Cirrhosis:
liver let live

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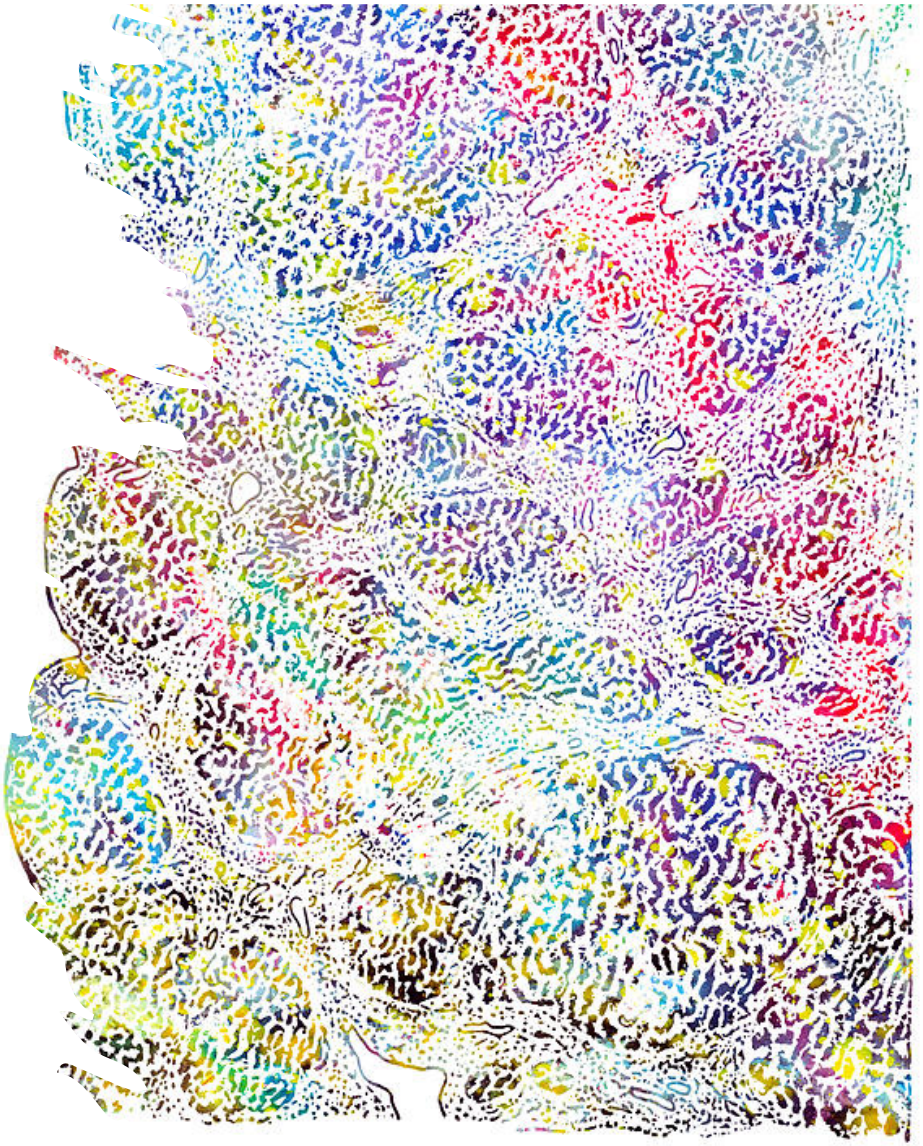
University of Louisville



Disclosures

- None

Disclaimer:

I believe in evidence-based healthcare and health equity for all.

Educational Need / Practice Gap

- The complex and rapidly expanding literature surrounding cirrhosis management can lead to over (or under) ordering as well as lack of evidence-based care.

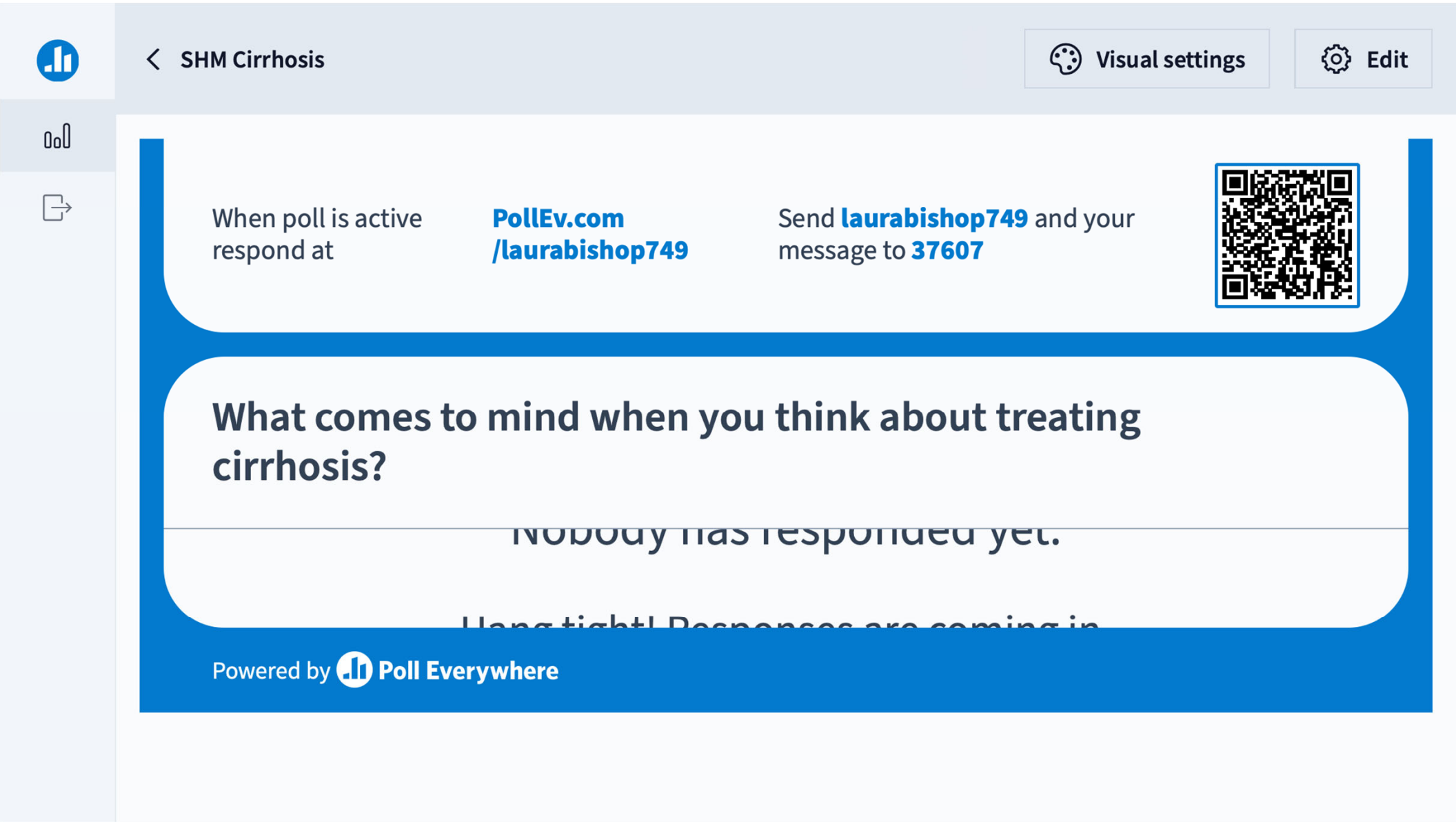
Objectives

Upon completion of this educational activity, you will be able to:

- Describe the utility and limitations of various lab/imaging tests for assessing hepatic and renal function, encephalopathy, and coagulopathy in the setting of cirrhosis.
- Implement appropriate prophylaxis for patients with risk factors for decompensation.
- Coordinate a continuing treatment plan aimed at improving symptoms, reducing morbidity and readmission including optimizing nutrition, treatment of substance use disorders and early hepatology and palliative care involvement.
- Analyze your current practice and that of your hospital system to streamline a systematic approach to decompensated cirrhosis that provides equitable and evidence-based care and prevents readmission.

