26es JNI 2025 TOURS
et la région Centre - Val de Loire VINCI
Journées Nationales d'infectiologie
du mercredi 11 juin 2025 au vendredi 13 juin 2025
Journée Nationale de Formation
des Paramédicaux en Infectiologie
Jeudi 12 juin 2025

Best-of

Infections sur prothèses vasculaires

Dr Simon JAMARD
CHRU de Tours – Hôpital Bretonneau
Service de Médecine Infectieuse et Tropicale
INRAE – UMR 1282 – Infectiologie et Santé Publique

Déclaration d'intérêt de 2014 à 2025

- Intérêts financiers : aucun
- Liens durables ou permanents : aucun
- Interventions ponctuelles : orateur atelier Philips
- Intérêts indirects : aucun

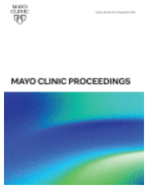
Actualité sur les IPV / Perplexity

perplexity

quelles sont les dernière nouveauté dans la littérature scientifique pour la prise en charge des infections sur prothèses vasculaires

Réponse
Images
Sources
Tâches

Epidémiologie



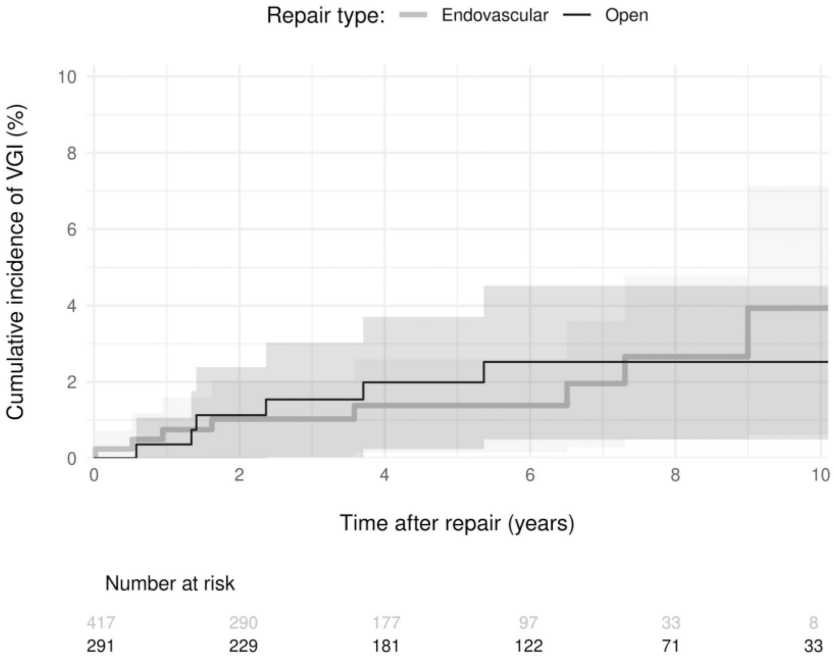
2023

Vascular Graft Infection Following Aneurysm Repair: A Population-Based Study

Hussam Tabaja, M.D.[1], Larry M. Baddour, M.D.[1,2], Supavit Chesdachai, M.D.[1], Randall R. DeMartino, M.D.[3], Brian D. Lahr, M.S.[4], Daniel C. DeSimone, M.D.[1,2]

- Mayo Clinic – 2010 à 2020
- 708 interventions
  - 291 Chirurgies ouvertes
  - 417 Endovasculaires

- Suivi médian : 4,1 [1,9-6,8] années
- Infections : 15 épisodes
- Incidence cumulative à 5 ans : 1,6% [0,6-2,7%]
  - Endovasculaire : 1,4% [0,2-2,6%]
  - Chirurgie ouverte : 2,0% [0,3-3,7%]



Caractéristiques des IPV

Characteristics and Outcome of Vascular Graft Infections: A Risk Factor and Survival Analysis

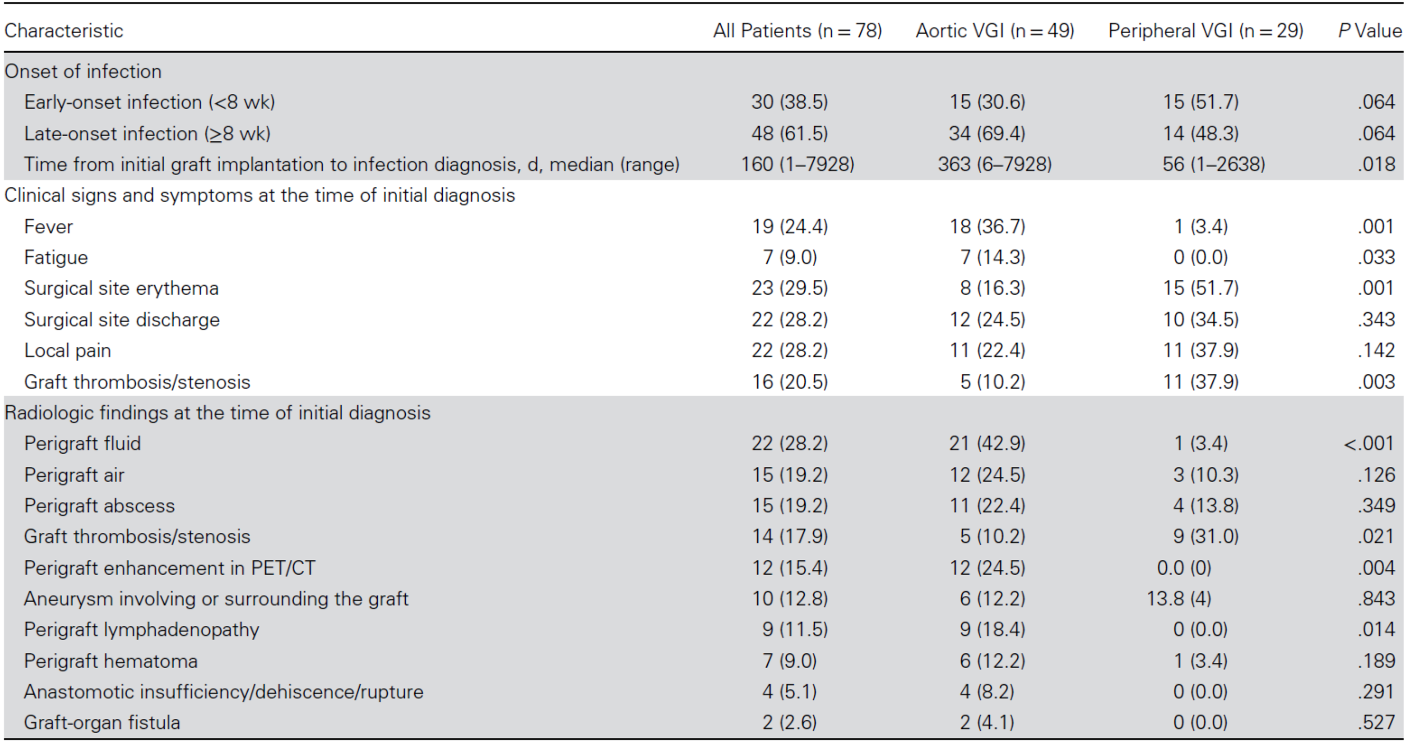
Open Forum Infectious Diseases

MAJOR ARTICLE

2024

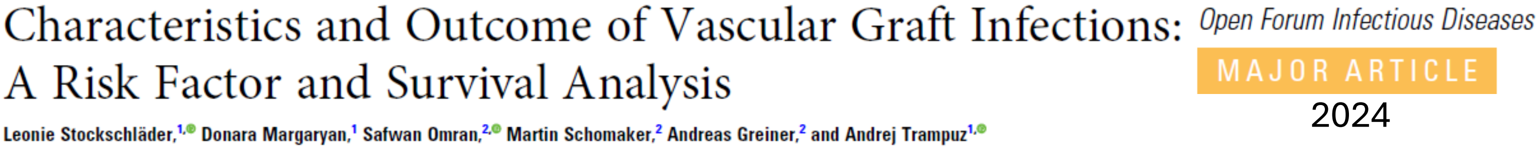
Leonie Stockschläder,[1] Donara Margaryan,[1] Safwan Omran,[2] Martin Schomaker,[2] Andreas Greiner,[2] and Andrei Trampuz[1]

