Endoscopic Follow-up of Digestive Anastomosis

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Editor

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Preface

There are undoubtedly several books and atlases, available on the shelves of scientific bookstores, regarding digestive endoscopy and investigating both diagnostic and therapeutic techniques, and all those publications are surely very useful from a didactic and technical point of view.

What is, then, the rationale of this new text? My purpose in undertaking the editorship of this volume was to develop a monograph about a topic often treated in a superficial or even vague way.

The study of anastomosis is one of the most frequent indications in diagnostic digestive endoscopy, and the endoscopist is frequently asked to treat some complications of the surgical interventions, such as bleeding, benign strictures, neoplastic recurrences, and dehiscences, by the means of operative procedures. Moreover, the evaluation of a digestive anastomosis can represent a source of worries and anxiety, especially for the junior professionals, because they are confronted with the new anatomy modified by the surgeon.

In spite of this, in most cases, textbooks and atlases available for practitioners devote just a few pages or short paragraphs to the endoscopic follow-up of digestive anastomosis and to the endoscopic treatment of their complications.

Finally, beyond the technical aspects of the topic, it appears very important to clarify the logistic points of view of the problem: what is the appropriateness of the endoscopic follow-up, who should be put under surveillance, how and when to perform surveillance, has biopsy been performed, and what about the useful tools of endo-ultrasonography, chromoendoscopy, and magnification?

The main goal of this text is to present the knowledge about endoscopic follow-up of digestive anastomosis as much completely as possible, both illustrating diagnostic protocols and operative techniques, in the global perspective of a systematic and multidisciplinary monograph.

I would like to seize the opportunity to express my thankfulness to collaborators and colleagues. In the first place, my sincere thanks go to all the authors and contributors of the book: with their efforts they have been able to share and communicate their scientific knowledge and enthusiasm to all those who will read and study this volume. Secondly, my thanks to the Springer editorial team, who believed in this endeavor and followed it with professionalism. Finally, my thoughts go to the readers: we hope this volume will be a contribution to their professional growth and foster a comprehensive vision of digestive endoscopy.

Naples, Italy — Giuseppe Galloro

Contents

Part I

Diagnostic Procedures and Follow-Up

Analysis of Surgical Risk Factors in Tailoring Digestive Anastomosis

1

Mario Testini, Ilaria Fabiola Franco, Valentina Ferraro, Angela Gurrado, and Germana Lissidini

Failure of gastrointestinal anastomosis results in *leaks*, *fistulas* and dehiscence, still representing the major complication following abdominal surgery. Despite the improved perioperative assessment, the standardization of surgical technique, and the use of innovative devices, reported incidence of gastrointestinal anastomosis leakage ranges from 2 to 12 % [1–4], significantly increasing mortality (7–12 %), morbidity (20–30 %), and hospital resource utilization [5].

The anastomotic leakage rate is highly variable and strictly depending on the anastomotic site [6]: failure of esophagojejunostomy is a potentially catastrophic event, as a missed leakage of a colorectal anastomosis; on the contrary, gastroenteric or entero-enteric anastomosis leakage could be more often managed by a conservative approach. Therefore, anastomotic leakage represents one-third of overall mortality in colorectal surgery [6] and even more in esophagectomy and total gastrectomy [7–9].

The *risk factors* for anastomotic failure in digestive surgery (Table 1.1) can be divided into two groups:

(a) General
(b) Local also including factors related to surgical technique

Diabetes mellitus seems to have an important role on the anastomosis healing. Experimental studies demonstrated an increased anastomotic leakage in untreated diabetic rats vs diabetic one

Table 1.1 Risk factors of anastomotic leakage

General	Local
Age	Bowel preparation
Sex	Surgical technique
Diabetes mellitus	Mechanical or manual anastomosis
Nutritional state	Emergency surgery
Blood transfusion	Surgical skills
Uremia	Comorbidity
Anemia	Peritonitis
Preoperative radiotherapy	Bowel obstruction
Chemotherapy	Antibiotic therapy prophylaxis
Chronic obstructive pulmonary disease	Operative time
Cardiopathy	Protective ileostomy
Hypotension	Use of drain
Weight loss	High tension at anastomosis level
Obesity	Vascularization
Coagulopathy	Anastomosis site and number
Smoke	Positive surgical margins after resection (Flogosis, necrosis, neoplasia)
Corticosteroid therapy	
Metastatic disease	
Fluid and electrolyte disorders	

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treated by insulin therapy. Obesity, anemia, hypotension, uremia, coagulopathy, age, and male sex are also reported in some experiences [1–5, 8]. Otherwise, a prolonged nonsteroidal anti-inflammatory drugs (NSAIDs) use yields a higher risk of anastomotic breakdown. NSAIDs result in an increased rate of anastomotic leakage after colorectal surgery during the postoperative treatment too; consequently, cyclooxygenase-2 selective NSAIDs should be used with caution after colorectal resections with primary anastomosis [10, 11]. Moreover, some authors [12, 13] consider intraoperative blood loss of 200 mL or more, blood transfusions (more than 2 U/24 h), and low albumin serum level (inferior than 3.0 g/L) as significant factors. Conversely, chronic hypovolemia and weight loss don't seem to be significant factors, while vascular disease, advanced tumor stage, radiotherapy (Figs. 1.1 and 1.2), and chemotherapy are associated with increased anastomotic leakage. However, localized and generalized leaks also have a significant negative impact on overall, cancer-related, and disease-free survival [1–8, 12–14].

