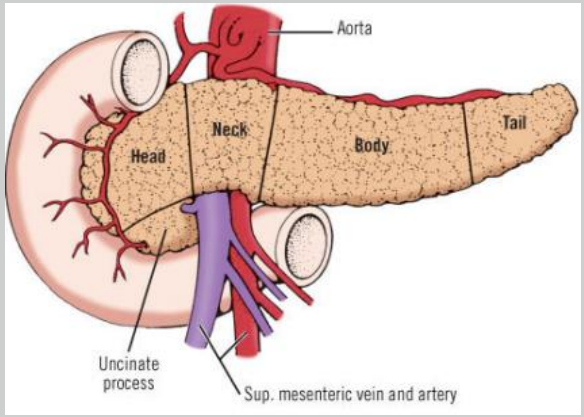
Robot Pankreaskirurgi på Karolinska Huddinge



Whipple och Distal pankreasresektion

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Summary

- Start of the robotic program in 2020 during pandemic with 1 robot (1,5 OR´s for HPB surgery per week)
- In the beginning, 4 surgeons
- Great support at site and with case observations, wet-lab training
- Proctoring from Utrecht
- Additional robot and double console in january 2022 (2,5 OR´s for HPB surgery per week)

Strategy

- Proportional increase of minimal-invasiv HPB cases at Karolinska to create patient benefit
- Education of a sufficient number of HPB surgeons/surgeons in training in the robot
- Inclusion of robotic HPB training in the international fellowship program (first fellow started september 2022)
- Step-wise increase of complexity

So, the plan was….

- Transfer standard HPB surgery to the robot
- Train not everybody at the same time but as many as needed to be able to do robotic surgery independently from the schedule
- After the first step, increase access to the robot, train further surgeons and increase complexity
- Goal: to provide 50-60 % of all HPB surgery MIS

What have we done so far?

Preoperative, Intraoperative and Postoperative Profile of All Patients Who Underwent Robotic Surgery (N= 495, Sep 30th 2020 - Aug 1st 2024)

Characteristics	Total, No. (%) (N= 495)	Surgery type, No. (%)		
		Liver (N= 235; 47.5%)	Pancreas (N= 208; 42%)	Biliary/other (N= 52; 10.5%)
Preoperative				
Age, median (range), y	68 (14-89)	68 (14-89)	69 (16-86)	60 (16-88)
Female sex, No. (%)	256 (51.7)	125 (53.2)	106 (51)	25 (48.1)
BMI, median (IQR)	25 (6)	26 (6)	25 (6)	27 (6)
ASA score, No. (%)				
1-2	287 (58)	128 (54.4)	126 (60.6)	33 (63.4)
3-4	208 (42)	107 (45.6)	82 (39.4)	19 (36.6)
Intraoperative				
Surgery type, No. (%)				
Right-sided hemi-hepatectomy		3 (1.3)	–	–
Left-sided hemi-hepatectomy		6 (2.6)	–	–
Pancreatoduodenectomy			31	–
				–
				–
Simultaneous colectomy		21 (8.9)		
P				–
Distal Pancreatectomy			130	–
				–
Total pancreatectomy		–	1 (0.5)	
Enucleation				
CBD resection + hepa				
SP distal Pancreatectomy				36
Splenectomy		–	–	8 (15.4)
Other		–	–	5 (9.6)
Conversion, No. (%)	38 (7.7)	18 (7.7)	15 (7.2)	5 (9.6)
Blood loss, median (IQR), ml	50 (80)	70 (145)	50 (75)	20 (50)
Operative time, median (IQR), min	171 (120)	153 (99)	201 (110)	118 (86)

Table1. Preoperative, Intraoperative and Postoperative Profile of All Patients Who Underwent Robotic Surgery (N= 495) During the Study Period (Sep 30th 2020 - Aug 1st 2024)

