



Montefiore Montefiore Einstein
Center for Transplantation

Surgical emergencies in cirrhosis

(Non-transplant surgery in cirrhosis)

Juan P. Rocca, MD MHA FACS.
Associate Professor of Surgery
Abdominal Organ Transplantation and Hepatobiliary Surgery
Montefiore Einstein Center for Transplantation

Disclosures

- No financial disclosures
- No conflict of interests

Liver Cirrhosis Overview

Number of adults with diagnosed liver disease: 4.5 million

Percent of adults with diagnosed liver disease: 1.8%

Number of deaths: 41,743 (2018)

Deaths per 100,000 population: 12.8

Viral Hepatitis and NASH main causes of cirrhosis

Alcohol use disorder and alcohol liver disease are on the rise

Recent Increases in cirrhosis related mortality disproportionately affect

young people aged 25-34, white Americans, Native Americans

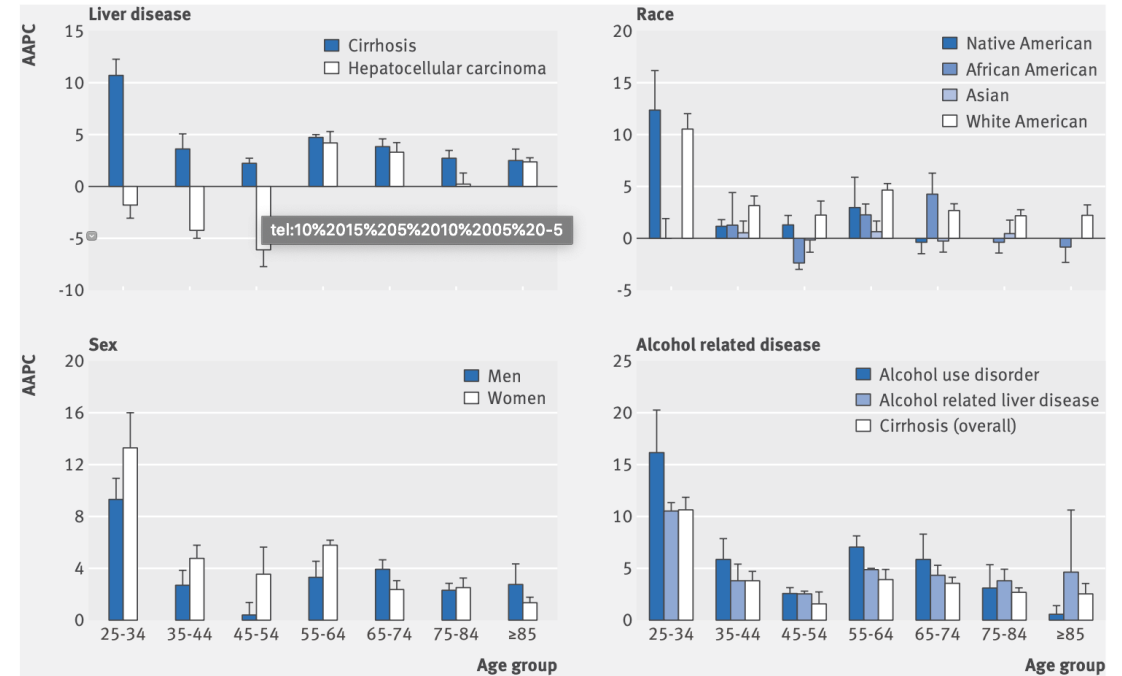


Fig 1 | Trends in mortality due to liver disease by age group in the USA, 2009-16. AAPC=average annual percentage change

BMJ 2018;362:k2817 | doi: 10.1136/bmj.k2817

A Vicious Cycle

Cirrhosis – high morbidity and mortality without transplant

> 15 % of cirrhotic require non-transplant surgery

Avoidance of elective surgery in cirrhotics

Increased surgical emergencies

Increased complications and mortality.

