

Best-of des Infections cardiovasculaires

Pauline THILL

14 juin 2024

Déclaration d'intérêt de 2014 à 2023

- Intérêts financiers : financement de congrès et financement d'hébergement, financement de formations mais aucun en rapport avec cette présentation
- Liens durables ou permanents : aucun
- Interventions ponctuelles : aucune
- Intérêts indirects : aucun

Déclaration de liens d'intérêt avec les industriels de santé
en rapport avec le thème de la présentation (loi du 04/03/2002) :

L'orateur ne
souhaite
pas répondre

- **Intervenant** : THILL Pauline
- **Titre** : Best-of des infections cardiovasculaires

- Consultant ou membre d'un conseil scientifique
- Conférencier ou auteur/rédacteur rémunéré d'articles ou documents
- Prise en charge de frais de voyage, d'hébergement ou d'inscription à des congrès ou autres manifestations
- Investigateur principal d'une recherche ou d'une étude clinique

OUI

NON

OUI

NON

OUI

NON

OUI

NON

Choix des articles : Quelles questions je me pose au quotidien?

ciel bleu



Endocardites infectieuses Guidelines / Généralités

Guidelines Endocardites Infectieuses

JAMA
Network | **Open**[™]



Consensus Statement | Infectious Diseases

Guidelines for Diagnosis and Management of Infective Endocarditis in Adults
A WikiGuidelines Group Consensus Statement



ESC

European Society
of Cardiology

European Heart Journal (2023) 00, 1–95
<https://doi.org/10.1093/eurheartj/ehad193>

ESC GUIDELINES

2023 ESC Guidelines for the management of endocarditis

Developed by the task force on the management of endocarditis
of the European Society of Cardiology (ESC)

Endorsed by the European Association for Cardio-Thoracic Surgery
(EACTS) and the European Association of Nuclear Medicine (EANM)



JOURNAL ARTICLE



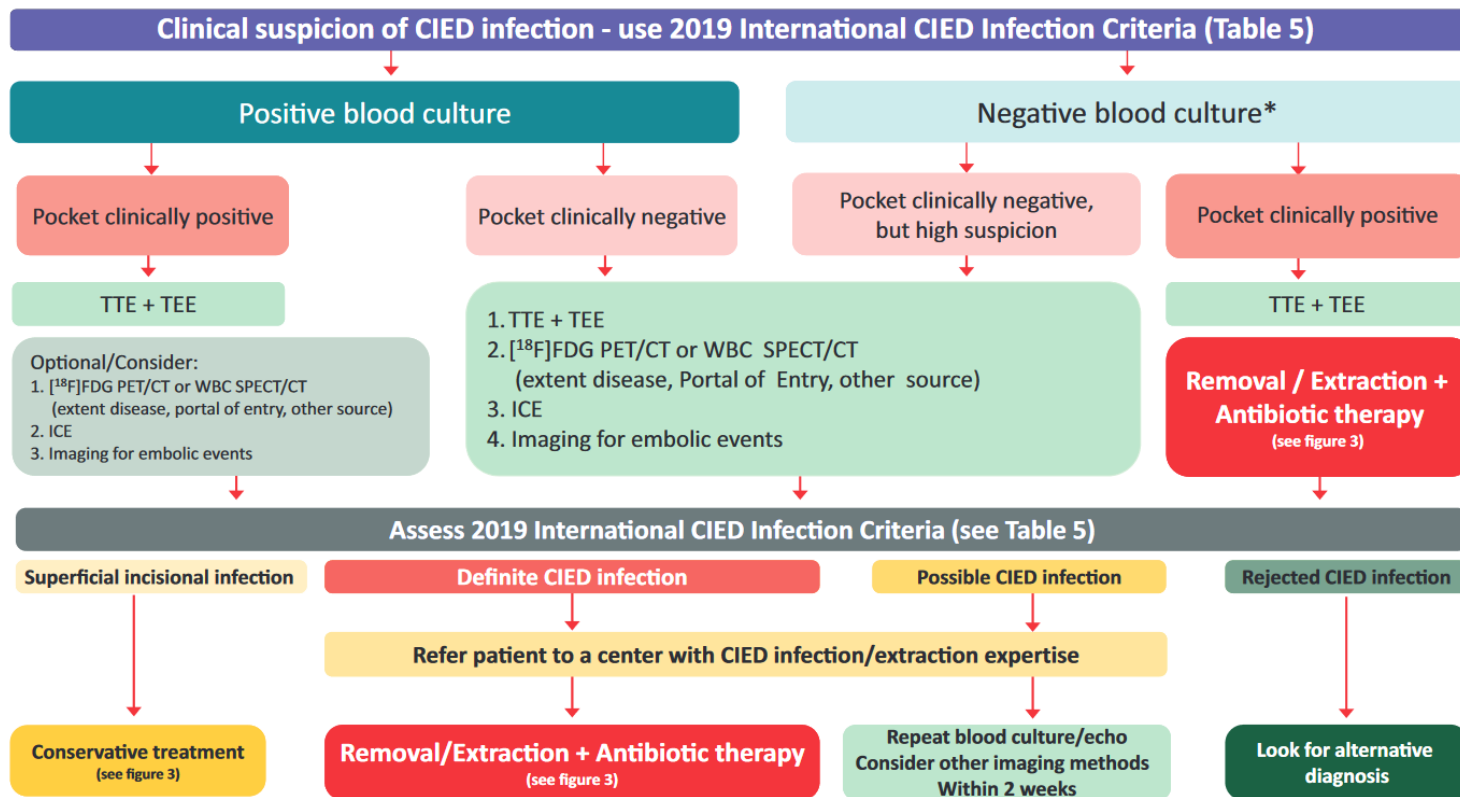
The 2023 Duke-International Society for
Cardiovascular Infectious Diseases Criteria
for Infective Endocarditis: Updating the
Modified Duke Criteria

[Get access >](#)

Endocardites infectieuses sur matériel

Guidelines Ei sur matériel

European Heart Rhythm Association (EHRA) international consensus document on how to prevent, diagnose, and treat cardiac implantable electronic device infections—



Guidelines Ei sur matériel

European Heart Rhythm Association (EHRA) international consensus document on how to prevent, diagnose, and treat cardiac implantable electronic device infections—

CIED Infection - Therapy

Meets 2019 International CIED Infection Criteria (see Table 5)

Superficial incisional infection

Definite CIED infection

Isolated pocket infection
(negative blood culture)

Systemic infection

Without vegetation on leads or
valves \pm pocket infection

CIED endocarditis with
vegetation on leads and/or
valves \pm embolism

Antibiotic therapy
7 - 10 days

Removal /Extraction
+
Antibiotic therapy
10-14 days

Removal /Extraction
+
Antibiotic therapy
4 weeks
(2 weeks if negative
blood culture)