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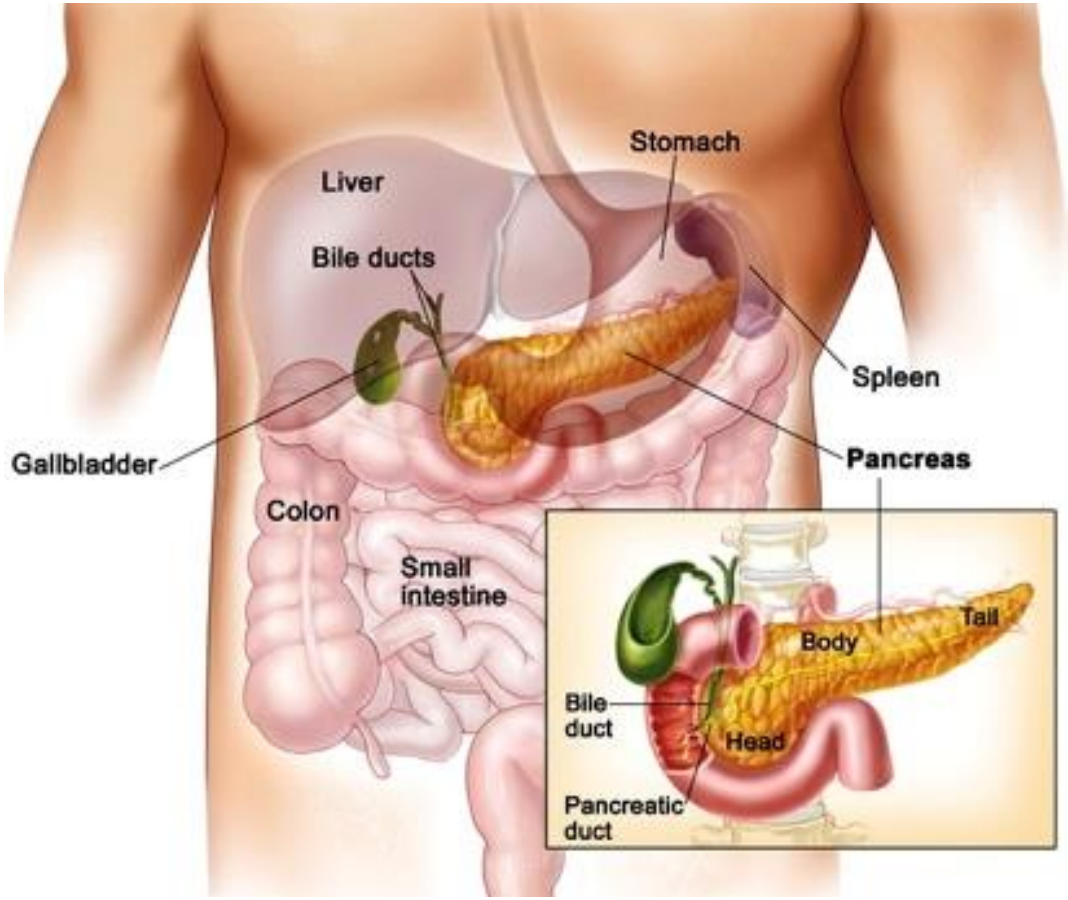
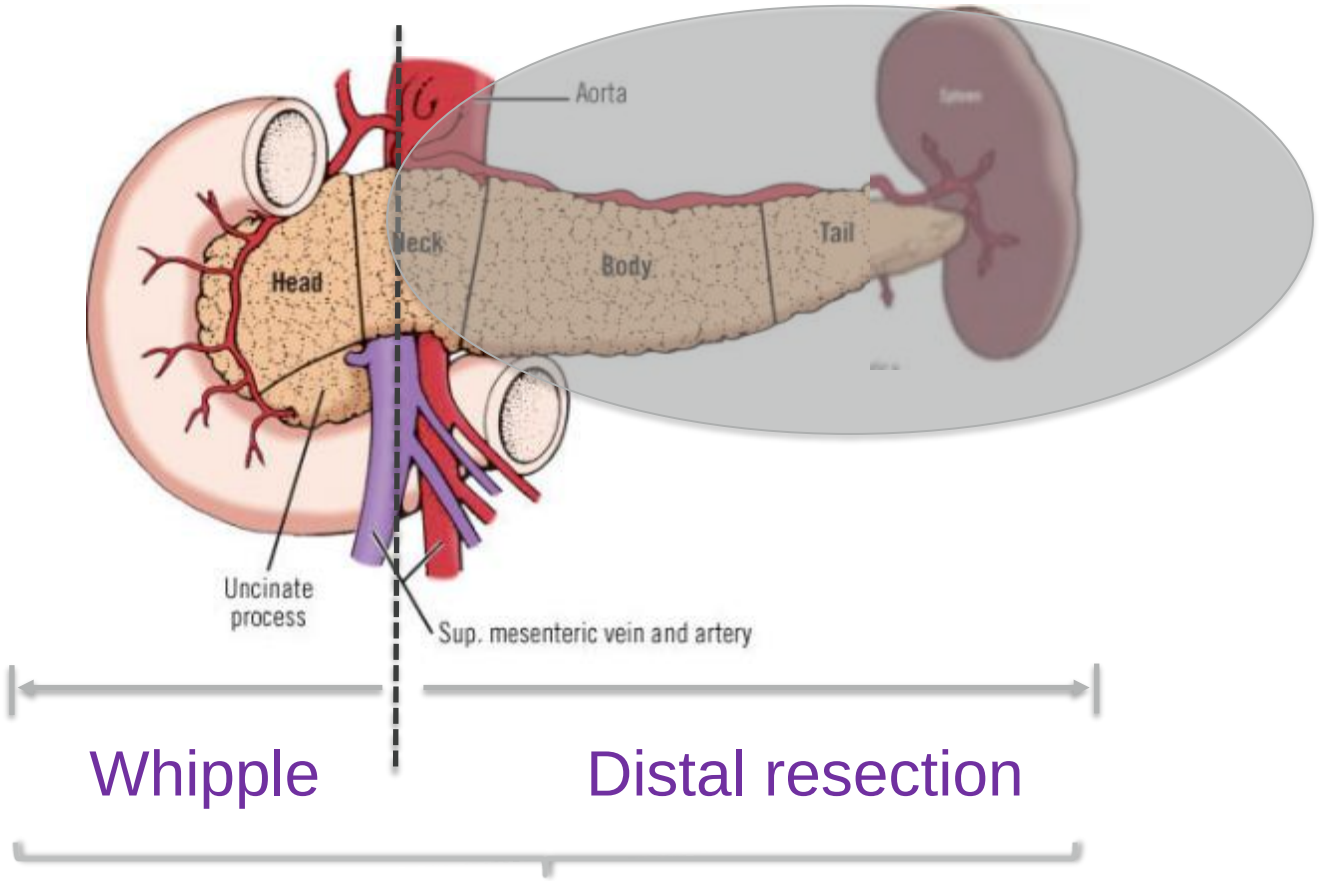
Postoperative				
LOS, median (IQR), days	5 (4)	4 (2)	6 (3)	3 (2)
Readmission (90-days), No. (%)	99 (20)	22 (9.4)	70 (33.7)	7 (13)
Clavien-Dindo, No (%)				
0	250 (50.3)	159 (67.6)	61 (29,3)	29 (55.8)
1	55 (11.1)	17 (7.2)	31 (14.9)	7 (13.5)
2	100 (20.2)	32 (13.6)	58 (27.9)	10 (19.2)
3a	54 (10.9)	17 (7.2)	36 (17.9)	1 (1.9)
3b	19 (3.8)	5 (2.1)	11 (5.3)	3 (5.8)
4	5 (1)	_	4 (1.9)	1 (1.9)
5	4 (0.8)	1 (0.4)	2 (1)	1 (1.9)
Major morbidity (CD ≥3), No (%)	82 (16,6)	23 (9.8)	53 (25.5)	6 (11.4)
Mortality, No. (%)	4 (0.8)	1 (0.4)	2 (1)	1 (1.9)

