

Aorta Remodeling after Endovascular Treatment of a Chronic DeBakey IIIb Aneurysm and Simultaneous Palliation of a Renal Cell Carcinoma

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We report the case of a patient with a chronic DeBakey type IIIb aneurysm who underwent thoracic endovascular aortic repair to seal the primary entry tear and stent-graft insertion to cover the re-entry tear at the renal artery. The procedure was performed in order to achieve complete thrombosis in the entire thoracoabdominal false lumen, leading to favorable aortic remodeling. Simultaneously, ethanol ablation and renal artery embolization were performed to treat a renal tumor suspicious of renal cell carcinoma. Radical nephrectomy then confirmed clear cell carcinoma. To the best of our knowledge, no other cases of this type have been reported in the Korean literature.

Key words: 1. Endovascular procedures
2. Aortic dissection
3. Renal cell carcinoma

CASE REPORT

A 54-year-old man was referred to Gangnam Severance Hospital for acute DeBakey type IIIb aortic dissection extending to the juxtarenal aorta. The primary entry tear and re-entry tear were located at the T8 level and the right renal artery, respectively. The celiac trunk, superior mesenteric artery, and left renal artery originated from the true lumen (TL). The right renal artery originated from both a false lumen (FL) and the TL. The maximum diameter of the aneurysm was 36 mm (Fig. 1A). A 23-mm cystic lesion was present in the right kidney with fine calcifications and septation (Bosniak IIF) (Fig. 1B). The patient was transferred to the intensive care unit for optimal medical treatment. The patient was discharged in good condition eight days later.

At the three-month and seven-month follow-ups, the patient showed no signs of malperfusion. A computed tomography (CT) scan revealed no significant interval aortic diameter change. By the 24-month follow-up, the maximum aortic diameter had grown from 36 mm to 46 mm (Fig. 1C). Additionally, within a previously existing cyst, a renal tumor had developed that was suspicious for renal cell carcinoma (RCC) (Fig. 1D). The patient was readmitted and underwent zone 3 thoracic endovascular aortic repair (TEVAR) starting just behind the left subclavian artery and extending to the T12/L1 (Fig. 2A, B) supraceliac region with cerebrospinal fluid drainage. Two TX2 Pro-Form grafts (38-202-34 and 34-157-30; Cook, Bloomington, IN, USA) were used. The cerebrospinal fluid pressure was maintained at 10 mmHg for the first 24 hours, and the mean arterial pressure was kept above

