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Latissimus dorsi free flap reconstruction of major abdominal defect in treatment of giant Marjolin's ulcer: a short report focused on preoperative imaging

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Abstract

We present a case of a 56-year-old man with a giant carcinoma in the abdominal wall. Based on positron emission tomography/computed tomography (PET/CT) scan there were FDG-avid lymph nodes in the ipsilateral axillary and groin, suspicious for metastases. At contrast-enhanced CT the parietal peritoneum seemed free of tumor invasion, which was essential to radical surgery planning. The tumor was completely removed with clear margins of resection and no metastasis in the resected lymph nodes. The PET/CT scan was repeated after 4 months, showing no signs of recurrence.

Keywords

Positron emission tomography (PET), surgery, metastases, soft tissues/skin, computed tomography (CT)

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Introduction

The term ''Marjolin's ulcer'' describes the formation of malignant tumors in chronically inflamed skin such as non-healing ulcers or previously traumatized, burned, or scarred skin. Epidermoid malignant tumors, such as squamous cell carcinomas, basal cell carcinomas, and malignant melanomas account for over 90% of Marjolin's ulcers (1). Usually the patient sustains tissue damage with scarring or chronic ulcer for several decades prior to diagnosis. ''Acute'' transformation just a few months after primary injury is also described, however significantly less frequent (1,2). The pathophysiology, of Marjolin's ulcer is hypothetically multifactorial (1,3,4). A chronic ulcer or scar suddenly changing in characteristics is highly suspicious of cancer and should lead physicians to perform a diagnostic survey. Symptoms such as fever, malaise, and weight loss are typically absent (5). Marjolin's ulcers are generally recognized as very aggressive tumors with high mortality rate when regional lymph node metastases or distant metastases are present (3). The metastatic rate varies between studies, but is generally reported to be approximately 30% (3,4).

The diagnosis may be difficult to establish due to necrotic areas and areas without malignant transformation (6). In a recent retrospective study, fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) was found to be helpful in the differentiation between malignant and benign ulcers (7).

Case report

A 56-year-old man was admitted to the hospital with a 20×25 cm giant ulcer on the right upper quadrant of the abdomen. Destroying underlying subcutaneous

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tissue and muscles, the ulcer was covered by malodorous necrosis and surrounded by a discrete peritumoral inflammation (Fig. 1). Fifteen years earlier a small pedunculate skin lesion had been removed from the area without performing histological annalysis on the removed specimen. After 3–4 years without symptoms, a small ulcer appeared in the same area with slow increase in size. One year prior to admission tumor size accelerated rapidly with increase in exudate and malodor, but no pain was reported. He had a high administrative position in a large company. His medical history was uneventful. He was in good general condition at the time of admission. Blood analysis showed mild anemia with a hemoglobin level of 6.6 mmol/L (ref 8.0–10.0) and mild hypoalbuminemia of 26 g/L (ref 37–48). White blood cell count was 11.9*10-9/L (ref 3.0–10.0) and C-reactive protein was 199 mg/L (ref <10).

Initial punch biopsies were performed showing low-differentiated basosquamous cell carcinoma with numerous mitoses and perineural growth. Based on the PET/CT scan (including low-dose CT without contrast enhancement) (Fig. 2a) there were FDG-avid ipsilateral axillary (Fig. 2b and c) and groin lymph nodes, suspicious of metastases. Furthermore a few lymph nodes less suspicious of metastases were identified in the contralateral axilla (Fig. 2d and e) and in the parasternal region. At contrast-enhanced CT, performed 1 week earlier, the parietal peritoneum seemed free of tumor invasion, which was essential to surgery planning (Fig. 3).

During surgery a simultaneous resection of lymph nodes in the ipsilateral axilla and groin was performed, because of the findings at PET/CT. The entire ulcer was excised with a wide margin of 3 cm including the underlying costa and peritoneum, leaving a 10×10 cm peritoneal defect (Fig. 4). Reconstruction was executed with a large free latissimus dorsi musculocutaneous flap enforced with a Vipromeche and a combined Monocryl and Prolene mesh. The thoracodorsal vessels were anastomosed micro-surgically to the deep inferior epigastric artery and vein, with immediate good perfusion of the flap. The donor site was covered with a split thickness skin graft.

Fig. 1. The 56-year-old patient as he presented at the time of admission to hospital.

