

PINPOINT Endoscopic Fluorescence Imaging System

Illumination beyond the limits of the human eye





Committed to improving outcomes through innovation and collaboration

NOVADAQ technologies enable surgeons to go beyond the visual boundaries of the human eye. With an emphasis on innovation and collaboration with the medical community, NOVADAQ provides clinically relevant technologies that assist physicians in achieving improved patient outcomes and decreased healthcare costs.

The PINPOINT Endoscopic Fluorescence Imaging System combines — into a single laparoscopy platform — the latest in high-definition white-light video with SPY Fluorescence imaging, resulting in bright, clear images that evolve a surgeon's operating room experience.

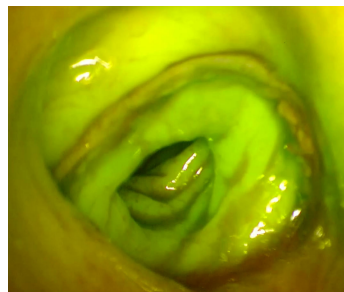




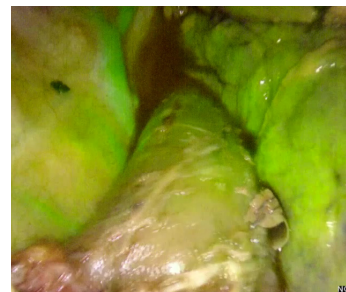
Visualize anatomical structures and tissue perfusion in a different light

SPY Fluorescence is the core technology that drives NOVADAQ's suite of imaging products. In combination with high-definition white-light video, it provides the ability to visualize blood flow in vessels and micro-vasculature structures, tissue and organ perfusion, lymphatics, and perfusion associated with tumors and tumor margins throughout the body. The fluorescent imaging agent binds to protein in blood and is metabolized and excreted by the liver thereby providing laparoscopic visualization of the hepatic artery and bile ducts.

In colorectal and esophageal surgery, SPY Fluorescence enables a precise visual assessment of blood flow in vessels as well as the quality of tissue perfusion. In laparoscopic gallbladder surgery, bile duct misidentification and hepatic artery injury with white-light endoscopy alone is most commonly associated with early experience, aberrant anatomy and obesity. Intra-operative cholangiography may be used to navigate vessels and structures and avoid injury during minimally invasive surgery.



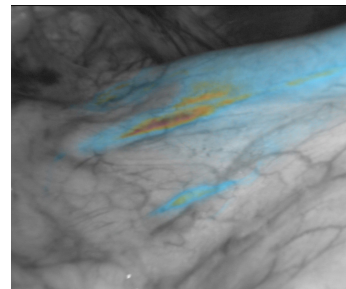
PINPOINT Fluorescence mode in colon resection – transanal view



PINPOINT Fluorescence mode in minimally invasive esophagectomy



SPY Fluorescence mode in laparoscopic cholecystectomy



SPY CSF Mode SLN mapping in gastric cancer

The complete laparoscopy solution for your surgical needs

The PINPOINT Endoscopic Fluorescence Imaging System provides surgeons with actionable, real-time visualization of tissue perfusion and structural anatomy during a variety of surgical procedures. This capability is a result of three additional display modalities that go beyond HD white-light video alone: PINPOINT Fluorescence Mode, SPY Fluorescence Mode and SPY CSF Mode illuminate anatomical structures and tissue perfusion in a manner otherwise not visible by the human eye.

Brilliant HD White-Light Image

- Full HD resolution delivers bright, clear images

Illuminated by SPY Fluorescence

- Fluorescence imaging modalities may assist surgeons with critical decisions during surgery

Operating Room Versatility

- Enhanced control allows surgeons to select optimal display modes for each specialty
- Connectivity to a variety of digital devices and networks provides greater flexibility in the operating room

..... 26" HD-LED Medical-Grade Display

..... PINPOINT Camera

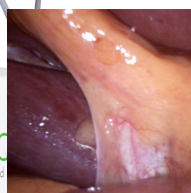
..... 0° PINPOINT Fluorescence Laparoscope
..... 30° PINPOINT Fluorescence Laparoscope
..... 0° PINPOINT HD White-Light Laparoscope
..... 30° PINPOINT HD White-Light Laparoscope

..... PINPOINT 50L CO₂ Insufflator

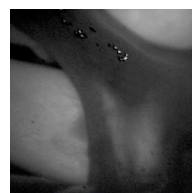
..... Video Processor Illuminator (VPI)

