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Case Report

Synchronous Colorectal Malignancy and Abdominal Aortic Aneurysm Treated With Endovascular Aneurysm Repair Followed by Laparoscopic Colectomy

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Although the incidence of synchronous abdominal aortic aneurysm (AAA) and malignancies is increasing, there has been no clear consensus in the surgical treatment of such patients. The focus on surgical treatments with minimal invasiveness, such as endovascular aneurysm repair (EVAR) for AAA and laparoscopic colectomy for colorectal cancer, has increased; however, the clinical applicability of combination treatment with EVAR and laparoscopic colectomy has not been established. A 61-year-old man was diagnosed with AAA, advanced sigmoid colon cancer, and coronary artery stenosis. Because the patient also had chronic renal failure with nephrotic syndrome, among several other comorbidities, surgery was considered to be associated with high risks in this patent. Sequential treatments with percutaneous coronary intervention, EVAR, and laparoscopic colectomy were successfully performed. Staged treatment of EVAR followed by laparoscopic colectomy may be a promising strategy for high-risk patients with AAA associated with malignancy.

Key words: Abdominal aortic aneurysm – Endovascular aneurysm repair – Colorectal cancer – Laparoscopic surgery

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With the aging of the general population, the prevalence of diseases associated with arterial sclerosis, such as abdominal aortic aneurysm (AAA), and that of neoplasms such as colorectal cancer (CRC), has also been increasing.[1] Therefore, the number of cases with concurrent AAA and CRC is expected to increase. However, there has been no clear consensus in the surgical treatment of such patients. The resection of CRC followed by aneurysm repair with a synthetic graft is associated with the potential risk of aneurysmal rupture during the perioperative period of the cancer operation.[2] Conversely, aneurysm repair prior to CRC resection may result in the delay of cancer therapy and consequent cancer progression[2]; there is also a possibility of aortic graft infection in the case of anastomotic leakage.[1]

In recent years, there has been increased focus on surgical treatments with minimal invasiveness for various diseases. In the treatment of AAA, endovascular aneurysm repair (EVAR) is a promising alternative to the conventional open graft replacement. In a large randomized study,[3] EVAR was reported to achieve low operative morbidity and mortality, short hospital stay and operation time, and minimal blood loss. However, as a minimally invasive surgical procedure, the use of laparoscopic surgery for CRC is becoming more widespread. Patients who undergo laparoscopic CRC resection have significantly less blood loss and shorter hospital stays than those who undergo more invasive procedures,[4] even though the reported oncologic outcome is equivalent to that of open surgery.[5] Although several studies on therapy for concomitant AAA and CRC have been reported,[6] there have only been a few reports on combination treatment with EVAR and laparoscopic colectomy.[7] In the present report, we describe a case of synchronous AAA and sigmoid colon cancer with several other comorbidities, in which successful treatment with EVAR and laparoscopic surgery was achieved.

Case Report

A 61-year-old man was referred to our hospital with the diagnosis of infrarenal AAA, which was detected during routine medical examination (Fig. 1A). The maximum AAA diameter was 61 mm and the patient was a candidate for surgical treatment. During the preoperative examination, colon cancer and advanced adenoma were detected in the sigmoid colon (Figs. 2, 3A). The clinical depth of the cancer was T3 and no evident lymph node or distant metastasis was detected on computed tomography (CT). Furthermore, coronary angiography revealed severe stenosis of the left anterior descending and left circumflex coronary artery. The patient also had chronic renal failure with nephrotic syndrome, and received 50 mg of cyclosporine and 20 mg of prednisolone by oral administration. Furthermore, the patient had atrial fibrillation, chronic obstructive pulmonary disease, severe anemia, and diabetes mellitus. Because of the high risks associated with surgery in this patient, staged minimal invasive therapy was planned.

Percutaneous coronary intervention with drug-eluting stents for the left anterior descending coronary artery was performed first, followed by that for the left circumflex coronary artery after 3 days. After 3 weeks, initially EVAR for AAA was performed using an endoprosthesis (GORE EXCLUDER, W.L. Gore & Associates, Inc, Flagstaff, Arizona). Although the stent grafts were deployed successfully and no type 1 endoleak was observed, a type 2 endoleak from the inferior mesenteric artery (IMA) was found to have persisted during postoperative CT (Fig. 1B). After 50 days, laparoscopic sigmoidectomy was performed (Fig. 3B). High ligation of the IMA was performed by double-clipping, both to dissect the lymph node and to resolve the type 2 endoleak. Because the patient received a high dose of corticosteroid therapy, sigmoidostomy with the stump of the proximal colon was performed to avoid anastomotic leakage. The final TNM classification of the CRC with histopathological examination was pT3N0M0 stage II. The postoperative course was uneventful and the patient was discharged on postoperative day 13. The patient immediately recovered from colectomy. On the first postoperative day, the white blood cell count had normalized and the C-reactive protein level was 0.74 mg/dL, and the postoperative course was uneventful.