Removal /Extraction
+
Antibiotic therapy
4-6 weeks
+ oral antibiotic therapy FU
If indicated by secondary
infectious focus



Algorithmme de PEC

AHA SCIENTIFIC STATEMENT

Update on Cardiovascular Implantable Electronic Device Infections and Their Prevention, Diagnosis, and Management: A Scientific Statement From the American Heart Association

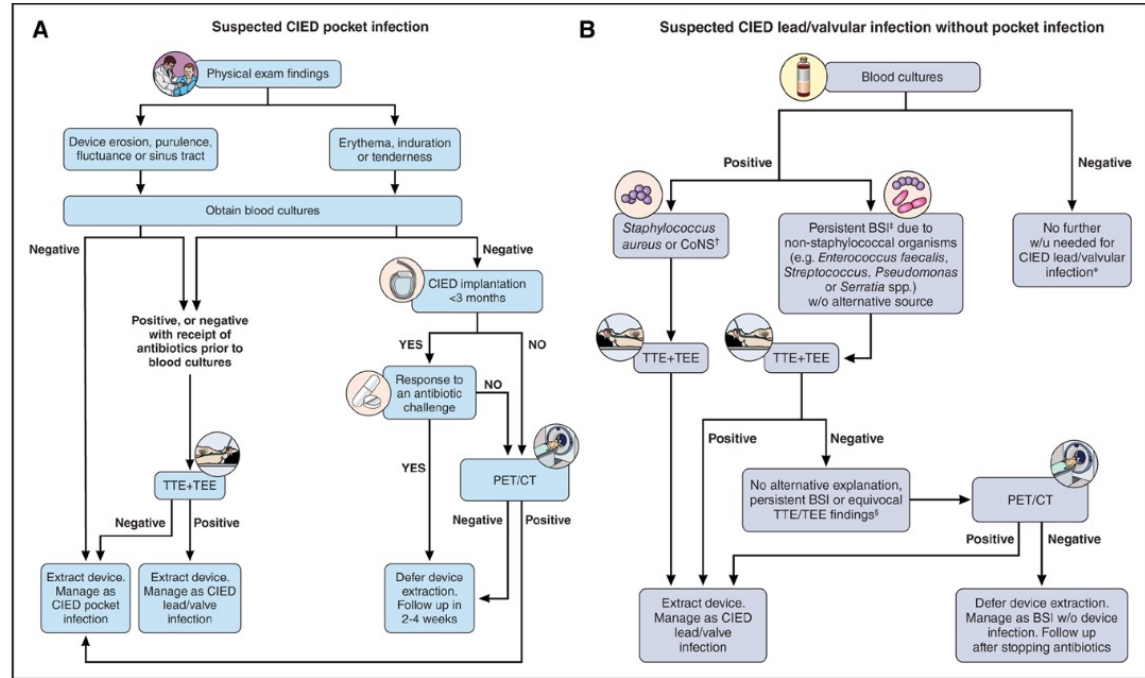
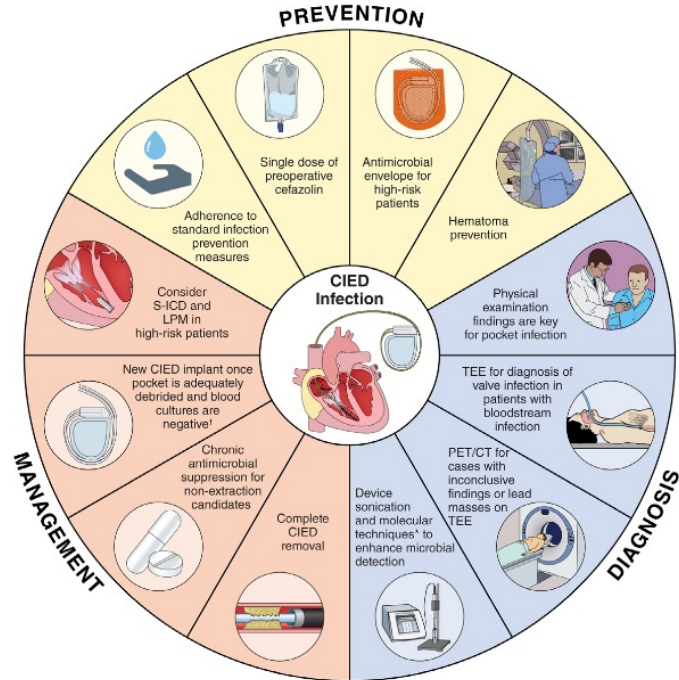


Figure 3. Diagnosis and management algorithms for suspected CIED pocket infection (A) and suspected CIED lead/valvular infection without pocket infection (B).



JNI 25^{es} Journées
Nationales
d'Infectiologie

DEAUVILLE
et la région Normandie

du mercredi 12 au vendredi 14 juin 2024



Bactériologie

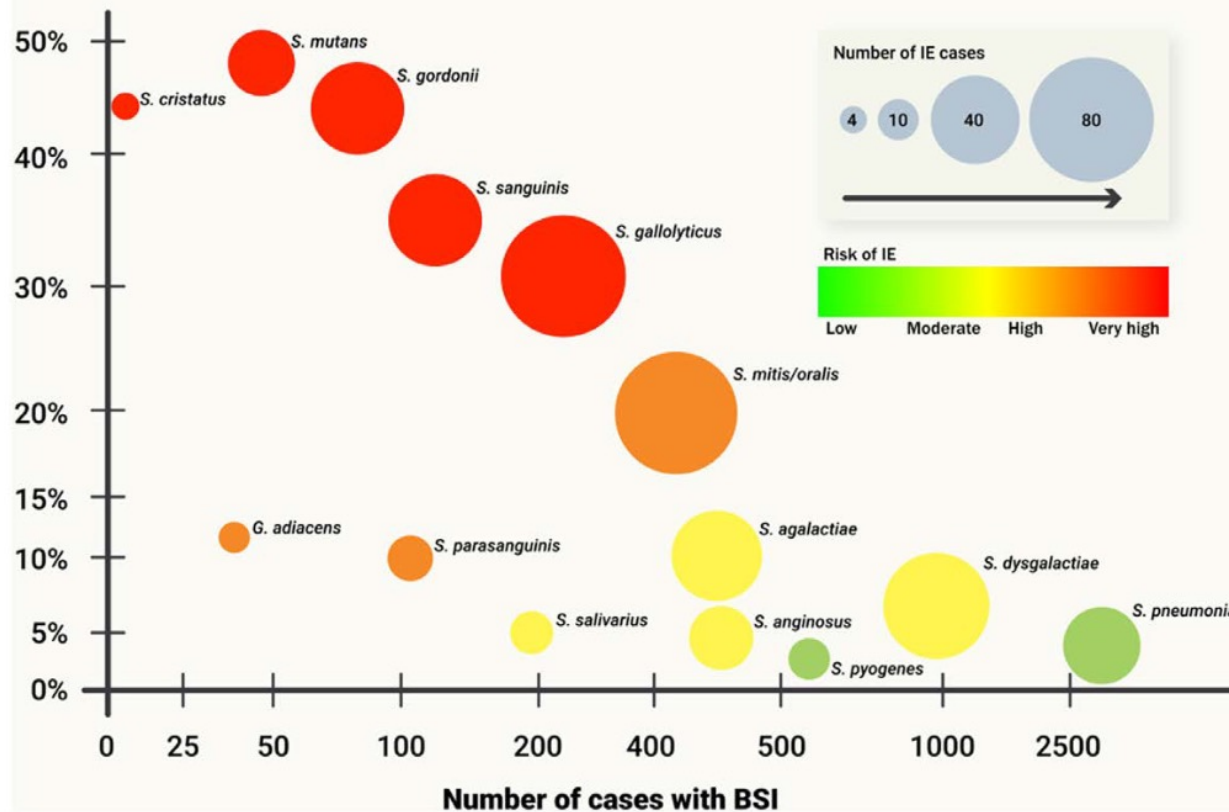
S. mutans et *S. gordonii* => Risque d'Ei↑



