

Abstract

Myocardial injury after noncardiac surgery (MINS) affects roughly 8% of patients aged 55 and older, and up to 20% in vascular and hip-fracture surgery; about 10% of patients with MINS die within 30 days, and most events are silent. This cost-effectiveness review asks whether routine postoperative troponin screening is justified.

Primary-prevention strategies, including colchicine (COP-AF), remote ischemic preconditioning (PRINCE), and hyperoxia with antioxidants, have repeatedly shown no benefit, while every proven therapy begins with a troponin result: accelerated surgery in the HIP ATTACK substudy cut 30-day mortality from 23% to 10%, and dabigatran improved outcomes in established MINS (MANAGE).

Troponin elevation predicts death stepwise, yet no trial has proven that a screening strategy itself improves outcomes, and screening costs roughly \$1,150 USD per additional case detected. We conclude that screening is a defensible standard for defined high-risk populations with a management pathway already in place, not a universal mandate.

Routine Postoperative Troponin Screening for Myocardial Injury after Noncardiac Surgery

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Introduction

- Myocardial injury after noncardiac surgery (MINS) affects roughly **8% of patients aged 55 and older**, and up to **20%** in vascular and hip-fracture surgery.
- About **10% of patients with MINS die within 30 days**, and risk rises with the size of the troponin elevation.
- Only about 20% of MINS patients report ischemic symptoms; close to **two-thirds of perioperative heart attacks are silent**.



The detection gap: without routine testing, the highest-risk patients appear well and are discharged undetected.

Methods

A *cost-effectiveness review* of routine perioperative troponin screening after noncardiac surgery, drawing on international trial and cohort evidence.

Who to screen: the high-yield groups

- Age 65 or older
- Age 45–64 with known cardiovascular disease
- Revised Cardiac Risk Index of 1 or greater
- Vascular or other major surgery
- Elevated preoperative natriuretic peptide

Do not screen low-risk patients having low-risk surgery.

How to test



Confirm MINS by excluding non-ischemic causes of elevation; a preoperative baseline separates acute surgical injury from chronic elevation, as in kidney or structural heart disease.

Results

Primary prevention has repeatedly come up empty

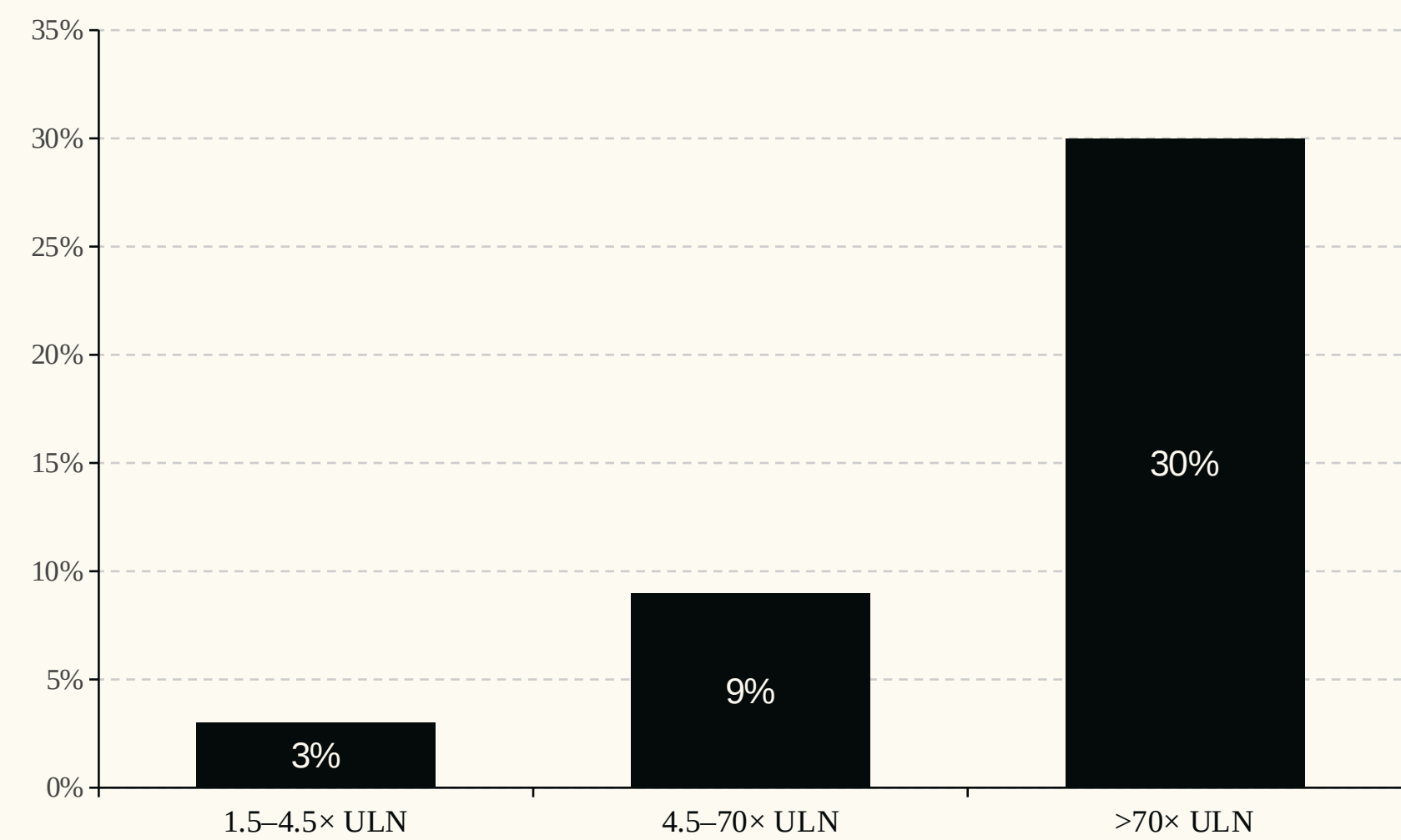
- Colchicine (COP-AF), remote ischemic preconditioning (PRINCE), and hyperoxia plus antioxidants all showed **no benefit**; statin and anesthetic-choice data remain unproven.
- Every proven therapy starts with a troponin result**
- HIP ATTACK substudy:** faster surgery in troponin-positive hip-fracture patients cut mortality from 23% to 10%.
- MANAGE:** dabigatran improved outcomes in patients with established MINS.
- A troponin rise of **5 ng/L or more** independently predicts death (hazard ratio **4.69**) even when symptoms and ECG do not.

