma must be evaluated carefully for possible metastases even if common sites are clear.

## Introduction

Adenocarcinoma of the colon is the 4th most common malignancy globally with an age-standardized incidence rate of 6.1/100.000 males in South-Central Asia(1). The most common sites of metastasis for colorectal adenocarcinoma are the liver, lung, peritoneum and bone via lymphatic, hematogenous or direct spread(2). Metastases to skeletal muscles are rare and estimated to constitute less than 1% of all metastases(3). Although, the way in which tumors metastasize to the skeletal muscles remain an area open for study, considering the relative resistance of the muscle cells to the tumor, the most probable route seems to be hematogenous(4). The likelihood of developing a muscle metastasis depends on several factors, including the primary tumor site, the primary tumor's stage and grade, and the type of primary tumor(4,5). Certain primary tumors such as sarcomas and melanomas have a higher incidence of metastasizing to the skeletal muscles compared to carcinomas(6).

Areca nut, also known as Betel nut, is the seed of the Areca nut, and is sold as a chewable substance, often mixed with tobacco or other products. An estimated 600 million people globally chew some form of Areca nut during their lifetime(7,8). Areca nut is a known carcinogen that cause oral and esophageal preneoplastic lesions with a very high risk for

progression to cancer.(8) Recently limited evidence became available that it could be potentially linked to hepatic cancer as well.(8) Animal models have found a potential link between Betel nut use and other gastro-intestinal (GI) cancers including colon cancer, and more recently anecdotal evidence from Taiwan has shown increased odds of developing colorectal polyps and colorectal cancer with Betel nut use(7,9,10). However, the International Agency on Research on Cancer currently considers this evidence insufficient to establish a solid link between Betel nut use and GI cancers beyond oral, esophageal, and liver cancers. We present a case of a delayed adenocarcinoma of the colon metastasis in the left deltoid muscle in a man in his 30s from the South Asia region.

### Case report

A male in his 30s and current Betel nut user, with an otherwise unremarkable personal and family history, presented at our hospital with umbilical and right lower quadrant abdominal pain, and weight loss. A colonoscopy and biopsy were done, which revealed a polypoidal mass in the caecum. The biopsy showed a poorly-differentiated mucin-secreting adenocarcinoma. The patient was scheduled for a right hemicolectomy in the same month. The pathology report of the intra-operatively obtained specimens was consistent with the previous result and described a poorly-differentiated adenocarcinoma invading through the muscularis propria into the sub-serosal adipose tissue with clear margins and 11 out of 23 recovered lymph nodes were involved.

The patient was referred for adjuvant chemotherapy and was prescribed a regimen of six cycles of oxaliplatin. The patient dropped out of the chemotherapy after two cycles and did not seek further care at our clinic until three years later owing to financial problems. When he presented again at the outpatient clinic that year, he was asymptomatic and was prescribed a follow-up CT abdomen and colonoscopy. The patient underwent the CT abdomen which showed no recurrence of the tumor to date and no metastatic disease. He did not undergo the colonoscopy and did not attend any further follow-up consultations due to social taboos.

Seven years after his initial diagnosis of his adenocarcinoma of the colon, he presented at the outpatient clinic with complaints of left shoulder pain and swelling. He received a Magnetic Resonance Imaging (MRI) of the left shoulder at another tertiary care hospital

prior to the consultation at our clinic. The MRI revealed a 6x15x13 mm lesion involving the anterolateral part of the left deltoid muscle. The T2 images showed a streak of fluid along the whole deltoid muscle and a solid lesion with an intensity that did not correlate with muscular tissue; no other muscle involvement was mentioned in the MRI report. The axillary lymph nodes were enlarged; however, no lesions were found in the osseous structures. A subsequent flourodeoxyglucose positron emission tomography scan confirmed the lesion in the left shoulder (Figure 1-3) and multiple metastatic lymph nodes in the axilla and retroperitoneum in addition to the lesion in the left deltoid muscle. The chest and abdominal viscera were disease-free. An incisional biopsy of the deltoid muscle lesion done and the pathology report was consistent with the results of the previous malignancy in the caecum; metastatic poorly-differentiated adenocarcinoma.

