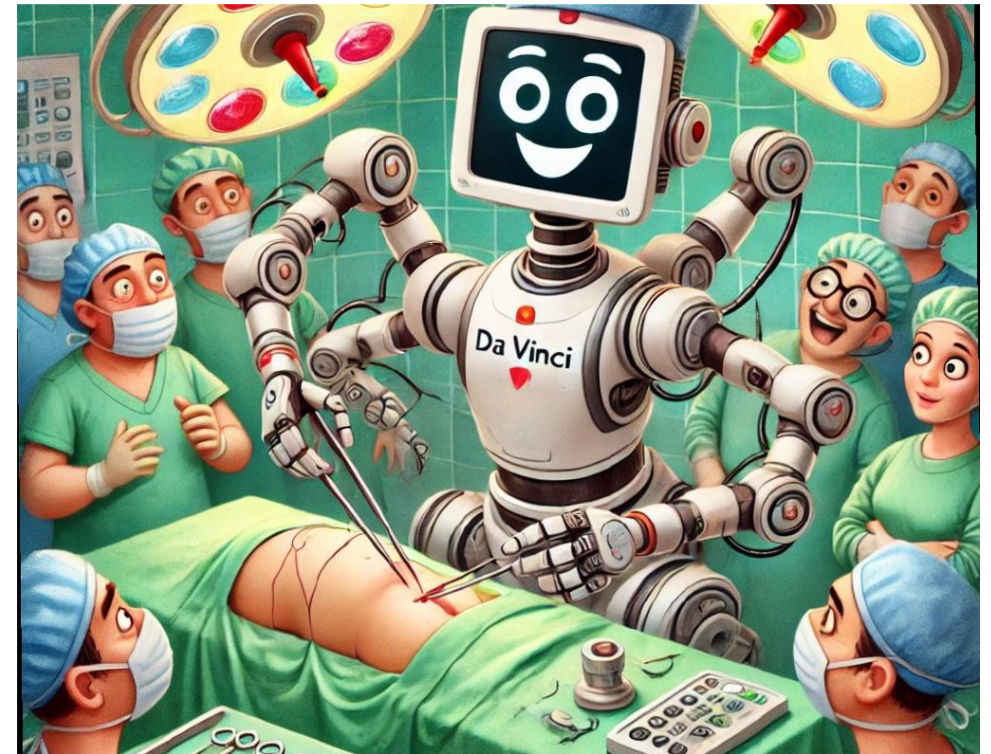
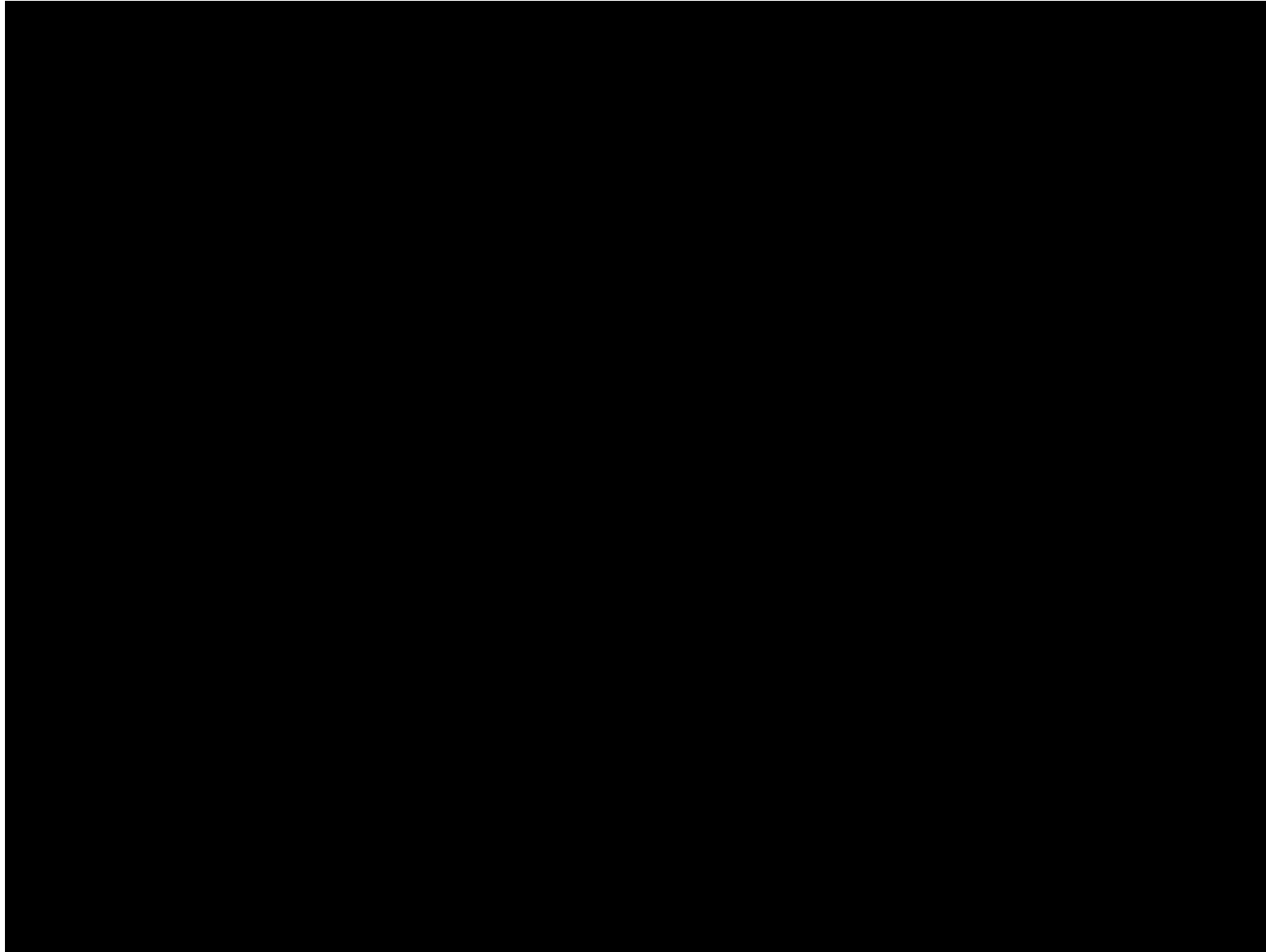


Roboter im Bauch – Einblicke in roboterassistierte Eingriffe

Prof. Dr. med. Martin Bolli
Chefarzt Viszeralchirurgie LUKS Gruppe



Viszeralchirurgie am frühen Morgen



16.8sec

How often a surgeon starts a
procedure using a da Vinci
system

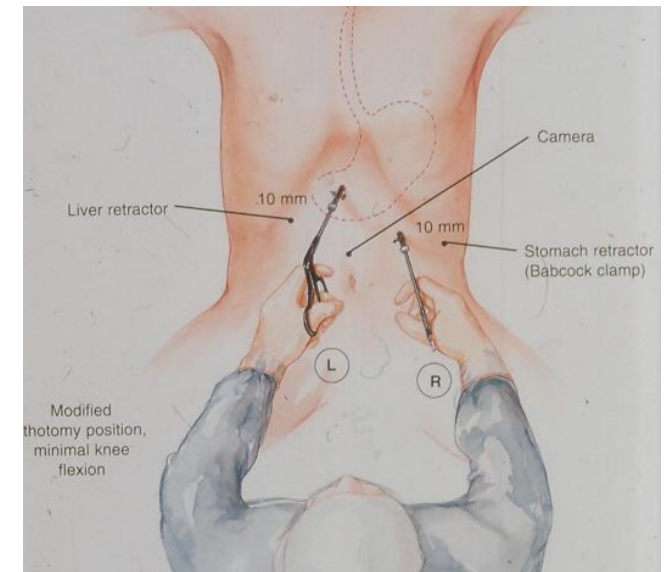
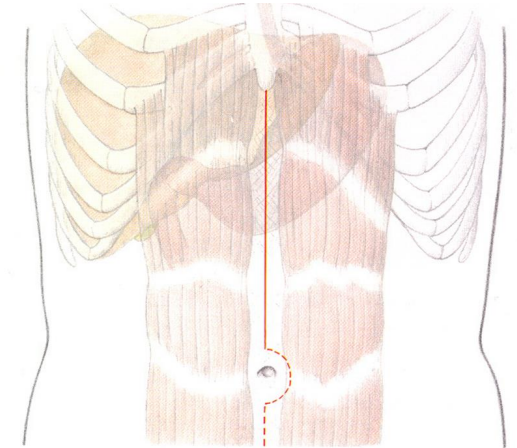
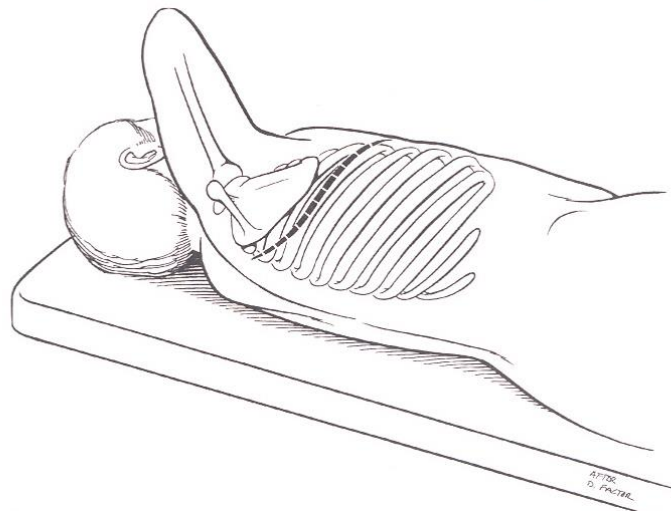
Minimalinvasive Chirurgie

Vorteile

- Kürzere Hospitalisationsdauer
- Niedrigere Komplikationsraten
- Schmerzreduktion
- Weniger Blutverlust
- Kosmetik

Limitationen der Laparoskopie

- 2D, kein räumliches Sehen
- Limitierte Bewegungsfreiheit



Die Geschichte der Roboterchirurgie

- 1985 erster Einsatz des PUMA 650 für neurochirurgische Biopsien
- 2000 da Vinci von Intuitive Surgical
 - Initiale Überlegung: Einsatz im Militär
- Hugo™ (Medtronic), MAKO (Stryker), RAS (Zimmer Biomet) und viele mehr

