Peritoneal dissemination of recurrent small intestine primary GIST, successfully diagnosed by diffusion-weighted imaging

Junichiro Tanaka**, Katsuyuki Nakanishi¹, Katsuhito Takahashi² and Noriyuki Tomiyama³

¹Department of Diagnostic & Interventional Radiology, Osaka International Cancer Institute, Japan
²Sarcoma Center, International University of Health and Welfare Mita Hospital, Japan
³Department of Diagnostic & Interventional Radiology, Osaka University Graduate School of Medicine, Japan

Abstract
An 81-year-old woman had undergone small intestine gastrointestinal stromal tumor (GIST) resection. Three years later, peritoneal dissemination appeared and was resected. She received imatinib therapy and was observed carefully. Three years after the first recurrence, diffusion-weighed imaging (DWI) of MRI revealed high intensity nodules on mesentery. These nodules lacked ¹⁸F-fluorodeoxyglucose (¹⁸F-FDG) uptake, but apparently increased, compared with DWI demonstrated a year before. Open biopsy was performed and many disseminated nodules were found on great omentum and mesentery. Two of these nodules were resected and confirmed as peritoneal dissemination of GIST having mutation with at exon 9 of the c-kit gene. The expression of glucose transporter-1 (GLUT-1) was low level in our cases.

Introduction
Gastrointestinal stromal tumor (GIST) represents the most common mesenchymal tumor arising from the gastrointestinal tract. GISTs are most frequently found in the stomach (60%), in the small bowel (30%), and 10% are found elsewhere [1].

For patients, whose primary, localized GIST were resected, it is important to evaluate not only local recurrence, but also metastases and peritoneal dissemination. Contrast enhanced computed tomography (CT) is widely used because of the fast throughput of examinations and lower cost. Magnetic resonance imaging (MRI) is used supplementary with CT. Fused ¹⁸F-fluorodeoxyglucose positron emission tomography (PET)/CT is used to clarify if CT or MRI is ambiguous, but it is useless for GIST without ¹⁸F-FDG uptake [2-4]. On the other hand, diffusion-weighed imaging (DWI) is becoming important in the assessment of malignant tumors [5]. We present a case of recurrent small intestine primary GIST, which was successfully diagnosed by DWI.

Case report
An 81-year-old woman underwent small intestine gastrointestinal stromal tumor resection. Three years later, peritoneal dissemination appeared and was resected. Since then she was administered imatinib and was observed carefully with CT, MRI with DWI and ¹⁸F-FDG PET/CT.

Three years after the first recurrence, MRI was performed and DWI revealed high intensity nodules on the mesentery. Compared with DWI of the previous year, these high intensity nodules became apparently more obvious and they were considered to be recurrences (Figure 1). However, on PET/CT they did not have ¹⁸F-FDG uptake (Figure 2). Open biopsy was performed and many disseminated nodules were found on great omentum and mesentery. Two of these nodules were resected and confirmed as peritoneal dissemination of GIST having mutation with at exon 9 of the c-kit gene. The expression of glucose transporter-1 (GLUT-1) was low level in our cases.

Discussion
The standard imaging technique in patients with GIST should be contrast- enhanced CT [3]. Contrast-enhanced CT is widely used, because of the fast throughput of examinations and lower cost. MRI has been used supplementarily with contrast-enhanced CT [2,3]. Recently, PET/CT is playing an important role in the assessment of malignant tumors. In particular, PET/CT imaging can be considered a reliable tool for assessment of GIST response to targeted therapy such as imatinib [5]. However, Choi et al. reported that 21% of lesions did not show appreciable glucose uptake on pretreatment PET [4]. In such cases, PET is useless and a different imaging modality may be required. In our case, on pathological evaluation, the expression of GLUT-1 was low level and it indicated that these recurrent nodules lacked ¹⁸F-FDG uptake.

Correspondence to: Junichiro Tanaka, Department of Diagnostic & Interventional Radiology, Osaka International Cancer Institute, 3-1-69, Otemae, Chuo-ku, Osaka, zip 541-8567, Japan, Tel: +81 6 6945 1181; Fax: +81-6-6945-1883; E-mail: tanaka_j@d2.dion.ne.jp

Key words: peritoneum, MR-imaging, treatment effects

Received: December 13, 2017; Accepted: December 27, 2017; Published: December 29, 2017
Diffusion-weighted imaging (DWI) has been more widely used in oncology patients because of its noninvasiveness and it is becoming important in the evaluation of malignant tumors [6,7]. Malignant tumors are frequently more cellular than the tissue from which they originate and thus appear to be of relatively high signal intensity at DWI, because of restriction of water movement [7]. Some radiologists compared the accuracy of MRI with DWI and PET/CT for diagnosing peritoneal dissemination [6-9]. Satoh et al. compared the diagnostic performance of PET/CT, MRI with and without DWI, and contrast enhanced MDCT in the detection of peritoneal dissemination of malignant tumors. They concluded that PET/CT is the most useful and DWI can be used as a screening tool if PET/CT is not available [8]. On the other hand, Soussan et al. [9] reported that PET/CT and MR-DWI showed a similarly high accuracy in diagnosing peritoneal carcinomatosis from gastrointestinal malignancy. In our case, DWI was a useful method in detecting dissemination of recurrent GIST.

In summary, after the second operation we detected small nodules in the abdominal cavity on PET/CT but they lack 18F-FDG uptake. It was difficult to determine if these are recurrences or not. Although, on DWI these nodules apparently increased, compared with the DWI from the previous year and they were considered to be recurrences. Open biopsy was performed and we got the diagnosis of recurrent GIST. MRI with DWI may be a useful follow-up method for GIST without 18F-FDG uptake after surgery.

Acknowledgement

We are indebted to Hisako Yamamura for pathological diagnosis of GIST.
Tanaka J (2017) Peritoneal dissemination of recurrent small intestine primary GIST, successfully diagnosed by diffusion-weighted imaging

References

Copyright: ©2017 Tanaka J. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.