When are parallel grafts the best way to preserve hypogastric flow with common iliac aneurysms

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Guideline’s Recommendations
Preservation of flow to at least one hypogastric artery is recommended in standard risk patients. Level 2c. Recommendation B.

Hypogastric preservation techniques
1. Iliac branch devices
2. External-Internal surgical Bypass
3. External-Internal endo-bypass (banana technique)
4. Bell bottom technique (?)
5. EAS technique (?)
6. Parallel endografts (Sandwich technique)
Itoga NK, et al. Circ J. 2017

- Adjunctive procedure to EVAR in order to extend distal sealing to the EIA but preserving flow to the IIA
- Compared with IBD:
  - Less anatomical limitations
  - Immediate availability
  - Easier procedure (?)
  - Less evidence
- Off-the-shelf devices side-to-side (parallel stenting technique) to create a tailored bifurcated component
  - Higher Risk of type III endoleak (gutters)
- Higher internal iliac patency rates (≈94% at 12 months)
- No major complications
- Low endoleak rate (≈2.5%)
**Sandwich-graft technique**

**Modified technique**

- **Proximal graft:** sealing zone
- **Chimney segment:** providing inflow
- **Distal graft:** providing sealing
  - \( b = a + 30\% \ a \)
- **Sandwich segment:** overlapped between grafts
- **Free segment:** connecting to iliac arteries

*Minimum 2.5 cm when using Aorfix™ graft*

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**Aim**

Contribute to the standardization by answering the following questions

- 1. How to calculate Oversize (OS) (areas, perimeters, diameters…)?
- 2. Which oversize (OS) should be applied to reduce gutters?
- 3. Which are the best types of parallel stent-grafts?

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**Materials and Methods**

- CIA (A): Reinforced silicon tube (10, 12, 14, 16, 18mm)
- IIA (B): 8mm Advanta/V12 or 8mm Viabahn
- EIA (C): 16mm Endurant or 12mm Aorfix or 11 and 13mm Viabahn

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**Materials and Methods**

- All combinations were introduced in a 37°C saline bath
- Both parallel-stents were simultaneously dilated (kissing ballooned)
- CT scan was performed

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Parallel-Stenting Technique in a Sandwich Configuration for Hypogastric Artery Preservation during Endovascular Aneurysm Repair: An In Vitro Study.

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In vitro iliac Sandwich procedure model

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Materials and Methods

Parameters

1: Gutters or gaps (mm²)
2: Parallel stent compression (%)
3: Malpositioning / Infolding (y/n)

Oversize calculation methods

\[
\text{Area OS} = \pi r^2
\]

\[
\text{Perimeter OS} = 2\pi r
\]

\[
\text{Diameter OS} = \frac{2}{\pi}
\]

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Results

1. Oversizing calculation methods

- Diameter OS – Perimeter OS:
  correlation coefficient 0.998, P < 0.001
- Diameter OS – Area OS:
  correlation coefficient 0.997, P < 0.001

Spearman’s rho

All OS methods were highly correlated so... Diameter OS was used!

2. OS rate: Gutters / Compression / Infolding

Increasing OS = Less gutters but more stent compression and infolding!

3. Devices: Gutters / Compression / Infolding

No EIA stent was significantly related to higher or lower infolding, gaps, IIA or EIA stent compression (backward linear regression, P < 0.005 for all variables).
• Preservation of at least one internal iliac artery is recommended whenever it is feasible.

• Parallel or sandwich technique is a good alternative when IBDs are not technically possible or not able.

• Total EIA + IIA stentgraft diameter should represent a 30-55% oversize related to the iliac limb to avoid compression, infolding and gutter issues.

• No clear superiority is identified among different types of stent-graft combinations.