The Future of Minimally Invasive Surgery

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The future of all Surgery is Minimally Invasive Surgery

Future Directions

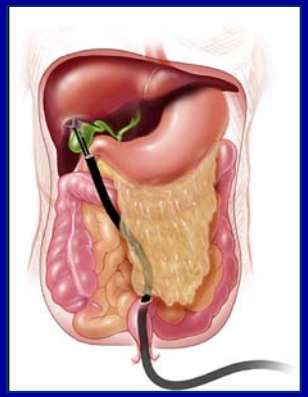
- Technology based
  - NOTES
  - Endoluminal
  - Computer assisted Surgery
- Increase understanding of Physiology and Wound Healing
- Imaging
- Training
- Disease Management
- Early Detection
- Functional organ replacement

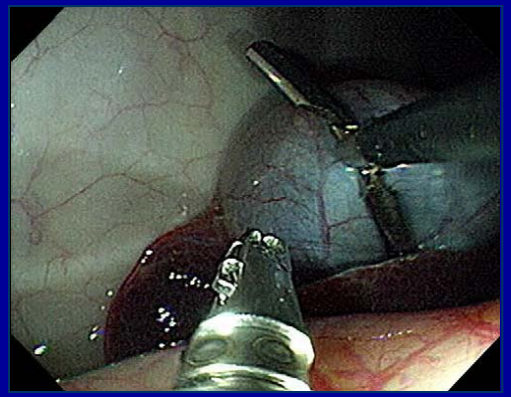
NOTES: What are we talking about?

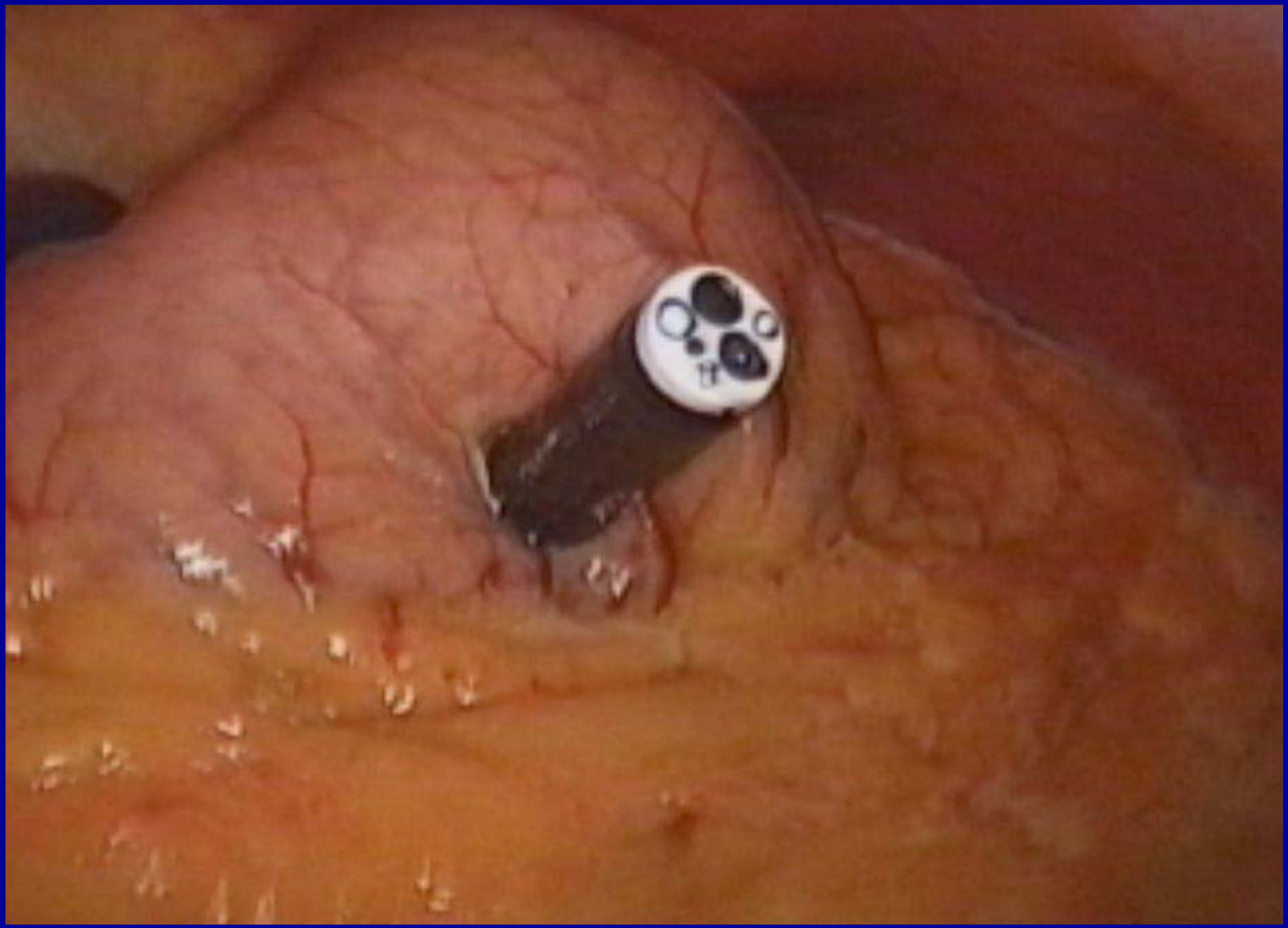
- Natural Orifice
- Hybrid
- Single Port
- e NOTES
- SPA
- LESS
- YADA YADA

Access Routes

- Trans-vesical
- Trans-vaginal
- Trans-colonic
- Trans-gastric







Endoluminal Surgery

- Natural Orifice Endoluminal Surgery
- Significant part of Urology and ENT
- Emerging importance in general surgery
- Gastrointestinal malignancies
- Full thickness resection
- Gastroesophageal Reflux
- Traditional Flexible Endoscope as the Platform

Notes update

NOSCAR 2013

US Experience

- 83 us pts in trial data being collected NOSCAR
- UCSD 114 cases, 25 poems, 20+ TV choley
- Yale
  - 78 TV chole, 24 Appy, 6 ventral hernia
- NW poems, 12 TV choleys
- MGH 7 transanal, 4 TV choley
- OSU 150 diagnostic , (80 no LS, 70 LS assisted)
- Oregon, 23 TG choley, 100POEM
- Baystate, 19 TV choley

South America, NOSLA

- 7 Transgastric choley, abandonded

- Current state is decreased application
- 320 tv choley since 2007
- Now only 21 in last year,
- Almost all choley, some TV appy and sleeve
- Instrumentation is limited and access has decreased

    - Ferreres, NOSCAR July 2013

Euro NOTES

- 250 poem (+500%)
- 100tg choley
- 4500 TV choley (German, Austria , swiss)(+66%)
- 200 TA colon(+1000%)