Expected Outcome

- Improvement in streamlining recommended care of the patient with cirrhosis while minimizing unneeded testing and reducing length of stay


SHM Cirrhosis
Visual settings
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When poll is active respond at
PollEv.com /laurabishop749
Send laurabishop749 and your message to 37607
What comes to mind when you think about treating cirrhosis?
Nobody has responded yet.
Hang tight! Responses are coming in
Powered by Poll Everywhere

Guidelines

Diagnosis, Evaluation, and Management of Ascites, Spontaneous Bacterial Peritonitis and Hepatorenal Syndrome: 2021 Practice Guidance by the American Association for the Study of Liver Diseases

ceived: 1 November 2023 | Accepted: 1 November 2023
I: 10.1097/HEP.0000000000000671

Practice Guidance

AASLD

AASLD Practice Guidance on Acute-on-chronic liver failure and the management of critically ill patients with cirrhosis

AASLD

OGY, VOL. 73, NO. 1, 2021

Malnutrition, Frailty, and Sarcopenia in Patients With Cirrhosis: 2021 Practice Guidance by the American Association for the Study of Liver Diseases

Jennifer C. Lai [1*] Puneeta Tandon,[2*] William Bernal,[3] Elliot B. Tapper [4] Udeme Ekong [5] Srinivasan Dasarathy,[6]

Reproductive Health and Liver Disease: Practice Guidance by the American Association for the Study of Liver Diseases

Monika Sarkar,[1] Carla W. Brady [2] Jaquelyn Fleckenstein,[3] Kimberly A. Forde,[4] Vandana Khungar,[4] Jean P. Molleston,[5] Yalda Afshar,[6] and Norah A. Terrault [7]

DOI: 10.1002/jhm.13117

Journal of Hospital Medicine
shm Society of Hospital Medicine

The Core Competencies in Hospital Medicine—Clinical Conditions 2023 Update

Satyen Nichani MD, FACP, SFHM[1] | Megan E. Brooks MD, MPH, FACP, SFHM[2] | Nick Fitterman MD, MACP, SFHM[3] | Michael Lukela MD, FACP, FAAP, SFHM[4] | Nick Marzano MEd[5] | Kelly Sopko MD, SFHM[6] | Joseph R. Sweigart MD[7]

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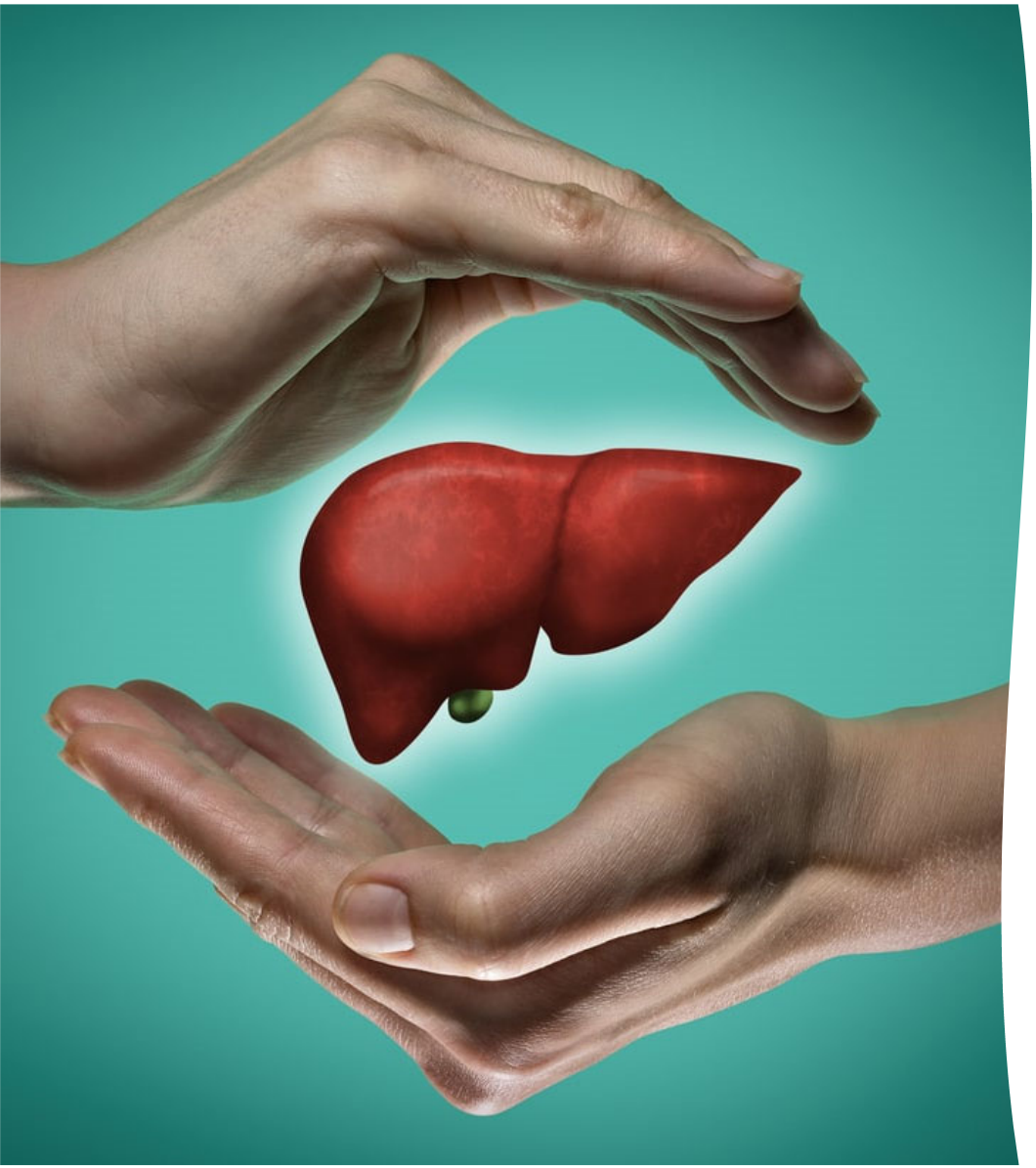
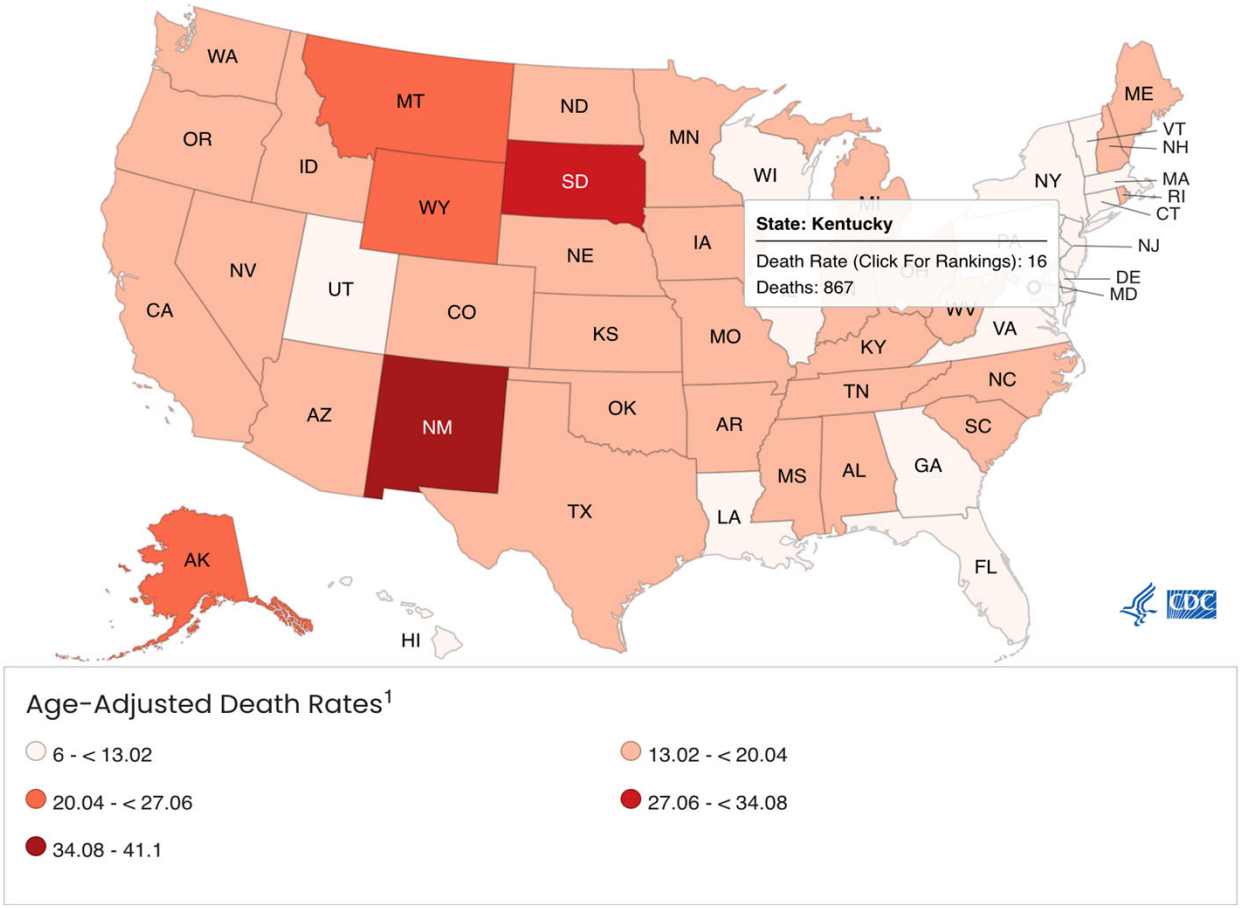


Bill E. Rubin is a 56yo man with hx of hypertension, depression and alcohol use who presented with increasing fatigue and abdominal discomfort over the past three weeks and is being admitted with AKI.

