Rectal Carcinoma Metastases to Multiple Skeletal Muscles-Role of F-18 FDG PET/CT

Abstract

Rectal carcinoma with metastasis to skeletal muscle is rare. So far, 16 cases of skeletal muscle metastasis from colorectal carcinoma have been documented of which only 5 were rectal carcinomas.[1] We discuss here the case of a 69-year old male, a known case of mucinous adenocarcinoma status post neoadjuvant chemoradiotherapy and abdomino perineal resection, who presented with low backache 4 months post surgery. He was found to have metastasis to multiple skeletal muscles without the involvement of common sites, such as liver and lung. The role of 18-FDG–PET/CT in such cases is rarely reported in the literature. This case highlights the importance of utilizing 18-FDG-PET/CT in detecting sites of skeletal muscle metastasis and thereby guides appropriate management.

Keywords: *18-FDG–PET/CT, carcinoma rectum, skeletal muscle metastasis*

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Introduction

Globally, colorectal carcinoma (CRC) is the third most commonly diagnosed cancer in males and the second in females.[2] Liver is the most common site of metastasis, followed by lung, peritoneum, and bone.[3] Previous studies have suggested that the skeletal muscle tissue may be involved but is usually a part of later stages of colorectal carcinoma with disseminated disease.[4] So far, 16 cases of skeletal muscle metastasis from colorectal carcinoma have been documented of which only 5 were rectal carcinomas.[1] The possible mechanism of metastatic spread of adenocarcinoma of colon and rectum to the skeletal muscles could be by lymphatics, hematogenous route, or direct extension of primary disease, and by manipulation during surgery.[3]

Here, we report the findings of 18 - FDG PET CT in a rare case of carcinoma rectum post neoadjuvant chemoradiotherapy and abdomino perineal resection, on follow up who was detected to have multiple skeletal muscle metastases. This case also demonstrates unusual occurrence of metastases to multiple skeletal muscles without involvement of common sites, such as liver and lung. The importance of 18-FDG–PET/CT in localizing the metastatic sites involved throughout the body and thereby arriving at the optimal management care for the patient is highlighted in this case.

Case Report

A 69-year-old male presented with history of constipation and painful defecation associated with occasional bleeding per rectum. On rectal examination, a mass was palpable at 4 cm from the anal verge. Biopsy from the mass showed adenocarcinoma with signet ring cell features. He then received neoadjuvant chemoradiotherapy followed by abdomino perineal resection. Sections of the rectal

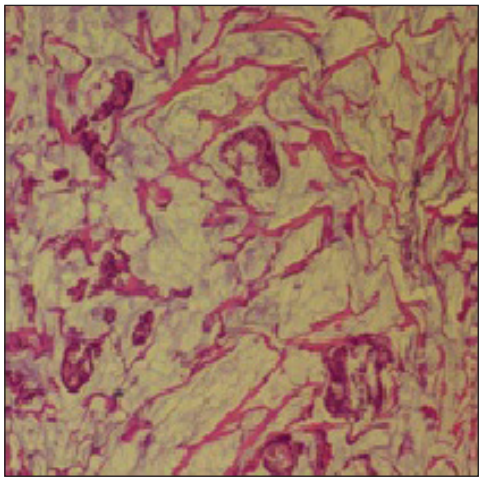

Figure 1: H and E (10×)—section of the rectal mass showing tumor cells floating in pools of mucin consistent with mucinous adenocarcinoma.

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mass showed tumor cells floating in pools of mucin consistent with mucinous adenocarcinoma; pT3N2, Dukes C1; circumferential margin involved [Figure 1]. The patient was started on tablet capecitabine. Four months later, the patient presented with severe low back ache. Suspecting metastatic disease as the cause, the patient was advised for 18-FDG-PET/CT for further evaluation.