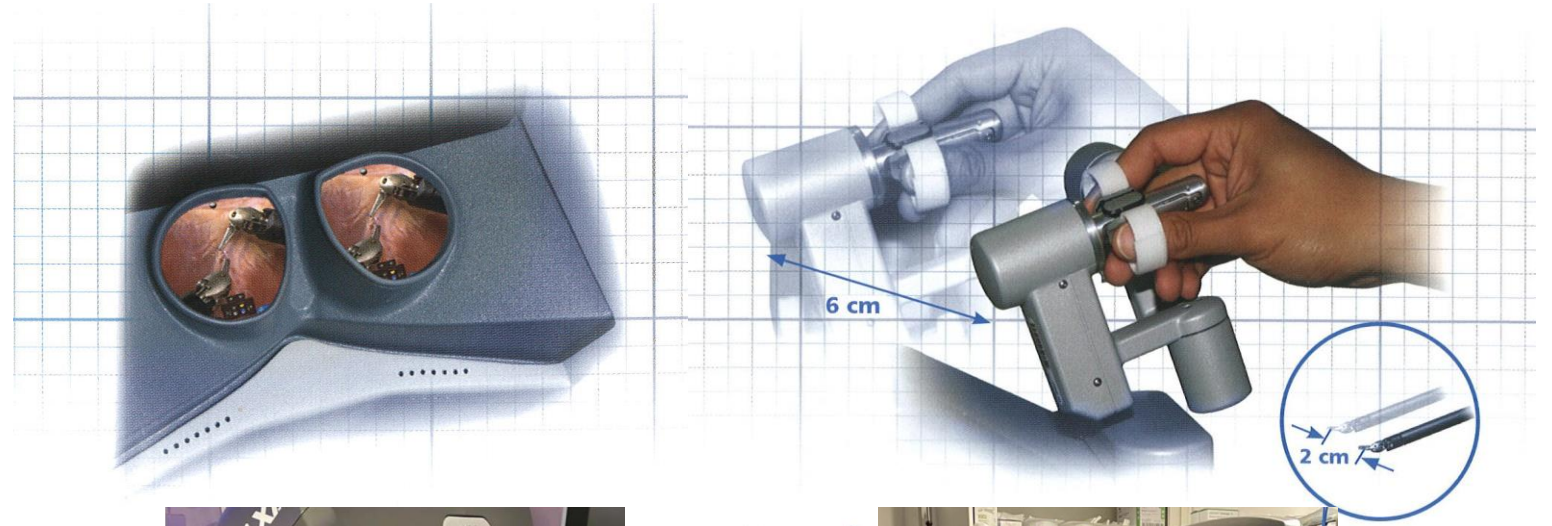


Da Vinci-System - 3 Elemente

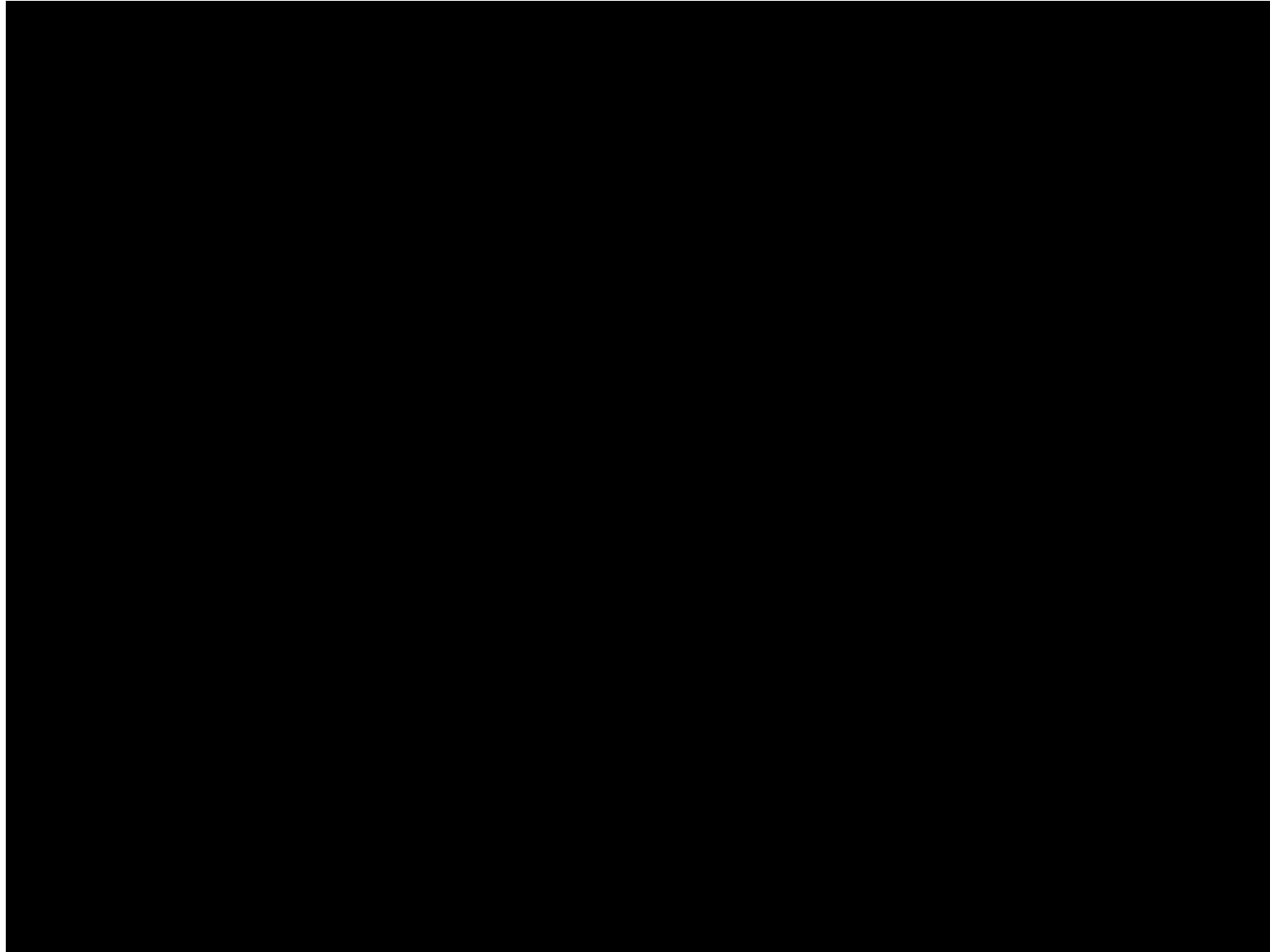


Surgeon console

- Binocular stereoscopic system ermöglicht dreidimensionale Sicht
- 2 Handgriffe übertragen die Bewegungen
- 2 Konsolen möglich → Ausbildung



Surgeon console



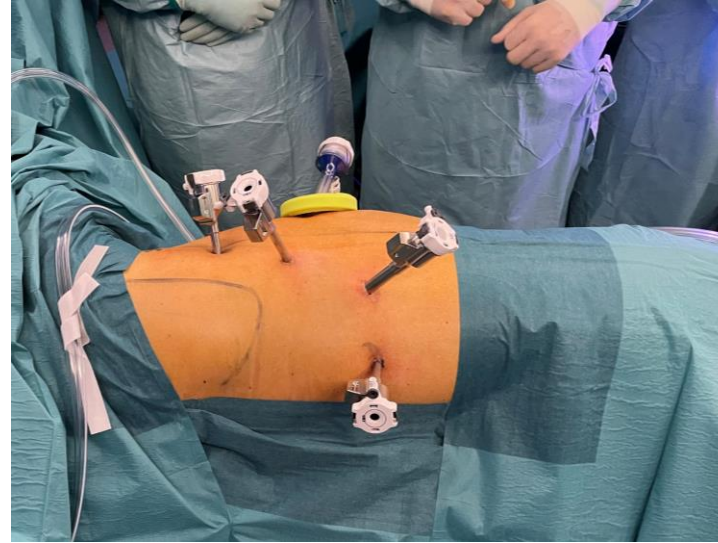
Vision cart - «Tech Tower»

- Hardware und Software
- Lichtquelle für Kamera
- Stromquelle für Monopolar und Bipolar
- CO2 Insufflator
- Bildschirm



Patient cart

- 4 Roboter-Arme werden an spezielle Trokare andockt
- Instrumente werden nach Bedarf ausgetauscht

