Case Report

Metastasis to skeletal muscle from gastric adenocarcinoma: a case report and literature review

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Received November 3, 2015; Accepted January 5, 2016; Epub February 1, 2016; Published February 15, 2016

Abstract: Gastric carcinoma is one of the most common malignancies in the world, but skeletal muscle metastatic lesions arising from gastric carcinoma are rare. We report here a rare case of an 87-year-old female patient with skeletal metastasis following surgery of gastric carcinoma. Gastroscopy examination showed a tumor located in the anastomotic stoma and gastric biopsy demonstrated poorly differentiated adenocarcinoma. The patient underwent total gastrectomy and Roux-en-Y reconstruction with D2 lymph node resection, followed by subsequent chemotherapy. Four months after the operation, the patient developed a left gluteal mass. After surgical resection of the mass, pathological examination showed a metastasis from gastric adenocarcinoma for the mass. After a systemic examination using ultrasonography, computed tomography (CT) and magnetic resonance imaging (MRI), no other metastatic lesions were found. No additional chemotherapy or radiotherapy was applied thereafter. The patient recovered well after surgery and did not show any signs of relapse during the follow-up period. Unfortunately, she died of a traffic accident nine months after resection of the metastatic mass. In order to get a better understanding of its incidence, clinical manifestation, diagnosis, therapy and prognosis, we further reviewed 13 cases of skeletal muscle metastases from gastric carcinoma worldwide since 1984.

Keywords: Stomach neoplasms, neoplasm metastasis, skeletal muscle

Introduction

Gastric carcinoma ranks fifth in terms of incidence and third in terms of cancer-related deaths worldwide [1]. Its most common metastatic sites are regional lymph nodes, abdominal peritoneum, liver, lungs, bones and adrenal glands. Metastasis of gastric carcinoma to skeletal muscle distant from the primary gastric carcinoma is extremely rare. We reported here a case of an 87-year-old female patient with skeletal metastasis following remnant gastric carcinoma surgery. In order to get a better understanding of its incidence, clinical manifestation, diagnosis, therapy and prognosis, we further reviewed 13 cases of skeletal muscle metastases from gastric carcinoma worldwide since 1984.

Case report

An 87-year-old Chinese woman was admitted in the department of Gastrointestinal Surgery, The First Affiliated Hospital of Wenzhou Medical University on April 30, 2014 due to progressive weight loose, fatigue and low-grade fever. She was normal in vital signs on admission. She had no abdominal pain, no nausea or vomiting, no hematemesis, and no change in bowel habits. On admission, she was 152 cm in height and 35 kg in weight. She had a temperature of 37.4°C, heart rate 82 beats/min, and blood pressure 116/57 mmHg. She was a non-smoker and had not been taking any medication. She had a history of subtotal gastrectomy 29 years ago, cholecystectomy 21 years ago and colectomy for colon carcinoma 10 years ago. She had lost 5 kg of weight over the past 5 months. On physical examination, the abdomen was soft and flat, a mild tenderness was presented beneath the xiphoid process, the liver and the spleen were not palpable, and no abdominal mass was palpable, no swelling supraclavicular lymph nodes were presented. Gastroscopy examination showed a swelling lesion located...
in the anastomotic stoma, the lesion displayed mucous membrane hyperaemia, oedema, become fragile, easy hemorrhage (Figure 1). Gastric biopsy from the lesion demonstrated poorly differentiated adenocarcinoma (Figure 2). The patient underwent total gastrectomy and Roux-en-Y reconstruction with D2 lymph node resection on May 13, 2014. A swelling tumor measuring 5×6 cm was observed in the anastomotic stoma. The tumor had infiltrated into the serosal layer but did not invade the adjacent organs. There were no signs of metastasis in the transverse colon, Douglas pouch and mesentry. The lymph nodes around the stomach were not swelling or hard. The operation was successful. The pathological examination of the resected specimen showed moderately to poorly differentiated adenocarcinoma (Figure 3A). Tumor vascular invasion was observed (Figure 3B). Pathological examination of the retrieved lymph nodes detected no tumor metastasis. According to the Japanese classification of gastric carcinoma [2], the tumor was classi-
Skeletal muscle metastasis from gastric carcinoma