Among the local factors, compelling evidence exists that intestinal bacteria play a predominant role in the pathogenesis of anastomotic leakage [15]. Moreover, some authors consider bowel obstruction (Fig. 1.3), while others don't confirm its relevance [13]. Sepsis appears to be associated with anastomosis leakage, also enhancing the collagenolytic effects of the collagenosis [16]. We believe that sepsis still represents an absolute contraindication to a single-stage anastomosis during emergency colorectal surgery, above all in the presence of endoabdominal multiple abscesses and collections. In these pathological evidences (Fig. 1.4), a prudent behavior is mandatory, with the performance of a *Hartmann* procedure. The leakage rate appears significantly higher in patients undergoing to emergency surgery than elective one [12, 17] (38.1 % vs 13.3 % in *Kim* experience [18], 13 % vs 3.9 % in our [13]). Moreover, a full bowel preparation allows greater intraoperative cleaning, reducing fecal contamination, even if *Harris* [19] suggests elective colon resection performed safely without preoperative mechanical bowel preparation.

The decrease of *mortality* and *morbidity* due to anastomotic leaks can be also gained by performing intraoperative pneumatic test, defunctioning ileostomy, and drain tube insertion, as reported by *Boccola* [14, 20].

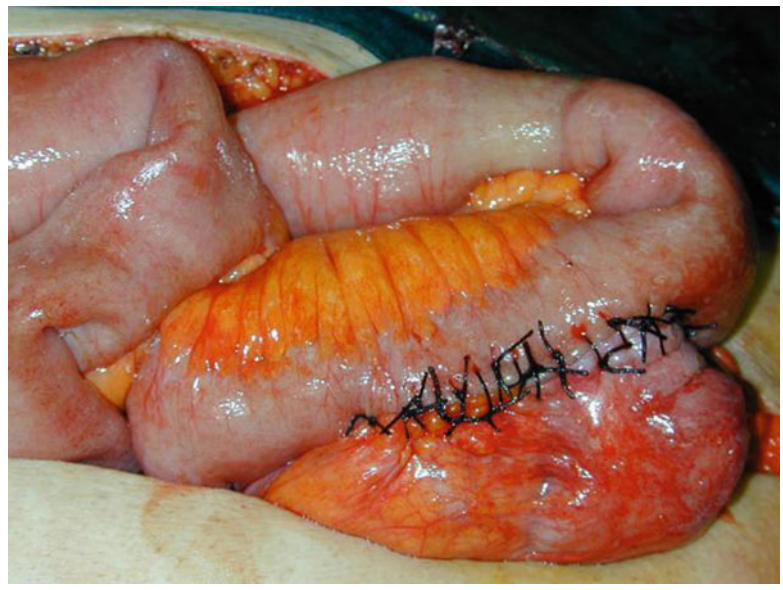

Fig. 1.1 Small bowel side-to-side anastomosis in a patient affected by volvulus following radiation enteritis