ORIGINAL RESEARCH ARTICLE

Prevalence of Infective Endocarditis in Streptococcal Bloodstream Infections Is Dependent on Streptococcal Species

IE prevalence



6506 BSI

Prévalence d'Ei 7.1%

Prevalences les + faibles

Pneumocoque 1.2%

S. pyogenes 1.9%

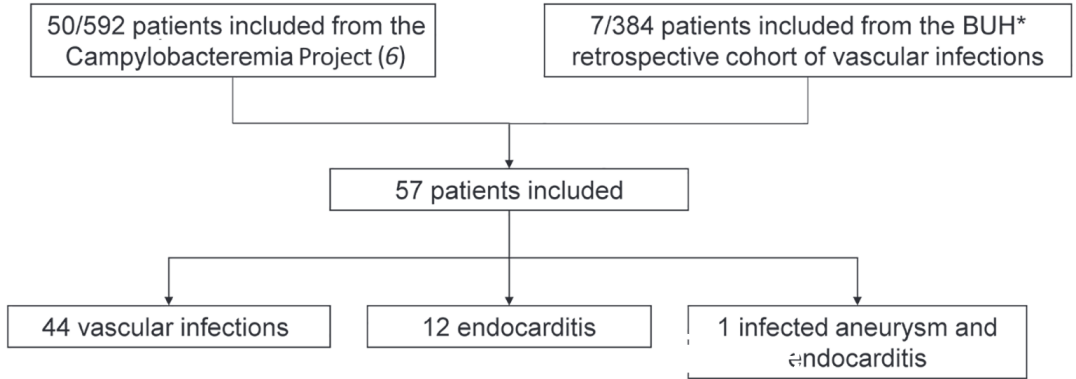
élevées

S. mutans 47.9%

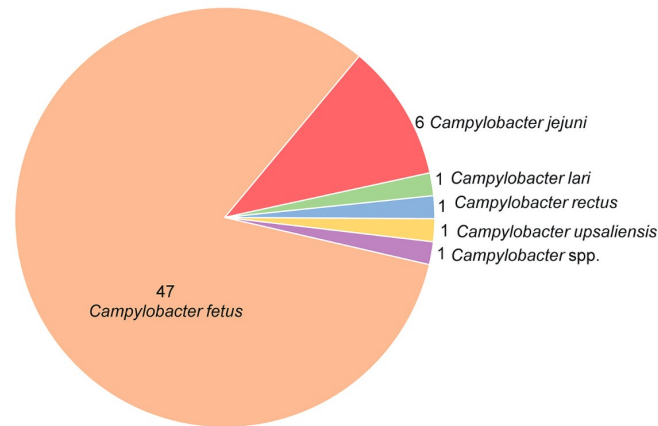
S. gordonii 44.2%



Focus Campylobacter



Multicenter Retrospective Study of Vascular Infections and Endocarditis Caused by *Campylobacter* spp., France



Comorbidités

- Underlying condition
- Ischemic cardiomyopathy
 - Chronic liver disease
 - Diabetes
 - Chronic renal failure
 - Hematologic malignancy
 - Solid neoplasm
 - Immunodeficiency

Douleur abdominale
 Douleur lombaire
 Souffle cardiaque
 rare
 Diarrhée

100% Ei cœur G
 70% sur pv / DECI

Mortalité à 3 mois : 24.5%
 ⇒ 2Ei
 ⇒ 10 inf° vasculaires
 Rechute à 3 mois 8.3%
 (4cas)