Discussion

The reported incidence of the synchronous occurrence of malignancies and AAA ranges from 3 to 13%.[8] Recently, there has been increased focus on the importance of minimally invasive surgery in such patients. In Japan, the reimbursement for EVAR using stent grafts was approved in 2006, which enabled the implementation of a new strategy for the treatment of AAA associated with malignancy. Indeed, several reports concerning combination therapy with EVAR and laparoscopic surgery

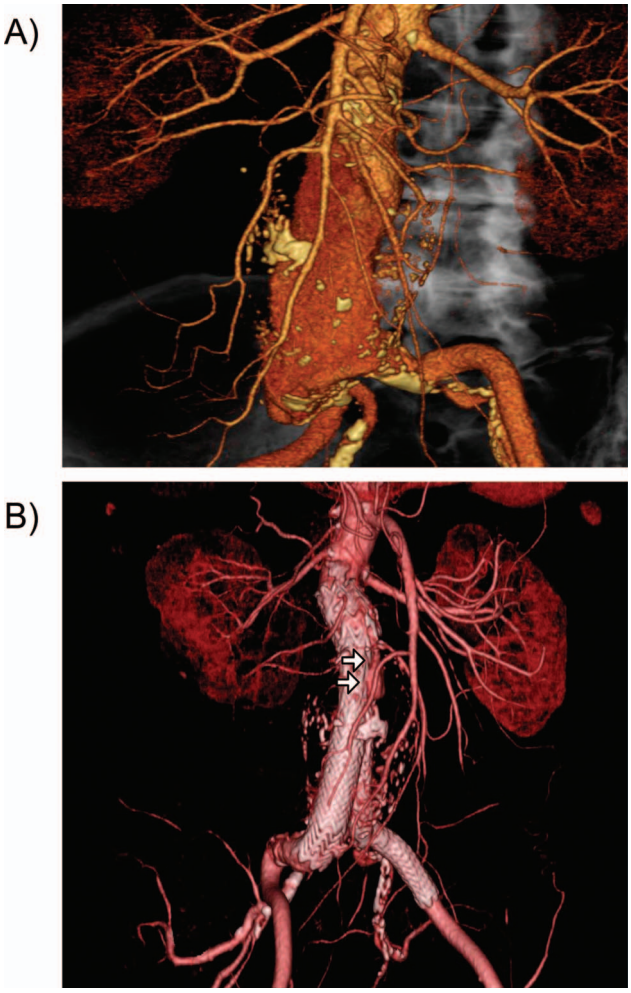

Fig. 1 Arterial reconstructions with computed tomography before (A) and after (B) EVAR are shown. White arrows indicate a type 2 endoleak from the IMA.