- Zornig TV vs LS choley 200pts
  - Only advantage is cosmesis

German Registry: Bulian 2013

- 2411 TV choley
- TV appy 169
- 145 TV choley

- DGAV NOTES Registry

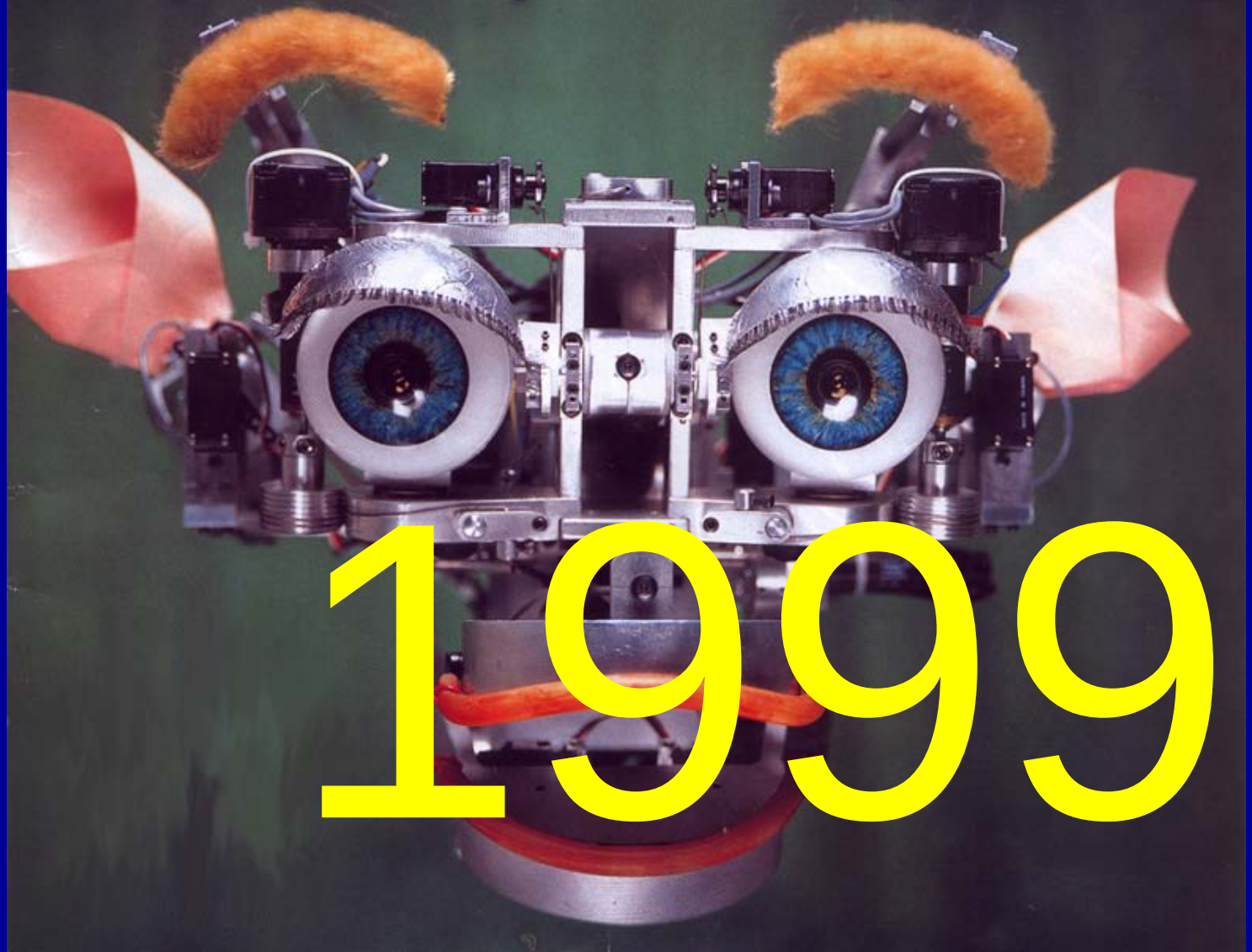
Asian Update

- Limited TV work
- POEM, STER, EFTR

- 900 POEM
- Multiple ESD for submucosal tumores
- 143 pts Li QL, GIE 2013

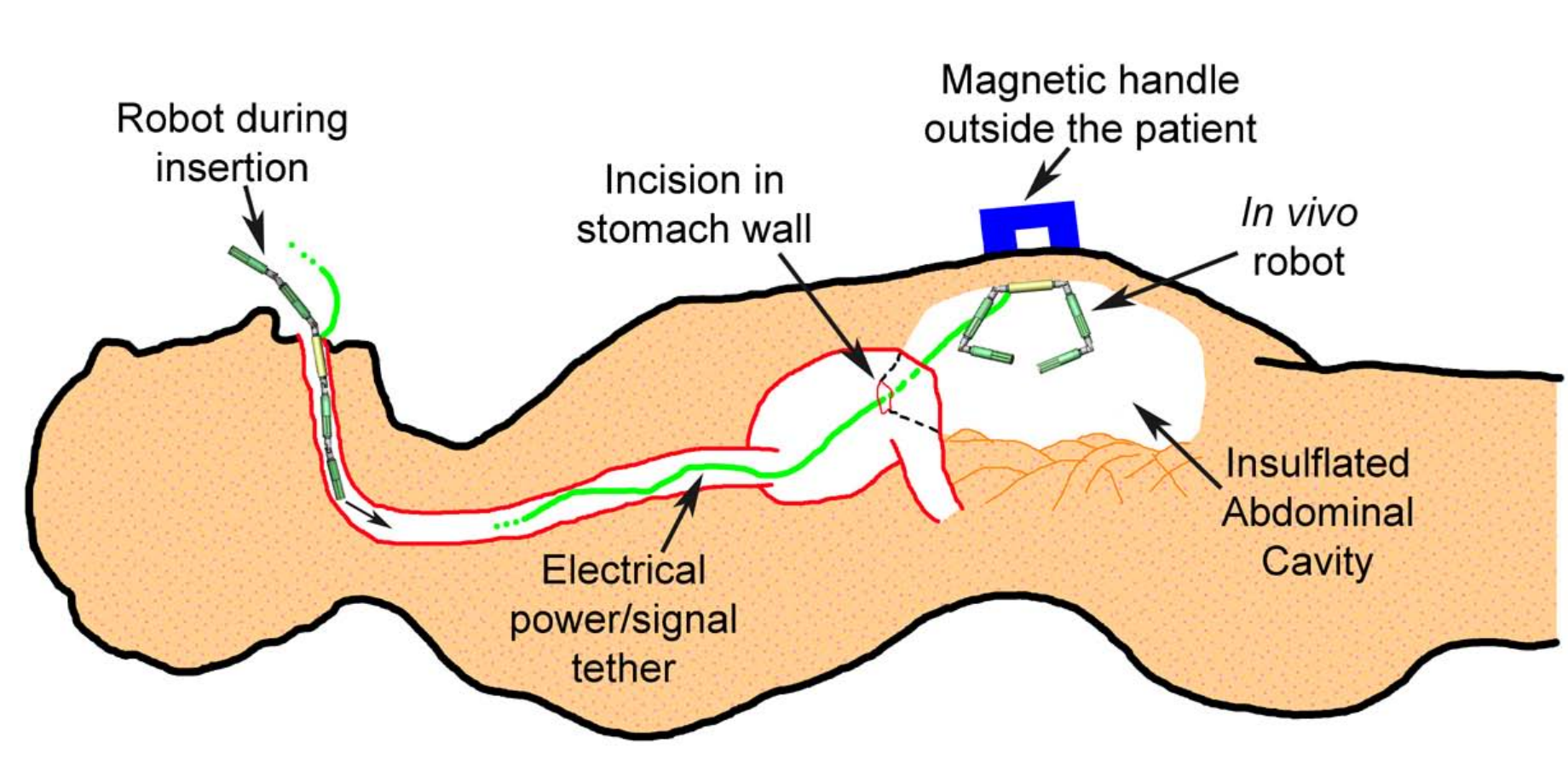
The Age of Robots

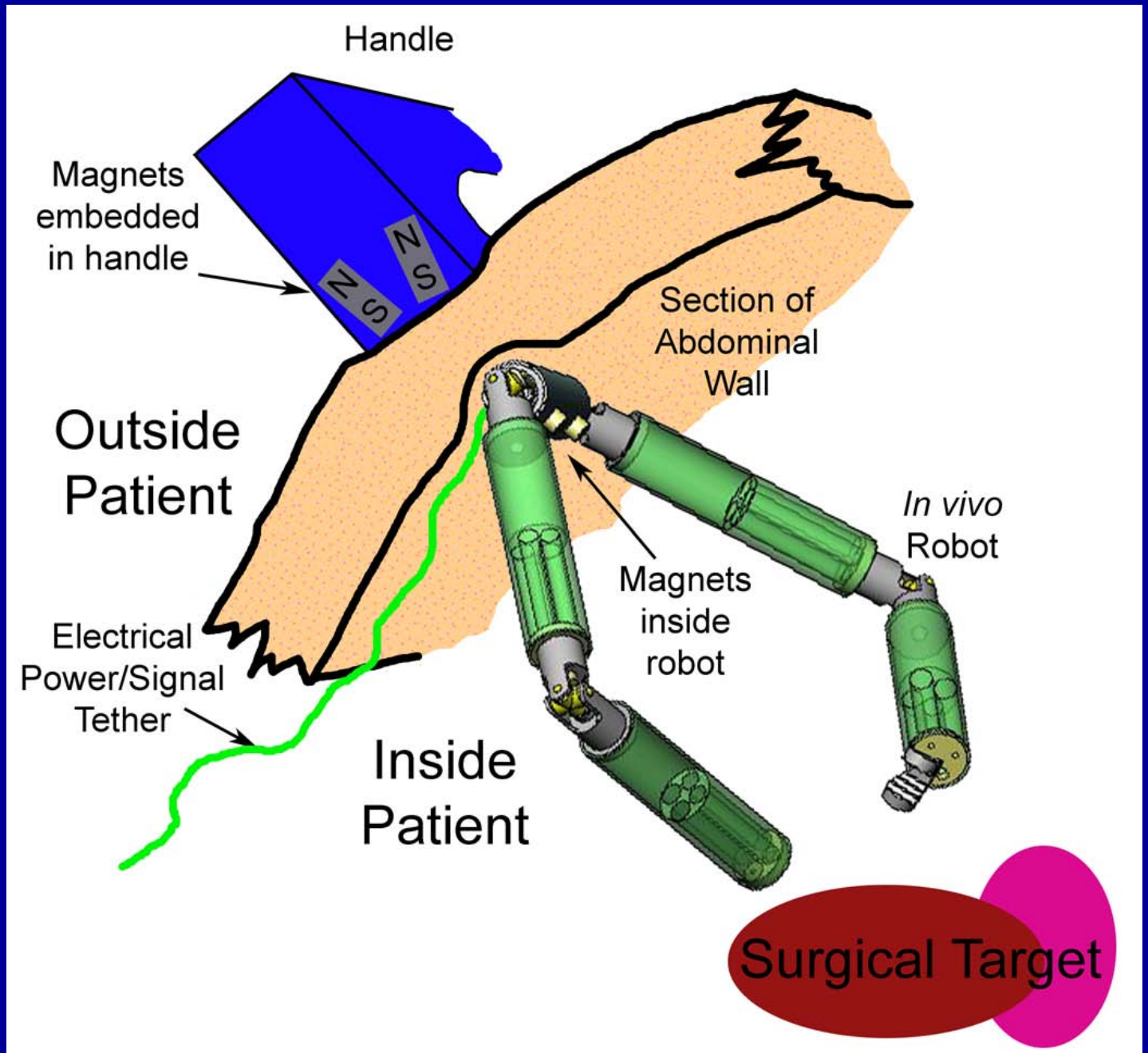
The promise and peril of thinking machines



1999

In Vivo Minirobot




Handle