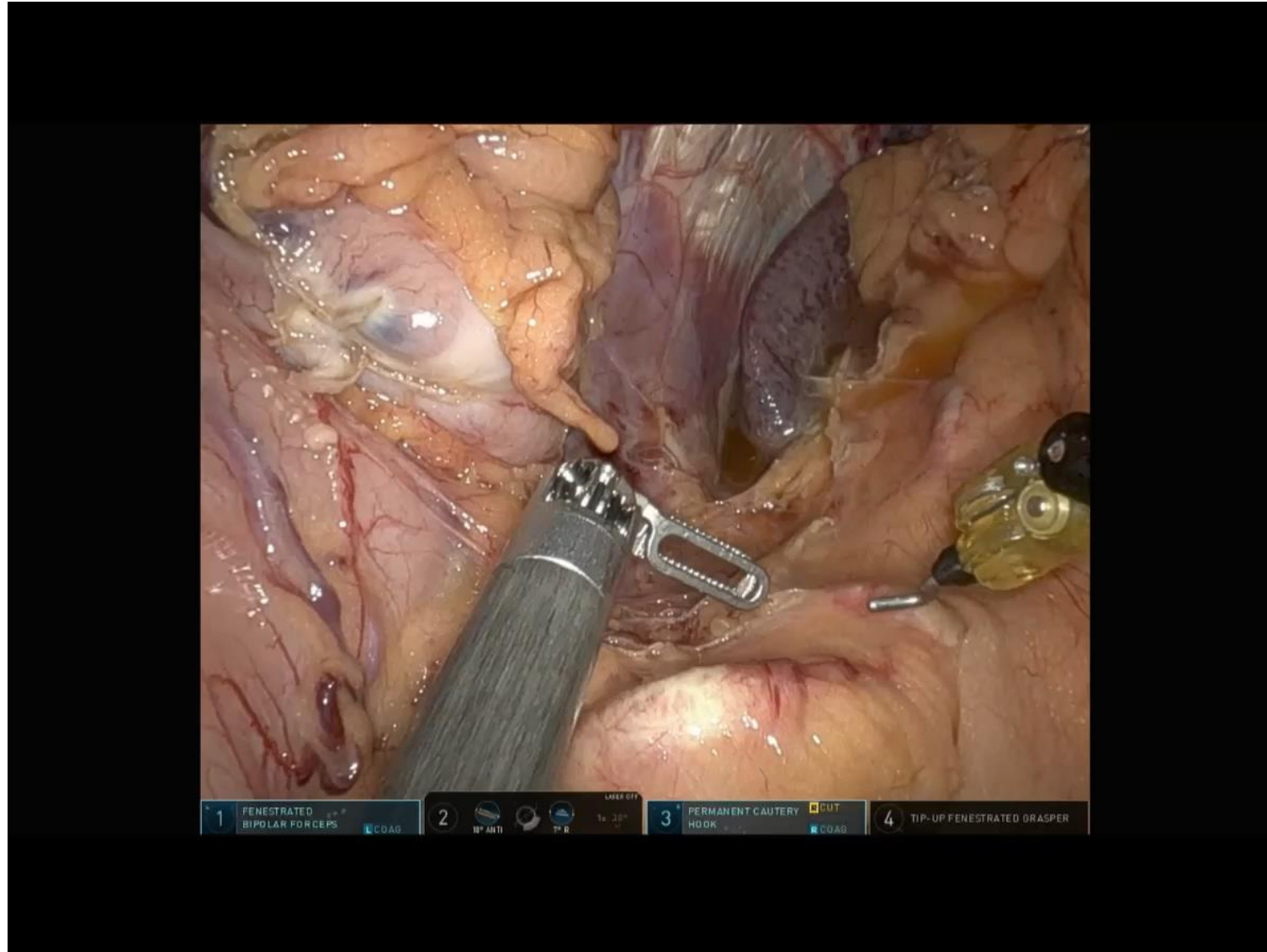


Instrumente

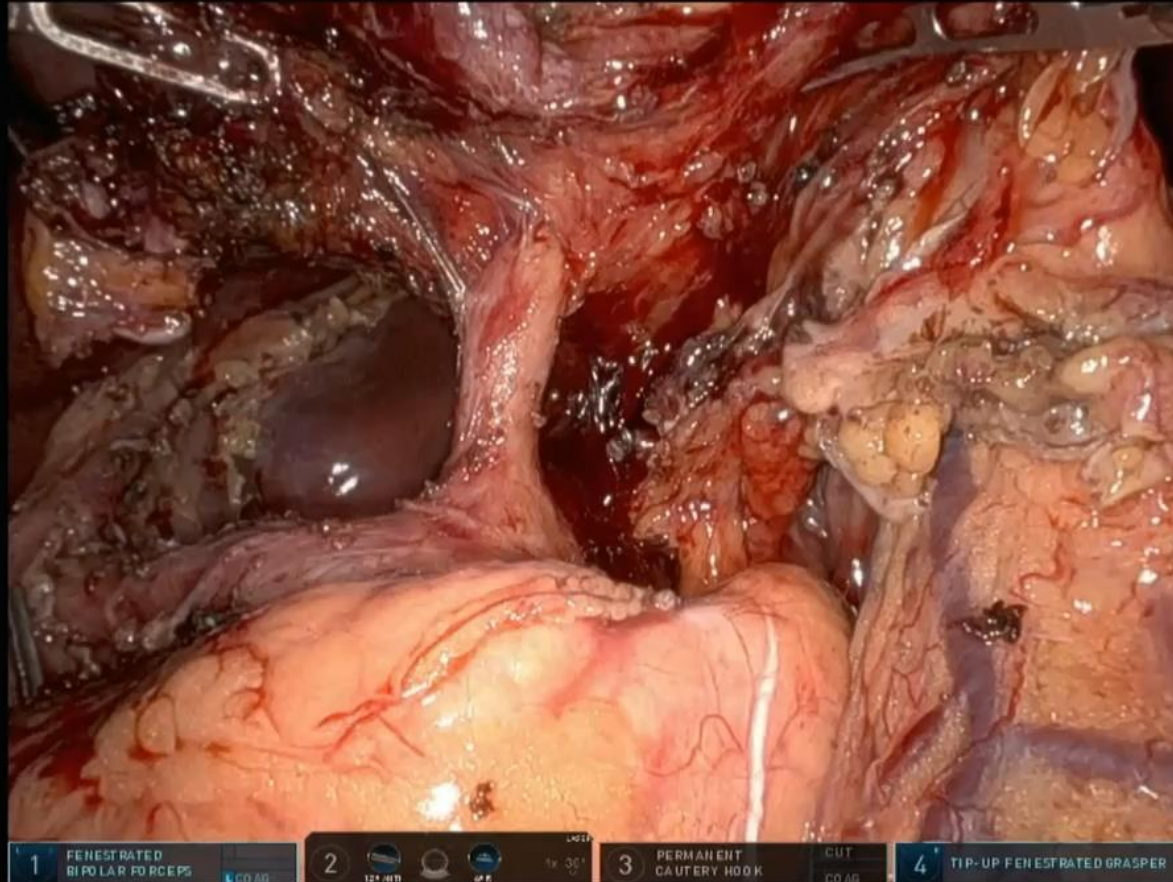
- Endowrist Instrumente
- Mehrere Gelenke simulieren präzise Handbewegungen
- Tremorfiltrierer



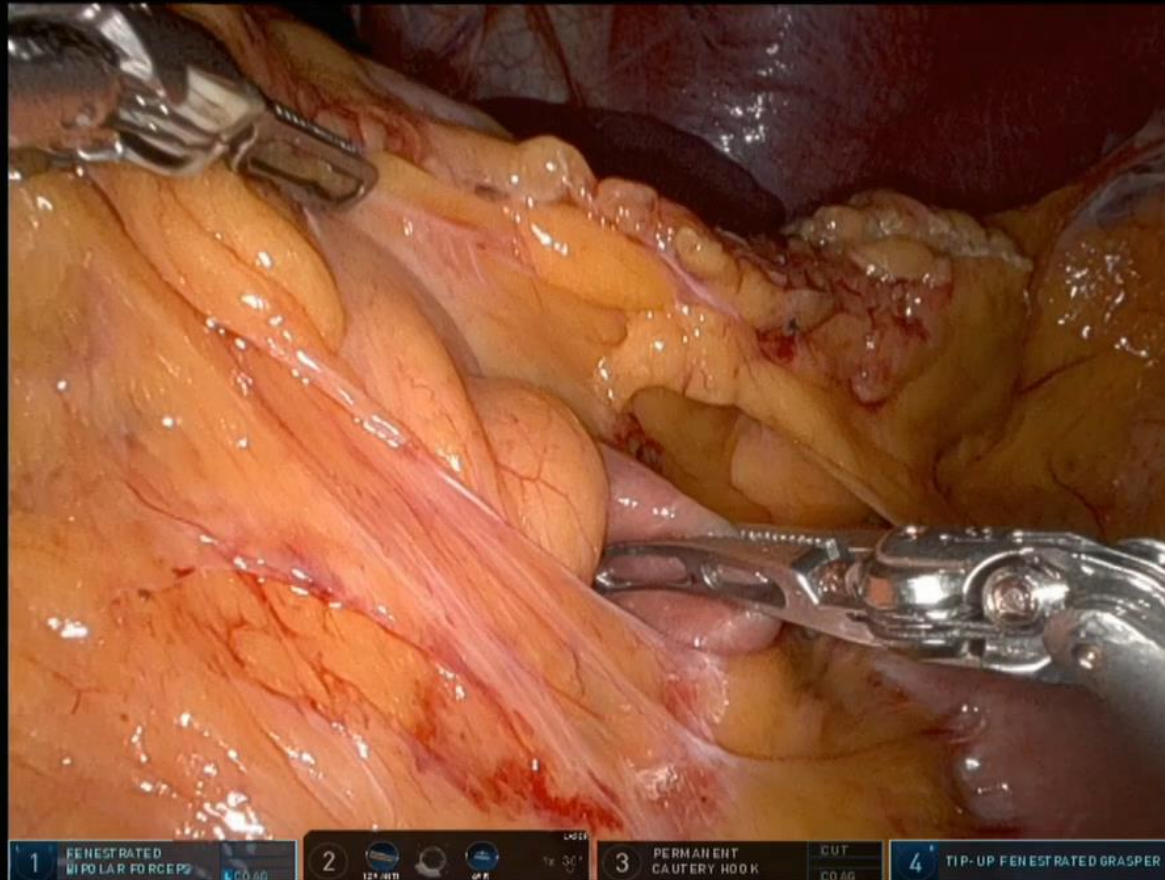
Lymphadenektomie - Präparation entlang von Gefässen



