

A Single-stage Operation for Abdominal Aortic Aneurysm with Concomitant Colorectal Carcinoma

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The coexistence of abdominal aortic aneurysm (AAA) and colorectal carcinoma needs special operative consideration. A single-stage operation for concomitant AAA and colorectal carcinoma has been thought to increase the risk of vascular prosthetic graft infection. We report two patients who received a single-stage operation for AAA and colorectal carcinoma. The first patient had a fusiform aneurysm of the infrarenal aorta. The second patient had a saccular aneurysm of the infrarenal aorta and a fusiform aneurysm of the left internal iliac artery. Both patients had left-sided colorectal carcinoma classified as Dukes' stage B. The two patients underwent a single-stage operation with Hartmann's procedure to avoid graft infection caused by anastomotic leakage. They tolerated the operation and had no postoperative complications including graft infection. A single-stage operation for concomitant AAA and left-sided colorectal carcinoma could be safely performed with Hartmann's procedure in two cases. (Ann Thorac Cardiovasc Surg 2005; 11: 339–42)

Key words: abdominal aortic aneurysm, colorectal carcinoma, single-stage operation, Hartmann's procedure

Introduction

The coexistence of abdominal aortic aneurysm (AAA) and colorectal carcinoma needs special consideration at the operative procedure. Many surgeons are reluctant to perform a single-stage operation for AAA associated with colorectal carcinoma^{1,2)} because of the risk of vascular graft infection, one of the most disastrous complications in vascular surgery.³⁾ It has been believed that a two-stage operation is better to avoid graft infection. A single-stage operation for AAA and colorectal carcinoma is not well accepted.

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We report two successful cases in which both AAA and concomitant colorectal carcinoma were simultaneously treated.

Case Report

Case 1

An 83-year-old woman had a medical examination in another hospital because of melena. Endoscopic examination revealed a hemorrhagic and advanced cancer of the upper rectum which occupied approximately half of the entire circumference of the rectum (Fig. 1), which was confirmed as adenocarcinoma on histological examination. There was no metastasis to the liver or lung. The carcinoembryonic antigen (CEA) and circulating tumor-associated antigen: CA 19-9 were within a normal range. Preoperative abdominal computed tomography (CT) scan revealed a fusiform aneurysm of the infrarenal aorta of 58 mm in the maximum diameter (Fig. 2). Digital subtraction angiography revealed fusiform dilatation of the bilateral common iliac artery.

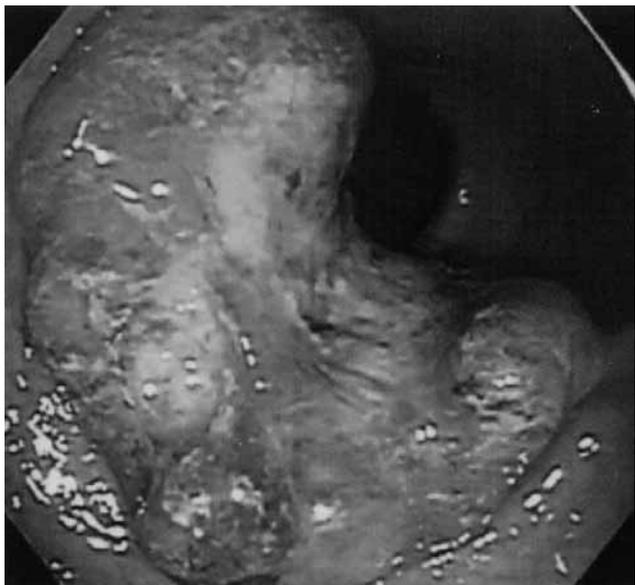


Fig. 1. Case 1.

Endoscopic examination revealed that a hemorrhagic tumor about 13 cm away from the anal verge occupied approximately half of the entire circumference of the colon.

