

Imaging diagnosis

Case 446

3. Strangulated ileus

【Progress】

He received open surgery, leading diagnosis of strangulation ileus with partial bowel necrosis.

【Discussion】

There is a two-beak sign identical to two-knot sign in one closed loop that is usually found in cases with strangulation ileus (1-3). Both are the occlusive transposition sites of small bowel obstruction. Either one beak (or knot) indicates the occlusive site between oral dilated small bowel and oral dilated closed loop while another beak or knot is the occlusive site between dilated anal closed loop and constrictive anal small bowel. Beak sign and knot sign is the same and the differences are the different viewpoints: when a beak configuration is appeared on axial CT, a knot configuration is appeared on sagittal or coronal CT (3).

One loop owns two occlusive sites that are demonstrated as two beak sign, two knot sign, one beak sign plus one knot sign on CT. If there were two closed loops, there should be four-beak sign or four-knot sign with simple adding calculation. But in our case, there are two-closed loop with three-beak sign or three-knot sign. This looks like a mystery.

The revelation of the trick is that double closed loops are not independent but continuous. Namely, the first occlusive transition point of the first closed loop is composed of oral dilated small bowel and the first dilated proximal closed loop. The second occlusive transition point is composed of the first dilated distal closed loop and the second dilated proximal closed loop. The third occlusive transition point is composed of the second dilated distal loop and the constrictive anal small bowel. Therefore, three occlusive sites are enough to form two closed loops.

Looking back CT images of this case, three occlusive transition sites either beak sign or knot sig, confused me because stereotype concept that one closed loop has two beak sign (or knot sign) and two closed loops should have four beak signs (or knot sign) (3). But, in reality, three occlusive sites can make up two closed loops.

Upon reflection, probably most important to investigate the findings of occlusive transposition sites. It can be ignored to follow the tract of continued dilated small bowel, that make the interpretation confuse. It is imperative to find out beak sign or knot sign in cases with small bowel obstruction, that indicate the occlusive transition point (1-3). In the past, it was said that small bowel feces sign, whirl sign, mesenteric edema, one single beak sign indicated the high incidence of small bowel obstruction. (5-9). These findings are indirect findings to find out the occlusive transition sited. Whereas, double beak sign or double knot sign indicates directly occlusion sites, namely, strangulation ileus (3). Three beak sign or three knot sign indicates double closed loops and strangulation ileus.

【Summary】

We presented an eighty-three-year-old male presented with persistent abdominal pain from this morning. Small bowel obstruction with three occlusive transition sites was depicted on non-enhanced and contrast-enhanced abdomen CT. The analysis of CT images show two closed loops with three occlusive transition sites that indicate two closed loops are continuous and own the common occlusive site between the distal first closed loop and the proximal second closed loop. It is borne in mind that the three occlusive transition sites indicate two closed loops.

【References】

1. Balthazar EJ, et-al. Closed-loop and strangulating intestinal obstruction: CT signs. Radiology. 1992;185 (3): 769-75.
2. Mbengue A, et al. Closed loop obstruction: pictorial essay. Diagnostic and interventional imaging. 2015; 96: 213-20.
3. www.seicholai.or.jp Case 402
4. Zins M, et al. Adhesive Small Bowel Obstruction: Predictive Radiology to Improve Patient Management. Radiology. 2020;296(3):480-92.
5. Delabrousse E, et-al. Small-bowel obstruction from adhesive bands and matted adhesions: CT differentiation. AJR Am J Roentgenol. 2009;192 (3): 693-697
6. Doishita S, et-al. Internal Hernias in the Era of Multidetector CT: Correlation of Imaging and Surgical Findings. Radiographics. 2016;36 (1): 88-106
7. Takeyama N, et-al. CT of internal hernias. Radiographics. 2005;25 (4): 997-1015.
8. Duda JB, et al. Utility of CT whirl sign in guiding management of small-bowel obstruction. AJR Am J Roentgenol 2008;191:743-747.
9. Khurana B. The whirl sign. Radiology 2003;226:69-70.

back

2026.9.4