



Oncology

Concomitant large renal cancer and abdominal aortic aneurysm. An original multidisciplinary approach to solve both pathologies saving residual kidney

Roberto Falabella^a, Saveriano Lioi^a, Sabrina La Falce^a, Franco Camillo Ponti^a, Giuseppe Di Fino^a, Vincenzo Francesco Caputo^{c,a,*}, Andrea Esposito^b

^a Department of Urology, Azienda Ospedaliera San Carlo, Potenza, Italy

^b Department of Cardiovascular Surgery, Azienda Ospedaliera San Carlo, Potenza, Italy

^c Department of Neurosciences, Sciences and Odontostomatology, Urology Unit, University of Naples "Federico II", Napoli, Italy

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ABSTRACT

A 65-year-old male patient presented a large mass of the left kidney and a concomitant saccular abdominal aortic aneurysm (AAA) of the infrarenal aorta. Due to the particular vascularization of the right kidney in order to allow an endovascular Aneurysm Repair (EVAR), a hybrid staged repair was planned. Through a median laparotomy, a left radical nephrectomy and an ilio-renal bypass were performed, thus creating the anatomical feasibility for subsequent EVAR. Two days later the AAA was excluded by positioning of an abdominal straight stent graft. This original surgical strategy showed to be effective and reduced invasiveness of traditional approach.

1. Introduction

Renal neoplasm (RN) and abdominal aortic aneurysm (AAA) are occasionally discovered concurrently, raising several questions about therapeutic and surgical strategies of management for both diseases.¹

Previously, open repair was the only surgical treatment available for both RN and AAA so, the major concern was about timing of interventions (simultaneous or staged). Particularly, a one-stage surgery increases the risk of aortic graft infection and the cumulative morbidity and mortality are significantly higher when compared to two-staged operations. A staged approach avoids major longer operations but often leads a significant time delay before the second operation with risk of aneurysm rupture if the neoplasm is resected first or risk of metastasis if the aneurysm is treated first.^{1,2}

Recently, this therapeutic dilemma may be decreased according to the development of less invasive techniques such as endovascular aortic repair (EVAR) and nephron-spare-surgery (NSS) which reduce the patient's healing time and, in most cases, reduce the time to undergo vascular and cancer surgery within few days.

We present a case of synchronous RN and AAA, both unsuitable for less invasive procedures, where the magnitude of the intervention was reduced thanks to a multidisciplinary approach.

2. Case presentation

A 65-year-old male patient was admitted to urologic department for hematuria. An abdominal ultrasound revealed a large mass of the left kidney. An enhanced CT-scan confirmed the presence of large neoplasm (10 cm) localized in the lower pole of the left kidney infiltrating the renal pelvis (Fig. 1) and a concomitant saccular AAA with 43mm of diameter of the infrarenal aorta. The case was also evaluated by the vascular surgical team of our institution; treatment of the AAA was indicated in consideration of its saccular morphology. Initially, EVAR was contraindicated due to the vascularization of the right kidney that presented a double renal artery with the lowest starting just above the origin of the AAA (Fig. 2). In this situation, the deployment of an aortic endograft would have resulted in the coverage of a great renal artery, thus hampering the functionality of the surviving kidney, and the size of the RN contraindicated an NSS. To reduce the invasiveness of the intervention avoiding a total open repair, a hybrid staged repair was planned. First stage open surgery was preferred due to the vascularization of the right kidney which needed realizing a contralateral ilio-renal bypass to allow the next EVAR. First, through a median laparotomy, a left radical nephrectomy and an ilio-renal bypass were performed, thus creating the anatomical feasibility for subsequent EVAR. The bypass was

* Corresponding author. Department of Urology Azienda Ospedaliera San Carlo, Via Potito Petrone SNC, Potenza, 85100, Italy.

E-mail address: vincitor@me.com (V.F. Caputo).



Fig. 1. Neoplasm (10 cm large) localized in the lower pole of the left kidney infiltrating the renal pelvis.

performed between the right common iliac artery and the lower right renal artery using a tract of saphenous vein. The ilio-renal bypass using the saphenous vein offered several advantages, including the utilization of an optimal conduit and enhanced patient survival. We opted for this approach due to the elevated risk of infection and limited lifespan associated with the use of a synthetic graft.

Two days later, under local anesthesia and through percutaneous right transfemoral access, the AAA was excluded by positioning of an abdominal straight stent graft (Endurant II, AVE, Santa Rosa, CA, USA) (Fig. 3 a, b, c).

Post-operative course was uneventful, and the patient was discharged after 7 days. Preoperative Creatinine serum level was 0.97 mg/dl, after nephrectomy 1.18 mg/dl, after EVAR 1.26 mg/dl and one month after surgery 1.16 mg/dl.

Histological examination showed renal clear cell carcinoma, Fuhrman 2, pT3a N0.

According to guidelines adjuvant chemotherapy was proposed with properly counseling but patient preferred active-surveillance.