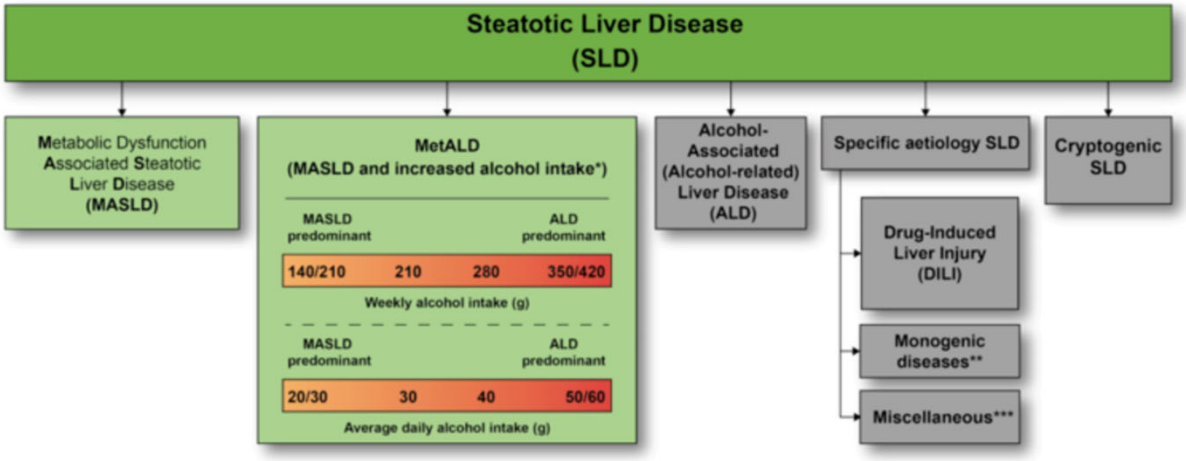
2022 Cirrhosis Stats

- Nationally 4.5 million adults have cirrhosis
  - 1.8% of the population
- Death rate of 16.4/100,000 nationally
- Cirrhosis has remained the 6th most common cause of death for those aged 25-44 since 1980
  - For ages 45-64, it was 5th in 1980 and is now 4th



Now That We Don’t Talk (about NAFLD)

- MASLD > NAFLD
  - Metabolic dysfunction associated liver disease
- MASH > NASH
  - Metabolic associated steatohepatitis
- Resmitirom (Rezdiffra)
  - Thyroid hormone receptor beta-agonist
  - Approved for MASH with stage 2-3 fibrosis



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What will be most helpful in predicting whether Mr. Rubin has cirrhosis or not?

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I Knew You Were Trouble

Predicting Cirrhosis

- "The overall impression of the clinician was not as informative as the individual findings or laboratory combinations"

Finding	Source	No. of Studies	Total No. of Patients	No. of Patients With Cirrhosis	Sensitivity	Specificity	Positive LR (95% CI)	I^2, %	*P* Value	Negative LR (95% CI)	I^2, %	*P* Value
Spider nevi[a]	55, 57-60, 62-64, 79, 82, 83, 86, 106	13	1821	694	0.46	0.89	4.3 (2.4-6.2)	78	< .001	0.61 (0.54-0.68)	31	.14
Hepatomegaly[b]	55, 57-59, 62, 64, 79, 82, 86, 110	10	1558	674	0.74	0.69	2.4 (1.2-3.6)	89	<.001	0.37 (0.24-0.51)	81	<.001
Thrombocytopenia, platelet count, × 10^3/μL <110[a]	55, 60, 61, 85, 112, 113, 140	7	2533	1137	0.50	0.95	9.8 (2.6-17)	87	<.001	0.53 (0.35-0.71)	90	<.001

AST:platelet ratio index (APRI)[71]

(AST/upper limit of normal AST) x (100/platelet count [x 10^3/μL])

Higher values of the APRI increase the likelihood of cirrhosis and lower values decrease the likelihood of cirrhosis.

Bonacini cirrhosis discriminant score (CDS)[94]

Platelet score + ALT:AST ratio score + INR score

Score	Platelets (x 10^3/μL)	ALT:AST ratio	INR
0	>340	>1.7	<1.1
1	280-340	1.2-1.7	1.1-1.4
2	220-279	0.6-1.19	>1.4
3	160-219	<0.6	
4	100-159		
5	40-99		
6	<40		

The modified Bonacini CDS has a range of possible values from 0 to 11; higher scores identify patients with higher likelihood of cirrhosis and lower scores identify patients with lower likelihood of cirrhosis.

Lok index[114]

exp (logodds) / [1 + exp(logodds)]

logodds = – 5.56 – (0.0089 × Platelet count [× 10^3/μL]) + (1.26 × AST:ALT ratio) + (5.27 × INR)

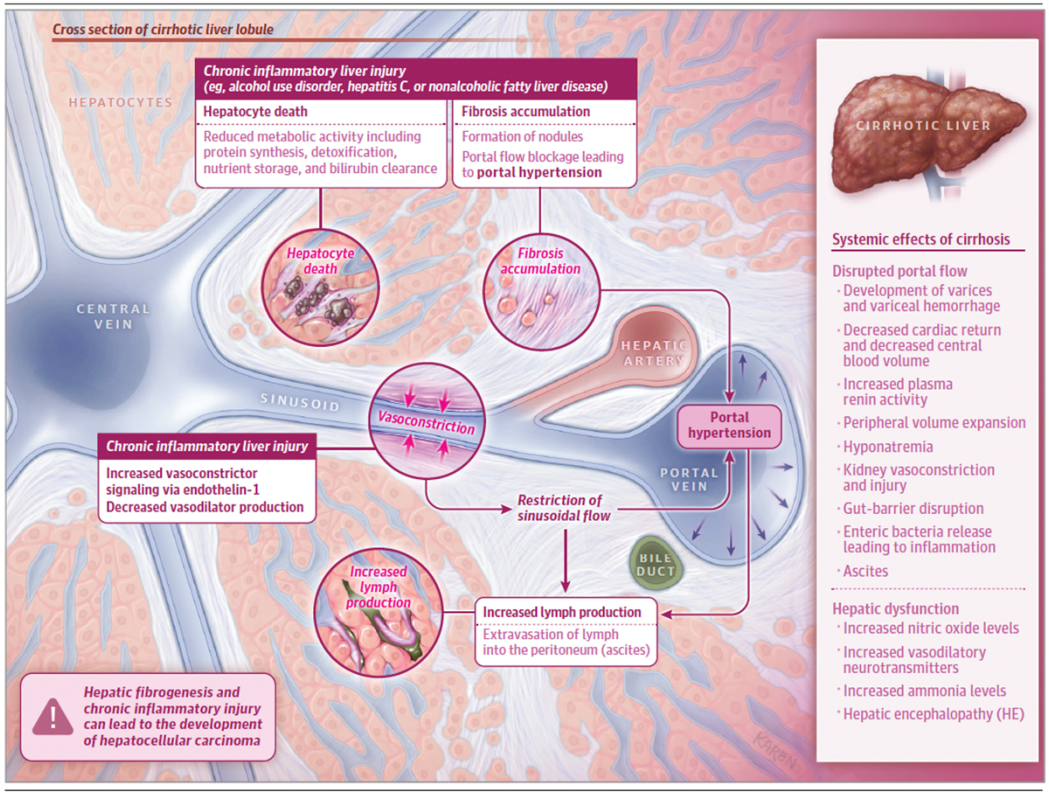
The Lok index is an odds ratio normalized to possible values between 0 and 1; a higher fraction (ie, probability) increases the likelihood of cirrhosis, while a lower fraction reduces the likelihood of cirrhosis. (See also http://www.haltctrial.org/cirrhosis.html.)

