One-step mini-invasive treatment of abdominal aortic-iliac aneurysm associated with colo-rectal cancer

Bruno Amato a, *, Giovanni Esposito b, Raffaele Serra c, d, Rita Compagna a, b, c, Gabriele Vigliotti a, Tommaso Bianco a, Guido Massa a, Maurizio Amato a, Salvatore Massa a, Giovanni Aprea a

a Department of Clinical Medicine and Surgery, University of Naples Federico II, Via S. Pansini 5, 80131 Napoli, Italy
b Department of Advanced Biomedical Sciences, Federico II University, Via Pansini 5, 80131 Naples, Italy
c Interuniversity Center of Phlebolymphology (CIFL), International Research and Educational Program in Clinical and Experimental Biotechnology, Headquarters – University Magna Graecia of Catanzaro, Viale Europa, 88100 Catanzaro, Italy
d Department of Medical and Surgical Sciences, University of Catanzaro, Italy

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A B S T R A C T

Background: Endovascular aneurysm repair (EVAR) is still now a controversial technique, which remains the subject of a number of prospective randomised trials. Although questions remain regarding its long-term durability, objective evidence exists which demonstrates its reduced physiological impact compared with conventional open repair, especially for older population and for the concomitant treatment of aortic abdominal aneurysm (AAA) and abdominal neoplasms, such as colo-rectal cancer (CRC). In these patients it may reduce the high perioperative mortality. Patients and methods: Abdominal aortic aneurysm and colo-rectal neoplasm are occasionally discovered concurrently. Simultaneous operative treatment may be in these cases an effective management strategy, alternative to a staged procedure. The medical record of three consecutive patients undergoing mini-invasive colectomy for cancer and abdominal aortic aneurysm repair were reviewed. Data collected included mode of presentation, preoperative evaluation, colo-rectal pathology and in-hospital morbidity and mortality. Long term follow-up was obtained through office records and telephone contact. Results: In one patient a asymptomatic colo-rectal mass was identified in the course of CT-scan evaluation for AAA; in the other two patients AAA was discovered during CT-scan oncological evaluation for symptomatic CRC. All patients underwent successfully concomitant repair of AAA and CRC by means of EVAR procedure and mini-invasive colo-rectal resection. Pathology revealed adenocarcinomas in all three cases. Perioperative follow-up revealed minor postoperative complications. Two years follow-up showed no cases of graft infection, and no interference of vascular procedure on oncological course of the colo-rectal malignancies.

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1. Introduction

With advancing age, the diagnosis of AAA and CRC increases in frequency. The incidence of synchronous AAA and CRC is rare (0.5–2% in most series [1,2]), but the management of this clinical situation remains perplexing and controversial. Careful clinical decision-making is required regarding which lesion to resect first, whether to resect both lesions at the same time and what to do when one lesion is an unexpected finding during elective or emergent resection of the other. Treating CRC first may lead to increased risk of rupture of AAA in the perioperative period [3]. It may also theoretically increase the rate of graft infection if AAA repair is done soon after bowel surgery [2]. Resection of AAA first may lead to significant delay of CRC treatment, which involves not only the operative resection of tumour but adjuvant (and nowadays neo-adjuvant) treatment as well. Concomitant treatment of both lesions has been described and has been successful [4].

* Corresponding author.
E-mail addresses: bruno.amato@unina.it (B. Amato), espogiov@unina.it (G. Esposito), rserra@unica.it (R. Serra), rita.compagna@libero.it (R. Compagna), federer2987@hotmail.it (G. Vigliotti), tommosobianco85@gmail.com (T. Bianco), guidomassa@libero.it (G. Massa), maurizioamato@gmail.com (M. Amato), smassa@unina.it (S. Massa), aprea@unina.it (G. Aprea).
List of abbreviations

EVAR  endovascular aneurysm repair
AAA  aortic abdominal aneurysm
CRC  colo-rectal cancer
CEA  carcinoembryonic antigen
CT-A  computed-tomographyangiography
ASA  American Society of Anesthesiologists
EG  endograft

2. Patients and methods

A retrospective review of the records of patients with colo-rectal oncologic disease and AAA was performed from 2009 to 2012. Among 62 patients (56 male and 6 female, ranging in age from 54 and 88 years, with a mean age of 74 years) with abdominal aortic aneurysm admitted during that period to our department for elective surgery, 3 of them (4.83%) had also synchronous colo-rectal cancer. One of them could be defined in type I of Szilagyi Classification (because the aneurysm was discover pre-operatively after the cancer); while the other two case may be considered as type II of Szilagyi Classification (because AAA and CRC were discovered at the same time pre-operatively). No AAA was discovered intra-operatively, during cancer surgery (Type III) or during AAA surgery (Type IV). So we have been considering a group of three patients with synchronous CRC and AAA. Mean age was 73 years, and all patients were men. Two patients were symptomatic for CRC and one asymptomatic. In Table 1, the data regarding the AAA are shown, whereas in Table 2, the data regarding characteristics of CRC of all patients are presented.

