Severe Colonic Complications requiring Sub-Total Colectomy in Acute Necrotizing Pancreatitis—A Retrospective Study of 8 Patients

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Received: 25 November 2010 / Accepted: 20 July 2012 / Published online: 17 August 2012
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Abstract Colonic involvement in acute pancreatitis is associated with high mortality. Diagnosis of colonic pathology complicating acute pancreatitis is difficult. The treatment of choice is resection of the affected segment. The aim of this study is to evaluate the feasibility of aggressive surgical approach when colonic complication is suspected. Retrospectively, 8 patients with acute necrotizing pancreatitis and colonic complications (2006–2010) were reviewed. Eight patients with acute necrotizing pancreatitis requiring colonic resection were evaluated. Presentation was varied, including rectal bleeding (2), clinical deterioration during severe pancreatitis (4), colonic contrast leak on CT scan (1) and large bowel obstruction (1). Typically, patients with severe acute pancreatitis had colonic pathology obscured and unrecognized initially because of the ongoing, fulminant inflammatory process. All eight patients underwent Sub-total colectomy & ileostomy for suspected imminent or overt ischemia/perforation, based on the outer aspect of the colon. There was one mortality due to severe sepsis and multiorgan dysfunction syndrome. All other patients recovered well and later underwent closure of the stoma. Recognition of large bowel involvement may be difficult because of nonspecific symptoms or be masked by the systemic features of a critical illness. Clinicians should be aware that acute pancreatitis may erode or inflame the large bowel,

resulting in lifethreatening colonic necrosis, bleeding or perforation. In our series of eight patients, we observed that mortality can be reduced by this aggressive surgical approach. We recommend a low threshold for colonic resection due to unreliable detection of ischemia or imminent perforation by outside inspection during surgery for acute necrotizing pancreatitis.

Keywords Colectomy · Necrotizing pancreatitis · Complications

Introduction

Colonic involvement in severe acute pancreatitis (SAP) is rare but potentially fatal. The large bowel, particularly the transverse colon and the splenic flexure, is susceptible to extension of pancreatic inflammatory processes due to its intimate anatomic relationship with the mesocolon and middle colic vessels. Inflammatory processes may compress, inflame, or invade the colon, presenting with diverse, life-threatening complaints [1]. Colonic involvement is difficult to diagnose clinically and radiologically. Any potential symptoms caused by ischemic and/or reactive colitis are usually overlaid by the symptoms of acute pancreatitis. CT findings of colonic wall thickening in patients with acute pancreatitis are mostly ignored in the daily routine as long as there is no special reason to look more actively for bowel wall lesions [2]. This may lead to the further increase in the insult and contribute to multiorgan dysfunction syndrome (MODS) and severe sepsis. To increase the awareness of the colonic involvement in SAP, to suggest the need for aggressive treatment and to reduce the mortality of this disastrous complication, we report eight patients who underwent large bowel resection for severe colonic complications in SAP.

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Methods and Material

Retrospectively, records of eight patients with SAP who underwent colectomy (2006–2010) were reviewed. This group represented 25 % of all patients admitted with SAP who required necrosectomy during this period (8/33). All eight patients underwent subtotal colectomy and ileostomy for suspected imminent or overt ischemia/perforation (Fig. 1), based on the inspection of outer aspect of the colon. The diagnosis of ischemia was made on the basis of whether the color of the bowel wall demonstrated ischemia or hemorrhagic infarction or pulsations of the mesocolic vessels could not be palpated.

Results

Serious colonic complications were identified in eight (6 male and 2 female) patients (Table 1). The mean age was 50.4 years (range 17–75 years). The etiology of underlying pancreatitis included biliary pancreatitis (2), postendoscopic retrograde cholangiogram (1), posttraumatic (1), and unknown (4). Presenting features included the following: abdominal pain (5), clinical deterioration during an episode of pancreatitis (1), rectal bleeding (1), and asymptomatic (1). Diagnosis of colonic involvement preoperatively was indicated by CT in one patient, which showed a splenic flexure perforation, colonic bleeding in one case, and evidence of colonic fistula in one patient. Indications for surgery included persistent MODS (2), severe sepsis (2), suspicion of colonic involvement (1), and preoperative diagnosis (3). In all eight patients, colonic resection was performed (Fig. 2). Histopathological examination of the colonic specimen revealed transverse colon perforation (5), transmural ischemia (2), and pericolicitis and fat necrosis (1). Intraabdominal pressure (IAP) was measured in four patients both