- Cohorte rétrospective
- 2010-2020
- Berlin



Characteristic	All Patients (n = 78)	Aortic VGI (n = 49)	Peripheral VGI (n = 29)	*P* Value
Onset of infection				
Early-onset infection (<8 wk)	30 (38.5)	15 (30.6)	15 (51.7)	.064
Late-onset infection (≥8 wk)	48 (61.5)	34 (69.4)	14 (48.3)	.064
Time from initial graft implantation to infection diagnosis, d, median (range)	160 (1–7928)	363 (6–7928)	56 (1–2638)	.018
Clinical signs and symptoms at the time of initial diagnosis				
Fever	19 (24.4)	18 (36.7)	1 (3.4)	.001
Fatigue	7 (9.0)	7 (14.3)	0 (0.0)	.033
Surgical site erythema	23 (29.5)	8 (16.3)	15 (51.7)	.001
Surgical site discharge	22 (28.2)	12 (24.5)	10 (34.5)	.343
Local pain	22 (28.2)	11 (22.4)	11 (37.9)	.142
Graft thrombosis/stenosis	16 (20.5)	5 (10.2)	11 (37.9)	.003
Radiologic findings at the time of initial diagnosis				
Perigraft fluid	22 (28.2)	21 (42.9)	1 (3.4)	<.001
Perigraft air	15 (19.2)	12 (24.5)	3 (10.3)	.126
Perigraft abscess	15 (19.2)	11 (22.4)	4 (13.8)	.349
Graft thrombosis/stenosis	14 (17.9)	5 (10.2)	9 (31.0)	.021
Perigraft enhancement in PET/CT	12 (15.4)	12 (24.5)	0.0 (0)	.004
Aneurysm involving or surrounding the graft	10 (12.8)	6 (12.2)	13.8 (4)	.843
Perigraft lymphadenopathy	9 (11.5)	9 (18.4)	0 (0.0)	.014
Perigraft hematoma	7 (9.0)	6 (12.2)	1 (3.4)	.189
Anastomotic insufficiency/dehiscence/rupture	4 (5.1)	4 (8.2)	0 (0.0)	.291
Graft-organ fistula	2 (2.6)	2 (4.1)	0 (0.0)	.527

Caractéristiques des IPV



Characteristics and Outcome of Vascular Graft Infections: A Risk Factor and Survival Analysis

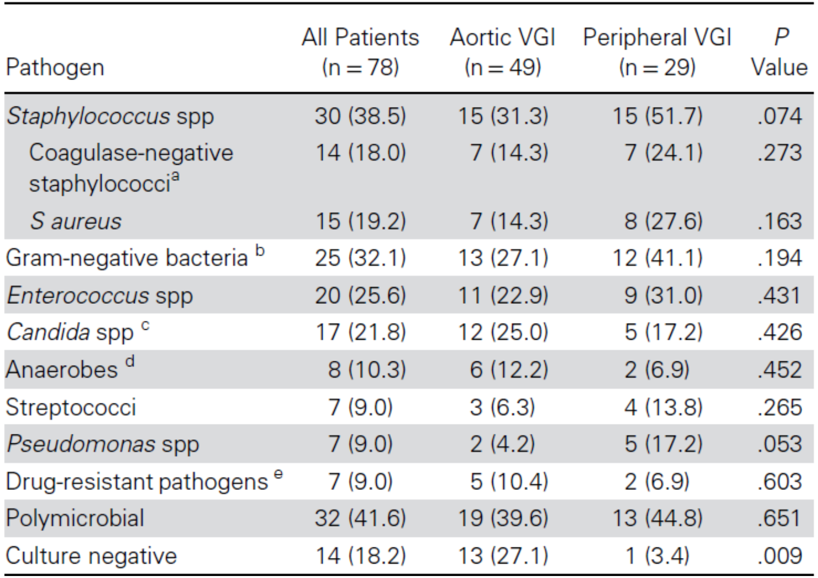
Open Forum Infectious Diseases

MAJOR ARTICLE

Leonie Stockschläder,[1] Donara Margaryan,[1] Safwan Omran,[2] Martin Schomaker,[2] Andreas Greiner,[2] and Andrej Trampuz[1]

2024

- Cohorte rétrospective
- 2010-2020
- Berlin



Pathogen	All Patients (n = 78)	Aortic VGI (n = 49)	Peripheral VGI (n = 29)	*P* Value
Staphylococcus spp	30 (38.5)	15 (31.3)	15 (51.7)	.074
Coagulase-negative staphylococci[a]	14 (18.0)	7 (14.3)	7 (24.1)	.273
S aureus	15 (19.2)	7 (14.3)	8 (27.6)	.163
Gram-negative bacteria [b]	25 (32.1)	13 (27.1)	12 (41.1)	.194
Enterococcus spp	20 (25.6)	11 (22.9)	9 (31.0)	.431
Candida spp [c]	17 (21.8)	12 (25.0)	5 (17.2)	.426
Anaerobes [d]	8 (10.3)	6 (12.2)	2 (6.9)	.452
Streptococci	7 (9.0)	3 (6.3)	4 (13.8)	.265
Pseudomonas spp	7 (9.0)	2 (4.2)	5 (17.2)	.053
Drug-resistant pathogens [e]	7 (9.0)	5 (10.4)	2 (6.9)	.603
Polymicrobial	32 (41.6)	19 (39.6)	13 (44.8)	.651
Culture negative	14 (18.2)	13 (27.1)	1 (3.4)	.009

Caractéristiques des IPV

Characteristics and Outcome of Vascular Graft Infections: A Risk Factor and Survival Analysis

Open Forum Infectious Diseases

MAJOR ARTICLE

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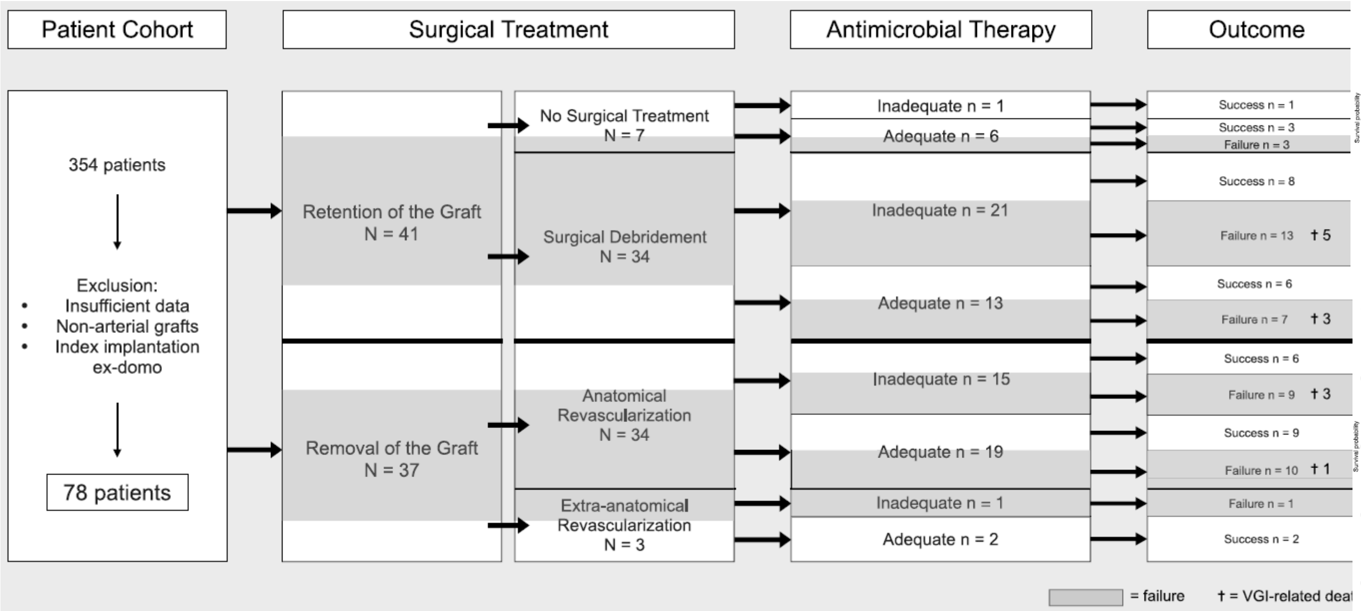


Patient Cohort

Surgical Treatment

Antimicrobial Therapy

Outcome

354 patients

Exclusion:
- Insufficient data
- Non-arterial grafts
- Index implantation ex-domo