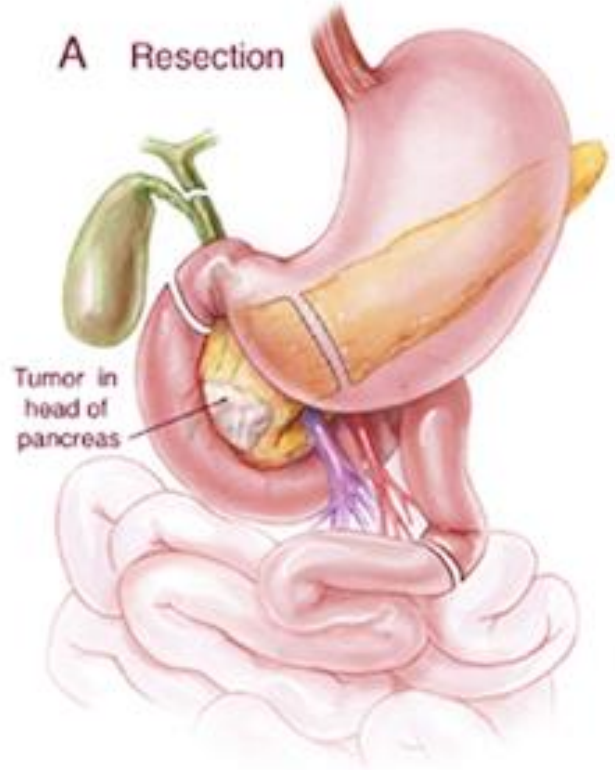
Pancreatic resections - background

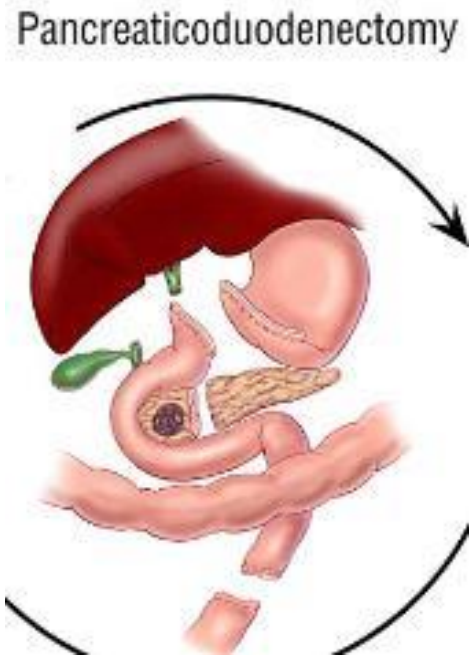


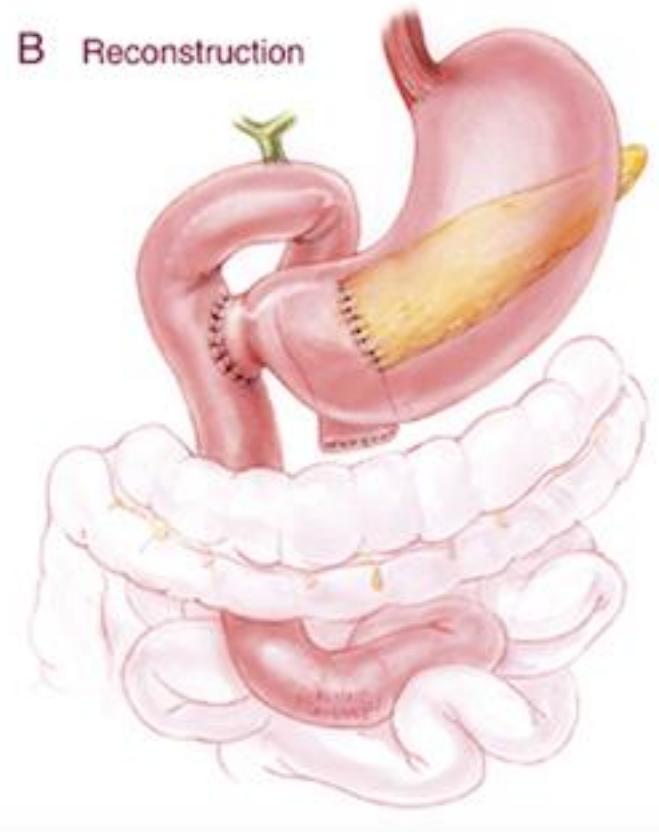

Aorta
Head
Neck
Body
Tail
Uncinate process
Sup. mesenteric vein and artery
Whipple
Distal resection
Total pankreatektomi