..... High-Definition Video Recorder

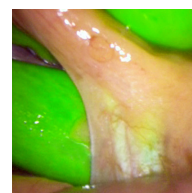
..... Image Printer



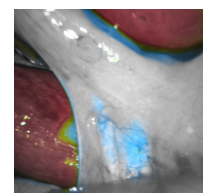
HD White-Light



SPY Fluorescence



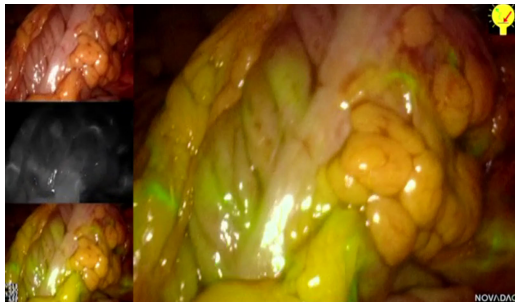
PINPOINT Fluorescence



SPY CSF

One technology, multiple minimally invasive applications

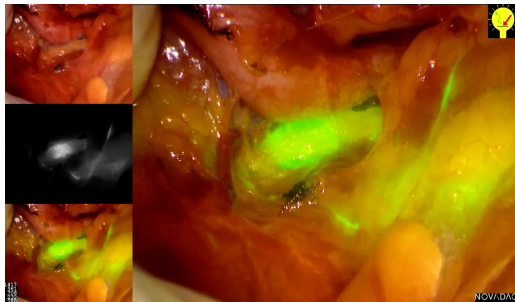
PINPOINT offers brilliant, high-definition, white-light video with the added advantage of SPY Fluorescence imaging technology, which has been demonstrated as beneficial in a variety of surgical applications.



Colon Resection

Assessing tissue perfusion assists surgeons in making informed decisions that can positively impact outcomes.

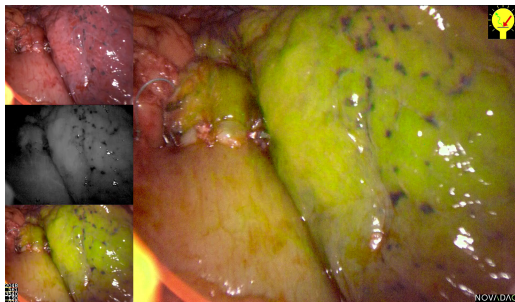
Left: Distal colon prior to anastomosis



Sentinel Lymph Node Detection

Precision mapping and targeting of Lymph Channels and Sentinel Lymph Nodes may assist surgeons and pathologists in the avoidance of overstaging of diseases.

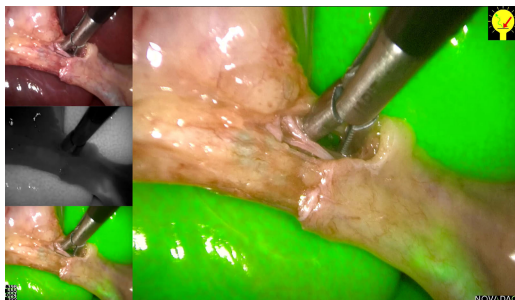
Left: Sentinel Lymph Node easily detected between external iliac artery



Minimally Invasive Esophagectomy

Visualizing micro-vascular blood flow of the distal esophagus and proximal gastric conduit may assist surgeons in improving patient outcomes.

Left: Distal esophagus and proximal gastric conduit post-anastomosis



Laparoscopic Cholecystectomy

Identifying vital biliary anatomy, including the critical view of safety, may be easier in SPY Fluorescence or PINPOINT Fluorescence mode.

Left: Triangle of Calot

Dedicated to improving outcomes

Published literature has long confirmed the significant social and economic burden associated with post-operative complications. More than 100 peer reviewed medical journals have demonstrated an improvement in patient outcomes and a reduction in hospital costs as a result of SPY Fluorescence technology. NOVADAQ's suite of imaging products, including PINPOINT, uphold a strong track record of assisting surgeons in making critical decisions that may reduce the occurrence of costly complications.

PILLAR II Study Results



139 Patients

1.4% of Low Anterior Resections resulted in an anastomotic leak when using **PINPOINT²**

8% change in operative plan due to **PINPOINT**, resulting in a **0%** anastomotic leak rate among those patients

Jafari MD, Wexner SD, Martz JE, McLemore EC, Margolin DA, Sherwinter DA, et al. Perfusion assessment in laparoscopic left sided/anterior resection (PILLAR) II: A multi-institutional study. Ann Surg. Submitted.

