



## Forgotten Stories of the First Fenestrated Endovascular Aneurysm Repair in Human Performed in 1995 and Published in 1996

Seung-Kee Min<sup>1</sup> and Jin Wook Chung<sup>2</sup>

<sup>1</sup>Division of Vascular Surgery, Department of Surgery and <sup>2</sup>Department of Radiology, Seoul National University College of Medicine, Seoul, Korea

“Every time you are tempted to react in the same old way, ask if you want to be a prisoner of the past or a pioneer of the future.”  
- Deepak Chopra -

Endovascular aneurysm repair (EVAR) is a game changer in the treatment of abdominal aortic aneurysm (AAA). This has led to a paradigm shift, and more than 70% to 80% of AAA patients are currently treated by EVAR [1]. In March 2020, Ivancev and Vogelzang [2] wrote an editorial in *Eur J Vasc Endovasc Surg* entitled “A 35 year history of stent grafting, and how EVAR conquered the world”. They described in a precise and elegant manner the moment when stent grafts were invented for AAA treatment and the consecutive developments by citing many innovative researchers, including doctors Volodos and Parodi.

However, they described shortly with only one phrase: “The first report on the use of a fenestrated stent graft came from interventional radiologists from South Korea in 1996.” Unlikely mentioning the inventors and pioneers in full names with detailed works, this sentence seemed to be too short. They also described that the first fenestrated endovascular aneurysm repair (FEVAR) to a renal artery was performed in Australia in 1998. Unfortunately, these are not true; two inaccuracies need to be corrected. Fact 1 is that the first FEVAR was performed not only by interventional radiologists, but also by a multidisciplinary team including vascular surgeons and interventional radiologists. Fact 2 is that the first FEVAR to a renal artery was performed in Seoul, 1996, not in Adelaide, 1998.

Because of some language barriers and cultural differences, the story of this world’s first FEVAR performed in South Korea is not well known. Therefore, we would like to describe this in detail. Professor Sang Joon Kim was a vascular surgeon, and Professor Jae Hyung Park was an interventional radiologist at Seoul National University Hospital, both of whom were our mentors. They were classmates who cooperated in all aspects and pioneered the specialties at Seoul National University Hospital, one of the best hospitals and training centers in Korea (Fig. 1).

They published their first cases of FEVAR in *J Vasc Interv Radiol* in 1996 [3], entitled “Fenestrated stent-grafts for preserving visceral arterial branches in the treatment of abdominal aortic aneurysms: preliminary experience”. They reported 2 cases of FEVAR. The procedures were performed

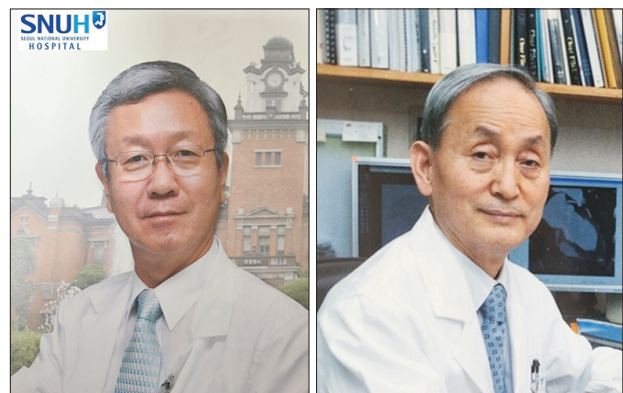


Fig. 1. Professors Sang Joon Kim, a vascular surgeon (left), and Jae Hyung Park, an interventional radiologist (right).

**Corresponding author:** Seung-Kee Min, Division of Vascular Surgery, Seoul National University Hospital, 101 Daehak-ro, Jongno-gu, Seoul 03080, Korea

Tel: 82-2-2072-0297, Fax: 82-2-766-3975, E-mail: skminmd@snuh.org, <https://orcid.org/0000-0002-1433-2562>

Copyright © 2020 The Korean Society for Vascular Surgery

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Vasc Specialist Int 2020;36(4):203-206 • <https://doi.org/10.5758/vsi.203641>

in the angiosuite via femoral cutdown under general anesthesia (Fig. 2).

