CASE REPORT

Jejunal intussusception caused by metastasis of a giant cell carcinoma of the lung

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SUMMARY

A 55-year-old woman was admitted to our hospital reporting of nausea, vomiting and anorexia. One month before admission, she had been diagnosed with lung cancer with intestinal metastasis. A CT scan confirmed intussusception due to intestinal metastasis and she underwent emergency laparoscopic surgery followed by resection of the primary lung cancer. Histopathological findings of the intestinal specimen suggested the metastasis was from a giant cell carcinoma of the lung, which had extensive necrosis. She was still alive without recurrence 11 months after the first surgery. Giant cell carcinoma of the lung is a rare type of non-small cell carcinoma and intestinal metastasis is one of the unique features. This type of tumour has such aggressive characteristics that oncological prognosis is reported to be extremely poor. In our case, however, complete surgical resection of both primary and metastatic tumours might result in a better outcome than has been reported.

BACKGROUND

Giant cell carcinoma of the lung is a rare form of poorly differentiated non-small cell lung carcinoma (NSCLC), which is classified as a sarcomatoid carcinoma according to the 2015 WHO classification.1 Giant cell carcinomas are composed entirely of giant cells and have specific patterns that do not resemble those of adenocarcinomas, squamous cell carcinomas or large cell carcinomas.1 These types are rare and account for ~0.1–0.4% of all lung carcinomas.2–5 They are aggressive tumours and are prone to metastasize to other organs, including unusual locations such as the gastrointestinal tract and the retroperitoneal space. However, intussusception caused by the metastasis of a giant cell carcinoma of the lung is an extremely rare complication. Here, we present a rare case of a patient with jejunal intussusception caused by intestinal metastasis of a giant cell carcinoma of the lung.

CASE PRESENTATION

A 55-year-old woman who had monoclonal gammapathy of undetermined significance underwent screening using a whole-body CT scan and positron emission tomography (PET)-CT to rule out malignant myeloma. The whole-body CT scan showed a 36 mm sized mass on the left upper lung lobe and a mass forming wall thickness in the upper jejunum with an 8 mm lymph node swelling near the intestinal mass (figure 1A, B). A protruded tumour was detected in the upper jejunum using small bowel endoscopy (figure 2), and PET-CT revealed abnormal accumulation at the same lesion (figure 3). The fine-needle aspiration specimen showed that the tumour cells had large abundant cytoplasm that was densely eosinophilic, reminiscent of an epithelioid rhabdomyosarcoma, malignant melanoma or poorly differentiated carcinoma. The laboratory test revealed a highly elevated white cell count count (38 700/mm³).

Figure 1 (A) Chest CT scan showed a 36 mm mass in the left upper lobe of the lung. (B) An abdominal CT scan showed a mass-forming wall thickness in the upper jejunum and a mesenteric lymph node swelling.
DIFFERENTIAL DIAGNOSIS
Considering the histological findings of the tumour and a lung lesion on CT scan, jejunal metastasis of the granulocyte-colony stimulating factor (G-CSF) secreting giant cell carcinoma of the lung was suspected. Other differential diagnoses were jejunal adenocarcinoma, malignant melanoma and anaplastic large cell lymphoma.

TREATMENT
One month later, she was admitted to our hospital reporting of nausea, vomiting and anorexia. We repeated the CT scan and diagnosed her with an intussusception of the jejunal tumour. We performed emergency laparoscopic surgery. The tumour with the intussusception was located in the upper jejunum 30 cm distal to the ligament of Treitz. After the intussusception was repositioned using the Hutchinson manoeuvre, the jejunum was resected. The postoperative course was uneventful and the white cell count count at day 3 was decreased significantly to baseline after resection. Two months later, she underwent segmentectomy of the left upper lobe of the lung.

Histopathologically, the jejunal tumour was composed of a diffuse proliferation of tumour cells without a clear direction of differentiation, and relatively non-cohesive, pleomorphic mononucleated cells admixed with bizarre, frequently multinucleated giant cells that contained abundant eosinophilic cytoplasm. In addition, an increased number of tumour-infiltrating neutrophils and focal tumour cell emperipolesis were present (figure 4A, B). On immunohistochemical study, most tumour cells expressed cytokeratin (AE1/AE3 and CAM 5.2), vimentin and thyroid transcription factor-1 (TTF-1), while some expressed Napsin A and G-CSF. Although the immunopositivity of TTF-1 and Napsin A was supportive of metastasis from lung, the microscopic finding of the lung tumour was extensive necrosis with only scanty degenerated tumour cells remaining (figure 5). These histological findings corresponded with jejunal metastasis of a G-CSF-producing giant cell carcinoma of the lung.

OUTCOME AND FOLLOW-UP
The patient has been recurrence-free for 11 months since the first surgery. Although we planned to treat with adjuvant chemotherapy, which was the same as that used for treating NSCLC, she refused it and instead received only a follow-up examination.