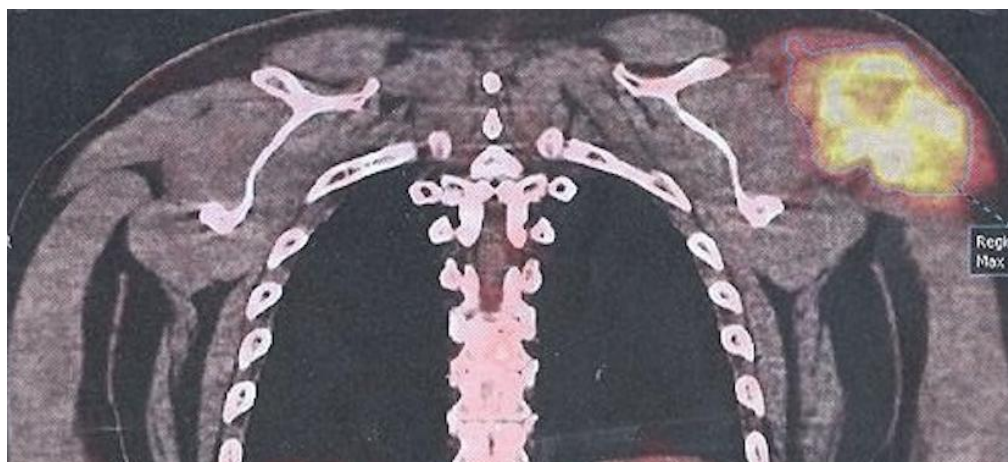
At the time of presentation to the other tertiary care hospital, based on the patient's history and aggressive clinical examination findings, along with his personal habit of frequent betel nut use, differentials of neoplastic aetiology (for example: liposarcoma and leiomyosarcoma) and infection (soft tissue complicated abscess / osteomyelitis) were considered. Furthermore, as there was a clear cut history of being operated for adenocarcinoma in the past, an emphasis on the possibility of metastasis was also borne in mind. Keeping in view the aforementioned details, the patient was advised a baseline blood investigation panel, to rule out infection, chronic disease state; regional magnetic resonance imaging for the evaluation of the lesion and metastatic workup comprising computed tomography of the chest-abdomen-pelvis along with flourodeoxyglucose positron emission tomography scan.

Based on the aforementioned findings, and after a tumor board discussion, the patient was referred for a cycle of neoadjuvant chemotherapy during which he was administered six cycles of doxorubicin and cisplatin. Furthermore, he also underwent eight cycles of radiotherapy to the shoulder. He received a post-chemotherapy and post-radiotherapy MRI about a year after the initial metastatic findings which demonstrated a solid lesion in the left deltoid muscle, now extending into the left triceps muscle; which was not involved in the prior year's MRI. Since, the tumor did not shrink as we had expected another tumor board meeting was then sought and a treatment plan was discussed.

A surgical wide marginal excision of the lesion with therapeutic intent was proposed by the tumor board. Using a utilitarian incision, the deltoid, part of the triceps, and supra- and infraspinatus muscles were removed along with the entire scapula en bloc with the tumor. The teres major, minor and the subscapularis muscles were preserved and the humeral head was hinged to the clavicle using a non-resorbable Ethibond suture. During the post-operative course, the patient developed a surgical site infection and was treated with wound irrigations and debridement, and IV antibiotics. After resolution of his surgical site infection, he was referred for seven cycles of adjuvant radiotherapy and three cycles of adjuvant chemotherapy.

As examined in the last clinical follow up, 2 years ago, after the sessions of adjuvant chemotherapy for the metastatic lesion, his only complaint was pain at the surgical site. Apart from this, the patient reported no ongoing or persistent side-effects of the chemotherapy and was in a generally healthy condition. Physical exam findings showed a healed surgical scar with minimal induration and a maculopapular lesion along the periphery of the scar. He was advised another magnetic resonance imaging of the involved region to rule out recurrence. The patient did not return after this encounter. As of December 2023, the patient has not followed up at our clinic despite multiple attempts to reach him. We eventually got in touch with the patient's family, who informed us about the patient's demise three months after his last out-patient consult in 2022. The patient did not undergo an MRI as advised by his medical team. He refused any further management and accepted his fate. Autopsy after the demise was not done due to social taboos and religious beliefs.

