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REVIEW

Anastomotic leakage after gastrointestinal surgery: Diagnosis and management



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Summary Anastomotic leakage represents a major complication of gastrointestinal surgery, leading to increased postoperative morbidity; it is the foremost cause of mortality after intestinal resection. Identification of risk factors is essential for the prevention of AL. AL can present with various clinical pictures, ranging from the absence of symptoms to life-threatening septic shock. Contrast-enhanced CT scan is the most complete investigation to define AL and its consequences. Early and optimal multidisciplinary management is based on three options: medical management, radiologic or endoscopic intervention, or surgical re-intervention. Prompt treatment should help decrease postoperative morbidity and mortality, with the choice depending on the septic status of the patient. If the patient is asymptomatic, treatment can be medical only, coupled with close surveillance. Interventional management is indicated when the fistula is symptomatic but not life-threatening. On the other hand, when the vital prognosis is engaged, surgery is indicated, emergently, associated with intensive care. Even more than their prevention, early and appropriate management counts most to decrease their consequences. © 2014 Elsevier Masson SAS. All rights reserved.

Introduction

Onset of anastomotic leakage (AL) in gastrointestinal surgery is a major complication, often associated with increased postoperative morbidity, mortality and duration of hospital stay. The prevalence and consequences of AL vary according to the site of the anastomosis. For esophageal anastomoses, the incidence ranges from 2.7% to 15% [1–4]. The risk of anastomotic breakdown of colorectal anastomoses ranges between 5% and 20% [5,6]. The prevalence of pancreatico-enteric AL is even higher, occurring in between 20% and 25% of all pancreatoduodenectomies.

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AL usually occurs early, and can have both short- and long-term consequences. In the short-term, AL can be life-threatening because of septic or hemorrhagic complications, particularly for proximal AL with high enzymatic activity. AL is the principal cause of mortality after gastrointestinal resections, and mortality rate after AL ranges between 18% and 60% [2–4]. Long-term consequences of AL are dominated by anastomotic stricture, with functional repercussions on patient quality of life. Lastly, onset of AL is a predictive factor for decreased long-term overall survival [7]. A negative impact on recurrence-free survival has been reported after colorectal resection for cancer [8]. The goal of this update is to present the general principles of diagnosis, and treatment of AL in gastrointestinal surgery, with a specific focus on esophagogastric, bariatric, pancreatic and colorectal surgery.

Predictive factors

Identification of predictive risk factors is an essential prerequisite for the prevention of AL. Performance of a gastrointestinal anastomosis should follow general overall rules, with specific variations related to the site and the type of tissues undergoing anastomosis.

Local factors

The site of the anastomosis is a risk factor in itself, because of difficulties in exposure or because of factors related to the technique i.e., biliary anastomosis above the superior convergence involving sectorial or segmental bile ducts. The environment can also influence the risk of AL, i.e., intra-thoracic negative pressure or elevated intra-luminal bile duct pressure.

Several mechanical factors have been identified. They correspond most often to technical problems such as anastomotic tension, torsion or compression, too many sutures leading to local ischemia, or presence of a rigid drain lying in contact with the anastomosis [4,9].

Certain local tissue conditions can also increase the risk of AL, i.e., cancer involvement at the gastrointestinal extremity [10], surgical site infection, poor tissue perfusion [11], or a defective muco-mucous approximation of the anastomosis.

General factors

Several systemic factors that are predictive of postoperative morbidity have been reported such as diabetes, the American Society of Anesthesiologists (ASA) score or tobacco/alcohol abuse, although a direct impact has never been clearly established in the literature. Conversely, several factors have been reported to be independent risk factors for postoperative AL (Table 1).

Diagnostic strategy

Clinical presentation

The clinical picture of AL can vary from complete absence of symptoms to life-threatening septic shock. Early diagnosis, even when signs are minor, offers the best guarantee to reduce the clinical severity and the consequences. When AL is adequately drained, the patient is usually asymptomatic

and the diagnosis is made essentially because of the abnormal issue of digestive fluid in the drains. If the AL is not well drained, the patient usually has systemic signs and associated thoracic or abdominal symptoms according to the site of the anastomosis. The diagnosis is suggested by rapid deterioration of patient general status, fatigue, loss of appetite or sometimes, isolated neurologic disorders such as mental confusion. Fever and tachycardia are found in more than 50% of cases. Later signs include appearance of shock with hypotension, skin discoloration, or respiratory distress.

Intra-thoracic anastomosis

Signs of sepsis are related to mediastinitis or pulmonary disease, occasionally associated with arrhythmia, subcutaneous emphysema, thoracic pain, pneumothorax, or pleural effusion.

Intra-peritoneal anastomosis

The abdominal signs may be non-specific, but pain is usually intense, associated with peritoneal irritation, rebound tenderness or guarding.

Infra-peritoneal anastomosis

The symptoms include perineal pain, urinary tract functional signs or purulent drainage through the anus.

Bariatric anastomosis

In this setting, the abdominal signs are often masked. The most frequent signs are tachycardia, fever and tachypnea. Tachycardia greater than 120 and/or respiratory distress have been found to be independent predictive factors of AL [12–14].

Laboratory findings

Since any delay in the diagnosis of AL may worsen prognosis, several authors have looked for biologic factors predictive for AL. Other than increased leukocyte count, usually not very specific finding, C-reactive protein (CRP) on postoperative day 4 has been shown to be useful to detect AL in colorectal surgery [15]. Similarly, in bariatric surgery, CRP greater than 27 mg/dl on postoperative day 2 has been shown to be an important predictive factor for postoperative complications [16].

For pancreatic and biliary AL, the positive diagnosis relies on the levels of amylase and/or bile, in the drainage fluid. AL is characterized by amylase levels three times higher than serum levels starting on postoperative day 3 [17,18]. Nonetheless, not all pancreatic and biliary AL are detected by these levels [19], and not all surgeons routinely insert drains in these operations.

Imaging

Contrast-enhanced thin slice multidetector CT scan

Contrast-enhanced thin slice multidetector CT scan is the best imaging technique for AL and its consequences. For gastrointestinal AL, upper or lower GI luminal opacification is performed accordingly. Besides permitting the diagnosis of AL, CT scan allows:

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