Long-term Comparative Effectiveness of Endovascular Interventions for Femoropopliteal Artery Disease: A Network Meta-Analysis

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BACKGROUND

- Endovascular interventions are widely used to treat femoropopliteal artery disease (FPA)
- Comparative long-term effectiveness of drug-coated balloons (DCB), drug-eluting stents (DES), bare-metal stents (BMS), and percutaneous transluminal angioplasty (PTA) remains uncertain.
- This study compared BMS, DES, DCB vs. PTA for reducing target lesion revascularization (TLR) and improving patency in treating FPA disease

METHODS

- **Design:** Systematic review + network meta-analysis using random-effects model
- **Databases:** Medline, Embase, CINAHL, Cochrane, INAHTA
- **Population:** Adults with femoropopliteal artery disease
- **Interventions:** PTA (comparator), DCB, DES, BMS
- **Outcomes:** Patency and Target Lesion Revascularization (TLR)
- **Effect measure:** Odds ratio (OR) with 95% confidence interval (CI)
- **Study protocol:** Registered in PROSPERO (CRD42024482434)

RESULTS

5 Databases searched

33 RCTs included

7,132 Participants included

Mean age 69.1 years; 67.8% male

RCTs from inception to February 2024 with ≥1 year follow-up

WHAT DO PATENCY AND TLR MEAN?

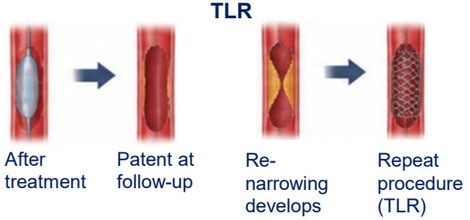
Patency

The treated artery remains open without significant re-narrowing

Target Lesion Revascularization

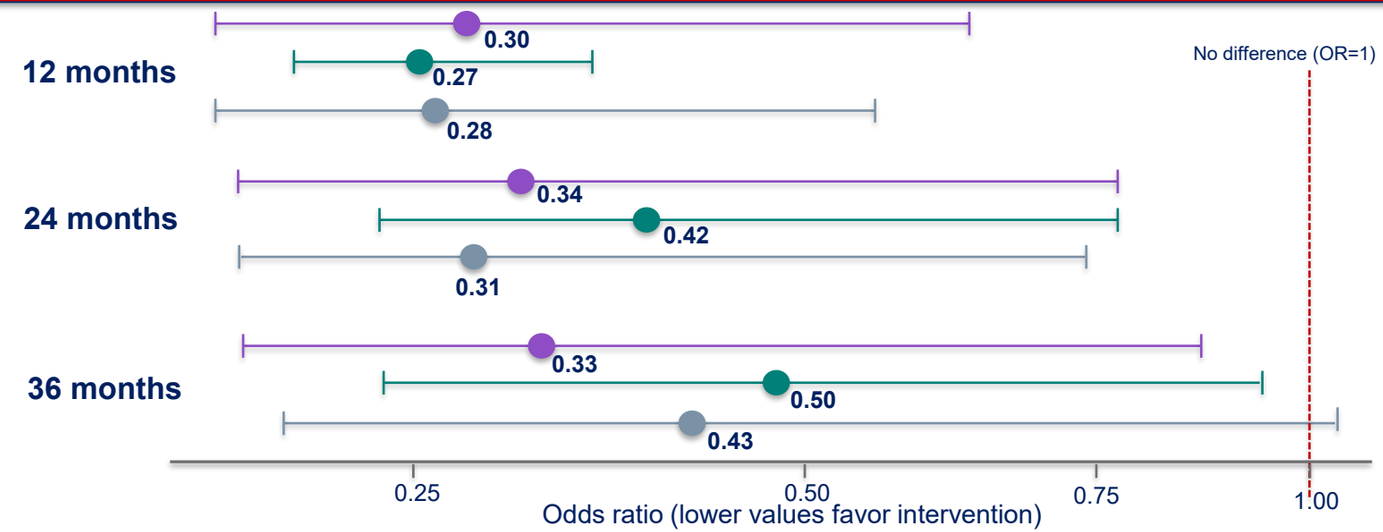
Repeat procedure at the same lesion due to re-narrowing or occlusion

Schematic illustration of vessel patency and TLR



Lower odds of TLR and higher patency indicate better long-term durability

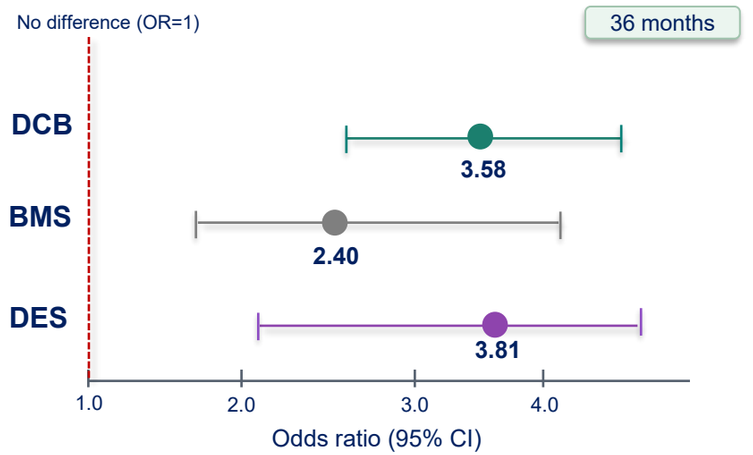
RESULTS: TARGET LESION REVASCULARIZATION BY DEVICE TYPE



Compared to PTA, DES, DCB and BMS were associated with lower odds of TLR at 12 and 24 months. At 36 months, DCB and DES vs. PTA showed significant TLR reduction at 36 months.

DES DCB BMS

RESULTS: PATENCY BY DEVICE TYPE



Patency was higher with DES, DCB and BMS vs PTA at 36 months

ENDOVASCULAR INTERVENTIONS

PTA (Percutaneous Transluminal Angioplasty) — Balloon inflation to widen the narrowed artery

DCB (Drug-Coated Balloon) — Balloon coated with antiproliferative drug to reduce re-narrowing

DES (Drug-Eluting Stent) — Stent that slowly releases drug to prevent tissue overgrowth

BMS (Bare-Metal Stent) — Metal stent provides scaffolding to keep the artery open

CONCLUSIONS

At up to 36 months, DCB and DES offer durable reductions in TLR and superior patency compared with PTA, while BMS benefit diminishes beyond 2–3 years. These findings can inform device selection and treatment strategies aimed at optimizing vessel durability.

KEY IMPLICATION

Durability results are a signal rather than definite evidence of superiority as head-to-head comparisons and follow-up beyond 3 years are limited.

DISCLOSURES

AOW is a PhD candidate at Lancaster University and employee of Boston Scientific. IN was an employee of The Life You Can Save. LF and KJ are employees of Lancaster University.

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Abbreviations: FPA, femoropopliteal artery disease; PTA, percutaneous transluminal angioplasty; DCB, drug-coated balloon; DES, drug-eluting stent; BMS, bare-metal stent; RCT, randomized controlled trial; TLR, target lesion revascularization; OR, odds ratio