78 patients

Retention of the Graft
N = 41

No Surgical Treatment
N = 7

Inadequate n = 1

Success n = 1

Adequate n = 6

Success n = 3

Failure n = 3

Surgical Debridement
N = 34

Inadequate n = 21

Success n = 8

Failure n = 13 † 5

Adequate n = 13

Success n = 6

Failure n = 7 † 3

Removal of the Graft
N = 37

Anatomical Revascularization
N = 34

Inadequate n = 15

Success n = 6

Failure n = 9 † 3

Adequate n = 19

Success n = 9

Failure n = 10 † 1

Extra-anatomical Revascularization
N = 3

Inadequate n = 1

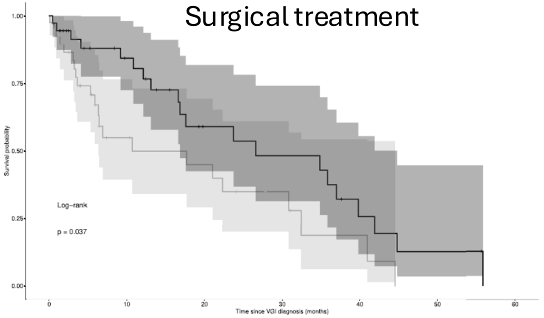
Failure n = 1

Adequate n = 2

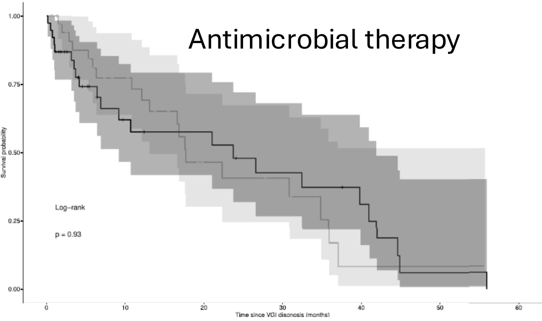
Success n = 2

▨ = failure

† = VGI-related deat

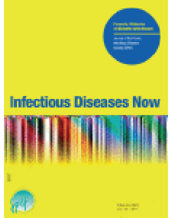


Surgical treatment



Antimicrobial therapy

IPV fongiques



2024

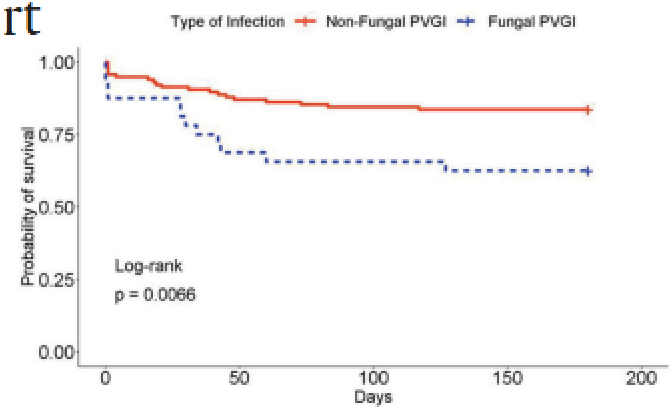
Fungal versus non-fungal supra-inguinal prosthetic vascular graft infections: A cohort study

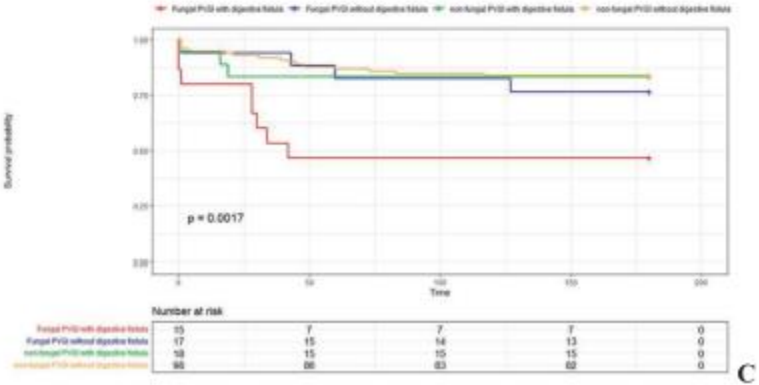
Baptiste Monnier [a], Thibault Couture [b], Agnès Dechartres [c], Samuel Sitruk [d], Johann Gaillard [e], Alexandre Bleibtreu [f], Laurent Chiche [g], Julien Gaudric [b], Jérémy Arzoine [h]

- Cohorte retrospective 2009-2021
- 32 IPV fongiques vs 116 IPV non fongiques

	Multivariable		
Variable	OR	95% IC	p value
Prostheto-digestive fistula	5.98	(2.29–15.62)	< 0.001
Preoperative antibiotic therapy ≥ 7 days	2.87	(1.12–7.38)	0.03
Immunocompromised	1.45	(0.39–5.38)	0.58
Late infection > 4 months	2.54	(0.86–7.52)	0.09
Preoperative use of norepinephrine	3.98	(0.95–16.61)	0.06

Abbreviations: OR, odds ratio; CI, confidence interval.





Critères diagnostics

Editor's Choice – Validation of the Management of Aortic Graft Infection Collaboration (MAGIC) Criteria for the Diagnosis of Vascular Graft/Endograft Infection: Results from the Prospective Vascular Graft Cohort Study

2021

Alexia Anagnostopoulos [a,**,‡], Fabienne Mayer [a,‡], Bruno Ledergerber [a], Judith Bergadà-Pijuan [a], Lars Husmann [b], Carlos A. Mestres [c], Zoran Rancic [d], Barbara Hasse [a,*], the VASGRA Cohort Study

- Validation score Magic sur cohorte existante VASGRA
- 137 patients avec IPV
  120 contrôles

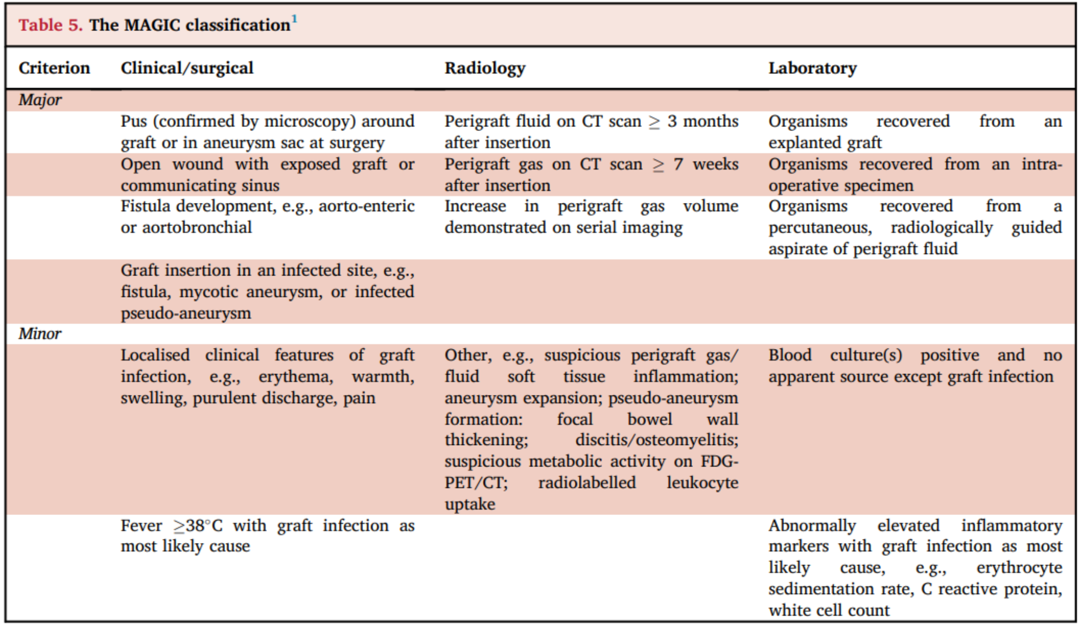


Table 5. The MAGIC classification[1]

Criterion	Clinical/surgical	Radiology	Laboratory
Major			
	Pus (confirmed by microscopy) around graft or in aneurysm sac at surgery	Perigraft fluid on CT scan $\geq$ 3 months after insertion	Organisms recovered from an explanted graft
	Open wound with exposed graft or communicating sinus	Perigraft gas on CT scan $\geq$ 7 weeks after insertion	Organisms recovered from an intra-operative specimen
	Fistula development, e.g., aorto-enteric or aortobronchial	Increase in perigraft gas volume demonstrated on serial imaging	Organisms recovered from a percutaneous, radiologically guided aspirate of perigraft fluid
	Graft insertion in an infected site, e.g., fistula, mycotic aneurysm, or infected pseudo-aneurysm		
Minor			
	Localised clinical features of graft infection, e.g., erythema, warmth, swelling, purulent discharge, pain	Other, e.g., suspicious perigraft gas/fluid soft tissue inflammation; aneurysm expansion; pseudo-aneurysm formation: focal bowel wall thickening; discitis/osteomyelitis; suspicious metabolic activity on FDG-PET/CT; radiolabelled leukocyte uptake	Blood culture(s) positive and no apparent source except graft infection
	Fever $\geq$38°C with graft infection as most likely cause		Abnormally elevated inflammatory markers with graft infection as most likely cause, e.g., erythrocyte sedimentation rate, C reactive protein, white cell count