Whipple – how we do it

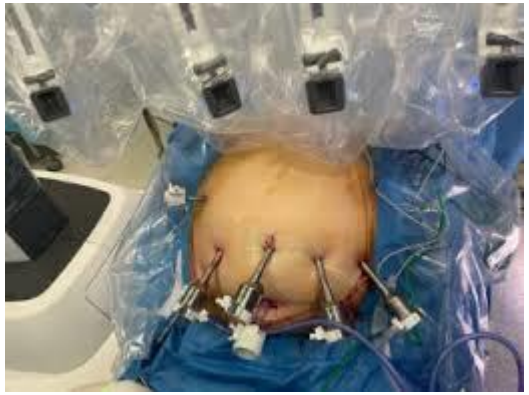
Whipple

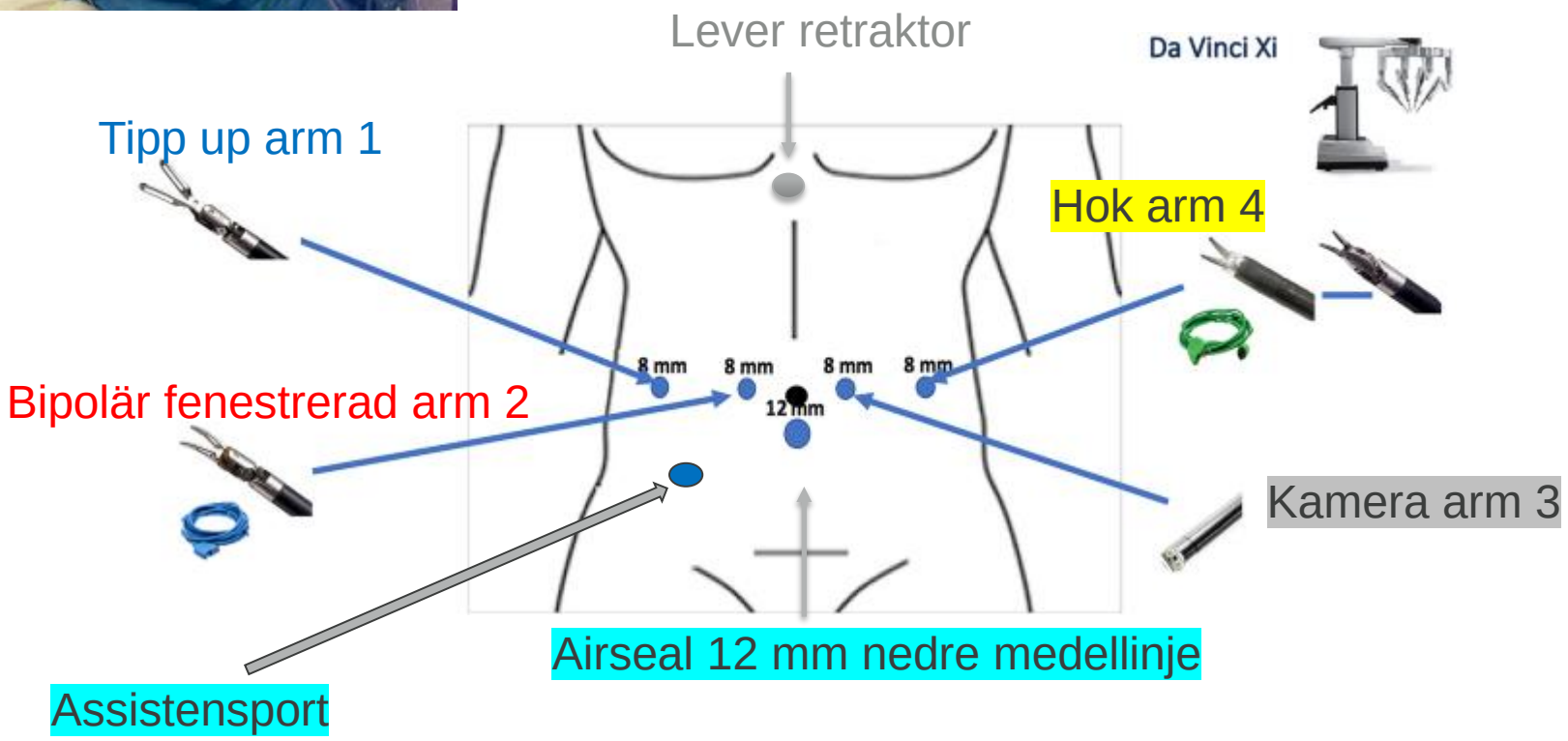

A Resection
Tumor in head of pancreas

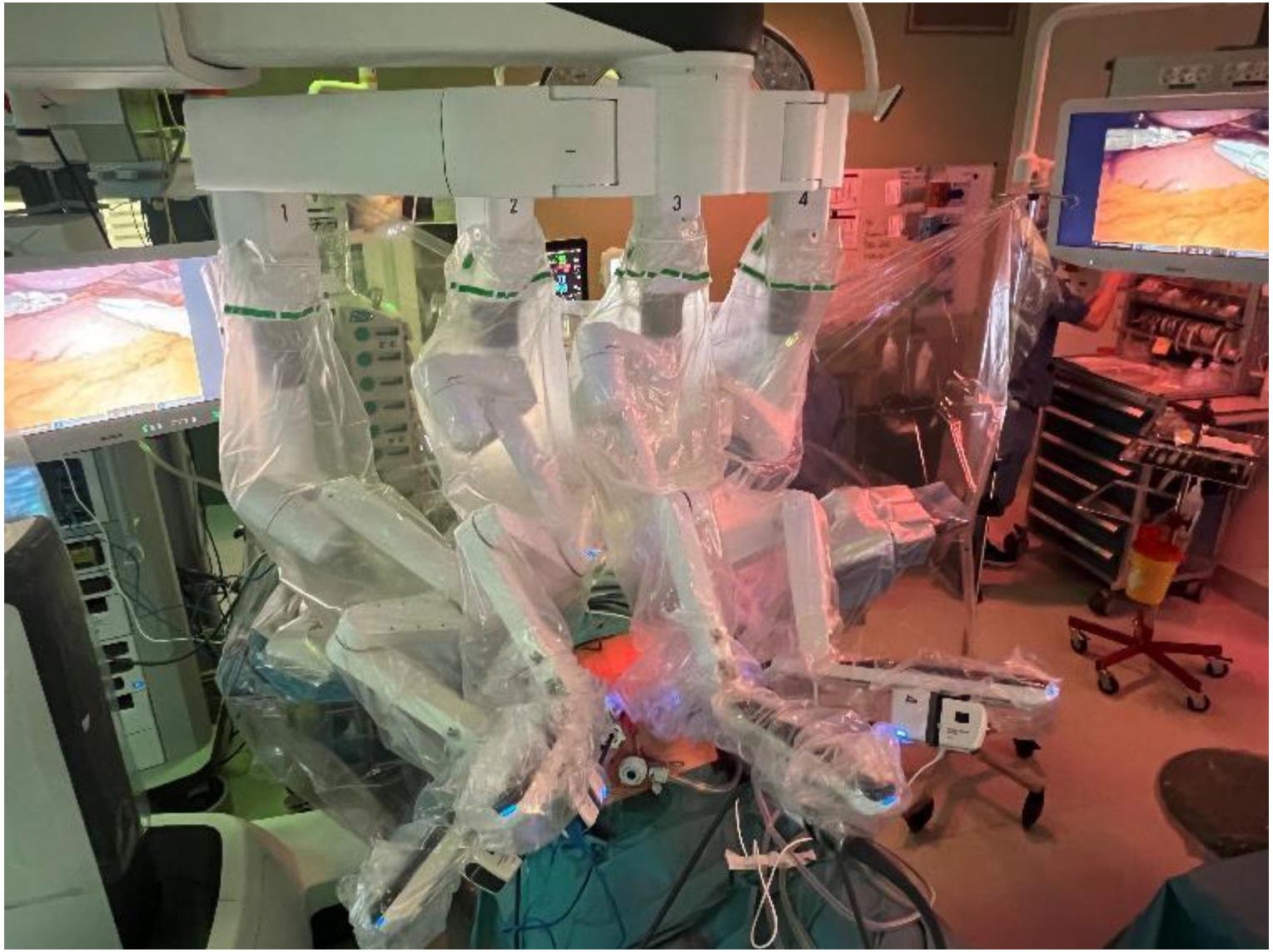

Pancreaticoduodenectomy


B Reconstruction

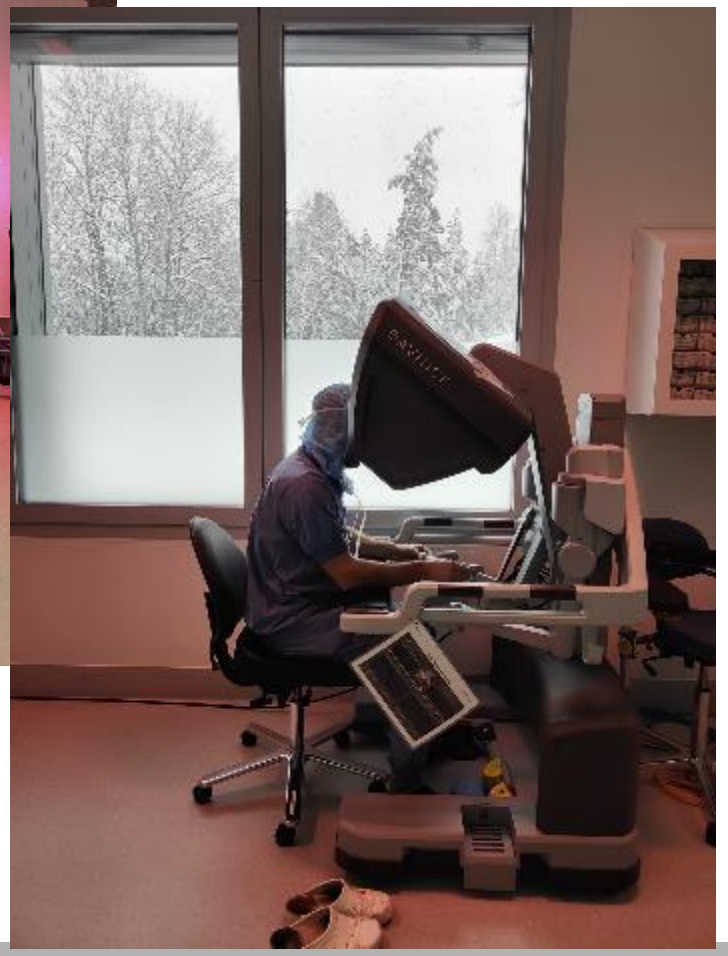
Dockning




Lever retraktor
Da Vinci Xi
Tipp up arm 1
Hok arm 4
8 mm
8 mm
8 mm
8 mm
12 mm
Bipolär fenestrerad arm 2
Kamera arm 3
Airseal 12 mm nedre medellinje
Assistensport


1
2
3
4

Op sal placering



Short summary of robotic whipple

Preparation → set-up robot/docking → start resection/energy device at table side/2 assistance ports

Resection → removal of specimen (Pfannenstiel) → skin closure Pfannenstiel

Preparation BEFORE reconstruction → Reconstruction (exchange table side/console surgeon)

