

# Incidence and Management of Iatrogenic Colonoscopic Perforations, in a Tertiary Care Center in Ahmedabad: A Retrospective Study

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## ABSTRACT

**Background:** Although the incidence of iatrogenic colonoscopic perforation is low, it can result in severe complications and mortality. This study assessed the incidence and management of colonic perforations during an eight year period at a tertiary medical center in Ahmedabad (Gujarat). **Methods:** We reviewed all the medical records of patients received colonoscopies from January 2011 to December 2018. We collected the patient's demographic data, colonoscopic reports, and data regarding the location of perforations, their treatment and outcome. **Results:** During the 8-year period, out of a total of 4650 colonoscopies, 9 cases (0.19%) involved in colonoscopic perforations (6 men, 3 women). Of the 9 perforations 6 (66%) occurred in the sigmoid colon. Out of 9 perforation 7 (77%) of perforations were treated surgically and two (23%) medically with intestinal rest and intravenous antibiotics. The two patient who were treated medically were having small perforation occurred by biopsy forceps, these people kept nil by mouth for 72 hours and antibiotics were given and watched carefully for any signs of peritonitis. Convincingly these two people did not need surgical intervention. In the group treated surgically, four patients received primary repair with proximal diversion, two received colonic diversion and one patient received resection with anastomosis. No patient of colonic perforation died in our institute. **Conclusion:** Iatrogenic colonoscopic perforation is a serious but rare complication. Its early recognition and treatment are essential. We found a perforation rate of 0.19%. Some patients with small colonoscopic perforations may be safely treated nonoperatively, while others with large perforation or diffuse peritonitis may require surgery.

**Keywords:** Colonoscopy, Iatrogenic.

## INTRODUCTION

Colonoscopy is a common procedure for the diagnosis, treatment and follow-up of colorectal pathologies. However, this invasive procedure is performed with some risk of hemorrhage, perforation and even death.<sup>[1,2]</sup> The incidence of perforation is reported to range between 0.2% to 0.8% for diagnostic colonoscopy and from 0.15% to 3% for therapeutic colonoscopy. With increasing numbers of colonoscopies being performed for screening purposes, this small possibility of perforations can lead to a large number of clinical problems. Colonoscopic perforations may be managed medically or surgically, depending on the nature of the perforation. Knowing risk factors,

recognizing early signs of perforations, and giving early and optimal treatment may reduce the probability of complications and death. In this study, we report our experience with 9 consecutive colonoscopic perforations over an 8-year period.<sup>[1-4]</sup>

## MATERIALS AND METHODS

A total of 4650 colonoscopies were performed between January 2011 and December 2018 at Vadilal Sarabhai General Hospital Ellibrige, Ahmedabad (Gujarat). Including 3420 diagnostic colonoscopies and 1230 therapeutic colonoscopies. All procedures were performed by department of Medical Gastroenterology faculty and DM medical gastroenterology residents during the period of eight year. Data on patients undergoing colonoscopy were collected on retrospective basis. We reviewed the medical records of all patients reported to have colonoscopy-related colonic perforations. The following parameters were analyzed: patient age and sex, comorbidity, endoscopic indication, time

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interval from the procedure to the diagnosis of perforation, clinical presentation, location, type of treatment (operative vs. nonoperative), and outcome. Data regarding clinical characteristics, management, and outcome were analyzed descriptively.

**RESULTS**

Over the 8-year period (Jan 2011-Dec 2008), out of 4650 colonoscopies, we found 9 perforations (0.19%) in 6 men and 3women (mean age of 64

years. range 39-82). The co-morbidities in each of the 9 patients is mentioned in [Table 1]. Of these 9 patients, 3 received colonoscopy for polyps, two for diverticulosis/itis, two for chronic diarrhoea and two for lower gastrointestinal bleeding [Table 2]. Four of perforations occurred during diagnostic procedures, and five during therapeutic procedures (3 polypectomies and 2 biopsy) performed during colonoscopies. The perforation rate for diagnostic procedure and therapeutic procedure were 0.11% and 0.41%, respectively.

**Table 1: Co-morbidities of patients with perforations during colonoscopy**

Patient	Gender	Age	Hypertension	DM	COPD	Prior abdominal surgery	Anemia	Hospital stay (Days)	mortality
1	M	58	yes	yes	no	No	no	15	-
2	F	62	no	no	no	No	no	7	-
3	M	82	yes	no	no	No	yes	8	-
4	F	39	no	no	no	Yes	no	5	-
5	M	57	no	no	yes	No	no	9	-
6	M	56	yes	yes	no	No	yes	13	-
7	F	70	yes	no	no	No	yes	12	-
8	M	64	no	yes	no	No	No	15	-
9	M	52	Yes	no	no	No	No	9	-

Five perforations (55%) were identified during the examination or immediately thereafter, 3 (33%) within the first 24 hours, and 1 (6%) within 72 hours. The signs and symptoms at presentation included abdominal pain and distension, nausea, bleeding and respiratory distress [Table 3]. Abdominal pain was the most common presenting symptom (66%). Plain abdominal x-ray showed pneumoperitoneum in 7 patients and retro-pneumoperitoneum in 2 patients.

**Table 2: Indications for procedures in patients with colon perforations**

Indication	Number of patients
Polyps /polypectomy	3
Diverticulosis/itis	2
Chronic diarrhoea	2
Lower GI bleeding	2

**Table 3: Clinical presentation in 9 patients with iatrogenic colonic perforation**

Symptoms	Number of patients
Abdominal pain	6 (66%)
Abdominal distension	4 (44%)
Bleeding	1 (11%)
Nausea / Vomiting	4 (44%)
Respiratory distress	2(22%)

The most frequent site of perforation was the rectosigmoid region. [Table 4].