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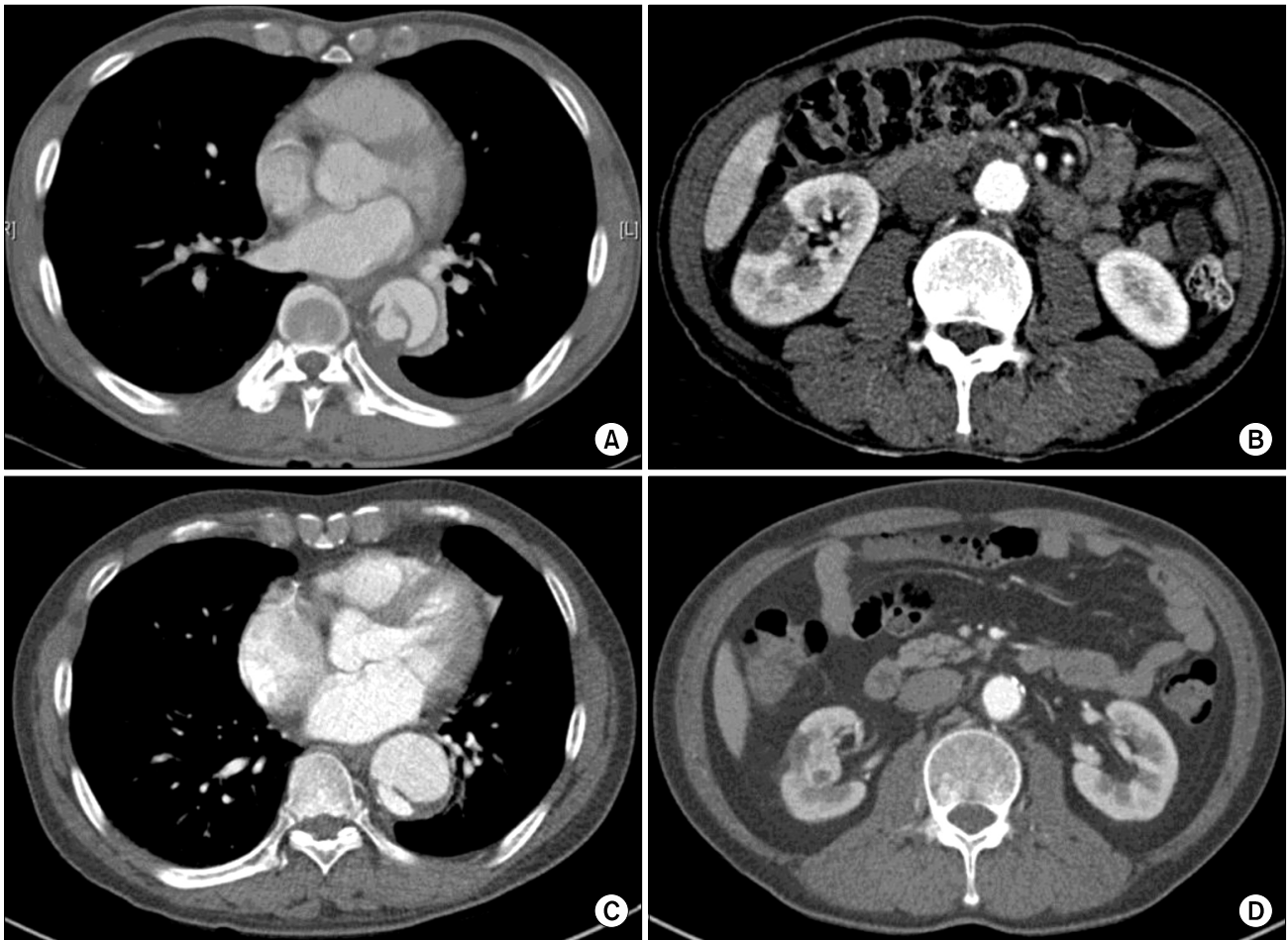


Fig. 1. (A) Initial preoperative computed tomography (CT) scan showing an acute DeBakey type IIIb aortic dissection with a maximum diameter of 36 mm. (B) Initial preoperative CT scan showing a renal cystic lesion about 23 mm in diameter on the right kidney (Bosniak IIF). (C) A CT scan performed twelve months later, showing that the aneurysm had grown to 46 mm. (D) Renal tumor formation on the right kidney.

90 mmHg to prevent spinal cord ischemia. The patient was discharged on the fifth postoperative day without any complications.

One month later the patient underwent a second stage operation covering the right renal artery re-entry tear with a Viabahn stent graft (6 mm in diameter, 25 mm in length; W.L. Gore & Associates, Flagstaff, AZ, USA) (Fig. 2C). Under the occlusion balloon, total ablation of the right kidney was performed using 99.9% ethanol (10 mL) mixed with lipiodol (1 mL), and two 0.889-mm platinum Nester coils (Cook) (Fig. 2D). The postoperative course was without incident and the patient was discharged from the hospital on the seventh postoperative day. Follow-up CT scans at one

and fourth months postoperatively revealed that the right kidney had atrophied and that the renal tumor size had decreased from 23 mm to 16 mm. The most recent CT scan, performed 7 months after the secondary surgery, showed favorable aortic remodeling with complete thrombosis in the entire thoracoabdominal FL (Fig. 2E), and partial response of the renal tumor was achieved, as its diameter decreased from 23 mm to 16 mm without metastasis (Fig. 3A). Seventeen months after the secondary surgery, radical nephrectomy was performed (Fig. 3B) and pathological results revealed a 1.8-cm clear cell RCC of Fuhrman nuclear grade III. The patient is doing well, with no evidence of major aortic events or recurrence of the tumor.