Pancreato-duodenostomy → Hepato-jejunostomy → Gatsro-jejunostomy

Drain (2, 1 from each side) → end of robotic phase → skin closure

Set-up

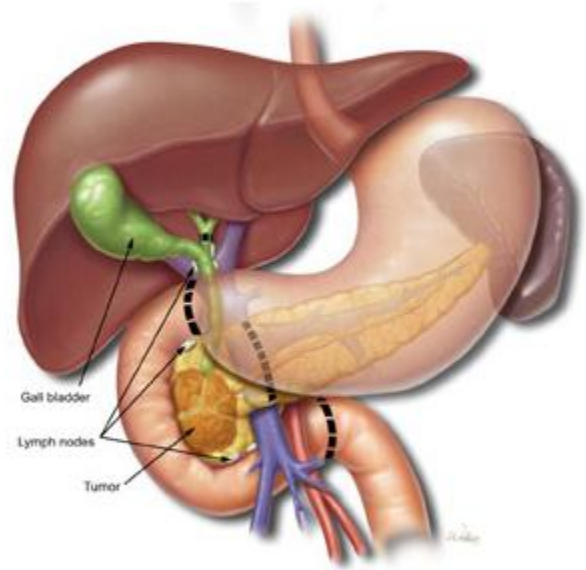
Console and table-side surgeon switch in the middle of the operation

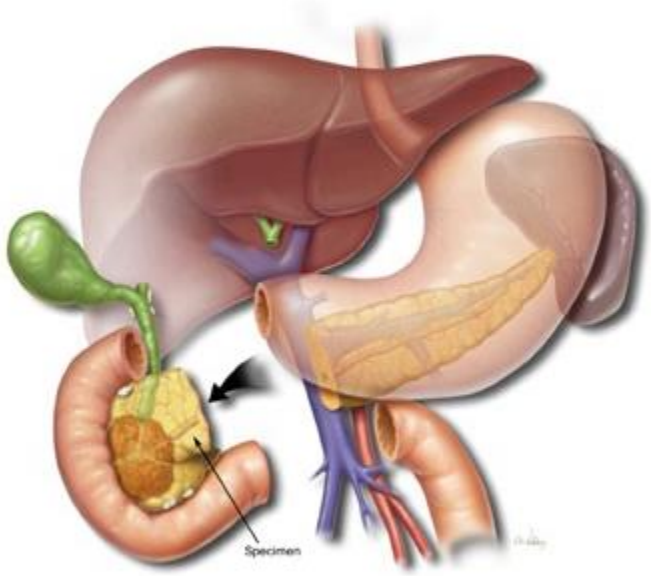
Scrubb Nurse: essential preparation BEFORE reconstruction

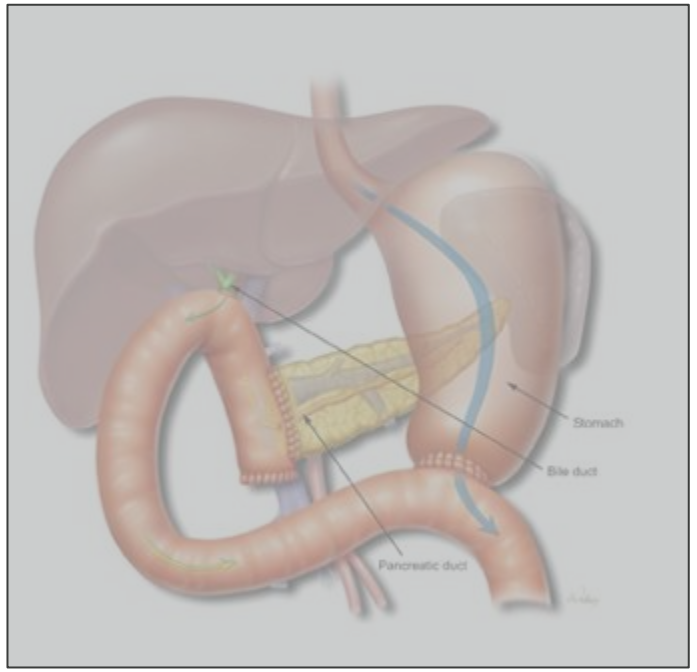
- **sutures (typ, length)**
- **pancreatic stent**
- **drain**
- **endo-catch**
- **skin sutures**

And so on….

