

Perigraft Seroma After ePTFE Lower Extremity Arterial and Aortic Grafts: Frequency, Etiology When Do They Need to be Treated and How

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Disclosure

- Educational grants from W.L. Gore & Associates ; Terumo Aortic
- Speaker for Endospa

Background

Perigraft hygroma (PGH)

- Collection of sterile fluid
- > 3 months postop
- Hounsfield unit < 30
- Ultrafiltration of acellular, protein rich serum components through ePTFE, polyester and vein

Blumenberg et al *Surgery* 1985;97:194
Ahn et al *Am J Surg* 1987;154: 173

Background: Varying fluid consistency

Clear

Semisolid, gelatinous proteinaceous

Background

May occur after any vascular reconstruction

- AV Graft
- Aortic repair
- Ax-Fem
- Fem-Fem
- Fem-Pop

Etiology

Patient-related	Graft-related
<ul style="list-style-type: none"> Host versus graft reaction Immunoallergic reaction Hyperfibrinolysis with repetitive bleeding, coagulation, and liquefaction Malnourishment Low Hemoglobin Genetic predisposition 	<ul style="list-style-type: none"> Premature wetting of the graft with blood, fat, organic solvents (alcohol, antibiotics): hydrophobic surface becomes hydrophilic Excessive graft manipulation / forced irrigation High-flow (> 1L/min) Graft kinking: 41% increase in leakage

Fibroblast inhibition, Ultrafiltration & Poor Graft Incorporation

Prevention

- Avoid
 - Graft wetting with alcohol, betadine, serum, liquefied fat, or blood.
 - Stretching of the graft
 - Angulation or bending
 - Excessive handling of the graft
 - Forced irrigation
- Use protective sheath for atraumatic tunneling
- Remove venous/distal clamp first to avoid rapid filling and pressurization of the graft with blood

Frequency

Difficult to estimate:

- Early: confused with Hematoma
- Late: detected only when symptomatic


Non-Aortic

- Fem-Pop: 2% (38 studies of 1,609 procedures) van de Weijer Semin Vasc Surg 2015; 28: 112
- Extra-anatomic (ax-fem; fem-fem): ~ 4%. Ahn et al Am J Surg 1987; 154: 173

Frequency

Open Aortic Reconstruction

- Thought to be low



Frequency, risk factors, and management of perigraft seroma after open abdominal aortic aneurysm repair

J Vasc Surg 2011;54:637

Ajith K. Kadkol, MD, Timothy J. Nypaver, MD, Judith C. Lin, MD, Mitchell R. Weaver, MD, Joseph L. Karam, MD, Daniel J. Reddy, MD, Georges K. Haddad, MD, and Alexander D. Shepard, MD, *Detroit, Mich*

Henry Ford Series

98 Aortic Repairs with ePTFE

- Overall frequency: 18%
- 20% ePTFE vs 0% Polyester
- 20% intervention

Frequency of perigraft hygroma after open aortic reconstruction

Alexander H. King, MS, Ravi N. Ambani, MD, Karem C. Harth, MD, Vikram S. Kashyap, MD, Norman H. Kumins, MD, Virginia L. Wong, MD, Henry R. Baele, MD, and Jae S. Cho, MD, Cleveland, Ohio

J Vasc Surg 2020;72:154

140 patients

♂ 93 (66%); ♀ 47 (44%)
Mean age: 69.3 (37-89)
AAA 127; AIOD 13

Mean Follow-up: 5.2 years (0.5-15.9)


Material	AAA	AIOD
ePTFE (88 (63%))	75	13
Polyester (52 (37%))	52	0

Results

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- Frequency of Hygroma: 16% (23/140)
 - All after AAA repair
 - ePTFE (24%, 21/88) vs Polyester (3.8%, 2/52) (P =.002)
- 14 patients had multiple CT
 - 7 stable / 1 shrinkage
 - 6 enlargement
- Symptomatic development: 17% (4/23)
 - All > 8 cm
 - 2 ruptures
 - 2 compressions