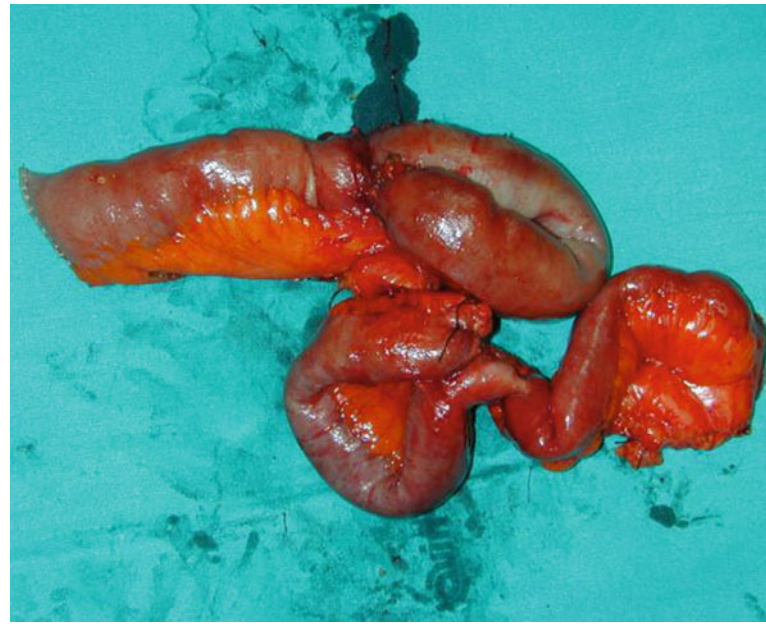

Fig. 1.2 Small bowel volvulus caused by radiation enteritis

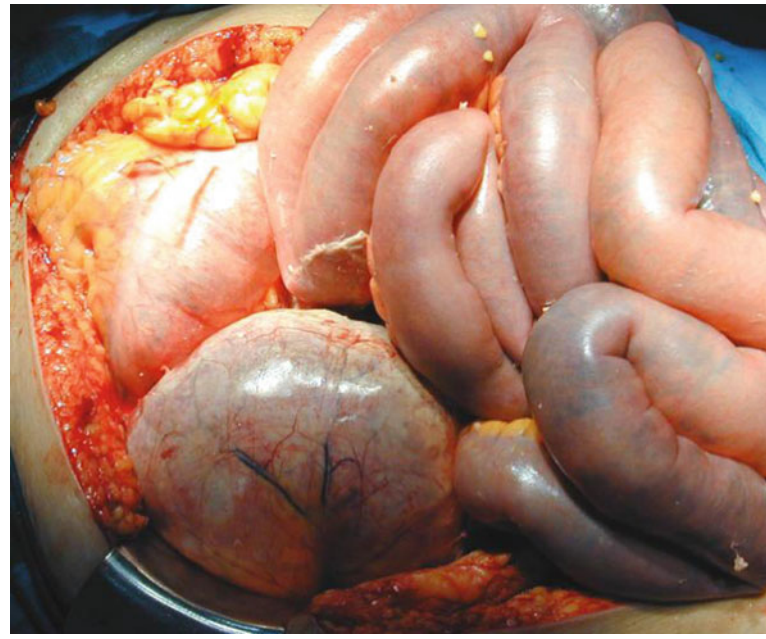

Fig. 1.3 Mechanical bowel obstruction with cecum diastase due to stenosis by carcinoma of the rectum

The choice of anastomosis remains at the discretion of the surgeon, largely depending on experience, patient's characteristics, and operative setting, even if there isn't a clear evidence for one technique over another [20]. Stapled anastomoses is associated with a significant lower leak rate regardless of anastomotic location [21], even if, as recently surprisingly reported by *Korolija* [21], anastomotic failures can be more than twice with stapled than hand sewn in the emergency general surgery.

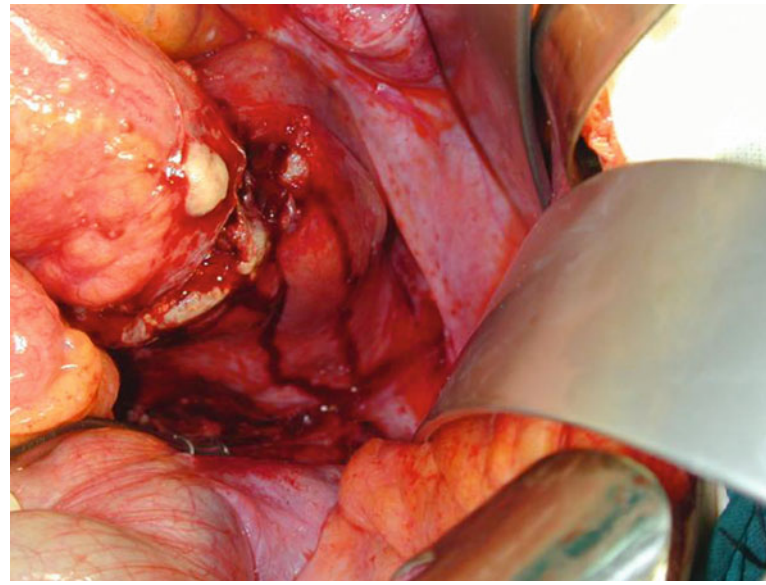

Fig. 1.4 Pelvic abscess from perforated carcinoma of the rectum

The anastomosis site represents one of the main problems in the digestive surgery. In fact, low colorectal [12, 14] as well as esophagus–jejunal [8, 9] anastomoses are associated with a higher incidence of failure. In this regard, *Montesani* reported re-peritonealizing and technical changes in the mechanical suture as useful in order to reduce failures following low anterior resection [22]. No differences in anastomotic colorectal leak are reported between laparoscopic and open surgery [23], even if a lower incidence in the laparoscopic one is reported in a recent review (3.0–17 % vs 0–23.0 %) [24]. The use of a protective stoma is controversial, with widespread use in some experience and markedly reduced or abolished in other [25]. In our opinion, according to *Hansen* [25], we justify the use of a protective ileostomy or colostomy only in situations with a high risk of failure as low colorectal anastomosis, difficult pelvic dissection, and risk patients. However, it is important to consider also the morbidity related to re-surgery and to the stoma management. Therefore, we believe that when an anastomotic failure appears, a late opening of a ghost-ileostomy could be not useful. A tension at the level of anastomosis resulting from an incomplete mobilization, an insufficient blood supply, and the absence of margins' integrity for necrosis, inflammatory disease, or cancer are univoquely accepted as high-risk local factors [1]. For these reasons a proper mobilization of the splenic flexure is essential to prevent the stretching on the anastomosis in left colon *resective surgery* [12]; otherwise, the low percentage of splenectomies of necessity reported in the literature does not justify different behaviors. Instead, the kind of disease does not seem to constitute a risk element [22] but a higher incidence of tumor recurrence resulting from the onset of dehiscence is reported in literature [14]. In univariate analysis [8], the patient age, the pulmonary insufficiency, the lymph node dissection, the combined resection of other organs, the omental resection, the operative time, the blood loss, the intraoperative blood transfusion, and the postoperative creatinine level were reported as significant factors influencing anastomotic healing. Also, a multivariate analysis [1] identified *pulmonary insufficiency* and duration of operation as predictors of anastomotic leakage.

