Case Report
Ileocecal adenocarcinoma with overexpression of P53 protein metastasized to the thenar muscle: report of a rare case and review of literature

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Abstract: Metastatic malignancies of the hand are rare and metastases to the skeletal muscle from the gastrointestinal system are even much rare. Here we present a case of metastatic ileocecal adenocarcinoma to the thenar muscle, which is the first report of thenar muscle metastasis from ileocecal adenocarcinoma with P53 mutation. To date, only two other cases of thenar muscle metastasis have been documented, one is from squamous cell carcinoma of the lung and the other is from rectal carcinoma. The present 67-year-old Chinese man of poorly differentiated adenocarcinoma of the ileocecal region developed metastatic carcinoma in the right thenar eminence, which presented with swelling and pain. Magnetic resonance imaging of the right hand revealed a well-defined enhanced mass in the right thenar muscle. It was proved to be metastatic adenocarcinoma using core needle biopsy, which was supported to be gastrointestinal origination by positive immunoreaction with CDX2. Positive immunoreaction with P53 protein indicated the poor prognosis of the patient. Further systemic evaluation including computerized tomography scans revealed extensive metastases to liver, right kidney, right abdominal wall, lef tal axillary and right subclavicular lymph nodes, and skin of the right thigh. Treatment was given with palliative systemic chemotherapy. After 8 cycles of chemotherapy, the swelling and pain of the right thenar were ameliorated, and the patient regained full use of his right hand and his quality of life was improved. The patient died of liver metastasis 9 months after the diagnosis of the right thenar metastasis. In conclusion, here we display a case of thenar skeletal muscle metastasis from P53 mutated ileocecal adenocarcinoma, who survived 9 months after diagnosis of the rare metastasis. If an oncological patient presents an intramuscular mass, muscle metastasis must be included in the differential diagnosis. Metastatic hand tumors generally indicate systemic spread, so the treatment is usually palliative and the prognosis is poor. The primary objective of treatment is improvement of the patient’s quality of life.

Keywords: Ileocecal adenocarcinoma, metastasis, thenar muscle

Introduction
Metastatic malignancies of the hand are rare and usually develop from lung (44%), kidney (12%), or breast (10%) tumors [1]. Most of the metastatic hand lesions are osseous. Metastases to skeletal muscles of the hands are even much rare. Here we report an extremely rare case of metastatic P53 mutated ileocecal adenocarcinoma to the thenar muscle of the right hand.

Case report
Clinical summary
A 67-year-old Chinese man manifested with the right lower abdominal pain and a palpable mass in this region accepted right hemicolec- tomy in Feb. 2012 in the local hospital. It was proved to be poorly differentiated adenocarcinoma of the ileocecal region, infiltrating into the plasma membrane. Six of 9 lymph nodes were involved.

The patient had already found a bean-like nodule in the right thenar eminence before the surgery, but he did not pay attention to it. Half a month after the surgery, he accepted one cycle of chemotherapy with a regimen containing oxaliplatin. There were no significant adverse effects caused by chemotherapy. However, several days after the first cycle of chemotherapy, the patient complained of pain in the right thenar eminence. He was inpatient again in the local hospital. Magnetic resonance imaging...
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(MRI) to the right hand revealed a well-defined enhanced mass in the right thenar muscle (Figure 1A and 1B). He was given another cycle of chemotherapy containing oxaliplatin. But the pain was not relieved.

In May 2012, he was referred to our hospital. Physical examination revealed swelling of the right thenar eminence (Figure 2A), with a palpable mass about 2 cm in diameter. He had difficulty in gripping and stretching out the right hand. A core needle biopsy of the right thenar showed invasive adenocarcinoma in the muscle (Figure 3A), which resembles the original adenocarcinoma in the ileocelecal region (Figure 3B). The metastatic carcinoma showed positive immunoreaction with CDX2 and P53 by immunohistochemical staining (Figure 3C and 3D), which indicate the colorectal origination.

Further systemic evaluation including computerized tomography scans revealed extensive metastases to liver, right kidney, right abdominal wall, left axillary and right subclavicular lymph nodes, and skin of the right thigh (Figure 4). He was then treated with standard FOLFIRI (leukovorin, Fluorouracil, and Irinotecan) chemotherapy. After 2 cycles of chemotherapy, the pain was relieved apparently.

Figure 1. Magnetic resonance imaging (MRI) to the right hand revealed a well-defined enhanced mass in the right thenar muscle. A. Transverse section. B. Longitudinal section.
The patient received 8 cycles of chemotherapy totally. The current assessment of efficacy was stable disease, but the swelling and pain of the right thenar were ameliorated. Wrinkles appeared on the right thenar eminence. The patient died of liver metastasis 9 months after the diagnosis of the right thenar metastasis.