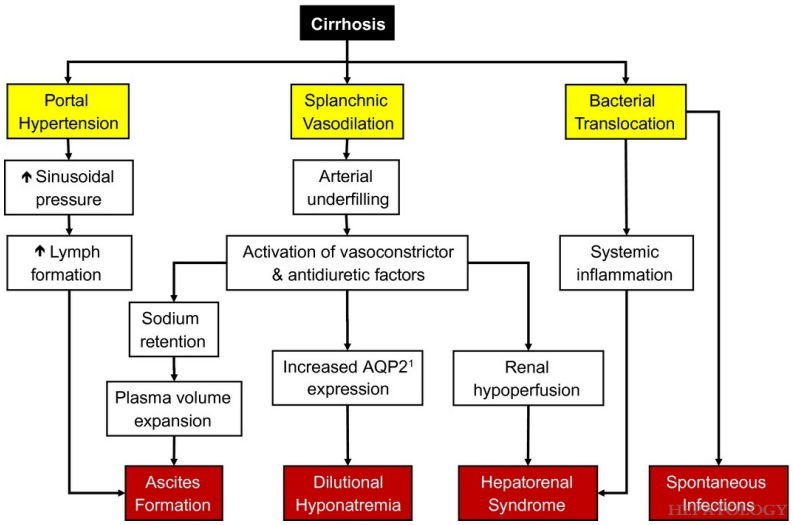
JAMA 2012 Feb 22;307(8):832

Back to Bill

- You review Mr. Rubin's labs and see sodium of 130, BUN 34, Cr 1.2, WBC 6, Hgb 11.3, Platelets 80,000, AST 94, ALT 58, Tbili 3.2, INR 2.4.
- On exam, he has mild scleral icterus, spider angioma on his chest, nl cardiorespiratory auscultation, distended, mildly tender abdomen with shifting dullness, no peripheral edema.

Treacherous





JAMA. 2023;329(18):1589-1602

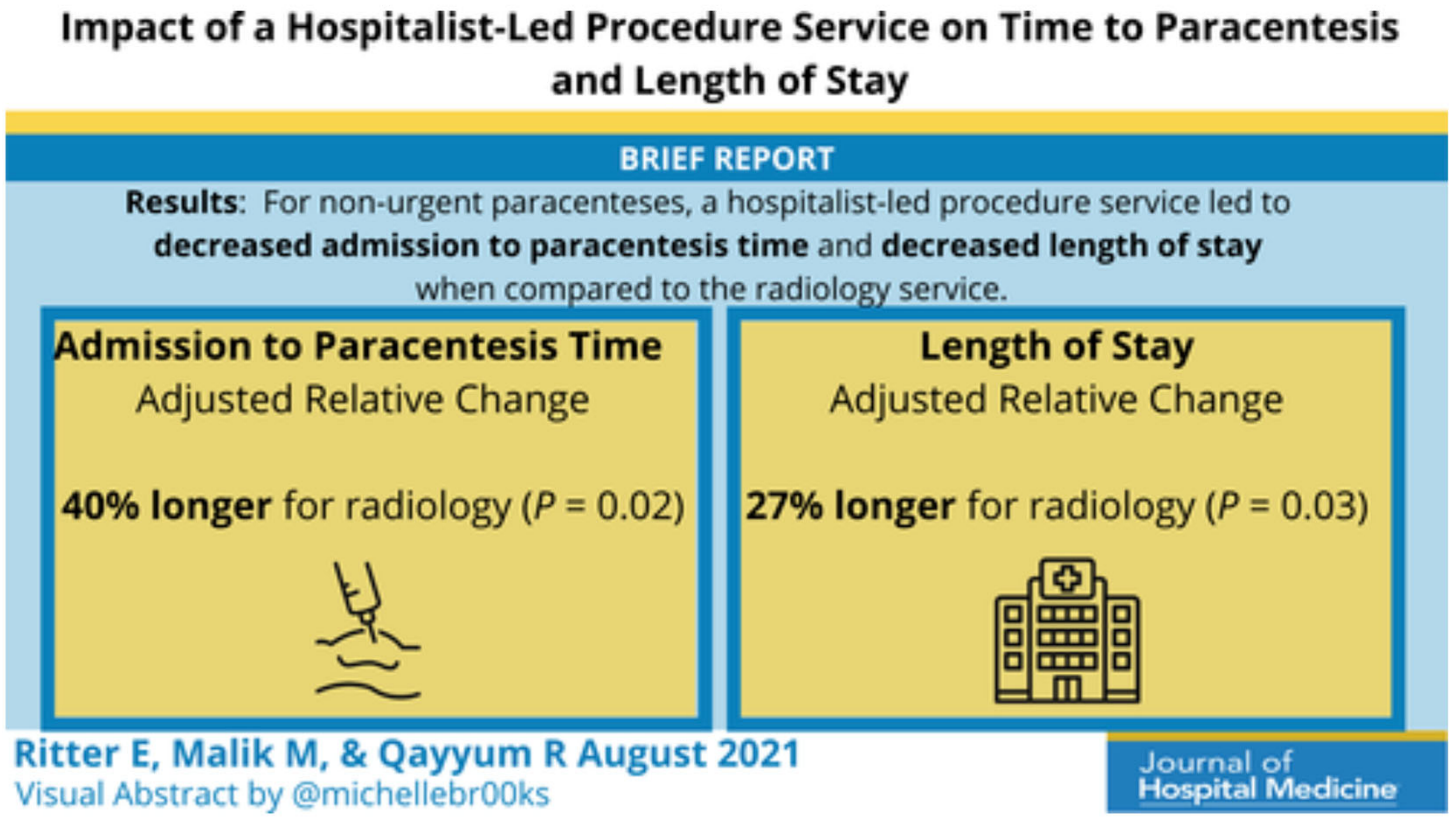
Hepatology 74(2):1014-1048, August 2021

Continuing the case

RUQ US $1288
Dopplers $1880

- You order an ultrasound with dopplers to evaluate the portal vasculature.
- Paracentesis ordered for evaluation of portal hypertension and exclusion of SBP. Initially ordered through IR; however, they have concerns about his elevated INR and call you to discuss how to safely proceed.

Who should be doing paracenteses?

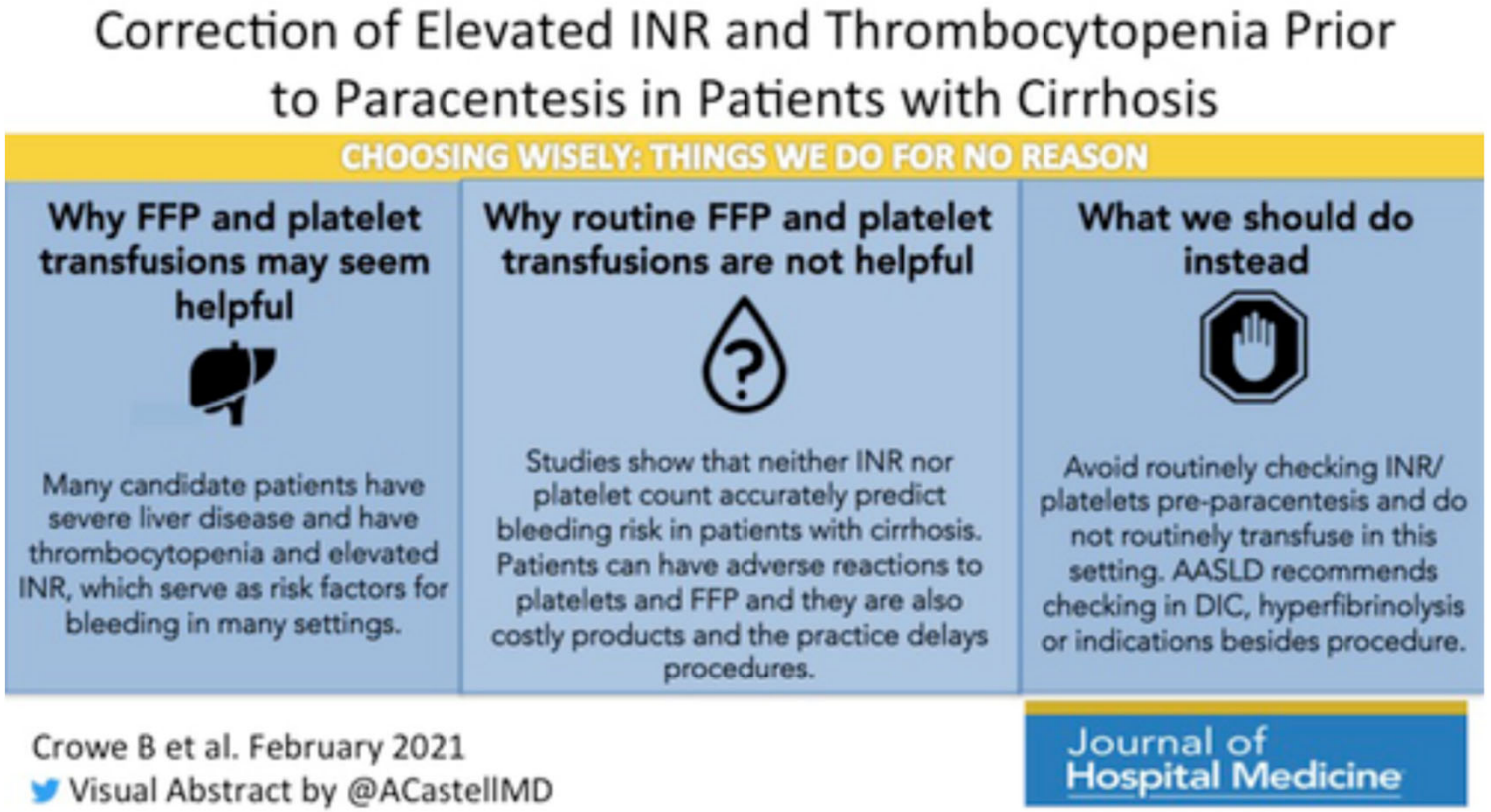


Bad Blood

Coagulopathy and Cirrhosis

INR and platelet count aren't helpful	Rotational thromboelastography is a better way to capture risk
	Choosing Wisely: Don't use FFP, platelets or vitamin K for routine procedures
If undergoing liver surgery	Consider antifibrinolytic agents (tranexamic acid)
Active liver failure and active bleeding with threat of hemorrhage	consider prothrombin complex concentrates
	consider Vitamin K parenterally

You Need To Calm Down



Shake It Off

Para with US $6612
Procedural $1528

You decide to perform the paracentesis yourself to prevent further delays. Mr. Rubin had 4L of straw-colored fluid removed during para. What labs would you like to order?

