

Pelvic radiation therapy as a potential risk factor for ischemic colitis complicating abdominal aortic reconstruction

África Duque Santos, MD,^a Andrés Reyes Valdivia, MD, PhD, FEBVS, FACS,^a Margarita Martín, MD,^b Julia Ocaña Guaita, MD, PhD,^a and Claudio Gandarias Zúñiga, MD, PhD,^a Madrid, Spain

ABSTRACT

A 78-year-old man with a 56-mm juxtarenal aneurysm and previous pelvic radiotherapy for prostate cancer (3 years earlier) who was disease free during follow-up received elective aorto-aortic bypass suprarenal clamping through a transperitoneal approach. After the patient experienced initial abdominal pain and diarrhea, a computed tomography scan showed mild sigmoid inflammation, and the patient received conservative treatment. One month after discharge, the patient underwent urgent laparotomy and bowel and sigmoid resection for an enterocutaneous fistula. At 6-month follow-up, he has recovered, although a bowel stoma remains. (*J Vasc Surg Cases and Innovative Techniques* 2020;6:413-5.)

Keywords: Abdominal aortic aneurysm; Open repair; Transperitoneal approach; Radiotherapy; Ischemic colitis

Colonic ischemia (CI) is considered one of the most deleterious complications after any type of abdominal aortic aneurysm (AAA) repair. Although the recent literature suggests that endovascular aneurysm repair (EVAR) may be associated with a lower frequency of CI than open aortic repair (OAR), it remains unclear whether this is true.¹ Here, we describe an unusual case of CI clearly related to previous pelvic radiotherapy, which is reminiscent of a previous report published in this journal 25 years ago² with nearly the same title (here, we added the word *potential* to indicate that a direct cause and effect relationship should be evaluated). The patient has consented to publication of the details and images related to the case.

CASE REPORT

A 78-year-old man with a 56-mm juxtarenal AAA was evaluated. He was a former heavy smoker with hypertension, diabetes, and nonsymptomatic coronary disease, and he had received previous external pelvic radiotherapy treatment for T2aNOMO prostate cancer (3 years earlier). The total dose was 60 Gy distributed in daily doses of 3 Gy. His cardiac, pulmonary, and kidney preoperative test results were normal. As shown in

Fig 1, the anatomic features of the aneurysm precluded three modalities of treatment (fenestrated EVAR with four fenestrations, triple-chimney EVAR, and open surgery). OAR with suprarenal clamping was decided on during consultation.

Surgical treatment was performed with a transabdominal approach, and an 18-minute proximal clamp was required. The inferior mesenteric artery (IMA) was ligated, and low-dose vasopressor drugs were required after clamp release. Abdominal bowel exploration revealed normal perfusion as determined by the main surgeon. On postoperative day 1, the patient was discharged from the intensive care unit, and one transfusion was required to keep the hemoglobin level at 10 g/dL. On day 2, he experienced abdominal discomfort and diarrhea that, although not severe, were suggestive of CI. Therefore, an urgent computed tomography (CT) scan was performed at day 3 and revealed mild sigmoid inflammation, which was addressed with conservative medical treatment. On postoperative day 14, the patient was scheduled for a predischarge CT scan, which showed no worsening radiologic findings. Because of his clinical improvement, the patient was discharged home.

Ambulatory consultations 1 and 2 weeks after discharge showed usual clinical recovery. At 1 month and at the scheduled consultations, the patient showed low-grade fever and abdominal pain associated with spontaneous fecaloid drainage in the periumbilical zone. After a diagnosis of enterocutaneous fistula through a CT scan, the patient was urgently treated with sigmoid resection and bowel stoma (Fig 2). Histopathologic features were described as severe hyalinization with mild hemorrhagic changes as well as associated obliterative endothelial inflammation. Several days later, he was discharged home and continued to be well at a 6-month follow-up.

DISCUSSION

Only one statement regarding the presence of CI after AAA repair has been confirmed: it is a life-threatening condition with a high rate of mortality (20%-30%), which increases to 50% if bowel resection is required.³

From the Department of Vascular and Endovascular Surgery,^a and Department of Radiotherapy Oncology,^b Ramón y Cajal University Hospital.

ADS and ARV share co-first authorship.

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Correspondence: África Duque Santos, MD, Department of Vascular and Endovascular Surgery, Ramón y Cajal University Hospital, Carretera Colmenar km 9,100, Madrid 28034, Spain (e-mail: africaduque@hotmail.com).

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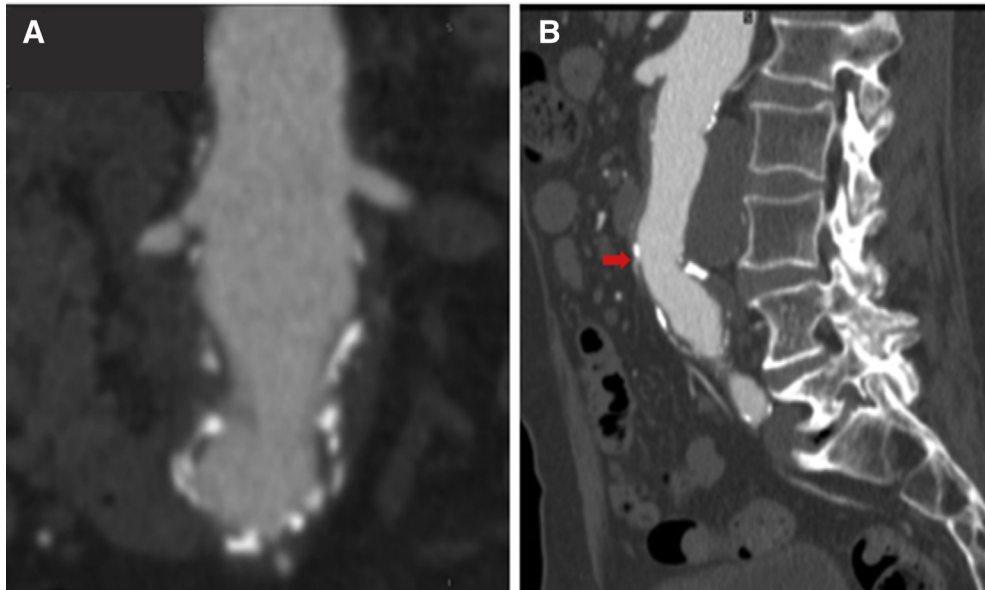


