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Laparoscopic caudate lobectomy

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Introduction

The caudate lobe of the liver is an anatomically complex liver segment that poses significant technical and oncologic challenges

- Its unique and intimate location with the hepatic hilum and IVC
- Dual supply from both portal pedicles and direct venous drainage into the IVC make vascular control a particular challenge

With the progress of laparoscopic liver resection, technically challenging resections are increasing performed laparoscopically with its attendant benefits of improved perioperative outcomes

3 common approaches

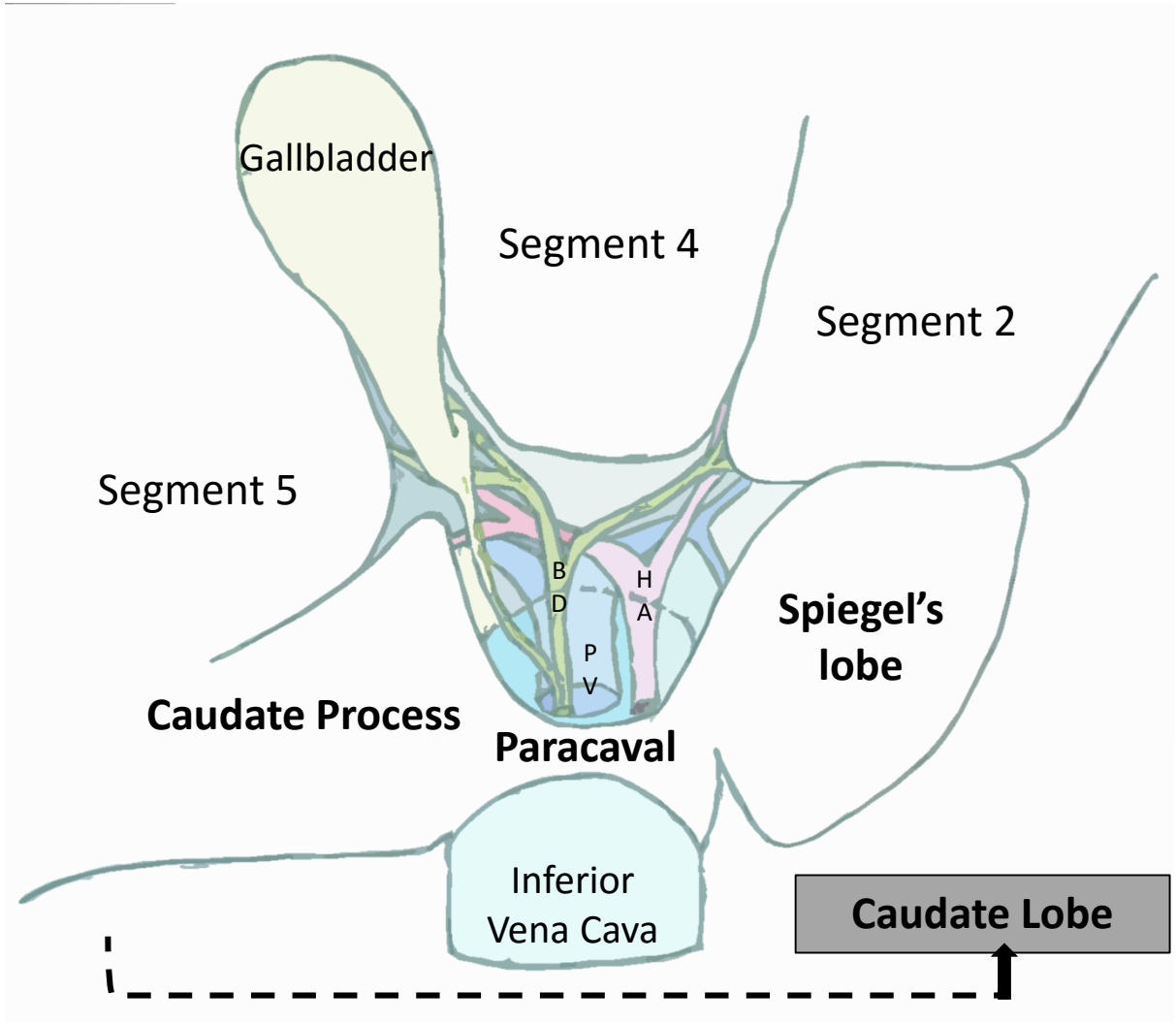
- **Right approach** is typically indicated for large lesions located in the caudate process; in combined with right hepatectomies.
  - Requires a complete mobilisation of the right lobe to the left side to expose the caudate hepatic veins