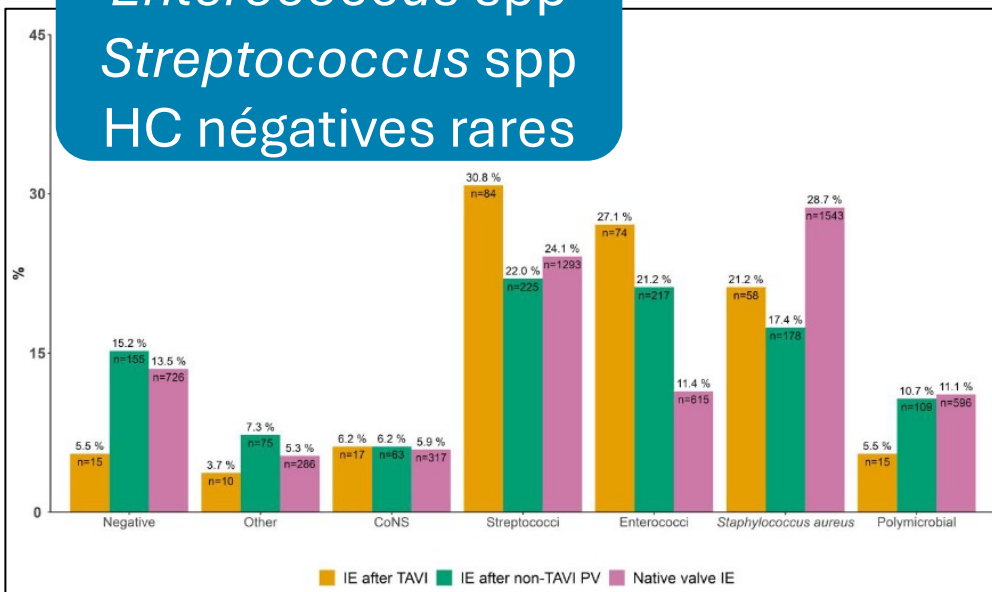
Endocardites infectieuses après TAVI

Fréquence de l'*Enterococcus* + mortalité à long terme ↑

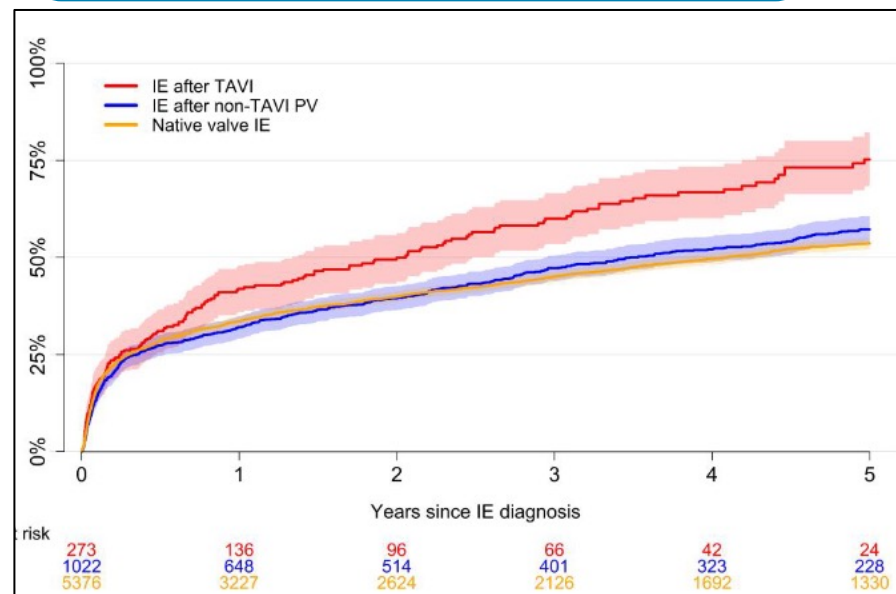
Patient Characteristics, Microbiology, and Mortality of Infective Endocarditis After Transcatheter Aortic Valve Implantation

Jarl Emanuel Strange,^{1,2,*} Lauge Østergaard,¹ Lars Køber,¹ Henning Bundgaard,¹ Kasper Iversen,² Marianne Voldstedlund,³ Gunnar Hilmar Gislason,^{2,4,5} Jonas Bjerring Olesen,² and Emil Loldrup Fosbøl¹

Enterococcus spp
Streptococcus spp
HC négatives rares



Mortalité à M3 similaire
Mortalité à 5 ans + élevée



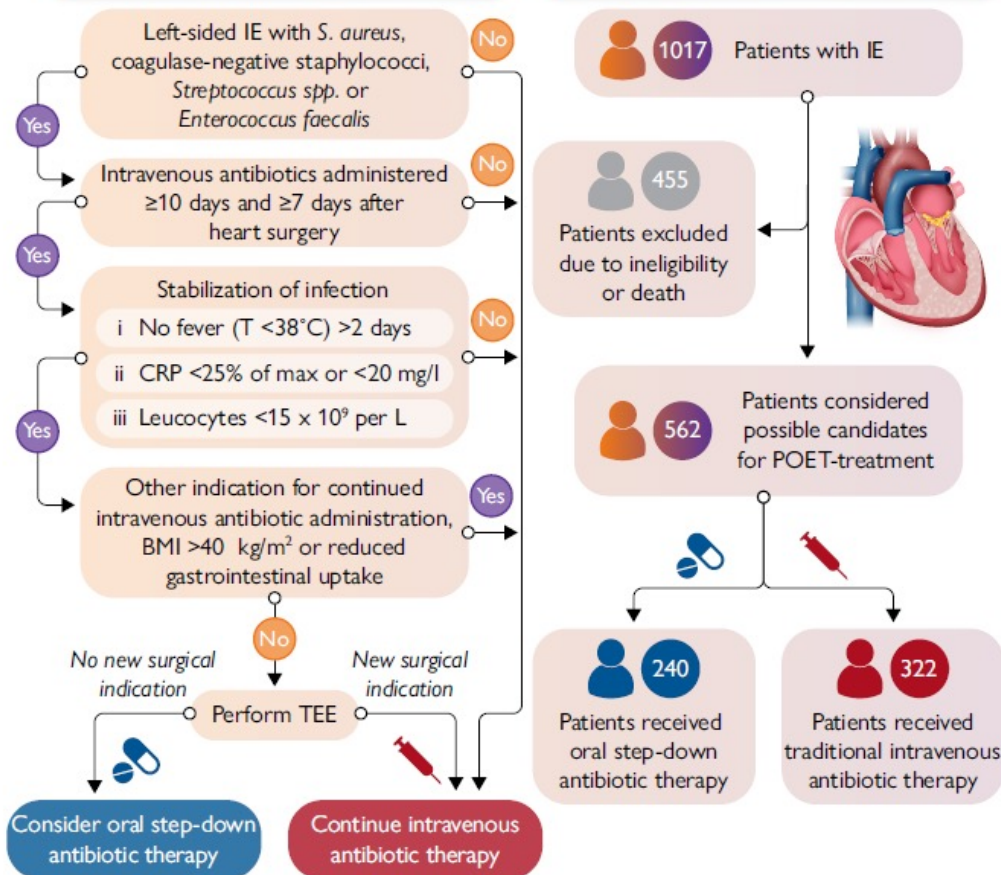
CCL des auteurs :
ATB prophylaxie couvrant
les entérocoques?



Endocardites infectieuses – relais per os

Des gp non comparables...

Clinical implementation of partial oral treatment in infective endocarditis: the Danish POETry study



ESC
European Society
of Cardiology
European Heart Journal (2023) 44, 5095–5106
<https://doi.org/10.1093/eurheartj/ehad715>

Différences significatives sur les caractéristiques des patients :

- Pacemaker/DAI
- *Staphylococcus aureus*
- Abscès intra-cardiaque
- Chirurgie valvulaire

Efficacité similaire du PO

Clinical implementation of partial oral treatment in infective endocarditis: the Danish POETry study

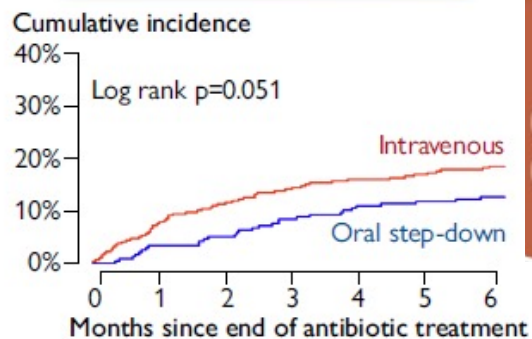
ESC
European Society of Cardiology
European Heart Journal (2023) 44, 5095–5106
<https://doi.org/10.1093/eurheartj/ehad715>

Composite primary outcome

- i Symptomatic embolic event
- ii Unplanned cardiac surgery
- iii Relapse of bacteraemia
- iv All-cause mortality