**Immunohistochemical staining**

Immunohistochemical staining was performed using antibody against P53 (Clone DO-7, 1:500 dilution, DakoCytomation China) and CDX2 (clone DAK-CDX2, 1:400 dilution, DakoCytomation China). Five micron thick paraffin sections were dewaxed, rehydrated in graded alcohols, and processed using DAKO envision detection kit (DakoCytomation, Carpinteria, CA, USA). Most of the tumor cells were immunoreactive with CDX2 and P53 in the nucleus (Figure 3C and 3D), which support that the carcinoma metastasized from the digestive tract and express P53 protein.

**Discussion**

Colorectal carcinoma mainly metastasizes through either lymphatic or hematogenous spread. The most common organs of colorectal metastasis are the liver and lung; however, metastases to the bone, adrenals, lymph nodes, brain, and skin have also been reported [2]. Metastases are rarely found in skeletal muscle, it is believed to be 0.8-16% in autopsy series [3], despite the fact that skeletal muscle comprises nearly 50% of the total body mass and receives an abundant blood supply. It is thought that muscular contractile actions, local pH environment and the accumulation of lactic acid and other metabolites contribute to the rare occurrence of this phenomenon. The most frequent sites of described clinical involvement are thigh, iliopsoas and paraspinous muscles [4-6]. However, metastasis to the foot and hand is extremely rare (0.007-0.3%), and metastatic hand lesions represent 0.1% of all osseous metastases [1]. To our knowledge, only 22 cases, including the present one, of metastatic colorectal carcinoma to the hand have been reported, in which only 7 cases (31.8%) are soft tissue metastases (Table 1). To date, only 2 cases of thenar muscle metastasis have been documented, one is from squamous cell carcinoma of the lung [7], another is from rectal carcinoma [8]. The present case is a new report of
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The most common presentation of muscle metastasis is local inflammation or pain. Muscle metastasis must be included in the differential diagnosis of oncological patients presenting with an intramuscular mass. In most of the known cases of metastasis to the muscle, lung cancer is the primary malignancy, although there are many other described origins, such as kidney, stomach, pancreas, thyroid and breast cancers [4-6]. Metastatic hand tumors generally occur as a feature of systemic spread, so the treatment is usually palliative. Treatment options of these lesions are dependent upon the status of the patient, the primary origin of the tumor, the extent and localization of the metastases. Amputation, radiotherapy, curettage, cementation, chemotherapy, and wide excision are the most frequently used treatment forms [1]. In the present case, extensive metastases to liver, right kidney, right abdominal wall, left axillary and right subclavicular lymph nodes, and skin of the right thigh had

Figure 3. Pathological analysis of the right hand metastasis. A. Invasive adenocarcinoma in the background of connective tissue was demonstrated in the biopsy of thenar (HE stain, ×100); B. Invasive adenocarcinoma was observed in the background of muscular layer of the original carcinoma in the ileocecal region (HE stain, ×100); C. Positive immunoreaction with CDX2 suggests the original carcinoma of ileocecal region (immunohistochemical staining, ×200); D. The carcinoma was immunoreactive with P53 (immunohistochemical staining, ×200).

Figure 4. Metastatic carcinoma presented as a skin nodule in the right thigh.

thenar muscle metastasis from ileocecal carcinoma. The most common presentation of muscle metastasis is local inflammation or pain. Muscle metastasis must be included in the differential diagnosis of oncological patients presenting with an intramuscular mass. In most of the known cases of metastasis to the muscle, lung cancer is the primary malignancy, although there are many other described origins, such as kidney, stomach, pancreas, thyroid and breast cancers [4-6]. Metastatic hand tumors generally occur as a feature of systemic spread, so the treatment is usually palliative. Treatment options of these lesions are dependent upon the status of the patient, the primary origin of the tumor, the extent and localization of the metastases. Amputation, radiotherapy, curettage, cementation, chemotherapy, and wide excision are the most frequently used treatment forms [1]. In the present case, extensive metastases to liver, right kidney, right abdominal wall, left axillary and right subclavicular lymph nodes, and skin of the right thigh had
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Table 1. Review of reported cases of metastatic colorectal carcinoma to the hand