Surgical management in cirrhosis is not standardized

The level of evidence is low

Few prospective trials

Surgical risk stratification in cirrhosis relies in small series

Pathophysiologic risks for surgery in liver cirrhosis

Protein synthetic dysfunction

Malnutrition/sarcopenia → Wound healing and physical recovery

Portal Hypertension

Varices and collateral splanchnic circulation → Ascites + Bleeding

Hypersplenism

Thrombocytopenia → Bleeding

Disrupted secondary hemostasis and fibrinolysis

Bleeding or clotting

Renal dysfunction

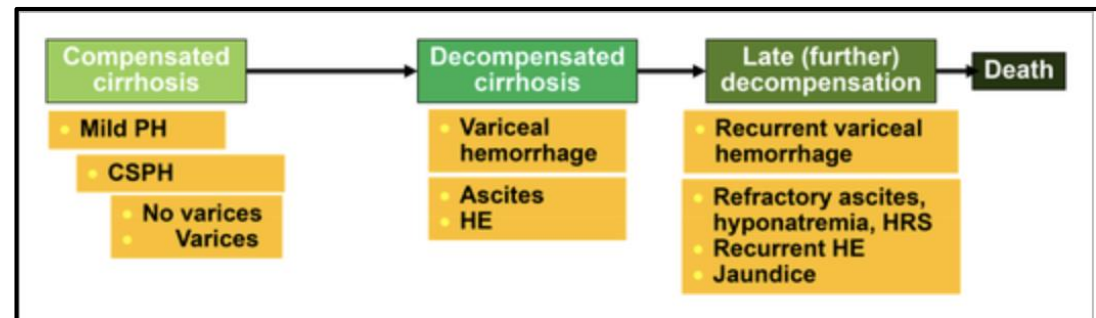
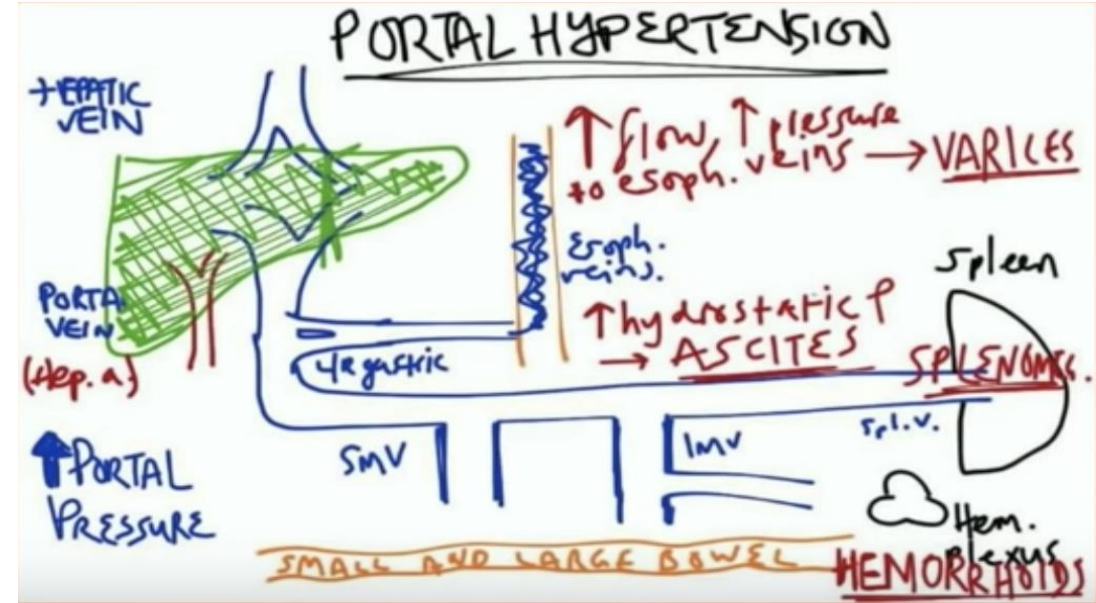
Complicated fluid management → ascites/fluid overload

Poor hepatic clearance

Encephalopathy and change in pharmacokinetics

Enteric Bacterial translocation

Septic complications



HEPATOLOGY, Vol. 65, No. 1, 2017

Surgical Risk Stratification

3 broad categories of surgical procedures

Lifesaving

Cardiovascular or cancer surgery

Emergency interventions

Bleeding, incarcerations, perforations

ASA 5 → Median survival 2 days, 90% mortality at 14 days,
100% mortality at 90 days.