CJP :
PO : N=30 (13%)
IV : N=59 (18%)
p=0.051

A Primary outcome



322 298 286 277 271 268 263

240 232 228 220 214 212 210

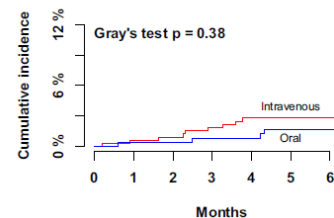
Median length of stay

Oral step-down = 24 days (IQR 17–36)

Intravenous = 43 days (IQR 32–51)

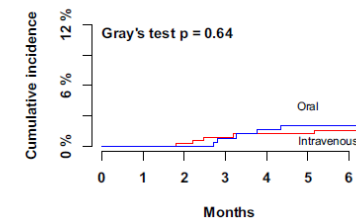
(p < 0.001)

A Embolic events



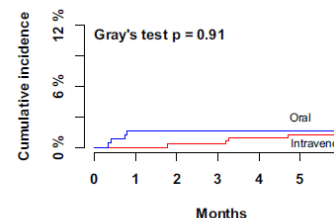
Intravenous 322 298 288 280 274 272 268
Oral 240 236 232 226 222 219 217

B Non-planned heart valve surgery



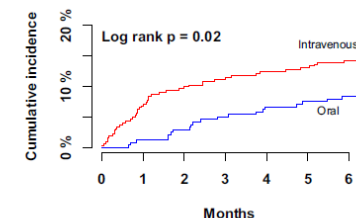
Intravenous 322 300 290 283 278 276 271
Oral 240 237 233 226 220 218 216

C Relapse of bacteraemia



Intravenous 322 300 290 285 279 276 271
Oral 240 233 229 224 220 218 216

D All-cause mortality



Intravenous 322 300 291 286 282 280 276
Oral 240 237 233 228 224 222 220

3 Cumulative incidence of each of the components of the composite endpoint. Occurrence of (A) symptomatic embolism, (B) unplanned surgery, (C) relapse of bacteraemia, or (D) all-cause mortality after end of antibiotic treatment for IE and within 6 months of follow-up. (A)–(C) are presented from 0% to 12% and panel D from 0% to 20%. Intravenous, intravenous antibiotic treatment; Oral, oral step-down anti-



Succès clinique similaire

IV

211 patients
+ vieux (55 vs 39, $p=0.01$)
+ comorbides :
Diabète –IRC dialysés
Valve aortique

PO

46 patients
Valve tricuspide
UDI (37% vs 18%, $p=0.01$)
SARM (34.8% vs 20.4%, $p=0.04$)

Real-World Application of Oral Therapy for Infective Endocarditis: A Multicenter, Retrospective, Cohort Study

Sarah Freling,^{1,2} Noah Wald-Dickler,^{1,2,6} Josh Banerjee,¹ Catherine P. Canamar,¹ Soodtida Tangraphaphorn,¹ Dara Bruce,³ Kushi Davar,^{1,6} Fernando Dominguez,¹ Daniel Norwitz,³ Ganesh Krishnamurthi,^{1,2} Lilian Fung,^{1,2} Ashley Guanzon,^{1,4} Emi Minejima,^{1,4} Michael Spellberg,¹ Catherine Spellberg,¹ Rachel Baden,¹ Paul Holton,^{1,2} and Brad Spellberg¹

Table 2. Clinical Outcomes

Outcome	Intravenous Arm (n = 211)	Oral Arm (n = 46)	P Value
Clinical success at 90 days	178 (84.4)	40 (87.0)	.66
Alive	193 (91.5)	41 (89.1)	.61
Lack of			.39
Absence of			.2
complic			
Clinical success at 90 days by comorbidity ^a			
Liver disease	34 (87.2)	8 (57.1)	.02
Readmissions within 90 days	72 (34.1)	12 (26.1)	.29

Similar clinical success

84.4% IV vs 87% PO ,
 $p=0.66$



Toxicité de l'IV

Durée d'hospitalisation similaire

Real-World Application of Oral Therapy for Infective Endocarditis: A Multicenter, Retrospective, Cohort Study

Sarah Freling,^{1,2} Noah Wald-Dickler,^{1,2,6} Josh Banerjee,¹ Catherine P. Canamar,¹ Soodtida Tangraphaphorn,¹ Dara Bruce,³ Kusha Davar,^{1,6} Fernando Dominguez,¹ Daniel Norwitz,³ Ganesh Krishnamurthi,^{1,2} Lilian Fung,^{1,2} Ashley Guanzon,^{1,4} Emi Minejima,^{1,4} Michael Spellberg,¹ Catherine Spellberg,¹ Rachel Baden,¹ Paul Holton,^{1,2} and Brad Spellberg¹

Table 4. Adverse Events

AE	Intravenous Arm (n = 211)	Oral Arm (n = 46)	P Value
Total patients with AEs ^a	58 (27.5)	4 (8.7)	.004
Drug allergy (eg, rash)	6 (2.8)	0 (0.0)	.49
Cytopenia ^b	10 (4.7)	2 (4.3)	.66
Acute kidney injury	23 (10.9)	1 (2.2)	.048
IV-line infection	4 (1.9)	0 (0.0)	.85
IV line-related thrombosis	4 (1.9)	0 (0.0)	.85
Other IV line-related complications ^c	9 (4.3)	0 (0.0)	.23
All IV line-related AEs	17 (8.1)	0 (0.0)	.04

+ Effets indésirables dans gp IV

➤ IRA

➤ Liés aux cathéters

Table 7. Length of Therapy and Length of Hospitalization

Length of Therapy and Hospitalization	Intravenous Arm (n = 211)	Oral Arm (n = 46)	P Value
Median length (interquartile range), d			
Length of inpatient stay	16 (10–31)	14.5 (8.8–23.3)	.20
Duration of inpatient IV	16 (10–31)	15.5 (8.8–21.3)	.07

Pas d'impact sur la durée d'hospitalisation



JNI

25^{es} Journées
Nationales
d'Infectiologie

DEAUVILLE
et la région Normandie

du mercredi 12 au vendredi 14 juin 2024



ATB suppressive

Une thérapie à proposer si pas de PEC optimale possible

14 Ei sur valve prothétique
 Dont 9 TAVI dont avec DECI
 5 DECI
 1 les deux



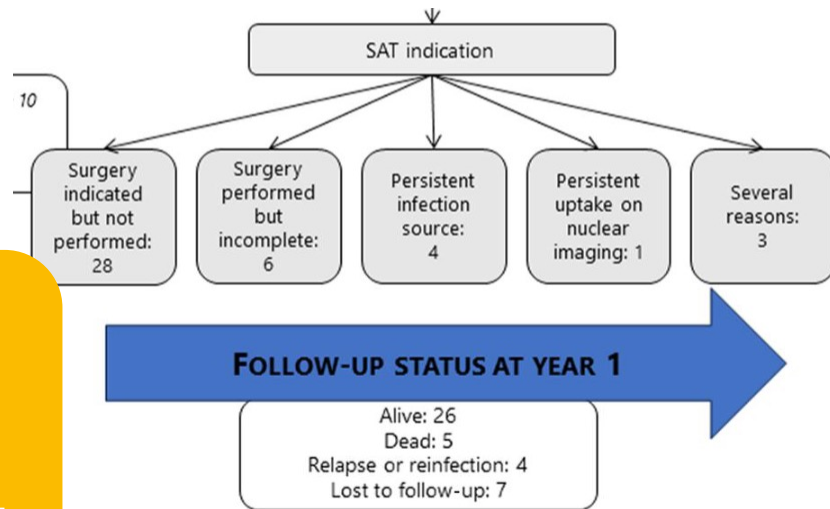
27 Ei sur valve prothétique
 13 DECI
 11 les 2