Magnets embedded in handle
N
S
N
S
Section of Abdominal Wall
Outside Patient
In vivo Robot
Magnets inside robot
Electrical Power/Signal Tether
Inside Patient
Surgical Target


Look Ma’
No Hands

Advanced Imaging: Today

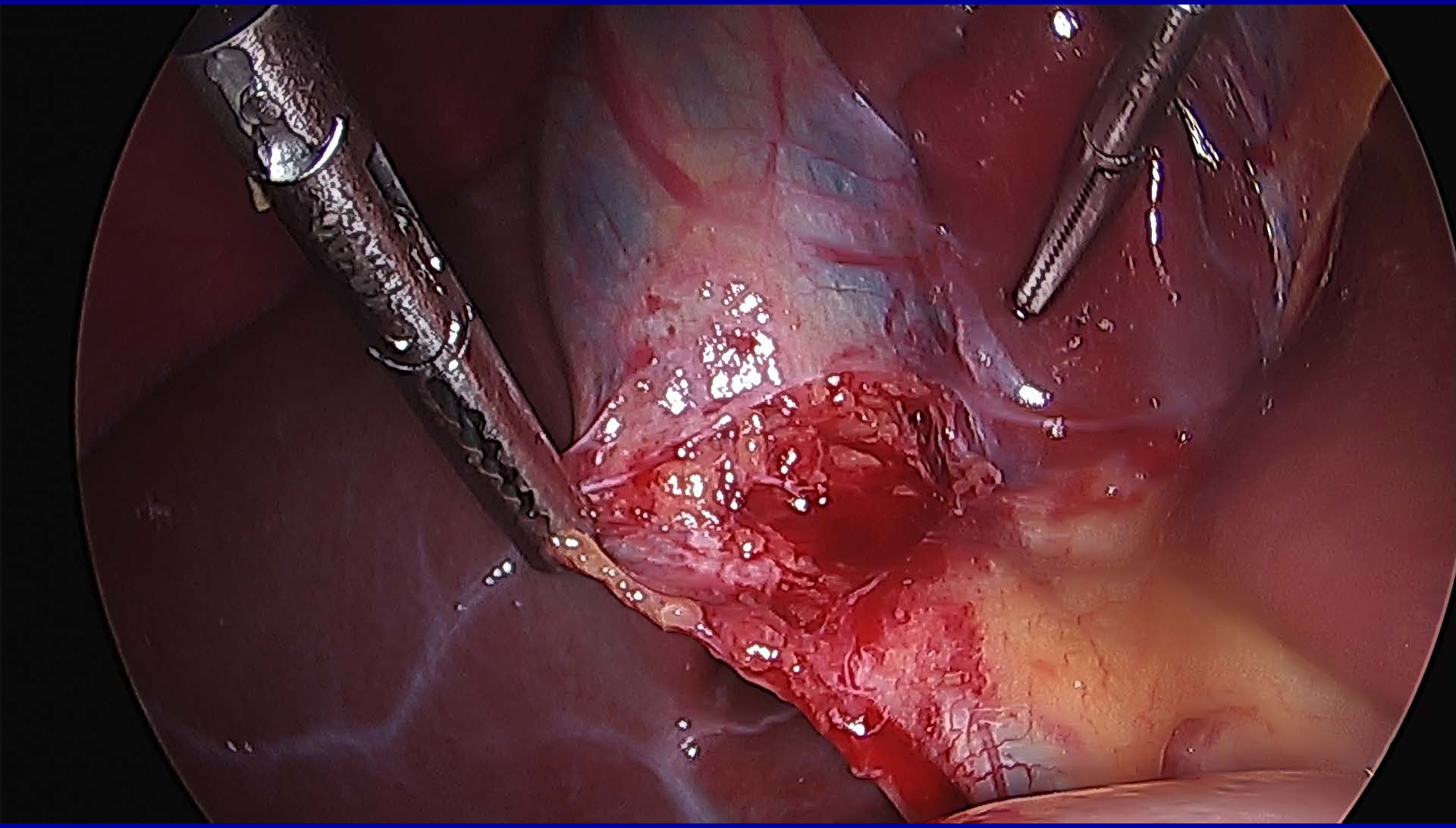
- Near Infrared Fluorescence Cholangiography(NIRF-C)
- Real time imaging using flourescence
- 800nm visualization
- Enabled via high resolution combined white light and laser light source
- Video camera with NIR capability
- Optimize for resolution and ease of use