Improvement of patient's quality of life

Elective and early...deferral risks emergency

Risk of postoperative mortality and complications

Degree of hepatic dysfunction

Comorbidities

Type of surgical procedure

Experience of the managing team

Multidisciplinary, Anticipated communication,

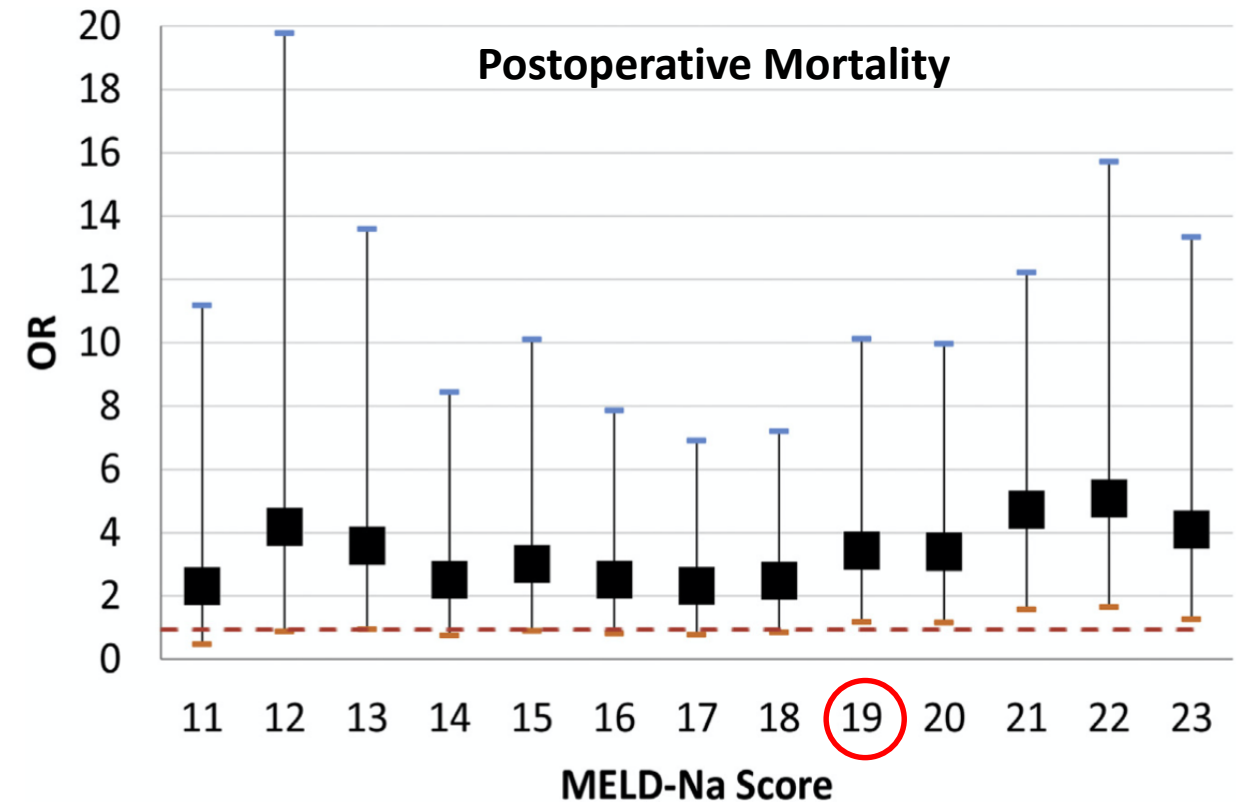
Anesthesia, Critical Care, IR, GI-Hepatology, Surgery

Surgical Risk Stratification

Current role of MELD, MELD-Na

- Risk of mortality without transplant in cirrhosis
- Liver transplant allocation priority
- Mortality and complications in non-transplant surgery
- Good correlation with hepatic and renal dysfunction
- Not good correlation for Portal HTN

E.L. Godfrey et al. / The American Journal of Surgery 216 (2018) 407–413



Surgical Risk Stratification

The old classic CPT score

Both severity of Liver dysfunction + Portal HTN

Ascites especially correlates with poor surgical outcomes

Class A: elective surgery

Class B (ascites): selected cases

Class C: no surgeries other than liver transplant

Factor / points	1	2	3
Encephalopathy	None	Stage I-II	STAGE III-IV
Ascites	Absent	Slight (diuretic controlled)	Moderate (despite diuretic)
Total Bilirubin (mg/dl)	< 2	2-3	> 3
Serum Albumin (g/l)	> 3.5	2.8-3.5	< 2.8
INR	< 1.7	1.7-2.3	> 2.3
	Class A	Class B	Class C
Total points	5-6	7-9	10-15
Elective surgery Mortality	10%	30%	82%
Emergency Surg Mortality	22%	38%	100%

Mansour A, Watson W, Shayani V, et al. Abdominal operations in patients with cirrhosis: still a major surgical challenge. *Surgery* 1997;122:730-5.