Critères diagnostics

esvs
European Journal of Vascular & Endovascular Surgery

Editor's Choice – Validation of the Management of Aortic Graft Infection Collaboration (MAGIC) Criteria for the Diagnosis of Vascular Graft/Endograft Infection: Results from the Prospective Vascular Graft Cohort Study

2021

Alexia Anagnostopoulos [a,**,‡], Fabienne Mayer [a,‡], Bruno Ledergerber [a], Judith Bergadà-Pijuan [a], Lars Husmann [b], Carlos A. Mestres [c],
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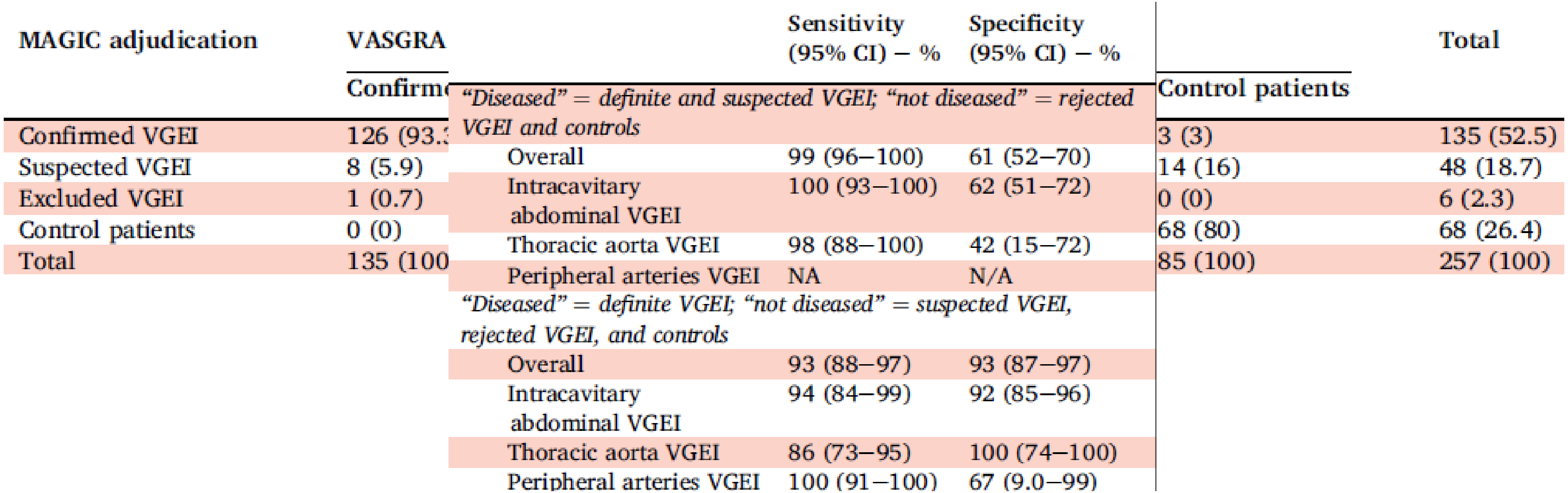
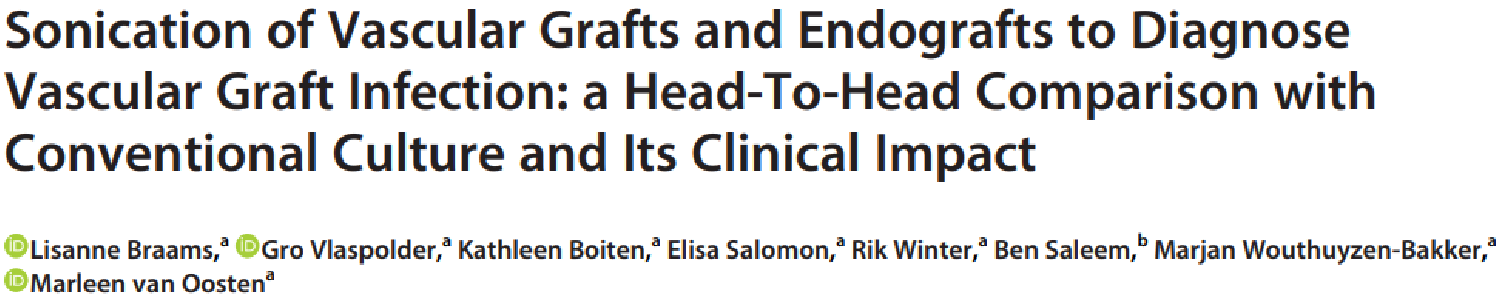


MAGIC adjudication	VASGRA Confirme	Control patients	Total
Confirmed VGEI	126 (93.	3 (3)	135 (52.5)
Suspected VGEI	8 (5.9)	14 (16)	48 (18.7)
Excluded VGEI	1 (0.7)	0 (0)	6 (2.3)
Control patients	0 (0)	68 (80)	68 (26.4)
Total	135 (100	85 (100)	257 (100)

	Sensitivity (95% CI) – %	Specificity (95% CI) – %
"Diseased" = definite and suspected VGEI; "not diseased" = rejected VGEI and controls		
Overall	99 (96–100)	61 (52–70)
Intracavitary abdominal VGEI	100 (93–100)	62 (51–72)
Thoracic aorta VGEI	98 (88–100)	42 (15–72)
Peripheral arteries VGEI	NA	N/A
"Diseased" = definite VGEI; "not diseased" = suspected VGEI, rejected VGEI, and controls		
Overall	93 (88–97)	93 (87–97)
Intracavitary abdominal VGEI	94 (84–99)	92 (85–96)
Thoracic aorta VGEI	86 (73–95)	100 (74–100)
Peripheral arteries VGEI	100 (91–100)	67 (9.0–99)

Diagnostic microbiologique



Sonication of Vascular Grafts and Endografts to Diagnose Vascular Graft Infection: a Head-To-Head Comparison with Conventional Culture and Its Clinical Impact

Lisanne Braams,[a] Gro Vlaspolder,[a] Kathleen Boiten,[a] Elisa Salomon,[a] Rik Winter,[a] Ben Saleem,[b] Marjan Wouthuyzen-Bakker,[a] Marleen van Oosten[a]

Microbiology Spectrum
2023

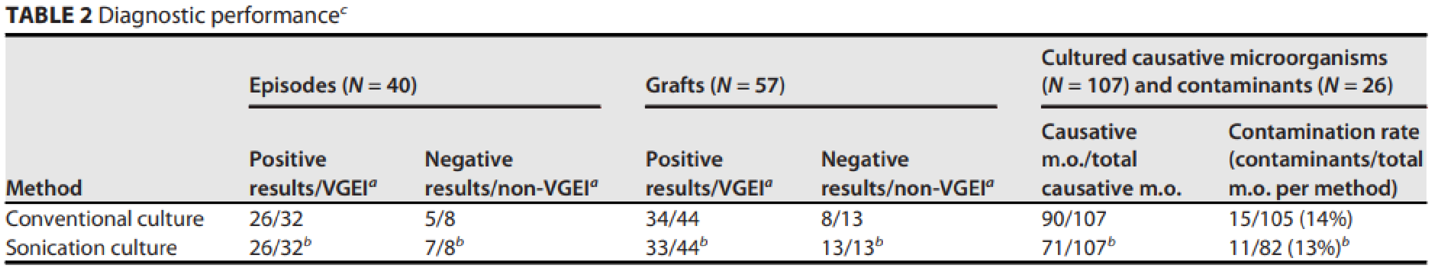
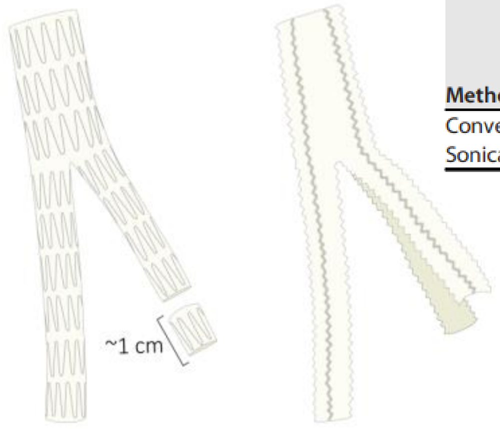


TABLE 2 Diagnostic performance[c]

	Episodes (*N* = 40)		Grafts (*N* = 57)		Cultured causative microorganisms (*N* = 107) and contaminants (*N* = 26)	
Method	Positive results/VGEI[a]	Negative results/non-VGEI[a]	Positive results/VGEI[a]	Negative results/non-VGEI[a]	Causative m.o./total causative m.o.	Contamination rate (contaminants/total m.o. per method)
Conventional culture	26/32	5/8	34/44	8/13	90/107	15/105 (14%)
Sonication culture	26/32[b]	7/8[b]	33/44[b]	13/13[b]	71/107[b]	11/82 (13%)[b]