A decision was made to treat the rectal lesion and the AAA by a single-stage operation because advanced rectal cancer and AAA of 58 mm in the maximum diameter were considered to need early treatment for the avoidance of tumor progression or rupture of the aneurysm. We thought that the patient should not undergo intra-abdominal intestinal anastomosis to avoid the risk of graft infection, so Hartmann's procedure was planned.

A lower median incision was made on the peritoneal cavity. In the first-stage procedure, the aneurysm was

opened after clamping of the infrarenal aorta. The inferior mesenteric artery was ligated at its origin. Aorto-biiliac prosthetic grafting was established with a gelatin-impregnated bifurcated polyester graft (Sulzer Vascutek Ltd., Scotland, UK). The aneurysmal sac was wrapped around the graft. In the second-stage procedure, Hartmann's procedure was performed. The tumor of the upper rectum was mobilized. The colon was divided by using a GIA stapling device, and the rectum was divided with ROTICULATOR (autosuture, Norwalk, CT, USA). The retroperitoneum was tightly sutured after closure of the rectal stump by Lembert's suture. The proximal colon was opened and sutured to the skin after complete closure of laparotomy. Histological examination revealed that the tumor was well differentiated adenocarcinoma beyond the muscularis propria but not penetrating the peritoneum, and the resection margins were free of malignancy. Lymph nodes showed no involvement. Postoperative recovery was uneventful. Eighteen months after the procedure, the patient has been in good condition without recurrence or metastasis. No sign of graft infection has been documented.

Case 2

A 72-year-old man had a medical examination in our hospital because of fecal occult blood. Endoscopic examination revealed a hemorrhagic and advanced sigmoid colon cancer that occupied one third of the lumen, which was confirmed as adenocarcinoma on histological examination. There was no metastasis to the liver or lung. CEA and CA 19-9 were within a normal range. Preoperative abdominal CT scan revealed a saccular aneurysm of the

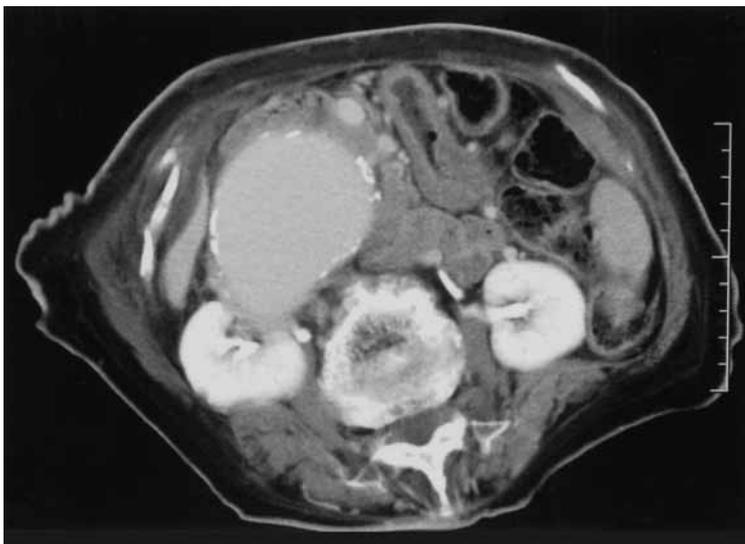


Fig. 2. Case 1.

Abdominal CT scan demonstrated a fusiform aneurysm of the infrarenal aorta of 58 mm in maximum diameter.

infrarenal aorta of 30 mm in the maximum diameter and dilatation of the left internal iliac artery of 50 mm in the maximum diameter.

We planned a single-stage operation for almost the same reason as is described in case 1. We thought that the patient should not undergo intra-abdominal intestinal anastomosis to avoid the risk of graft infection, so Hartmann's procedure was planned.