Surgical Risk Stratification

Online Mayo Postoperative Surgical Risk score

Combines MELD + ASA + Age

More granularity and better predictive value than Meld alone

Not procedure specific

Post-operative Mortality Risk in Patients with Cirrhosis

What is the age?

What is the [ASA score](#)?
Enter 3 for compensated cirrhosis
Enter 4 for decompensated cirrhosis

What is the bilirubin? (mg/dl)

What is the creatinine? (mg/dl)

What is the INR?

What is the etiology of cirrhosis?
 Alcoholic or Cholestatic
 Viral/Other

Probability of Mortality

7 days	30 days	90 days	1 year	5 years
<input type="text" value="3.369"/> %	<input type="text" value="13.12"/> %	<input type="text" value="20.32"/> %	<input type="text" value="40.584"/> %	<input type="text" value="76.345"/> %

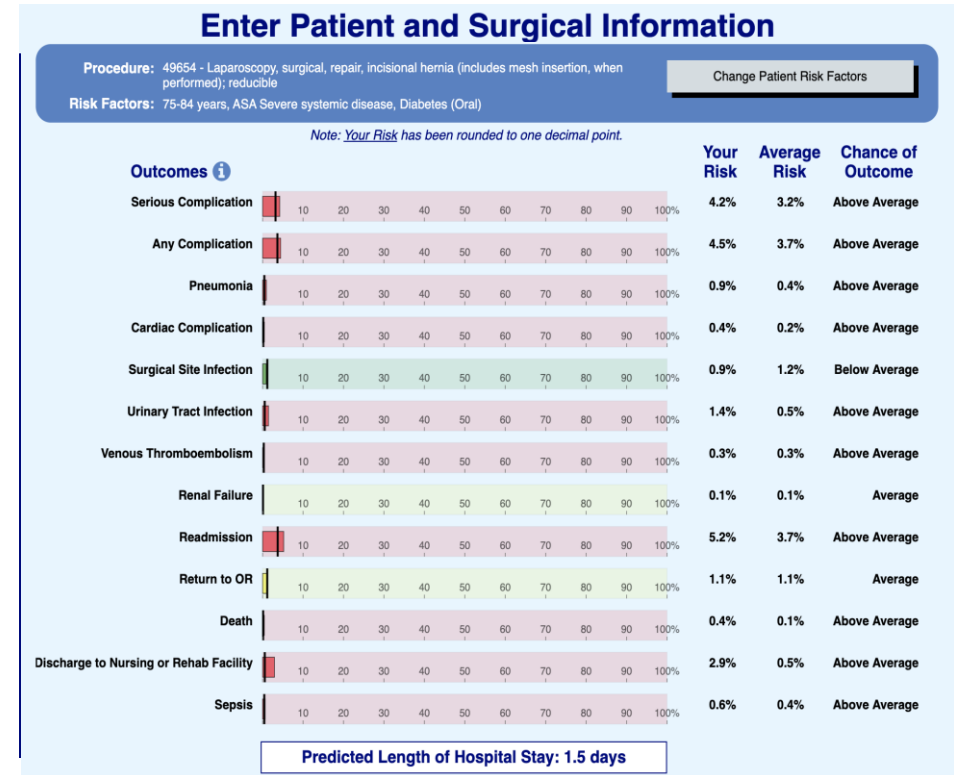
Surgical Risk Stratification

NSQIP Surgical Risk Calculator

Procedure specific

Accounts for age & multiple comorbidities

Only factor related to liver disease is ascites



Surgical Risk Stratification

Important considerations in Cirrhosis

Platelet count: 100k threshold

HVPG: < 10 mmHg

Fibroscan or elastography

Cross sectional imaging

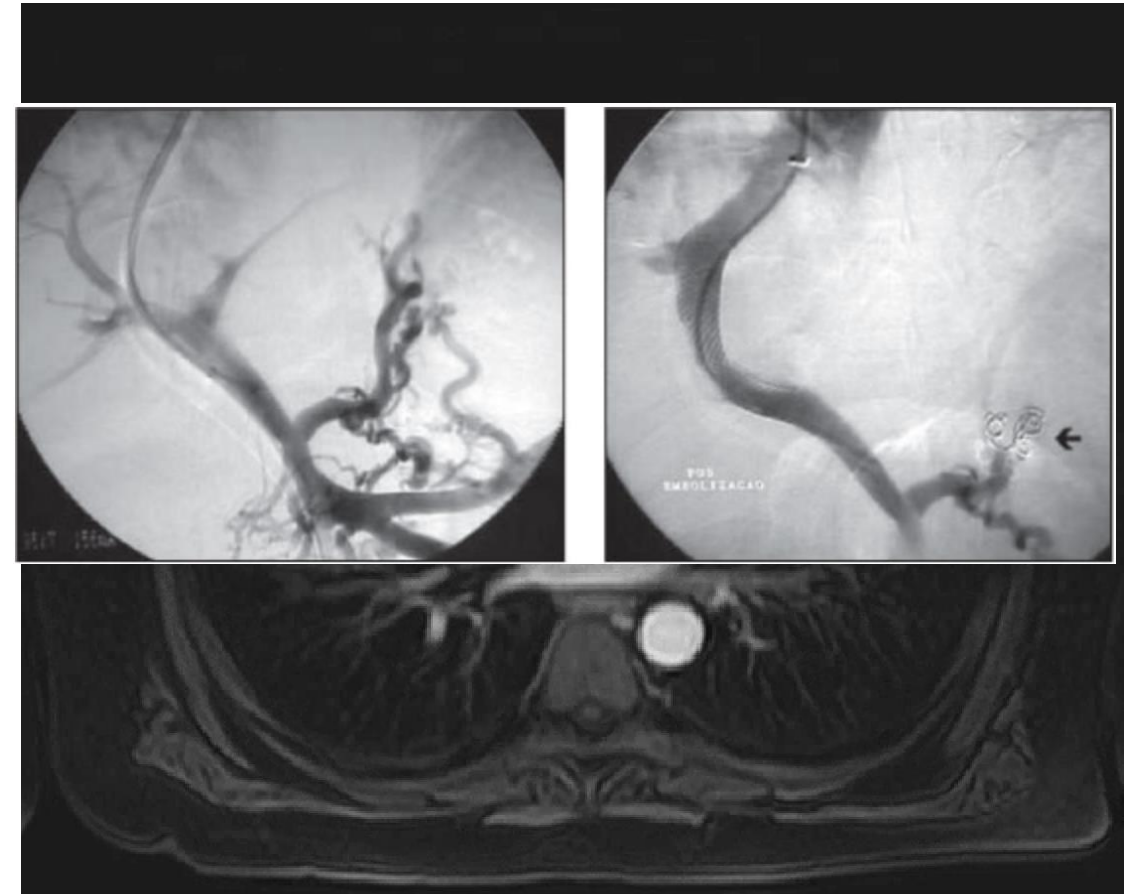
Splenomegaly, ascites, intraabdominal varices, liver size/shape