The patient was requested to fast for 6 hours prior to 18-FDG-PET/CT examination. After 60 minutes of 10 mCi intravenous injection of 18-FDG, whole body images (vertex to mid thigh) were acquired in 3D mode, using a dedicated BGO PET-CT scanner. Reconstruction of the acquired data was performed to obtain fused PET-CT images in transaxial, coronal, and sagittal views. The 18-FDG-PET/CT maximum intensity projection image showed multiple areas of patchy uptake, predominantly in the abdomen, bilateral shoulder, and thigh regions [Figure 2]. Post-surgical changes of abdomino perineal resection and colostomy were seen with no abnormal FDG uptake. There was no evidence of local recurrence/abnormal hypermetabolic lymph nodes. Peripheral enhancement with FDG uptake was seen in hypodense lesions involving erector spinae muscles (SUVmax 5.2 in the right erector spinae muscle at the level of T3 T4 vertebra and SUVmax 5.3 in the left erector spinae muscle at the level of L3/4 vertebra) [Figure 3]. FDG uptake was seen in hypodense lesions involving multiple skeletal muscles namely left sartorius muscle with SUVmax 3.9 [Figure 4], left vastus lateralis muscle (SUVmax 4.9), left infraspinatus muscle with SUVmax 2.9 [Figure 4], left levator scapulae muscle (SUVmax 3.4), left 10th intercostal muscle laterally (SUVmax 3.0), and right subscapularis muscle (SUVmax 3.6). Biopsy correlation was recommended from the left erector spinae muscle at the L3/4 vertebral level. The patient then underwent CT guided biopsy of the FDG avid lesion in the left erector spinae muscle. Histopathology showed a similar picture of the primary lesion with tumor cells floating in pools of mucin and also highlighted by an Alcian-blue PAS special stain, consistent with metastatic mucinous adenocarcinoma [Figure 5].

Discussion

Metastasis to skeletal muscles is very rare. Several mediators released by muscle cells namely TNFα, TGFβ, lymphocyte infiltrating factor, interferon γ, lactic acid, and plasminogen activator inhibitor exert an inhibitory effect on the growth of several human tumor cell lines. Also, muscle sarcolemma itself is a physical barrier against tumor cells.[4] In a retrospective study, records of 8492 patients were examined and skeletal muscle metastases in 18-FDG-PET/CT were determined in 73 (0.86%) patients. Sources of metastasis were: lung 34%, gastrointestinal tract 18%, breast 14%, genitourinary malignancy and lymphoma 8%, melanoma 7%, and other malignancies 4%.[5] They usually manifest as

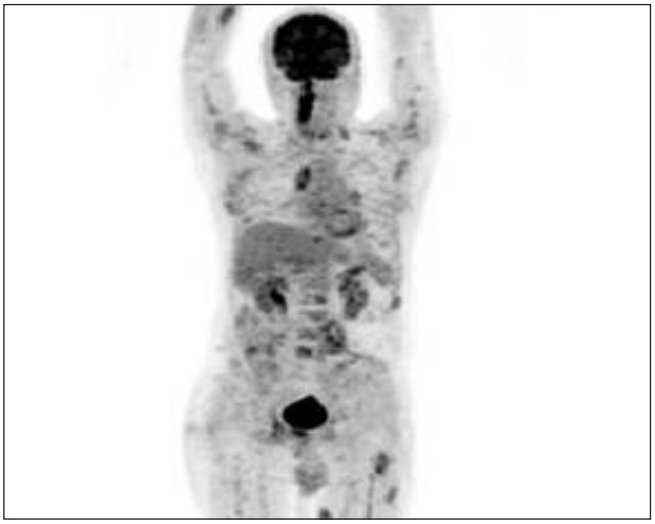

Figure 2: 18 - FDG PET CT maximum intensity projection image showing multiple areas of patchy uptake, predominantly in the abdomen, bilateral shoulder and thigh regions

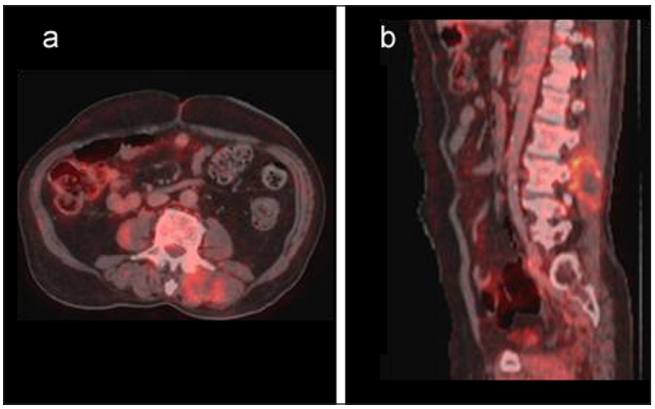

Figure 3: Transaxial and sagittal fused 18 - FDG PET CT images show uptake in peripherally enhancing hypodense lesions in the left erector spinae muscle at the level of L3/4 vertebra with SUVmax 5.3