Versorgung der Arteria gastrica sinistra



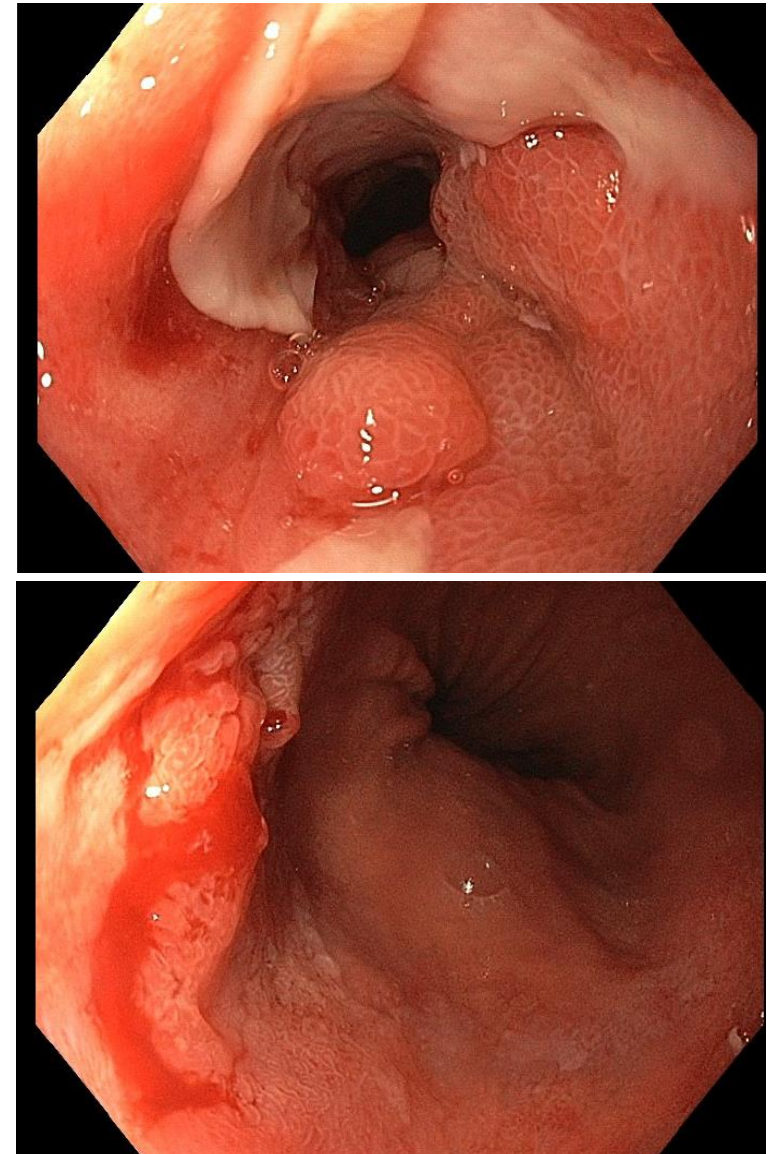
Anastomose - Ösophagojejunostomie





Fall 1 - Ösophaguskarzinom

- Schluckstörungen
- Globusgefühl
- Verschlechterung des Allgemeinzustandes
- Ungewollter Gewichtsverlust

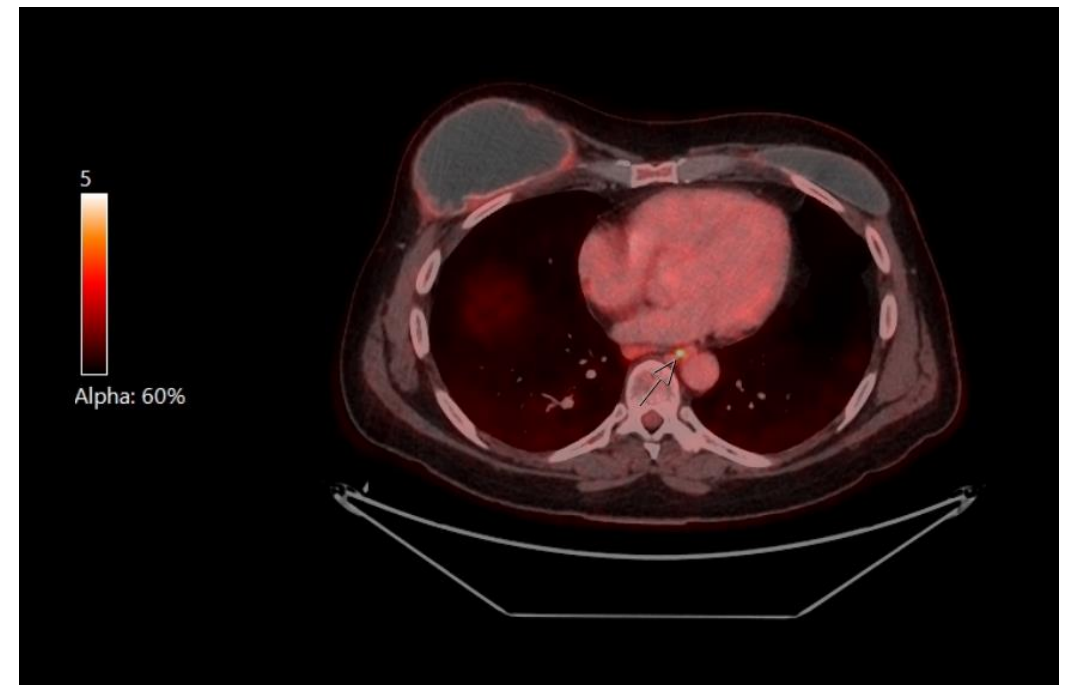


Weitere Diagnostik

Endosonographie: cT? cN?



PET-CT: cN? cM?