Assembling the general and loco-regional with technical factors, we still agree with the multivariate analysis of *Golub* [3] that selected five statistically significant predictive parameters: chronic obstructive pulmonary disease (COPD), bowel obstruction, peritonitis, corticosteroids use, blood transfusion >2 U, and serum albumin level <3.0 g/L. Furthermore, a supplemental 80 %

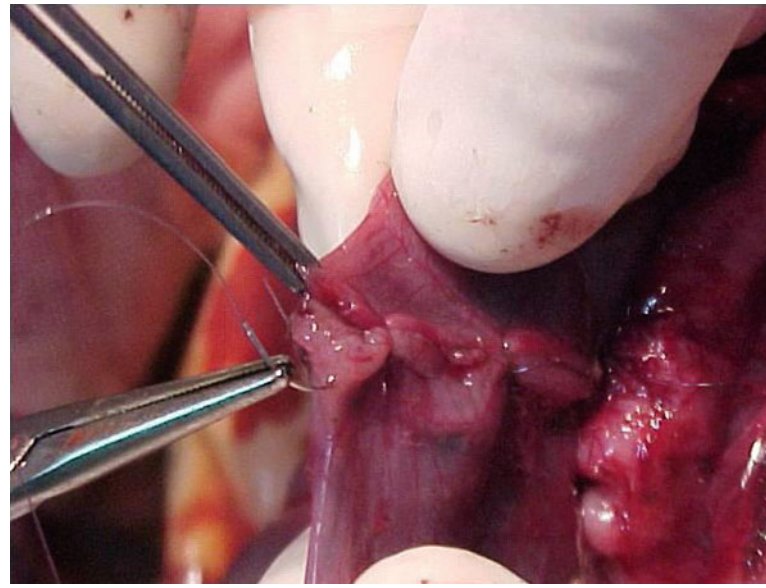

Fig. 1.5 Experimental study: small bowel anastomosis in the rabbit

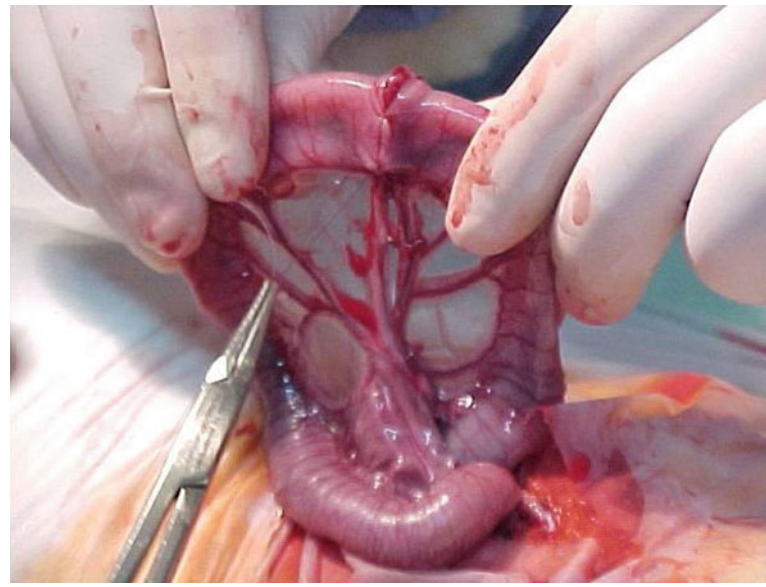

Fig. 1.6 Experimental study: colo-colic anastomosis in the rabbit

FiO2 during the rectal cancer surgery and immediate postoperative period reduces anastomotic failure [26].

Despite of the importance of general, local, or technical factors, at the base of the anastomosis failure could be an "innermost" *primum movens*, to look for both at the pathophysiological and biochemical levels. In fact, it is not otherwise possible to explain leakage in anastomoses performed under optimal conditions of elective surgery, using perfect technique, in patients without general risk factors.

Starting from this *rationale*, and from the higher leak rate in large than in small bowel anastomoses, we performed experimental studies comparing resected and anastomosed segments of small and large bowel (Figs. 1.5 and 1.6) using biochemical and tensiometric methods [27–29].

Previous experimental studies showed an early and massive deposition of collagen and a greater distress of the large compared with the small bowel. It is also well known the importance of the maturation of collagen in the anastomosis *healing process* and that an adequate *metabolic energy* is needed to realize healing process. Starting from these assumptions, our first study [27] was to analyze the process of oxidative phosphorylation (mitochondrial function) in colon and small bowel during the anastomotic process. The results of polarographic, spectrophotometric, and gel-electrophoresis analysis showed a prevalence of oxidative metabolism in the colic mitochondria compared with the small bowel, demonstrated by an increased activity of oxygen consumption and enzymatic respiratory. On the contrary, the small bowel showed a prevalence of glycolytic metabolism. Summarizing these results, the small bowel burns sugars through anaerobic glycolysis to produce energy for collagen deposition and healing process of anastomosis, and therefore is less influenced by the decrease of available oxygen occurring in the anastomotic area during surgical stress. By contrast, colon shows a metabolism mainly linked to the oxidative phosphorylation, presents a more difficult anastomotic healing process in absence of oxygen, and shows a greater risk of leak. This observation is confirmed by the decrement of biochemical parameters in colonic cells. In fact, at the end of the study, we observed a small bowel tissue biochemically identical to the preoperative one, while the colon tissue showed marked differences.

In the second phase of our experiments [29], we investigated if *biochemical differences* were also associated with motility and peristalsis. In fact, the aim was to verify in vitro how much the surgical stress could affect contractility of the smooth muscle (both spontaneous and agonist induced) of both organs, correlating these results to the biochemical parameters too. The results showed an anarchist contractility and late restart of colic peristalsis compared with an early and regular contractile activity of the small bowel. Such motor abnormalities may be the consequence of abnormal biochemical changes, because the ATP is necessary in the maintenance of membrane potentials, in calcium homeostasis, and in the actin–myosin interactions. The study showed that surgical stress determines abnormalities in the mitochondria of the smooth muscle, damaging the contractility. In consequence of a difficult process of collagen maturation and deposition, these changes are prevalent in the colon and may explain unexpected anastomotic leakage in the absence of apparent risk factors.