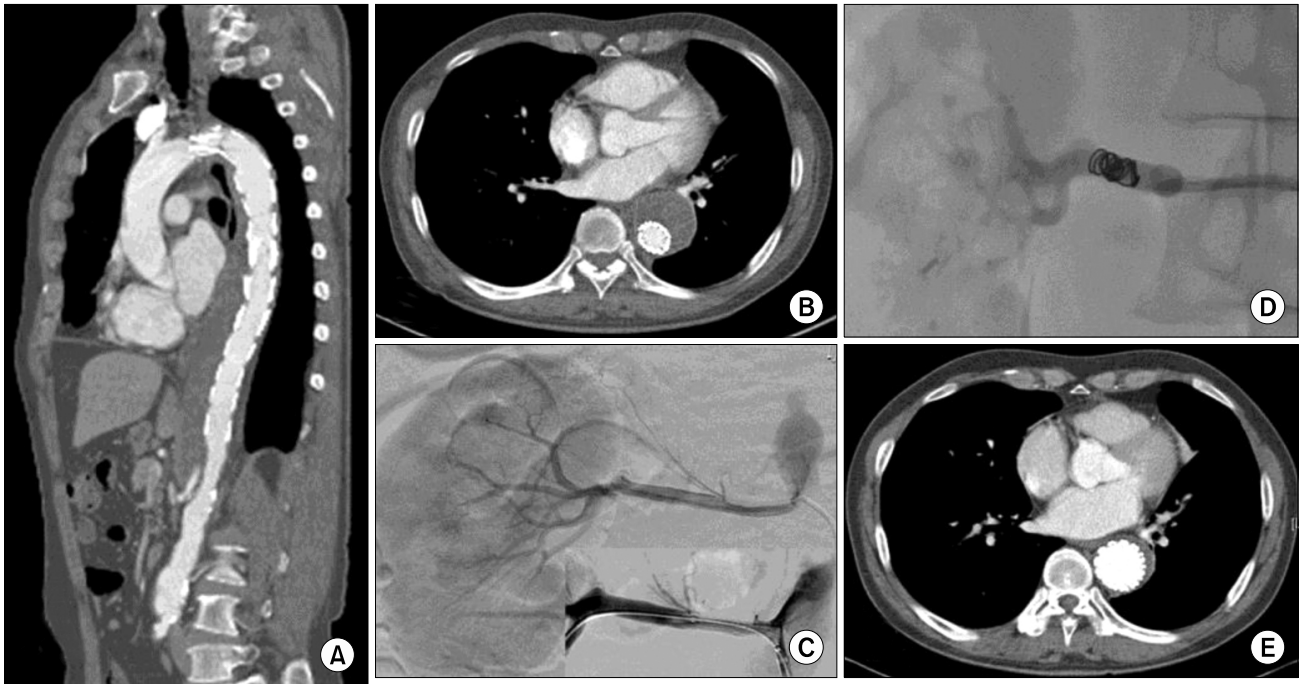


Fig. 2. (A) Zone 3 thoracic endovascular aortic repair (TEVAR) in the supraceliac trunk. (B) Complete thrombosis in the false lumen. (C) A re-entry tear at the origin of the right renal artery (top). A Viabahn stent graft (6 mm diameter, 25 mm length; W.L. Gore & Associates, Flagstaff, AZ, USA) was inserted into the right renal artery (bottom). (D) Total ablation of the right renal artery using a mixture of 99.9% ethanol (9 mL) and lipiodol (1 mL) together with coil embolization. (E) A computed tomography scan taken 11 months later, showing favorable aortic remodeling with a decreased aortic diameter and resorption of the thrombosis of the false lumen.