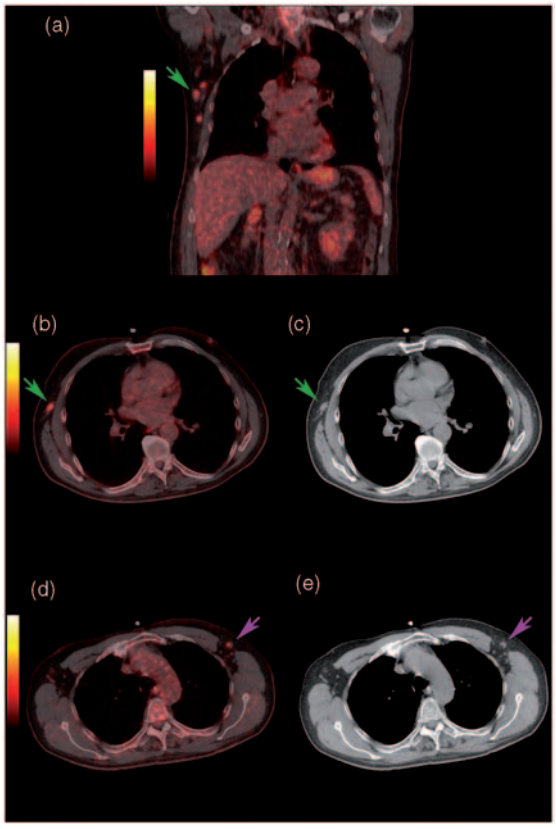

Fig. 2. Preoperative PET/CT: coronal (a) and transaxial (b, c) images from PET/CT and CT demonstrating FDG-avid, marginally enlarged right axillary lymph nodes with eradicated fatty hilus, suspicious of metastases (green arrows). On left side transaxial (d, e) PET/CT and CT images demonstrated less FDG-avid lymph nodes with preserved fatty hilus, suggestive of inflammation (purple arrows).

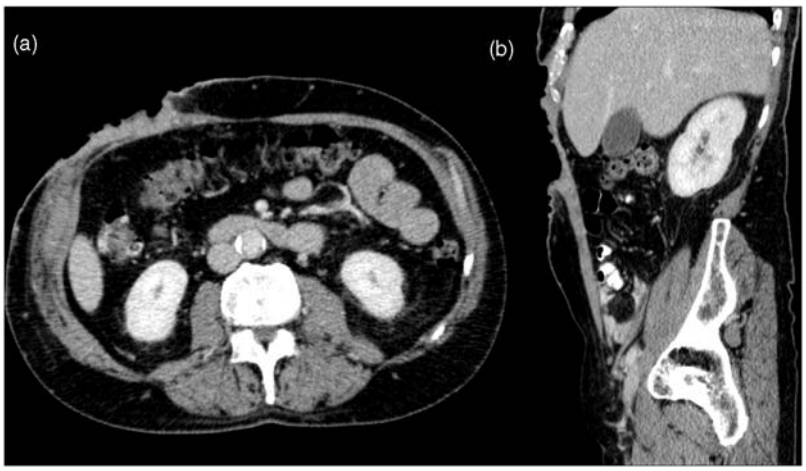

Fig. 3. Preoperative contrast-enhanced CT: transaxial (a) and sagittal (b) image without signs of tumor invasion into the parietal peritoneum.

Fig. 4. Peroperative image. After resecting the tumor with a margin of 3 cm including underlying ribs and peritoneum, there was a large peritoneal defect exposing the ventricle, liver, and intestines, all macroscopically unaffected.

The tumor was completely removed with clear margins of resection and surprisingly no metastasis in the resected lymph nodes. Postoperative recovery was uneventful (Fig. 5). PET/CT scan was repeated after 4 months, showing no signs of recurrence.

Discussion

The diagnostic reference standard of Marjolin's ulcer is the punch biopsy. However, in the case of a giant tumor like the one in question, it is unlikely a single biopsy would be diagnostically representative for the entire lesion and biopsy should be guided by metabolism imaging like FDG-PET/CT (7). In cases of deep dermal invasive limb lesions, amputation has been suggested rather than wide local excision (7,8). This emphasizes the need for imaging assistance in staging and surgery planning.

Fig. 5. Two months postoperatively displaying the surviving flap on the abdomen and the donor site on the back. There was no hernia in relation to the flap. The patient was given intense physiotherapy leaving him with only minor limitations in range of motion of the right arm.

In the assessment of the tumor site, PET/CT was highly suggestive of involvement of the abdominal muscles, but at contrast-enhanced CT the parietal peritoneum seemed unaffected. Tumor invasion into the

parietal peritoneum would obviously exclude the patient from radical surgery.

Although regional lymph nodes are the most frequent site of metastasis, liver lung, brain, kidney, and other distant metastases can also be observed (9). In a tumor of the size and location presented in the current case, sentinel node biopsy would be pointless. Not only would engagement of bilateral axillary and groin lymph nodes be expected, but could potentially also involve lymph node regions unavailable to biopsy, for instance in the parasternal region. Whole body PET/CT was useful in the evaluation of lymph nodes, and in guiding lymph node resection selectively. Ipsilateral lymph nodes metastases could not be ruled out due to the FDG uptake and the appearance on CT which showed marginally enlarged nodes with an eradicated fatty hilus. On the contrary the contralateral lymph nodes were less FDG-accumulating and had a preserved fatty hilus on CT, as observed in inflammatory lymph nodes (10). A drawback is, of course, that PET/CT may not be able to detect micrometastases (11).

FDG-PET/CT was very useful to exclude distant metastases in the patient, which is a recognized feature of PET/CT in skin cancer (12). Moreover PET/CT was excellent to follow-up and monitor the patient after surgery, when lymph node metabolism had normalized.

In conclusion, the limitation of FDG-PET is, being an unspecific modality, the uncertainty of differentiating between metastatic and inflammatory lesions. Of the resected lymph nodes, none proved to be metastatic at biopsy. The reason of the positive PET/CT was most likely infection and inflammation in the giant ulcer.

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