Table 1. Reported cases of skeletal muscle metastases from gastric carcinoma

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Sex</th>
<th>Muscle site of metastasis</th>
<th>Treatment</th>
<th>Survival time*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosenbaum et al.</td>
<td>1984</td>
<td>54</td>
<td>M</td>
<td>Upper arm; femoral</td>
<td>Radiotherapy, chemotherapy</td>
<td>2 months, died</td>
</tr>
<tr>
<td>Van et al.</td>
<td>1993</td>
<td>47</td>
<td>F</td>
<td>Extraocular</td>
<td>Managed conservatively</td>
<td>Not described</td>
</tr>
<tr>
<td>Sudo et al.</td>
<td>1993</td>
<td>61</td>
<td>M</td>
<td>Trapezius</td>
<td>Radiotherapy, chemotherapy</td>
<td>5 months, died</td>
</tr>
<tr>
<td>Ghonekar et al.</td>
<td>1997</td>
<td>75</td>
<td>M</td>
<td>Abdominal wall; left axilla</td>
<td>Resection</td>
<td>Not described</td>
</tr>
<tr>
<td>Oba et al.</td>
<td>2001</td>
<td>70</td>
<td>M</td>
<td>Left lumbar; iliopsoas</td>
<td>Not described</td>
<td>2 months, died</td>
</tr>
<tr>
<td>Kondo et al.</td>
<td>2002</td>
<td>64</td>
<td>F</td>
<td>Gluteus maximus; adductor magnus</td>
<td>Radiotherapy, chemotherapy</td>
<td>8 months, died</td>
</tr>
<tr>
<td>Tuoheti et al.</td>
<td>2004</td>
<td>48</td>
<td>M</td>
<td>Buttock</td>
<td>Resection</td>
<td>6 months, died</td>
</tr>
<tr>
<td>Tuoheti et al.</td>
<td>2004</td>
<td>89</td>
<td>M</td>
<td>Shoulder</td>
<td>Radiotherapy</td>
<td>10 months, alive</td>
</tr>
<tr>
<td>Souayah et al.</td>
<td>2008</td>
<td>49</td>
<td>M</td>
<td>Right lateral rectus</td>
<td>Radiotherapy</td>
<td>2 months, died</td>
</tr>
<tr>
<td>Plaza et al.</td>
<td>2008</td>
<td>55</td>
<td>F</td>
<td>Abdominal wall</td>
<td>Not described</td>
<td>Not described</td>
</tr>
<tr>
<td>Tuoheti et al.</td>
<td>2009</td>
<td>71</td>
<td>M</td>
<td>Right deltoid</td>
<td>Radiotherapy, chemotherapy</td>
<td>13 months, alive</td>
</tr>
<tr>
<td>Pergolini et al.</td>
<td>2014</td>
<td>67</td>
<td>M</td>
<td>Right adductor</td>
<td>Chemotherapy</td>
<td>2.4 months, died</td>
</tr>
<tr>
<td>Lourenco et al.</td>
<td>2014</td>
<td>68</td>
<td>M</td>
<td>Deep muscular planes of the right thigh</td>
<td>Chemotherapy</td>
<td>Not described</td>
</tr>
<tr>
<td>Present case</td>
<td>2015</td>
<td>87</td>
<td>F</td>
<td>Gluteus maximus</td>
<td>Resection</td>
<td>9 months, died</td>
</tr>
</tbody>
</table>

*Survival time after diagnosis of skeletal muscle metastasis.

Discussion

Skeletal muscle metastasis is rare for all kinds of primary malignancies, although the skeletal muscle was resected with little blood loss. The patient discharged from the hospital 2 days postoperatively. After surgery, pathological examination of the resected mass showed metastasis from the gastric adenocarcinoma (Figure 4). Immunohistochemistry examination of the mass showed CA125 (-), CK20 (-), CK7 (+), EMA (+). To detect other possible metastatic lesions, the patient underwent ultrasonography examination of the neck, groin and subaxile; CT scan of the chest, abdomen and pelvis; and MRI examination of the abdomen, neck and brain. Surprisingly, no sign of local or remote metastasis was detected. In accordance with the imaging examination, the serum tumor markers were all within normal ranges after surgery and during the follow-up period. The patient recovered well after surgery and no additional chemotherapy or radiotherapy was applied thereafter. No signs of relapse were detected during the follow-up period. She was last followed up in September 11, 2015. Abdominal CT scans showed no signs of local or remote metastasis. Serum tumor markers levels were: carcinoembryonic antigen (CEA) 4.1 ng/ml (normal range, <5 ng/ml), carbohydrate antigen 125 (CA 125) 12.7 U/ml (normal range, <35 U/ml), carbohydrate antigen 153 (CA 153) 13.5 U/ml (normal range, <31.3 U/ml), carbohydrate antigen 199 (CA 199) 3.8 U/ml (normal range, <37.0 U/ml). Unfortunately, she had a traffic accident in September 12, 2015 and died one day later.