- Albumin
- Total Protein
- Cell Count
- LDH
- Amylase
- Glucose
- Cytology
- Culture & Gram Stain

Shake It Off

Para with US $6612
Procedural $1528

You decide to perform the paracentesis yourself to prevent further delays. Mr. Rubin had 4L of straw-colored fluid removed during para. What labs would you like to order?

- Albumin - $60
- Total Protein - $86
- Cell Count - $193
- LDH - $85
- Amylase - $140
- Glucose - $174
- Cytology
- Culture & Gram Stain - $177 + 96 ($100 for ID and $101-391 sensitivities)

What to Test	First Episode of Ascites		Recurrent Ascites	
	Inpatients	Outpatients	Inpatients	Outpatients*
SAAG	Yes	Yes	No	No
PMN count	Yes	Yes	Yes	Yes
Culture	Yes	No	Yes	No
Protein concentration	Yes	Yes	Only when a primary prophylaxis of SBP is clinically indicated or a secondary bacterial peritonitis is suspected	Only when a primary prophylaxis of SBP is clinically indicated
Glucose concentration	Only when a secondary bacterial peritonitis is suspected	No	Only when a secondary bacterial peritonitis is suspected	No
Lactate dehydrogenase	Only when a secondary bacterial peritonitis is suspected	No	Only when a secondary bacterial peritonitis is suspected	No
Cytology	Only when causes of ascites other than cirrhosis are suspected	Only when causes of ascites other than cirrhosis are suspected	No	No
Amylase concentration	Only when a pancreatic origin of ascites is suspected	Only when a pancreatic origin of ascites is suspected	No	No

SHM Cirrhosis

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You obtained dx labs and were able to remove 4L of straw-colored ascitic fluid. Do you give albumin?

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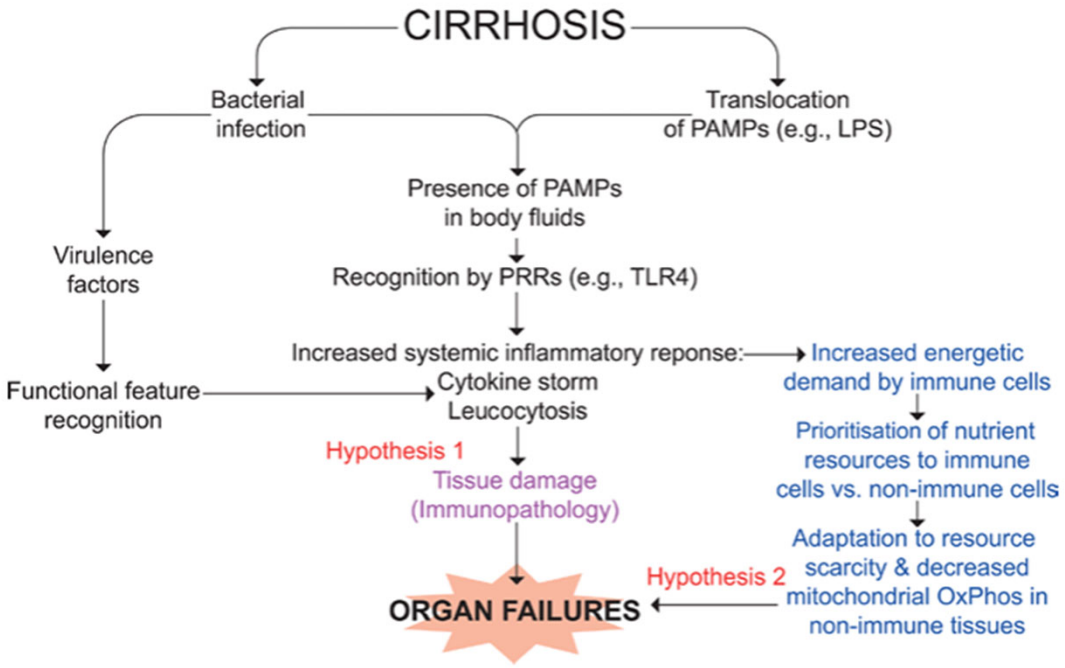
Everything Has Changed

About Albumin

- Rather than purely considering cirrhosis complications as effective hypovolemia, it is now clear that there is a systemic proinflammatory and pro-oxidant environment that leads to multiorgan dysfunction
- Albumin is traditionally used to improve “volume” status; however, additional benefits as a pleotropic scavenger, antioxidant and immunomodulatory
- This opens the door to novel pharmacologic targets and individualized pharmacogenomics



Gut. 2020;69(6):1127-1138

Albumin post-paracentesis

IV infusion for hydration $732
Blood transfusion service $2,634

- Prevention of paracentesis-induced circulatory dysfunction (PICD or PPCD)
  - LVP ↓ abd pressure, ↑ venous return, ↓ SVR increasing splanchnic vasodilation, ↓ effective circulating volume and RAS activation
  - Leading to ascitic reaccumulation, renal impairment, hypervolemic hyponatremia, increased mortality
- Guidelines recommend HA after LVP ≥5 L to prevent PICD, with a replacement volume of 6 to 8 g of albumin per liter of ascitic fluid removed
  - Also consider in those who are at risk for PICD (already hypotensive, hyponatremic or with AKI)
  - Consider limiting to <8L/session and perhaps increased albumin dose if at highest risk

2012

- Meta-analysis showed reduced PCD by 93%, mortality by 36% and decreased hyponatremia by 80%
- Hepatology, 55: 1172-1181.

2017

- Improved plasma renin activity and hyponatremia but no mortality benefit
- *J Gastroenterol Hepatol*. 2017;32(2):327-338.

I Wish You Would

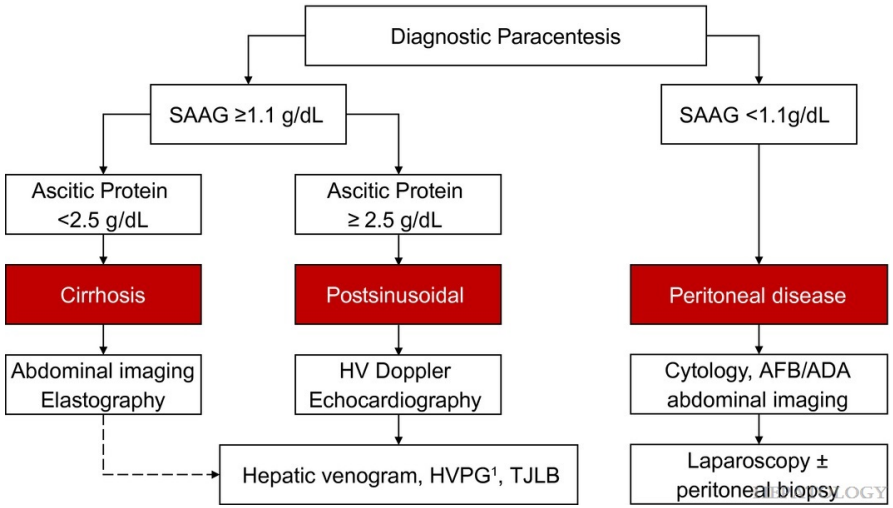
Guideline Recommended Indications for Albumin use in Cirrhosis

Prevention of paracentesis-induced circulatory dysfunction	Prevention of kidney injury in bacterial infection	Diagnosis and treatment of HRS
• Replace 6-8g/L ascitic fluid removed • para > 5L • para < 5L and hypotensive, AKI or hyponatremic	• SBP but can consider in other infections • 1.5g/kg on day 1 and 1/g/kg on day 3	• 1g/kg on day 1 then 40-50g/day