In the follow up renal function was strictly monitored, and patient did not need dialysis. One-year follow-up CT scan showed no local or distant recurrence of malignancy, complete exclusion of AAA and patency of the renal bypass (Fig. 3d).

3. Discussion and conclusions

There is no consensus on the best management approach for patients with simultaneous AAA and abdominal urological malignancies. Previously, open repair through laparotomy was the only surgical treatment for both AAA and RN and timing of surgery was the major concern.

In one-stage approach both pathologies are solved through the same approach avoiding the potential risk of aneurysm rupture following the cancer resection stage, the potential delay in cancer treatment if the aortic aneurysm was addressed first and the potential difficulty in dealing with adhesions resulting from an earlier laparotomy. Despite some authors dealing with a combined urologic and vascular surgery have not shown any significant increase in the risk of graft infection,^{2,3} a simultaneous approach carries an increased operative time, surgical morbidity, and mortality.

In a study on 10 patients undergoing simultaneous AAA repair and radical nephrectomy for RN no deaths were reported but major complications rate was 20 %.³

Staged operation has the theoretical advantage of avoiding major longer operation, reducing morbidity and mortality. However, often in staged approach there could be a significant time delay before the second operation with consequent risk of aneurysm rupture if the neoplasm is resected first or risk of metastasis if the aneurysm is treated first.

These drawbacks can be overcome by the availability of less invasive techniques such as EVAR or NSS. Most authors dealing with synchronous AAA and malignancy have found a persistent decrease of the interval period between repairing the aortic aneurysm using EVAR and performing the malignancy operation in the two-staged approach, with a reduction in operative morbidity, mortality, length of hospital stay and intraoperative blood loss.³ According to these findings, we performed EVAR only two days after radical nephrectomy.

During the preoperative planning of EVAR, the finding of an

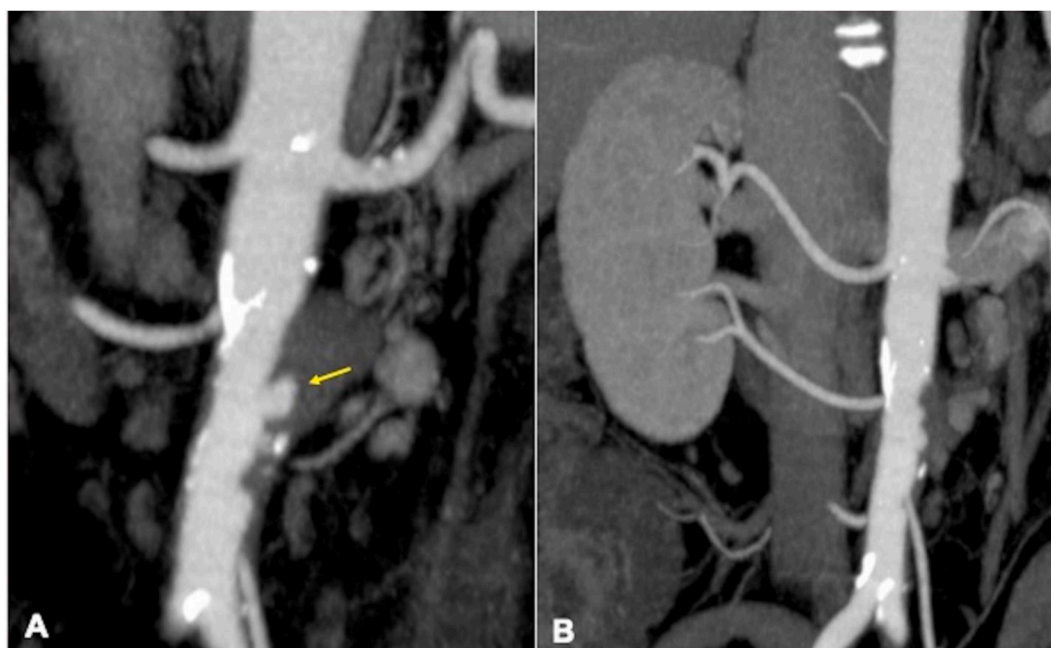


Fig. 2. Vascularization of the right kidney that presented a double renal artery with the lowest starting just above the origin of the AAA.

