

Imaging diagnosis

Case 402

4. Strangulation ileus

【Progress】

He received laparoscopic surgical resection of small intestine of 20 cm-length for strangulation ileus.

【Discussion】

Small bowel obstruction occurs in various situations; intrinsic and extrinsic. Intrinsic occlusion occurs when food ingestion to be unable to pass in the lumen of bowel, is swallowed. Meanwhile, extrinsic obstruction occurs when small bowel is narrowed by tightening with bands following surgical treatment or entering small space called internal hernia. In clinical reality, it is imperative to make a judgement whether the situation of small bowel obstruction should be served with laparoscopic approach, ileus tube alone or under watchful observation. Its final decision is dependent upon clinical findings and diagnostic images by surgeon. Radiologists can assist the surgeon by referring imaging diagnosis.

Strangulation ileus shifts non-ischemic damages at first to ischemic necrotic stage in the end. The early diagnosis of strangulation may lead to pre-necrosis stage, avoiding resection of necrotic small bowel and releasing occlusive mechanism alone such as band resection alone.

There are three points in abdomen CT that should be clarified when suspicious small bowel occlusion was encountered; small bowel diameter is over 3cm or greater; identification of colon with owing contents or not (especially, the contents of ileum end, cecum and ascending colon): the small bowel occlusion site (1-4).

It is reported that for diagnosis of small bowel obstruction, these information such as whirl sign, small bowel feces sign, beak sign, mesenteric edema, and closed loop sign are useful (1-8). The whirl sign indicates small intestine or mesentery rotate like airplane circulating (5, 6). Small bowel feces sign indicates the presence of colon-like content in the dilated small bowel. Beak sign indicates gradually narrowing of small bowel diameter. The closed loop sign indicates small bowel is dilated as a configuration as a loop line (7, 8). Of these, closed loop is a direct sign for strangulation ileus that meets with imagination or intraoperative finding. However, closed loop configuration is not so often found on CT, because closed loop does not appear in one plane or slice on axial, sagittal or coronal image. Most appear partial of the loop in plural or several slices that are hard to identify or imagine loop configuration.

Other direct signs other than closed loop sign, I propose double beak sign as the same as double dot sign or beak and dot sign. There should be two dots in the situation of strangulation ileus; one dot indicates dilated oral-sided small bowel and dilated closed loop: another dot indicates dilated closed loop small bowel and constrictive anal-sided small bowel. For finding out these signs, it is important to look for occlusion sites of small bowel. Although whirl sign, single beak sign and small bowel feces sign are not direct signs for strangulation ileus, they are useful to find out occlusion sites. After occlusion sites are identified, the next step is that whether double beak sign, double dot sign or beak & dot sign is present or absent, should be investigated.

In our case, beak & dot sign is depicted on coronal images and double beak sign is depicted on sagittal images. However, it is hard to find out these signs on axial images.

【Summary】

We presented an eighty-three-year-old male with persistent and increasing abdominal pain who was treated with laparoscopy showing strangulation ileus. Double beak sign and beak & dot sign are depicted on sagittal and coronal CT images, respectively. It is borne in mind that the findings of 3cm or grater small intestine diameter and the presence of contents of ileum, cecum, ascending colon are useful for small bowel obstruction, that small bowel feces sign, mesenteric edema, and beak sign are useful for finding out the small bowel occlusion site, and that the presence of closed loop sign, double beak sign, double dot sign or beak & dot sign is useful for strangulation ileus. Based on my experiences, coronal image or sagittal image is better than axial image to find out these signs to identify strangulation hernia.

【References】

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