DISCUSSION
Sarcomatoid carcinomas are a group of poorly differentiated NSCLCs that contain a component of sarcoma or sarcoma-like (spindle and/or giant cell) differentiation. Pleomorphic carcinomas, spindle cell carcinomas, giant cell carcinomas, carcinosarcomas and pulmonary blastomas are classified into this group according to the recent WHO classification. Sarcomatoid carcinomas are very rare diseases and have unique clinical features compared with other non-small cell carcinomas. As seen in our...
case, sarcomatoid carcinomas sometimes cause an elevated inflammatory response due to the production of G-CSF and interleukin 6. Immunohistologically, TTF-1 and cytokeratin are detected in a significant percentage of sarcomatoid carcinomas.\(^6\) The outcome is significantly poorer than that of patients with other NSCLCs, and adjuvant chemotherapy and radiotherapy seem to be ineffective. Their aggressive characteristics such as large tumours, advanced-stage cancer and pleural invasions, result in higher rates of recurrence and lower survival rates.\(^3\)\(^4\) Some previous reports showed that the median survival time of patients with sarcomatoid carcinoma was 8–22.8 months and the 5-year survival rate was 10–36.7%.\(^2\)\(^5\)\(^7\)

Giant cell carcinomas of the lung sometimes metastasize to the gastrointestinal tract. Wellmann \textit{et al}\(^8\) demonstrated that 17–25% of patients with pulmonary giant cell carcinomas had gastrointestinal metastases. However, intussusception caused by the intestinal metastasis of the primary lung carcinoma is rarely seen. Intussusception in adults accounts for <5% of all intussusceptions and in 90% of adult cases is secondary to bowel

<table>
<thead>
<tr>
<th>Author</th>
<th>Published year</th>
<th>Age</th>
<th>Sex</th>
<th>Cancer cell type</th>
<th>Tumour stage at initial diagnosis</th>
<th>Other metastasis sites</th>
<th>Time interval from initial diagnosis to intussusception</th>
<th>Time interval from intussusception to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katz \textit{et al}(^9)</td>
<td>1981</td>
<td>68</td>
<td>M</td>
<td>Giant cell carcinoma</td>
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<td>Liver, supracavicular lymph node</td>
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<td>Listrom \textit{et al}(^9)</td>
<td>1988</td>
<td>63</td>
<td>M</td>
<td>Squamous cell carcinoma, spindle cell type</td>
<td>4</td>
<td>Left adrenal gland</td>
<td>Simultaneously</td>
<td>NS</td>
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<td>Eng and Sabanathan (^10)</td>
<td>1992</td>
<td>60</td>
<td>M</td>
<td>Carcinosarcoma</td>
<td>2B</td>
<td>Brain</td>
<td>18 months</td>
<td>6 months</td>
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<td>61</td>
<td>M</td>
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<td>4</td>
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<td>1 month</td>
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<tr>
<td>Testini \textit{et al}(^12)</td>
<td>2002</td>
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<td>M</td>
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<td>Brain</td>
<td>Simultaneously</td>
<td>12 months (still alive)</td>
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<td>Yang \textit{et al}(^13)</td>
<td>2006</td>
<td>57</td>
<td>M</td>
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<td>Brain, ascite</td>
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<td>3 months</td>
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<td>Alvarez \textit{et al}(^14)</td>
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<td>Vertebral</td>
<td>NS (but metachronous)</td>
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<tr>
<td>Goh \textit{et al}(^15)</td>
<td>2007</td>
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<td>M</td>
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<td>Para-aortic lymph node, liver</td>
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<td>NS</td>
<td>Brain, bone</td>
<td>4 months</td>
<td>5 months</td>
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<td></td>
<td></td>
<td>69</td>
<td>M</td>
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<td>NS</td>
<td>Bone, liver, cervical lymph node</td>
<td>6 months</td>
<td>9 months</td>
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<td>59</td>
<td>M</td>
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<td>Simultaneously</td>
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<tr>
<td>Pollheimer \textit{et al}(^17)</td>
<td>2009</td>
<td>65</td>
<td>F</td>
<td>Pleomorphic carcinoma</td>
<td>4</td>
<td>NS</td>
<td>Simultaneously</td>
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<tr>
<td>Chiu \textit{et al}(^18)</td>
<td>2009</td>
<td>87</td>
<td>M</td>
<td>Poorly differentiated adenocarcinoma</td>
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<td>Gingiva</td>
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<td>Shi \textit{et al}(^19)</td>
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<td>M</td>
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<td>4</td>
<td>Right adrenal gland, liver, brain</td>
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<td>4 months</td>
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<td>78</td>
<td>M</td>
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<td>5 months (still alive)</td>
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<td>None</td>
<td>Simultaneously</td>
<td>0.9 months</td>
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<tr>
<td>Lee \textit{et al}(^22)</td>
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<td>74</td>
<td>M</td>
<td>Poorly differentiated adenocarcinoma</td>
<td>4</td>
<td>None</td>
<td>Simultaneously</td>
<td>NS</td>
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<tr>
<td>Rashid \textit{et al}(^23)</td>
<td>2011</td>
<td>57</td>
<td>M</td>
<td>Pleomorphic carcinoma</td>
<td>4</td>
<td>None</td>
<td>Simultaneously</td>
<td>3 months</td>
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<tr>
<td>Jarmin \textit{et al}(^24)</td>
<td>2012</td>
<td>75</td>
<td>M</td>
<td>Small cell carcinoma</td>
<td>4</td>
<td>None</td>
<td>Simultaneously</td>
<td>NS</td>
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<tr>
<td>Guner \textit{et al}(^25)</td>
<td>2012</td>
<td>71</td>
<td>M</td>
<td>Sarcomatoid carcinoma</td>
<td>3A</td>
<td>None</td>
<td>12 months</td>
<td>9 months</td>
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<tr>
<td>Wou \textit{et al}(^26)</td>
<td>2013</td>
<td>77</td>
<td>F</td>
<td>Non-small cell carcinoma</td>
<td>4</td>
<td>NS</td>
<td>Almost simultaneously</td>
<td>2 months</td>
</tr>
<tr>
<td>Lin \textit{et al}(^27)</td>
<td>2014</td>
<td>78</td>
<td>M</td>
<td>Pleomorphic carcinoma</td>
<td>4</td>
<td>None</td>
<td>Simultaneously</td>
<td>3 months</td>
</tr>
<tr>
<td>Jung \textit{et al}(^28)</td>
<td>2014</td>
<td>63</td>
<td>M</td>
<td>Pleomorphic carcinoma</td>
<td>3A</td>
<td>Bone, mediastinal lymph node</td>
<td>5 months</td>
<td>NS</td>
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<tr>
<td>Mandeville \textit{et al}(^29)</td>
<td>2015</td>
<td>49</td>
<td>F</td>
<td>Giant cell carcinoma</td>
<td>4</td>
<td>Vertebral, cervical lymph node, brain</td>
<td>Simultaneously</td>
<td>6 months</td>
</tr>
<tr>
<td>Present case</td>
<td>2015</td>
<td>55</td>
<td>F</td>
<td>Giant cell carcinoma</td>
<td>4</td>
<td>None</td>
<td>1 month</td>
<td>11 months (still alive)</td>
</tr>
</tbody>
</table>

