

Splenic rupture following colonoscopy, a rare complication

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ABSTRACT

Splenic rupture is an extremely rare complication of colonoscopy. So far, less than 80 cases have been reported worldwide since 1970. We report two patients, one patient presenting with haemorrhagic shock after a therapeutic colonoscopy and another patient presenting with abdominal pain following a diagnostic colonoscopy. In both cases splenic rupture was diagnosed by abdominal computed tomography (CT scan). One patient was treated by selective embolisation of the splenic artery; the other patient underwent a splenectomy.

Because the numbers of colonoscopies performed in the Netherlands as well as in many other European countries are likely to double in the coming years as a result of the introduction of nationwide colorectal cancer screening programmes and intensive surveillance protocols after polypectomy, more splenic injuries as a complication of colonoscopy can be expected in the near future. Awareness of this complication is of great importance in early recognition and management of this potentially life-threatening injury.

KEYWORDS

Colonoscopy, complications, splenic injury

INTRODUCTION

According to Magma, the magazine of the Dutch Society of Gastroenterologists, 116,815 colonoscopies and 70,049 sigmoidoscopies were performed in the Netherlands in 2004.¹ One may assume that this number has increased over the past few years. This increase is partly due to intensive surveillance after polypectomy and screening programmes for hereditary and familial colorectal cancer.

It can be expected that the number of colonoscopies will increase even further in the future, certainly when in due course a national screening programme for colorectal cancer is introduced.¹

Colonoscopy is a relatively safe diagnostic and therapeutic procedure. In general the procedure, with or without sedation, is well tolerated and the risk for serious complications is low.² The most frequent complications of colonoscopy are haemorrhage and gastrointestinal perforation, usually related to therapeutic interventions, such as polypectomy. The incidence of haemorrhage is 1 to 2% and the incidence of perforation is 0.1 to 0.2%.^{2,3}

Less commonly described complications include pneumothorax, pneumomediastinum, volvulus, hernia incarceration, retroperitoneal abscess and emphysema, bacteraemia, endocarditis, vasovagal reaction, and bronchospasm.^{2,4}

Splenic rupture is a very rare complication with an estimated incidence of 0.004% in all colonoscopies performed. A splenic rupture is a dangerous complication, with potentially lethal consequences.^{4,5} The patient usually presents within 24 hours after the procedure with left upper quadrant abdominal pain, sometimes accompanied by shoulder pain.

We describe two patients who recently underwent a colonoscopy in our hospital, complicated by splenic rupture.

CASE REPORTS

Case 1

An 81-year-old man was admitted to the hospital because of abdominal pain and diarrhoea, without rectal haemorrhage, since he started using paracetamol-codeine and naproxen.

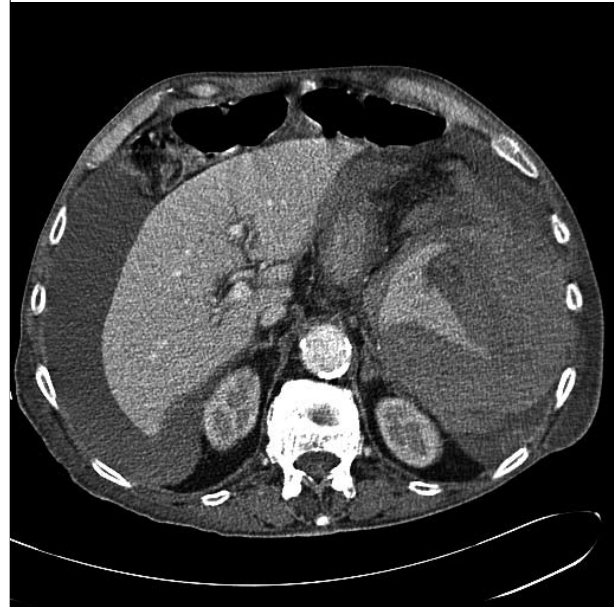
His medical history was significant for hypertension, chronic obstructive pulmonary disease, atrial fibrillation, benign prostatic hyperplasia and chronic back pain. His medication consisted of phenprocoumon, furosemide, tamsulosin, paracetamol-codeine, amiodarone, theophylline, acetylcysteine, naproxen, pantoprazole and macrogol.

The differential diagnosis included constipation with paradoxal diarrhoea, diverticulosis or colorectal cancer.