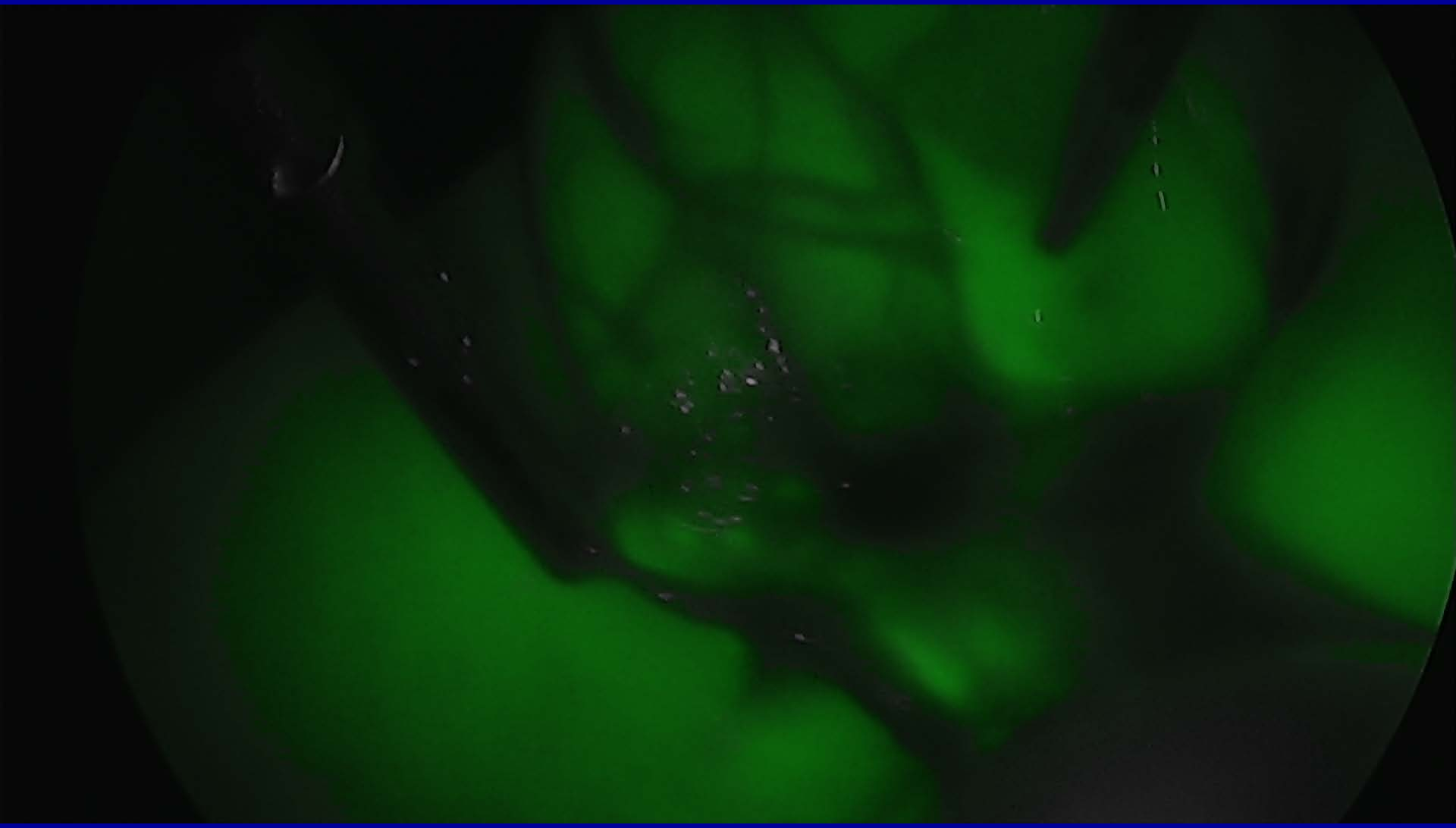
Bile Duct Injuries

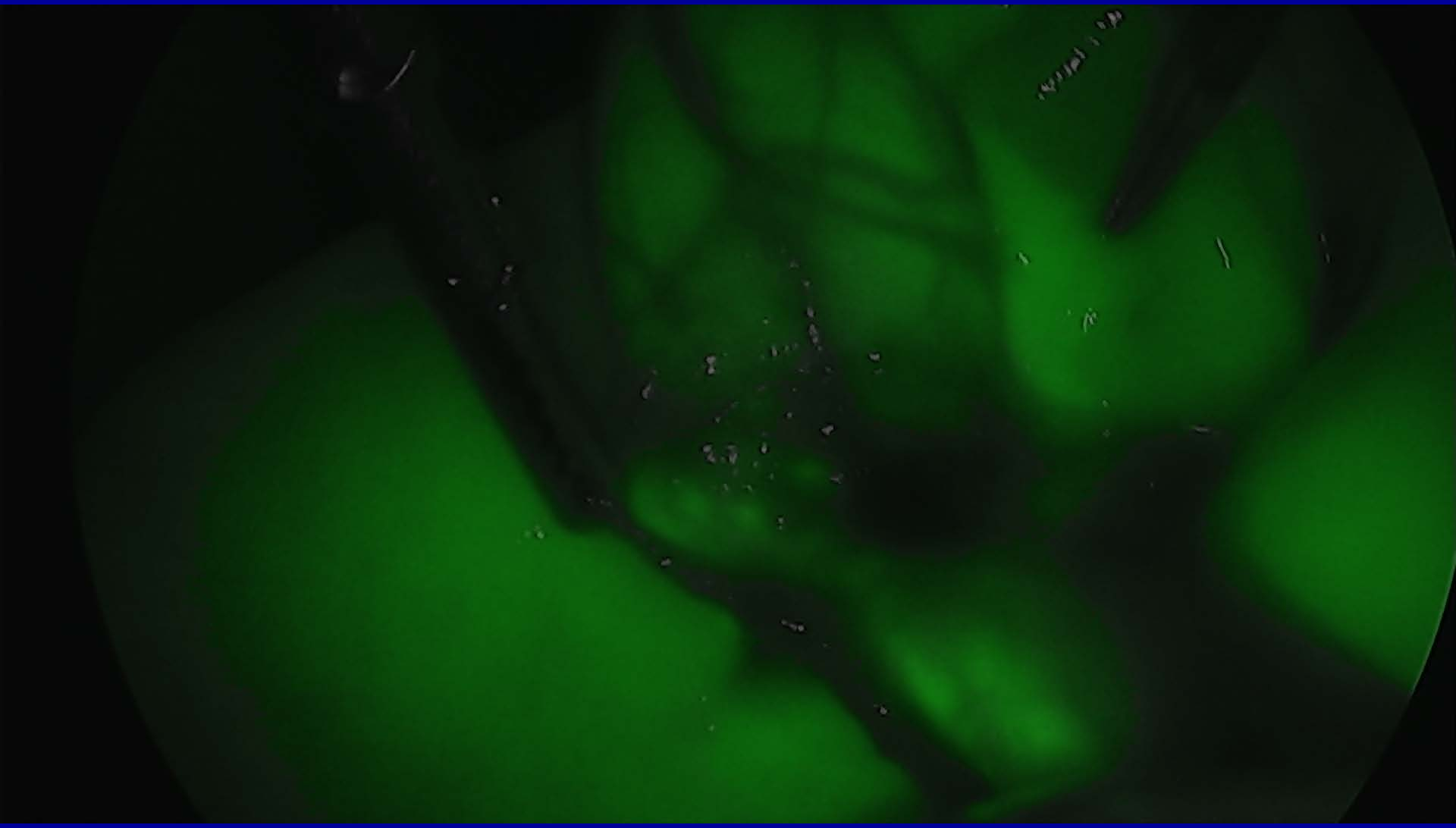
- Still a significant incidence
- Xray Fluoroscopy cholangiography
- Data in prevention remains unclear
- Recent editorial imploring mandatory cholangiography
- Not widely practiced, time, $$, low yield
- Real time imaging enhancement might improve safety, assuming it was used

