



# Perfusion Assessment in Colorectal Anastomosis using **FLUORESCENCE**: a prospective study of diagnostic accuracy and clinical impact

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**OBJECTIVE:** Analyze the clinical impact of fluorescence-guided surgery in colorectal anastomosis and conduct a study of diagnostic accuracy to quantify objectively the findings visualized by fluorescence

**DESIGN:** Prospective cohort test accuracy study

**PATIENTS:** 30 unselected patients in which a colocolonic or colorectal anastomosis was performed over a period of 12 months (2015-16)

**INTERVENTIONS:** All patients underwent a intraoperative perfusion assessment of the anastomosis using **FLUORESCENCE** at the time of preparing the proximal margin (STEP1) AND then the anastomosis (STEP2) using a visual nominal scale

Table 2 Description of Operative Technique and Findings During Utilization of Fluorescence Angiography (N=30) **Colorectal Cancer 20 (66.7%)**

| Operative technique and findings    | Data       |                          |
|-------------------------------------|------------|--------------------------|
| Surgeon, n (%)                      | 19 (63.3%) | Senior Colorectal        |
| Laparoscopy, n (%)                  | 19 (63.3%) | Conversion 3.3%          |
| Ileostomy, n (%)                    | 10 (33.3%) | 10 (33.3%) TME           |
| Operative time, mean (range), min   | 145 (140)  |                          |
| Splenic flexure mobilization, n (%) | 5 (16.7%)  |                          |
| High ligation of IMA, n (%)         | 21 (70%)   | Colorectal Cancer (n=31) |
| Distal section (1 charge), n (%)    | 19 (70.4%) |                          |

  

| STEP 1   |           |                              |
|--|-----------|------------------------------|
| Image acquired, n (%)                            | 30 (100%) |                              |
| ICG side effects, n (%)                          | 1 (3.3%)  | Hypotension and desaturation |
| Maximum level of fluorescence, mean (range), sec | 63.5 (7)  |                              |
| Change to resection margin, n (%)                | 1 (3.3%)  | Patched                      |

  

| STEP 2   |            |  |
|--|------------|--|
| Anastomosis level  |            |  |
| - < 5, n (%), cm   | 5 (16.7%)  |  |
| - 5-10, n (%), cm  | 6 (20%)    |  |
| - > 10, n (%), cm  | 19 (63.3%) |  |
| Fluorescence anastomosis revision from ICG infusion, mean (range), min | 20 (30)    |  |
| Change in surgical plan, n (%)   | 0 (0%)     |  |

  

|                              |            |
|------------------------------|------------|
| Satisfactory donuts, n (%)   | 24 (85.7%) |
| Negative sealing test, n (%) | 29 (96.7%) |
| Drainage, n (%)              | 19 (63.3%) |
| Contamination, n (%)         | 1 (3.3%)   |
| Blood loss, mean (range), cc | 50 (180)   |

TME, total mesorectal excision; Min, minutes; IMA, inferior mesenteric artery; ICG, indocyanine green; Sec, seconds; Cm, centimeters; Cc, cubic centimeters.

**STEP 1: Perfusion Assessment of the PROXIMAL Margin**

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Change in Surgical Plan?

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**MAIN OUTCOME MEASURES:** We have analyzed the impact of fluorescence in making surgical decisions at the time of colorectal anastomosis and their clinical impact on postoperative outcomes

|  |   |    |
|--|---|----|
| Anastomotic leak   |   |    |
| - Clavien-Dindo Grade III (I/V)                                    | 0 | 0  |
| - Clavien-Dindo Grade II   | 3 | 10 |
| - Change to resection margin based on ICG                          | 0 | 0  |
| Complications related to ICG infusion (hepatic and renal function) |   |    |
|  | 0 | 0  |

|                                   |            |
|-----------------------------------|------------|
| Hospital stay, days, mean (range) | 6 (17)     |
| - < 7 days, n (%)                 | 22 (73.3%) |

**SECONDARY ENDOPOINT:** We have studied the **CORRELATION** between intraoperative findings, obtained using a **visual nominal scale front**, the **percentage value of ICG analyzed postoperatively through captured images** during the surgical procedure:

STEP 1 = moderate (Kappa 0.47)

STEP 2 = moderate (Kappa 0.48)



Fluorescence guided surgery is a **SAFE** and **REPRODUCIBLY** tool with **MINIMAL** added complexity that could have an **IMPACT** on **SURGICAL STRATEGY** and **CLINICAL RESULTS** in colorectal anastomosis. The visual scale used intraoperatively for this purpose moderately correlated with quantitative fluorescence data postoperatively obtained through a computer analysis

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