A diagnostic colonoscopy was performed. At admission, the phenprocoumon was stopped and the international normalised ratio (INR) was normal at the time of the colonoscopy. The examination was conducted without any difficulties. The caecum was unremarkable, but the colon showed severe diverticulosis, more pronounced in the left colon, and in the ascending colon a small sessile adenomatous polyp was found and removed. In the sigmoid, about 30 cm from the anus, a second pedunculated adenomatous polyp, with a diameter of 2 cm, was found and removed after injection of 2 cc of adrenaline 1:10,000. After the colonoscopy phenprocoumon was resumed. Thirty-six hours after the examination the patient was seen on the hospital ward because of dizziness. Physical examination revealed hypotension (80/40 mmHg) with a pulse rate of 70 beats/min, normal heart sounds and a prolonged expiration, without wheezing or crackles. The abdomen showed no peritoneal signs. Laboratory tests revealed a decrease in the haemoglobin from 6.8 mmol/l to 3.5 mmol/l and an INR of 5.86. The patient received a blood transfusion with five units of packed red cells, the prothrombin time was corrected to within the normal range with prothrombin complex concentrate and the phenprocoumon was stopped again. A retroperitoneal haematoma was considered, and an ultrasound of the abdomen was performed. The ultrasound demonstrated free fluid in the abdominal cavity and a pathological spleen. An abdominal computed tomography (CT) scan revealed a large haematoma in the spleen and massive intra-abdominal free fluid (*figure 1*).

Due to his medical history and clinical condition it was decided to perform a splenic embolisation. Haemostasis was achieved by selective embolisation of the splenic artery and placement of coils (*figures 2A and B*). After the procedure the patient was transported in a stable condition to the intensive care unit. At first his clinical condition improved. Later he developed respiratory insufficiency due to an exacerbation of chronic obstructive pulmonary disease (COPD). The chest X-ray showed no signs of redistribution or signs of transfusion-related acute lung injury (TRALI), pulmonary embolism, and acute myocardial infarction could be excluded. The patient was intubated and mechanically ventilated and treated with antibiotics and steroids. Nevertheless he died six days after the embolisation. No obduction was performed.

Figure 1. Abdominal CT-scan with intravenous contrast



Massive amount of free fluid in the upper abdomen. The spleen is deformed and shifted due to a haematoma.

Case 2

A 66-year-old woman presented at the outpatients clinic with a change in her bowel habits. Her medical history was significant for a cerebrovascular accident, aneurysm of the abdominal aorta of 5.5 cm and hypertension. She was taking acetylsalicylic acid, triamterene and nebivolol.

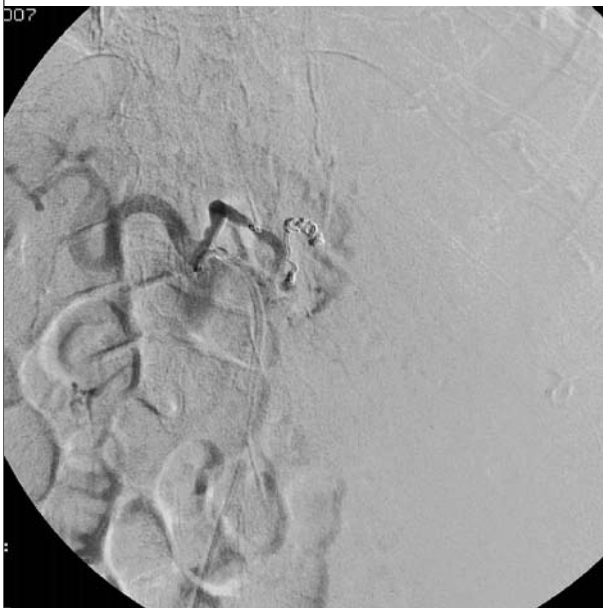
A diagnostic colonoscopy was performed; the examination was unremarkable to the caecum, no biopsies were performed. The next morning she presented at the emergency room with left upper quadrant abdominal pain. The pain started the evening before and was progressive. At physical examination a pale woman was seen, with a blood pressure of 86/65 mmHg and a regular pulse rate of 55 beats/min. Auscultation of heart and lungs revealed no abnormalities. Abdominal examination showed a protuberant abdomen with hypoactive bowel sounds and normal span of liver dullness. There was pain on palpation in the hypogastric region without rebound tenderness. On presentation the haemoglobin level was 7.6 mmol/l, clotting profile was normal, as were liver functions, kidney function and electrolytes. A chest X-ray was unremarkable and a plain abdominal X-ray showed moderate dilation of the colon, with gas in the ascending colon but no free air. The differential diagnosis included a ruptured aneurysm of the aorta, and an abdominal CT scan (*figure 3*) was performed. The CT scan revealed a large intra-abdominal haemorrhage in the spleen region, in the paracolic recesses and in the pouch of Douglas, the spleen was no longer recognisable. No signs of rupture of the known aneurysm of the aorta were seen.

Figure 2A. Selective angiography of the celiac trunk before embolization



Because of the splenic artery is more narrow compared to the hepatic artery. The spleen is shifted medial due to haematoma.

Figure 2B. Selective angiography of the celiac trunk after embolization



After the placement of several coils in the mid and distal part of the splenic artery there is stasis of the flow in the splenic artery.

The patient was transported to the intensive care unit. The haemoglobin decreased to 5.0 mmol/l. A splenectomy was performed and shortly after she was transported to the intensive care unit. In total she needed six units of packed red cells. The postoperative course was uneventful, pneumococcal vaccination was given and she was discharged home after a few days.

