

# Management of Colonic Perforation After Colonoscopy

## Report of Three Cases

GREGORIO CARPIO, M.D., EUGENE ALBU, M.D., MILTON A. GUMBS, M.D., PAUL H. GERST, M.D.

Carpio G, Albu E, Gumbs MA, Gerst PH. Management of colonic perforation after colonoscopy: report of three cases. *Dis Colon Rectum* 1989;32:624-626.

*From the Department of Surgery,  
The Bronx-Lebanon Hospital Center,  
Bronx, New York*

In a review of 5424 colonoscopies performed in the last ten years at Bronx-Lebanon Hospital Center, 14 perforations related to the procedure were found. Seven perforations occurred during therapeutic colonoscopies (polypectomies) and seven during diagnostic colonoscopies. Eight patients were treated surgically and six nonsurgically. The decision about whether or not to perform surgery for a colonoscopically induced perforation depends on the clinical condition of the patient. Nonsurgical management is indicated if the patient's general condition remains stable, if the perforation has been diagnosed late, if the pneumoperitoneum that led to the diagnosis does not increase in size, if there are no signs of peritonitis, if the patient does not have a distal obstruction, and if the patient's condition improves in response to conservative treatment. [Key words: Colonoscopic perforation; Management of colonoscopic perforation]

THE INCIDENCE OF colonic perforation during colonoscopic procedures is reported to be in the range of 0.2 to 2.0 percent.<sup>1</sup> During diagnostic colonoscopy, the incidence of perforation is 0.3 to 0.8 percent; during therapeutic colonoscopy, the incidence of colonic perforations is reported to be 0.5 to 1.0 percent.<sup>1-10</sup> These perforations can be managed either surgically<sup>1,2,5,6,11</sup> or nonsurgically.<sup>1,4-6,12-14</sup> We reviewed our experience with colonic perforations after colonoscopy, focusing on the morbidity, the seldom-reported mortalities, and the principles of management, and analyzed the results of surgical and nonsurgical management.

### Methods

Colonoscopy is a standard diagnostic and therapeutic procedure that has its own morbidity and mortality. At the Bronx-Lebanon Hospital Center, we reviewed all colonic perforations that were diagnosed after colonoscopy during the 10-1/2 year period from January 1977 to July 1987. A total of 5424 colonoscopic procedures were performed. All patients with colonic perforations following colonoscopy were documented.

### Results

Among the 5424 colonoscopies performed, there were 14 perforations. Of these, seven followed therapeutic colonoscopy and seven followed diagnostic colonoscopy. Four of the 14 perforations occurred when the procedures were performed by physicians who do colonoscopy only occasionally. Nine of the perforations were located in the sigmoid colon, two in the splenic flexure, one in the transverse colon, and two in the descending colon (Table 1). Six patients were managed nonsurgically with antibiotics, intravenous fluids, and close clinical observation. Five of these patients recovered without further treatment; the other patient underwent surgery on the 25th hospital day and subsequently died. One patient, whose perforation had been treated conservatively, underwent anterior resection for sigmoid

Address reprint requests to Dr. Gerst: Bronx-Lebanon Hospital Center, 1650 Grand Concourse, Bronx, New York 10456.