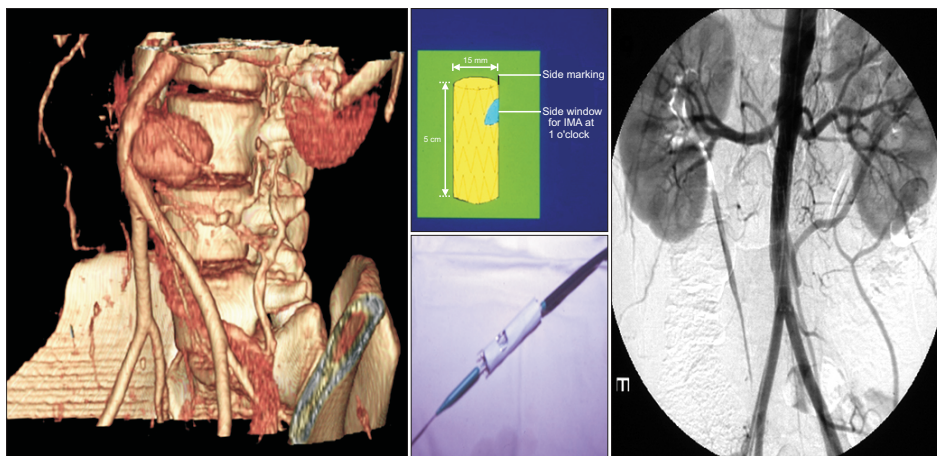
The first case was a 49-year-old man with Behcet dis-



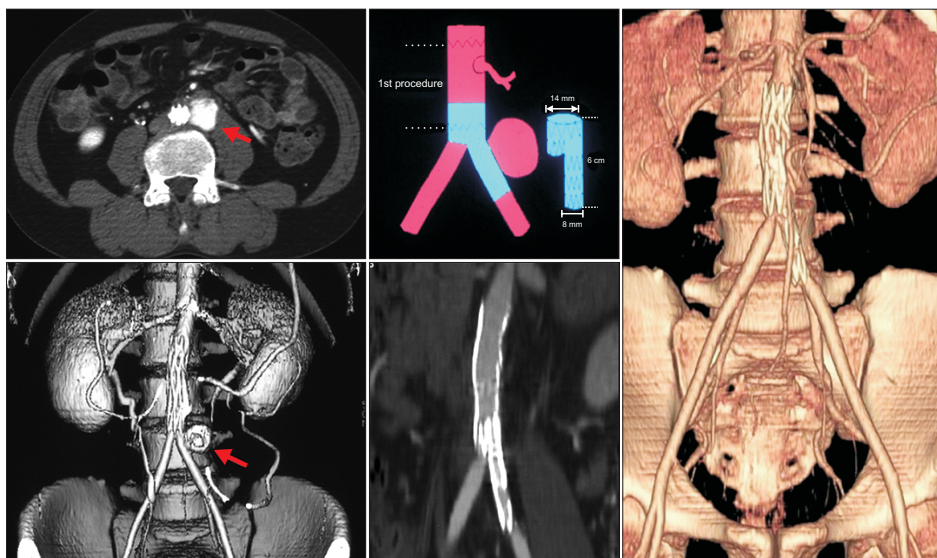
**Fig. 2.** Professors Park and Kim were performing endovascular aneurysm repair in 1990.

ease. He presented with a pseudoaneurysm at the distal aorta, and open repair with a patch angioplasty was performed successfully. However, 10 months later, a new anastomotic pseudoaneurysm developed at the posterior aspect of the distal aorta at the level of the inferior mesenteric artery (IMA). Because it was difficult to perform a reoperation and it carried a risk of recurrence, endovascular repair was attempted. The superior mesenteric artery was already occluded due to vasculitis, and preservation of the IMA was important. Therefore, they designed a FEVAR with a fenestration to the IMA. The stent-graft consisted of modified Gianturco stents and polytetrafluoroethylene graft, and the fenestration was made on the back table at the 1 o'clock position, and the procedure was performed successfully as planned (Fig. 3). Unfortunately, one year later, the patient suffered from a recurrent pseudoaneurysm at the aortic bifurcation just distal to the previous stent graft. A bifurcated stent graft was designed and deployed successfully (Fig. 4).

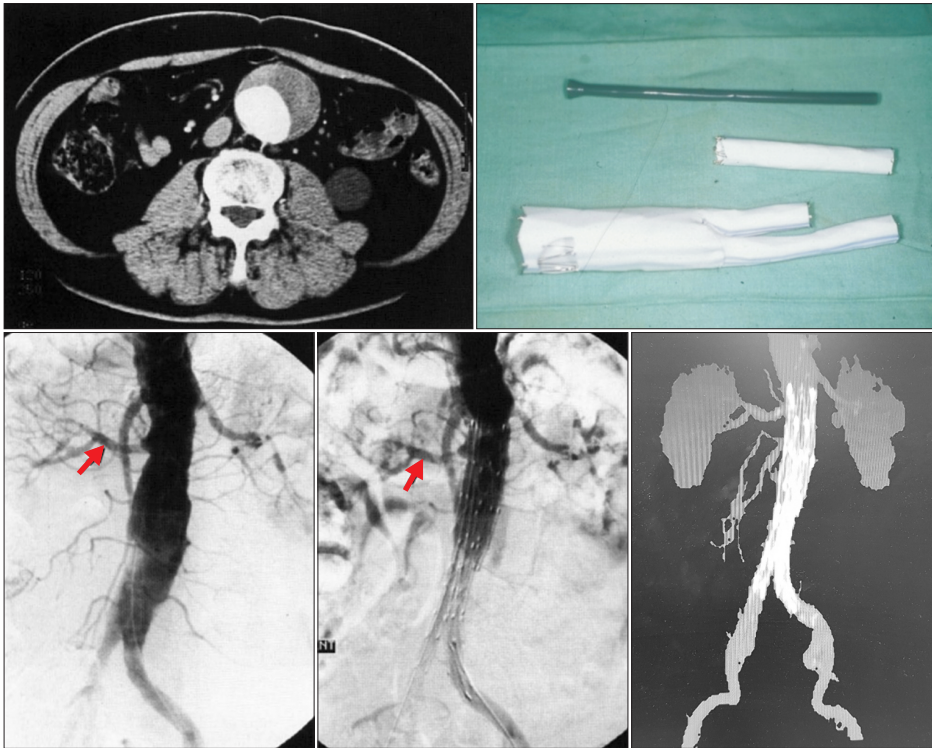
The second case was a 72-year-old man with a 5.5-cm