Complication of cirrhosis	Indications for human albumin	Dosing and schedule
PICD		
Paracentesis ≥5 L	Standard of care	6-8 g/L ascites removed
Paracentesis <5 L	Consider based on the patient's risk for PICD	6-8 g/L ascites removed
SBP		
High-risk patients	Standard of care	1.5 g/kg on day 1, followed by 1 g/kg on day 3
Low-risk patients	Recommended	1.5 g/kg on day 1, followed by 1 g/kg on day 3
HRS		
Diagnosis	Standard of care	1 g/kg for 2 days + vasoconstrictors
Treatment	Standard of care	25-50 g daily for >3 days + vasoconstrictors
Hypovolemia/hypotension	Suggested	Target clinical perfusion and/or MAP ≥65 mm Hg
Long-term treatment of ascites	Defer to transplant hepatologist	Weekly vs biweekly, not yet established
Hyponatremia	Consider if severe hyponatremia (<120 mmol/L)	Undefined + free water restriction
Hypervolemia	Benefit not established	
Hypoalbuminemia	Not indicated	
Non-SBP infections	Not indicated	

Back to Mr. Rubin…

- You decide not to administer albumin as he doesn't have known cirrhosis, sBP > 90mmHg and Cr of 1.2 (with unknown baseline).
- Fluid studies return and are consistent with cirrhosis:
    - SAAG > to 1.1g/dL suggestive of portal HTN; protein < 1g/dL
    - WBC: 180; PMNs 20; RBC 50
    - Gram stain negative

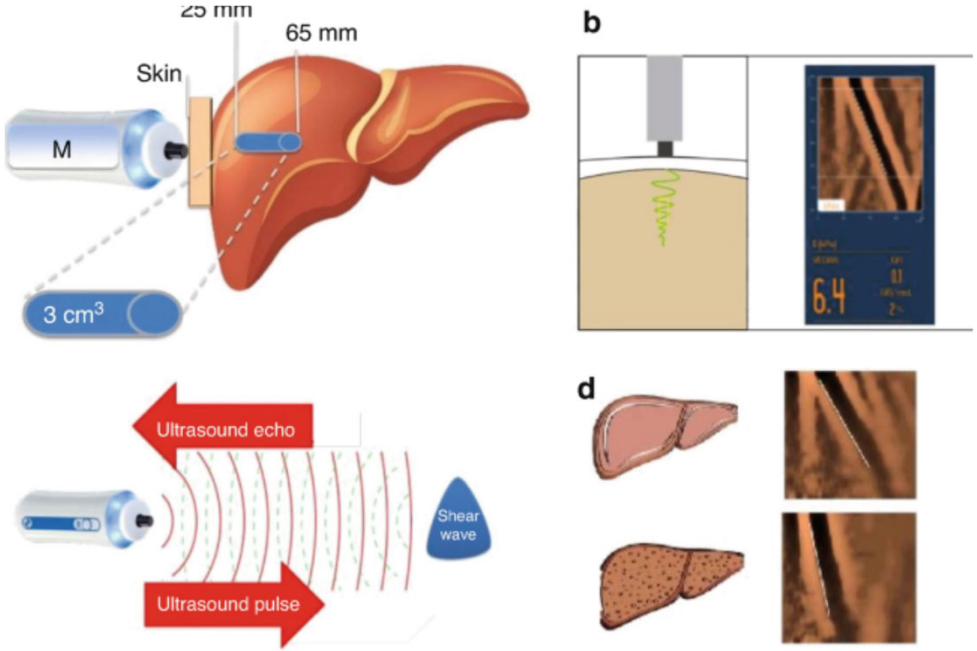


Hepatology 74(2):1014-1048, August 2021

I Look In People's (Ultrasound) Windows

Cirrhosis Diagnosis: Imaging

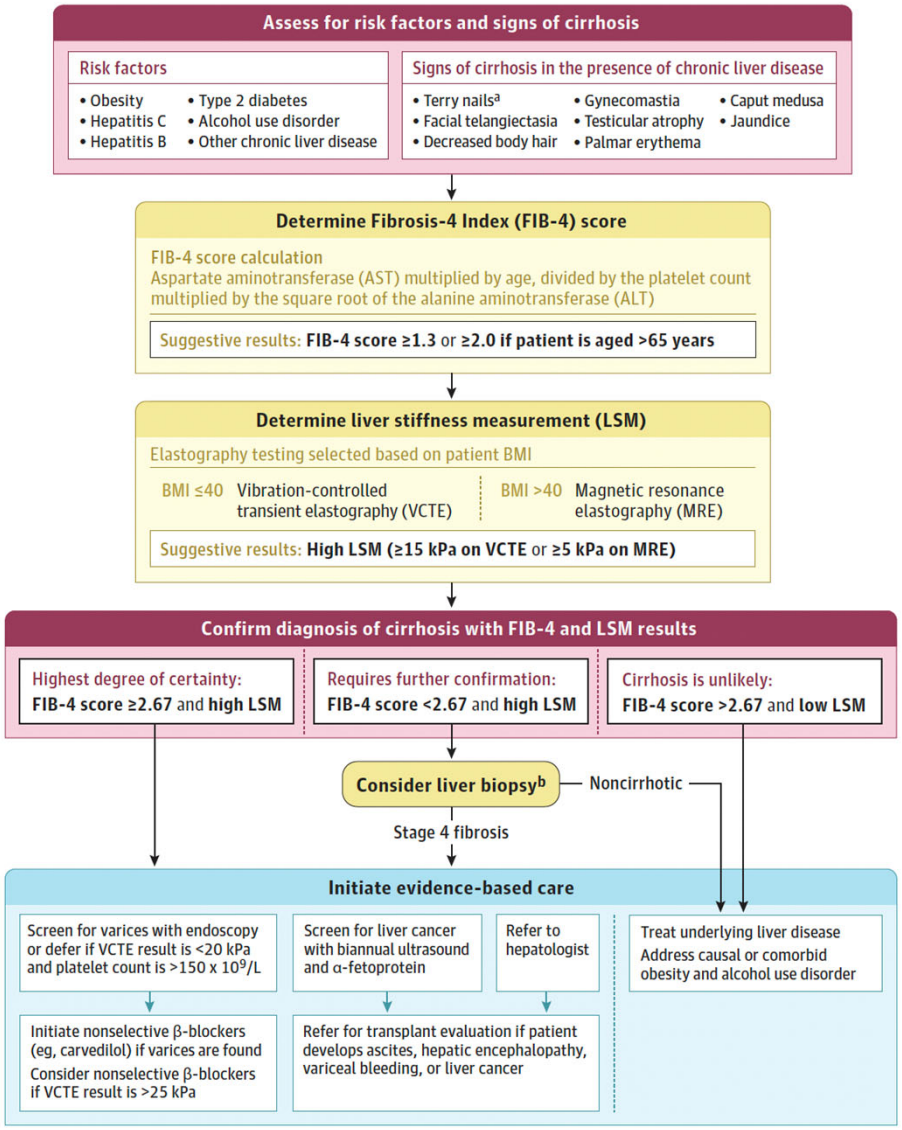
- Transient elastography (Fibroscan) most accurate method for detection for most cirrhosis cirrhosis
  - TE uses an ultrasonic transducer, vibrator, and computer software to provide liver stiffness measurement (LSM).
  - At 15kPa or greater, 95.5% specificity
  - False positives from central venous congestion from heart failure and widespread liver inflammation
- Other options:
  - US utilizing vibration controlled transient elastography
  - acoustic radiation impulse imaging
  - 2D-shear wave elastography
  - MR elastography



J Hepatol. 2008;48(5):835-847

Cirrhosis Diagnosis

- Serology and imaging has largely supplanted biopsy due to decreased expense, risk and less risk of sampling error
- Transient elastography often combined with biomarkers
  - Fibrosis-4 (FIB-4) for NAFLD/EtOH stratifies low, intermediate and high likelihood
    - Age, AST, ALT, platelets
  - Liver Stiffness Measurement (LSM)



JAMA. 2023;329(18):1589-1602

SHM Cirrhosis

Visual settings

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Send **laurabishop749** to **37607**

What do your GI/Hepatology consultants order to investigate the etiology a new diagnosis of cirrhosis?

