Complications in Surgery – Let's Face Them

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Patients admitted to a surgical ward have a chance of more than 10% to encounter a severe adverse effect of their treatment [1]. For some types of gastrointestinal surgery the risk of complication can be as high as 50%. Some of these complications, as superficial wound infection after surgery for perforated viscera, are rather frequent but will only minimally effect the immediate outcome of treatment, although incisional hernias may result. Other complications, such as iatrogenic bile duct injury after laparoscopic cholecystectomy, are infrequent but have a dramatic effect on the outcome of the treatment. Iatrogenic bile duct injury can lead to reinterventions, that vary from endoscopic papillotomy to liver transplantation and can lead to severe impairment of the patient's quality of life, even after successful interventions or repair [2].

Anastomic leakage after resection and reconstruction of the various parts of the digestive tract and intra-abdominal parenchymatous organs is one of the most feared complications, that in the worst-case scenario can lead to generalized peritonitis septicemia and death. In many cases, reinterventions are needed. That means repeated relaparotomies, that can be planned or based on a patient's clinical situation (on demand), with drainage of the anastomosis or diverting enterostomies. Salvage pancreatotomy is in some cases the only remedy to have a patient survive after a leaking pancreaticojejunostomy, leading to a brittle diabetes with its own serious complications [3].

Whereas the success of surgery is frequently measured by cure rate and (long-term) survival, postoperative morbidity (i.e. complication rate) and mortality should be more prominently used in evaluations of surgery. Therefore the management of postoperative complications should be a very important activity in all surgical departments. Surgeons should also be aware of the incidence of complications of various therapies by collecting and analyzing their own data.

At the department of surgery of the Academic Medical Center in Amsterdam, complications are being registered with great care. The department is both serving the community and functions as a secondary and tertiary referral center for gastrointestinal surgery. The complications of all patients discharged from the surgical wards are scored in a daily plenary session with all staff present including the trainees, in order to enhance the completeness of the registration, although underscoring of events will take place, like in all systems.

Around 3,100 patients are discharged each year, of whom around 70% underwent an operation. Of all patients, 11.2% had a complication in the year 2000. This percentage has not changed very much over the years. The presence of a complication has a striking effect on the mean hospital stay, that is about three times longer in patients with complications than without (table 1).

Complications are especially frequent in patients treated in the year 2000 for malignant disease (22.5%) as compared with benign disease (8.8%). Patients with gastroesophageal disease have a higher complication rate

Table 1. Incidence of complications from 1996 to 2000 and the effect on mean hospital stay with and without complications

	1996	1997	1998	1999	2000
Complications, %	11.6	10.6	12.6	10.7	11.2
Mean hospital stay, days					
With complications	27.0	26.2	26.5	26.3	25.5
Without complications	8.8	8.7	8.0	7.9	7.8

(36%) than patients with hepatopancreatobiliary disease (13%) or inflammatory bowel disease (16%).

Prevention is the next step in the management of complications. This can be done by selection of patients, selection of procedures and concentration of knowledge and experience.

First, selection of patients. Patient's co-morbidity is a clear risk factor for complications [1]. This should be assessed before selecting for invasive surgery and alternative procedures should be offered to elderly, frail and malnourished patients, especially when the chance of cure is relatively low or when nonsurgical treatment is a fair second best. Obstructions of the gastrointestinal tract can often be successfully bypassed by endoscopic or percutaneous induced stents with good palliation, as in advanced esophageal and periampullary tumors. Conservative treatments are an alternative in many benign gastrointestinal diseases. In many cases, symptoms can be awaited, as in case of stones in the gallbladder after common bile duct clearance by endoscopic retrograde cholangiography and papillotomy.

Second, selection of procedure. Modern imaging techniques, as helical CT scan [4], endoultrasound and PET scanning can prevent unnecessary laparotomies and diagnostic laparoscopy can prevent more invasive laparotomies, although the yield is rather limited in pancreatic cancer [5]. The choice to perform surgical procedures with extended lymph node dissection should be made on scientific evidence and not on personal preference, especially since extended lymph node dissection leads to more complications [6, 7]. There is no good evidence that more extensive surgery is better in treatment for gastrointestinal malignancies [8]. In colorectal surgery, prevention of anastomotic leakage has been studied by many authors, the use of omentoplasty has been advised but has shown to be ineffective in a prospective randomized study [9]. The threshold to perform a diverting ileostomy should be low, especially when the anastomosis is considered at risk

during peroperative testing. The frequent complications of the enterostomy, such as parastomal herniation and skin problems, should be taken into account in this decision. Preoperative measures can be taken to improve the patient's condition and lower the chance of complications. Preoperative enteral and parenteral nutrition for 2–3 weeks has shown to have a beneficial effect in severely malnourished patients. Preoperative internal biliary drainage in jaundiced patients has been performed routinely in centers as our own, but the theoretical advantage does not seem to overrule the disadvantage of stent-induced infection [10]. Preoperative antibiotic prophylaxis has shown to be effective in many gastrointestinal surgical procedures, but the guideline of infusing the drug before the skin incision should be followed. Bowel preparation, mechanically and antibioticly, has been the rule for colorectal surgery, although its value is questioned and colorectal surgery can be done with few complications in the unprepared bowel [11].

Third, concentration of knowledge and experience. For high-risk gastrointestinal surgery, as esophageal and pancreatic surgery, the volume-outcome effect has been shown, indicating that postoperative or hospital mortality can be high in so-called low-volume hospitals and vice versa [12, 13]. The effect depends on the center and not on the surgeon. The volume-outcome effect is less striking for complications. There is still a complication rate of $\pm 40\%$ in our center after pancreaticoduodenectomies, but mortality is very low. This probably indicates that complications have a relative low mortality, because of good management by the whole team. Treatment of complications, that all surgeons have to face, requires teamwork and often novel strategies. Treatment can be a challenge and especially successful for surgeons in the referral center, whereas the referring surgeon still has to cope with the reason for 'his' complication. Therefore it is indicated not to attempt to repair one's own complications in all cases at all costs.

The topic of complications does not have a high popularity within the surgical community and courses or symposia solely devoted to this topic are rare. The tradition within the AMC to have a yearly postgraduate course on complications for Dutch and Belgian specialists was transferred to the United European Gastroenterology Week, Amsterdam 2001, and under the auspices of EDS and ISDS a postgraduate course was held on 'Management of complications of gastro-intestinal surgery'.

This issue of *Digestive Surgery* is dedicated to the papers presented and to the cases discussed, using an interactive voting system. We hope you enjoy this issue.

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