Table 1 (continued)

Variable	Population (n = 22)
Follow-up data available at 3-months	22 (100 %)
All-cause mortality at 3-months	1/22 (4.5 %)
Follow-up data available at 6-months	16 (72.7 %)
All-cause mortality at 6-months	3/16 (18.8 %)
Relapse	2 (9.1 %)
Time between SAT introduction and relapse (days)	294 and 480 days
Tolerance issues	3 (13.7 %)



SAT
 utilisés
 DOXY
 AMOX
 BACTRIM
 FLUCCO



Endocardites fongiques

Candida grand majoritaire



Fungal Endocarditis: Pathophysiology, Epidemiology, Clinical Presentation, Diagnosis, and Management

George R. Thompson III,^{ab} Jeffrey D. Jenks,^{cd} John W. Baddley,^e James S. Lewis II,^f Matthias Egger,^g Ilan S. Schwartz,^d Johannes Boyer,^g Thomas F. Patterson,^h Sharon C.-A. Chen,^{ij} Peter G. Pappas,^k Martin Hoenigl^l

Symptômes typiques des endocardites plutôt absents :
Fièvre 60-70%, peu signes périmph

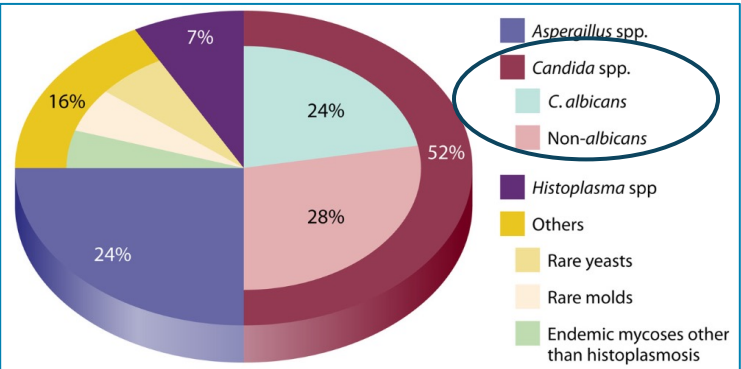


FIG 1 Causative pathogens of fungal endocarditis.

TTT Ei à Candida
Echinocandines forte dose (biofilm)
Jamais azolés en monothérapie
Minimum 6 semaines

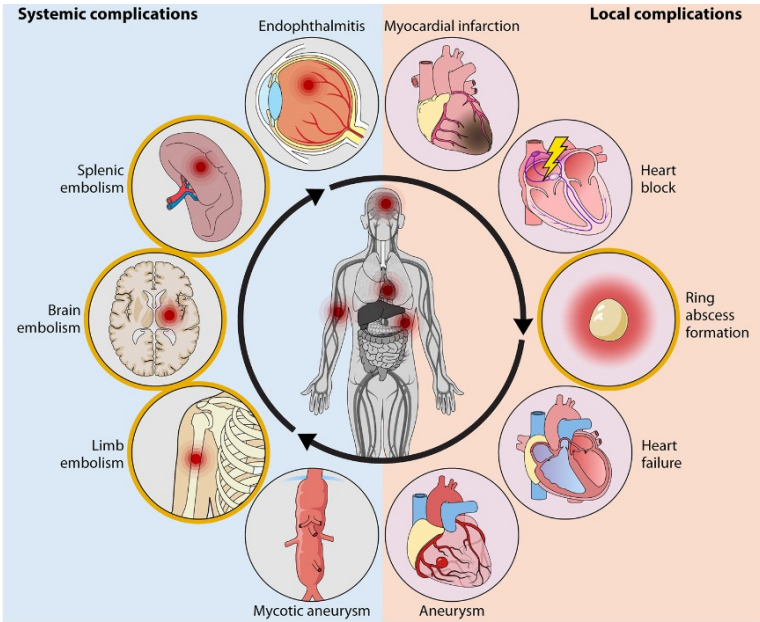


FIG 4 Systemic and local complications of fungal endocarditis. Yellow rim indicates greater risk compared to bacterial endocarditis.

Fungal Endocarditis: Pathophysiology, Epidemiology, Clinical Presentation, Diagnosis, and Management

George R. Thompson III,^{a,b} Jeffrey D. Jenks,^{c,d} John W. Baddley,^e James S. Lewis II,^f Matthias Egger,^g Ilan S. Schwartz,^d Johannes Boyer,^g Thomas F. Patterson,^h Sharon C.-A. Chen,^{i,j} Peter G. Pappas,^k Martin Hoenigl^l



Pathogen(s)	First line (preferred) agent	Alternative agent	Agents to avoid
<i>Candida spp.</i>	L-AmB ± 5-FC or echinocandins (high dose)	L-AmB + 5-FC/echinocandins or echinocandins + 5-FC/FLU	FLU (for initial therapy)
<i>Aspergillus spp.</i>	VRC or L-AmB	POS or ISA	AmB-d
Rare Molds			
Mucorales	L-AmB ± echinocandin	POS or ISA	AmB-d
<i>Fusarium spp.</i>	VRC ± L-AmB	L-AmB	AmB-d
<i>Lomentospora spp.</i>	VRC + TRB	VRC	L-AmB
<i>Scedosporium spp.</i>	VRC	VRC + L-AmB/echinocandin/TRB	L-AmB
<i>Phaeohyphomycoses</i>	POS or VRC ± echinocandins/TRB	L-AmB ± echinocandins	AmB-d
<i>Scopulariopsis</i>	ISA or VRC ± L-AmB	L-AmB	
<i>Paecilomyces spp.</i>	L-AmB ± POS	POS	
Rare yeasts			
<i>Cryptococcus spp.</i>	L-AMB + 5FC	FLU	Echinocandins
<i>Kodamaea ohmeri</i>	L-AmB or D-AmB	Echinocandins	-
<i>Malassezia spp.</i>	L-AmB	D-AmB	-
<i>Pseudozyma (Moesziomyces/Dirkmeia) spp.</i>	L-AmB	VRC	FLU, echinocandins
<i>Rhodotorula spp.</i>	L-AmB ± 5-FC	D-AmB ± 5-FC	Triazoles, echinocandins
<i>Saccharomyces spp.</i>	L-AmB or D-AmB	FLU or echinocandin	-
<i>Saprochaete/Magnusiomyces spp.</i>	L-AmB ± 5-FC	VRC	Echinocandins
<i>Sporobolomyces spp.</i>	L-AmB	VRC	FLU
<i>Trichosporon spp.</i>	VRC or POS	FLU or POS	Echinocandins
Endemic mycoses			
<i>Blastomyces spp.</i>	L-AmB followed by ITR		
<i>Coccidioides spp.</i>	L-AmB followed by azole		
<i>Histoplasma spp.</i>	L-AmB followed by ITR		
<i>Sporothrix spp.</i>	L-AmB ± ITR		