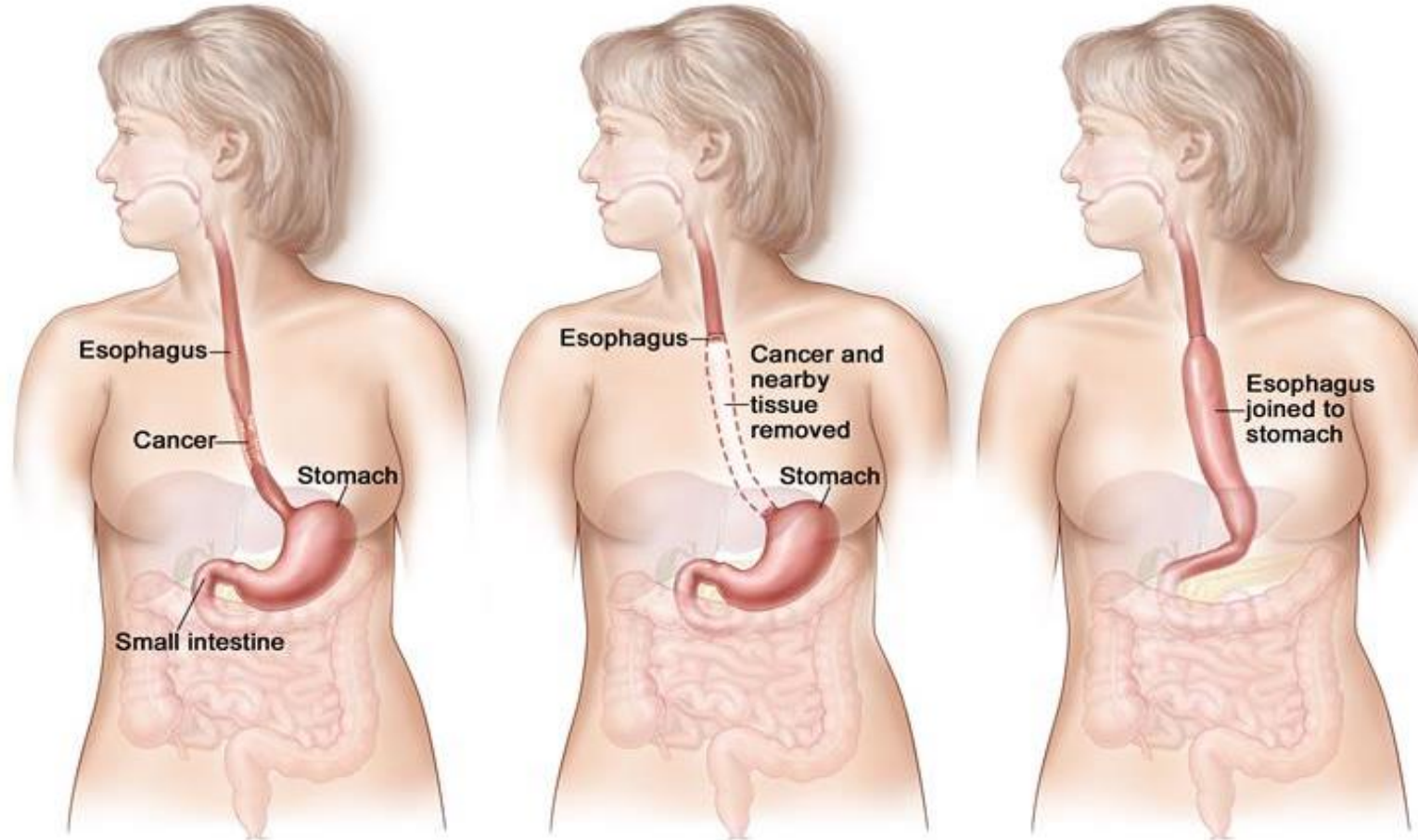


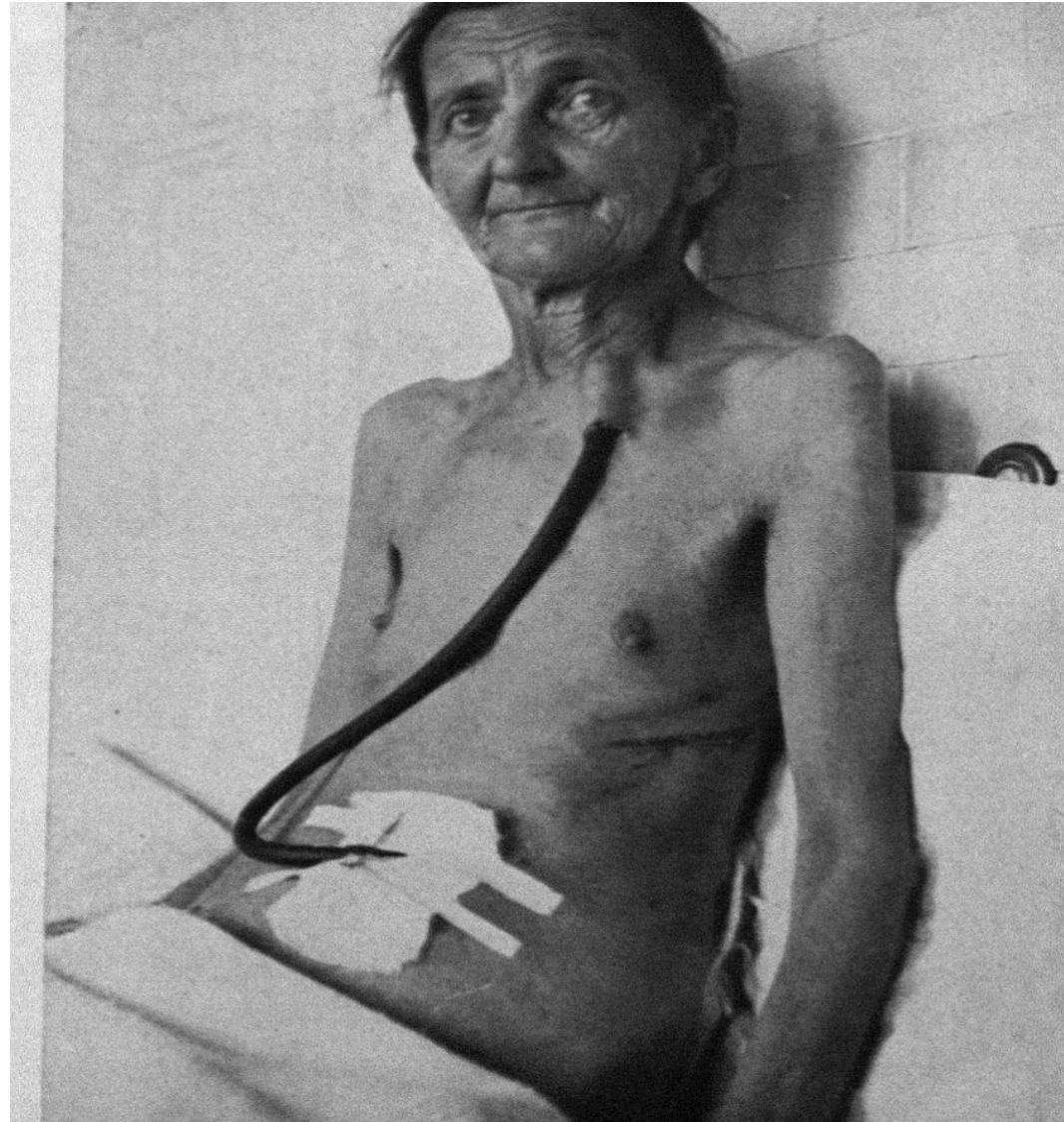
Therapieoptionen

- Vorstellung am interdisziplinären Tumorboard
- Chemotherapie
- Bestrahlung
- Operation

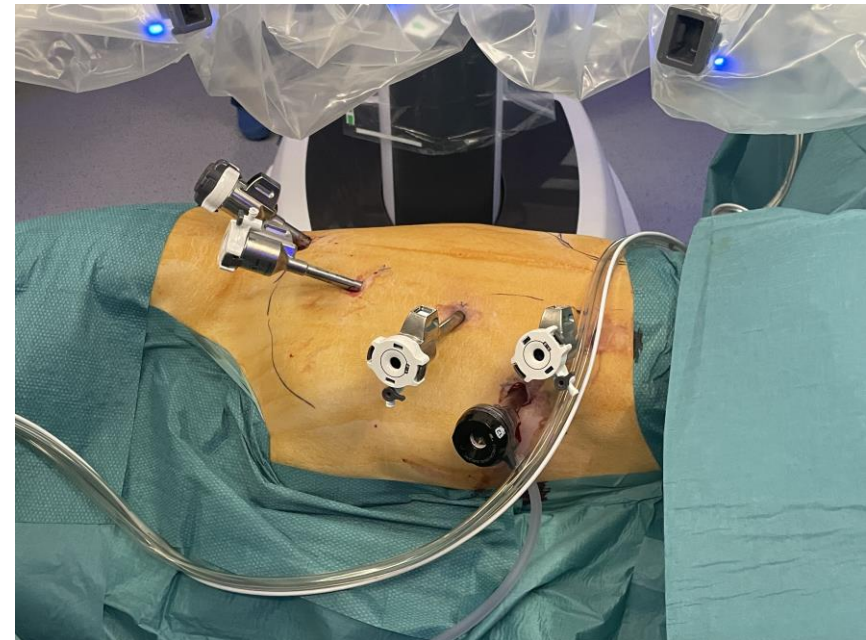
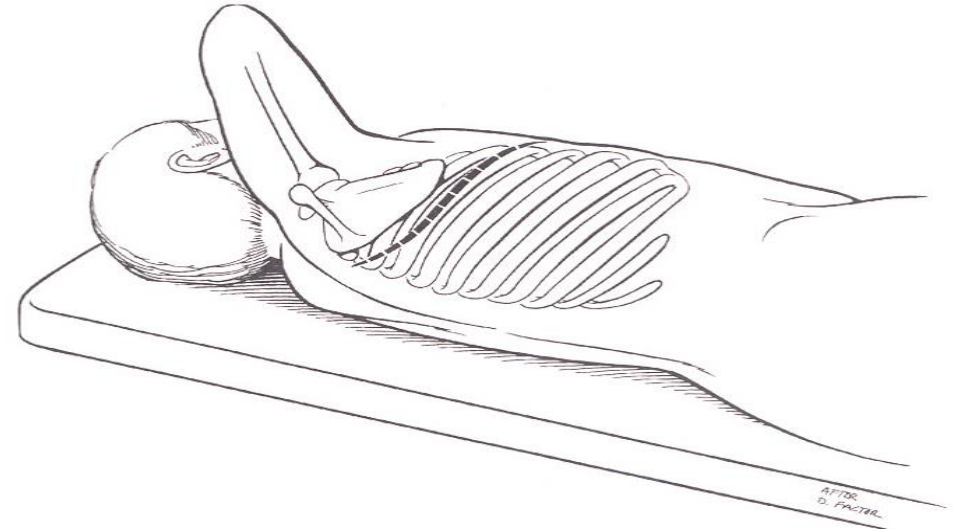
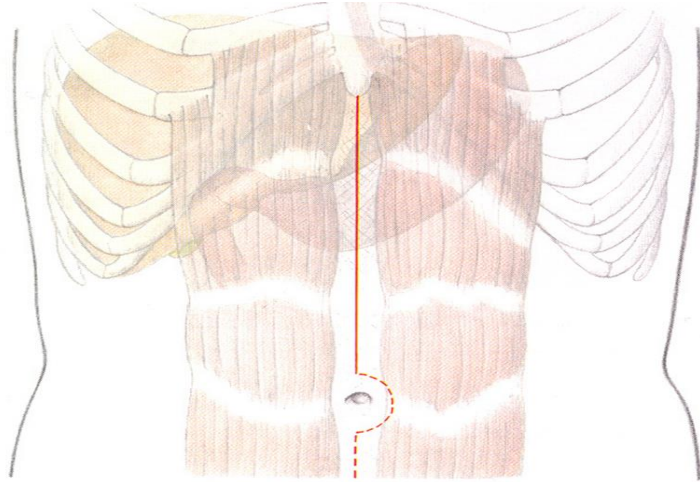


Ösophagusresektion





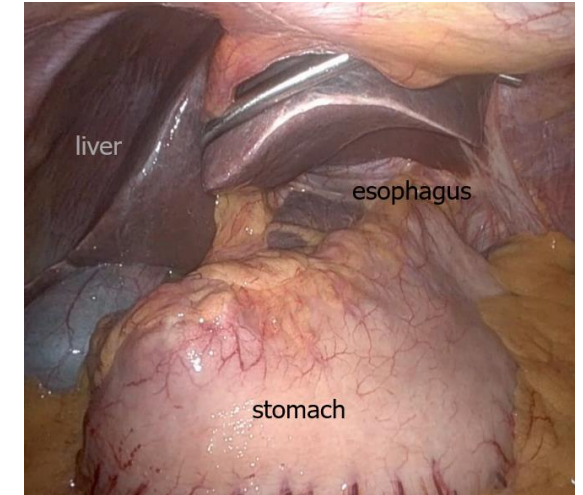
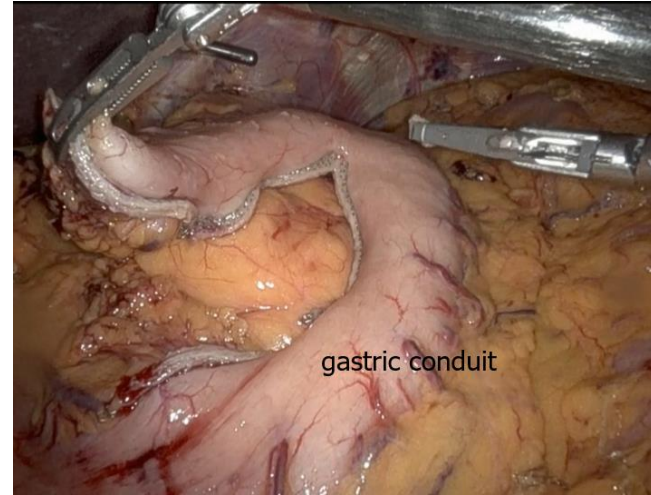
Zwei-Höhlen-Eingriff



Ösophagusresektion

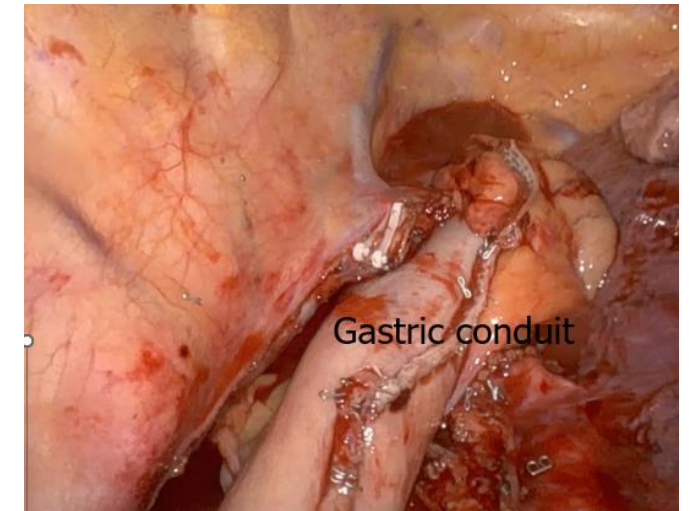
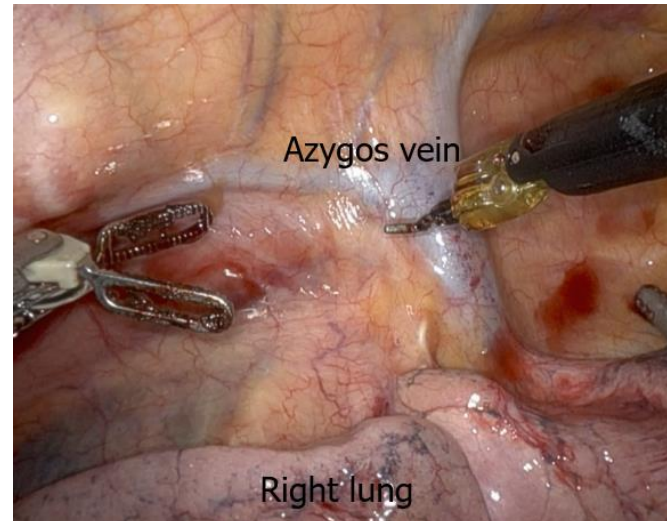
1. Abdominelle phase