Figure 3. Abdominal CT-scan with intravenous contrast



Massive amount of free fluid in the upper abdomen. The spleen is deformed and shifted medial due to the haematoma. Known aneurysm of the abdominal aorta with elongation. No signs of rupture of the aneurysm.

DISCUSSION

Splenic rupture is a rare but dangerous complication of colonoscopy, with an incidence of 0.004%, and can be lethal.^{4,5} The first report of splenic rupture as a complication of colonoscopy was described by Wherry and Zehner in 1974.⁶ Since then, more cases have been reported.^{1-5,7-11}

Clinical manifestation

Signs of splenic rupture usually occur within 24 hours after colonoscopy, but occasionally several days after the procedure.^{3,4} The majority of patients present with abdominal pain in the left upper quadrant, with possible radiation to the left shoulder and peritoneal signs. Patient A did not fit this description, he did not present with abdominal pain and at presentation a splenic rupture was not suspected. An intra-abdominal haemorrhage was considered when the laboratory tests showed a significant decrease in the haemoglobin level without visible blood loss. Patient B did present with abdominal pain, but at first the pain was not in the left upper quadrant, but in the lower abdomen.

Pathogenesis

The exact reasons for developing a subcapsular or intra-parenchymal haematoma after a colonoscopy are not entirely clear although three mechanisms have been described. First, a direct trauma of the spleen when the endoscope passes through the splenic flexure has been suggested. Biopsy in the splenic flexure can also cause direct trauma of the spleen.^{2,5,7,12} Second, rupture of the splenic capsule due to traction on the splenocolic ligament during

the colonoscopy, leading to haemorrhage, is mentioned. Third, rupture of the splenic capsule due to traction on the adhesions between the spleen and the colon could be the cause of splenic injury; these adhesions can be a result of prior operations, inflammation or infection.^{2,5,7,12}

Risk factors

Risk factors for developing a splenic rupture during colonoscopy are splenomegaly, inflammatory bowel disease, oral anticoagulation therapy, difficult procedure, therapeutic procedures during the examination and intra-abdominal adhesions due to prior intra-abdominal surgery, inflammation or infection.^{5,6,12}

None of these risk factors were present in these two reported cases. There were no difficulties in reaching the caecum in either of the patients. Indeed patient A was taking oral anticoagulation, but when the colonoscopy was performed his INR was normal and the polyps removed in patient A were not in the region of the splenic flexure. However, the INR was markedly elevated at time of presentation with the splenic rupture and this could have been significant.

Diagnosis

An abdominal CT scan is the diagnostic examination of choice to diagnose a splenic rupture.^{2,4,7,12} A CT scan provides an estimate of the extent of the injury and can identify signs of haemoperitoneum.⁷ An abdominal CT scan, elaborated with contrast, provides an estimate of the activity of the haemorrhage and injury of the parenchymatous organs.² In stable patients a CT scan may help to decide whether the patient needs emergency surgery or can be treated conservatively.^{7,12} In unstable patients, in whom a CT scan is not an option, an abdominal ultrasonography can be useful for quickly identifying free fluid in the abdomen.¹²

Therapy

There are three treatment options for a splenic rupture. The degree of splenic injury and the medical condition of each individual patient should be taken into consideration when deciding which treatment to use.⁵ In a stable patient with an active haemorrhage, operative treatment by means of splenectomy is the treatment of choice.

Theoretically, spleen preserving surgery, by wrapping the spleen in a vicryl® net, is an option. Hypovolaemic shock is often present and after stabilising the patient splenectomy is in most cases the best solution.⁵

In a patient with active haemorrhage, another treatment option is selective embolisation of the splenic artery. During a catheter-guided angiography coils are placed in the splenic artery.⁵ Sometimes embolisation particles are used or a combination of both. Angiographic embolisation is a good option in unstable patients with a high perioperative risk. When the subcapsular haemorrhage is limited, conservative treatment is an option. In unstable patients,

patients with pre-existing splenic disease (for example splenomegaly) or in case of a haemoperitoneum this is not an option.⁷

CONCLUSION

It can be expected that the number of colonoscopies will increase in the future. This is due to intensive surveillance after polypectomy, screening programmes for hereditary and familial colorectal cancer and the possible introduction of a nationwide screening programme for colorectal cancer.

Nowadays, the procedure is frequently performed with sedation to make it more tolerable. A disadvantage of performing the procedure with sedation is that the patient cannot inform about pain and thus possible signs of complications can be missed.

Of course, all patients should be well informed about the possible complications of the procedure. They should be given instructions about what to do if they experience symptoms after the procedure. Since the number of colonoscopies will increase in the future, there will also be more complications. When a patient presents with abdominal pain and peritoneal signs or with signs of haemodynamic instability, with or without an acute fall in the haemoglobin level, a splenic rupture as a complication of colonoscopy should be considered.^{2,12} Early recognition of the symptoms is of great importance in preventing a possible lethal outcome. An abdominal CT scan is the diagnostic imaging method of choice.

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