Fig. 1 Perforation seen in transverse colon

Table 1 Clinical data

Age	Sex	Etiology	Days to surgery	Colon Involved	Indication for Surgery	Re look Surgery	Histopathology Examination	M Morbidity	Outcome	Reconstruction
54	M	Gallstone	32 days	Transverse	Colonic Bleeding	Thrice	Perforation	Intra abd pus, atelectasis, MODS	Mortality	–
71	M	Idiopathic	12 weeks	Transverse	Persistent MODS	–	Serosal necrosis Submucosal Edema Perforation	Intra abd collection	Lost to F/u	–
17	M	Idiopathic	20 days	Transverse	Severe Sepsis	Twice	Ischemic Colitis	Jejunal Perforation, Convulsions	Recovered	Done
49	F	Post ERCP	13 days	Transverse	Persistent MODS	–	Ischemic Colitis	Jejunal Fistula	Recovered	Done
50	M	Idiopathic	22 days	Transverse	Severe Sepsis	–	Ischemic Colitis	Wound Infection	Recovered	Done
52	M	Post Traumatic	14 days	Transverse	Trauma/ColonicFistula	Four times	Perforation	Incisional Hernia	Recovered	Done
75	F	Idiopathic	26 days	Hepatic Flexure	CECT Abd s/o Air in RP	–	Ischemic Colitis/Perforation	Jejunal fistula	Recovered	Done
35	M	Gallstone	30 days	Splenic Flexure	CECT abd s/o leak	–	Perforation Splenic flexure	Wound infection	Recovered	Done

RP Retroperitoneum

Fig. 2 Change in Intra Abdominal pressure post colectomy

preoperatively and postoperatively. A decrease in IAP postoperatively was found in all the patients who underwent colectomy (Table 2). None of the patients had a negative laparotomy. Relook laparotomy was required in three patients. In-hospital mortality was 1/8. Restorative surgery was performed in six patients without substantial morbidity.

Discussion

Severe colonic complications of SAP are rare. Colonic involvement is most commonly minor with contiguous inflammation causing ileus, abdominal cramps, or spasm; however, a broad range of fulminant colonic complications exists, including fatal hemorrhage or overwhelming sepsis. Seven of the eight of our patients survived to be discharged from the hospital. Four of our patients were identified because of clinical deterioration during an episode of pancreatitis. Involvement of the large bowel should be considered among the diverse complications associated with lack of resolution or exacerbation during the course of acute pancreatitis. Our experience mirrors that of others. Aldridge et al reported 22 patients with SAP who failed to improve

despite intensive supportive therapy and who subsequently underwent subtotal pancreatic resection or pancreatic debridement [3]. Nine of these patients had involvement of the colon requiring resection. Similar findings were noted by Van Minnen et al who reported a similar result in 16 patients [4]. Clinicians should consider the diagnosis of a colonic complication in any patient who fails to improve clinically despite aggressive medical therapy. Lower GI bleeding may be a manifestation of complicated pancreatic disease masquerading as primary large bowel pathology and can be considered an indication for prompt surgical intervention.

One of our patients presented with rectal bleeding with anemia, requiring transfusion due to the pancreatic inflammation causing colonic necrosis. Reports have also described lower gastrointestinal bleeding secondary to colonic erosion of a pancreatic inflammatory process or large bowel infarction and necrosis [1, 5]. Patients with massive lower gastrointestinal hemorrhage caused by pseudocyst rupture into the colon have been reported [6]. Gumaste et al reported pancreatic inflammation encasing the colon in a patient presenting with diarrhea and rectal bleeding [7]. An isolated case has been described of ileus producing colonic infarction by incarceration of the large bowel within a ventral hernia [8]. Clinicians should be aware that rectal bleeding may reflect a colonic complication of pancreatic disease.