**Fig. 3.** The first fenestrated stent-graft to the inferior mesenteric artery was deployed to exclude aortic pseudoaneurysm in a patient with Behcet disease in December 19, 1995.



**Fig. 4.** A pseudoaneurysm recurred at the distal end of the previous endograft (red arrow). A new bifurcated endograft was deployed to exclude the pseudoaneurysm while preserving bilateral iliac perfusion.



**Fig. 5.** The first fenestrated stent-graft to a renal artery (red arrow) was designed and deployed successfully. Computed tomography after 2 months showed patent right renal artery and excluded aortic aneurysm.

asymptomatic AAA. Because he had undergone coronary artery bypass and had dilated cardiomyopathy, EVAR was selected. However, the proximal neck was short, 5-mm from the right renal artery. Therefore, right renal fenestration was made on the back table, and FEVAR was successfully performed as planned (Fig. 5). The patient survived for 43 months without any leakage and died of ischemic cardiomyopathy. Although the FEVAR design was not the same as what we are doing currently and no bridging covered stent was used, the result was excellent.

These cases have some lessons. It reminds us of the old medical idiom of “Publish or perish.” Even if a story is forgotten, it can be remembered later on because of its previous report. We firmly believe that this novel procedure and its technical report have opened the history of FEVAR and inspired many vascular specialists to try and design novel techniques.

Recently in the annual symposium of the Asian Society for Vascular Surgery 2020 held virtually in Seoul, South Korea, I gave a small talk entitled “Publish or perish; most undervalued vascular surgeon in the history”. Radial-cephalic arteriovenous fistula (RC-AVF) for hemodialysis was a great paradigm shift and has become the treatment of choice for vascular access for hemodialysis. The operation was usually called “Brescia-Cimino fistula”. Interestingly, both doctors are nephrologists, and the vascular surgeon who performed the first RC-AVF was Dr. Kenneth Charles Appell. It is strange that an operation name is not coined by the sur-

geon who invented and first performed the operation. It is time to correct this misnomer, and I insist on calling it Appell fistula or the more scientific term, RC-AVF. Dr. Appell is one of the most undervalued vascular surgeons in history [4]. Professors Kim and Park are also undervalued vascular surgeon and interventional radiologist in the history of EVAR. We hope that this editorial can provide some insight to vascular specialists around the world about the forgotten pioneers in this field.

## ACKNOWLEDGEMENTS

We appreciate Professors Emeriti Sang Joon Kim and Jae Hyung Park of Seoul National University Hospital for their pioneered works, mentorship of the authors, and critical revision of the article.

## CONFLICTS OF INTEREST

Seung-Kee Min has been the editor-in-chief of Vasc Specialist Int since 2019.

## ORCID

Seung-Kee Min  
<https://orcid.org/0000-0000-1433-2562>  
 Jin Wook Chung  
<https://orcid.org/0000-0002-1090-6872>

---

## REFERENCES

---

- 1) Choi C, Ahn S, Min SI, Ahn M, Ha J, Yoon HJ, et al. Nationwide epidemiologic study of abdominal aortic aneurysms in Korea: a cross-sectional study using National Health Insurance Review and Assessment Service data. *Vasc Specialist Int* 2019;35:193-201.
- 2) Ivancev K, Vogelzang R. A 35 year history of stent grafting, and how EVAR conquered the world. *Eur J Vasc Endovasc Surg* 2020;59:685-694.
- 3) Park JH, Chung JW, Choo IW, Kim SJ, Lee JY, Han MC. Fenestrated stent-grafts for preserving visceral arterial branches in the treatment of abdominal aortic aneurysms: preliminary experience. *J Vasc Interv Radiol* 1996;7:819-823.
- 4) Brescia MJ, Cimino JE, Appel K, Hurwicz BJ. Chronic hemodialysis using venipuncture and a surgically created arteriovenous fistula. *N Engl J Med* 1966;275:1089-1092.