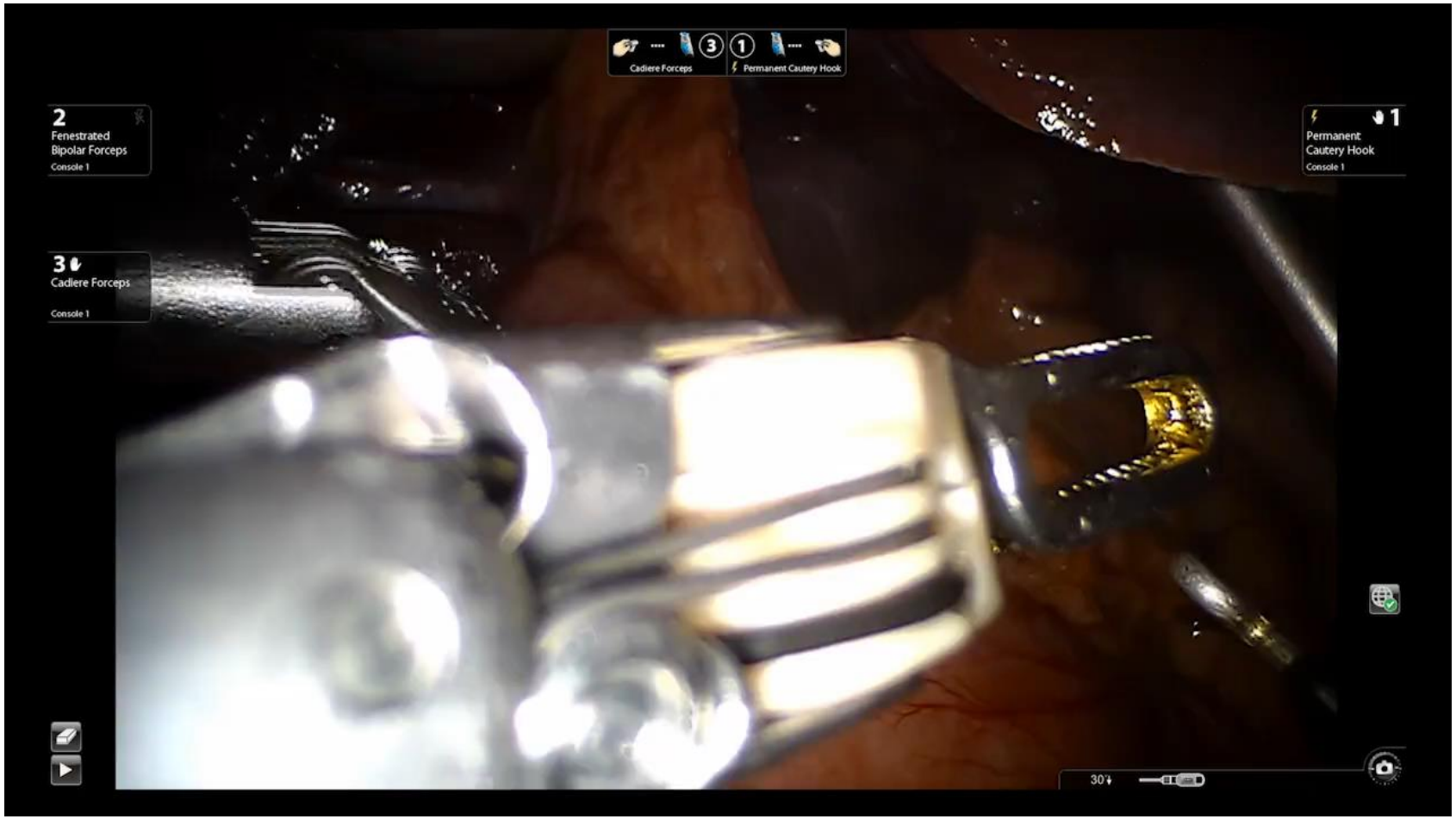
Resection


Gall bladder
Lymph nodes
Tumor

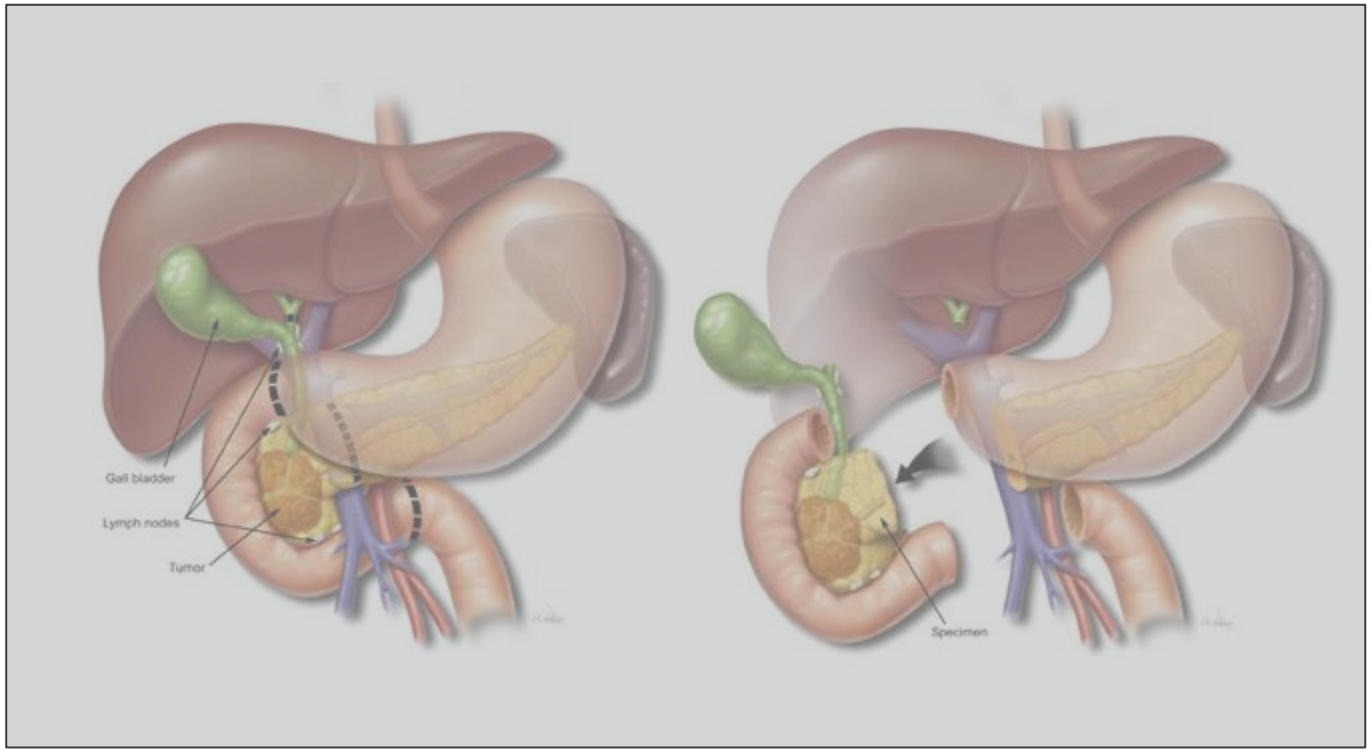

Specimen

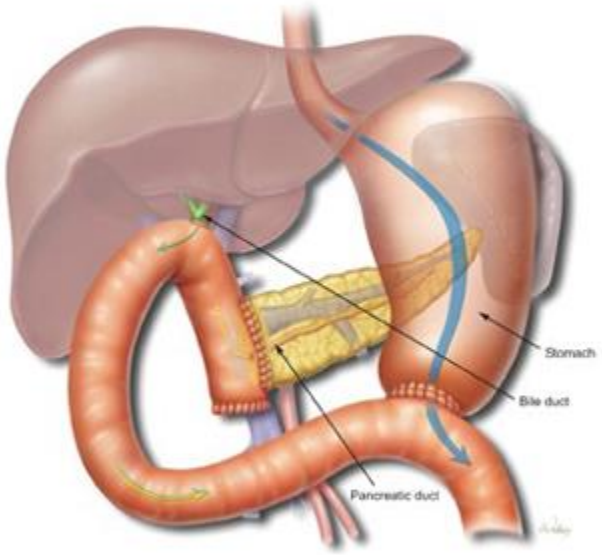

Stomach
Bile duct
