

Extensive Subcutaneous Emphysema Due to Colonic Perforation Following Colonoscopy

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ABSTRACT

During colonoscopy, subcutaneous emphysema may occur as a result of colonic perforation into retroperitoneal area. In this report, a 54-year-old woman with sigmoid colon perforation following colonoscopy is described. Subcutaneous emphysema was the first manifestation of the perforation in this case. Initially, the patient received supportive, non-surgical treatment, but due to development of acute abdominal signs and symptoms in later stages, the patient underwent surgical treatment.

Key words: Colonoscopy. Colonic perforation. Subcutaneous emphysema. Pneumomediastinum. Pneumoretroperitoneum.

INTRODUCTION

Perforation is one of the uncommon complications of colonoscopy. Prevalence of this complication has been reported to be about one percent. Perforation can be due to penetration of the tip of colonoscopy device, excess air during colonoscopy, or other interventions such as performing biopsies and cauterization.¹

Perforation may be manifested in different ways. Acute abdominal symptoms and peritoneal irritation signs are the most common manifestations.^{1,2} In rare clinical conditions, when perforation is oriented toward retroperitoneal area, subcutaneous emphysema may occur. This phenomenon has been scarcely reported previously.²⁻⁴ Therefore physicians must be aware of such a potential complication, which at first may seem unrelated to colonoscopy.

Herein, we report a patient with an infrequent and at the first view irrelevant complication of diagnostic colonoscopy.

CASE REPORT

A 54-year-old woman with the history of a single episode of bleeding from rectum was referred for colonoscopy. The patient received complete colonic preparation for this procedure. During colonoscopy, the colon was viewed thoroughly and successfully upto ileocecal junction. No apparent abnormality was found except for

a small internal hemorrhoid. Some random mucosal specimens were taken for pathological investigation from various parts of the colon, which were reported later as non-specific mucosal inflammation. About 15 minutes after completion of the procedure, the patient suddenly developed respiratory distress and severe swelling of face and neck, which was compatible with subcutaneous emphysema. She was then admitted to emergency ward immediately and a consultation with the department of surgery was requested.

On X-ray, air was seen in mediastinum. Therefore, the patient was transferred to surgical department for further evaluation and treatment. She was conscious and afebrile with tachycardia and tachypnea. Emphysema was obvious in facial areas with crepitation in chest and neck. Auscultation of lungs was normal. A reduction in the number of bowel sound was detected. Abdomen was soft in palpation with an area of slight tenderness in left lower quadrant of the abdomen. Digital rectal exam revealed no abnormality.

White Blood Cell (WBC) count was 11000/ μ L. Serum electrolytes were within normal range. A slight metabolic acidosis was detected in arterial blood gas of the patient. In the requested plain abdominal film, air was found around both kidneys, but there was no free air within peritoneal cavity which was consistent with pneumoretroperitoneum later confirmed on CT scan (Figures 1 and 2). With the above-mentioned findings, an intravenous antibiotic therapy (including Ceftriaxone 1gr b.i.d., and Metronidazole 500mg q.i.d.) was started for the patient.

About 20 hours after onset of the manifestations, the patient developed fever of 38.5 degree celsius. The abdomen became severely tender and WBC count reached 14000/ μ L. It was then decided to transfer the patient to the operating room for laparotomy. After the abdomen was opened, it was noticed that abdominal

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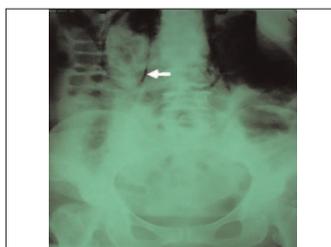


Figure 1: Abdominal plain X-ray. The arrow shows an area of air was around kidneys.



Figure 2: CT scan. Arrow shows air around kidneys.

cavity was clear. There was a perforation in proximal portion of the sigmoid colon with a size of 2 by 3 centimetres that was located in the retroperitoneal parts. After peritoneal incision and mobilization of the sigmoid colon, retroperitoneal area was entered and examined, which demonstrated a relatively significant degree of inflammation.