A lower median incision was made on the peritoneal cavity. The wall of the infrarenal saccular aneurysm was thin and on the point of rupturing in spite of the size of aneurysm. In the first-stage procedure, aneurysmectomies of infrarenal aorta and left internal iliac artery were performed. The inferior mesenteric artery, which arose immediately beneath the infrarenal saccular aneurysm, was ligated at its origin. Aorto-biiliac prosthetic grafting was established with a gelatin-impregnated bifurcated polyester graft (Sulzer Vascutek Ltd., Scotland, UK). The aneurysmal sac was closed in front of the graft. In the second-stage procedure, Hartmann's procedure was performed. The tumor of the sigmoid colon was mobilized, and then the colon and rectum were divided by using a GIA stapling device. The retroperitoneum was tightly sutured after the stump of the distal colon was closed by Lembert's suture. The proximal colon was opened and sutured to the skin after complete closure of the laparotomy. Histological examination revealed that the tumor was well differentiated adenocarcinoma limited to muscularis propria, and the resection margins were free of malignancy. Lymph nodes showed no involvement. Postoperative recovery was uneventful. The patient has been in good condition without recurrence or metastasis 40 months after the procedure. No sign of graft infection has been documented.

Discussion

It remains controversial to select the most appropriate surgical approach for patients with concomitant AAA and colorectal carcinoma. It is difficult to decide which disease is treated first, or if both are treated simultaneously. Many reports have recommended that a two-stage operation should be the preferred treatment for reducing the risk of graft infection.¹⁻³⁾ However, there are some patients who should have both lesions treated by a single-stage operation for the avoidance of rupture of the aneurysm and tumor progression. A single-stage operation may lead to an increase of graft infection in theory. Left-sided colorectal carcinoma especially has a higher risk of anas-

tomotic leakage than right-sided colon carcinoma,⁴⁾ therefore we need special consideration for a single-stage operation of concomitant AAA and left-sided colorectal carcinoma. We consider that a temporary colostomy or Hartmann's procedure should be performed for a single-stage operation of concomitant AAA and left-sided colorectal carcinoma to reduce the risk of graft infection.

Most clinicians agree that a symptomatic lesion should be treated first when they treat concomitant AAA and colorectal carcinoma,¹⁻³⁾ however, neither lesion is actually symptomatic and herein lies the therapeutic dilemma. Treatment of the AAA first exposes the patient to the risk of tumor progression before resection. On the other hand, treatment of the colorectal carcinoma first exposes the patient to the risk of AAA rupture in the preoperative period. However a single-stage operation may result in bacterial contamination of the aortic graft or a potential graft infection. There have been some reports suggesting the indication of a single-stage operation for concomitant AAA and colorectal carcinoma.^{3,5-7)} According to Kurata et al.,⁵⁾ a single-stage operation is recommended to the case in which both diseases are life-threatening, and patients can tolerate a simultaneous operation. Robinson et al.²⁾ reported that an AAA larger than 6 cm in diameter should be either given preferential treatment or resected simultaneously because of the high risk of rupture in the post operative period.

Our two patients had an AAA likely to rupture and advanced colorectal carcinoma, therefore both lesions were considered to need early treatment for the avoidance of tumor progression and rupture of the aneurysm. Therefore we decided to perform a single-stage operation, and avoid the risk of serious problems that can arise if dehiscence of the primary anastomosis occurs. Both patients had left-sided colorectal carcinoma, so we selected Hartmann's procedure to reduce the risk of graft infection.

A single-stage operation has some theoretical advantages; it may avoid complications of untreated lesions including rupture of aneurysm and growth of carcinoma.^{3,5-7)} Usually the second procedure of a two-stage operation is delayed because complications occur or patients refuse to further undergo major surgery when a two-stage operation is planned.¹⁾ Theoretically, a single-stage operation for concomitant AAA and colorectal carcinoma may lead to the graft infection, however, there have been no reports of graft infection related to synchronous AAA and colorectal carcinoma in a single-stage operation although the total number of the patients is small.⁷⁾

Matsumoto et al.⁶⁾ reported that a single-stage operation is well tolerated and can avoid the time, financial costs, and patient anxiety involved in a second operation. For the purpose of reducing the risk of graft infection, they aggressively create a temporary ileostomy and a temporary colostomy for right-sided colon carcinoma and left-sided colon carcinoma, respectively. And they described that Hartmann's procedure may be feasible for sigmoid colon or rectal carcinoma.