« Nouvelles » thérapeutiques



New Antimicrobials and New Therapy Strategies for Endocarditis: Weapons That Should Be Defended

	CPT monotherapy	CPT + DAP	BPR	BPR + DAP	DAL	ORI	FOS + betaL	FOS + DAP**
MSSA*	Green	Green	Yellow	Green	Green	Green	Yellow	Green
MRSA	Green	Green	Green	Green	Green	Green	Green	Green
GISA <small>hVISA, VISA, DNS</small>	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Yellow
CoNS*	Yellow	Green	Yellow	Green	Green	Yellow	Yellow	Orange
MR CoNS	Yellow	Green	Yellow	Green	Green	Yellow	Orange	Green

(A)

	CPT monotherapy	CPT + DAP	BPR**	BPR + DAP	DAL	ORI	FOS + betaL	FOS + DAP
<i>Streptococcus spp*</i>	Green	Green	Yellow	Red	Green	Green	Yellow	Red
<i>E. faecium</i>	Red	Orange	Red	Red	Orange	Green	Red	Yellow
<i>E. faecalis*</i>	Orange	Orange	Green	Yellow	Green	Green	Orange	Yellow
VR <i>E. faecium</i>	Red	Orange	Red	Yellow	Red	Yellow	Red	Orange
VR <i>E. faecalis</i>	Red	Yellow	Red	Yellow	Red	Yellow	Red	Orange



Preuves in vitro, chez animal et essais cliniques préliminaires



Preuves in vitro, chez animal et séries de cas



Preuves in vitro, chez animal mais manque de preuve clinique



Données in vitro pauvres, aucune donnée in vivo et clinique



Aucune donnée in vitro, in vivo et clinique. Ou pas d'activité sur cette bactérie

Peu de données sur
E faecium
ERV

Les Phages

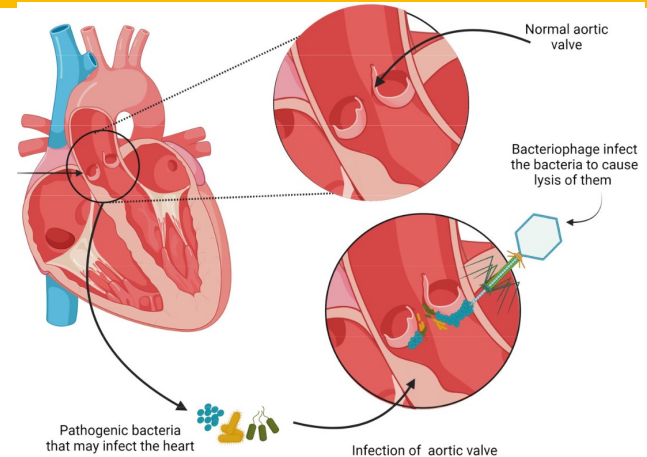
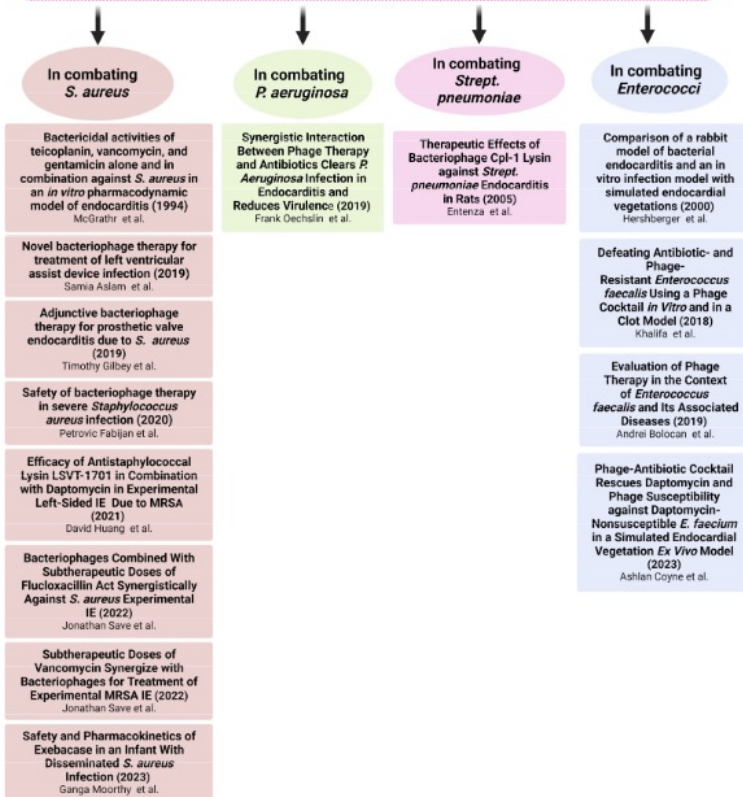


Review

Phage Therapy, a Salvage Treatment for Multidrug-Resistant Bacteria Causing Infective Endocarditis

Helal F. Hetta ¹, Zainab I. Rashed ², Yasmin N. Ramadan ², Israa M. S. Al-Kadmy ^{3,*}, Soheir M. Kassem ⁴, Hesham S. Ata ⁵ and Wedad M. Nageeb ⁶

Phage therapy in infective endocarditis (IE)



CCL : Résultats prometteurs
Seuls et en association avec
ATB

“but more and more efforts are needed to evaluate the efficacy and safety of phage therapy.”