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Foolish One

Choosing Wisely:
Don’t order HFE genotyping based on serum ferritin values alone to dx hereditary hemochromatosis

Service	Cost	Service	Cost
Venipuncture	$36	A1AT	$48
Ferritin	$186	A1AT phenotype	$52
HFE gene	$1053	Nuclear Antigen Ab	$414
Ceruloplasmin	$62	Microsomal Ab	$180

- CMP $289
- BMP $193
- RFP $203
- TSH $226

https://hospitalpricedisclosure.com/

Back to Bill…

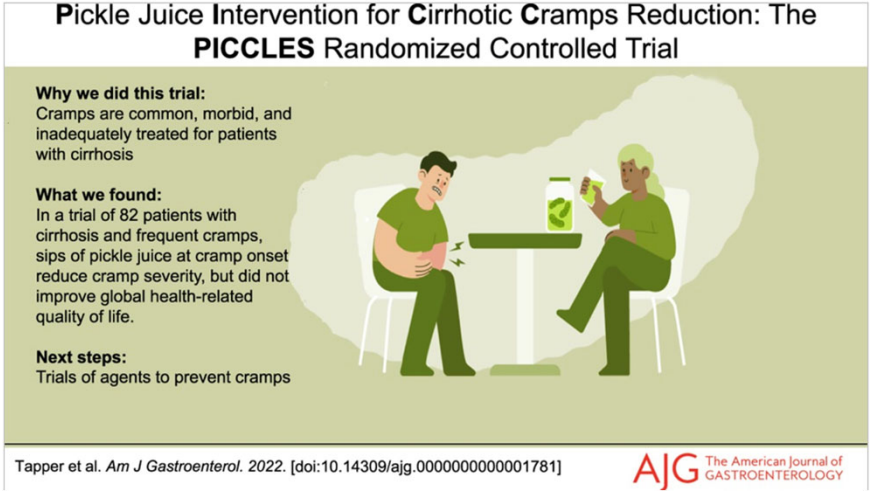
Your resident has a few questions about Mr. Rubin's admission orders.

- What sort of symptomatic medications can we have available for a patient with suspected cirrhosis?
- What workup should be performed for a likely AKI?

Down Bad

Managing Symptoms of Cirrhosis

- Pain
  - 2g Tylenol ok (advise no alcohol)
  - Avoid nsaids!
  - Can cautiously use opioids
    - Fentanyl and methadone are not affected by hepatic metabolism
    - Prefer oxycodone and hydromorphone initially
    - Avoid combinations
- Muscle cramps:
  - Recommendations for albumin 20-40g/week or baclofen 10mg/d (weekly increase up to 30mg/day as tolerated)
  - Pickle brine, taurine might help
- Pruritis
  - Cholestyramine has lacking RCTs
  - Naltrexone
- Insomnia
  - Hydroxyzine

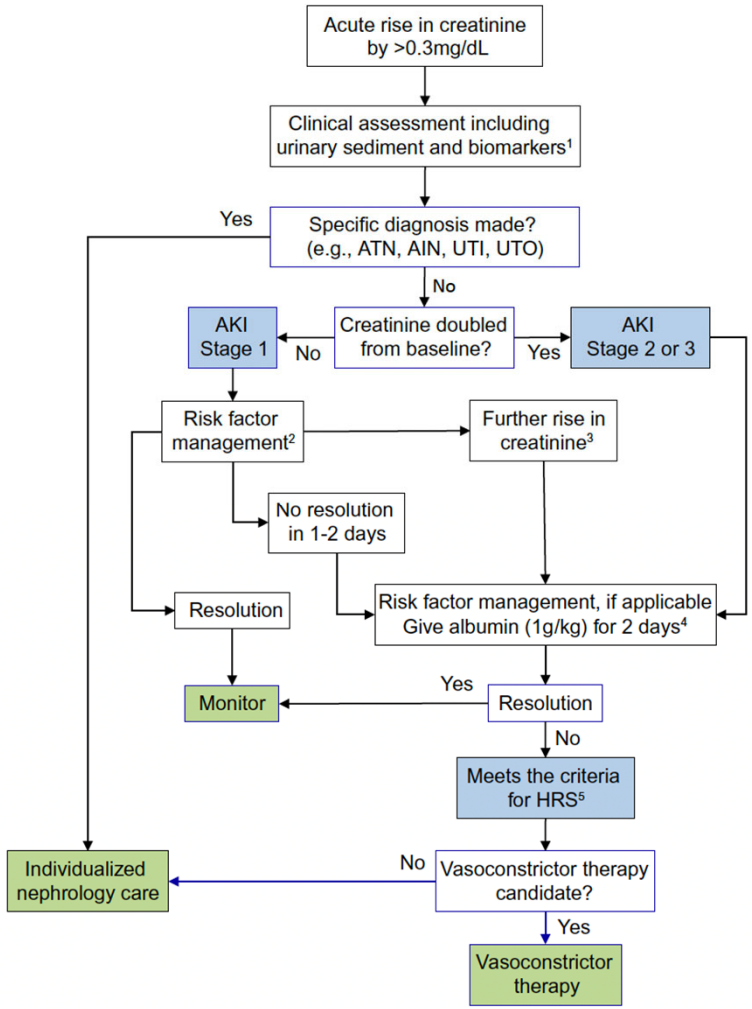


pickle brine juice associated with short-term decrease in severity of cirrhotic muscle cramps by about 20% compared to tap water

Call It What You Want

AKI in Cirrhosis: Is It HRS?

- AKI with no response after 2d off diuretics and 1g/kg albumin each day
  - in the absence of recent nephrotoxins and bland urinalysis + normal renal US
- NGAL is the most promising biomarker to help with differentiating ATN (>0.80); recommend testing on day 3

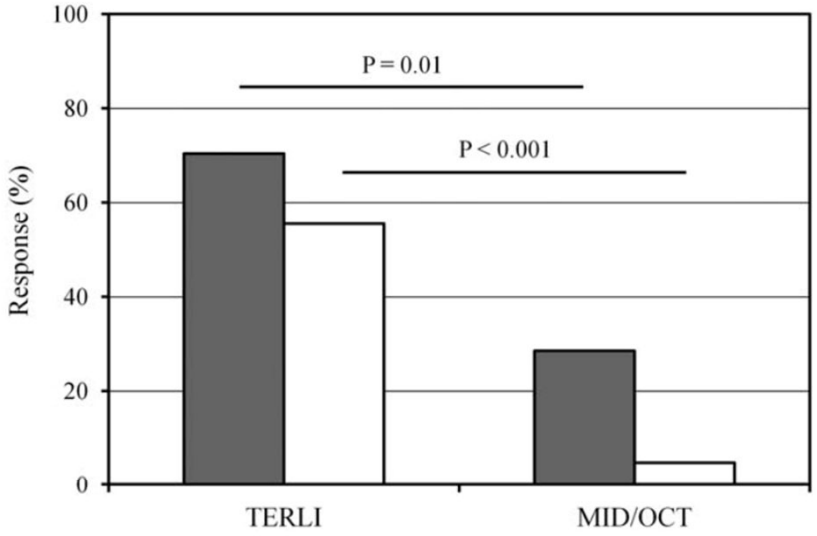


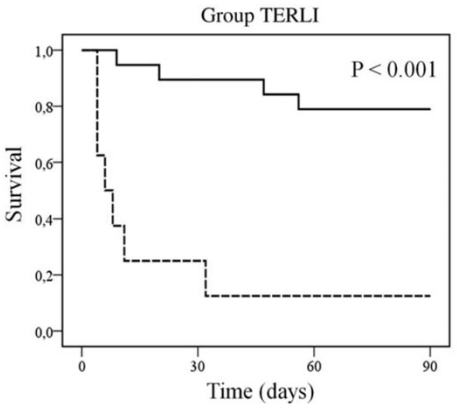
HRS-AKI Treatment

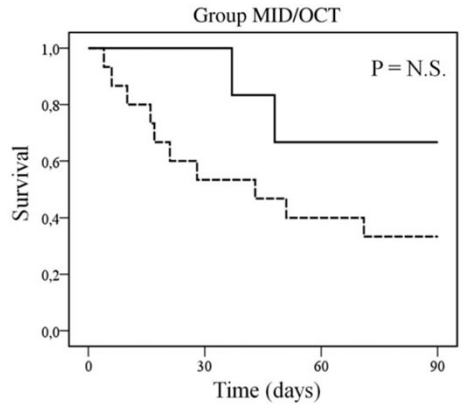
Albumin

Vasoconstrictors

- **Terlipressin**
- Norepinephrine
- Midodrine + octreotide







Hepatology. 2015;62(2):567-574

It’s Been A Long Time Coming

Terlipressin (Terlivaz)

- CONFIRM phase 3 trial in 2021
  - 32% reversal vs. 17% placebo
  - 11% death vs. 2%
  - Serious complication of respiratory failure
- FDA approval 9/14/2022
  - Limited by institutional formulary/cost
    - Cost per response is favorable despite increased cost per use right now
  - Future indication for GI bleeds in patients with cirrhosis?