TABLE 1. *Perforations After Colonoscopy: Management and Results*

Patient	Age	Sex	Dx and Associated Diseases	Perforation Site	Management	Result
1	73	M	Sessile polyp, ascending colon; diverticulosis, sigmoid	Sigmoid	Exteriorization of perforated bowel and colostomy	Recovered
2	76	F	Carcinoma in a villous adenoma, cecum; congestive heart failure	Sigmoid	Closure of perforation and transverse colostomy	Recovered
3	64	M	Carcinoma, sigmoid	Sigmoid	Resection of perforated and carcinomatous bowel and end colostomy	Recovered
4	84	F	Diverticulosis; congestive heart failure	Sigmoid	Exteriorization of perforated bowel and colostomy	Recovered
5	70	F	Cloacal carcinoma, anorectal polyp, sigmoid	Sigmoid	Conservative	Recovered
6	56	M	Polyp, sigmoid	Sigmoid	Exteriorization of perforated bowel and colostomy	Recovered
7	86	F	Polyp, sigmoid	Sigmoid	Conservative	Recovered
8	68	F	Intestinal adhesions	Sigmoid	Conservative	Recovered
9	87	F	Status after polypectomy, splenic flexure with bleeding at polypectomy site	Splenic flexure	Exteriorization of perforated bowel and colostomy	Died
10	50	M	Ulcerative colitis	Transverse colon	Closure of perforation, transverse colostomy	Recovered
11	64	F	Carcinoma, splenic flexure with associated obstruction	Splenic flexure	Segmental resection of perforated and carcinomatous bowel, transvers and colostomy, mucous fistula, splenectomy	Died
12	84	M	Polyp, descending colon	Descending colon	Conservative management followed by segmental resection of perforated bowel, end colostomy, and mucous fistula	Died
13	63	M	Polyp, sigmoid	Sigmoid	Conservative	Recovered
14	65	F	Carcinoma, sigmoid	Sigmoid	Conservative	Recovered

carcinoma four weeks after the perforation. Another patient, who had been treated conservatively for perforation following fulguration of a polyp, had to have surgery three weeks later for small-bowel obstruction. Despite thorough inspection during surgery, no perforation site was detectable in either of these patients.

As shown in Table 1, the patients who were treated surgically underwent the following procedures: two patients, closure of the perforation and transverse colostomy; four patients, exteriorization of the perforated bowel and colostomy; three patients, resection of the perforated bowel and end colostomy (two of these

patients also had carcinoma of the colon). Three patients who had colonoscopic perforations died.

### Report of Three Cases

**Patient 9:** An 87-year-old woman with a 2.5 cm splenic flexure polyp underwent therapeutic polypectomy. Because of subsequent bleeding, she had another colonoscopy five days later. Perforation of the bowel was diagnosed three days after the second procedure. Consequently, exteriorization of the bowel and a colostomy were performed. The patient died 11 days later of a myocardial infarction.

**Patient 11:** A 64-year-old woman had carcinoma of the splenic flexure with complete intestinal obstruction. She underwent diagnostic colonoscopy and biopsy of the tumor, which produced a perforation. Subsequently, the patient developed massive fecal

peritonitis and septic shock. She immediately underwent resection of the perforated and carcinomatous bowel, together with transverse end colostomy and mucous fistula. She died 13 hours after surgery.

**Patient 12:** An 84-year-old man with two polypoid lesions at the descending colon underwent polypectomy. Free air was seen under the diaphragm four days later. Initially, the patient was managed nonsurgically and showed improvement. On the 25th day after the perforation, however, the patient's abdomen became more tender; his pneumoperitoneum was persistent and increasing. Exploratory laparotomy was performed with resection of the descending colon and end colostomy. The patient died 24 days after surgery.

### Discussion

During the period reviewed, the incidence of perforation was 0.26 percent. The mortality rate for the procedure was 0.05 percent.

The first critical analysis of colonic and rectal trauma was reported in 1951, by Woodhall and Ochsner,<sup>15</sup> who advocated primary repair with or without proximal decompression. Colonic perforation after colonoscopy can be managed nonsurgically, however, because preparation of the bowel before colonoscopy minimizes the risk of fecal contamination of the peritoneal cavity. The presence of pneumoperitoneum does not indicate that surgery should be performed if the patient's general condition is good and if there are no signs of general peritonitis. Perforations in these patients are usually small. Many of the perforations are simply fissures resulting from insufflation or punctate necrosis at the site of electrocoagulation during polypectomy.<sup>2</sup> Nonsurgical management also should be considered if the perforation is retroperitoneal.<sup>12</sup>

Of the six patients in this series who were treated conservatively, five recovered. Two of these patients had surgery several weeks after colonic perforation, one for sigmoid carcinoma and the other for intestinal obstruction. In both patients, the colon was completely healed and no site of perforation could be seen.