NS, not stated.
diseases.9–12 Malignancy is found in 6–30% of small bowel intussusceptions following surgical resection, and lung cancers account for 21.6% of these cases.13–15

We examined the prevalence of secondary intussusceptions caused by primary lung malignancies by performing a PubMed search up until November 2015 using the key words ‘intussusception’ and ‘lung cancer/carcinoma’. Inclusion criteria were case reports, case series and cohort studies that investigated patients with intussusception caused by primary lung malignancies. Exclusion criteria included studies in languages other than English. We found 25 cases, including our case, which corresponded to the criteria presented in 22 publications.9–30 The data are shown in Table 1. The male to female ratio was 21:4 and the average age was 63.2 years old (40–87 years old). The most common tumour types of the primary lung lesion were sarcomatoid carcinomas (44%), including giant cell carcinomas (12%), followed by large cell carcinomas (20%), adenocarcinomas (16%), small cell carcinomas (8%), squamous cell carcinomas (4%), non-small cell carcinomas (4%) and malignant melanomas (4%). This result supports the fact that sarcomatoid carcinomas are more likely to develop intestinal metastases. Almost all cases were diagnosed in advanced stages and intussusception was the first symptom in 44% (11/25) of all cases. The prognosis of patients with intussusception was particularly poor because of metastatic lung cancer. The median survival time after diagnosis of intussusception was 5 months (range, 0.9–12 months).

Accordingly, we considered that the intussusception because of lung cancer metastases was particularly rare, and prognoses of such cases were extremely poor. In contrast, our patient was still alive without recurrence for 11 months after the first surgery. Although the exact reason remains unclear, it seems possible that the better prognosis of this patient was due to complete resection of both primary lung lesion and intestinal metastasis. Shoji et al11 reported a case of a pulmonary giant cell carcinoma with metastases to the small intestine, which resulted in more than 3-year disease-free survival after aggressive surgical resection and chemotherapy. Although the standard therapy for giant cell carcinomas of the lung with intestinal metastasis has not been established, we believe that aggressive surgical resection is an effective strategy and plays an important role in the management of such cases.

## Learning points

- Giant cell carcinomas of the lung are rare tumours whose oncological prognoses are extremely poor and intestinal metastasis is one of the unique features of them.
- Intussusception because of intestinal metastasis of lung cancer is a rare complication.
- Although pulmonary giant cell carcinomas with intestinal metastases have a poor prognosis, complete surgical resection of tumours might result in a better outcome.

### Acknowledgements

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### Contributors

YF is a main author and writes fundamentals of this article. SH is the chief doctor of this patient and got informed consent from her. He also plays a role of reviewer for this article. TY provides scientific and grammatical advice to this article. AT critically reviews and revises this article.

### Competing interests

None declared.

### References