Type of surgery → The closer to the liver the higher the risk
(HPB > CTS > FG > CR > AW)

Urgency of the procedure

Role of TIPS?

Assess transplant candidacy if MELD 12-15 or more



Specific surgical procedures

Cholecystectomy

Thickened Gallbladder wall in cirrhosis

Not recommended in transplant candidates

No recommended in CPT C.

If unavoidable, Laparoscopic preferred.

GB encasement by cirrhotic liver → Partial Chole

Cross-sectional imaging deal breaker

Acute cholecystitis in CPT C

Attempt Trans cystic Cholecystostomy first

TH Percutaneous Cholecystostomy

TG cholecystostomy + drain ascites

TABLE 2. Outcomes of endoscopic gallbladder stenting

Author (year)	Type of study	No. of cases	Technical success, no.	Clinical response, no.	No. of adverse events
Tamada et al (1991) ²³	R	14	14	9	0
Kaloo et al (1994) ³⁰	R	4	4	4	0
Shrestha et al (1996) ³³	R	3	3	3	0
Gaglio et al (1996) ²⁹	R	3	3	3	0
Conway et al (2005) ²⁸	R	29	26	25	0
Schlenker et al (2006) ³²	R	23	23	18	0
Pannala et al (2008) ³¹	R	51*	51	50	8
Total, no. (%; 95% CI)		127	122/127 (96%; 0.911-0.987)	112/127 (88%; 0.812-0.932)	8

CI, Confidence interval; R, retrospective.

*Including endoscopic gallbladder stenting cases (number of cases was unknown).