Nonsurgical management of colonic perforation following colonoscopy is indicated if the event was diagnosed late, if there are no signs of peritonitis, if the patient's general condition continues to be good, if the pneumoperitoneum that led to the diagnosis does not increase, if the patient does not have a distal obstruction, and if the patient's condition improves on conservative treatment.

The decision about whether to perform surgery following a colonoscopic perforation depends on the clinical condition of the patient. As various reports have emphasized, mortality increases as time elapses between injury and surgery.<sup>1,5,12,13</sup> The following are indications for surgery: immediate awareness of perforation, signs of peritonitis, rising temperature and pulse, long-

standing absence of bowel sounds, sepsis, deterioration of the patient's condition during nonsurgical treatment, persistence or increase of pneumoperitoneum, and presence of distal obstruction. In older individuals, peritoneal signs may be absent even if there is obvious peritonitis. In addition, these patients usually have associated disease and delaying surgery may be detrimental.

In the surgical management of perforation following colonoscopy, primary repair without a defunctioning colostomy should be considered if the perforation is small, if there is minimal contamination, if the colon was well prepared for colonoscopy, and if laparotomy is to be done within eight hours of the injury.<sup>9</sup> In this series, however, no patient underwent primary repair without a defunctioning colostomy because of gross fecal contamination, delay in surgical intervention, or both.

In these cases we followed the well-established principles of repair of the colonic perforations<sup>14,16</sup> (Table 1).

### References

1. Brynitz S, Struckman J. Perforations from colonoscopy during diagnosis and treatment of polyp. *Ann Chir Gynecol* 1966;75:142-50.
2. Fasano J. Surgery for complications resulting from paraclinical colorectal examinations. *Ann Gastroenterol Hepatol* 1985;21:371-5.
3. Geenen J, Schmitt M, Hogan W. Major Complications of colonoscopy: bleeding and perforations. *Dig Dis Sci* 1975;20:231-5.
4. Ghazi A, Grossman M. Complications of colonoscopy and polypectomy. *Surg Clin North Am* 1982;62:889-96.
5. Macrae F, Tan K, Williams B. Towards safer colonoscopy: a report on the complications of 5000 diagnostic or therapeutic colonoscopies. *Gut* 1983;24:376-83.
6. Nelsons R, Abscarian H, Prasad ML. Iatrogenic perforation of the colon and rectum. *Dis Colon Rectum* 1982;25:305-8.
7. Sharmir M, Schuman B. Complications of fiberoptic endoscopy. *Gastrointest Endosc* 1980;26:86-91.
8. Smith LE, Nivatvongs S. Complications in colonoscopy. *Dis Colon Rectum* 1975;18:214-20.
9. Vincent M, Smith LE. Management of perforation due to colonoscopy. *Dis Colon Rectum* 1983;26:61-3.
10. Thorbjarnerson B. Iatrogenic and related perforation of the large bowel. *Arch Surg* 1961;84:608-14.
11. Patviliege J, Asagra J, Clerckx L. Diverticular and instrumental perforation of the colon. *Acta Chir Belg* 1984;84:109-12.
12. Dubas F, Rohner A. Iatrogenic colorectal perforation: incidence, mechanism and prevention. *Helv Chir Acta* 1985;52:681-6.
13. Bartizal J, Boyd DR, Folk FA, Smith D, Lescher TC, Freeark RJ. A critical review of management of 392 colonic and rectal injuries. *Dis Colon Rectum* 1974;17:313-8.
14. Walt AJ. Management of injuries of the colon and rectum. *Adv Surg* 1983;16:277-97.
15. Woodhall J, Ochsner A. The management of perforating injuries of the colon and rectum in civilian practice. *Surgery* 1951;29:305-20.
16. Lucas CE, Ledgerwood AM. Management of the injured colon. *Curr Surg* 1986;43:190-3.