2 deaths



Frequency after EVAR

Late abdominal aortic aneurysm enlargement after endovascular repair with the Excluder device

Jae-Sung Cho, MD, Elton D. Dhillon, MD, Robert Y. Rhee, MD, and Michel S. Makarov, MD, *Frontiers* 2022

Probability of freedom from sac growth or re-expansion at 4 years was only 43%

- Led to the device modification in 2024
- Addition of low permeability layer

Objective: Behavior of the abdominal aortic aneurysm (AAA) sac after endovascular abdominal aortic aneurysm repair (EVAR) is graft-dependent. The Excluder endograft has been associated with less sac regression than some other most popular long-term deployment bare-frame endografts. Objective: To evaluate the long-term behavior of the AAA sac after EVAR with the Excluder endograft. Design: Retrospective analysis of patients who underwent EVAR with the Excluder endograft. Setting: Tertiary care center. Patients: 100 patients who underwent EVAR with the Excluder endograft. Measurements and Main Results: A significant difference was observed in the sac diameter between the two groups. The Excluder group had a significantly lower rate of sac growth or re-expansion at 4 years (43%) compared with the bare-frame group (57%). Conclusion: Late aneurysm sac growth or re-expansion after EVAR with the Excluder device is common, even in the absence of endoleaks. Although the incidence of important clinical sequelae is low at this point, the incidence of aneurysm expansion should be taken into consideration during the risk benefit assessment before EVAR repair with the Excluder device. (J Vasc Med 2004;9:1236-42.)

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Frequency after EVAR

Two decades of experience in explanation and graft preserving strategies following primary endovascular aneurysm repair and lessons learned

- 910 EVARs
- 44 (4.8%) reinterventions
 - 18 Relining
 - 12 Open aortic plication
 - 14 Explanation

Sherif Sultan^{1,2,3,4}, Yogesh Acharya^{5,6}, Mohieldin Hezima⁷, Keegan Chua^{8,9}, Osama Soliman¹⁰, Juan Parodi¹¹ and Niamh Hynes¹²

Sultan et al, *Frontier in Surgery* 2022

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Some Regress!

Sept 2021 | Oct 2022 | Oct 2023

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Indication for Treatment

- Symptoms from mass effects
 - Pain
 - Compression (nausea / emesis / graft thrombosis)
 - Rupture
- Size: > 8 cm

King et al J Vasc Surg 2020;72:154
Kadokol et al J Vasc Surg 2011;54:637
Dauria et al J Am Coll Surg 2006;203:508
Sultan et al Ann Vas Surg 2021;72:647

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Treatment Options

- Aspiration / I&D
- Tight wrapping of the aneurysm wall
- Microfibrillar collagen injection into the periprosthetic space
- Laparoscopic fenestration with resection of the sac
- Marsupialization
- Plasmapheresis

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Treatment Options: Explantation

- Complete removal of the pseudocapsule and affected graft replacement with a different material

Adedigba et al Vascular 2021;29:244

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Treatment Options: Relining

After EVAR

Aortic Sac Hygroma

Sultan et al *Frontiers in Surg* 2022

Relining

Explant

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Treatment Options: Explantation

Aortic sac >8 cm

King et al *J Vasc Surg* 2020;72:154
Sultan et al *Ann Vas Surg* 2021;72:647

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Conclusions

- Frequency of hygroma after open aortic repair with ePTFE is about 25%; after EVAR < 5%. It is a rare complication after reconstructions of non-aortic arterial beds.
- While resection with replacement provides the definitive therapy, relining may be tried first, especially for aortic hygroma.

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Conclusions

- Use of woven polyester for open aortic repair is recommended.
- Manufacturer's modification of ePTFE material is warranted.

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Wilson Street Hospital
1866 - 1876

Where University Hospitals began.

"The most in need are considered the most worthy."

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