2.1. Case 1

A 76-year-old male underwent colonoscopy after complaining of change in bowel habits along with rectal bleeding; colonoscopy revealed an irregular vegetant lesion involving half of the circumference of the sigmoid colon. Biopsy revealed a tubule-villous adenoma with areas of cancer degeneration. The carcinoembryonic antigen (CEA) and circulating tumor-associated antigen (CA 19.9) were within a normal range. Clinical examination did not reveal a pulsatile abdominal mass, but the thoraco-abdominal computed-tomographyangiography (CT-A) performed as part of the preoperative staging workup showed a 43-mm fusiform infrarenal AAA without involvement of the aortic bifurcation and a 32-mm fusiform left common iliac artery aneurysm. There was no liver or lung metastases. No hypercoagulable disorder was documented. American Society of Anesthesiologists (ASA) score was class II. Anatomic criteria for endograft (EG) placement were met and informed consent for a synchronous procedure was obtained. A bifurcated infrarenal EG (Excluders 26 mm—W.L. Gore & ass. Inc., USA) was implanted through a conventional surgical exposure of the right common femoral artery with a contralateral percutaneous transfemoral approach; a completion angiogram showed the successful deployment of the EG, the complete exclusion of the both the aneurysms, the patency of the renal and hypogastric arteries, and no endoleak. During the same operation, a laparoscopic colorectal resection was performed in standard fashion.

The histological examination of the sigmoid lesion confirmed a pT1 G2 adenocarcinoma, beyond the muscularis propria but no penetrating the peritoneum. The resection margins were free of malignancy. Lymphnodes showed no metastatic involvement. The patient had an uncomplicated recovery and was discharged home 6 days after the intervention. Six, twelve and twenty-four month follow-up CT-A showed the persistent exclusion of the aneurysms without endoleak, no EG-related complication, no sign of graft infection and the absence of malignant recurrence.

2.2. Case 2

A 73-year-old male underwent CT-A scan for a pulsatile abdominal mass after a routine abdominal echography for vague abdominal pain. This revealed an infrarenal AAA measuring 5.4 cm in diameter. This revealed also a lesion on the sigmoid colon. Biopsy at colonoscopy showed a moderately differentiated adenocarcinoma. Criteria for placement of an endograft were met. The patient underwent a successful placement of an aorto-bis iliac endograft (Excluders 26 mm—W.L. Gore & ass. Inc., USA). During the same procedure, the patient underwent a resection of the sigmoid colon, by means laparoscopic procedure. The pathologic diagnosis of the sigmoid lesion was that of a T2N0M0 adenocarcinoma. The patient had an uncomplicated recovery and was discharged home after 7 days. At 6, 12 and 24 months follow-up there have been no complications.

2.3. Case 3

A 82-year-old male underwent an abdominal A-CT scan for abdominal pulsation: a 3.2 cm left common iliac aneurysm was discovered. A lesion in the proximal rectum was also visualised and then biopsied at colonoscopy. Biopsy shown a moderately differentiated adenocarcinoma. Criteria for placement of an iliac endograft and concomitant laparoscopic colo-rectal resection were met. The patient underwent placement of an endograft (Excluders 12 mm—W.L. Gore & ass. Inc., USA) followed by a colo-rectal resection during the same operation. The pathologic diagnosis of the rectal lesion was that of a T3NOM0 adenocarcinoma. The patient had an uncomplicated recovery and was discharged home after 9 days. At 6–12 and 24 months follow-up there have been no major complications.

3. Results

Management of concurrent disease was standard, regarding sequence and timing of operations: all patients underwent...
endovascular intervention first, and all CRC-patients were treated with laparoscopic procedure, during the same period of hospitalization, with a three-day interval between the two procedures. The decision to proceed first with the vascular disease was suggested both from its severity, and also mostly to prevent that heparinization, which is required by the endovascular procedure, could cause late bruising or bleeding at the level of previous intestinal anastomoses: heparin was in fact used during endovascular procedures and then stopped in all patients.

The procedures for the application of endovascular stent graft required respectively 180, 205 and 195 min, and all were conducted under spinal anesthesia with sedation. The duration of the interventions performed for colorectal cancer by laparoscopic surgery, in each case after three days of the endovascular procedure, required respectively 220, 190 and 230 min. All patients treated by laparoscopic colorectal surgery underwent successfully general anesthesia.

The preoperative bowel preparation has not been modified in any case from the previous procedure of spinal anesthesia, or from drugs used for the previous endovascular procedure.

The recovery of the bowel canalization was normal (36–72 h) in all three patients following surgery for resection of colorectal cancer. There were no dehiscence of intestinal anastomoses, nor hematomas were observed in the course of laparoscopic surgery in the retroperitoneal region. There were no wound infections in any of the procedures performed and there were no major complications related to the two minimally invasive procedures performed in the patients observed, neither during the period of hospitalization, nor in the subsequent follow-up.