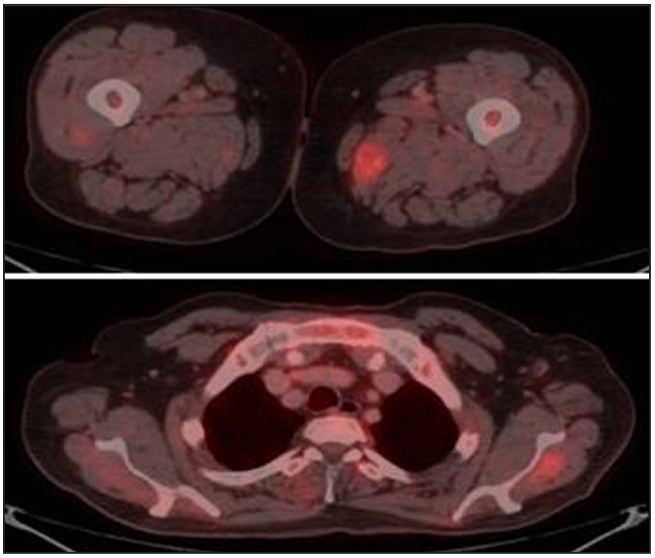

Figure 4: Transaxial fused 18 - FDG PET CT images show FDG uptake in peripheral enhancing hypodense lesions involving left sartorius muscle with SUVmax 4.9 and left infraspinatus muscle with SUVmax 2.9

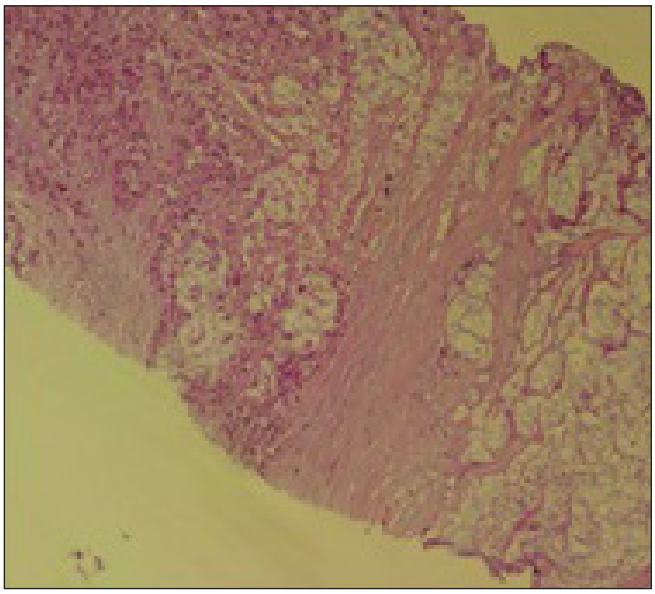

Figure 5: H and E (10×)-section of the core biopsy from the erector spinus muscle also showed tumor cells floating in pools of mucin consistent with metastatic mucinous adenocarcinoma

painful masses of size 2–12 cm. Skeletal muscle metastases from colorectal carcinoma are very rare. Many imaging modalities (US/ CT/ MRI) have been tried to characterize these lesions, but biopsy is a must for diagnosis.[3] The role of 18-FDG-PET/CT in such cases has not been explored. According to the NCCN guidelines, 18-FDG-PET/CT in colorectal carcinomas is to be considered if there are suspected recurrence of lesions following therapy. This case highlights the importance of doing 18-FDG-PET/CT as it helped in not only identifying all the involved metastatic sites but also help guide biopsy for definite diagnosis. The present case also focuses on the importance of keeping rectal carcinoma as a differential diagnosis in evaluating skeletal muscle metastases from unknown primary sites.

Conclusion

Incidence of metastases to skeletal muscle is rare and that from rectal carcinoma is rarely reported in the literature. This is an unusual case of rectal carcinoma with metastases to multiple skeletal muscles without involvement of primary sites such as liver and lung. Also, the utility of 18-FDG-PET/CT has been highlighted for localizing the involved sites of metastases and guide appropriate management.

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Conflicts of interest

There are no conflicts of interest.

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