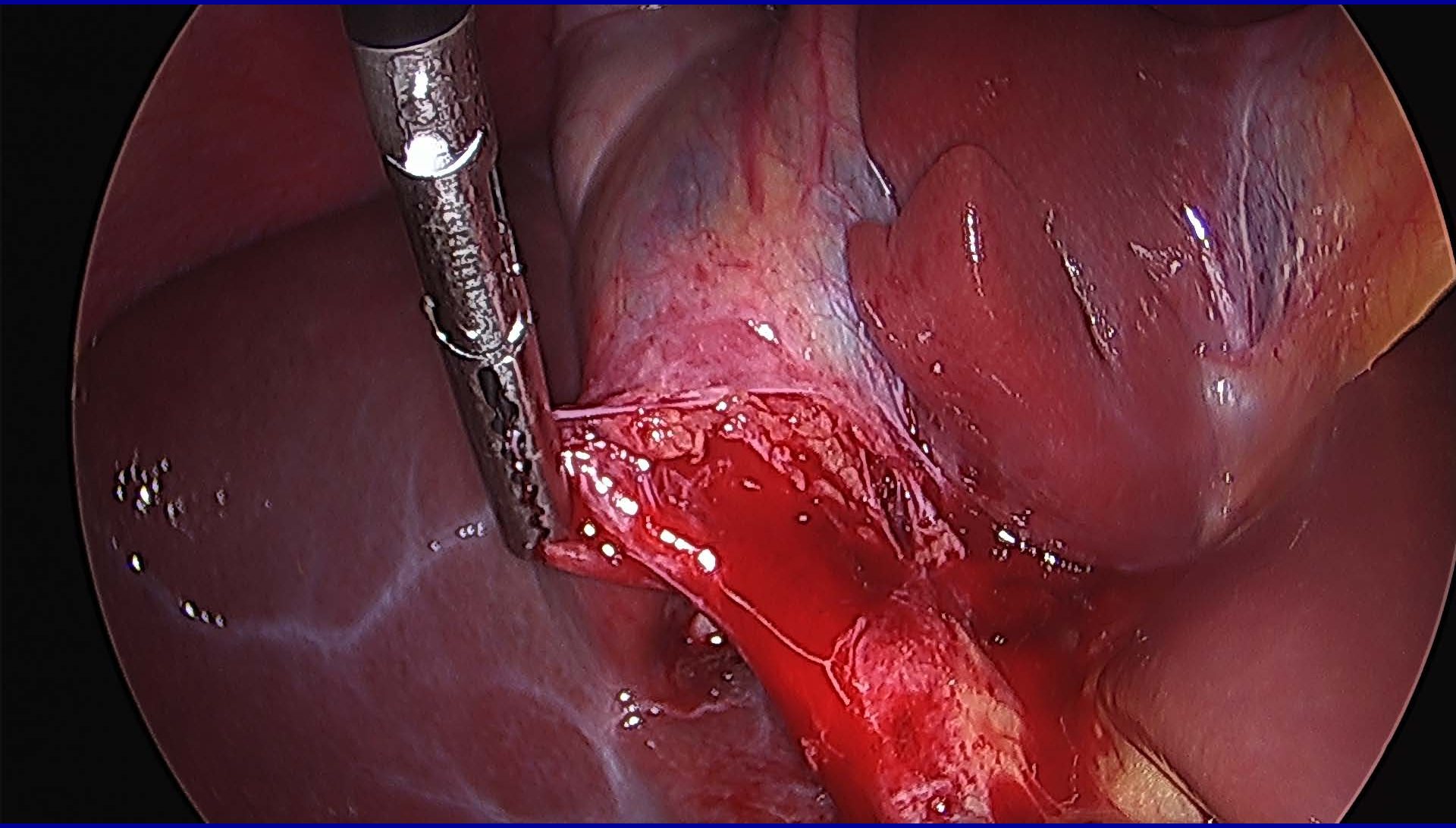
NIRF-C

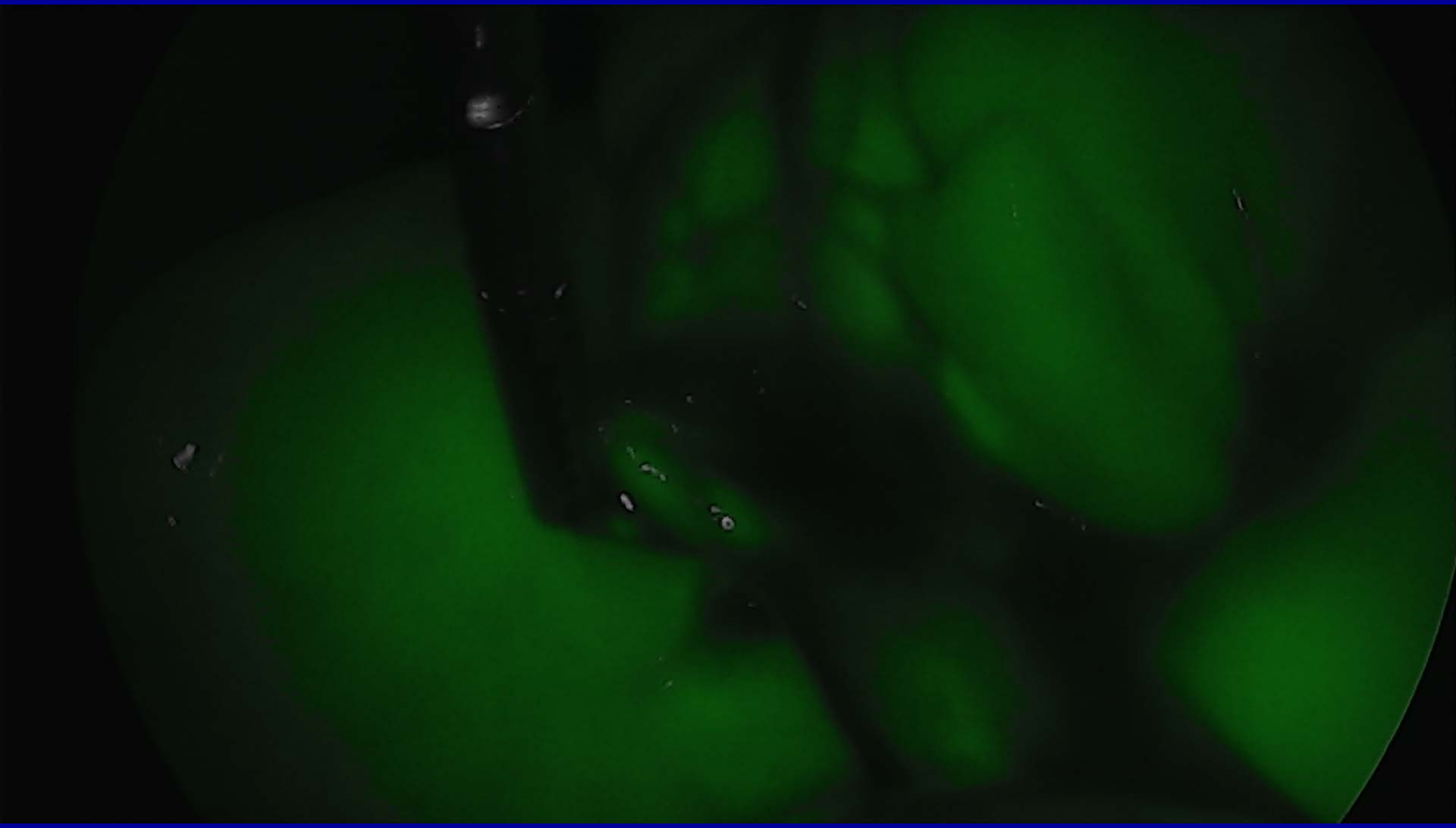
- High resolution video system
- Light source with integrated low output red laser
- Optimized light cables and scopes
- Camera head switch
- System optimized for background light and color and resolution

