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Vascular Risk Factors in Left Colon Anastomosis Leakage: A Computed Tomography Guided Study

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Abstract

25 cases of left colon anastomosis, complicated by an early post-operative leakage, have been studied by Computed Tomography (CT): in 20 of them an arterial vascular insufficiency was observed, and considered a pathogenetic factor of this pitfall.

Introduction

Many risk factors have been considered in order to explain leakage of left colon anastomosis, colo-colic or high colo-rectal: ischemia of the colon segments anastomosed, their inadequate mobilization, or patient’s poor conditions (1-7). On the other hand, the utility of CT in the diagnosis of post-operative peritonitis is well known (8-10). We have considered CT a useful tool also in demonstrating post-surgical conditions, particularly concerning vascular supply of the colon, directly correlated to anastomotic leakage: this has been the aim of the present study.

Methods

We have examined 25 cases of the left colon anastomosis leakage (17 colo-sigmoid and 8 high colo-rectal) observed in the years 2010-2012; 22 of these patients were referred us from other centres. CT was performed in all the patients within the 4th post-operative day, with a multislice technique and intravenous contrast enhancement. The diagnosis of diffuse peritonitis or of localized abscess was possible in all the cases. Vascular lesions, observed in the colonic segments anastomosed, were relevant in 20 cases with the following morpho-radiological signs considered indicative:

1) Arterial hypovascularization, demonstrated by a poor or attenuated arterial network in the colonic mesentery;
2) Poor contrast enhancement of the walls of the colonic anastomosed segments;
3) Their oedema and thickening, with absence of the normal contrast hyper-enhancement of the mucosa (Illustration 1);
4) Dilatation of one or both colon anastomosed segments.

Results

All the above mentioned CT signs have been found associated in the 16 cases of severe diffuse peritonitis, treated promptly by a re-laparotomy. A less evident hypoperfusion, demonstrated only in the afferent loop of the anastomosis, was observed in the other 4 cases of pelvic abscess, treated successfully by a percutaneous drainage.

Discussion

Ischemia of the colon segments is an important pathogenetic factor in anastomotic leakage. It can be CT proved by two fundamental signs:

1) Absence of a clear arterial network of the colon mesentery (Illustration 2,3,4);
2) Contrast hypo-enhancement of the colonic walls, with unclear visualization of the corresponding mucosa.

Oedema of the colon walls can be easily ascribed to an ischemic damage of the micro-circulatory apparatus, while their dilatation can be a consequence of the diffuse peritonitis, with subsequent autonomous nervous system paralysis, resulting in a condition of muscle atony. The same diffuse inflammatory condition can explain the venous congestion and oedema, with lymph nodes enlargement, often observed in the small bowels mesentery.

CT can also demonstrate signs of mesenteric venous thrombosis, complication infrequent today, because of the largely diffused anti-thrombotic prophylaxis.

Conclusion(s)

Surgeons must be interested to know the causes of operative pitfalls, especially if related to anatomo-surgical factors; in case of colon anastomotic dehiscence CT can demonstrate a condition of arterial insufficiency, which must be considered an important pathogenetic factor (11-13).
A demonstrated condition of frank arterial insufficiency often is followed by a diffuse peritonitis, obliging to a prompt re-laparotomy and to a complete take-down of both the colonic segments anastomosed.

An adequate study of the colon vascular anatomy can also be obtained pre-operatively by CT, which permits to detect anatomical variations or pre-existing pathological conditions in the colon vascular supply, and subsequently to choose an adequate operative planning (14,15). An intra-operative recognition of the colonic arterial anatomy must follow in order to perform a radical lymphadenectomy, and contemporarily assure an adequate vascular supply to the intestinal segments, before their anastomosis.

Reference(s)

Illustrations

Illustration 1

Post-operative CT: the efferent loop of a failed left-sided colonic anastomosis appears oedematous, thickened, with poor arterial vascular supply and inflammatory strands in the corresponding mesentery.

Illustration 2

Post-operative CT. A) Axial view: leakage of a left-sided colon anastomosis: oedema and thickening of the colonic walls of the afferent loop, with insufficient arterial vascular network, which is better evident in the transverse colon. B) Coronal view: poor vascular supply to the colonic afferent loop of the anastomosis.
Illustration 3

Post-operative CT of a failed left sided colonic anastomosis. A) Axial view: oedema and thickening of the colonic afferent loop, with a fluid collection laterally, and poor vascular network. B) Coronal view: attenuated vascular supply, without evident arterial branches, to the colonic afferent anastomosed segment, markedly dilated.

Illustration 4

Post-operative CT of a failed left sided colo-sigmoid anastomosis. A) Axial view: oedema and dilatation of the afferent loop, with a poor arterial vascular supply. B) Coronal view: evident the insufficient arterial vascular supply of the entire afferent loop.
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