26% Failures in Surgical Treatment for Bacterial Arthritis of a Native Joint in Adults: A Systematic Review of 8,586 joints

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Alex Walinga	Declares that he received an unrestricted research grant from Arthrex and an innovation grant from Amsterdam UMC during the conduct of the study
Tobias Stornebrink	Declares that he received an unrestricted research grant from Arthrex outside the submitted work
Kaj Emanuel	Declares that he does not have any financial interest or other relationship with a commercial company or institution
Arthur Kievit	Declares that he does not have any financial interest or other relationship with a commercial company or institution
Stein Janssen	Declares that he does not have financial interest or other relationship with a commercial company or institution
Gino Kerkhoffs	Declares that he is a paid consultant for Arthrex and he received an unrestricted research grant from Arthrex outside the submitted work

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Background

Bacterial arthritis is a **clinical emergency** that requires prompt treatment.

Most patients are effectively managed with a single surgical debridement, but some cases may require **more than one debridement** to control the infection.

Reported failure rates of a single surgical debridement **vary widely** and a structured assessment of risk factors for failure **is lacking**

Aims

To assess the overall failure rate of a single surgical debridement in adults with bacterial arthritis of a native joint

To identify risk factors for failure of a single surgical debridement

Methods

Study design: Systematic review

Protocol: PROSPERO (CRD42021243460) & PRISMA guidelines

Search: Pubmed, Embase, and Cochrane libraries (January 1980 – January 2021)

Inclusion criteria

Bacterial arthritis of a native joint

Cohort > 10 or more patients

16 years or older

Incidence of failure (i.e. persistence of infection requiring reoperation or mortality)

Exclusion criteria

No original data, meeting abstracts, case reports, animal or cadaveric studies

Arthroplasty included

Patients with a foreign body in the affected joint

Axial arthritis

Risk of bias analysis: Quality in Prognostic Studies (QUIPS) tool

Primary outcome: The rate of failures

Secondary outcome: The potential risk factors associated with failure (best evidence syntheses)

Results

Study and patient characteristics

Title and abstract screening: 1,836 studies
Full-text screening: 97 studies
Included: 30 studies (97% retrospective design)

Low risk of bias: 12 studies
Moderate risk of bias: 13 studies
High risk of bias: 5 studies

Patients: 8,569 (8,586 joints)
Mean age: 59 years (mean age range 42 – 72)
Gender: 61% male, 39% female, 0% others

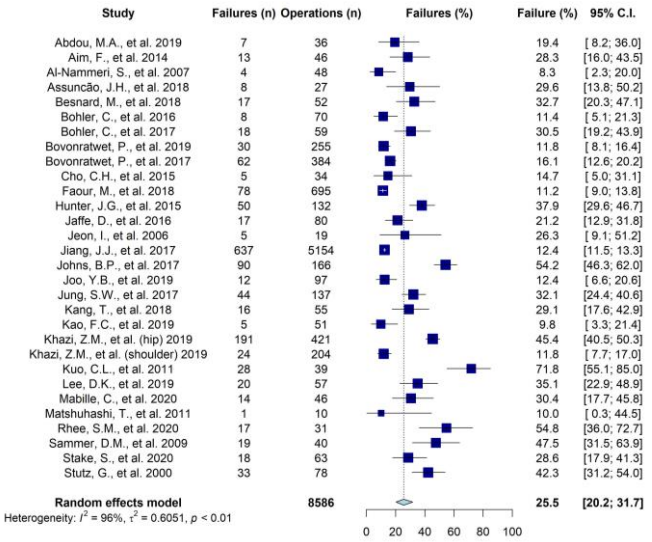
Joints: Shoulder (70%), knee (21%), hip (6%), other (3%)
Microorganism: Staphylococcus Aureus (44%)
Operation: 66% arthrotomy, 33% arthroscopy, 1% not reported

Secondary outcome

79 risk factors: 26 significant predictor
Best evidence synthesis:

- Strong evidence: 0
- Moderate evidence: 1 (synovial white blood cell count)
- Limited evidence: 5 (sepsis, large joint, irrigation volume, blood urea nitrogen test, and blood urea nitrogen/creatinine ratio)

Primary outcome



Conclusion

One out of four single surgical debridements fails to control the infection in native bacterial arthritis

Limited to moderate evidence exists that risk factors associated with failure are synovial white blood cell count, sepsis, large joint, irrigation volume, blood urea nitrogen test, and blood urea nitrogen/creatinine ratio.

These factors should **urge physicians** to be especially receptive to signs of an adverse clinical outcome

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