Chest pain caused by pneumomediastinum as the first symptom of sigmoid perforation – case report

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ABSTRACT:

Introduction: Chest pain is one of the most common symptoms with which patients report to the doctor. The reason for this is the fear of the sick, who often equate this symptom with dangerous diseases such as heart attack. The primary source of pain does not always have to be located within the chest. Colon perforation is a rare but possible complication of colonoscopy, which may result in free gas entering the mediastinum which is accompanied by chest pain.

Case report: We present the case of a 78-year-old woman who reported to the hospital emergency department with chest pain, shortness of breath and abdominal pain. On the basis of imaging examinations, perforation of sigmoid affected by diverticulosis, complicated by pneumomediastinum and retroperitoneal emphysema, was suspected. The aforementioned ailments were caused by iatrogenic perforation of the sigmoid during diagnostic colonoscopy performed on an outpatient basis a few hours before reporting to the hospital. The patient was urgently qualified for laparotomy. Intraoperatively, perforation was confirmed at the rectosigmoid junction, which was the cause of retroperitoneal and pneumomediastinum with right-sided emphysema of the lateral neck region. No fluid or intestinal contents were found in the abdomen. The sigmoid colon and upper rectum were resected via double-stapled anastomosis performed between the descending colon and rectum. The patient was discharged home in good condition on the 7th postoperative day.

Conclusions: Colonoscopy is a diagnostic and therapeutic procedure that is considered relatively safe, but also carries complications such as bleeding or perforation of the large intestine. Diverticular disease is a common condition which most often affects the sigmoid colon. In areas of the weakest resistance, diverticulum formation occurs as a result of increased intra-abdominal pressure, which is an additional risk factor for perforation during colonoscopy. It is important to remember the possible different clinical presentation of gastrointestinal perforation, which may also manifest as chest pain. With early detection and surgical treatment, life-threatening complications associated with the development of pneumothorax can be avoided.

KEYWORDS: colon, colonoscopy, perforation, pneumomediastinum

INTRODUCTION

Chest pain is one of the most common symptoms with which patients report to the doctor. The reason for this is the fear of the sick, who often equate this symptom with dangerous diseases such as heart attack. The primary source of pain does not always have to be located within the chest. Examples of this are conditions such as: gastroesophageal reflux disease, peptic ulcer disease, cholelithiasis, pancreatitis [1]. An exceptionally rare cause of these symptoms is pneumomediastinum caused by gastrointestinal perforation, which may occur during lower gastrointestinal endoscopy.

Perforation on the posterior sigmoid wall may result in air entering the retroperitoneum, followed by the fascial spaces, along the mesentery and large vessels, through the oesophageal diaphragm into the mediastinum and subcutaneous tissue [2]. Clinical manifestations include subcutaneous emphysema involving neck, face, orbital region with characteristic cracks found during palpation, scrotal emphysema, pneumomediastinum, and even pneumothorax with accompanying dyspnoea, chest pain that intensifies with breathing and changes in body position [3–5].

We present a rare case of a patient whose chest pain was the first symptom of sigmoid perforation complicated by retroperitoneal emphysema accompanied by pneumomediastinum and subcutaneous emphysema.

CASE REPORT

A 78-year-old patient reported to the hospital emergency department of the A. Juraz University Hospital No. 1 in Bydgoszcz due to chest pain. A few hours earlier the patient underwent outpatient colonoscopy which confirmed diverticulosis. On admission to hospital, the patient complained of shortness of breath and stomach-ache. The patient had a history of grade II angina pectoris in CCS grading, condition after CABG in 2018 and PTCA LAD in 2002 and RCA in 2006. ECG without signs of recent myocardial infarction, troponin level – 12.2 ng/l (norm <15.6 ng/l). Laboratory examinations showed leukocytosis (13.16 G l), elevated CRP (16.39 mg/l), respiratory alkalosis due to hyperventilation. Physical examination demonstrated pain on pressure in the lower abdomen and umbilical region, increased muscle tension in this area, with positive peritoneal signs. Subcutaneous emphysema was present in the supraclavicular and lateral cervical region on the right side. Abdominal x-ray showed the presence of free intraperitoneal air, pneumomediastinum and bilateral emphysema of the supraclavicular region (Fig. 1.). Furthermore, abdominal CT confirmed large amounts of free air in the retroperitoneal space, mainly in the perianal space and in the vicinity of the rectosigmoid junction, which could indicate the likely location of intestinal perforation (Fig. 2.). The patient was admitted urgently to hospital and qualified for laparotomy. Intraoperatively, due to the earlier preparation of the intestine for endoscopic examination and the short time that
has elapsed since the examination, no faecal and purulent contents were found in the peritoneal cavity. A perforation on the anterior sigmoid wall with a diameter of about 1.5 cm was revealed within the rectosigmoid junction, in the site changed by the presence of diverticula. The sigmoid colon and upper rectum were resected with double-stapled anastomosis between the descending colon and rectum. No macroscopic changes were found in the remaining fragments of the large intestine and small intestine. The post-operative course was uneventful. The patient was discharged in good general condition on the 7th day after surgery.