Low Anterior Resection Anastomotic Leak Rate



12.6%

of Low Anterior Resections resulted in an anastomotic leak, as shown by the BSLR study

Senagore A, et al. Bioabsorbable staple line reinforcement in restorative proctectomy and anterior resection: a randomized study. Dis Colon Rectum. 2014 Mar;57(3):324-30.

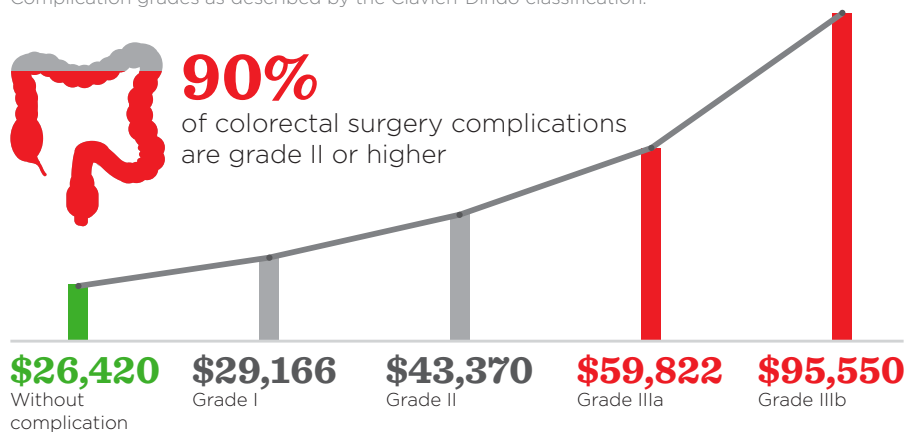
Cost of Colorectal Surgery by Complication Grade

Complication grades as described by the Clavien-Dindo classification.



90%

of colorectal surgery complications are grade II or higher



Vonlanthen R, Slankamenac K, Breitenstein S, Puhan MA, Muller MK, Hahnloser D, Hauri D, Graf R, Clavien P. The Impact of Complications on Costs of Major Surgical Procedures A Cost Analysis of 1200 Patients, Ann Surg. 2011 Dec;254(6):907-13

Study Results

Intraoperative Assessment of Perfusion and Correlation with Anastomotic Leaks After Esophagectomy



144 Total Patients

2% of patients identified by **SPY** as having "good perfusion" leaked

45% of patients identified by **SPY** as having "less robust perfusion" leaked

Jorg Zehetner, MD, Steven R. DeMeester, MD, Evan T. Alicuben, MD, Daniel S. Oh, MD, John C. Lipham, MD, Jeffrey A. Hagen, MD, Tom R. DeMeester, MD. Intraoperative Assessment of Perfusion of the Gastric Graft and Correlation with Anastomotic Leaks After Esophagectomy. *Ann Surg* July 2014

Study Results

Enabling Surgeons to Visualize Sentinel Lymph Nodes More Efficiently



227 Patients*

81% overall detection rate with Methylene Blue

95% overall detection rate with Indocyanine Green

61% bilateral detection rate with Methylene Blue

79% bilateral detection rate with Indocyanine Green

Jewell et al. 2014. J. J. Abu-Rustum, MD, et al. Visualization of Sentinel Lymph Node in Minimally Invasive Surgery using indocyanine green and near-infrared fluorescence. *Int J Gynecol Cancer* 2014. Patients with Cervical Cancer. *Journal of Gynecological Oncology*. 2014.

11.5 days average hospital stay as a result of laparoscopic cholecystectomy complication



\$587,491 average cost of common bile duct injury including litigation

Podnos YD. Is intraoperative cholangiography during laparoscopic cholecystectomy cost effective? *Am J Surg*. 2001 Dec;182(6):663-9

Indications For Use

The PINPOINT Endoscopic Fluorescence Imaging System is intended to provide real-time endoscopic visible and near infrared fluorescence imaging. This imaging system enables surgeons to perform routine visible light endoscopic procedures as well as further visually assess circulation, including blood flow in vessels and microvessels, tissue and organ perfusion, lymphatics, and perfusion associated with tumors and tumor margins with near infrared fluorescence imaging during minimally invasive surgery.

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