<table>
<thead>
<tr>
<th>Category</th>
<th>Cases</th>
<th>Reported year</th>
<th>Primary site</th>
<th>Age (Years)</th>
<th>Sex</th>
<th>Metastatic site</th>
<th>Survival time* (Months)</th>
<th>Citation</th>
</tr>
</thead>
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<tr>
<td>Osseous metastases</td>
<td>1</td>
<td>1958</td>
<td>rectum</td>
<td>61</td>
<td>M</td>
<td>Left third distal phalanx</td>
<td>6</td>
<td>[9]</td>
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<tr>
<td></td>
<td>2</td>
<td>1962</td>
<td>rectum</td>
<td>52</td>
<td>F</td>
<td>Left third proximal phalanx</td>
<td>5</td>
<td>[10]</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1968</td>
<td>cecum</td>
<td>84</td>
<td>F</td>
<td>Right thumb</td>
<td>N/A</td>
<td>[11]</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>1974</td>
<td>colon</td>
<td>61</td>
<td>M</td>
<td>Left luminate</td>
<td>N/A</td>
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<tr>
<td></td>
<td>5</td>
<td>1986</td>
<td>colon</td>
<td>--</td>
<td>--</td>
<td>Right fifth metacarpal</td>
<td>N/A</td>
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<tr>
<td></td>
<td>6</td>
<td>1987</td>
<td>sigmoid colon</td>
<td>78</td>
<td>F</td>
<td>Left trapezium</td>
<td>6</td>
<td>[14]</td>
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<tr>
<td></td>
<td>7</td>
<td>1987</td>
<td>transverse colon</td>
<td>61</td>
<td>F</td>
<td>Left fourth proximal phalanx</td>
<td>2</td>
<td>[14]</td>
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<td></td>
<td>8</td>
<td>1987</td>
<td>colon</td>
<td>61</td>
<td>M</td>
<td>Left luminate</td>
<td>12</td>
<td>[15]</td>
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<tr>
<td></td>
<td>9</td>
<td>1987</td>
<td>colon</td>
<td>44</td>
<td>M</td>
<td>Left fifth middle phalanx</td>
<td>N/A</td>
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<td>53</td>
<td>M</td>
<td>Left fifth metacarpal</td>
<td>12</td>
<td>[17]</td>
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<tr>
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<td>11</td>
<td>1997</td>
<td>colon</td>
<td>--</td>
<td>--</td>
<td>First metacarpal</td>
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<td>[18]</td>
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<tr>
<td></td>
<td>12</td>
<td>2005</td>
<td>colon</td>
<td>42</td>
<td>F</td>
<td>Metacarpal bones</td>
<td>N/A</td>
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<td></td>
<td>13</td>
<td>2006</td>
<td>sigmoid colon</td>
<td>72</td>
<td>M</td>
<td>Distal phalanx of the index finger</td>
<td>&gt;18</td>
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<tr>
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<td>2010</td>
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<td>M</td>
<td>Right fifth distal phalanx</td>
<td>7</td>
<td>[21]</td>
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<td></td>
<td>15</td>
<td>2011</td>
<td>rectum</td>
<td>74</td>
<td>M</td>
<td>Proximal phalanx</td>
<td>3</td>
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<tr>
<td>Soft tissue metastases</td>
<td>1</td>
<td>1970</td>
<td>sigmoid colon</td>
<td>72</td>
<td>F</td>
<td>Soft tissue of the palm</td>
<td>6</td>
<td>[23]</td>
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<tr>
<td></td>
<td>2</td>
<td>1978</td>
<td>colon</td>
<td>83</td>
<td>M</td>
<td>Soft tissue of the dorsal</td>
<td>6</td>
<td>[24]</td>
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<tr>
<td></td>
<td>3</td>
<td>2000</td>
<td>sigmoid colon</td>
<td>62</td>
<td>M</td>
<td>Soft tissue of the right hand</td>
<td>10</td>
<td>[25]</td>
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<td></td>
<td>4</td>
<td>2006</td>
<td>rectum</td>
<td>72</td>
<td>M</td>
<td>Subungual metastasis to the left thumb</td>
<td>6</td>
<td>[26]</td>
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<tr>
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<td>5</td>
<td>2007</td>
<td>rectum</td>
<td>76</td>
<td>M</td>
<td>Soft tissue of the left palm</td>
<td>4</td>
<td>[27]</td>
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<tr>
<td></td>
<td>6</td>
<td>2011</td>
<td>rectum</td>
<td>53</td>
<td>M</td>
<td>Skeletal muscle of the right thenar eminence</td>
<td>N/A</td>
<td>[8]</td>
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<tr>
<td></td>
<td>7</td>
<td>2015</td>
<td>ileocecal region</td>
<td>67</td>
<td>M</td>
<td>Skeletal muscle of the right thenar eminence</td>
<td>9</td>
<td>The present case</td>
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</tbody>
</table>

*Survival time after diagnosis of hand metastasis (months).

Also been confirmed. So chemotherapy was used to control the wide spread of the tumor. The patient regained full use of his right hand and his quality of life was improved after 8 cycles of chemotherapy. Patient with hand or skeletal muscle metastasis is thought to be associated with poor prognosis. The average length of survival in patients with hand metastasis was reported to be merely 6 months [1], and the majority of patients with skeletal muscle metastasis from lung carcinoma died within 1 year, with a mean survival period of 8.0 months after resection of the primary carcinoma [3]. Based on the cases that reported the survival (Table 1), the mean survival of patients with hand metastasis from colorectal carcinoma was 7.1 months, with little difference between osseous (7.2 months) and soft tissue metastases (6.8 months).

Conclusion

To summarize, here we display a case of thenar skeletal muscle metastasis from ileocecal adenocarcinoma, who survived 9 months after diagnosis of the rare metastasis. If an oncological patient presents an intramuscular mass, muscle metastasis must be included in the differential diagnosis. Metastatic hand tumors generally indicate systemic spread, so the treatment is usually palliative and the prognosis is poor. The primary objective of treatment is improvement of the patient’s quality of life.

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Written informed consent was obtained from the son of the patient for publication of this Case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Disclosure of conflict of interest

None.

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