- Mobilisation des Magens
- Absetzen der Magengefäße
- Lymphadenektomie
- Bilden eines Magenschlauches

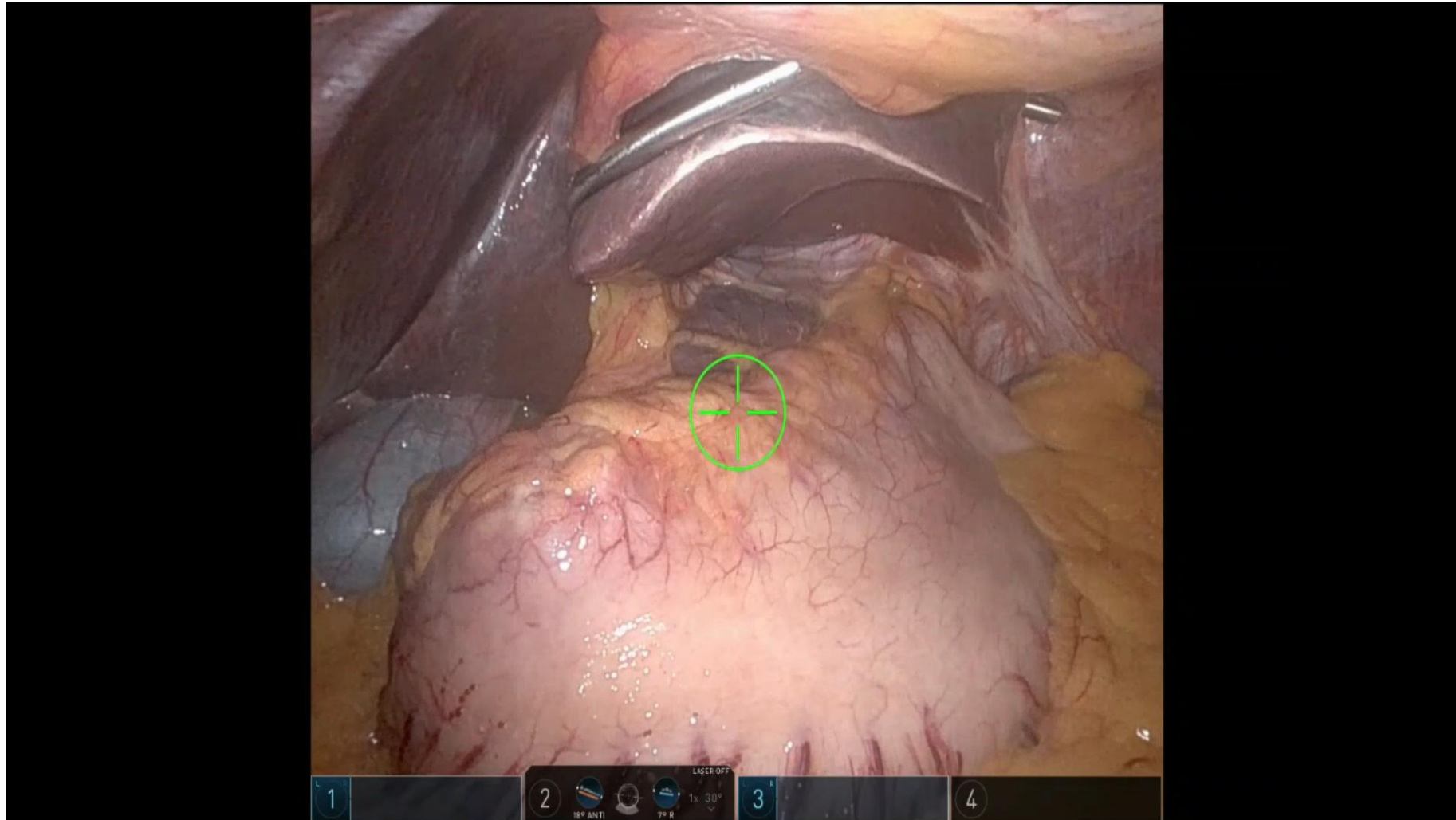


2. Thorakale phase

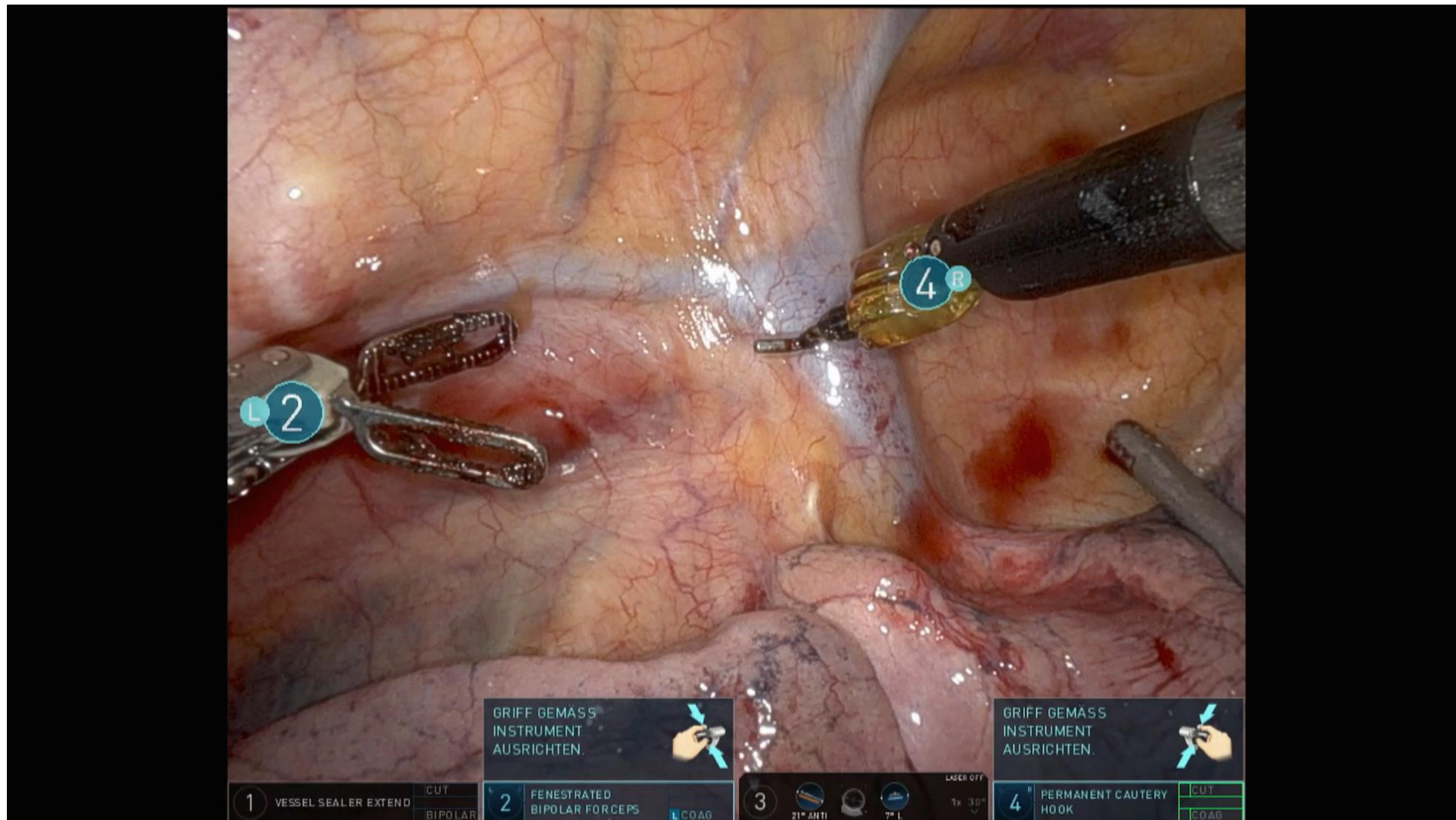
- Resektion Ösophagus
- Lymphadenektomie
- Rekonstruktion