Makela et al.⁴⁾ studied the risk factors for anastomotic leakage after left-sided colorectal resection with rectal anastomosis. They reported that preoperative variables significantly associated with anastomotic leakage included malnutrition, weight loss, hypoalbuminemia, cardiovascular disease, two or more underlying diseases, and use of alcohol. When we perform a single-stage operation for concomitant AAA and colorectal carcinoma, a stoma may have to be only made for the patient who has a high risk of anastomotic leakage. However, we can not assess the risk of anastomotic leakage for a single-stage operation at the moment. We consider that the patients who have cardiovascular disease, AAA for example, are in a high risk group for anastomotic leakage,⁴⁾ so we usually perform a single-stage operation making a temporary colostomy or Hartmann's procedure for left-sided colorectal carcinoma. It is difficult to assess the necessity of a stoma for each patient with a planned single-stage operation.

Several case reports documented a single-stage operation for concomitant AAA and colorectal carcinoma,^{3,5-7)} also endosurgical treatment for concomitant AAA and rectal cancer in one case report.⁸⁾ In future, improving endoluminal technology and expanding the indication for endovascular AAA repair may resolve difficulties of a single-stage operation for concomitant AAA and colorectal carcinoma.

We consider that a two-stage operation for concomitant AAA and colorectal carcinoma is the usual treatment for reducing the risk of graft infection. However a single-stage operation may be preferable only when both lesions

need early treatment. When we select a single-stage operation, we must select every approach to avoid graft infection after a single-stage operation. If patients have left-sided colorectal carcinoma, we consider that a temporary colostomy or Hartmann's procedure should be performed. Our two patients did not undergo intra-abdominal intestinal anastomosis, and this might have contributed to prevention of graft infection.

In conclusion, a single-stage operation for concomitant AAA and left-sided colorectal carcinoma could be safely performed with Hartmann's procedure in two cases.

References

1. Nora JD, Pairolero PC, Nivatvongs S, et al. Concomitant abdominal aortic aneurysm and colorectal carcinoma: priority of resection. *J Vasc Surg* 1989; **9**: 630–6.
2. Robinson G, Hughes W, Lippey E. Abdominal aortic aneurysm and associated colorectal carcinoma: a management problem. *Aust N Z J Surg* 1994; **64**: 475–8.
3. Bachoo P, Cooper G, Engeset J, et al. Management of synchronous infrarenal aortic disease and large bowel cancer: a North-east of Scotland experience. *Eur J Vasc Endovasc Surg* 2000; **19**: 614–8.
4. Makela JT, Kiviniemi H, Laitinen S. Risk factors for anastomotic leakage after left-sided colorectal resection with rectal anastomosis. *Dis Colon Rectum* 2003; **46**: 653–60.
5. Kurata S, Nawata K, Nawata S, et al. Surgery for abdominal aortic aneurysms associated with malignancy. *Surg Today* 1998; **28**: 895–9.
6. Matsumoto K, Murayama T, Nagasaki K, et al. One-stage surgical management of concomitant abdominal aortic aneurysm and gastric or colorectal cancer. *World J Surg* 2002; **26**: 434–7.
7. Baxter NN, Noel AA, Cherry K, et al. Management of patients with colorectal cancer and concomitant abdominal aortic aneurysm. *Dis Colon Rectum* 2002; **45**: 165–70.
8. Herald JA, Young CJ, White GH, et al. Endosurgical treatment of synchronous rectal cancer and abdominal aortic aneurysm, without laparotomy. *Surgery* 1998; **124**: 932–3.