



Images in
Cardiovascular Medicine



Successful Direct Iliac Transcatheter Aortic Valve Implantation to Overcome Significant Tortuosity of the Thoracic Aorta

Umihiko Kaneko , MD¹, Ken Kobayashi, MD¹, Daisuke Hachinohe , MD¹, Satoshi Sumino, MD², Azusa Furugen, MD¹, Takeshi Kawamura, MD³, Hirosato Doi, MD², and Tsutomu Fujita, MD¹

¹Department of Cardiovascular Medicine, Sapporo Cardio Vascular Clinic, Sapporo Heart Center, Sapporo, Japan

²Department of Cardiovascular Surgery, Sapporo Cardio Vascular Clinic, Sapporo Heart Center, Sapporo, Japan

³Department of Anesthesiology, Sapporo Cardio Vascular Clinic, Sapporo Heart Center, Sapporo, Japan

 OPEN ACCESS

Received: Apr 13, 2018

Revised: Jun 27, 2018

Accepted: Jul 17, 2018

Correspondence to

Umihiko Kaneko, MD

Department of Cardiovascular Medicine,
Sapporo Cardio Vascular Clinic, Sapporo Heart
Center, North 49, East 16, 8-1 Higashi Ward,
Sapporo, Hokkaido 007-0849, Japan.
E-mail: uk434471@gmail.com

Copyright © 2018. The Korean Society of
Cardiology

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

ORCID iDs

Umihiko Kaneko 

<https://orcid.org/0000-0003-2392-5084>

Daisuke Hachinohe 

<https://orcid.org/0000-0003-4828-1836>

Conflict of Interest

The authors have no financial conflicts of
interest.

An 87-year-old woman with symptomatic severe aortic stenosis underwent transcatheter aortic valve implantation (TAVI). Multi-detector computed tomography showed a significantly tortuous descending thoracic aorta (**Figure 1A and B**). Due to the high risk of coronary obstruction and a horizontal aorta, a SAPIEN 3 (Edwards LifeSciences, Irvine, CA, USA) prosthesis via transfemoral access was considered. However, the total length of the Edwards expandable introducer sheath (eSheath, 360 mm) was not sufficient to reach the acute bend in the thoracic aorta, which measured 415 mm in length. Therefore, direct right common iliac access obtained by retroperitoneal approach was chosen to insert the eSheath beyond the acute bend of the thoracic aorta (**Figure 1C and D**). After insertion of a single stiff wire, the tip of the eSheath was successfully placed beyond the acute bend of the thoracic aorta with no resistance (**Figure 1E**). Using buddy wire technique, smooth delivery and implantation of a 26-mm SAPIEN 3 was successful without vascular complication (**Figure 1F-H**).

An extremely tortuous thoracic aorta can be a major hindrance to transfemoral access and is associated with fatal complications, such as aortic dissection or rupture.^{1,2)} Compared with advancement of bulky TAVI device, insertion of the eSheath beyond the acute bend via a direct iliac access can be easier and less traumatic due to its tapered tip and hydrophilic coating, finally yielding an excellent result. A severely calcified aorta may not be straightened even after insertion of double stiff wires. Therefore, the calcium extent and distribution of aorta will be important factors for successful sheath insertion.