At confirm of these experimental results, an other retrospective study [30] showed a significant leakage rate (24.1 % vs 2.7 %, $P=0.001$) in patients who underwent colic resection, affected by COPD compared with patients not affected by COPD. COPD is characterized by a condition of chronic hypoxemia that determines a reduced peripheral oxygen delivery (DaO2). However, the mechanism of control of blood flow and of oxygen extraction at intestinal level let the consumption of oxygen (VO2) to be independent from DaO2; thus, the reduced DaO2 does not influence the VO2 in patients with COPD. On the contrary, during the healing process of colic anastomosis, the need of oxygen increases, both for higher metabolic request related to the oxidative phosphorylation and for the synthesis of collagen. In patients with COPD undergoing to resective surgery and colic anastomosis, these pathophysiologic changes inevitably relate the VO2 to the insufficient DaO2. Therefore, the correction of impaired oxygen tension could reduce the high incidence of anastomotic leak in patients with COPD. On the basis of these results, a preoperative evaluation of respiratory tract (chest X-ray, CT, spirometric tests, hemogasanalysis) is essential before colic resective surgery, especially in aged patients affected by COPD. Moreover, a perioperative oxygen therapy also may facilitate anastomotic healing.

In a further *experimental study* [31] we investigated in pigs if *pericardium bovine patch* (Tutomesh®) wrapping ileoileal and colo-colic anastomosis seals the suture line and promotes anastomotic healing. By using integrated and translational methodologies, we described intraoperative, histological, biochemical, tensiometric, and

electrophysiological evaluations performed on intestinal specimens.

Biologic materials have been introduced in general surgery as reinforcement of abdominal wall hernia in contaminated or potentially contaminated settings, when the use of alloplastic meshes is contraindicated [26–31]. In this respect, an innovative application of biologic patch could be their use as reinforcement of the gastrointestinal anastomotic suture line [7–9]. Therefore, the aim of the study was to verify if bovine pericardium patch improved the healing of anastomosis, when in vivo affixed on the hand-sewn suture line of large and small bowel anastomosis of the pigs.

A further end point was to verify if the patch was able to avoid anastomotic leakage in the presence of a deliberately incomplete left suture.

The results showed that the application of a patch wrapping the colic anastomosis produces a positive effect in the healing compared with untreated samples also showing, during follow-up, an almost full recovery [1–3, 26]. In the large bowel patch anastomosis group, the delay of oxidative stress in the early stage of reparative processes could prevent the damage of noble cells (like tissue stem cells), allowing a full restoration of tissue functions and also decreasing fibrotic reaction during the next stages of healing process. Under a condition of cellular oxidative stress, the protective effect of the patch is compatible with the histological observation of a moderate inflammatory infiltrate; moreover, the late increase of reacting oxygen species can be correlated with an appearance of a granulation tissue, without damages during the repairing process. Therefore, tensiometric evaluations in colic specimens suggested that the use of patch can preserve smooth muscle response to acetylcholine similar to the response of controls (specimens without anastomosis) in the early postoperative time (48 h–14 days), while the colic preparations with traditional anastomosis showed contractility alterations. In the ileum, the presence of pericardium bovine patch clearly prevents the alterations following the traumatic effect of surgery. However, pericardium bovine patch appears to modulate and counteract the traumatic effect of surgery. Overall, our results suggest that the application of the patch also improves the intestinal mucosal function, restoring the almost normal transport properties. In conclusion, the use of the pericardium bovine patch as *reinforcement* of the intestinal anastomosis could be safe and effective. Moreover, the leakage prevention in the presence of iatrogenic perforation is also unpublished before and it represents a surprising histopathological data. On the basis of these experimental results, we started a multicenter-controlled clinical trial in humans, comparing the outcomes of intestinal anastomosis performed with and without the bovine pericardium patch in risk patients.

In conclusion, despite studies regarding risk factors and prevention, the anastomotic leakage continues to be the most serious *complication* after *gastrointestinal tract surgery*. A thorough surgical technique, avoiding hazardous anastomoses without protective stoma, or without two-stage surgery in patients at risk, could allow a significant reduction of healing process failure. A tailored surgical approach to both patient's physiology and disease is the most important factor that influences anastomotic integrity after resective surgery. Further studies regarding innovative devices able to improve the healing process of anastomosis are needed.

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2 Impact of Flexible Endoscopy in the Evaluation of Digestive Anastomosis

Antonello Trecca, Raffaele Manta, Amitabh Naik, Mario De Bellis, Alberto Arezzo, and Giuseppe Galloro

2.1 Introduction

Flexible endoscopy plays a fundamental role in the clinical monitoring of surgical digestive anastomosis [1]. Careful endoscopic exploration is essential for the recognition of the linked intestinal segments and for the description of the type of anastomosis (end to end, end to side, side to side), providing both an accurate evaluation of the new digestive anatomy and the early detection of any postsurgical complications or recurrence. Close monitoring of the surgically treated disease, both neoplastic and nonneoplastic, can be realized by an accurate and scheduled follow-up which should consider all the imaging modalities available nowadays in clinical practice, such as radiology and endoscopic ultrasonography. A functional evaluation of the reconstructed segment can be provided by an accurate endoscopic technique aimed at observing caliber, patency, motility, response to the air insufflation, and flexibility of the anastomosis. On the other hand, prompt detection of any pathologic pattern of the anastomosis (stenosis, dehiscence, fistula, recurrence) is the key factor for the choice of any further and appropriate treatment. Our chapter is aimed at defining the key factors of an accurate endoscopic evaluation of surgical anastomosis and at discussing the clinical criteria for an accurate follow-up.