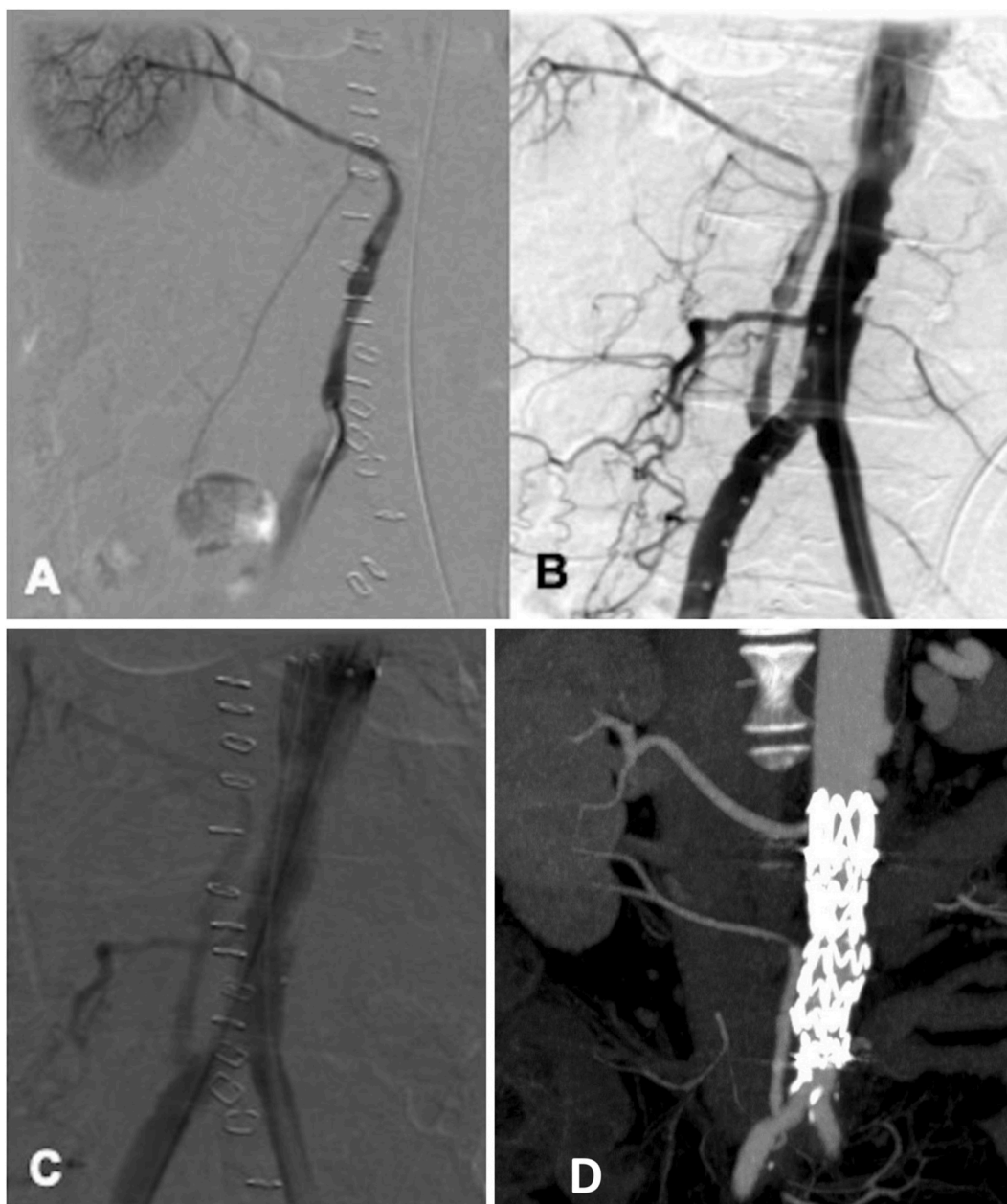


Fig. 3. (a,b,c) Through percutaneous right transfemoral access, the AAA was excluded by positioning of an abdominal straight stent graft; (d) One-year follow-up CT scan showed no local or distant recurrence of malignancy, complete exclusion of the AAA and the patency of the renal bypass.

accessory renal artery (ARA) occurs in 15 %–30 % of cases. A recent review⁴ supports the safety of ARA coverage during EVAR when necessary; despite this, others⁵ report an association between ARA coverage, renal infarction and decline in renal function.

In our case the ARA perfused a large portion of the surviving right kidney, so its preservation was mandatory. In our hybrid strategy we did not use any prosthetic material, avoiding the risk of graft infection. This strategy allowed us to reduce the invasiveness of the intervention; a total open repair would have involved aortic cross clamping, aneurysm resection and aortic graft replacement with increased operative time and blood losses.

Statement of ethics

Published research complies with the guidelines for human studies and is conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The patient has given his written

informed consent to publish his case (including publication of images).

Informed consent

Written informed consent and permission to publish the case report was obtained by the patient.

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CRediT authorship contribution statement

Roberto Falabella: Writing – original draft, Methodology, Data curation, Conceptualization. **Saveriano Lioi:** Methodology, Conceptualization. **Sabrina La Falce:** Writing – review & editing. **Franco**

Camillo Ponti: Writing – review & editing. **Giuseppe Di Fino:** Writing – original draft, Data curation. **Vincenzo Francesco Caputo:** Writing – original draft, Data curation. **Andrea Esposito:** Methodology, Conceptualization.

Declaration of competing interest

All authors have no conflicts of interest to declare.

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