Fig 1. Preoperative computed tomography (CT) images of the patient treated. **A**, Coronal view of juxtarenal aneurysm. **B**, Lateral view showing small 2-mm patent inferior mesenteric artery (IMA) with stenosis at the origin (arrow).

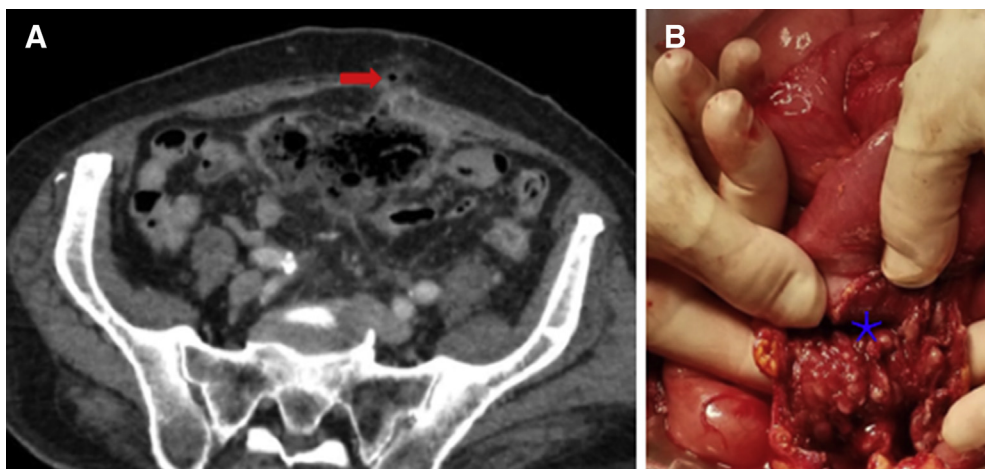


Fig 2. Reintervention due to enterocutaneous fistula. **A**, Computed tomography (CT) image showing bowel communication with the abdominal wall, an enterocutaneous fistula (arrow). **B**, Intraoperative findings of sigmoid (star) requiring resection and bowel stoma.

Some surgeons follow an anatomically based approach that preserves the IMA during open repair or the hypogastric arteries with iliac branch devices during EVAR. These strategies remain controversial. Moreover, Lee et al⁴ concluded that IMA reimplantation does not protect against CI. However, the study design has been criticized (and addressed by the authors).⁵ Good long-term patency of the procedure itself has been described.⁶

The increased worldwide use of EVAR for AAA treatment has resulted in improvements in the technique, and the lower morbidity outcomes are based on a standard EVAR approach. The actual benefit of decreasing morbidity for CI specifically remains unclear. The findings

that hypogastric artery embolization does not increase the risk of CI and that the use of iliac branch devices does not decrease the rate of CI, as found by Lu et al,⁷ are testaments to the uncertainty in this area.

To our knowledge, an important factor underlying the development of CI in our patient was his clinical history of pelvic irradiation. Although we are unsure of the direct cause and effect relationship of CI development, the association with vasopressor use in a diseased peripheral collateral network (our patient used to be a heavy smoker and had peripheral artery disease) may explain his delayed presentation—a situation that, although not typical, has been described in case reports.⁸

An endovascular approach in this case would have required a four-fenestration custom-made device or a triple chimney (assuming a high chance of type IA endoleak) derived from the anatomically reconstructed CT scan. Adjunctive EndoAnchors (Medtronic, Santa Rosa, Calif) could not be used for standard EVAR because of neck constraints. Although the literature suggests that EVAR may pose a lower risk of CI, these outcomes worsen when complex EVAR rather than standard EVAR is required.⁹ Moreover, these poorer outcomes with complex EVAR have been found in high-volume, experienced centers in fenestrated-branched EVAR. Although we do have some experience with those complex endovascular approaches, an honest appraisal should be discussed with patients because our center still maintains a 30% to 35% OAR load for AAA treatment, primarily juxtarenal aneurysms, with outcomes in line with those reported in other centers (our report is in press).

With an open surgical approach, poorer outcomes occur with transabdominal access (which we used).¹⁰ The reimplantation of the IMA was rejected because of the critical stenosis at the origin and a 2-mm diameter along the entire length.

Although identification of patients at risk for development of CI is crucial, many gray areas remain regarding the optimal approach for these patients. Given current knowledge and the increasing number of patients receiving pelvic radiotherapy,^{11,12} we highlight the importance of considering this treatment as a factor for CI development. Interestingly, a similar statement was made 25 years ago in reporting of two cases² and highlighted in an editorial¹³ in relation to a CI population-based analysis.¹⁴ To our knowledge, no study has focused on such analysis during CI evaluation. Therefore, our findings must be carefully evaluated in larger studies to confirm or to reject the potential role of pelvic radiotherapy in CI development after AAA repair.

CONCLUSIONS

Pelvic radiotherapy should be carefully evaluated in deciding on a surgical treatment strategy during AAA repair. Further research considering pelvic radiotherapy as a preoperative risk factor in population studies might clarify whether this is a spurious finding or a true risk factor that should be considered.

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