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2.2 Endoscopic Evaluation

An accurate endoscopic technique is the first step in order to describe the morphology of the new intestinal tract. Bowel preparation of the patient is one of the key factors, as the intestinal damage during surgery can induce a reduction of bowel segmentation and movement. Tailored preparation should be sought after, in order to reduce the missing rate of recurrence and to avoid any further reevaluation of the patient [2]. Administration of a cholinergic blocking agent or glucagon to reduce spasms can be of added value in close observing the intestinal mucosa.

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Some authors underline possible side effects and suggest the intracolonic administration of peppermint oil during colonoscopy for the control of colonic spasms. Asao [3] refers on a satisfactory spasmolytic effect in 88.5 % of the patients treated with a mixed solution of peppermint oil, water, and indigo carmine by using a hand pump attached to the accessory channel of the colonoscope, with a continuing effect of at least 20 min. Endoscopic observation should consider the useful role of the air in the evaluation of intestinal lumen with its adequate introduction and aspiration during the exploration of the anastomosis. Injection of a saline solution directly or using an irrigation pump through the accessory channel of the endoscope is another tool in the hand of the endoscopist to improve the quality of gastrointestinal exploration. Flexible endoscopy should always evaluate the caliber of the intestinal lumen which can be measured by using an opened biopsy forcep and the main longitudinal axis of the new reconstructed intestinal tract (Fig. 2.1). The description of the type and morphology of the surgical anastomosis should always be provided in the endoscopic report. After a complete evaluation of the functional status of the anastomotic site, including its patency and motility, flexible endoscopy should be prolonged to the evaluation of the proximal and distal parts and to all the reconstructed segments in order not to miss any morphologic change of the intestinal tract. The presence of metallic clips or suture stitches along the border of the anastomosis are often visible during upper and lower endoscopy as far as the presence of connecting venules, which reflects the healing process of the mucosa and rarely can cause impairment of the anastomosis. After an accurate cleaning of the intestinal lumen, the surgical anastomosis should be accurately checked for any mucosal defect such as discolorations, atrophic changes, and nodular irregularities which can be the expression of a redundant mucosal response or can mimic the presence of an endoluminal recurrence (Figs. 2.2 and 2.3). In this scenario the role of histology is mandatory to complete the endoscopic

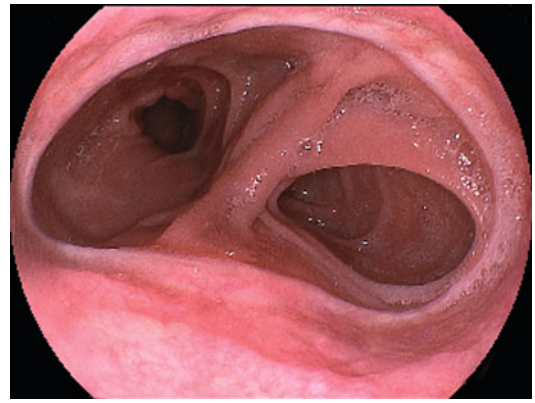

Fig. 2.1 Esophago-digiunal anastomosis after total gastrectomy: normal endoscopic findings

evaluation of the anastomosis and to detect any inflammatory or neoplastic change. We have to consider that any surgical intervention creates a new and different environment, and it should be taken into account when we study upper or lower gastrointestinal tract. So far the gastric remnant has been considered at higher risk for gastric cancer with an increasing postoperative interval, with a well-established clinical entity after remote surgery for peptic ulcer, called gastric stump carcinoma [4]. Many factors are involved in the pathogenesis such as achlorhydria, hypergastrinemia, biliary reflux, Epstein–Barr virus, atrophic gastritis, and also some polymorphisms in interleukin-1β and maybe cyclooxygenase-2. The microscopy of the anastomosis changes from the chronic active *H. pylori* gastritis into the typical reflux gastritis with foveolar hyperplasia, congestion, paucity of inflammatory infiltrate, reactive epithelial change, and smooth muscle fiber proliferation which slowly evolve to preneoplastic conditions, particularly dysplasia. Endoscopic surveillance is mandatory particularly in this clinical condition where the detection of premalignant or early neoplastic lesions is more frequent [5]. Concerning the lower tract, ileal-pouch anastomosis after proctocolectomy represents another example of how the modified clinical environment can lead to a new disease condition, named as pouchitis and

