Outcome of *in situ* fenestration for endovascular aortic arch repair

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Prof. Dr. PM Kasprzak
Disclosure

Speaker name:

...............................................................

I have the following potential conflicts of interest to report:

☐ Consulting

☐ Employment in industry

☐ Stockholder of a healthcare company

☐ Owner of a healthcare company

☐ Other(s)

☒ I do not have any potential conflict of interest
Aortic arch pathologies

- therapeutic options

open aortic arch repair

hybrid procedures with supraaortic debranching

chimney/periscope

TEVAR
Endovascular aortic arch repair

Global experience with an inner branched arch endograft

Stéphan Haulon, MD, PhD, Roy K. Greenberg, MD, Rafaëlle Spear, MD, Matt Eagleton, MD, Cherrie Abraham, MD, Christos Lioupis, MD, Eric Verhoeven, MD, PhD, Krassi Ivancev, MD, Tilo Kölbl, MD, PhD, Brendan Stanley, MD, Timothy Resch, MD, Pascal Desgranges, MD, PhD, Blandine Maurel, MD, Blayne Roeder, PhD, Timothy Chuter, MD, and Tara Mastracci, MD

Aortic arch *in situ* stent graft fenestration

Aim:
complete or partial endovascular aortic arch repair

**principles**

- retrograde puncture of aortic arch stent graft
- dilatation of the puncture site
- connecting covered stent graft
- antegrade perfusion of supraaortic vessels
- during intervention: extraanatomic supraaortic perfusion
Endovascular total aortic arch replacement by in situ stent graft fenestration technique

Björn Sonesson, MD, PhD, Tim Resch, MD, PhD, Mats Allers, EBCP, and Martin Malina, MD, PhD, Malin Å, Sweden

Fig 1. Rupture of the arch on axial computed tomography (CT) image.

Fig 2. A diagram of the shunt circuit.

Fig 3. After the hole has been dilated with a cutting balloon, it is possible to pass a nephrostomy introducer and exchange for a 0.035 Amplatz wire. A 7F flexor sheat is advanced through the hole and a balloon-expandable stent is deployed. This is shown for the left carotid artery. The arrow shows the undeployed balloon-expandable stent in the brachiocephalic trunk with the introducer withdrawn.
Aortic arch aneurysm

in situ fenestration (transcarotid)
Endovascular Aortic Arch Reconstruction Using In Situ Stent-Graft Fenestration in the Brachiocephalic Artery

Norio Hongo, MD, Shinji Miyamoto, MD, Rieko Shuto, MD, Tomoyuki Wada, MD, Shunro Matsumoto, MD, Hiro Kiysue, MD, and Hiromu Mori, MD

CASE REPORT

Figure 2. Schematic drawing of in situ fenestration. (a) The 10-F sheath is positioned through the conduit of the right subclavian artery adjacent to the stent-graft, which is followed by graft puncture using the 20-gauge needle. (b) The obturator of the needle is withdrawn and replaced with a 0.018-inch wire, over which a dilator is advanced, followed by dilation of a 4-mm balloon. (c) The 0.018-inch wire is replaced with a 0.035-inch wire using a 5-F angiographic catheter, and the hole is dilated with a 12-mm balloon. (d) A 12-F sheath is delivered across the fenestration, and the stent-graft (12 mm in diameter and 7 cm in length) is positioned. Deployment is completed by subsequent dilation with a high-pressure balloon to optimize alignment of the fenestration with the target vessel. (Available in color online at www.jvir.org.)

J Vasc Interv Radiol. 2011, 22(8):1144-8
**Aortic arch *In-situ* fenestration**

- patients treated/published (zone 0/1)

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Results:

2009–2015:
14 patients treated
   7 different institutions

in situ fenestrations
- brachiocephalic trunk (n=12)
- LCCA (n=11) and the
- LSA (n=6)

technical success for intended in situ fenestrations was 93.5 % (29/31)
with additional supraaortic bypass procedures performed in 7 patients.

no persistent Typ I or III endoleak, no perioperative mortality.
14.3 % cerebrovascular events.

outcome (new data, 11 patients):
follow-up (1-60 mo): 4 patients died,
unrelated to their aortic arch pathologies
2 endovascular aortic reinterventions, no conversion
mean survival time: 33.8 ± 8.3 months, 2 year survival: 71.4 %
Aortic arch in-situ fenestration

AARCHIF registry

multicenter observational study

please contact
genfaess.chirurgie@ukr.de or ktd-tmd@umin.ac.jp
Aortic arch *in-situ* fenestration

- is an additional endovascular option
- for selected indications
  - suitable aortic anatomy
- when other options are not indicated
Aortic arch - in situ stent graft fenestration

Methods

- wire, sheath
- needle 18 G, 21 G
- catheter, puncture set

- micropuncture introducer Set (21 G, .018´´)
- access needle CAN 18 G / 10 cm /18 cm
- TIPS puncture set
- bronchoscopy needle MW319

laser catheter
radiofrequency catheter

dilatation
3 / 5 / 6-8 mm (high pressure, cutting balloon)

connecting stent graft
(balloon-, self expandable)
Experimental Evaluation of Complete Endovascular Arch Reconstruction by In Situ Retrograde Fenestration

Ludovic Canaud, MD, PhD, Elsa Madeleine Faure, MD, Pascal Branchereau, MD, Baris Ata Ozdemir, BS, MRCS, Charles Marty-Ané, MD, PhD, and Pierre Alric, MD, PhD
Department of Thoracic and Vascular Surgery, Arnaud de Villeneuve Hospital, Montpellier; and INSERM U 1046, Montpellier, France

Fig 3. No tearing of the graft material was observed, and the gross integrity of the fabric was always maintained. Endograft material had no impact on the quality of fenestrations: (A) expanded polytetrafluoroethylene versus (B) woven polyester.
*in situ* stent graft fenestration for aortic arch repair

*In situ* stent-graft fenestration to preserve the left subclavian artery.


Figure 4: Follow-up axial CT at the level of the *in situ* fenestration shows the Jomed stent-graft passing through the thoracic stent-graft near the center of the first stent.
“Squid-Capture” Modified In Situ Stent–Graft Fenestration Technique for Aortic Arch Aneurysm Repair

Hongo N et al. 2014
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