Specific surgical procedures

Abdominal wall Hernia Repair

Frequent problem secondary to ascites

Complicated hernias: most frequent emergency surgery

Flood syndrome (perforated skin, ascites leakage)

Incarceration, spontaneous or after LVP

Early and elective repair encouraged

Controlling ascites key to successful hernia repair

Diuretics

LVP

TIPS, only selected cases

Mesh considerations

Surgical drain

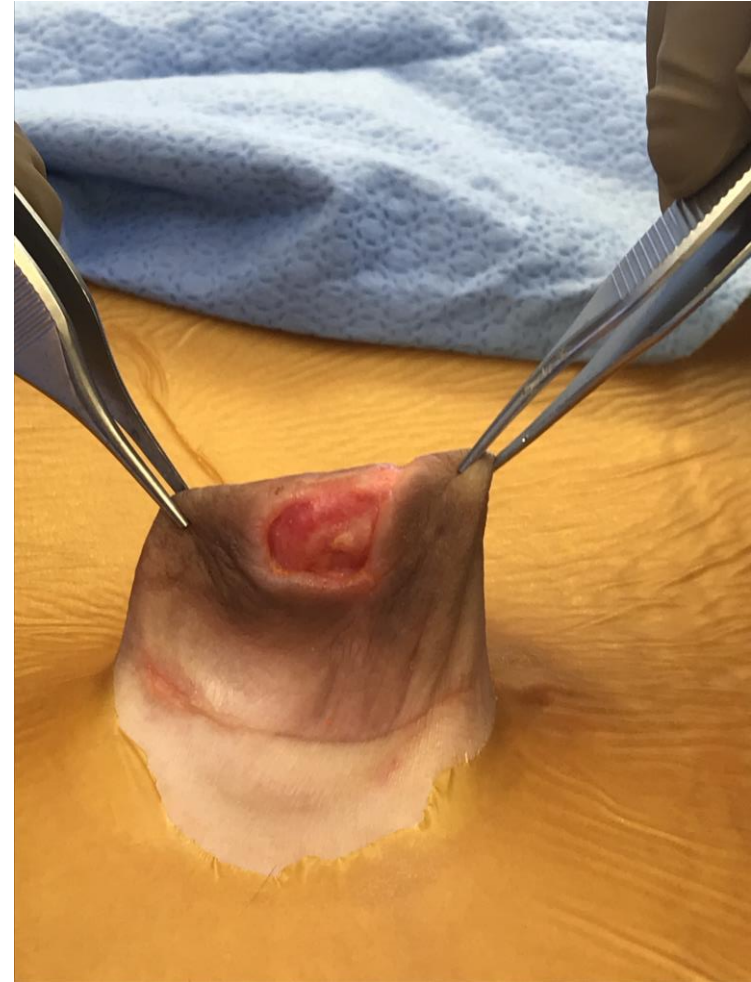


Table 1 Demographics, hernia, and underlying liver disease characteristics and post-operative course in the entire cohort and in the two subgroups of patients underwent elective or emergency operations

Variables	Entire cohort (n = 61)	Elective cases(n = 27)	Emergency cases(n = 34)
Age (range in years)	52 (44–62)	51 (45–60)	53 (43–65)
Male gender (%)	46 (82.1)	20 (87.0)	26 (78.8)
Mean BMI ^a (range)	25 (16–36)	28 (19–34)	24 (16–36)
Poorly controlled ascites (%)	25 (41)	2 (7.4)	23 (67.6)
CTP ^b (%):A	19 (31.1)	16 (59.2)	3 (8.8)
B	29 (47.5)	9 (33.3)	20 (58.8)
C	13 (21.4)	2 (7.5)	11 (32.4)
Mean Pre-operative MELD ^c (range)	14 (8–22, 24, 25)	12 (8–21, 24, 25)	16 (8–22, 24, 25)
Hernia surgery (%):umbilical	39 (54.9)	9 (25.7)	30 (83.3)
inguinal	23 (32.4)	19 (54.3)	4 (11.1)
other	9 (12.7)	(20)	2 (5.6)
Combined surgery (%)	10 (17.9)	8 (34.8)	2 (6.0)
Ascites leak (%)	13 (23.2)	0 (–)	13 (39.4)
Incarceration (%)	10 (16.4)	0 (–)	10 (29.4)
Use of prosthesis (%)	24 (39.4)	16 (59.3)	8 (23.5)
Mean Hospital stay (range in days)	11 (3–33)	5 (3–14)	13 (6–33)
ICU ^d stay (%)	22 (36)	4 (14.8)	18 (53)
Mean ICU ^d stay (range in days)	7 (0–33)	2.5 (0–4)	9 (0–33)
Morbid Event (post-operative complication) (%)	26 (42.6)	4 (14.8)	22 (64.7)
Death (%)	11 (18)	1 (3.7)	10 (29.4)
Clavien-Dindo classification (%):	3 (4.9)x	1 (3.7)	2 (5.8)
I	6 (9.8)	1 (3.7)	5 (14.6)
II	2 (3.3)	0 (–)	2 (5.8)
III	4 (6.5)	1 (3.7)	3 (8.9)
IV	11	1 (3.7)	10 (29.4)
V	(18)		
Mean Post-operative MELD (range)	16 (13–21, 24, 25)	14 (11–15)	21 (15–30)

