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PREOPERATIVE TUMOR MARKING WITH INDOCYANINE GREEN (ICG) PRIOR TO ROBOTIC COLORECTAL RESECTION[1]

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A PROSPECTIVE CASE-SERIES STUDY EVALUATING FLUORESCENCE-GUIDED LOCALIZATION IN ROBOTIC COLORECTAL SURGERY.

INTRODUCTION

- Colorectal tumor localization during minimally invasive robotic surgery is challenging due to the absence of tactile sensation.
- Preoperative endoscopic tattooing provides critical intraoperative guidance.
- India ink has been traditionally used but is associated with inflammatory complications and permanent tissue staining.
- Indocyanine Green (ICG) fluorescence offers a safe, transient, and easily visualized alternative under Near-infrared (NIR) imaging.

OBJECTIVE

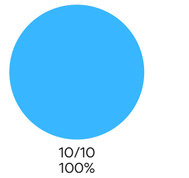
- To assess the feasibility and effectiveness of preoperative ICG colonoscopic tumor marking for intraoperative identification during robotic colorectal resections.

METHODOLOGY

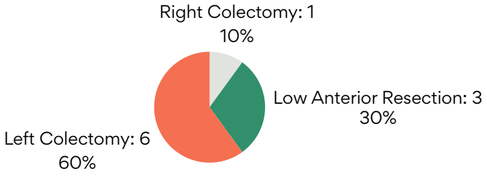
- Study design: Prospective case-series (Feb–Jun 2022)
- Setting: Athens Medical Center
- Participants: 10 patients undergoing robotic colorectal resection for cancer
- ICG injection: 0.1 ml of 2.5 mg/ml ICG solution injected into submucosal layer at two opposite distal sites (180° apart)
- Performed <24 h before surgery
- Assessment: Visualization of fluorescence during surgery using NIR mode

KEY FINDINGS

- Tumor identification under Near-infrared light (NIR): 100%
- Fluorescence intensity: Very bright in all cases
- Mean identification time: 2 minutes (range 1.5–5)
- Adverse events or ICG spillage: None
- Conversion to open surgery: 0%



Tumor Identification Success Rate



Operation Types

ANALYSIS

ICG marking allowed rapid and accurate tumor localization in all robotic resections.

Compared to India ink, ICG provides:

- Excellent visibility under NIR light
- No permanent tissue discoloration
- Absence of inflammatory reactions
- This method improved intraoperative orientation and reduced uncertainty in tumor localization.

CONCLUSION

- Preoperative tumor marking with Indocyanine Green is safe, reproducible, and highly effective for guiding robotic colorectal resections.
- It enables precise intraoperative localization with no related complications.
- Further randomized comparative studies with India Ink are needed to confirm these advantages.

Three images of the same patient marked with ICG.
A. Preoperative endoscopic view of marked tissue with ICG
B. Intraoperative view of rectosigmoid junction during robotic surgery under white light
C. Intraoperative view of rectosigmoid junction during robotic surgery under NIR visualization mode

[1]KONSTANTINIDIS MK ET AL., FRONTIERS IN SURGERY (2022), 9:1087889 DOI: 10.3389/FSURG.2022.1087889