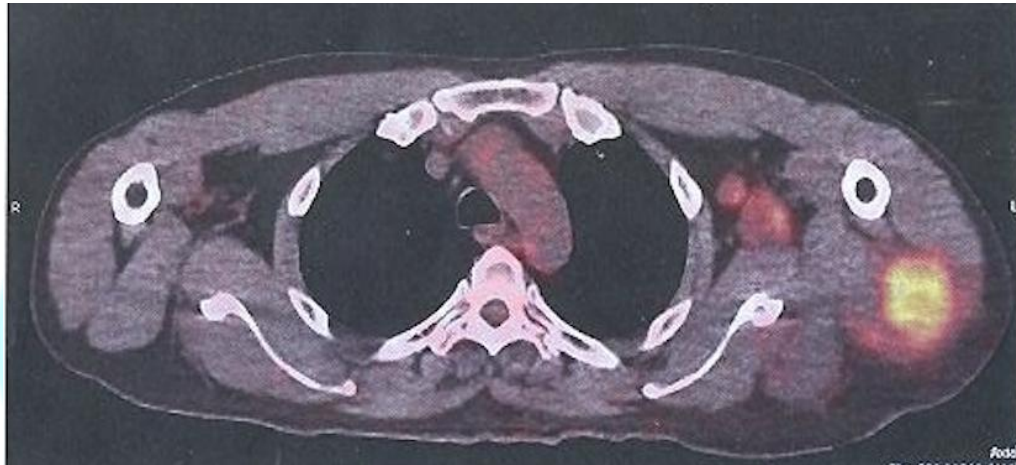
### **Figures**



**Figure 1:** Axial plane PET scan, cranial aspect of the lesion



**Figure 2:** Axial plane PET scan, caudal aspect of the lesion



**Figure 3:** Coronal plane PET scan, caudal aspect of the lesion

## Discussion

The majority of patients with a skeletal muscle metastasis are asymptomatic, and skeletal muscle metastases tend to be an incidental finding on follow-up radiological exams such as MRI or PET-CT scans(11,12). In symptomatic patients, such as our patient, patients often present with vague, localized symptoms such as pain, swelling and muscle weakness that can easily be misinterpreted as a common side effect of generalized fatigue or the ongoing cancer treatment(4,5). Though imaging modalities have improved tremendously over the past decades and chances of diagnosing skeletal muscle metastases has increased, patients are still at risk of a delayed diagnosis compared to patients with more common metastases, which could negatively impacted the patients' outcome. As in our case, adequate imaging, diagnosis and referral was obtained, but at another hospital by a non-oncological department because symptoms were initially considered unrelated to the prior cancer

diagnosis. Diagnosing skeletal muscle metastases thus poses their own specific clinical and radiological challenges and depend predominantly on the provider's index of suspicion. We recommend providers to maintain skeletal metastases as part of the differential diagnosis, especially in former or current cancer patients with new or unusual symptoms involving muscle tissue. This is especially important for non-oncological orthopedic surgeons or rheumatologists who will probably constitute the first-line specialists consulted by patients with vague muscle complaints.

Adherence to long-term treatments is known to be difficult, and when patients aren't adequately supported by their communities and health systems, unwanted side-events and outcomes can present. The patient in our case showed non-adherence to his prescribed treatment on several occasions throughout his treatment journey. Even though, this case is set in a low-resource setting, the challenges that come with patients' non-adherence are not limited to these settings. The mix of non-adherence and the underlying socio-economic and health system factors that facilitate non-adherence can also easily be found in high-income countries among uninsured, undocumented or low-income families.

Our patient was a Betel nut user, which put him at an increased risk of certain carcinomas, although not necessarily the GI carcinoma he ended up developing, and it may have even served as a distraction rather than a supporting clue towards the correct direction. Our case describes a rare intersection of specific medical, societal and behavioral factors leading to the development of a rare metastatic lesion. This case reaffirms the importance of seeing and treating patients taking their wider societal and social context into consideration. Even though the patient survived his metastatic disease, the morbidity of having a total scapulectomy and adjuvant chemotherapy and radiotherapy should not be underestimated. Part of this morbidity could most likely have been avoided if the patient would have stayed in treatment over a decade ago if contextual factors would have allowed for it.

### **Conflict of interest**

The authors declare no conflict of interest.

### **Ethics approval**

Not applicable

**Consent to participate**

Not applicable

**Written consent for publication**

Written consent for publication was obtained from the patient's next of kin

**Availability of data and material**

Not applicable

**Code availability**

Not applicable

**Authors' contributions**

The following authors were responsible for drafting of the text, sourcing and editing of clinical images, investigation results, drawing original diagrams and algorithms, and critical revision for important intellectual content: Jabbar Ghufraan Syed, Kazim Hussain, Muhammad Danish Khan, Syed Ali Anwer Jilani, Manon Pigeolet

The following authors gave final approval of the manuscript: Jabbar Ghufraan Syed, Kazim Hussain, Muhammad Danish Khan, Syed Ali Anwer Jilani, Manon Pigeolet

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### Figure legends

- Figure 1: Axial plane PET scan, cranial aspect of the lesion
- Figure 2: Axial plane PET scan, caudal aspect of the lesion
- Figure 3: Coronal plane PET scan, caudal aspect of the lesion