- 32 % de Mismatch
  - Anaerobie plus souvent retrouvé en culture conventionnelle
  - E. faecalis, E. corrodens, Lactobacilli retrouvé sur sonicat

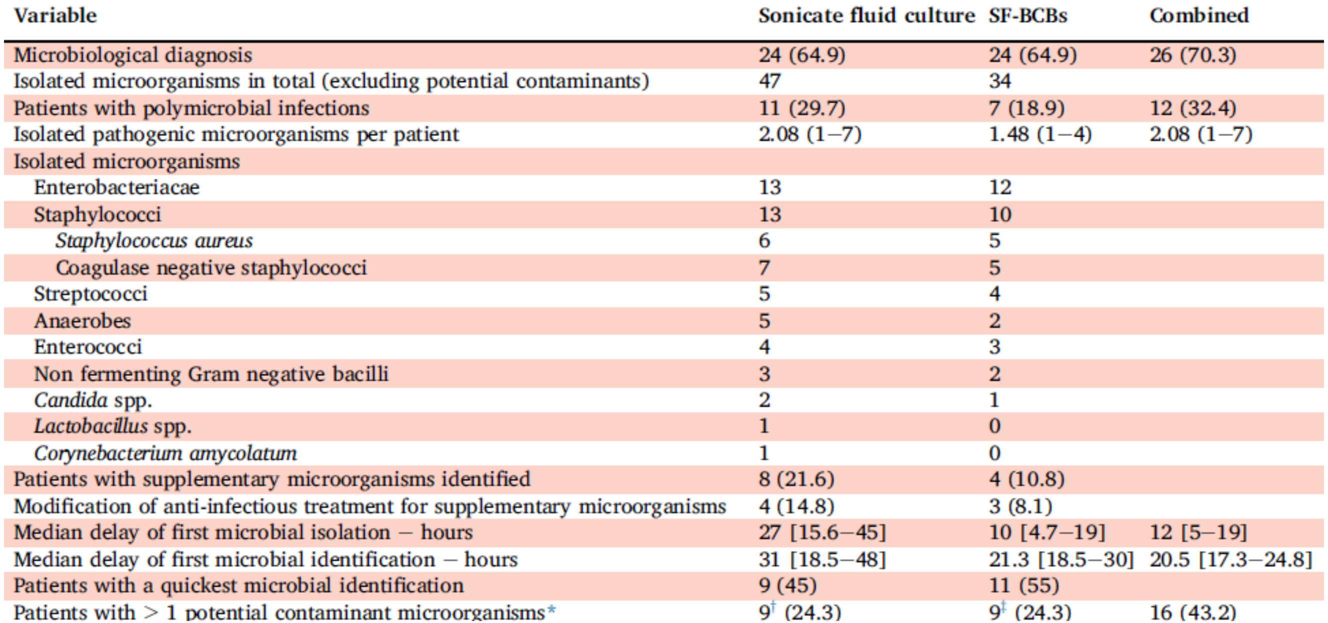
Diagnostic microbiologique

2024

Sonicate Fluid Inoculation Into Blood Culture Bottles for Vascular Graft and Endograft Infection Microbiological Diagnosis

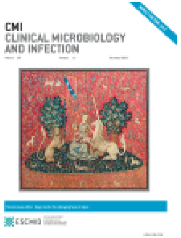
Mathilde Puges [a,c,*], Mathilde Carrer [a], Caroline Caradu [b], Xavier Bérard [b], Charles Cazanave [a,c], on behalf of the VIP study group

- Inoculation du sonicat dans un flacon d'hémoculture



Variable	Sonicate fluid culture	SF-BCBs	Combined
Microbiological diagnosis	24 (64.9)	24 (64.9)	26 (70.3)
Isolated microorganisms in total (excluding potential contaminants)	47	34	
Patients with polymicrobial infections	11 (29.7)	7 (18.9)	12 (32.4)
Isolated pathogenic microorganisms per patient	2.08 (1–7)	1.48 (1–4)	2.08 (1–7)
Isolated microorganisms			
Enterobacteriacae	13	12	
Staphylococci	13	10	
Staphylococcus aureus	6	5	
Coagulase negative staphylococci	7	5	
Streptococci	5	4	
Anaerobes	5	2	
Enterococci	4	3	
Non fermenting Gram negative bacilli	3	2	
Candida spp.	2	1	
Lactobacillus spp.	1	0	
Corynebacterium amycolatum	1	0	
Patients with supplementary microorganisms identified	8 (21.6)	4 (10.8)	
Modification of anti-infectious treatment for supplementary microorganisms	4 (14.8)	3 (8.1)	
Median delay of first microbial isolation – hours	27 [15.6–45]	10 [4.7–19]	12 [5–19]
Median delay of first microbial identification – hours	31 [18.5–48]	21.3 [18.5–30]	20.5 [17.3–24.8]
Patients with a quickest microbial identification	9 (45)	11 (55)	
Patients with > 1 potential contaminant microorganisms*	9[†] (24.3)	9[‡] (24.3)	16 (43.2)

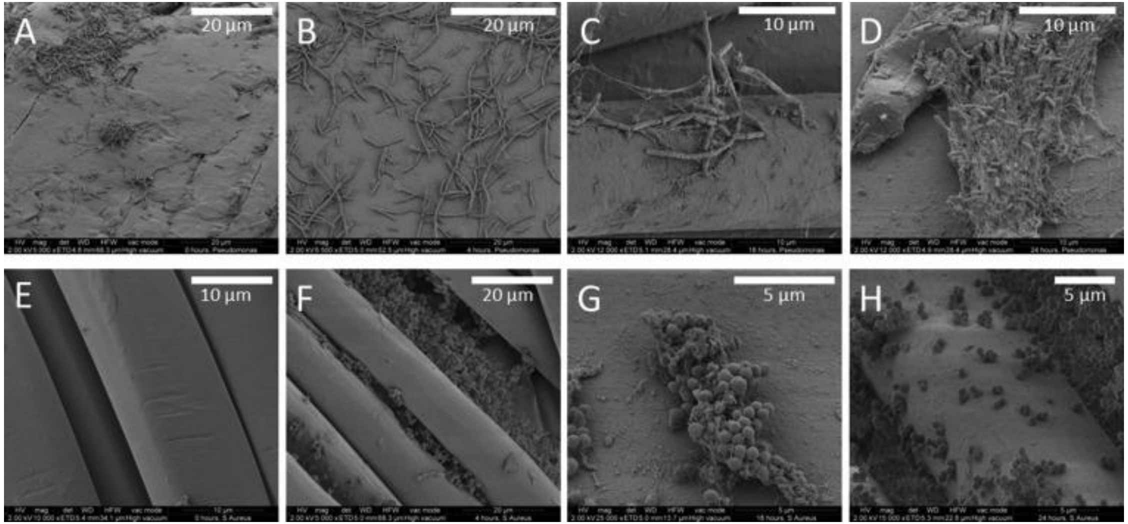
Biofilm et IPV


CMI
CLINICAL MICROBIOLOGY AND INFECTION

2023

Biofilm formation on endovascular aneurysm repair(EVAR) grafts—a proof of concept *invitro* model

Torgny Sunnerhagen[1 2 3] ✉, Franziska Schwartz[1], Lars Christophersen[1], Thomas Bjarnsholt[1 4], Klaus Qvortrup[5], Nikolaj Eldrup[6], Katja Vogt[6], Claus Moser[1 4]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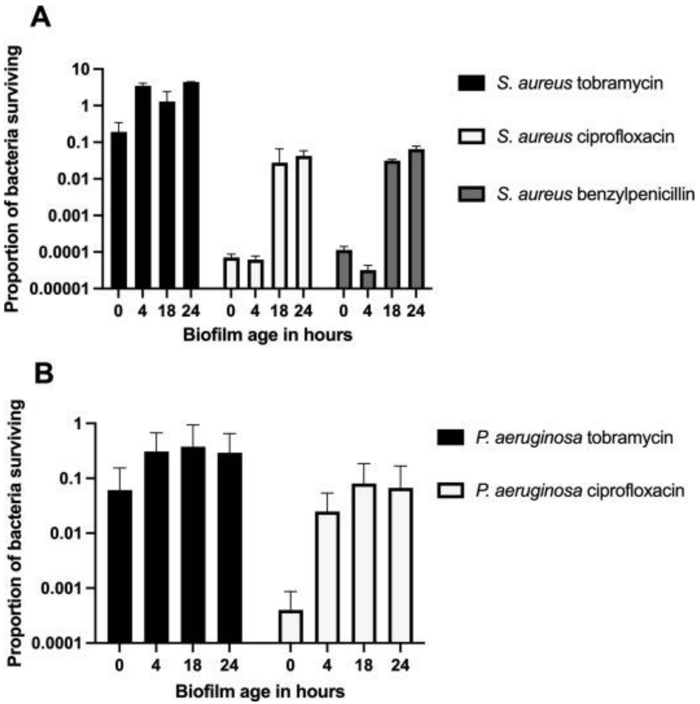
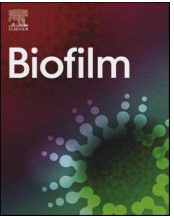


