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A case of acute ischemic colitis after endovascular abdominal aortic aneurysm repair

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ABSTRACT

Colonic ischemia is a recognized complication of either open or endovascular abdominal aortic aneurysm repair. The clinical difficulty in establishing the diagnosis, the severity of this complication and the patient's poor physiological status may lead to a fatal outcome. We presented a case of ischemic colitis in a patient with patent hypogastric arteries that occurred after an endovascular abdominal aortic aneurysm repair as well as a review of the available literature. The patient's preoperative, intraoperative and postoperative data were recorded. A thorough search through the Google data and Medline to review similar cases or any analyses that referred to ischemic colitis after endovascular abdominal aneurysm repair was conducted. A 76-year-old male was admitted to our department for an elective endovascular repair of an 8 cm in diameter abdominal aortic aneurysm. A Zenith bifurcation graft was implanted. The whole procedure was uneventful and the final angiogram showed an accurate deployment of the endograft without endoleaks and patency of both hypogastric arteries. During the 1st postoperative day, the patient developed symptoms of acute abdomen in combination with metabolic acidosis and oliguria. He underwent an exploratory laparotomy, which revealed necrosis of the sigmoid. A Hartmann's procedure was performed; the patient was transferred to the intensive care unit where he deceased after 24 h. Postoperative ischemic colitis has been described after open abdominal aneurysm repair. The description of this complication has been reported since the early phase of endovascular abdominal aneurysm repair development with a current incidence of 1.5%–3.0%. Possible mechanisms that may contribute to ischemic colitis in spite of the presence of patent hypogastric arteries include atheroembolization, shock, vasopressive drugs and inferior mesenteric artery occlusion.

1. Introduction

Physiologically, the arterial circulation to the gut is served by three unpaired anterior branches of aorta, namely, celiac trunk, superior mesenteric artery and inferior mesenteric artery (IMA). The main collateral channels between the superior mesenteric artery and IMA occur in the region of the splenic flexure and middle colic arteries through the marginal artery of Drummond and the arch of Riolan. In the presence of an IMA occlusion, another important collateral circulation is between internal iliac artery and the left colic artery via the superior hemorrhoidal arteries.

Colon ischemia is a devastating complication following aorto-iliac surgery. Severity varies from mucosal to transmural ischemia with a mortality rate that reaches to 100% in some reports[1]. Three forms of ischemic colitis are described: (1) mucosal ischemia which is transient; (2) mucosal and muscularis involvement which may result in healing with fibrosis and stricture formation and (3) transmural ischemia or infarction, which results in gangrene and perforation. Following open repair, the incidence of clinically significant colonic ischemia ranges from 1%–3% after elective surgery and 10% in cases of rupture[2,3]. Stokmans *et al*. reported an incidence of bowel ischemia of 0.5% in symptomatic and 0.2% in asymptomatic abdominal aortic aneurysms in patients undergoing an endovascular procedure[4]. Neary *et al*. showed that the overall incidence of colonic infarction in a total number of 405 patients was 2.2% after open aorto-iliac surgery, whereas in patients operated on an elective basis, the

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incidence was 0.8% and the mortality rate associated with colonic infarction was 89%[5].

Endovascular abdominal aortic aneurysm repair (EVAR) has been proven to be an attractive and alternative method to open surgery and has a lower rate of postoperative morbidity and mortality in carefully selected patients. However, ischemic complications such as colon ischemia have been reported since the early phase of EVAR with a current incidence of 1.5%–3.0%[6].

Several possible mechanisms have been advocated. EVAR may be complicated by difficult iliac artery anatomy, making it necessary to occlude the flow to one or both hypogastric arteries in order to ensure proper seal around the aorto-iliac endograft. Hypogastric artery occlusion may also be necessary for successful endovascular repair of common iliac or external iliac artery aneurysms. Endovascular aneurysm repair with extension of the stent graft to the external iliac artery and embolization of the hypogastric artery can be associated with more complications and worse long-term results compared with simple endovascular aneurysm repair[7]. The reported side effects associated with bilateral hypogastric artery occlusion include buttock claudication, impotence and more serious sequelae such as colonic and spinal cord ischemia[8]. Papazoglou *et al.* reported 13.1% incidence of buttock claudication but no colonic ischemia after selective hypogastric artery coverage without coil embolization[9]. However, the causes of colonic ischemia development in spite of the presence of patency of both hypogastric arteries still remain ambiguous. Possible mechanisms that have been advocated include embolization, shock, use of vasopressive drugs and hypotension. Hypoperfusion of the left colon due to systemic hypotension may contribute to ischemic colitis than occlusion of hypogastric arteries[10]. Other factors have also been independently associated with colonic ischemia.

