Chimney endovascular aneurysm sealing (ch-EVAS) for ruptured abdominal aortic aneurysms (AAA) due to type Ia endoleak following failed EVAS

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Disclosure

Speaker name:
Dr. Saritphat Orrapin

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
Background

• Currently, the Nellix EVAS System (Endologix Inc, Irvine, CA, USA) is a modern approach to standard endovascular aneurysm repair (EVAR) including
  • Elective and Emergency (ruptured) infrarenal AAA repair.¹⁻³

• Recent data report EVAS outside of indication for use (IFU) demonstrates early feasibility and efficacy in unfavorable neck anatomies.⁴

1. Reijnen et al. J Endovasc Ther. 2015
2. de Bruin et al. J Endovasc Ther. 2015
However, EVAS system in unfavorable neck anatomies may lead to type la endoleak with potential aneurysm sac rupture.\textsuperscript{1-3}

Previous data reported successful EVAS to treat post-EVAR complications including proximal type la endoleak.\textsuperscript{4-6}

However, the using of EVAS system to treat post-EVAS complications with aneurysm sac rupture is not well established.\textsuperscript{7}

\begin{itemize}
\item 1. Hughes et al. \textit{J Endovasc Ther}. 2015
\item 2. van den Ham LH et al. \textit{Eur J Vasc Endovasc Surg}. 2017
\item 3. Thompson et al. \textit{J Endovasc Ther}. 2016
\item 5. Jonker and Zeebregts. \textit{J Endovasc Ther}. 2015
\item 6. Hughes et al. \textit{J Endovasc Ther}. 2015
\item 7. Zoethout AC et al. \textit{J Vasc Interv Radiol}. 2016
\end{itemize}
Aim

- To demonstrate the use of Chimney endovascular aneurysm sealing (Ch-EVAS) for corrected type Ia endoleak with sac rupture in post-EVAS patient.
Case report

A 69-year-old male presented with acute abdominal pain and 7 cm of impending rupture AAA.

- Proximal Aortic neck
  - angulation 85°
  - length 10 mm
  - diameter 24 mm

- Severe stenosis of Lt renal a. orifice
Case report

- Nellix EVAS stents graft were used to excluded aneurysm, percutaneously.
- 180 mmHg of endobag pressure (220 ml of Polymer volume fill in endobag)
Case report

- Completion angiogram
  - not seen endoleak
  - Appropriate stent graft position.

- Patient loss to follow-up for 1 month visit.
Case report

Next 2 months:
- Patient re-visited to ED with acute abdominal pain and anemia

CT Angiogram:
- Caudal migration of Rt. Nellix stent graft with type Ia endoleak began at Rt. stent graft extending to aneurysm sac with retroperitoneal hematoma.
- Lt. renal a. occlusion with atrophic left kidney
Case report

To treat type Ia endoleak with aneurysm sac ruptured: Ch-EVAS

- Percutaneous puncture under US guide
  - Lt. proximal and distal brachial a.
  - Bilateral CFA
- Local anesthesia
- Prevent induction of general anesthesia (GA) induced loss of tamponade effect

(abdominal muscles relaxation and loss of sympathetic tone)
1. After Angiogram to identified type Ia endoleak, wire insertion to abdominal aorta via Lt. CFA and brachial a.

2. After General anesthesia: Rt renal a. and SMA were selected by 0.035” hydrophilic wire and exchange to Rosen guidewire

3. 6 Fr guiding sheath (90 cm) insert to Rt renal a. and SMA orifice
Ch-EVAS with proximal extension by Nellix-in-Nellix

1. Bilateral insertion of 100 mm Nellix stent grafts via CFA.

2. Chimney graft (BeGraft peripheral stent graft system) 6 x 58 mm and 6 x 38 mm were inserted to Rt renal a. and 8 x 57 mm were inserted to SMA via guiding sheath.
1. The Nellix-in-Nellix to proximal extension 3 cm above previous stent and 2 cm proximal to neck of aneurysm.

2. Prefill endobag of Nellix stent graft by saline at 180 mmHg of endobag pressure and expand Chimney stent grafts simultaneously.

(Contrast added in saline to allow visualization of endobag and estimated volume of polymer)
Ch-EVAS with proximal extension by Nellix-in-Nellix

1. On prefill endobag expansion, Angiogram not seen endoleak type Ia.

2. The endobag was aspirated and refill by polymer at 180 mmHg of endobag pressure and secondary filling of endobag was performed to maintain endobag pressure bilaterally
   - 20 ml of polymer fill in endobag
Completion angiogram

- The type Ia endoleak was no longer seen with good perfusion to Chimney grafts.
- All access site were closure by ProGlide Closure Device
A 1-month post-op CTA scan and 3-month post-op DUS demonstrated successful resolution of the endoleak and continuing patency of chimney stent-grafts without stent migration.
Conclusion

• Ch-EVAS with proximal extension by Nellix-in-Nellix to treat type Ia endoleak appears feasible in short-term results.

• The endobag can filled in space between gutter of aortic stent and chimney stent graft to achieved the type Ia endoleak.

• However, long-term follow-up is necessary to determine efficacy of this procedure.
Conclusion

- For outside IFU including severe neck angulation and short neck anatomies, Ch-EVAS may be an effective choice of treatment.

- For rAAA, Ch-EVAS with percutaneous access under local anesthesia as initially appears safe for stable patients.
Thank you

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