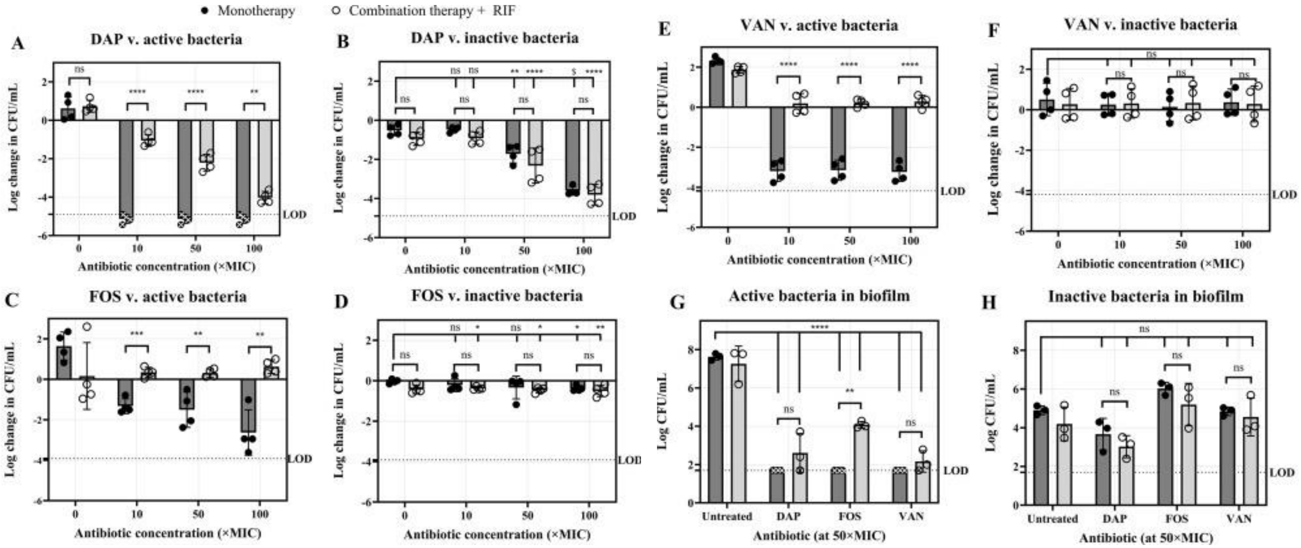
Biofilm et IPV

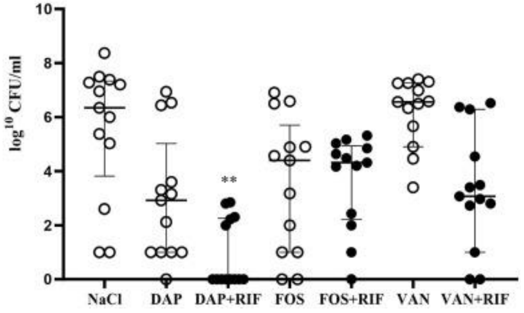


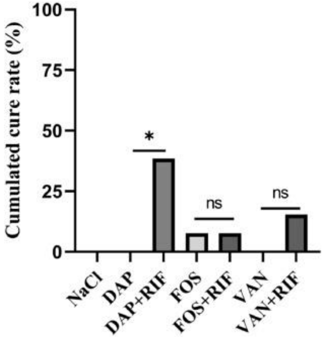
Efficacy of rifampicin combination therapy against MRSA prosthetic vascular graft infections in a rat model

Mikkel Illemann Johansen [a,b,1], Maiken Engelbrecht Petersen [c,1], Emma Faddy [a,b], Anders Marthinsen Seefeldt [b], Alexander Alexandrovich Mitkin [c], Lars Østergaard [b,a], Rikke Louise Meyer [c,d,*], Nis Pedersen Jørgensen [b,**]

2024







Prise en soin

Merits of Puncture and Drainage of Perigraft Material in Patients with Vascular and Endovascular Prosthetic Graft Infection

In press

Giulia Colonna [a], Reinoud P.H. Bokkers [b], Marjan Wouthuyzen Bakker [c], Barzi Gareb [d], Maurizio Taurino [a], Clark J. Zeebregts [e], Ben R. Saleem [e]

- Cohorte rétrospective – 2018-2023 – Pays bas
- 69 patients inclus
  - 45 IPV abdominale
  - 24 IPV périphériques
- Score ASA ≥ 3
- Aspiration percutanée et/ou mise en place d'un drain dans la collection périprothétique
- Complications :
  - Drainage : 2 plaies rénales et 1 décès sur choc septique

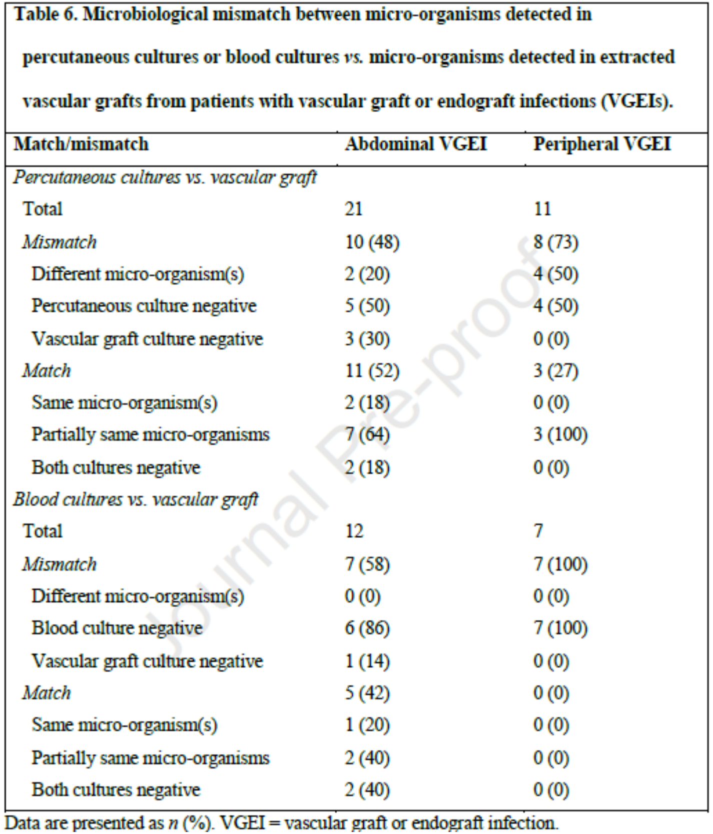


Table 6. Microbiological mismatch between micro-organisms detected in percutaneous cultures or blood cultures *vs.* micro-organisms detected in extracted vascular grafts from patients with vascular graft or endograft infections (VGEIs).

Match/mismatch	Abdominal VGEI	Peripheral VGEI
Percutaneous cultures vs. vascular graft		
Total	21	11
Mismatch	10 (48)	8 (73)
Different micro-organism(s)	2 (20)	4 (50)
Percutaneous culture negative	5 (50)	4 (50)
Vascular graft culture negative	3 (30)	0 (0)
Match	11 (52)	3 (27)
Same micro-organism(s)	2 (18)	0 (0)
Partially same micro-organisms	7 (64)	3 (100)
Both cultures negative	2 (18)	0 (0)
Blood cultures vs. vascular graft		
Total	12	7
Mismatch	7 (58)	7 (100)
Different micro-organism(s)	0 (0)	0 (0)
Blood culture negative	6 (86)	7 (100)
Vascular graft culture negative	1 (14)	0 (0)
Match	5 (42)	0 (0)
Same micro-organism(s)	1 (20)	0 (0)
Partially same micro-organisms	2 (40)	0 (0)
Both cultures negative	2 (40)	0 (0)

Data are presented as *n* (%). VGEI = vascular graft or endograft infection.

