CASE REPORT

Rectal adenocarcinoma presenting with thigh muscle metastasis as the only metastatic site

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SUMMARY

Rectal carcinoma with metastasis to skeletal muscle is a rare finding. According to literature review, 17 cases of skeletal muscle metastasis from colorectal carcinoma have been documented where only six cases were rectal carcinomas.

We discuss a case of a middle-aged man with a known history of high-grade mucinous adenocarcinoma of the rectum, status post abdominoperineal resection followed by adjuvant radiotherapy and chemotherapy. During the planned chemotherapy course, a right proximal thigh subcutaneous mass was incidentally found which on subsequent biopsy proved to be metastatic from rectal primary site. On subsequent 18F-FDG (Fluorodeoxyglucose) positron emission tomography (PET)/CT scan after completion of chemotherapy for the purpose of treatment response evaluation, only FDG-avid lesion was residual right proximal thigh metastatic mass without involvement of other common sites, such as liver and lung. In this case, the 18F-FDG-PET/CT scan was able to exclude additional metastatic sites and also evaluate the patient's treatment response.

BACKGROUND

Skeletal muscle metastasis is a very rare condition, accounting for less than 1% of metastasis, due to the improper environment of musculature for tumour growth.^{1 2} Despite its rare nature, it is reported in a large variety of primary malignancies including lung,³ lymphoma,⁴ renal cell carcinoma,⁵ gastrointestinal tract tumours,⁶ ovarian, thyroid, pancreatic and breast,⁷ with lung being the most common primary neoplasm.⁸ Occasionally, skeletal muscle metastases are asymptomatic and are diagnosed incidentally on imaging such as MRI, CT scan and positron emission tomography (PET)/CT scan.⁷ Colorectal carcinomas are second and third most common cancers among men and women, respectively,⁹ with 50 260 deaths from the disease in 2017 in the USA.¹⁰ Most common metastatic sites for these tumours include liver, lung and peritoneum.¹¹ Metastasis to musculature from colorectal carcinomas are rather rare and from recent review of English literature only 17 cases were reported and among them rectal carcinoma was the primary site for only six cases.⁹ Here, we report the findings of 18F-FDG PET/CT scan in a rare case of high-grade rectal mucinous adenocarcinoma, status post surgical resection and adjuvant radiotherapy and chemotherapy, who was detected to have single skeletal muscle metastasis in proximal

right thigh musculature. This case demonstrates the unusual occurrence of single metastasis to skeletal muscles without the involvement of other common sites, such as liver and lung. The importance of 18F-FDG PET/CT in excluding other metastatic sites throughout the body and assessment of treatment response is also highlighted in this case.

CASE PRESENTATION

This is a 48-year-old man with a known history of high-grade mucinous adenocarcinoma of the rectum (figure 1), status post abdominoperineal resection in September 2014, Page 3 of 5 December 2016, followed by adjuvant radiotherapy completed in May 2017 and chemotherapy completed in March 2018. During chemotherapy course in November 2017, a right proximal thigh subcutaneous mass was incidentally found. Subsequent biopsy and immunohistochemical (IHC) investigation demonstrated a metastatic lesion from the rectal adenocarcinoma as primary tumour site. Subsequently, the patient underwent 18F-FDG PET/CT scan on 29 May 2018 at the end of planned chemotherapy course for the purpose of treatment response evaluation. The only FDG-avid lesion was residual right proximal metastatic mass without involvement of other common sites, such as liver and lung (figure 2).

INVESTIGATIONS

Biopsy from the subcutaneous right proximal thigh mass and further IHC evaluation demonstrated metastasis from colon as primary site.

Figure 1 Atypical epithelial cells invading striated muscle (10×20).

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Figure 2 Distant metastatic site as FDG-avid intermuscular mass lesion in proximal right thigh.

DIFFERENTIAL DIAGNOSIS

Residual hypermetabolic right proximal thigh mass lesion on 18F-FDG PET/CT in this patient may suggest an inflammatory/infectious process. However, this is less likely because there is no other FDG-avid lesion on the PET/CT scan. Also contrary to our case, inflammatory/infectious process tends to spread locally and is usually associated with predisposing factors such as recent surgical intervention.

TREATMENT

The patient underwent wide tumour excision through abdominoperineal resection on diagnosis, followed by adjuvant radiotherapy and chemotherapy completed on March 2018.

OUTCOME AND FOLLOW-UP

Following 18F-FDG PET/CT scan in our department which demonstrated residual right proximal tumorous mass lesion with no evidence of other FDG-avid metastatic lesion, the patient became a candidate for tumour excision (metastasectomy) followed by additional course of chemotherapy.