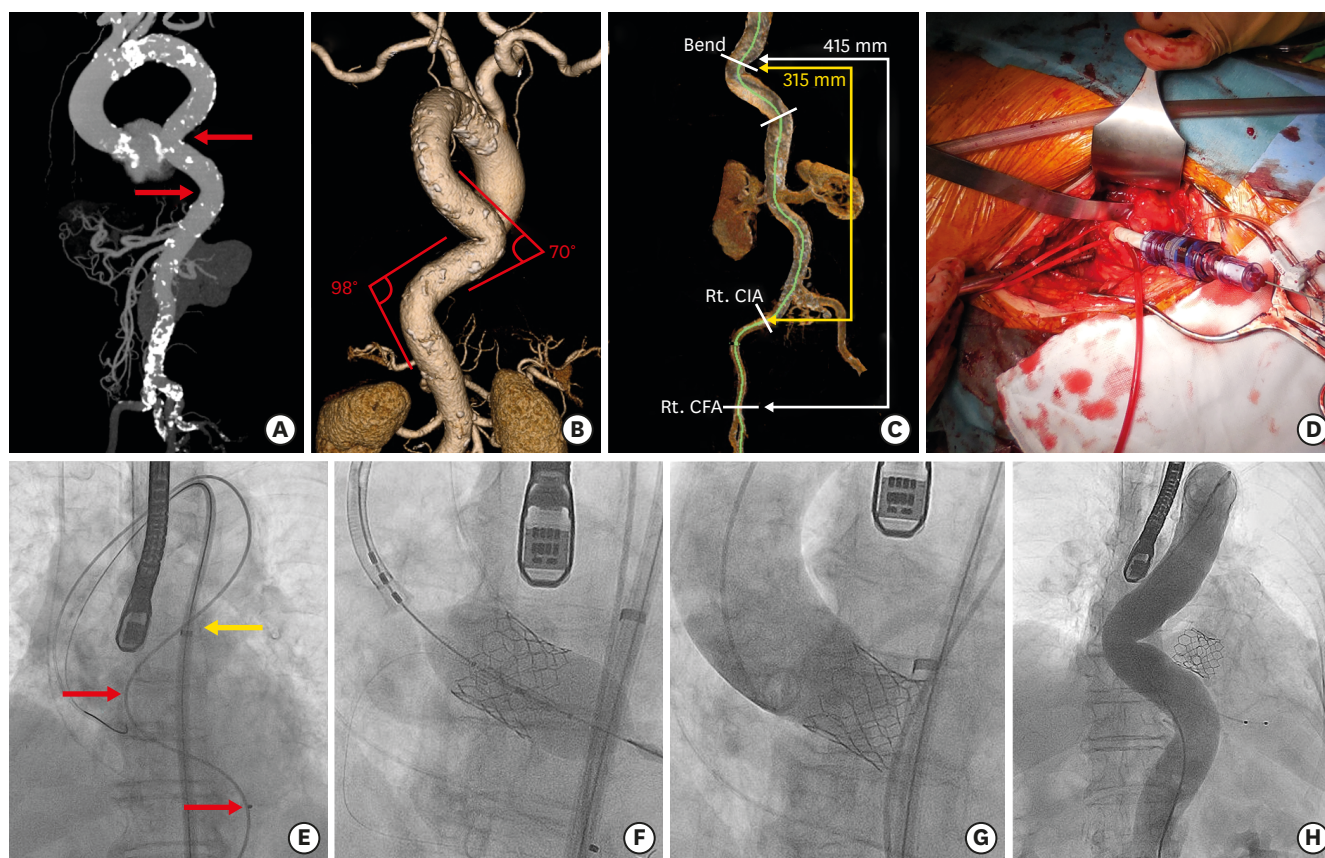


Figure 1. (A-C) Pre-procedural MDCT (A) Left anterior oblique view of maximum intensity projection showing a markedly tortuous thoracic aorta and no significant calcification around the acute bend (red arrows). (B) Posterior volume-rendering image of the aorta. (C) Volume-rendering image of the aorta showing the distance from the Rt.CFA (white bidirectional arrow) and the Rt.CIA (yellow bidirectional arrow) to the acute bend in the thoracic aorta. (D) Direct iliac approach. (E-H) Fluoroscopic images during the procedure. (E) Facilitating smooth insertion of the eSheath (yellow arrow) beyond the tortuous segment of the thoracic aorta (red arrows). (F) Successful implantation of the prosthetic valve. (G) Aortography showing trivial paravalvular leak. (H) Final aortography showing no vascular complication. MDCT = multi-detector computed tomography; Rt.CFA = right common femoral artery; Rt.CIA = right common iliac artery.

Author Contributions

Conceptualization: Kobayashi K, Hachinohe D, Furugen A, Sumino S; Formal analysis: Kawamura T; Supervision: Doi H, Fujita T; Writing - original draft: Kaneko U.

REFERENCES

1. Aminian A, Lalmand J, El Nakadi B. Perforation of the descending thoracic aorta during transcatheter aortic valve implantation (TAVI): an unexpected and dramatic procedural complication. *Catheter Cardiovasc Interv* 2011;77:1076-8. [PUBMED](#) | [CROSSREF](#)
2. de Agustin JA, Jiménez-Quevedo P, Nombela-Franco L, et al. Descending aorta rupture during transcatheter aortic valve replacement. *Circulation* 2016;133:e14-7. [PUBMED](#) | [CROSSREF](#)