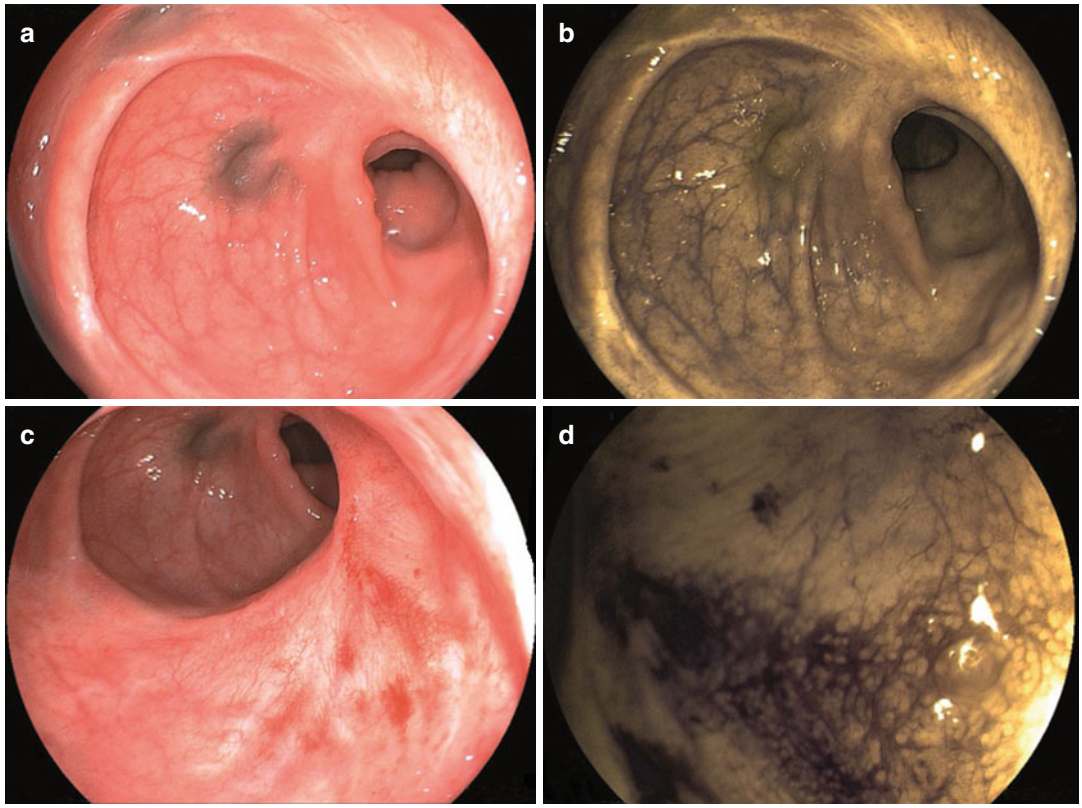

Fig. 2.2 Lower colonic anastomosis with a small reduction in caliber (**a**). Electronic chromoendoscopy (FICE-system evaluation) with negative findings (**b**). Slight hyperemia is visible at the edge of the anastomosis (**c**). Electronic chromoendoscopy confirmed negative findings (**d**)

characterized by a nonspecific inflammation of the ileal reservoir. Bacterial overgrowth, chronic inflammation, and villous atrophy, even if always present, can evolve in pouchitis in some cases, mainly after surgery for ulcerative colitis, and for this reason pouchitis is considered an inflammatory bowel disease. Lower endoscopy, together with an accurate histopathological evaluation, is mandatory for studying and monitoring this condition [6].

A significant reduction of the intestinal lumen, even if asymptomatic, should be described and monitored, while in case of intestinal stenosis, fistula, or dehiscence, other imaging modalities together with prompt treatment should be scheduled and selected among the different options (endoscopic dilation, stent placement, or surgical reconstruction) (Fig. 2.4).

2.3 Oncological Criteria of Follow-Up

Endoscopists should keep in mind clinical criteria for an accurate follow-up of the patient: synchronous cancer is defined as a cancer detected within 1 year of follow-up, while metachronous cancer is that one detected after 1 year of follow-up, while concomitant cancers are defined as multiple cancers detected before the surgical treatment. In this setting, we define the miss rate as the proportion of missed cancer out of all