Peri-operative optimization

Ascites:

Na restriction, diuretics, paracentesis, TIPS in selected cases.

Varices:

B-Blockers, endoscopic control, TIPS.

Encephalopathy:

Lactulose, rifaximin, golytely

Coagulopathy:

Deficiency Factors II, V, VII + Protein C.. State of “rebalance”, INR ineffective.
Deficit in fibrinogen.

Thrombocytopena

Threshold of 50k

Fluid Management and Antibiotics

Choice of procedures in bleeding emergencies

GI bleeding, variceal or other.

Endoscopy, Balloon tamponade

Interventional radiology → TIPS, BRTO, Angioembolization

Role of surgery, anecdotic.

Liver mass bleeding:

Angioembolization

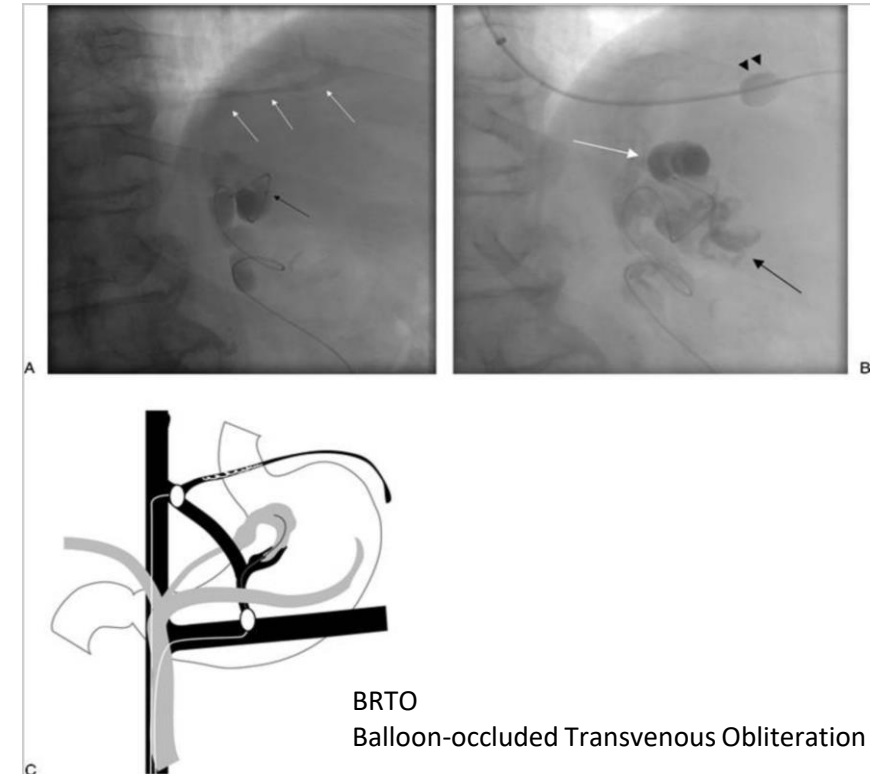
Surgery: peripheral hepatic resection, thermal ablation,
hemostatic suturing.

Other intraabdominal bleeding:

Tamponade

Laparoscopy

Laparotomy and packing +/- TIPS/shunting



How would you manage this case?

Case 1:

50 y/o M with hx of Decompensated ETOH Cirrhosis

(Ascites + EV s/p endoscopic ligation)

Listed for LT with Meld 26, current Meld 20.