Over the past 2 years, we performed nearly 200 EVAR procedures with a bifurcation endoprosthesis implantation. We presented the case of a male patient who developed colonic ischemia after EVAR.

2. Case report

A 76-year-old male was admitted to our department for an elective repair of abdominal aortic aneurysm that was found accidentally during an ultrasound examination for prostatic hypertrophy. His personal history included coronary artery disease for which he was treated with percutaneous transluminal coronary angioplasty 4 years ago, arterial hypertension, hyperlipidemia, psoriasis vulgaris, anemia of unknown etiology and chronic obstructive pulmonary disease (all under medication).

A computed tomographic angiography of the abdominal aorta was performed, which showed the presence of an infrarenal aortic aneurysm, 8 cm in diameter (Figure 1). Taking into consideration the comorbidities, it was suggested that an endovascular approach would be more appropriate for him since the aneurysm had all the anatomic prerequisites for EVAR. In addition, the patient preferred to be treated by the endovascular method. Since no other contraindications existed, we performed endovascular implantation of a Zenith bifurcation endoprosthesis under regional anesthesia.

The intraoperative period was uneventful with no apparent difficulty in the deployment of the main body and the catheterization of the contralateral limb. The final angiogram

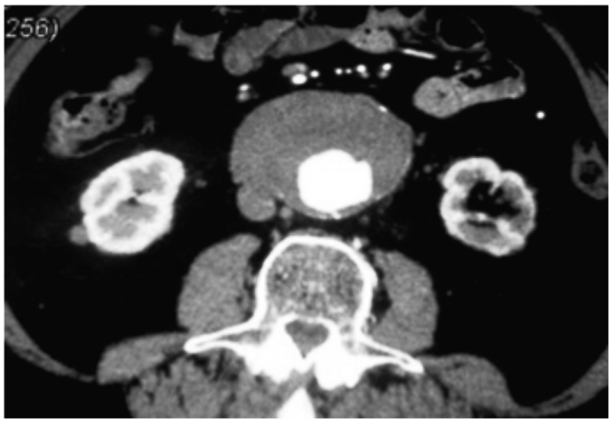

Figure 1. CT angiography showing an infrarenal aortic aneurysm, 8 cm in diameter.

confirmed the accurate position of the stent graft, the patency of the renal and hypogastric arteries bilaterally while it corroborated the absence of any kinds of endoleak (Figure 2). Post-

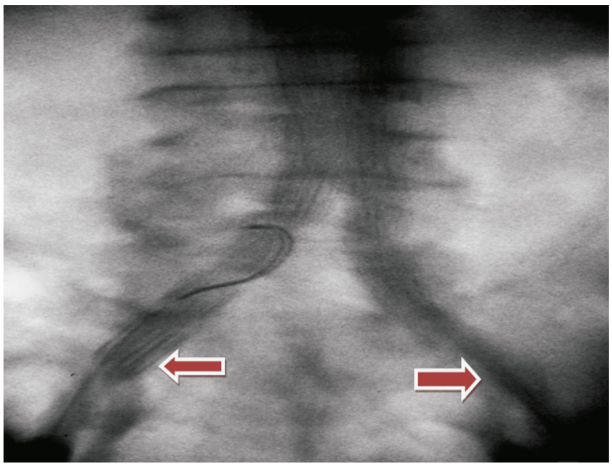

Figure 2. Intraoperative final angiography showing patency of both hypogastric arteries.

operatively, the patient had palpable peripheral pulses bilaterally.

Although an uncomplicated postoperative period was expected, he developed oliguria and metabolic acidosis in arterial blood gases 24 h after the procedure with no signs of acute abdomen. A couple of hours later, he presented with leukocytosis, fever and symptoms of acute abdomen with inability to raise his left lower limb, anuria and deterioration of the acidosis as well as an increase in creatinine phosphokinase and lactate dehydrogenase values in peripheral blood samples. The aggravated clinical status of the patient led to an urgent exploratory laparotomy which revealed necrosis of the sigmoid. A Hartmann's procedure was performed and the patient was transferred to the intensive care unit where he deceased after 24 h suffering from multiple organ dysfunction.

3. Discussion

Although EVAR is associated with less morbidity and mortality in comparison with open aneurysm repair, ischemic complications are not exceptional. The reported side effects associated with bilateral hypogastric artery occlusion include buttock claudication, impotence and more serious complications