Journal Pre-proof

Prise en soin

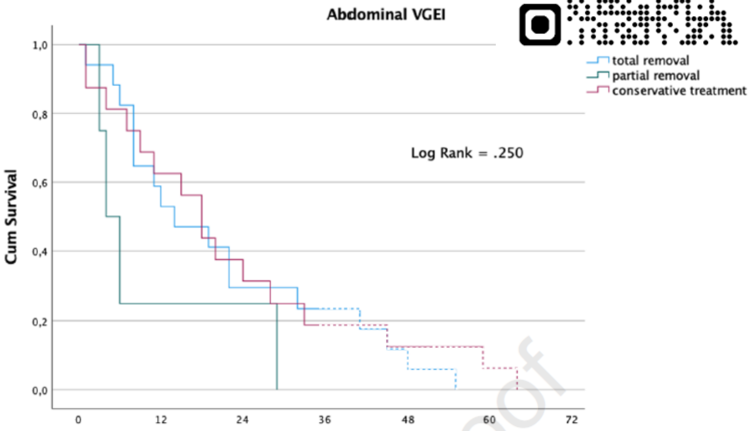
esvs
European Journal of Vascular & Endovascular Surgery

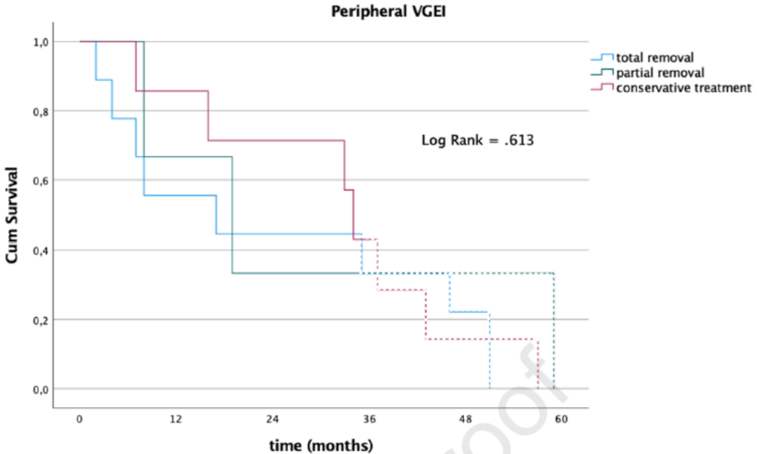
Merits of Puncture and Drainage of Perigraft Material in Patients with Vascular and Endovascular Prosthetic Graft Infection

In press

Giulia Colonna [a], Reinoud P.H. Bokkers [b], Marjan Wouthuyzen Bakker [c], Barzi Gareb [d],
Maurizio Taurino [a], Clark J. Zeebregts [e], Ben R. Saleem [e]

- Cohorte rétrospective – 2018-2023 – Pays bas
- 69 patients inclus
  - 45 IPV abdominale
  - 24 IPV périphériques
- Score ASA ≥ 3
- Aspiration percutanée et/ou mise en place d’un drain dans la collection périprothétique
- Complications :
  - Drainage : 2 plaies rénales et 1 décès sur choc septique



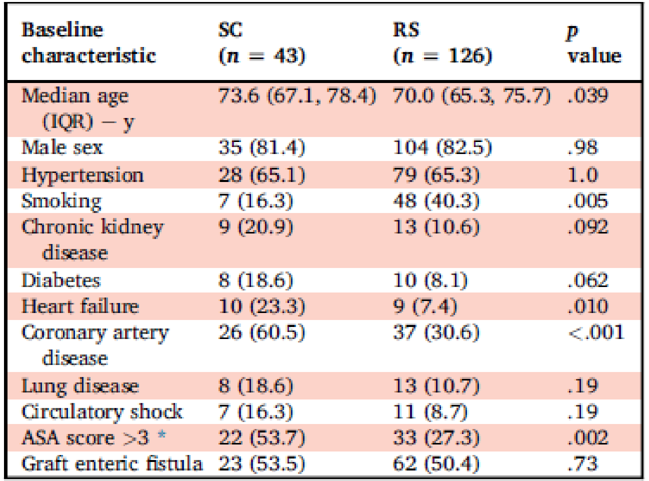


Prise en soin

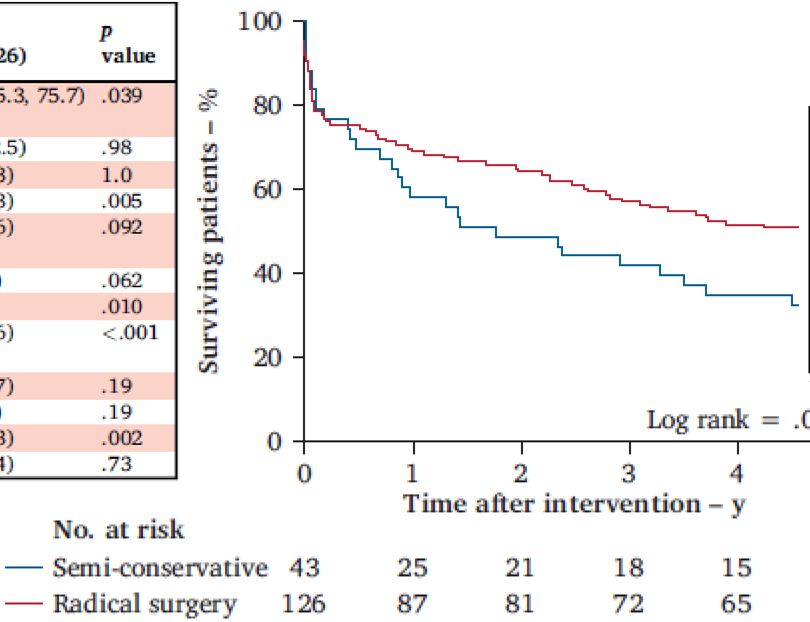
2023

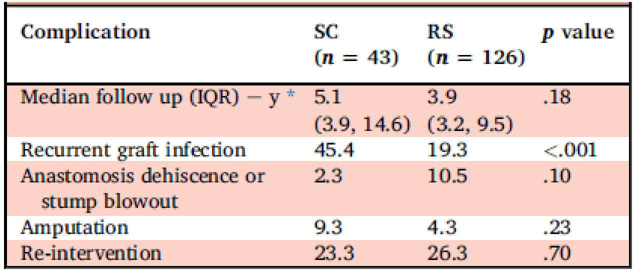
Semi-Conservative Treatment Versus Radical Surgery in Abdominal Aortic Graft and Endograft Infections

Hamid Gavali [a,*], Kevin Mani [a], Mia Furebring [b], Karl Wilhelm Olsson [a], David Lindström [a], Karl Sörelius [c], Birgitta Sigvant [a,d], Gustav Torstensson [e], Manne Andersson [f,g], Claes Forssell [h], Håkan Åstrand [g], Tobias Lundström [i], Shahzad Khan [j], Björn Sonesson [j], Otto Stackelberg [k,l], Peter Gillgren [k,m], Jon Isaksson [n], Björn Kragsterman [a,o], Khatereh Djavani Gidlund [p], Tal Horer [p], Mitra Sadeghi [p], Anders Wanhainen [a,n]



Baseline characteristic	SC (n = 43)	RS (n = 126)	p value
Median age (IQR) – y	73.6 (67.1, 78.4)	70.0 (65.3, 75.7)	.039
Male sex	35 (81.4)	104 (82.5)	.98
Hypertension	28 (65.1)	79 (65.3)	1.0
Smoking	7 (16.3)	48 (40.3)	.005
Chronic kidney disease	9 (20.9)	13 (10.6)	.092
Diabetes	8 (18.6)	10 (8.1)	.062
Heart failure	10 (23.3)	9 (7.4)	.010
Coronary artery disease	26 (60.5)	37 (30.6)	<.001
Lung disease	8 (18.6)	13 (10.7)	.19
Circulatory shock	7 (16.3)	11 (8.7)	.19
ASA score >3 *	22 (53.7)	33 (27.3)	.002
Graft enteric fistula	23 (53.5)	62 (50.4)	.73





Complication	SC (n = 43)	RS (n = 126)	p value
Median follow up (IQR) – y *	5.1 (3.9, 14.6)	3.9 (3.2, 9.5)	.18
Recurrent graft infection	45.4	19.3	<.001
Anastomosis dehiscence or stump blowout	2.3	10.5	.10
Amputation	9.3	4.3	.23
Re-intervention	23.3	26.3	.70