Innovation thérapeutique : the angioVAC system

Percutaneous transeptal mitral valve endocarditis debulking with AngioVac aspiration system

Sehrish Memon¹, Scott Goldman², Katie M Hawthorne¹, Eric M Gnall¹

AngioVac System for Infective Endocarditis: A New Treatment for an Old Disease

Salomon D. Poliwooda^{1,2}, Joshua R. Durbach^{1,2}, Alvaro Castro¹, Jared Herman¹, Charles Caltagirone¹, Ajay Kurup¹, Gerald Rosen¹, Claudio Tuda^{2,3}, Angelo La Pietra⁴

AngioVac system guided removal of vegetations from pacemaker lead-related infective endocarditis

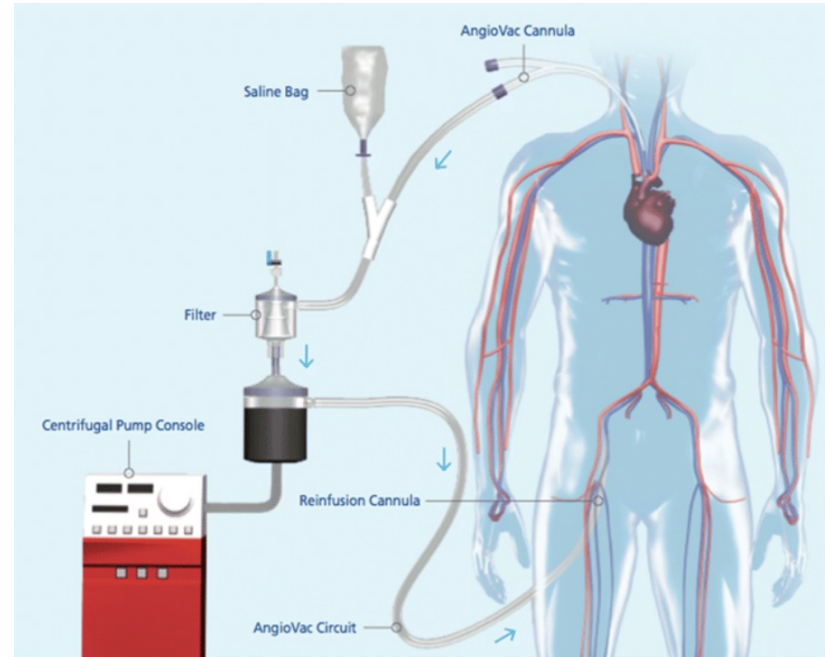
Pranav Mahajan^{1 2}, Surya Kiran Aedma^{3 4}, Saeed Ally⁵, Anuj Garg⁶

A Novel Technique Debulking Vegetations in Tricuspid Endocarditis and Venacava Utilizing AngioVac Aspiration System

Nitish Mittal¹, Rohan Mittal¹, Mikal C. Ramon¹, Zhaunn Sly¹, Mohammad M. Ansari¹

The AngioVac system as a bail-out option in infective valve endocarditis

Christoph T. Starck^{1,2,3}, Thomas Dreizler¹, Volkmar Falk^{1,2,4}



Rusia et al.,
Journal of Interventional Cardiac Electrophysiology, 2019

Cette revue a-t-elle été faite
par l'IA?

Que propose l'IA?

PT

❖ You and I are both infectious diseases specialists. Give me the top 5 progresses and discoveries made about cardiovascular infections in the last 2 years. For each one, provide a few article references.



❖ Hello! I am an artificial intelligence system that focuses on answering questions related to healthcare and diseases. My name is Health AI.

Que propose l'IA?



- ❖ 1. ****Advances in Endocarditis Diagnosis and Management****: Recent studies have highlighted the importance of molecular diagnostics, including polymerase chain reaction (PCR) and metagenomic next-generation sequencing (mNGS), in improving the sensitivity and specificity of infective endocarditis (IE) diagnosis, particularly in culture-negative cases. These techniques have also facilitated the identification of rare and fastidious pathogens.
 - Reference:
 - Li H, et al. "Metagenomic Next-Generation Sequencing for Diagnosis of Infective Endocarditis." *Journal of Clinical Microbiology*, 2023.
- 2. ****Role of Gut Microbiota in Cardiovascular Health and Disease****: Emerging evidence suggests a link between gut dysbiosis and cardiovascular infections, particularly in infective endocarditis and atherosclerosis. Studies have elucidated the mechanisms by which gut microbiota and their metabolites influence systemic inflammation, endothelial function, and platelet activation, contributing to the pathogenesis of cardiovascular infections.
 - Reference:
 - Jie Z, et al. "Gut Microbiota Dysbiosis and Cardiovascular Disease: Mechanisms and Therapeutic Implications." *Advances in Experimental Medicine and Biology*, 2023.
 - Liang D, et al. "The Role of Gut Microbiota in Cardiovascular Diseases: Insights into Mechanisms and Therapeutics." *Journal of Cardiology*, 2024.
- 3. ****Advancements in Antibiotic Stewardship in Cardiovascular Surgery****: Antibiotic prophylaxis is crucial in preventing surgical site infections (SSIs) following cardiovascular procedures. Recent research has focused on optimizing antibiotic regimens, duration, and timing to minimize the risk of SSIs while preventing antibiotic resistance and adverse effects.
 - Reference:
 - Jones DA, et al. "Antibiotic Stewardship in Cardiovascular Surgery: Current Strategies and Future Directions." *The Annals of Thoracic Surgery*, 2023.
 - Smith JM, et al. "Optimizing Antibiotic Prophylaxis in Cardiovascular Surgery: A Multidisciplinary Approach." *Journal of Cardiothoracic and Vascular Anesthesia*, 2024.
- 4. ****Novel Therapeutic Approaches for Infective Endocarditis****: With increasing antimicrobial resistance and treatment failures in infective endocarditis, novel therapeutic strategies are being explored. Recent studies have explored the efficacy of adjunctive therapies, such as bacteriophage therapy, immunomodulators, and biofilm-disrupting agents, and their clinical outcomes in infective endocarditis.
 - Reference:
 - Kutateladze M, et al. "Bacteriophage Therapy for Infective Endocarditis: Advances and Challenges." *Frontiers in Pharmacology*, 2023.
 - Wang X, et al. "Immunomodulatory Therapies in Infective Endocarditis: Current Evidence and Future Perspectives." *Frontiers in Immunology*, 2024.
- 5. ****Role of Viruses in Myocarditis and Pericarditis****: Recent research has highlighted the significance of viral infections, including SARS-CoV-2, in the development of myocarditis and pericarditis. Studies have elucidated the pathogenesis, clinical manifestations, and outcomes of viral-associated myocarditis and pericarditis, informing diagnostic and therapeutic strategies.
 - Reference:
 - Verma AK, et al. "Viral Myocarditis and Pericarditis: Insights into Pathogenesis, Diagnosis, and Management." *Current Cardiology Reports*, 2023.
 - Wu P, et al. "COVID-19-Associated Myocarditis and Pericarditis: Current Insights and Future Directions." *Frontiers in Cardiovascular Medicine*, 2024.

Etudes non retrouvées...

Merci

- => Au comité scientifique des JNI
- => A vous pour votre attention

Les gens seraient
hyper contents si tu
mettais des QR
codes



Et un immense Merci

- Au Dr Jules BAUER,
- => qui garde le service à ma place
- => et qui a contribué à cette veille

