

## Successful staged management of simultaneous abdominal aortic aneurysm and renal tumor: the novel minimally invasive treatment with endovascular aneurysm repair and retroperitoneal laparoscopic radical nephrectomy in an elderly and high-risk case

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### Abstract

The association between abdominal aortic aneurysm (AAA) and renal tumor is becoming more frequent, and the increasing incidence of this synchronous diseases raised questions about the procedures of treatment. In most of the previous cases, open nephrectomy and AAA surgery have been reported, however in high risk and elderly patients, the procedure is life threatening. We present a successful staged treatment of AAA and renal tumor using novel minimally invasive treatment with endovascular aneurysm repair and retroperitoneal laparoscopic radical nephrectomy in an elderly and high-risk case.

### Introduction

Abdominal aortic aneurysm (AAA) is a typical disease of aging. It was reported that a percentage of 1% and 12.7% of cases in which patients present both a solid neoplasm and AAA. This association is about 0.1-3% for renal tumor. Occasionally, these disease entities present concomitantly. The increasing incidence of this two synchronous diseases is probably due to better life expectancy of population, diffusion of cancer staging which allows diagnosis of asymptomatic AAA and development of imaging techniques that often permits diagnosis of silent cancer in patients with AAA.<sup>1</sup>

There have been reported the excellent results in patients who have undergone open AAA repair combined resection of renal tumor

with one-staged procedure,<sup>2</sup> however there is no consensus on the best therapeutic approach for patients with simultaneous AAA and renal tumor. There is still a concern that treating both pathologies during the same procedure is the risk of aortic graft infection and rupture.

Although the long-term effectiveness is still controversial, endovascular aneurysm repair has recently been proposed as a treatment option for patients with AAA.

Herein, we report our experience of a successful combination of minimally invasive treatments of endovascular aneurysm repair (EVAR) and retroperitoneal laparoscopic surgery in a staged management of elderly and high-risk patient with renal tumors and AAA.

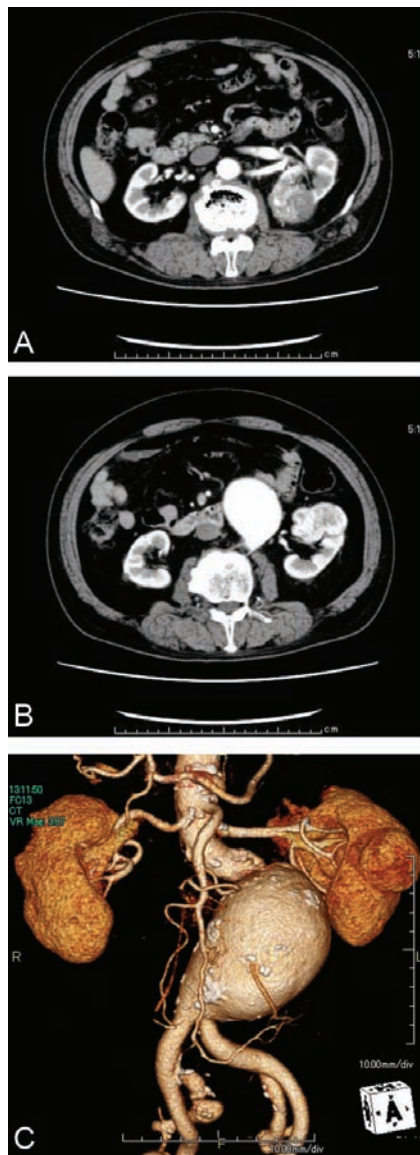


Figure 1. Abdominal computed tomography (CT) scan performed for the evaluation of renal tumors. (A) Upper tumor; (B) Lower tumor; (C) Abdominal aortic aneurysm (3D CT).

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Figure 2. Computed tomography (CT) scan performed for the evaluation of abdominal aortic aneurysm after endovascular aneurysm repair. (A) Plain CT; (B) Enhanced CT.