Abdominal pain, tachycardia and hypotension

CT abd → hemoperitoneum + hemorrhagic GB

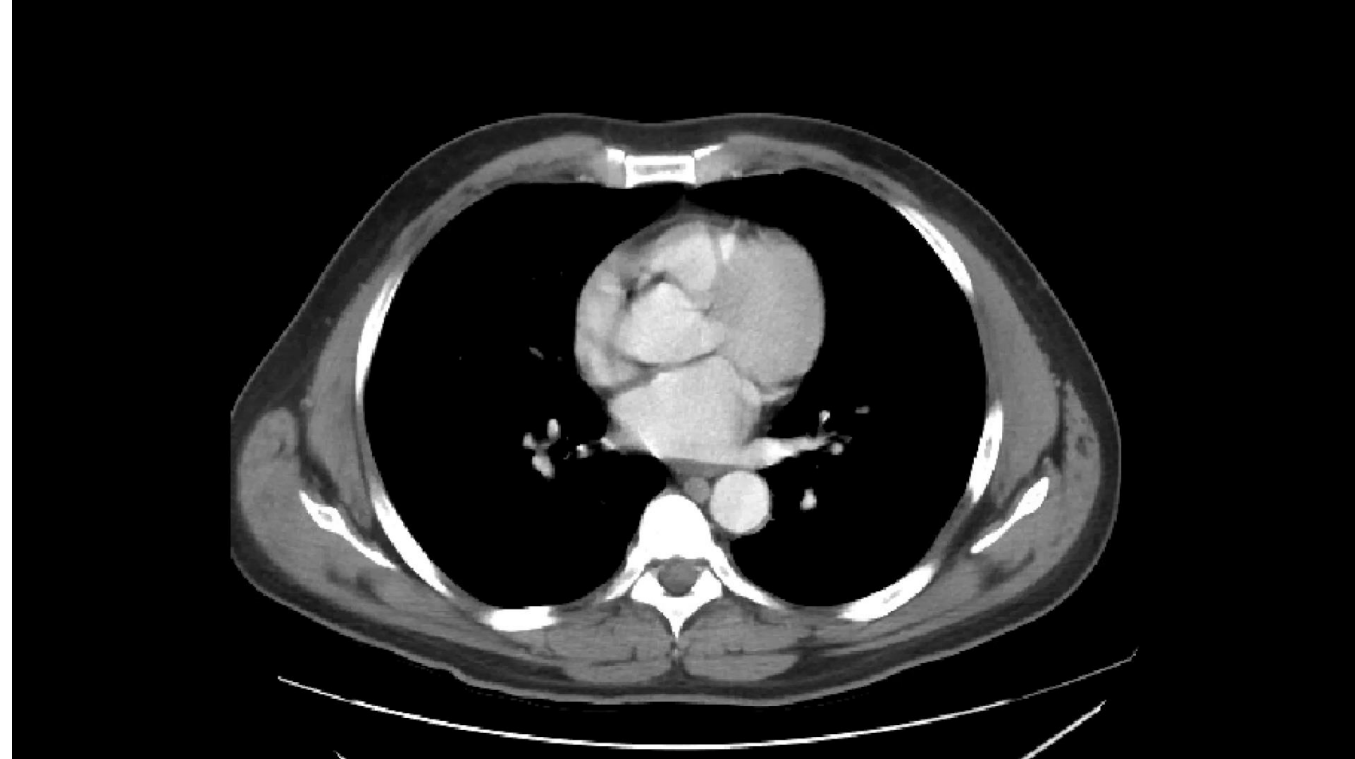
Resuscitated and transferred to Montefiore

Involved: SICU, Hepatology, Surgery and IR

GB as bleeding source, variceal bleeding vs. perforated GB

Active bleeding resolved, HD stable

Hb ~10, Plt 120k, INR 1.4, TB 2.2 → 3.5



How would you manage this case?

Case 2:

76 y/o W with hx of Decompensated NASH Cirrhosis

Ascites, now compensated on diuretics, Meld < 10, CPT Class A.

Bilateral inguinal hernia and small ventral incisional hernia

Relentless pain from inguinal hernias, affecting walking/sleeping

Good performance status. TB 1.1, Cr 0.7, INR 1.4, Plt 67K

CT abd/pelvis:

Cirrhotic liver. Splenomegaly. Abdominal varices. Mild ascites.

Subcutaneous varices.

Right inguinal hernia containing fat and fluid.

Smaller left inguinal hernia with fat.

Small fat-containing umbilical hernia with fat.

