A woman in her 80s with a medical history of hypertension and an infrarenal aortic aneurysm was scheduled for endovascular aortic repair (EVAR). The aneurysm had a severely angulated neck (SAN), and the Zenith Flex device was selected. Completion angiography showed migration of the main body resulting in right renal artery stenosis. A Palmaz genesis was placed across the renal orifice. The patient had no renal dysfunction and was discharged 7 days after EVAR. If Zenith Flex devices are used for a SAN, it is necessary to consider not only the position of the renal artery but also the appropriate position of the stent-graft.

Keywords: Zenith flex, migration, severely angulated neck

Introduction

The Zenith device (Cook, Inc, Bloomington, IN, US) has been widely used for endovascular aortic repair (EVAR) and has obtained excellent midterm outcomes.\(^1\)\(^-\)\(^3\) Although migration of the Zenith device at the distal site after EVAR is known to be caused by morphologic changes due to an angulated distal neck,\(^4\) migration at proximal sites during or after EVAR is uncommon.

A case of an infrarenal aortic aneurysm with a severely angulated neck (SAN), in which migration of the Zenith Flex device occurred during EVAR and resulted in renal artery stenosis, is presented. The cause of migration is discussed, paying attention to the relationship between the characteristics of the Zenith Flex device and the SAN.

Case Report

A woman in her 80s with a medical history of hypertension and an infrarenal aortic aneurysm was scheduled for EVAR. Contrast-enhanced computed tomography (CECT) showed a fusiform aortic aneurysm with a maximum short diameter of 68 mm. Proximal neck (PN) diameter was 20 mm, PN angulation was 110°, and PN length was 35 mm (Fig. 1). A Zenith Flex device was selected because of the SAN.

Under general anesthesia, the main body (TEFB 26-96-ZT) was deployed just below the right renal artery via the right femoral artery (Fig. 2a). Then, the ipsilateral leg (TELE 12-73 ZT) and the contralateral leg (TELE 18-73 ZT) were placed into the bilateral common iliac arteries, respectively. Completion angiography showed right renal artery stenosis, thought to be due to migration of the stent-graft (Fig. 2b). A 6F guiding sheath (Parent Plus, Medikit Co., Tokyo, Japan) was inserted via the left brachial artery. The right renal artery was cannulated, and a 6 mm x 18 mm Palmaz genesis (Cordis) was placed across the renal orifice without residual stenosis.

The patient had no renal dysfunction and was discharged 7 days after EVAR.

Discussion

An important technical issue was identified in this case. The Zenith Flex device can migrate at proximal sites in an aneurysm with a SAN. To the best of our knowledge, this has not been previously reported.

Though a hostile neck including a SAN is known to be associated with a high risk of migration,\(^5\)\(^-\)\(^6\) a EUROSTAR study showed no relationship between migration of the stent-graft and the presence of a SAN.\(^6\) Moreover, a recent report also showed no migration at the proximal...
Therefore, we focused on the characteristics of the Zenith Flex device and the morphology of the proximal neck to explain this phenomenon.

To improve flexibility over the previous model, the Zenith Flex device was modified to have a widened longitudinal dimension between rows of Z-stents. However, compared to other devices such as the Excluder, Endurant, or Aorfix devices, the Zenith Flex is the only device that has a Z-stent, and its flexibility is not superior to other devices.

In this case, although the longitudinal dimension between the rows of Z-stents was below a flexure of the aorta just after main body deployment (Fig. 2a), the longitudinal dimension between the rows of Z-stents and the flexure were fitted and resulted in upward migration of the proximal stent graft, resulting in renal artery stenosis (Fig. 2b). Furthermore, there was a thick wall and narrowing at the flexure of the aorta that can cause migration due to a compressed Z-stent. The flexure of the aorta is usually associated with a narrowing of the diameter. This phenomenon is shown schematically in Fig. 3.

Therefore, the combination of a discrepancy in the longitudinal dimension between the rows of Z-stents and the flexure of the aorta with a narrowing of the diameter and a thick wall can result in upward migration of the stent-graft. If it is thought that a suitable position of the Zenith Flex cannot be obtained based on preoperative CECT, other devices should be considered.

**Conclusion**

If the Zenith Flex device is used for a SAN, it is necessary to consider not only the position of the renal orifice but also the fit of the stent-graft in an angulated aorta.
Disclosure Statement

There are no conflicts of interest that could influence this study.

Author Contributions

Study conception: YO, HN
Data collection: YO, KM, KC, YS
Analysis: YO, HN, TM, YN
Investigation: YO, KM, KF
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References