## Case Report

An 82-year-old male patient with hypertension (HT) and hyperlipidemia (HL) was referred to the department of vascular surgery in our hospital because of an incidental finding of left renal tumors and AAA, following an ultrasonography for medical work up by his physician. Computed tomography angiography of the abdomen/pelvis revealed an AAA and enhancing 5.1 cm and 4.6 cm left renal masses (Figure 1). A single renal artery that originates from the abdominal aorta supplied left kidney. Left renal cell carcinoma was suspected and the patient was referred to our department. From these findings, he was clinically diagnosed left renal cell carcinoma stage (T1bN0M0). His significant past medical history included HT, HL, and chronic renal insufficiency (S-cre; 1.2 mg/dL). He was deemed a candidate for EVAR by his vascular surgeon team. Considering his comorbidities and high age, a staged approach that consisted of EVAR followed by retroperitoneal laparoscopic radical nephrectomy was planned. The patient underwent successful placement of an aortic endograft through bilateral femoral artery exposure under general anesthesia (Figure 2). Blood loss was minimal. The patient tolerated the

procedure well and post operation was in good course. Three months later the patient underwent a left retroperitoneal laparoscopic radical nephrectomy. Utilizing 4 port technique, the procedure was uncomplicated and performed with no trouble associating with the repaired AAA (Figure 3). Estimated blood loss was only 94 mL. Post nephrectomy, retroperitoneal abscess was occurred, but it was cured by percutaneous drainage. The patient recovered well after drainage. Pathology revealed clear cell carcinoma in solid masses of 4 cm and 5 cm, which were presumed to be T1bN0M0 renal cell carcinoma. S-creatinine (mg/dL) was elevated from baseline of 1.1-1.5 to 1.7 in 6 months as expected.

## Discussion

Laparoscopic radical nephrectomy has become an international standard of care for medium to large renal tumors in academic and urban centers. Until now, many renal laparoscopic procedures were carried out via two approaches, transperitoneal and retroperitoneal. Each approach has its advantages and disadvantages.<sup>3,4</sup> There have been no controlled randomized studies that have compared the two approaches. In this case, considering the large AAA, retroperitoneal approach was easier and safer than transperitoneal with respect to the approach to renal artery.

Partial nephrectomy is currently considered the standard for most T1a ( $\leq 4$ cm) renal tumors and acceptable alternative to radical nephrectomy for select T1b ( $>4$ cm) renal tumors.<sup>5</sup> As the result of considering with double tumors and each tumor size  $>4$ cm, we concluded partial nephrectomy was very risky and hard. Finally, we concluded that retroperitoneal laparoscopic radical nephrectomy was the optimal procedure for him.

Recently, EVAR to exclude AAA was introduced for patients of poor health status considered unfit for major surgery, and the qualified patient has also quickly replaced open aneurysm surgery for the management of AAA.<sup>6</sup> The diagnosis of AAA and synchronous solid neoplasm is rare. This association is reported about 0.1-3% for renal neoplasm.<sup>1</sup> Most cases have been treated with one-staged procedure. In most of the previous cases, open nephrectomy and AAA surgery have been reported.<sup>7</sup> One-staged open procedure in the patients with AAA and renal tumors may be associated with an increased risk of infection of the vascular prosthesis. Infection of vascular prosthesis is potentially life threatening and

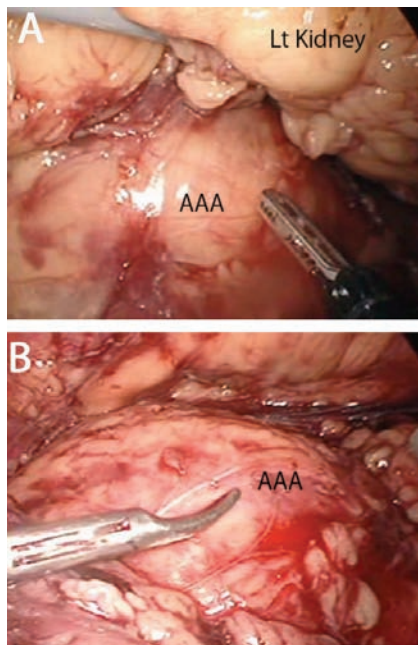
dangerous for elderly and high-risk patients. This disadvantage is not less relevant in patients, which can be treated laparoscopic surgery or EVAR than open surgery.

In our case, considering high age and the comorbidities, EVAR has been shown to be associated with a lower procedural mortality and morbidity in the short term, addition to shorter admission times and quicker recovery and offers the possibility of excluding the AAA rupture before treating the nephrectomy. Furthermore, left radical nephrectomy through retroperitoneal approach was very useful and safe with a good orientation of AAA in which endograft was inserted. Thus, the risk of direct graft contamination and rupture appears to be more markedly reduced.

Therefore we recommend a combination of minimally invasive treatments of EVAR and laparoscopic surgery in a staged approach, which allowed a prompt selective patient recovery.

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**Figure 3.** Intraoperative photograph of laparoscopic nephrectomy after endovascular aneurysm repair. (A) Before nephrectomy; (B) After nephrectomy.