Invited Commentary

I Can See (Myelin) Clearly Now

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Intraoperative identification of nerves remains a technical cornerstone of many operations across a variety of surgical specialties. This phase 1 trial[1] of rizedisben—a novel myelin-targeting fluorophore emitting in the blue light spectrum—represents a pivotal step toward enhancing intraoperative nerve visualization. Gold et al[1] demonstrate safety and efficacy of rizedisben in visualizing the obturator nerve during robotic radical prostatectomy. Rizedisben also allowed visualization of periprostatic neurovascular bundles, although less frequently than the larger obturator nerve, suggesting reduced efficacy in smaller or less heavily myelinated nerves.

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Arguably, these smaller nerves are more at risk of injury than larger nerves more readily identifiable with the naked eye.[2] If the sensitivity and specificity of rizedisben can be improved to reliably highlight these nerves, it could potentially reduce rates of iatrogenic nerve injury. Its application would then extend far beyond pelvic surgery, potentially transforming dissection in cases such as inguinal hernia repairs and esophageal or hiatal operations. Optimization for open surgery could expand its use to procedures such as thyroidectomies and axillary dissections, increasing the potential impact of rizedisben on surgical efficiency and patient morbidity.

Rizedisben is novel in that it directly binds to tissue, as opposed to other commonly used intraoperative dyes. For example, indocyanine green allows visualization based on its circulation and route of injection (eg, intravascular or intraluminal) or its absorption (into bile for cholangiography). The potential for direct tissue targeting is an exciting advancement for structure identification not amenable to current fluorescent imaging techniques. Could similar fluorophores be developed that bind to other tissue types, such as lymphatics, vasculature, tumor, or fibrosis?

Technologies to aid anatomic identification, such as image-guided or computer-assisted techniques and artificial intelligence platforms, are rapidly expanding in surgery.[3] Fluorophores have theoretical advantages: they provide real-time dynamic structure visualization in soft tissue deformed by pathology or retraction and can be used in conjunction with computer technologies.[4] To date, however, evidence that intraoperative fluorescence improves surgical outcomes is weak. Studies have suggested fluorophores reduce operative times,[5] rates of anastomotic leak,[6] and conversion to open surgery,[5] but high-quality evidence with controlled comparison groups is lacking. Still, although work remains, Gold et al have made clear that the future of surgery is lit.

ARTICLE INFORMATION

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REFERENCES

1. Gold SA, Pere MM, Assel M, et al. Rizedisben in minimally invasive surgery: a nonrandomized clinical trial. *JAMA Surg*. Published online July 2, 2025. doi:10.1001/jamasurg.2025.1987

2. Sharp E, Roberts M, Żurada-Zielińska A, et al. The most commonly injured nerves at surgery: a comprehensive review. *Clin Anat*. 2021;34(2):244-262. doi:10.1002/ca.23696

3. Kitaguchi D, Harai Y, Kosugi N, et al. Artificial intelligence for the recognition of key anatomical structures in laparoscopic colorectal surgery. *Br J Surg*. 2023;110(10):1355-1358. doi:10.1093/bjs/znad249

4. Deng H, Zeng X, Hu H, et al. Laparoscopic left hemihepatectomy using augmented reality navigation plus ICG fluorescence imaging for hepatolithiasis: a retrospective single-arm cohort study (with video). *Surg Endosc*. 2024;38(7):4048-4056. doi:10.1007/s00464-024-10922-8

5. van den Bos J, Schols RM, Boni L, et al. Near-infrared fluorescence cholangiography assisted laparoscopic cholecystectomy (FALCON): an international multicentre randomized controlled trial. *Surg Endosc*. 2023;37(6):4574-4584. doi:10.1007/s00464-023-09935-6

6. Fransvea P, Chiarello MM, Fico V, Cariati M, Brisinda G. Indocyanine green: the guide to safer and more effective surgery. *World J Gastrointest Surg*. 2024;16(3):641-649. doi:10.4240/wjgs.v16.i3.641