- **Anterior approach** is feasible, especially for concomitant hemi-hepatectomies
  - Allows transparenchymal resection through the middle of the liver
  - When combined the Hanging maneuver, it exposes the IVC and makes the approach to the caudate lobe more straightforward

- **Left approach** for isolated caudate lobe resections
  - Major vascular structures to the caudate are more easily seen on the left
  - Sequential dissection and retraction enables more control of the vascular structures

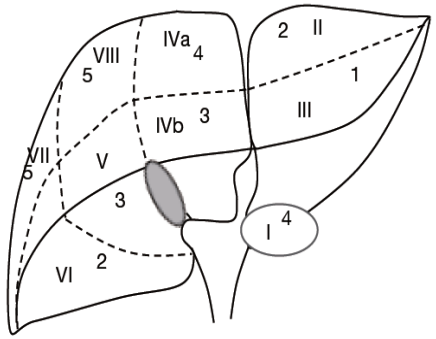
- **The technical challenges of laparoscopic caudate resection** are
  1. Dissection of the anterior part of the IVC off the caudate lobe, esp. for large lesions
  2. Parenchyma transection of the caudate process of which some part of it is a blind dissection

Anatomy and Difficulty Score



Scoring system

Tumor location (Couinaud segment)



Segment	Score
S1	4
S2	2
S3	1
S4a	4
S4b	3
S5	3
S6	2
S7	5
S8	5

Tumor size

	Score
<3 cm	0
≥3 cm	1

Proximity to major vessel*

	Score
No	0
Yes	1

*Main or second branch of Glisson's tree, major hepatic vein, or inferior vena cava

Extent of liver resection

	Score
Partial resection	0
Left lateral sectionectomy	2
Segmentectomy	3
Sectionectomy and more	4

HALS/Hybrid

	Score
No	0
Yes	−1

Liver function

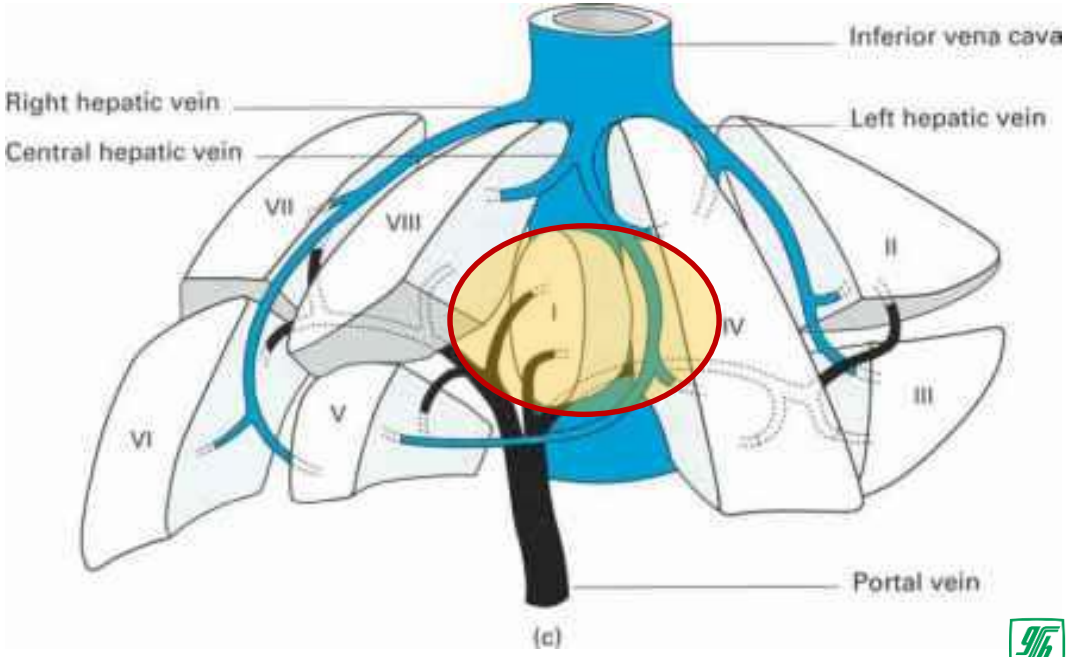
	Score
Child Pugh A	0
Child Pugh B	1

IWATE Criteria

Difficulty index	0	1	2	3	4	5	6	7	8	9	10	11	12
Difficulty level	Low				Intermediate			Advanced			Expert		
Index surgery	Simple and small partial hepatectomy in segment III				Left lateral sectionectomy						Right or left hepatectomy		Posterior sectionectomy for segment VII tumor ≥ 3 cm

