

Colonic anastomotic perfusion: laser speckle contrast imaging versus fluorescence

A prospective four-step intraoperative comparison in 24 consecutive colonic resections

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AIM

ICG fluorescence is limited by **subjective interpretation** and **passive dye diffusion**. LSCI reads perfusion in real time, **dye-free and repeatable at will**. We compared both, and both against the naked eye.

METHODS

Prospective comparative study · Feb 2025 – Feb 2026 · 24 consecutive colonic resections with anastomosis · identical four-step protocol

1

Macroscopic selection

Transection point chosen by naked eye

2

LSCI assessment

Active perfusion, dye-free, real time

3

ICG early phase

Fluorescence read at 30 seconds

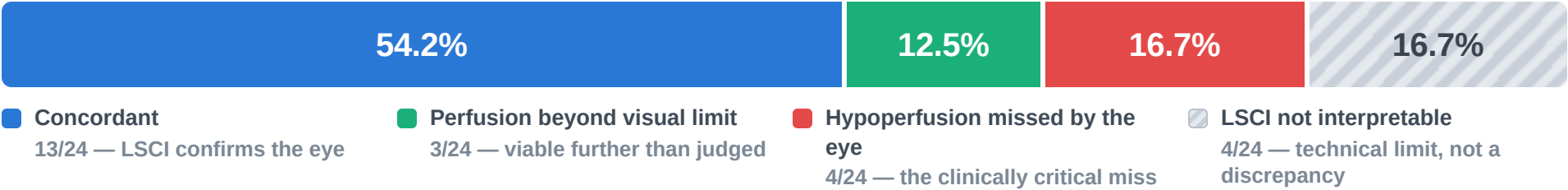
4

ICG at 60 seconds

Submucosal diffusion vs LSCI active-perfusion limit

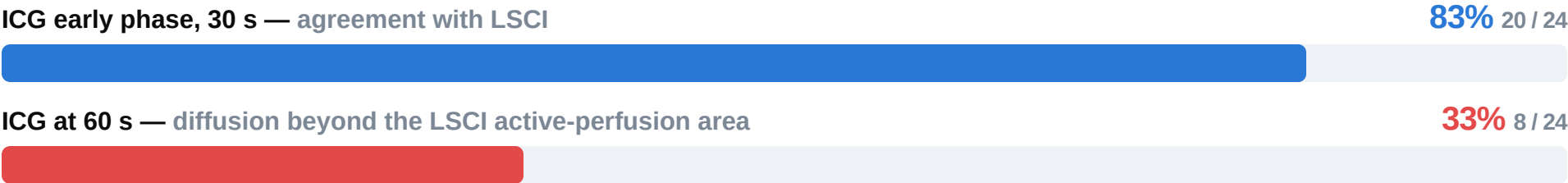


RESULT 1 — WHAT THE NAKED EYE MISSES (MACROSCOPIC VS LSCI, N = 24)

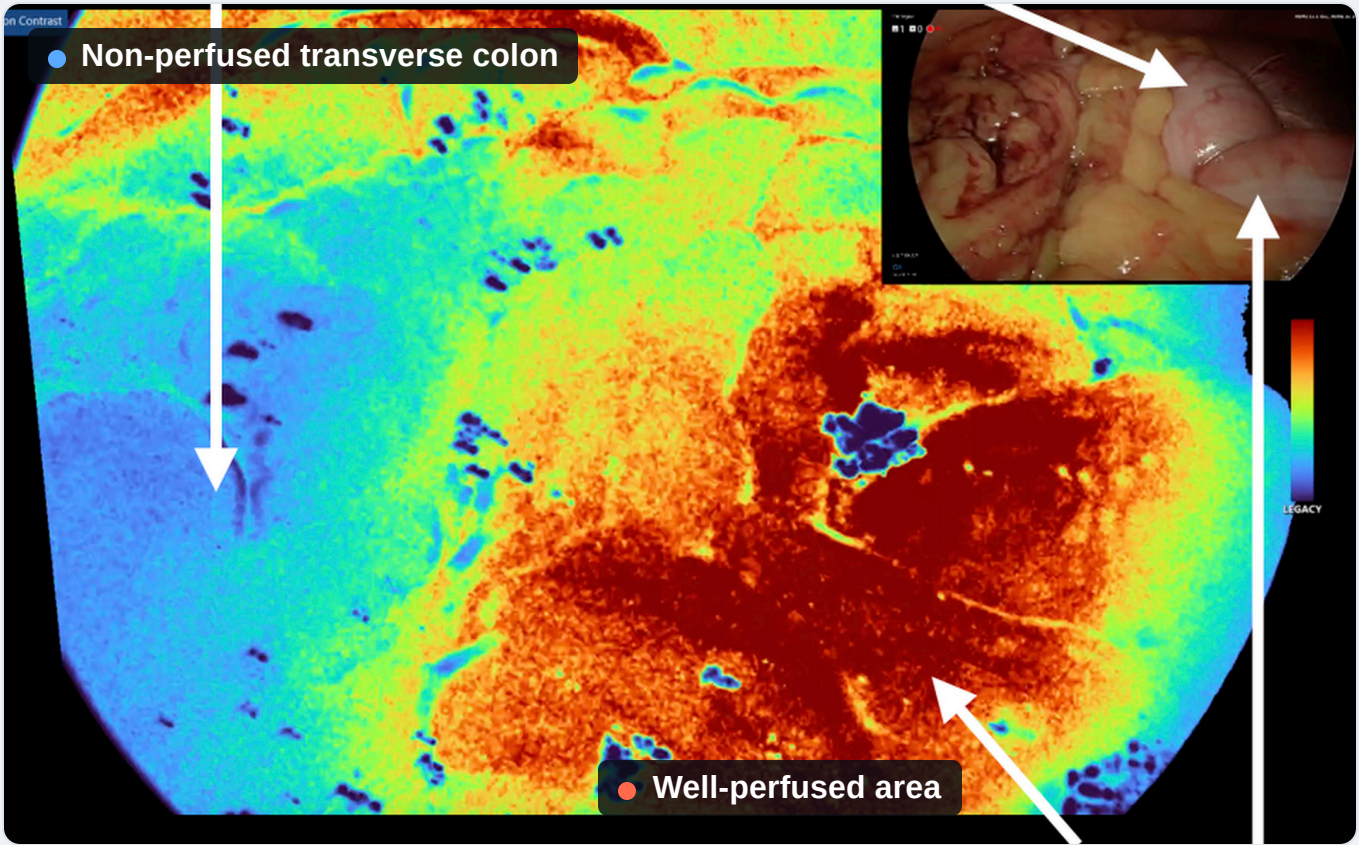


Read it this way: LSCI genuinely contradicted the naked eye in 7/24 (29%); in 4 more it gave no readable signal.

RESULT 2 — LSCI VS ICG FLUORESCENCE: THE SAME PICTURE DRIFTS WITH TIME



By 60 s, a third of ICG signal lay beyond the actively perfused area — diffusion, not perfusion. · One anastomotic leak (1/24, 4.2%), not ischaemic.



LSCI, intraoperative. Dye-free perfusion map with white-light inset.

CONCLUSION

LSCI assesses **active perfusion in real time, without dye and with unlimited repetition**, giving a more reproducible read that depends less on subjective interpretation. The consistent finding across the series was the **separation between active perfusion and passive ICG diffusion** — a distinction fluorescence alone cannot make.

Limitations. Early-stage technology (4/24 not interpretable); descriptive, unblinded, no reference standard; n = 24.