Ösophagusresektion – abdominelle Phase



Ösophagusresektion – thorakale Phase



Postoperativer Verlauf

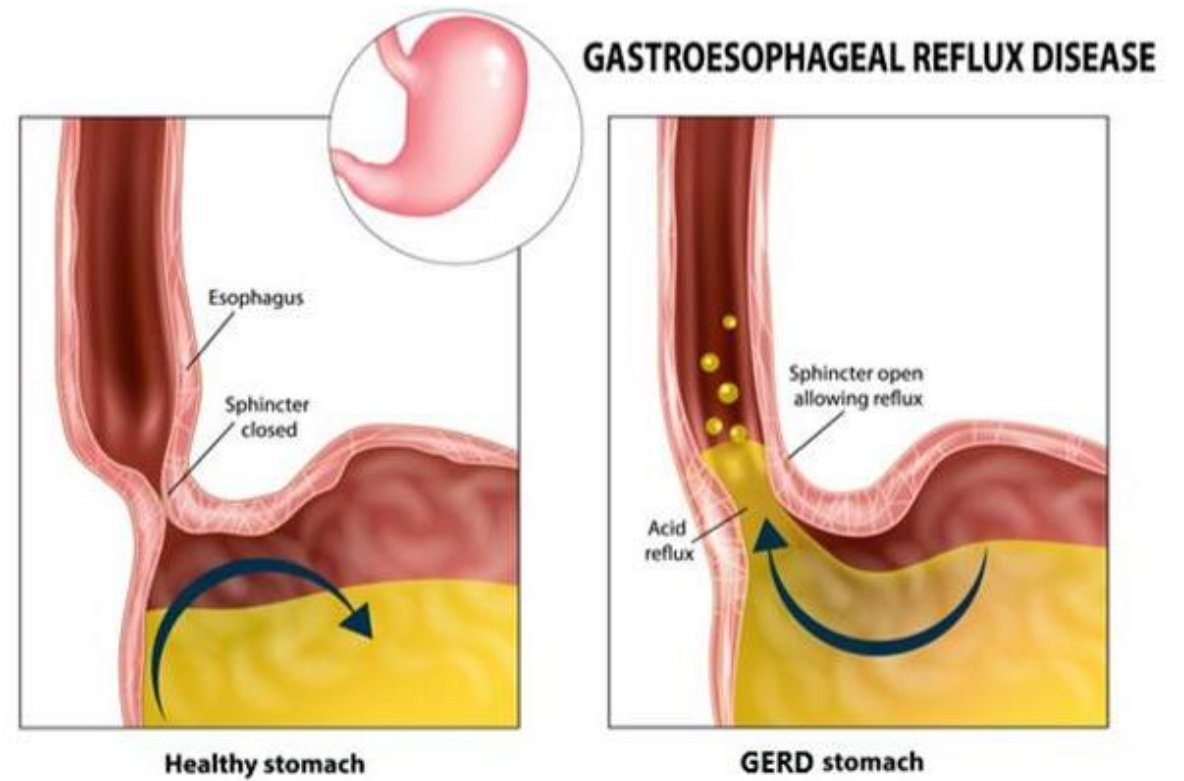
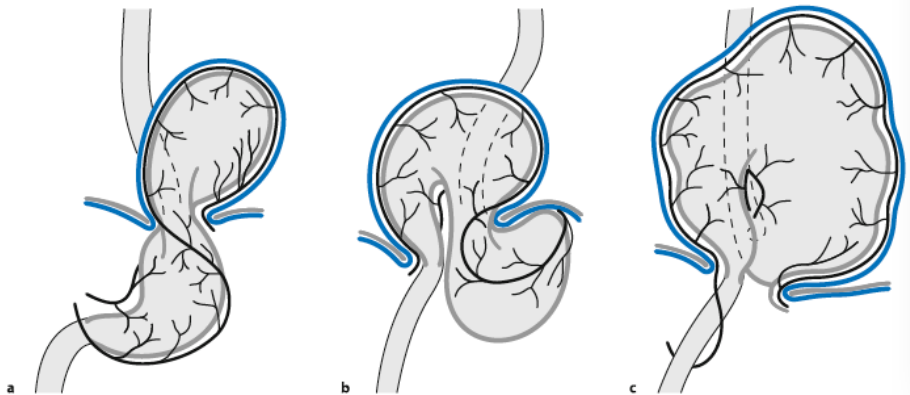
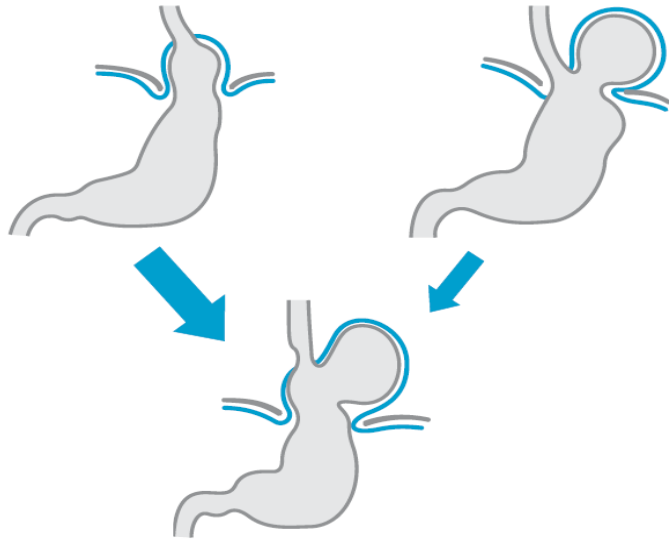
- Intensivstation
 - Mobilisation
 - Atemgymnastik
 - Kostaufbau
 - 10-14 Tage im Spital
-
- Lebenslang mit erhöhtem Oberkörper schlafen
 - Mehrere kleine Mahlzeiten pro Tag