HIP ATTACK: 30-day mortality in troponin-positive hip fracture



Source: HIP ATTACK trial substudy.

30-day mortality rises stepwise with troponin elevation (× ULN) (VISION cohort, Roche hs-cTnT, ULN 14 ng/L)



Discussion

Cost considerations

Screening costs about **\$1,150 USD** per additional MINS case detected, with **\$16,700 USD** in added cost per perioperative heart attack.

Limitations

- No trial has yet proven that **a screening strategy itself** improves outcomes or lowers cost.
- Fewer than one-third of diagnosed patients had their therapy intensified.

Conclusion

A defensible standard for defined high-risk populations with a management pathway already in place, **not a universal mandate**.

Translation and next steps

- Summer internship at VoxTelehealth:** helped design the patient-facing content of a MINS digital follow-up care plan: plain-language education modules and a daily symptom check-in with red-flag escalation to the care team.
- The essential next step:** a randomized trial of surveillance plus response versus usual care.

The value of troponin lies in detection and the secondary prevention it makes possible.

References

- Devereaux PJ, Sessler DI. N Engl J Med. 2015;373:2258-69.
- Ruetzler K, et al. AHA scientific statement. Circulation. 2021;144:e287-e305.
- Biccard BM, et al. Ann Surg. 2018;268:357-63.
- Thompson A, et al. 2024 AHA/ACC perioperative guideline. J Am Coll Cardiol. 2024;84:1869-1969.
- Devereaux PJ, et al. (VISION hs-cTnT). JAMA. 2017;317:1642-51.
- Conen D, et al. (COP-AF). Lancet. 2023;402:1627-35.
- Greco M, et al. (PRINCE). Circulation. 2025;152:1194-1205.
- Holse C, et al. (VIXIE). Anesthesiology. 2022;136:408-19.
- Borges FK, et al. (HIP ATTACK substudy). J Bone Joint Surg Am. 2024;106:2303-12.
- Devereaux PJ, et al. (MANAGE). Lancet. 2018;391:2325-34.
- Buse GL, et al. Can J Surg. 2018;61:185-94.
- Mahrokhi S, et al. Am Surg. 2026. doi:10.1177/00031348261460466.