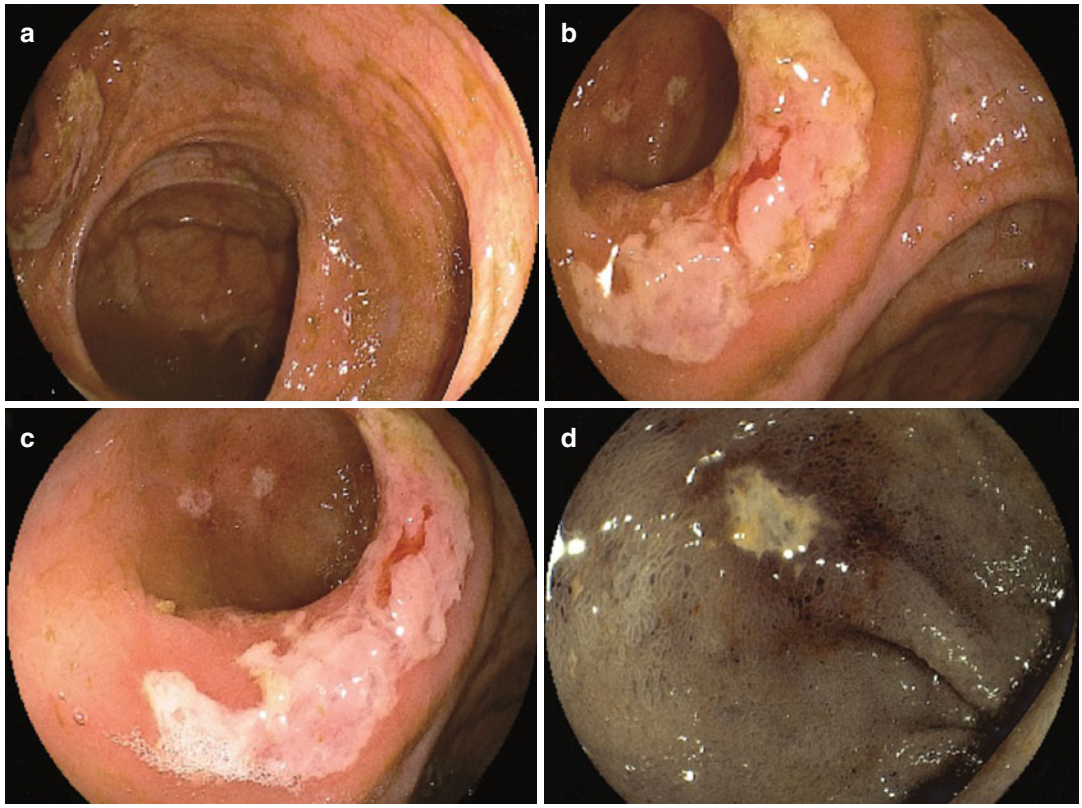

Fig. 2.3 Ileocolonic (side-to-side) anastomosis after *right* hemicolectomy (**a**). Whitish discoloration involving half of the anastomotic border (**b**). Conventional close-up view with evidence of superficial erosions of the ileal mucosa (**c**). Electronic chromoendoscopy (FICE system) of the ileal erosions with negative histologic findings (**d**)

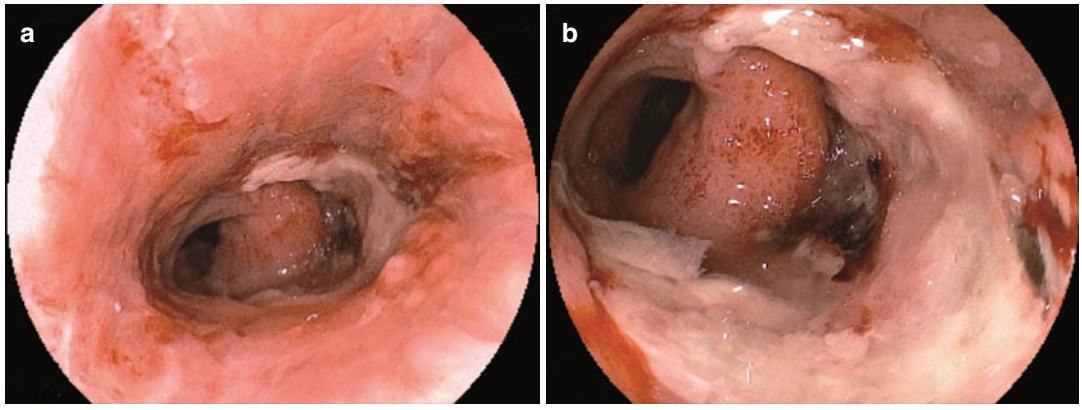

Fig. 2.4 Coloanal anastomosis with dehiscence and large amount of fibrin deposit (**a**). Close-up view with evidence of anastomotic leakage and necrotic area (**b**)

synchronous cancer [7]. These parameters have been introduced in order to better define the oncological criteria of the endoscopic follow-up. Timing of the first endoscopic evaluation has been questioned as a risky procedure particularly when dealing with difficult anastomosis such as esophageal ones. Maish [8] reports as early endoscopy after esophagectomy provided reliable identification of graft ischemia in 63 over 102 patients of his series. Upper flexible endoscopy performed a median of 9 days after operation was safe and with no anastomotic injuries. In another UK series [9] esophagoscopy was attempted within 1 week of esophagectomy in order to check the anastomosis and the reconstructed stomach of 79 consecutive patients. A total of 15 patients with gastric ischemia, two with a leak, and four with ischemia and leakage were detected, thus confirming endoscopy as a safe and accurate procedure. Intraoperative endoscopic diagnosis has been questioned to evaluate circular-stapled colorectal anastomosis during laparoscopic surgery and as a possible resource to prevent bleeding and possible leakage [10]. The patients with and without routine intraoperative endoscopic assessment were compared regarding postoperative complications, and even if the postoperative rate of bleeding and leakage was not significantly reduced, intraoperative endoscopy was accurate in the early detection and treatment of these complications. The implementation of new imaging modalities such as dye-spraying technique, virtual chromoendoscopy, and high-resolution endoscopy not only in eastern countries increases the early detection of neoplastic disease. These techniques made a much accurate diagnosis of neoplastic disease possible even in the endoscopic follow-up of surgically treated patients, so far improving the early detection of neoplastic recurrence. Endoscopic surveillance with chromoendoscopy in a Japanese series of 97 colectomized with ileorectal anastomosis ulcerative colitis showed definite dysplasia in four patients, who received IRA; among them two were adenocarcinoma with submucosal invasion [11, 12]. Postoperative surveillance endoscopy performed by an experienced endoscopist and with dye-spraying technique was useful to detect cancer at an early stage.

Conclusions

Flexible endoscopy is of pivotal importance in the evaluation of surgical anastomosis, in the definition of early recurrence, and in the diagnosis and treatment of complications. Clinical follow-up of treated patients should be implemented together with other imaging modalities, even if early postoperative endoscopic evaluation can be scheduled in selected cases without anastomotic injuries and with no further risk for the patient. Accurate endoscopic technique is mandatory for early recognition of the reconstructed anatomy and to detect any anastomotic defect, while endoscopist should consider the primary disease responsible for surgery, the timing of the endoscopic surveillance, and the role of other imaging modalities. Diagnostic accuracy of conventional endoscopy can be improved by new emerging modalities such as chromoendoscopy and enhanced endoscopy, even if these results should be confirmed in larger series.

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