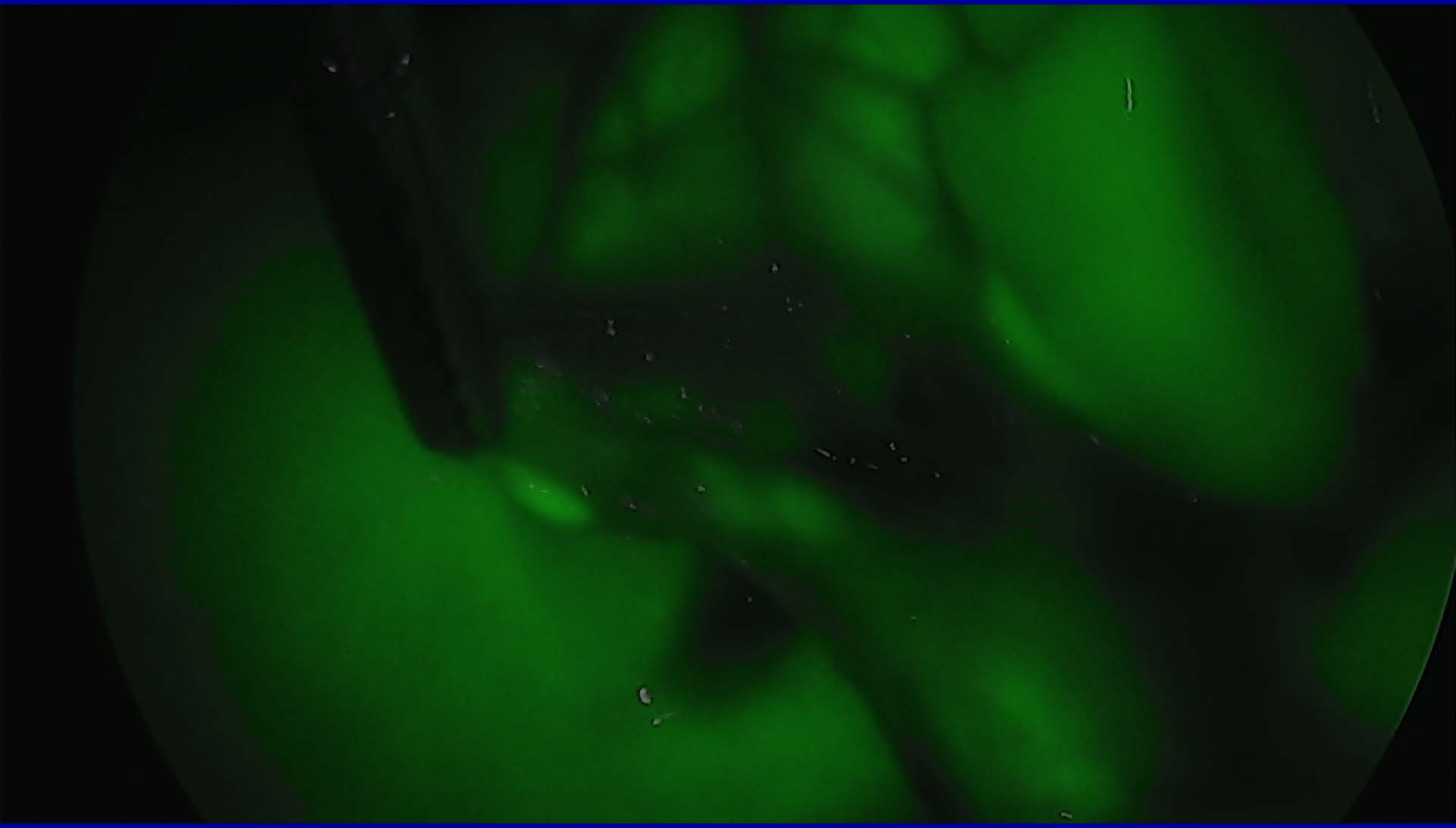


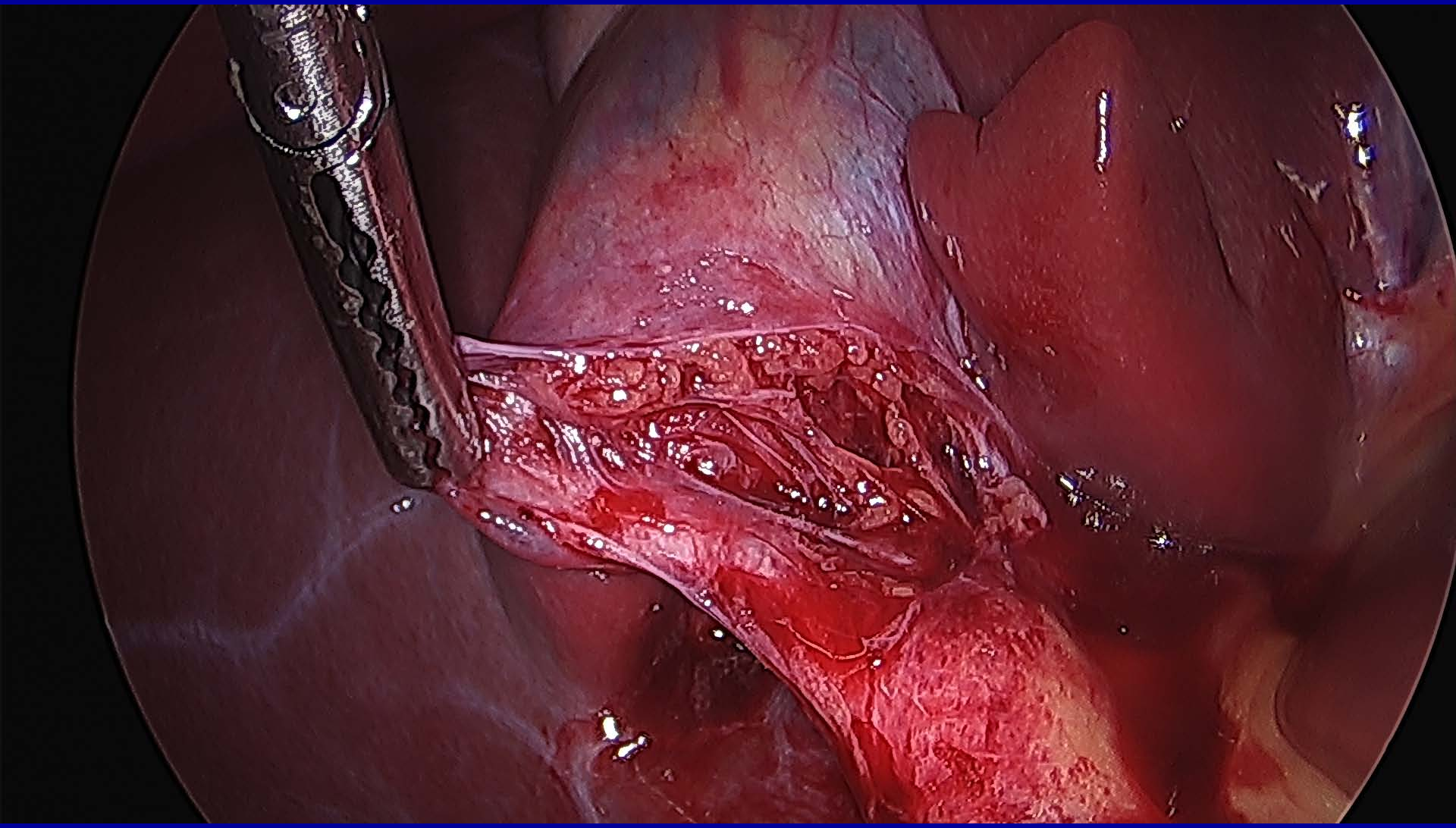


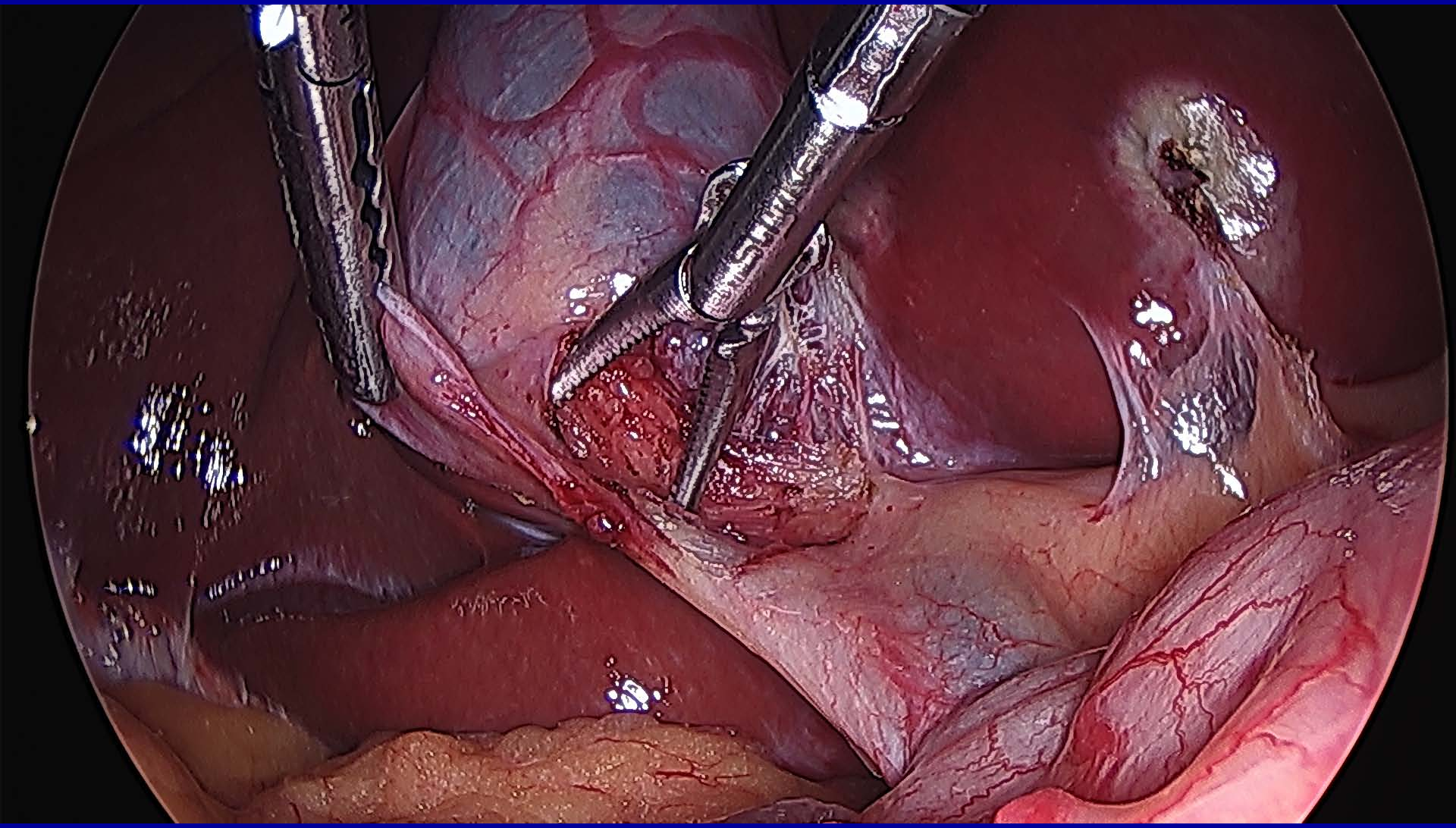


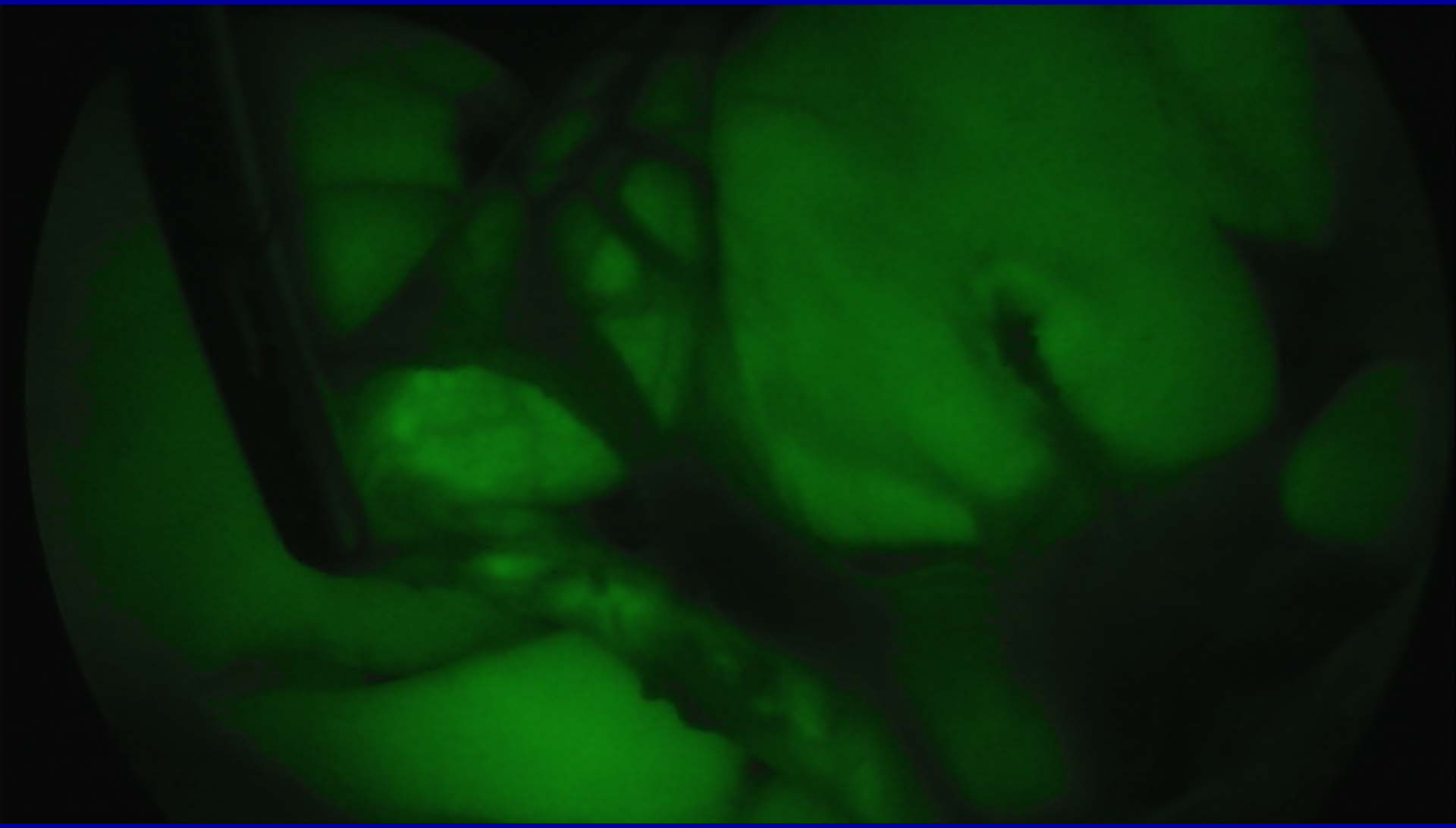


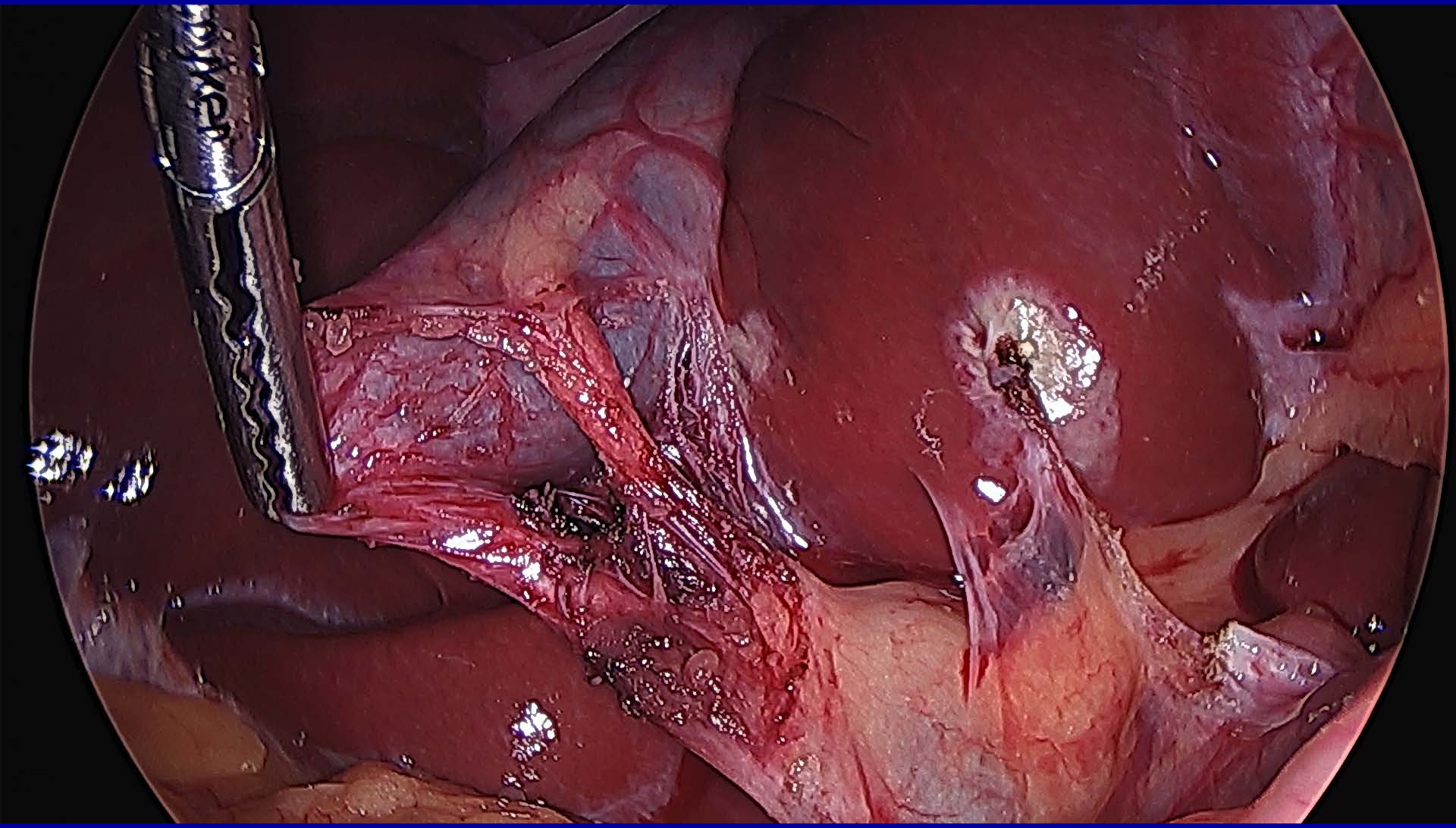


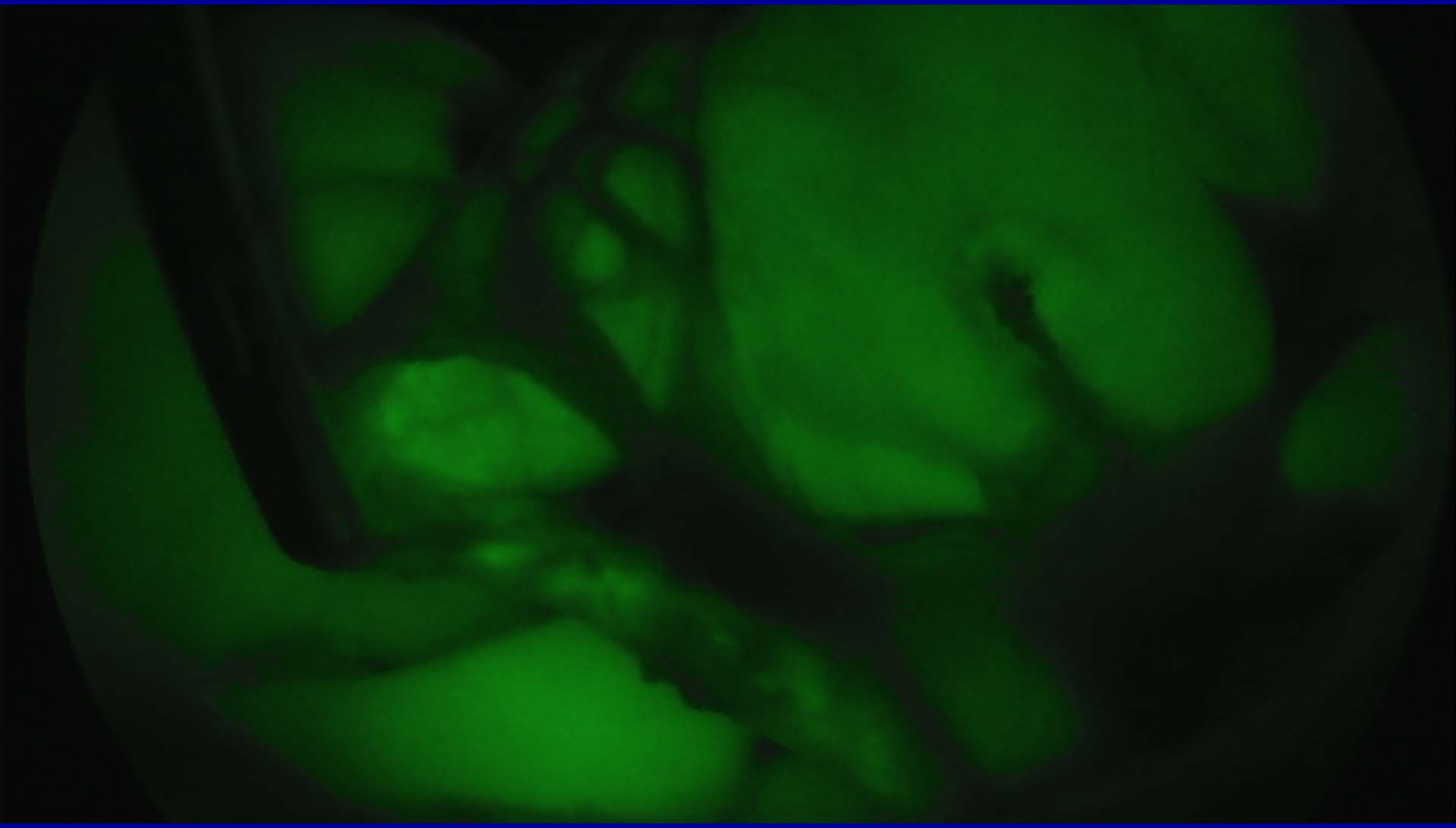












New Technology in Surgery

- Needs careful investigation
- Improved pt care is the goal
- Instrumentation is lacking and remains the slowest area of improvement
- “Spinoffs” may the only benefit
- Reasonable area to initiate research.
- Human work acceptable with rigorous review

Future MIS: Benefits

- Public and physician awareness of the value of Minimally Invasive (or Incisionless) therapeutic interventions.
- Technical and technologic advancements that will spread throughout the medical specialties
- Improved patient outcomes.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