**Table 4: Site of iatrogenic colonic perforation**

Site of perforation	Number of patients
Rectosigmoid	5 (55%)
Decending colon	2 (22%)
Transverse colon	1 (11%)
Caecum	1 (11%)

Out of 9 perforation 7 (77%) of perforations were treated surgically and two (23%) medically with

intestinal rest and intravenous antibiotics. The two patient who were treated medically were having small perforation occurred by biopsy forceps, these people kept nil by mouth for 72 hours and antibiotics were given and watched carefully for any signs of peritonitis. Convincingly these two people did not need surgical intervention. In the group treated surgically, four patients received primary repair with proximal diversion, two received colonic diversion and one patient received resection with anastomosis. No patient of colonic perforation died in our institute.

**DISCUSSION**

Perforation at the bowel wall is considered a major complication of colonoscopy. Perforation risk is reported to range from 0.2% to 0.8% for diagnostic colonoscopy and from 0.15% to 3% for therapeutic colonoscopy 5 Our data is 0.11% for diagnostic procedure and 0.41% for therapeutic procedures. These risk figures most likely are lower than estimates because they are based on documentation, which is sometimes less than precise. Factors thought to predispose to perforation during colonoscopy include inflammatory bowel disease, steroid use, malignancy, and preexisting partial tears or necrosis. Furthermore, loss of mobility of the colon or rectosigmoid due to previous surgery, infection, radiation, or adhesions may result in acute angulation of the bowel and increase the difficulty of colonoscopy procedure, which would also increase the possibility of perforation.<sup>[6,7]</sup>

Perforations during diagnostic colonoscopy result from a wide variety of procedures. Forceful instrument insertion and the “slide-by” technique in which the colonoscope is advanced along the

mucosal surface without visualizing the bowel lumen can cause perforations.<sup>[8,9]</sup> Mechanical injuries can also occur by direct injury caused by the colonoscopic tip, such as inadvertent advancement of the tip through a diverticulum.<sup>[10]</sup> Barotrauma is another important factor associated with perforation during diagnostic colonoscopy. Excessive insufflation of the colon results in linear tears of the serosa that may progress to a full thickness Perforation.

Perforations during therapeutic colonoscopy may occur from similar mechanisms involved in diagnostic procedures as well as from thermal or electrical injury. Electrocautery, a coagulation technique, creates transmural injury when too much current is used.<sup>[11]</sup> We found the most frequent site of perforation to be the sigmoid colon, as have other studies.<sup>[11,12]</sup> This may be explained by its anatomical characteristics, which may involve frequent redundancy or narrowing from diverticular disease or adhesions after previous pelvic operations. The signs and symptoms of perforation include abdominal pain, distension, nausea, fever, tachycardia, respiratory distress, and diffuse peritonitis. Similar to the findings of Farley and associates, we found abdominal pain and distension to be the most common presentation after colonoscopic perforation.<sup>[14]</sup> Radiographs were helpful adjuncts for identification of the perforation. An abdominal radiograph demonstrating free intraperitoneal air is a very good indicator of perforation.

If the plain radiograph does not indicate pneumoperitoneum, a CT scan may demonstrate retroperitoneal air. With CT scan, one also has the ability to detect bowel wall thickening, unexplained peritoneal fluid, and extravasation of contrast. Thus, CT scan is a reasonable aid to clinical diagnosis.<sup>[11]</sup>

Colonoscopic perforations may be managed operatively or nonoperatively. Conservative treatment includes bowel rest, intravenous fluids, and antibiotics to limit peritonitis and allow the perforation to seal. The indications for nonoperative treatment contain a well-prepared colon at time of endoscopy, postpolypectomy coagulation syndrome, small perforation caused by transmural burn injury, no symptoms of diffuse peritonitis and relief of symptoms under conservative treatment within 24 hours without pain medication. If there is no resolution of symptoms and signs, surgical intervention is warranted. The recognition of definite objective indicators of failure of conservative management requires experience, judgment, and close observation.

We choose conservative medical treatment for patient who were having small colonis perforation by biopsy forceps. These patient kept nil by mouth for three days given antibiotics and watched for signs of perforations. The average days for hospital

stays were also less for medically manage perforation.

One factor for increase number of colonoscopic perforation is involvement of trainees, as inexperience of trainees and faulty technique can produce colonic perforation. In our institute 6 out of 9 perforation done by trainees. So it should be consider as important factor as well.

Operative treatment is most often necessary in patients with generalized peritonitis, large injuries, or failed conservative treatment.<sup>[12]</sup> The specific operative procedures used will depend on the size of perforation, the degree of peritoneal soilage, the presence of associated colonic pathology, the stability of the patient and the overall underlying condition of the patient.<sup>[13-15]</sup> Primary repair of the colon is reserved for limited injury with no coexisting pathology. Surgical resection with primary anastomosis should be attempted if abdominal contamination or concomitant pathology is present. Bowel resection and colostomy are used in patients with extensive fecal contamination, operative delay, and multiple comorbidities. Finally, if there is significant peritoneal soilage or if patient's operative course is tenuous, a colectomy without anastomosis should be performed.<sup>[16]</sup>

## CONCLUSION

Although iatrogenic colonoscopic perforation is rare, it is a serious complication and its early recognition and treatment are essential. The sigmoid colon is the area at greatest risk for perforation. Although some colonoscopic perforations may be treated safely nonoperatively, they require constant observation. Surgery should be undertaken if the patient does not improve. For patients with large perforations or diffuse peritonitis, surgery is indicated.

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