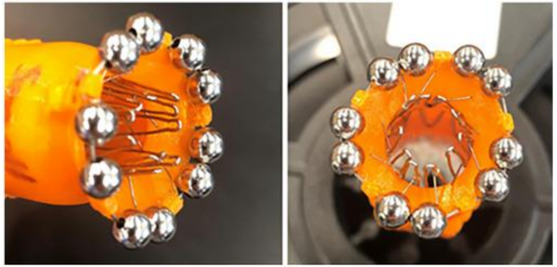
Prise en soin

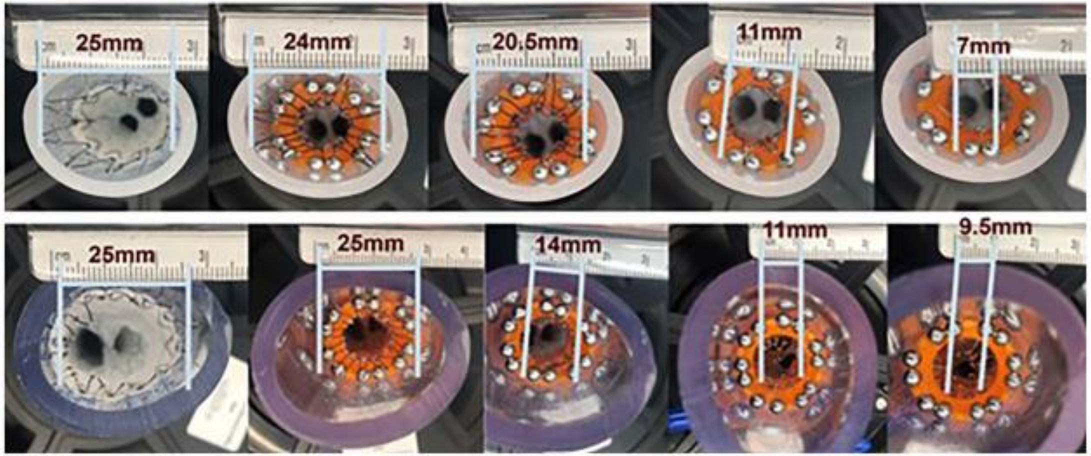
JVS-CIT
Cases, Innovations and Techniques

2024

Biodesign: Engineering an aortic endograft explantation tool

Solyman Hatami, MD,[a] Vamsi Maturi, MD,[a] Alwin Mathew, MD,[a] Shannon Lu, MD,[a] Paul Haddad, MD,[b]
Daanish Sheikh, BS,[c] *and* Maham Rahimi, MD, PhD,[b] *Houston and San Antonio, TX*

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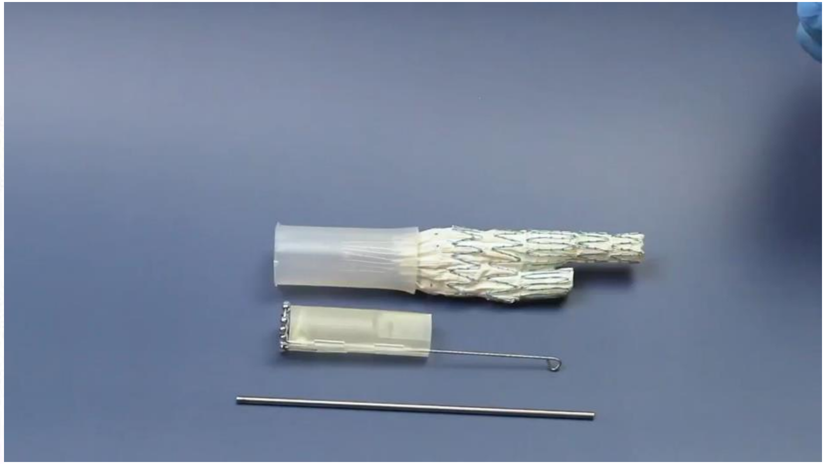


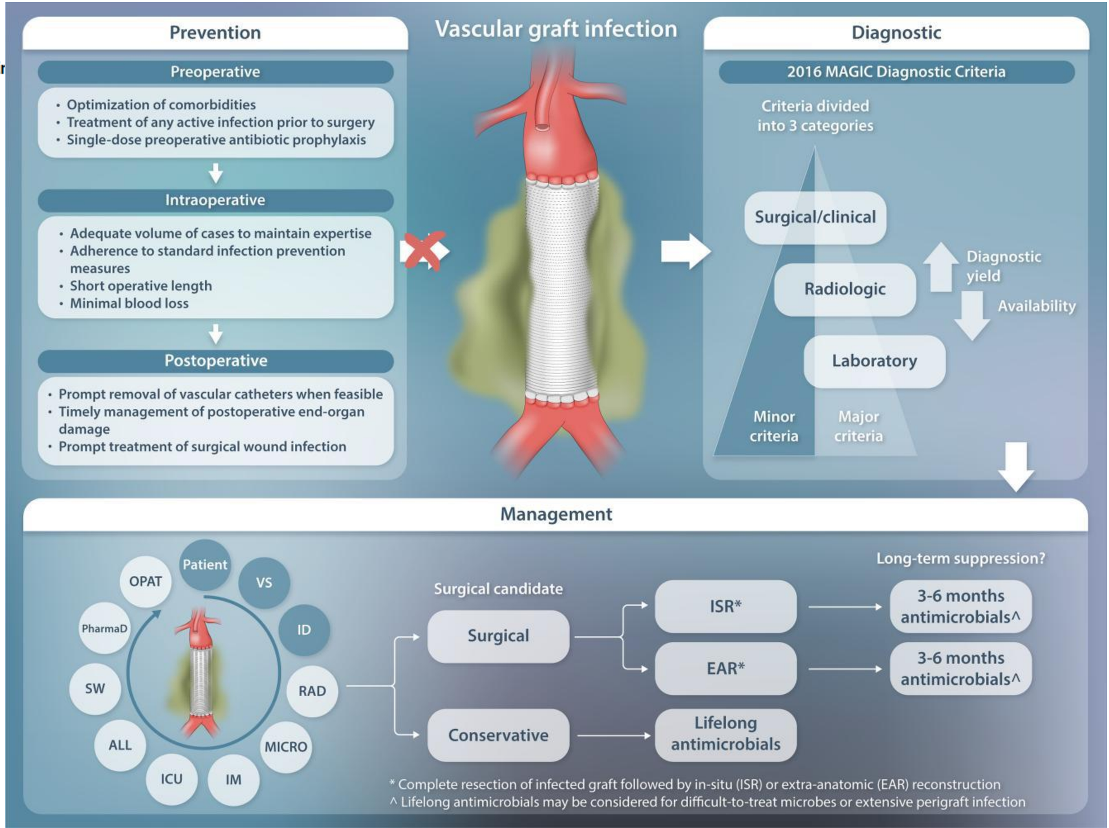
Clinical Infectious Diseases
STATE-OF-THE-ART REVIEW
IDSA Infectious Diseases Society of America
hivma hiv medicine association
OXFORD

Pour aller plus loin !

2024

Fostering Collaborative Teamwork—A Comprehensive Approach to Vascular Graft Infection Following Arterial Reconstructive Surgery

Hussam Tabaja,[1] **Supavit Chesdachai,**[1] **Aditya S. Shah,**[1] **Ryan W. Stevens,**[2] **Randall R. DeMartino,**[3] **Young M. Er**
Larry M. Baddour,[1,5] **and Daniel C. DeSimone**[1,5]



Vascular graft infection

Prevention

Preoperative
- Optimization of comorbidities
- Treatment of any active infection prior to surgery
- Single-dose preoperative antibiotic prophylaxis

Intraoperative
- Adequate volume of cases to maintain expertise
- Adherence to standard infection prevention measures
- Short operative length
- Minimal blood loss

Postoperative
- Prompt removal of vascular catheters when feasible
- Timely management of postoperative end-organ damage
- Prompt treatment of surgical wound infection

Diagnostic

2016 MAGIC Diagnostic Criteria

Criteria divided into 3 categories

Management

Surgical candidate

- Surgical → ISR* → 3-6 months antimicrobials^
- Surgical → EAR* → 3-6 months antimicrobials^
- Conservative → Lifelong antimicrobials

Long-term suppression?

* Complete resection of infected graft followed by in-situ (ISR) or extra-anatomic (EAR) reconstruction
^ Lifelong antimicrobials may be considered for difficult-to-treat microbes or extensive perigraft infection

Merci pour votre attention !

Séminaire du Groupe Infectiologie Digit@le

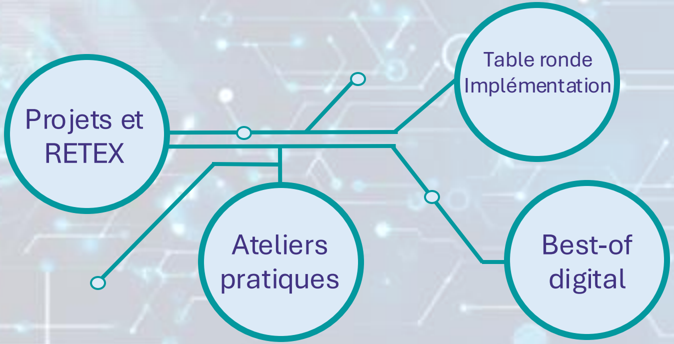


Table ronde Implémentation

Projets et RETEX

Ateliers pratiques

Best-of digital

Octobre 2025

Save the date!