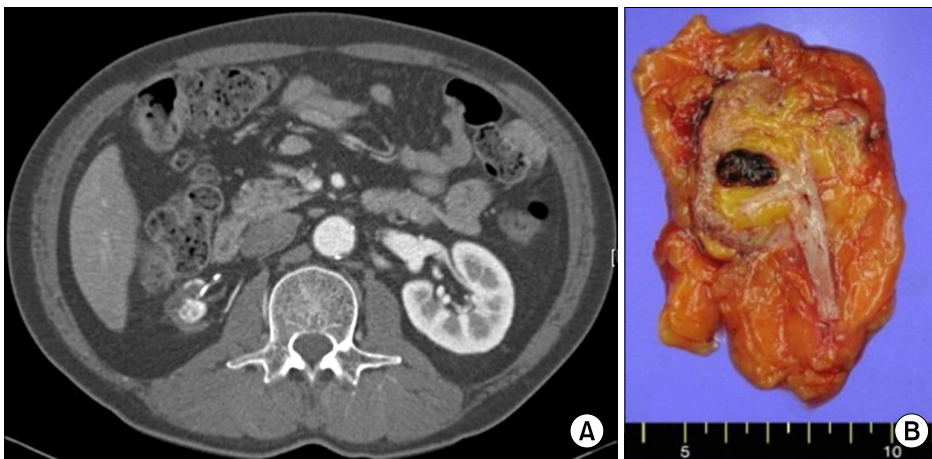


Fig. 3. (A) Computed tomography scan showing an atrophied right kidney containing a renal tumor with a decreased diameter of 16 mm. (B) Gross finding after en bloc radical nephrectomy.

DISCUSSION

Endovascular treatment has emerged as an effective and acceptable treatment with lower mortality and morbidity rates than open surgery [1-4]. However, controversy surrounds the TEVAR of complicated chronic (>three months duration) DeBakey type IIIb aneurysms [4,5]. In this case, surgical in-

tervention was performed on a patient in whom the diameter of the thoracic aorta had increased 5–10 mm or more per year [3,4]. Covering the primary and proximal tears with a stent graft can induce FL thrombosis and regression, expansion of the TL, and aortic remodeling, which prevents the abdominal aorta from dilating further [1,4]. In chronic aortic dissection, the presence of a rigid and thickened intimal flap

and multiple entry tears can adversely affect FL dilation [2-4]. Failure of the TL to re-expand after a stent graft is deployed usually occurs due to distal entry tears that pressurize the FL, potentially resulting in progressive dilation with possible aneurysm formation and rupture [1,4].

The present case report confirms that the presence of re-entry tears requires supplementary treatment, because continuous flow between the FL and TL is responsible for aneurysmal progression. However, one-step stent graft insertion from the descending thoracic aorta to the superior mesenteric artery may result in spinal cord ischemia due to occlusion of the lumbar arteries. The presence of persistent distal perfusion in the visceral branches through the FL, along with infrarenal aortic enlargement, required a staged procedure [3,5]. In order to preserve the flow of the lumbar arteries, TEVAR should first be performed from the descending thoracic artery to the supraceliac region. After one month, a secondary intervention involving stent graft insertion in the right renal artery in order to seal the re-entry tear resulted in thrombosis of the entire FL and favorable aortic remodeling.

In addition, total ablation of the right kidney using a 99.9% ethanol mixture and coil embolization was performed. The initial CT scan revealed a renal cystic lesion with fine calcifications and septation. The Bosniak category IIF lesions were defined as slightly more complicated cysts with minimal wall thickening or thin septa, and required a serial imaging study because of the relatively low malignancy rate (approximately 5%) in surgically treated lesions [6]. The patient in the present case underwent an additional follow-up study to confirm that the cysts remained stable and benign. A previously existing complicated cyst became a renal tumor suspicious for RCC in the right kidney. RCC is the most common renal malignancy, accounting for approximately 90% of cases. Active surveillance is recommended for the treatment of small renal masses (<4 cm) [7]. Although radical nephrectomy remains the standard treatment for cT3 tumors, which show invasion into the hilum and sinus fat, this patient was unfit for surgery due to significant co-morbidities, including the presence of an aortic aneurysm. We decided to perform a selective renal artery embolization that resulted in

the successful palliative treatment of RCC. However, a follow-up CT scan seventeen months after embolization revealed the recurrence of RCC with growth of the renal mass. Surgery was necessary to prevent potential metastasis.

In conclusion, endovascular stent grafts for chronic DeBakey type IIb aneurysms are an attractive alternative treatment. Endovascular treatment covering both the primary tear and re-entry tear can induce complete FL thrombosis and favorable aortic remodeling. In the presence of comorbidities such as RCC, additional concomitant use of ethanol and coil embolization may prove to be a useful therapeutic option and play the role of a bridge to surgery.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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