Methods and Aims

- From 2006 to 2017, 343 patients underwent laparoscopic liver resection in Singapore General Hospital
- 6 patients underwent laparoscopic caudate lobectomy
- To review our early experience



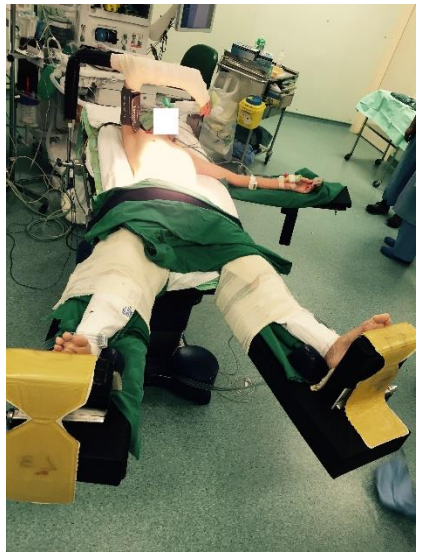
Operative Set-up

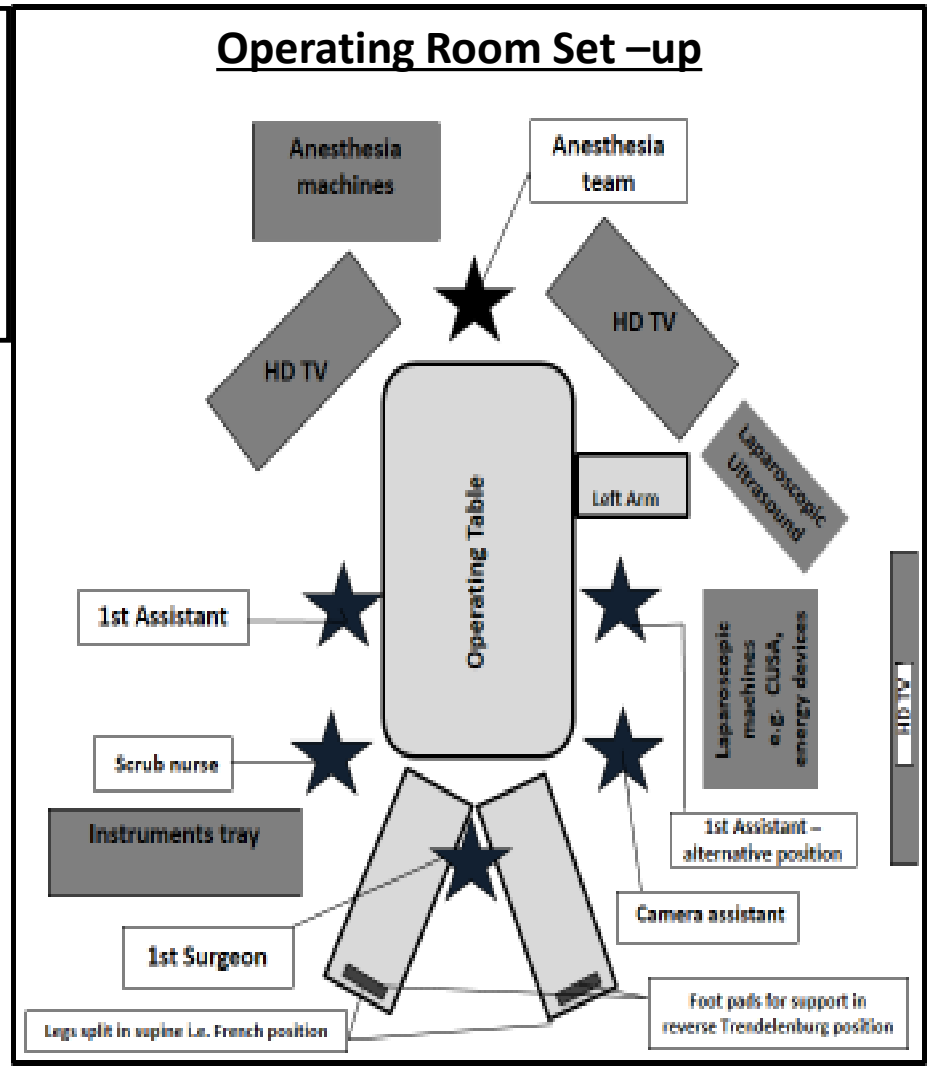
Members of the team

Surgical equipment

Operation Table

Foot pad

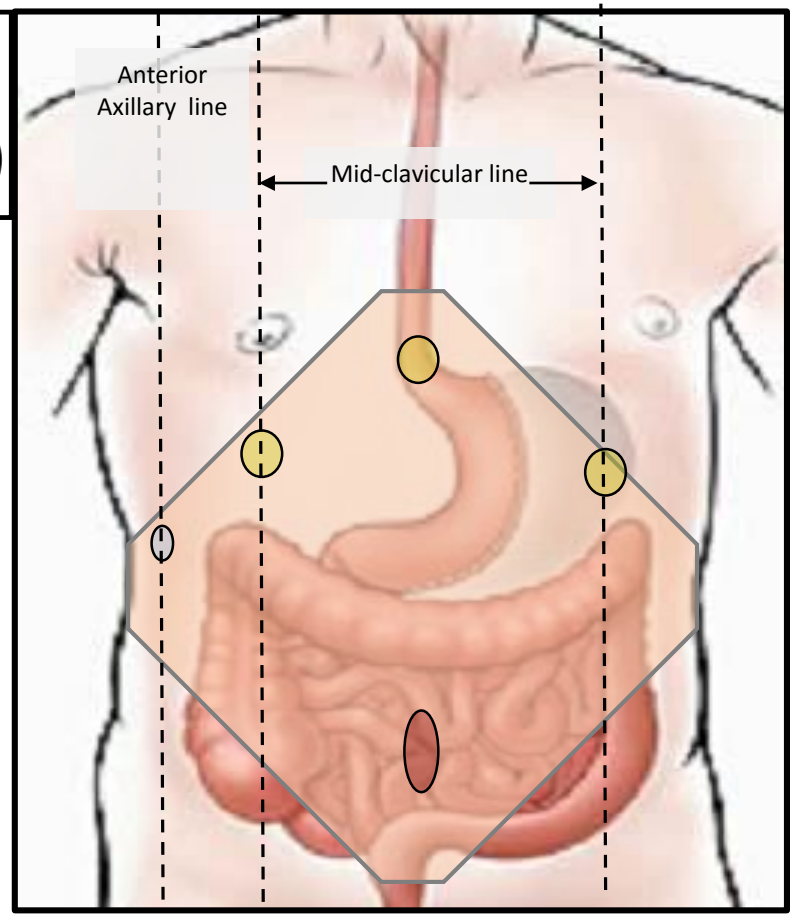




5.5mm ports

12mm port

Camera port (12mm)



LAPAROSCOPIC CAUDATE LOBE RESECTION

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Results

Table 1 Clinical and pathological data of the patients who underwent laparoscopic caudate lobe resection.

Age	Sex	Diagnosis	Tumour size	Margin (mm)	Surgery	Operative time (min)	Pringles	Blood loss (mL)	Post operative stay (days)	Post operative complication
58	M	HCC	38 mm; poorly differentiated grade 3	1.0	Caudate resection	205	No	50	3	Nil
52	M	HCC	30 mm; moderately differentiated grade 2	3.0	Caudate resection	270	No	500	4	Nil
61	M	Colorectal Liver Metastases	30 mm and 18mm; colorectal liver metastses	5.0	Left Hepatectomy and caudate resection	505	No	200	4	Nil
58	M	HCC	18 mm; moderately diiferentiated grade 2	2.5	Caudate resection	125	20 min	50	4	Nil
60	F	Fibropolycystic disease of liver	35 mm	5.0	Left Hepatectomy and caudate resection	400	No	300	5	Nil
72	M	Multifocal HCC	Segment 7: 28 mm poorly differentiated grade 3; Caudate: 7 mm poorly differentiated grade 3	1.0	Segment 7 and caudate lobe resection	400	No	200	4	Nil

Conclusion

- Laparoscopic Caudate resections can be feasible and safe
- Our 1st 6 cases were carefully selected, thus favorable because the lesions were small and did not involve the IVC intimately
  - We only embarked on caudate resections after we had some experience in both minor, major and complex lap liver resections
- The Caudal to Cranial view in laparoscopic approach offers good visualisation to this traditionally restricted area in open surgery
- These factors contributes to the success of a laparoscopic approach for caudate resections

THANK YOU

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