Discussion

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muscle mass accounts for nearly 50% of the total body weight and has an abundant blood supply. The incidence of skeletal muscle metastasis is reported to be approximately 0.16-0.03% in clinical practice, and 0.8% in an autopsy study [3]. We here reported a case of skeletal muscle metastasis from gastric adenocarcinoma, and we further reviewed 13 cases of skeletal muscle metastases from gastric carcinoma since 1984 (Table 1).

The mechanism of the rarity of skeletal muscle metastasis is still unclear, but several factors have been considered to be relevant. First, the inconstant blood flow and changing tissue pressure due to muscular contractions would prevent the settlement of the tumor cells. Second, accumulation of lactic acid and the low pH values in the skeletal muscle could play an inhibitory role in the proliferation and growth of the tumor cells [4, 5].

Skeletal muscle metastasis usually manifests itself as a “painful mass”, and can be associated with generalized muscle pain, muscle swelling, decreased range of motion of the adjacent joint, fever and weight loss, depending on the location and degree of impairment [5]. However, in many cases, it is asymptomatic, incidentally detected by imaging examination. Therefore, we suggest that surgeons or radiologists should be alert to their presence to avoid possible delay or miss of diagnosis and therapy [6]. Any soft-tissue mass occurring in patients with a known history of carcinoma should be highly suspicious for skeletal muscle metastasis [7].

To date, ultrasonography, CT and MRI have been widely employed in the diagnosis of skeletal muscle metastasis [4]. Compared with ultrasonography and CT, MRI is considered superior for detecting and characterizing muscle abnormalities [5, 8]. It shows a pattern of hypointense signal on T1 and hyperintense on T2 compared with surrounding muscle. Non-hemorrhagic soft-tissue sarcoma shows the same T1- and T2-weighted image patterns, but it usually has less necrosis, peritumoral edema, and lobulation, which is usually distinguished from skeletal muscle metastases [4]. However, these appearances are not always compatible with soft-tissue sarcoma. Therefore, biopsy should be performed for the final diagnosis of skeletal muscle metastases [4].

The optimal treatment of skeletal muscle metastasis is still unknown. Radiotherapy, chemotherapy, and surgical excision are common therapeutic options [7]. Radiotherapy may be effective to relieve the pain and to decrease the size of metastatic lesions [7, 9]. Surgical resection may be helpful in carefully selected patients, such as those with an isolated mass and in absence of other metastatic sites, with the hope to prolong the survival time. However, due to the advanced disease with multiple metastases, chemotherapy frequently is the only option [7]. Further studies are required to establish a standard therapy for the skeletal muscle metastasis from gastric cancer.

The prognosis principally depends on the primitive tumor type, but is generally poor because patients with skeletal muscle metastasis are generally in the terminal stage of gastric cancer [4]. Muscle metastasis has been considered to be a sign of systemic hematogenous metastasis during the terminal stage in the progress of gastric carcinoma [4]. However, in our case, systemic examination using ultrasonography, CT and MRI did not detect any local or remote metastatic lesions, and the serum tumor makers were all within normal ranges, both of which indicated a local primary tumor with solitary skeletal muscle metastasis. This may partially explain the relatively good prognosis of this patient.

One limitation of this case is that we did not perform imaging examinations to look for metastatic lesions in the upper or lower limbs. Therefore, we are not sure whether there are other skeletal muscle metastases in the upper or lower limbs. In fact, previous studies indicated that clinically undetectable metastatic lesions were already present at the initial diagnosis of the skeletal muscle metastasis [4, 10]. Therefore, we call for surgeons and radiologists to strengthen their awareness of skeletal muscle metastasis, hoping to detect and intervene skeletal muscle metastasis timely and to improve the prognosis.

Disclosure of conflict of interest

None.

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References


