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**Corresponding Author:**
Dr. Antonio Manenti,  
Associate Professor, Department Surgery - Italy

**Submitting Author:**  
Dr. Antonio Manenti,  
Associate Professor, Department Surgery - Italy

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Leakage of Colonic Anastomosis: Computed Tomography Diagnosis

Author(s): Manenti A, Manco G, Vezzelli E, Donatiello S

Abstract
Postoperative peritonitis following leakage of a colonic anastomosis is a challenging surgical complication, where a prompt clinical diagnosis, sometimes difficult, is requested before any therapeutic decision. In these cases Computed Tomography (CT) plays an important role.

Introduction
Colonic resection can complicate with anastomotic leakage and secondary peritonitis. The clinical diagnosis of this condition can be difficult, because (the) physical signs can vary from those of a frank peritonitis to others subtler, in case of localized abscesses. The picture of the correlated sepsis can be not absolutely specific, and often masqueraded by a symptomatic medical treatment, and can be referred to other possible sites of infection (pleuro-pulmonary, urological, etc.) (1,2). The severity of this complication and the necessity of an adequate treatment demand an urgent and certain diagnosis, based also on unequivocal imaging documents, among which today CT is of primary importance (3-6).

Methods
We have re-examined our experience of the years 2009-2011, based on 20 cases of post-operative peritonitis after colonic resection for carcinoma and complicated by anastomotic leakage, of which 17 referred from other surgical centres. 16 cases concerned left hemicolectomies or sigmoidectomies, 4 right hemicolectomies. After the usual diagnostic procedures (plain Rx of the abdomen, and echography), a multidetector CT was performed with multi-slice technique and intravenous contrast enhancement.

In our experience, the main indications to CT are the following:
- Diagnosis of peritonitis, distinguishing cases of anastomotic colonic leakage from other possible post-operative conditions, as pancreatitis, cholecystitis, diverticular sigmoiditis, perforated gastro-duodenal ulcer, vascular, arterial or venous, accidents (thrombosis, dissection, aneurysm rupture).
- Detection of other surgical pitfalls, responsible of secondary peritonitis: injuries to duodenum, colon, small intestine, ureters, bladder, spleen, etc.

When evaluating the CT findings, the following morpho-radiological signs are of particular value:
- Intraperitoneal unencapsulated effusion, with different amount of gas inside (Illustration 1).
- Oedematous swelling, hypervascularization and venous congestion of the mesentery, retroperitoneum and intestinal walls, and lymph nodes enlargement (Illustration 2).
- Intraperitoneal abscess with an hyperenhanced peripheral rim, air - fluid levels or gas bubbles inside (Illustration 3); when localized between the sacrum hollow and the rectum, the sign of “double rectum” can be observed.
- Haematomas, localized especially in the pre-sacral space, perisplenic region or retroperitoneum.
- Conditions of the colonic segments above and below the anastomosis (Illustration 4).

Results
After a careful reading of CT findings, two main different conditions must be distinguished.
A) An intraperitoneal liquid collection, largely diffused in the peritoneal cavity or in a quadrant, indicates a condition of acute peritonitis. Frequent concomitant lesions are oedematous swelling and hypervascularity of the mesentery, with venous congestion and enlarged lymph nodes. The walls of the adjacent small intestine and of the colon, above and below the anastomotic leak, often appear oedematous and thickened. A secondary pleural effusion is frequent.
B) Localized abscess appearing as a spherical or ovoidal fluid collection, often with inside gas bubbles, surrounded by thick and hyperenhanced walls, often localized in particular endoperitoneal regions (pelvic cavity, sub-phrenic, sub-hepatic, peri-splenic, central mesenteric, pre-sacral space); its size can be easily measured.
Other important morphological elements must be researched:
- Lesions of bladder, ureter or kidney, clearly appearing in the phase of CT excretory urography (7) (Illustration 5).
- Lesions of the small intestine, spleen, pancreas, gallbladder, often indirectly demonstrated by a surrounding hematoma, abscess, or a localized intraperitoneal effusion.
- Pathology of the colonic walls, above and below the anastomotic leak: oedematous thickening, signs of inadequate arterial vascular supply or venous thrombosis.

After CT examinations, we directly proceeded to a laparotomy in 11 cases; in 6 to a simple percutaneous drainage, and in the other 3 cases of single small abscess, a conservative medical treatment was sufficient. In all cases the CT diagnosis was confirmed.

Conclusion(s)

Our retrospective study confirms the essential role of CT for an early diagnosis of post-operative peritonitis, permitting also to determine its origin and severity. A diffuse peritonitis must be distinguished from a localized abscess, with possible indication to a percutaneous drainage or a conservative treatment, in case of small size (diameter inferior to 3 cm) (8-10).

Today, decision to an early re-laparotomy or a trans-cutaneous drainage demands a previous diagnostic procedure, and cannot be based only on clinical signs, without a complete research of all possible associated lesions. In case of diffuse peritonitis, there is a straight indication to a re-laparotomy with complete abdominal exploration and adequate drainage, considering the simple diverting colostomy rarely sufficient. Besides, lesions discovered by CT in the colonic walls, as oedematous thickness or ischemia, or leaks demonstrated of large size warn away a direct repair of the failed anastomosis, in favour of its complete take-down with resection of both the intestinal segments anastomosed. Our experience demonstrates the importance of the collaboration between radiologists and surgeons, also in these difficult post-operative circumstances.

Reference(s)

Illustrations

Illustration 1

Abundant intraperitoneal effusion, with amount of free air; oedema and congestion of the mesentery: diffuse acute peritonitis from leakage of high colo-rectal anastomosis

Illustration 2

Free fluid collection in the right flank, with gas bubbles inside, and oedematous and thickened small bowel walls: peritonitis from leakage of colo-sigmoid anastomosis
Illustration 3

Pre-sacral collection with a hyperenhanced peripheral rim, gas bubbles and extravasated intestinal content inside (double rectum sign). The anterior abdominal wound infiltrated with cutaneous dehiscence: pelvic peritonitis from leakage of high colo-rectal anastomosis.

Illustration 4

A: CT axial scan at the level of a failed colon-sigmoid anastomosis: dilatation of the colon with thickened walls and fluid collection around; corrugated drain in place. B: CT axial scan below the anastomosis: oedema and thickening extended to the whole sigmoid.
Illustration 5

CT urographic axial scan: surgical injury to the pelvic left ureter, with urinary extravasation in a pre-sacral collection, distinguished by an air fluid level, and in the colon above the anastomosis: pelvic abscess and ureteral fistula complicating a failed high colo-rectal anastomosis.
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