4. Discussion

While there are ample, anecdotal reports of synchronous and staged treatments of AAA and rectal cancer, there is no evidence of the uniform superiority of one approach. Treating the AAA and cancer simultaneously raises the concern of either bacterial seeding of the graft or the risks associated with prolonged operative time. The arguments against this are that with appropriate bowel preparation, perioperative antibiotics and meticulous operative and anesthetic technique, these complications are avoidable.

Those supporting a synchronous approach cite [1], avoiding the risks of a second, major operation and [2], obviating the risk of aneurysm rupture during recovery from colon surgery. Treating the cancer first with associated chemotherapy further raises the possibility of chemotherapyyrelated AAA growth and rupture [3]. Fixing the AAA first poses a risk of graft infection during subsequent colon surgery and increases the time to eventual cancer treatment, with any delay in recovery potentially increasing the complications and risks associated with cancer growth. In the absence of evidence supporting a uniform approach to patients with coexistent AAA and rectal cancer, we acknowledge that decisions tend to be based on surgeon experience and what seems most intuitive. Furthermore, we believe that the recommendations should still now be strictly individualized.

Aneurysm size (an independent predictor of aneurysm rupture), cancer stage, patient co-morbidities and life expectancy based on either co-morbidities or cancer prognosis are all relevant in informing the management priorities. The AAA should be treated first in a patient with a large AAA and a small, early-stage cancer. If, however, co-morbidities are prohibitive for the repair of a large juxtarenal AAA, we would suggest that the small cancer be treated first, and the AAA reassessed based on how the patient tolerates the colon surgery. Alternatively, in a healthy patient with few co-morbidities, the coexistence of a pre-obstructing cancer and a large AAA might merit concomitant treatment of both.

Treating the AAA first with endovascular techniques followed by staged CRC resection is an alternative, especially in large aneurysms suitable for an endograft. In the Lin series, this group of patients had the lowest perioperative morbidity and mortality (17 and 0%, respectively) [1].

Treating the CRC first, especially with laparotomy, exposes the patient to the risk of aneurysm rupture in the immediate postoperative period [3]. This may be secondary to collagen lysis induced by the operation itself; nutritional depletion and surgical dissection may also have an effect.

Administration of chemotherapy and radiation therapy may also induce aneurysm enlargement and rupture [4]. In a review of the literature, Shalhoub et al. [5] reported an 11% interval AAA rupture rate in patients treated with CRC resection followed by staged AAA repair. Treatment of CRC followed by endovascular repair is associated with low perioperative mortality rates, but postoperative sigmoid ischemia has been reported [6]. The authors propose that evaluation of the vasculature of the colon be undertaken before treatment of concurrent CRC and AAA. Simultaneous treatment of both lesions may offer the advantage of no delay between treatments and a single anesthetic. The magnitude of the operation is increased, however. Prusa et al. reported lower morbidity and mortality in patients with CRC and AAA treated in one stage versus two stages (8 and 4.5% vs. 21.3 and 6%, respectively) [7–9]. Endovascular therapy appears suitable for a single-stage procedure. However, in cases in which open AAA repair is undertaken with synchronous CRC resection, mortality may be as high as 13% [10]. Single-stage procedures theoretically pose the risk of graft infection. Several reports have not shown this to be significant. In most series of combined CRC resection and AAA repair, no graft infections were reported [11,12]. Risk of direct graft contamination by gut organisms might be reduced by a combination of bowel preparation, meticulous surgical technique, and antimicrobial therapy. In addition, endograft placement should in theory prevent exposure of the graft to a contaminated or infected operative field, since the aneurysmal sac is not opened [13,14].

The use of endovascular techniques has provided a valuable armamentarium to the surgical treatment of AAA. Short-term benefits regarding perioperative morbidity and mortality in elderly are well known. These short-term benefits are important in patients who require further treatment for concomitant neoplasms. The long-term complications of endovascular techniques may be of less importance, since life expectancy may be shorter [15–18].

Finally, with advancing technology and the ever-widening applications of minimally invasive approaches to both cancer surgery and aneurysm repair, the treatment paradigms and priorities should continue to evolve.

Ethical approval

Local Board approved the study.

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Author contribution

Bruno Amato: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data; also participated substantially in the drafting and editing of the manuscript.

Giovanni Esposito: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data.
Raffaele Serra: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data.

Rita Compagna: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data.

Gabriele Vigliotti: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data.

Tommaso Bianco: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data.

Guido Massa: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data.

Maurizio Amato: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data; also participated substantially in the drafting and editing of the manuscript.

Salvatore Massa: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data; also participated substantially in the drafting and editing of the manuscript.

Giovanni Aprea: Participated substantially in conception, design, and execution of the study and in the analysis and interpretation of data.

Conflicts of interest

All Authors have no conflict of interests.

References