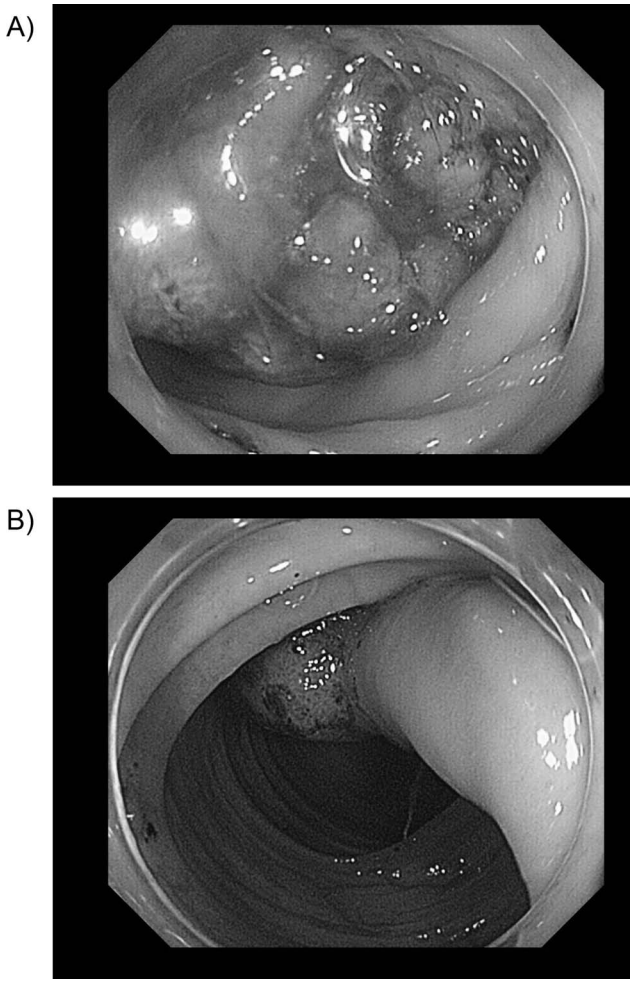

Fig. 2 Sigmoid colon cancer (A) and an adenomatous polyp with a long stalk (B) were detected on colonoscopy.

such as pancreaticoduodenectomy for pancreatic cancer[9] or nephrectomy for renal cell carcinoma[10] have recently been published. Endovascular aneurysm repair has several technical advantages compared with open surgery. Open repair could result in adhesions and interfere with the subsequent colorectal surgery. Moreover, sufficient lymph node dissection in colectomy frequently requires high ligation of the IMA, which could result in exposure of the graft and consequent postoperative graft infection. Conversely, although these complications could be avoided with EVAR, AAA shrinkage in the early post-EVAR period would be minimal and the peritoneal working spaces for the laparoscopic procedure in such patients may be limited compared with those without AAA. Despite this technical limitation, in the present case, we safely completed the laparoscopic procedure.

Recently, Porcellini *et al*. compared the short-term outcome of EVAR and open repair in 25 AAA patients with concomitant malignancy, and reported the superior morbidity and mortality rates associated with EVAR.[1] Although the long-term durability of EVAR remains controversial,[11] it may be less important in patients with malignancies, considering their relatively shorter life expectancy. Thus, EVAR is expected to be a promising alternative to the conventional open method, particularly in patients with malignancies.

There have been only a few case reports on laparoscopic surgery after EVAR; therefore, the applicability and outcome of the laparoscopic procedure for EVAR-treated patients has not been established. A prospective and randomized con-

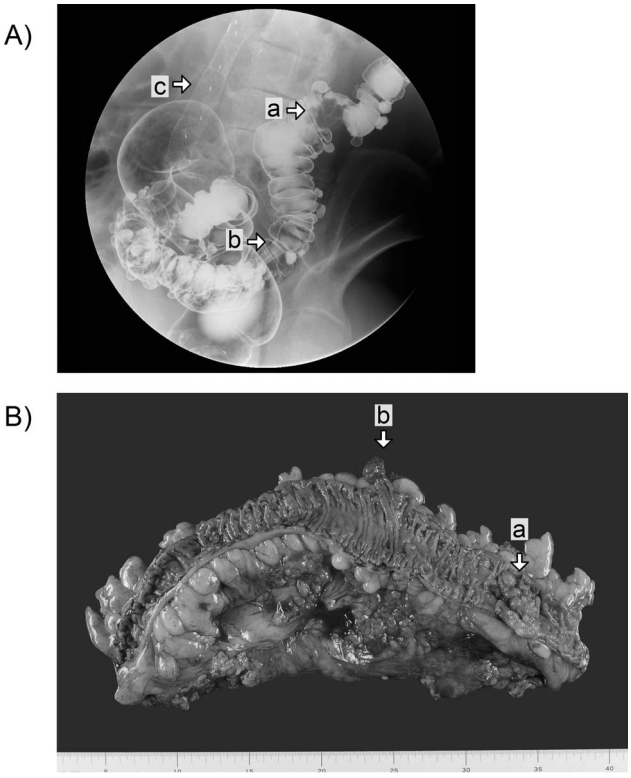

Fig. 3 (A) Barium enema performed between EVAR and laparoscopic colectomy: (a) sigmoid colon cancer, (b) polyp with a long stalk, (c) inserted stent graft. (B) Surgically resected sigmoid colon: (a) sigmoid colon cancer (pT3), (b) adenomatous polyp.

trolled study with a large number of patients is required to determine the optimal surgical treatment—i.e., laparoscopic or open laparotomy—after EVAR for AAA. In conclusion, we believe that staged treatment of EVAR followed by laparoscopic colectomy may be a promising strategy for high-risk patients with AAA associated with malignancy.

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