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1140 – Comparative performance of indocyanine green across tracer strategies in sentinel lymph node biopsy for breast cancer: a systematic review

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Introduction: Recent meta-analyses have reported non-inferiority or superiority of indocyanine green (ICG) *versus* conventional tracers for sentinel lymph node biopsy (SLNB) in breast cancer; however, structured analyses across clinically relevant comparator strategies remain limited, particularly with the incorporation of recent evidence.

Objective: To evaluate ICG performance across predefined tracer comparisons in early breast cancer.

Methods: A systematic review was conducted in accordance with the PRISMA statement. PubMed and Embase databases were searched for studies published between 2020 and 2026, using terms related to breast cancer, SLNB, ICG, and conventional tracers. After duplicate removal, records were screened using Rayyan. Eligible studies included clinical trials and observational studies comparing ICG with dual-tracer approach (radioisotope plus blue dye), blue dye alone, or radioisotope alone. Data were synthesized descriptively, with analyses stratified by comparator.

Results: A total of 454 records were identified, with 261 duplicates removed, yielding 193 screened records, of which 26 were included. Across studies, ICG demonstrated detection rates comparable to those of dual tracer approaches in most settings, although combined strategies occasionally achieved higher performance. In subgroup analyses, ICG consistently outperformed blue dye, with higher identification rates and increased detection of additional sentinel nodes and metastatic involvement. When compared with radioisotope alone, ICG showed equivalent performance in sentinel node detection and nodal assessment. Safety outcomes were favorable, with no severe allergic reactions reported and improved intraoperative visualization. Operational advantages, including real-time lymphatic mapping and independence from nuclear medicine infrastructure, were consistently reported.

Conclusion: ICG demonstrates consistent and competitive performance across tracer strategies and may represent a viable alternative to conventional techniques in selected clinical settings. Its superiority over blue dye and equivalence to radioisotope, together with practical and safety advantages, support its integration into clinical practice but do not support the universal replacement of dual-tracer approaches.

Ethics: Public data – Literature review.

Registry: International Prospective Register of Systematic Reviews (PROSPERO) CRD420261355134.

Keywords: breast cancer; sentinel lymph node biopsy; indocyanine green; breast neoplasms.