DISCUSSION

Different studies investigated the rate of muscular metastases from autopsies and have shown that only 16%–17.5% of all

metastases are involving musculature.⁸ Skeletal muscle metastases from colorectal carcinomas are rare. These metastases are usually indicative of disseminated disease and imply a poor outcome with median survival from 5 to 12 months.¹² So far, few related case reports have been published in the literature. Prabhu *et al* reported a case of rectal adenocarcinoma, with biopsy-proven multiple metastases to skeletal muscles, including erector spinae and thigh muscles which were initially detected on 18F-FDG PET/CT scan. They concluded that 18F-FDG PET/CT is a useful modality for localising metastatic sites and guiding the management.⁹ Unsal *et al* also reported metastasis to forearm muscle in a 31-year-old man with a history of mucinous rectal adenocarcinoma without other sites of metastasis. In most reports, skeletal metastases are found in disseminated disease, but in the latter case, it was the only site for metastatic disease, and the patient was not in the terminal stage. As in our case, skeletal muscle was the only site of metastatic disease with no sign of metastasis to common sites, such as lung and liver.¹³ Different mechanisms for metastasis to skeletal muscles are proposed. These include lymphatics, haematogenous, muscle trauma and surgical implantation.^{2 11} In the case reported by Tunio, they found two sites of muscular metastasis in gluteus maximus and rectus abdominis muscles in a 28-year-old man with known colon adenocarcinoma. They hypothesised that the

possible mechanism for metastasis in this patient is by implantation of tumour cells during surgery.¹¹ A comprehensive review on skeletal muscle metastases about primary tumour type, prevalence and radiological features has been published by Surov *et al* stating that most commonly involved muscles by metastases from various primary tumour sites are pelvic and paravertebral musculature.¹⁴ To the best of our knowledge, this is the eighth case being reported in the literature of a primary rectal carcinoma with single metastasis to skeletal muscles.

Learning points

- ▶ Colon/rectal carcinoma metastasis to skeletal muscles is a rare finding, but should be considered when suspicious lesions/masses are encountered in known patients.
- ▶ 18F-FDG positron emission tomography (PET)/CT scan is a valuable tool to evaluate these patients, in search for possible other metastatic sites.
- ▶ 18F-FDG PET/CT scan is a valuable tool to evaluate treatment response in patients with metastatic colon/rectal carcinoma and can guide further treatment strategy.

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REFERENCES

- 1 Lohiya V, Lohiya S, Windsor K. A large thigh mass: a blood clot or a rare skeletal muscle metastasis from renal cell carcinoma. *Springerplus* 2013;2:399.
- 2 Nocuri A, Chrapko B. Multiple and solitary skeletal muscle metastases on 18F-FDG PET/CT imaging. *Nucl Med Commun* 2015;36:1091–9.
- 3 Purandare NC, Rangarajan V, Pramesh CS, *et al*. Isolated asymptomatic skeletal muscle metastasis in a potentially resectable non-small cell lung cancer: detection with FDG PET-CT scanning. *Cancer Imaging* 2008;8:216–9.
- 4 Dai Y, Sowjanya M, You J, *et al*. Non-hodgkin's lymphoma of multiple skeletal muscles involvement seen on FDG PET/CT Scans. *Medicine* 2015;94:e833.
- 5 Gözen AS, Canda AE, Naser M, *et al*. Painful leg: a very unusual presentation of renal cell carcinoma. *Urol Int* 2009;82:472–6.
- 6 Domínguez ML, Rayo JJ, Serrano J, *et al*. Uncommon isolated distant subcutaneous tissue and skeletal muscle metastasis from oesophageal cancer diagnosed by 18 F-FDG PET/CT. *Revista Española de Medicina Nuclear e Imagen Molecular* 2016;35:38–41.
- 7 Khandelwal AR, Takalkar AM, Lilien DL, *et al*. Skeletal muscle metastases on FDG PET/CT imaging. *Clin Nucl Med* 2012;37:575–9.
- 8 Heffernan E, Fennelly D, Collins CD. Multiple metastases to skeletal muscle from carcinoma of the esophagus detected by FDG PET-CT imaging. *Clin Nucl Med* 2006;31:810–1.
- 9 Prabhu M, Raju S, Sachani H. Rectal carcinoma metastases to multiple skeletal muscles-role of F-18 FDG PET/CT. *Indian J Nucl Med* 2017;32:214.
- 10 Siegel RL, Miller KD, Fedewa SA, *et al*. Colorectal cancer statistics, 2017. *CA Cancer J Clin* 2017;67:177–93.
- 11 Tunio MA. Skeletal muscle metastasis secondary to adenocarcinoma of colon: a case report and review of literature. *J Gastrointest Dig Syst* 2013;S12:002.
- 12 Plaza JA, Perez-Montiel D, Mayerson J, *et al*. Metastases to soft tissue: a review of 118 cases over a 30-year period. *Cancer* 2008;112:193–203.
- 13 Unsal DC, AytuuUner AP, Üzum N, *et al*. Metastatic rectal adenocarcinoma to forearm muscle: An unusual site of metastasis. *Turkish Journal of Cancer* 2005;35:181–5.
- 14 Surov A, Hainz M, Holzhausen HJ, *et al*. Skeletal muscle metastases: primary tumours, prevalence, and radiological features. *Eur Radiol* 2010;20:649–58.

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