Komplikation - Anastomoseninsuffizienz

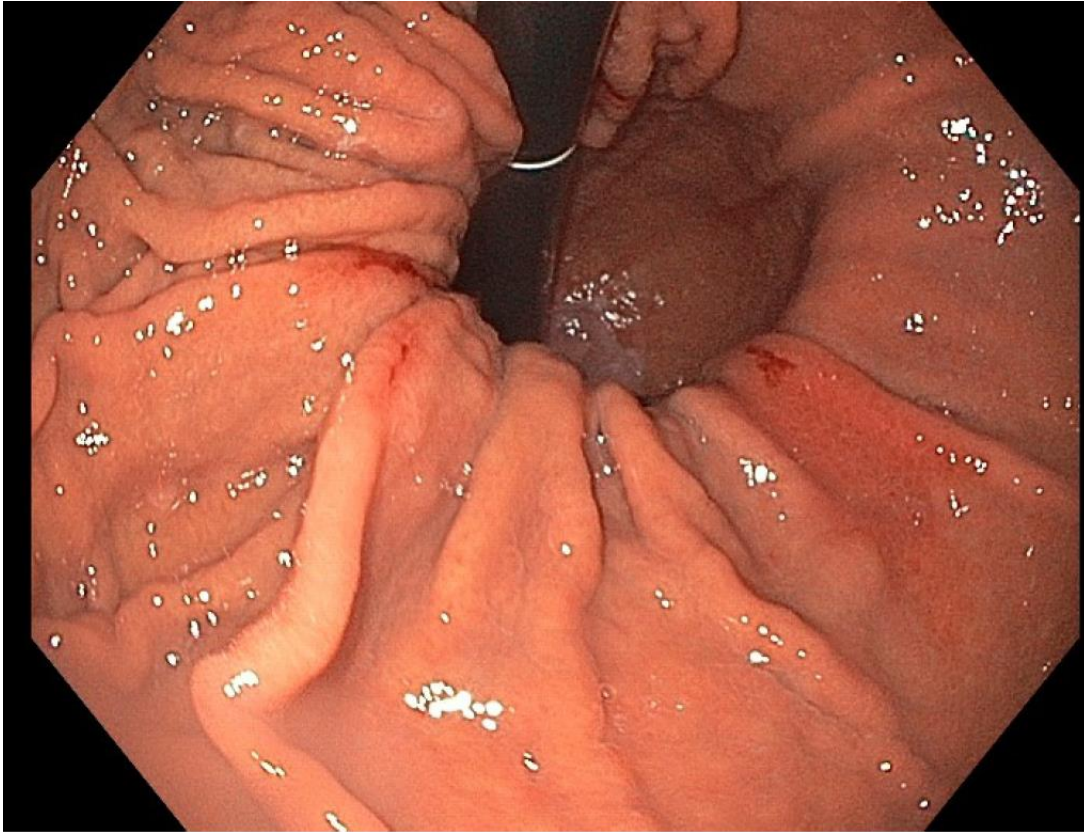


- Endoskopische Therapie – Sponge, Stent
- Mehrere Wechsel notwendig

Hiatushernie



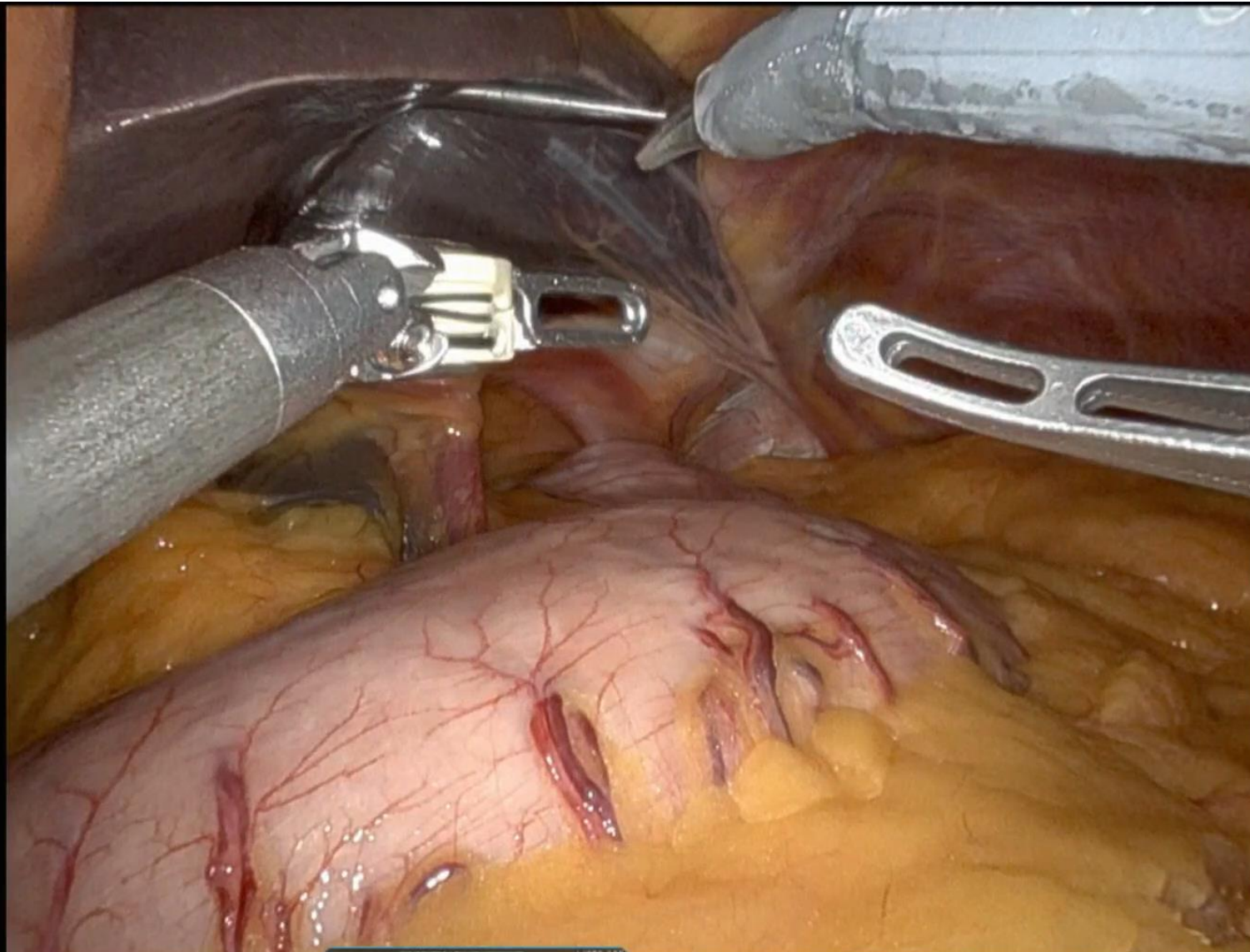
Hiatushernie



Hiatushernie - Operative Versorgung

- Reposition
- Cruroraphie
- Netzeinlage
- Fundoplicatio





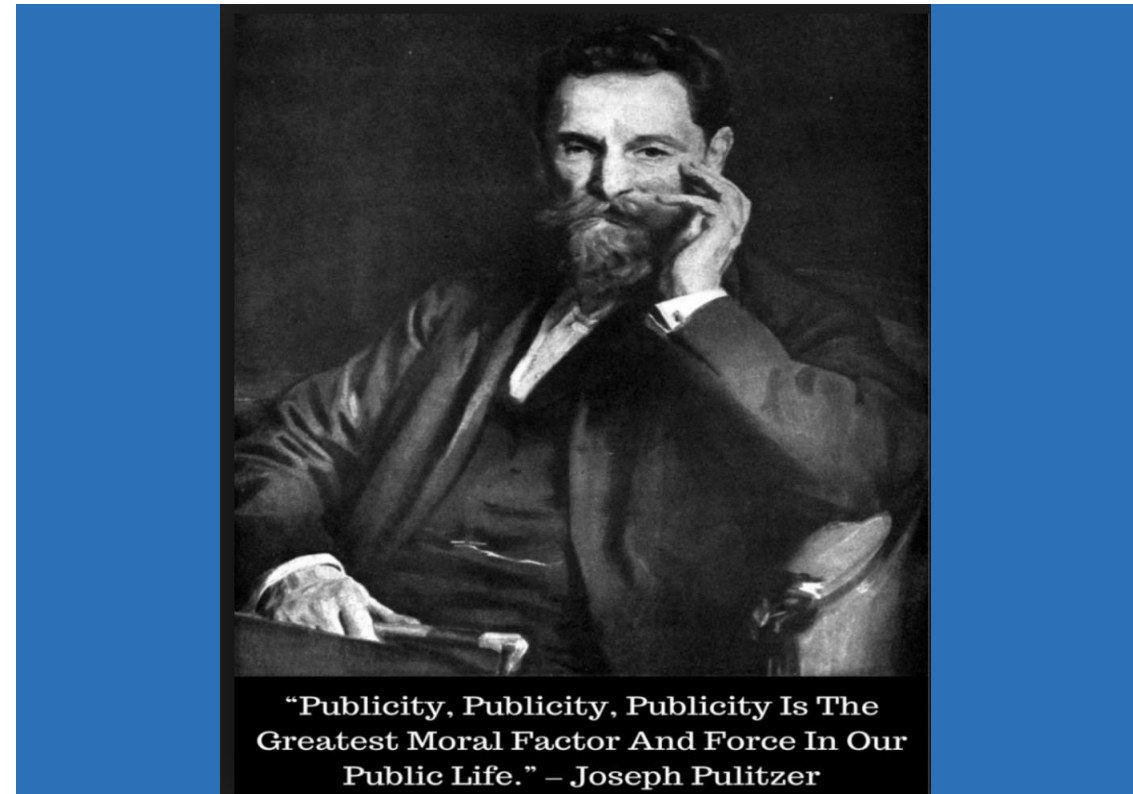
1 FENESTRATED BIPOLAR FORCEPS COAG	2 FOR SCISSOR/NEW/ID/ADDS/CH/EN LASER OFF 1x 30°	3 MONOPOLAR CURVED SCISSORS CUT COAG	4 TIP-UP FENESTRATED GRASPER
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[illegible]4^R TIP-UP FENESTRATED GRASPER

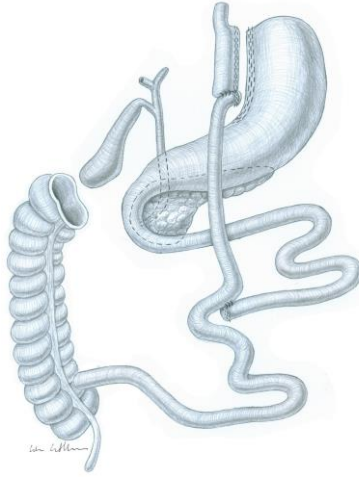
Qualität & Attraktivität



→ Verbesserung der klinischen Outcomes



→ Reputation und Attraktivität



Mastery in Bariatric Surgery The Long-term Surgeon Learning Curve of Roux-en-Y Gastric Bypass

Doumouras, Aristithes G. MD, MPH^{*,†}; Saleh, Fady MD, MPH[†]; Anvari, Sama[†]; Gmora, Scott MD^{*,†}; Anvari, Mehran MD, PhD^{*,†}; Hong, Dennis MD, MSc^{*,†}

Conclusions:

The present study demonstrated the clear, substantial influence of surgeon cumulative volume on improved perioperative outcomes and operative time. This finding emphasizes role of the individual surgeon in perioperative outcomes and that the true learning curve needed to master a complex surgical procedure such as gastric bypass is longer than previously thought, in this case requiring approximately 500 cases to plateau.

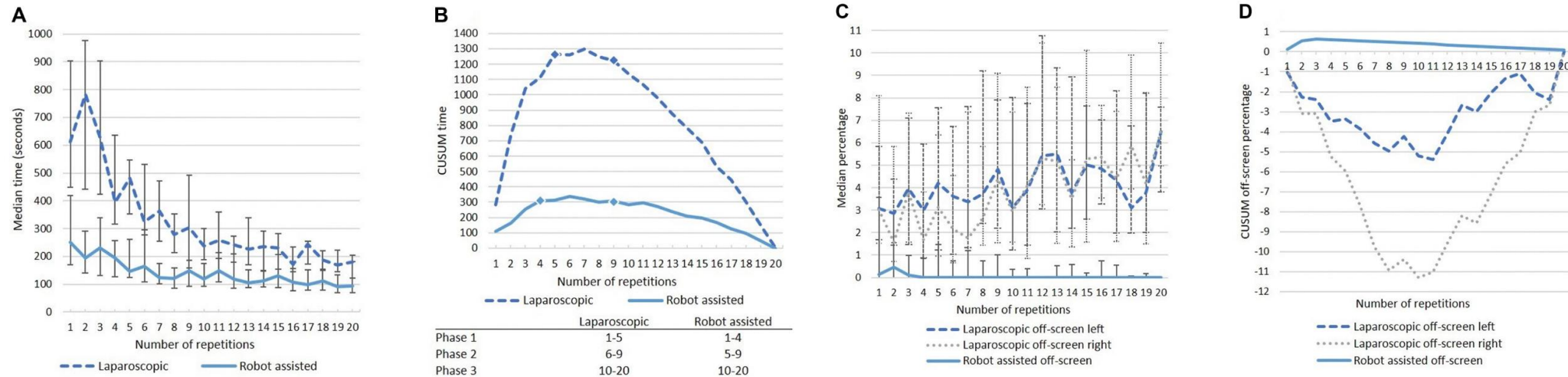
Establishing robotic bariatric surgery at an academic tertiary hospital: a learning curve analysis for totally robotic Roux-en-Y gastric bypass

Anne Kauffels¹ · Martin Reichert¹ · Ingolf Askevold¹ · Anna Bender¹ · Andreas Hecker¹ · Winfried Padberg¹ · Thilo Sprenger¹

Conclusion

TR-RYGB with hand-sewn gastrojejunostomy is a save procedure and can be carried out by a bariatric surgeon with experience in L-RYGB resulting in complication rates comparably low as for the laparoscopic approach. The learning curve is considerably steep and a first plateau is reached after 30 TR-RYGBs with an ongoing but less pronounced gain of experience by further procedures. However, beside its good feasibility and safety ab initio the conclusive role of TR-RYGB has to be evaluated in larger series with long-term results and higher levels of evidence.

It's easier



Leijte E et al. Robot assisted versus laparoscopic suturing learning curve in a simulated setting. Surg Endosc. 2020 Aug;34(8):3679-3689. doi: 10.1007/s00464-019-07263-2. Epub 2019 Nov 21. PMID: 31754849; PMCID: PMC7326898.

- Da Vinci Roboter-Systeme sind teuer...
 - Grundpreis: 1 800 000 CHF
 - Unterhalt: 120 000 CHF / Jahr
 - Instrumente: 200 – 300 CHF / pro Einsatz

- Kostenreduktion
 - Kürzerer Spital-/Intensivstationaufenthalt, weniger Komplikationen, raschere Genesung = Arbeitsunfähigkeitszeit verkürzt

- Roboterassistenz erweitert die minimal invasiven Möglichkeiten in der Viszeralchirurgie
- Invasivität gesenkt → niedrigere Morbidität und raschere Erholung
- Qualität & Attraktivität
- Integration in die Ausbildung
- Nutzen überwiegt die Kosten
- Weitere Innovationen in der roboterassistierten Chirurgie sind zu erwarten

Herzlichen Dank für die Aufmerksamkeit!

martin.bolli@luks.ch