Anatomic contiguity of the colon to the pancreas allows direct spread of both enzymes and inflammation; additionally, the splenic flexure is a watershed area often supplied by a poorly developed marginal artery that may make this area more susceptible to ischemic injury. The early diagnosis of severe colonic involvement in pancreatic disease is challenging [9]. The existence of large bowel disease may be obscure or masked, as in the case of fulminant necrotizing pancreatitis with multisystem organ failure [10]. Additionally, the complication might not be easily attributable to the primary pancreatic process if a symptom-free interval of weeks or months existed as seen in one of our patient who presented with no symptoms but a CECT abdomen showed a colonic fistula. None of our patients presented with peritonitis due to intestinal perforation or enterocutaneous fistula, although these complications have been described [4, 10, 11].

All the patients underwent aggressive treatment in the form of subtotal colectomy and ileostomy with distal mucous fistula. We were able to salvage these patients with acceptable morbidity. Colonic pathology—necrosis and perforation—complicating acute pancreatitis is known to be associated with high mortality of up to 50 % [12]. Our series has mortality in one patient of total eight patients. None of our patients were given a diverting loop ileostomy (DLI) as a measure to avoid colonic resection. The role of DLI is mentioned in literature and can be applied when colonic viability is dubious [13]. However, it would be interesting to

Table 2 Change in Intra Abdominal pressure post colectomy

Age	Sex	Reduction in Intra Abdominal Pressure post Colectomy
54	M	+
71	M	+
17	M	IAP not measured
49	F	+
50	M	+
52	M	IAP not measured
75	F	IAP not measured
35	M	IAP not measured

compare the role of DLI and the aggressive form of treatment such as subtotal colectomy in further studies.

As the diagnosis of colonic ischemia in SAP is difficult, a high index of suspicion must be maintained in these patients with ongoing organ dysfunction. Diagnosis of colonic involvement in necrotizing pancreatitis can rarely be made preoperatively. Probably the most frequently used diagnostic test will be contrast-enhanced CT with angiography of the middle colic vessels, and the finding of mural thickening of the transverse colon should raise the index of suspicion. Intramural gas can also be regarded as a definite feature of necrosis [14]. Surgical intervention will be required with the resection of the ischemic colon. As the series reviewed here indicate that the transverse colon is the most frequent site of involvement, extended right hemicolectomy with end ileostomy and distal mucous fistula/closure appears to be the most frequent intervention.

Low threshold for colonic resection can be defined either preoperatively or intraoperatively. Preoperatively if the CT scan is suggestive of gas in the retroperitoneum, suspicion about the colonic involvement should be made. Also, any thrombus or narrowing of the middle colic vessels should arouse a suspicion of colonic ischemia. Intraoperatively colonic involvement can be suspected if the color of the colon is dusky. One should try to palpate the middle colic vessels and look for vascular compromise to the colonic segment.

Benefits of Aggressive Treatment with Colectomy

1. Better drainage of all the pockets of necrosis, extending into the retrocolic spaces, can be achieved after colectomy. This has shown to reduce the relaparotomy rate as evident in our series.
2. As bacterial translocation is one of the main reasons for ongoing sepsis in SAP, colectomy reduces the bacterial load and thus may reduce the septic focus.
3. Early enteral nutrition can be started after colectomy as the patient is given a temporary ileostomy. This is important to protect the gut barrier, reduce bacterial translocation and decrease the morbidity and mortality by reducing the septic complications.
4. Colectomy has shown to reduce the intraabdominal pressure in these patients. This helps in improving the organ function, improves the renal function, reduces the ventilatory requirement, and achieves abdominal skin closure.

Conclusion

Clinicians should consider the diagnosis of a colonic complication in any patient who fails to improve clinically despite aggressive medical therapy. In our series of eight patients, we observed that mortality can be reduced by this aggressive surgical approach. We recommend a low threshold for colonic resection, when a surgical intervention is planned, due to unreliable detection of ischemia or imminent perforation by outside inspection during surgery for SAP. As our series has a few patients, it would be best to conclude that a multicenter study would help to justify the need for low threshold for colonic resection in severe acute pancreatitis.

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