As a result of elapse of about 24 hours after the onset of symptoms and presence of contamination, primary anastomosis was not performed. Therefore, following resection of the perforated part and irrigation of the area, an end-colostomy with a mucosal fistula were fashioned. The patient improved after the operation and she was discharged after starting feeding by mouth on the 4th postoperative day. The patient came back after 5 weeks and the colostomy and mucous fistula were closed. The bowel regained its full function eventually, and oral feeding was started during subsequent days. She was then discharged and developed no complications in the later follow-up sessions.

DISCUSSION

After diagnostic colonoscopy, the risk of perforation of the colon is 0.2-0.4%. With polypectomy, this risk rises to 0.3-1%, and with hydrostatic balloon dilatation of colonic strictures, higher rate (4.6%) may be expected.^{2,5}

Perforation may occur after pneumatic, mechanical, and therapeutic associated trauma.^{2,5} Immediate perforation is usually caused by direct trauma from mechanical pressure or excessive electrocautery.⁵ Therefore, the mechanism of perforation in this patient was more likely that of a mechanical trauma.

Colonic perforation can be intraperitoneal or retroperitoneal, or both.^{6,7} Retroperitoneal emphysema and accordingly subcutaneous involvement are well-known but with infrequent complications of rigid sigmoidoscopy and barium enema. However as a complication of colonoscopy, they may rarely occur.^{3,8}

Generally, symptoms depend on whether the perforation is intraperitoneal or extraperitoneal. Intraperitoneal perforations may predominantly show signs of peritonitis, but retroperitoneal ones may be silent.³ Colonoscopy-induced acute respiratory distress has

also been reported very rarely.⁹ We found in our review of literature that retroperitoneal perforation is reported to be relatively painless and may resolve spontaneously some hours after the procedure, compared to intraperitoneal perforation.^{3,7} This patient did not have positive findings related to pneumothorax. Therefore, pneumomediastinum and neck emphysema can be the main cause of respiratory distress. Other clinical findings which may eventually develop with any of the perforations are fever and leukocytosis.⁶

Other symptoms which have been reported in patients with neck emphysema following bowel perforation are difficulty in swallowing and impairment of speech.^{3,10}

Subcutaneous and prevertebral tissues and visceral and perivisceral spaces are the soft tissue contents of the neck, thorax and abdomen. The visceral space invests the trachea and esophagus and continues into the mediastinum. It follows the esophagus through the diaphragmatic hiatus toward the retroperitoneal soft tissue space. Therefore, air arising from an abnormality in anyone of these regions could reach another area. This emphysema can even be developed without any perforation and as a result of penetration of the air with high pressure through intestinal wall and its movements within tissue planes.^{3,9}

Chest X-rays, plain abdominal X-rays and CT scans are useful in detection and differentiation of intraperitoneal and extraperitoneal perforations.^{5,9}

Either to choose conservative treatment or laparotomy mainly relates to patients' clinical findings.⁹ We should consider that presence of gas under the diaphragm is not in itself an indication for a laparotomy.¹⁰ Therefore, it is possible that patients having a perforation following colonoscopy are less likely to develop generalized peritonitis due to a relatively clean bowel.³ Dimension of the perforation, the time passing from the beginning of perforation, and condition of the patients are the factors that determine the surgical or non-surgical method of treatment.¹ However, the patients must be closely monitored and if their general condition deteriorate with development of signs of generalized peritonitis then a surgical intervention is mandatory. In the operating room, according to the extent of contamination and condition of the patient, the surgeon will choose between primary anastomosis or fashioning a colostomy.^{1-3,9}

In conclusion, physicians should be aware of the possibility of retroperitoneal perforation after colonoscopy, and patients should be closely monitored after development of primary symptoms.

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