Pancreatic duct

Robotically assisted Whipple – resection

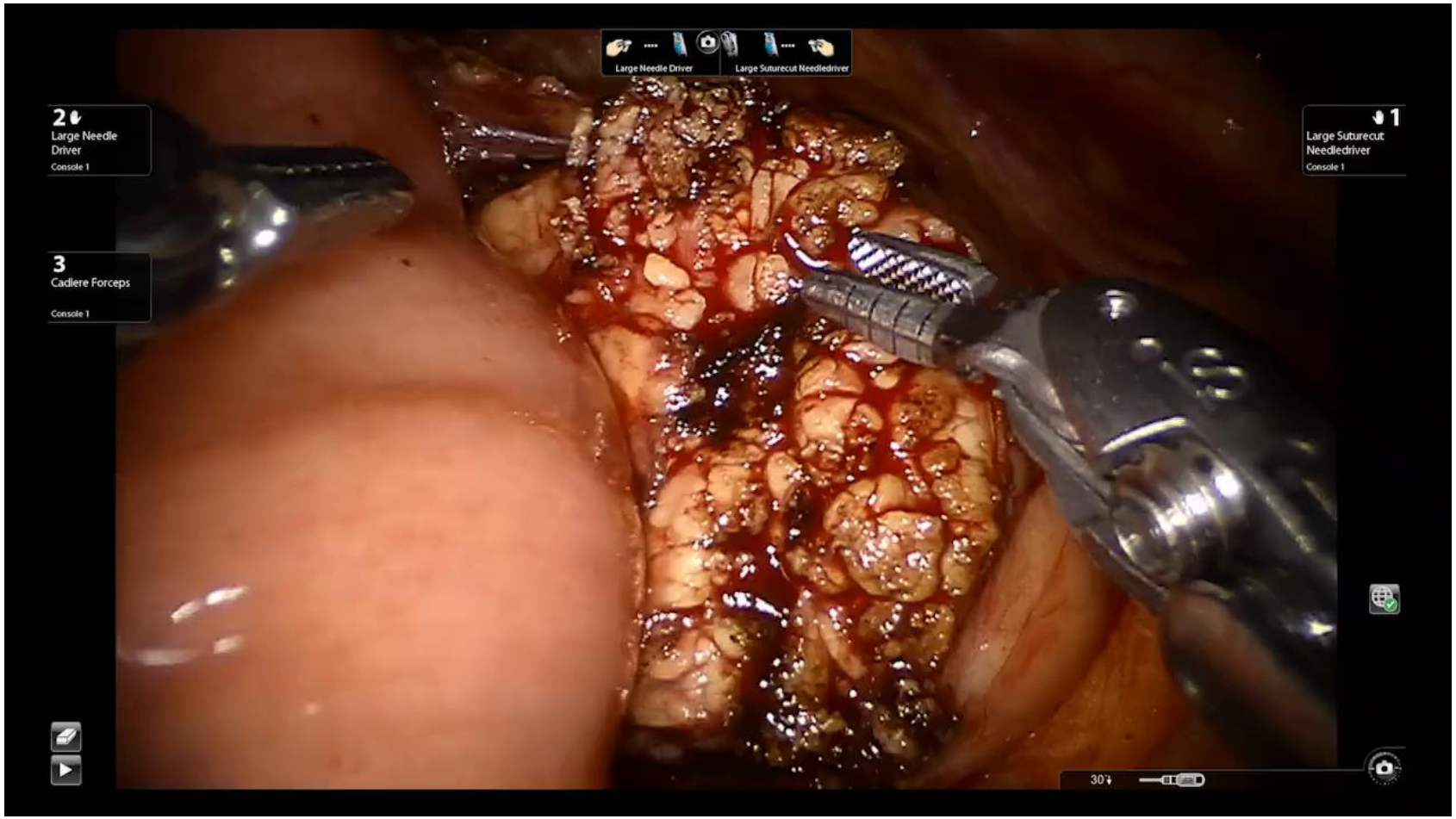


Reconstruction





Reconstruction

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