**DISCUSSION**

Complications after colonoscopy occur quite infrequently, on average in 0.8% of patients, these mainly include bleeding (0.1–1.5%), most often after polypectomy, which can already be managed during endoscopic examination. The risk of colon perforation is estimated at 0.17% for diagnostic colonoscopy and 0.41% for therapeutic colonoscopy [1]. Risk factors for colorectal perforation include advanced age, female sex and presence of comorbidities [2]. Special attention should also be paid to the risk factor of diverticulosis, which is increasing especially in highly developed countries [6]. While the disease is not common before the age of 40, it occurs in more than 50% of people in the 7th decade of life [7]. It is worth noting that all of the above-mentioned factors occurred in the described case. There are several mechanisms of perforation associated with endoscopy: mechanical, pneumatic and resulting from the use of electrocoagulation or induced by biopsy or polypectomy. Mechanical failure accounts for 32% to 63% of colon perforation and usually results from direct manipulation of the endoscope. Pneumatic perforation as a consequence of insufflation during examination may occur in the case of colon affected by diverticulosis [2, 8]. The most common localisation of colon damage during lower gastrointestinal endoscopy is the rectosigmoid junction and caecum [8]. Symptoms of perforation vary depending on the area of the large intestine where the wall has been damaged. Perforation into the free peritoneal cavity is usually manifested by abdominal pain, while perforation into the retroperitoneal space can be manifested by subcutaneous emphysema, retroperitoneal emphysema, pneumomediastinum, pericardial emphysema, and even pneumothorax [6]. Most patients with isolated retroperitoneal pneumothorax present no abdominal symptoms, making these cases difficult to diagnose [8]. The direction of gas diffusion usually occurs along loose fascial structures. The pretracheal layer of the deep cervical fascia includes the trachea and oesophagus joining the pericardium, then it follows the oesophagus to the retroperitoneal space, therefore there are potential spaces through which air can pass according to a pressure gradient [9]. Iatrogenic perforation of the colon formed during endoscopy is diagnosed in about 60% of cases already during examination of patients [10]. In some cases of iatrogenic perforation of the colon, in the absence of peritonitis and sepsis, conservative treatment is possible. The efficacy of such a strategy range from 33 to 90% [11]. Iatrogenic perforation of the colon occurs more frequently during diagnostic examinations of patients [2, 10, 12]. In our case, due to the presence of pneumomediastinum, shortness of breath and escalating abdominal pain, the decision was made about early laparotomy and resection of the sigmoid colon. Early diagnosis is critical due to the fact that most endoscopic examinations are performed on outpatient basis without in-patient observation, and in some patients, especially with retroperitoneal perforation, symptoms are delayed. It should be mentioned that the mortality rates after late diagnosis are significant [2].

**CONCLUSION**

Knowledge of risk factors and close observation of possible clinical manifestations of iatrogenic perforation particularly promote early diagnosis, which is crucial for successful treatment.
Khuat D., Julkowska A., Chamarczuk F., Flont A., Horbacka K.: Chest pain caused by pneumomediastinum as the first symptom of sigmoid perforation – case report; Pol Przegl Chir 2019: 91 (1-3); DOI: 10.5604/01.3001.0013.3425 (Advanced online publication)


Cite this article as: Khuat D., Julkowska A., Chamarczuk F., Flont A., Horbacka K.: Chest pain caused by pneumomediastinum as the first symptom of sigmoid perforation – case report; Pol Przegl Chir 2019: 91 (1-3); DOI: 10.5604/01.3001.0013.3425 (Advanced online publication)