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Article type: Original article

Received: June 27, 2019.

Accepted: July 22, 2019.

Published online: July 24, 2019.

ISSN: 1897-9483

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The clover sign of internal fistulas in Crohn disease

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Short title: The clover sign of Crohn disease

Key words: the clover sign, internal fistula, Crohn disease

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Conflict of interest: none declared.
A 51-year-old man with a 10-year history of ileocolonic Crohn disease (CD) presented with general fatigue and body weight loss. Past history included partial resection of the ileum and sigmoid colon due to ileosigmoid fistula at the age of 42. Then he had been treated with infliximab for 6 years until its adverse effect, peripheral neuritis, appeared at the age of 49. Physical examination revealed decreased body mass index of 16 kg/m² and leg edema. Abdomen was non-tender with increased bowel sounds. Complete blood cell counts showed white blood cells of 9,100/mm³ and hemoglobin of 9.5 g/dl. Biochemical tests showed elevated levels of C-reactive protein (5.93 mg/dL [reference range, <0.14 mg/dl]), erythrocyte sedimentation rate (97 mm/h [2-10 mm/h]), and markedly decreased level of albumin (1.8 g/dl [4.1-5.1 g/dl]). An axial computed tomography (CT) scan showed enteroenteric fistulas and marked thickening of the bowel wall (FIGURE 1A). A coronal CT scan disclosed complex fistulas with a star-like configuration of dilated bowel loops (FIGURE 1B). A gastrographin follow-through revealed multiple ileocolic and ileoileal fistulas with markedly dilated bowel loops, resembling “the clover leaves” (FIGURE 1C). He underwent right hemicolecotomy and partial ileotomy. His symptoms and nutritional status improved and ustekinumab has been administered, resulting in clinical remission for 2 years.

CD causes deep transmural ulcerations, thus small bowel fistulas occur in 10-20% of patients and are due to the extension of the deep ulcers beyond the bowel wall to bypass a distal luminal obstruction [1]. The European guideline has indicated that cross-sectional imaging, such as CT and magnetic resonance imaging (MRI) has a pivotal role in the assessment of penetrating complications of CD [2]. MR enterography and MR enteroclysis have proved an efficacy in the depiction of internal fistulas with “the star sign” in CD [3, 4]. Although small bowel follow-through study has radiation exposure, it can be useful in the clear detection of whole fistulas in a single image, as in this case. Well-known characteristic radiological signs of CD include linear ulceration, cobblestone pattern, string sign, comb sign, and target sign.
[1]. With the characteristic features detected by small bowel follow-through study in this case, we would like to propose “the clover sign”, clover leaves-like arrangement of bowel loops that converge to a central fistula point. It may be refer to the star sign and the indicative sign of internal fistulas by small bowel follow-through study in CD. This sign may aid the diagnosis of internal fistulas, one of the troublesome complications in CD.

References


Figure legend.

Figure 1A. An axial computed tomography scan showing an enteroenteric fistula (arrow) and marked thickening of the bowel wall.

Figure 1B. A coronal computed tomography scan showing complex fistulas with a star-like configuration of dilated bowel loops.
Figure 1C. A small bowel follow-through study using gastrographin showing multiple ileocolic and ileoileal fistulas (arrow) with markedly dilated bowel loops, resembling “the clover leaves”.

Figure 1D. Colonoscopy revealing the opening of the fistula (arrow) at the stricture site of the transverse colon.