N Engl J Med. 2021;384(9):818-828

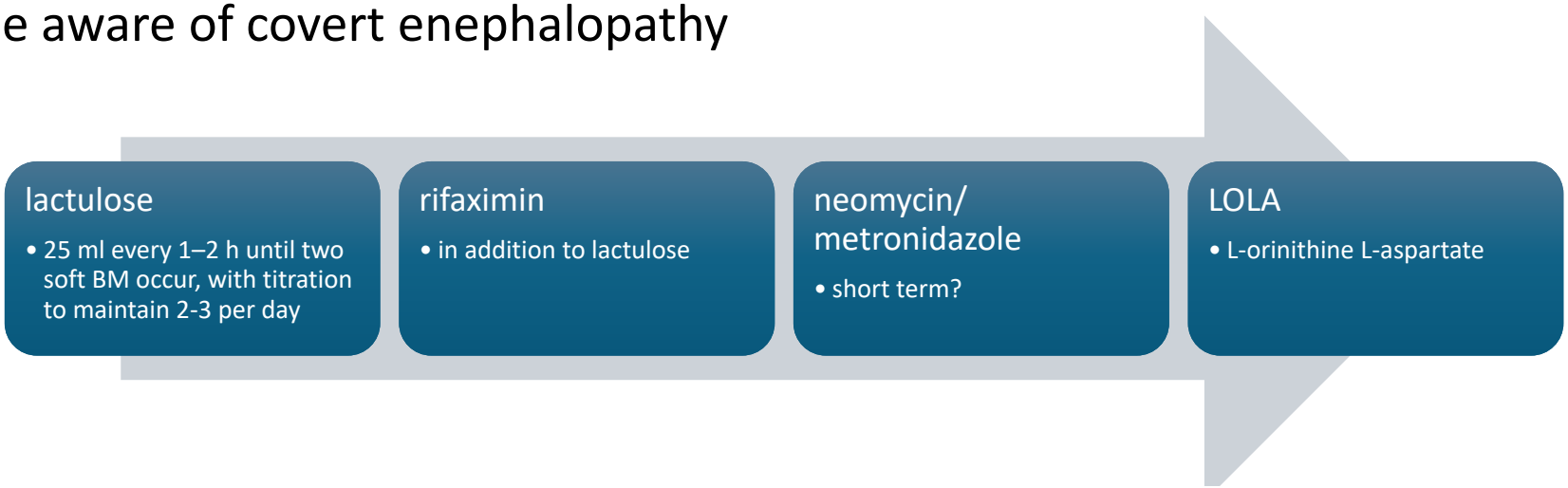
Adv Ther. 2023 Dec;40(12):5432-5446

Ammonia $198

Lavender Haze

Hepatic Encephalopathy

- We don't do a great job at adhering to guidelines
  - Complete workup only 22% of the time
    - Bcx, UA/Ucx, CXR, Dx para if ascites, BMP, urine tox
  - 95% of the time ammonia ordered despite guidelines
- 20-40% of readmissions due to HE are preventable
- Slow resolution even in-hospital
- Be aware of covert enephalopathy



EGD variceal ligation $3443 + procedural fee $2507

Maroon

GI Bleed in Cirrhosis

Vasoactive therapy

Somatostatin, octreotide, terlipressin

- Continue x 5d if variceal bleeding on scope

SBP prevention

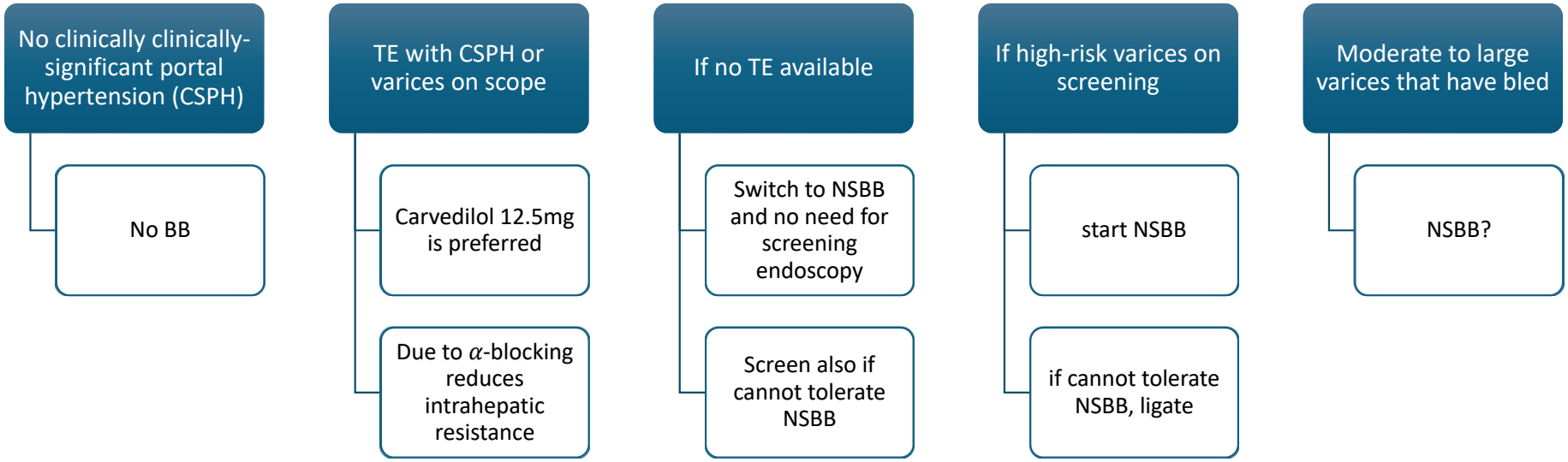
- Ceftriaxone continues to be the preferred ppx abx until bleed resolved, and off pressors or for 7d
- Recommend ruling out SBP or other primary infections first
- Still the recommendation but trials don't have sufficient evidence to strongly support an improvement in mortality

Target Hgb >7

Endoscopy with ligation

Red

GI Bleed in Cirrhosis



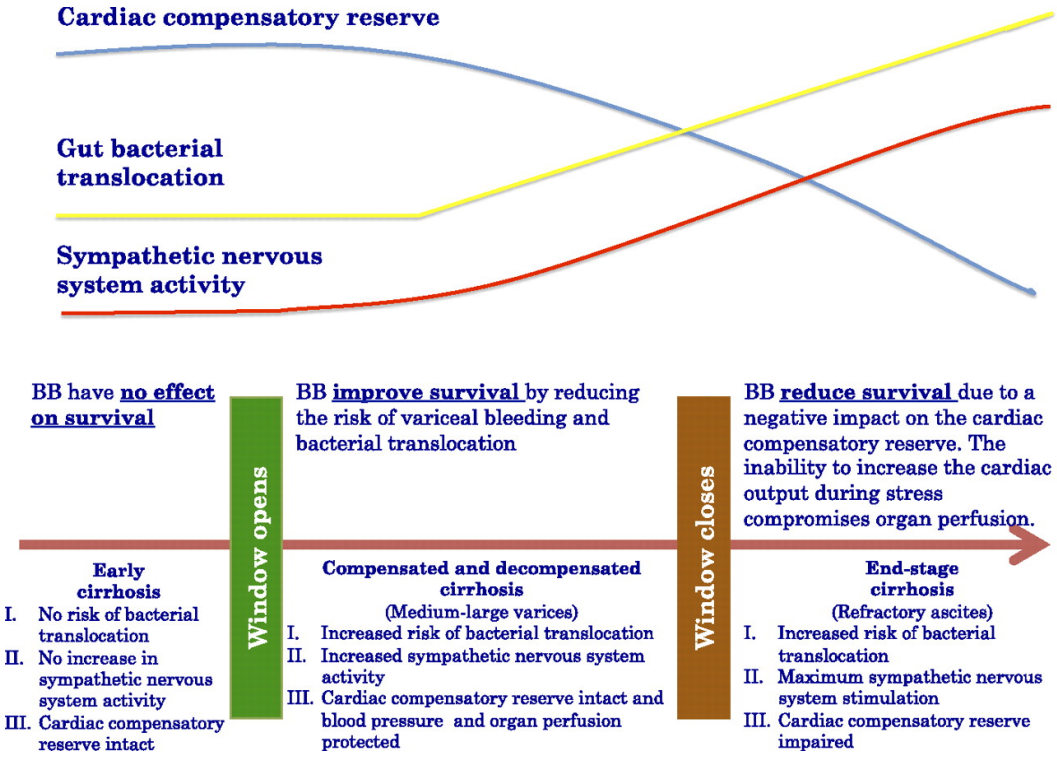
NSBB = Propranolol 20mg BID or naldolol 40mg daily

Hepatology 2007 Sep;46(3):922

Hoax…or epiphany

Beta-blockers in EV

- Rising controversy over non-selective beta-blockers, especially in those with refractory ascites.
  - Study showed in those on NSBB during decompensated cirrhosis, PPCD is a higher risk and they had shorter survival
  - But also no RCTs and some contrary studies
  - "Window period" theory – perhaps there is a certain timing in which NSBB may provide benefit, but beyond that time, they may be detrimental.



Gut. 2012;61(7):967-969

SHM Cirrhosis

Visual settings

Edit

When poll is active respond at

PollEv.com /laurabishop749

Send **laurabishop749** to **37607**

GI clipped EV and he improved. Over the next two days, had increasing ascites and confusion (despite adequate HE tx). You perform another para and PMNs = 450. What abx do you start?

Powered by Poll Everywhere

Hits Different

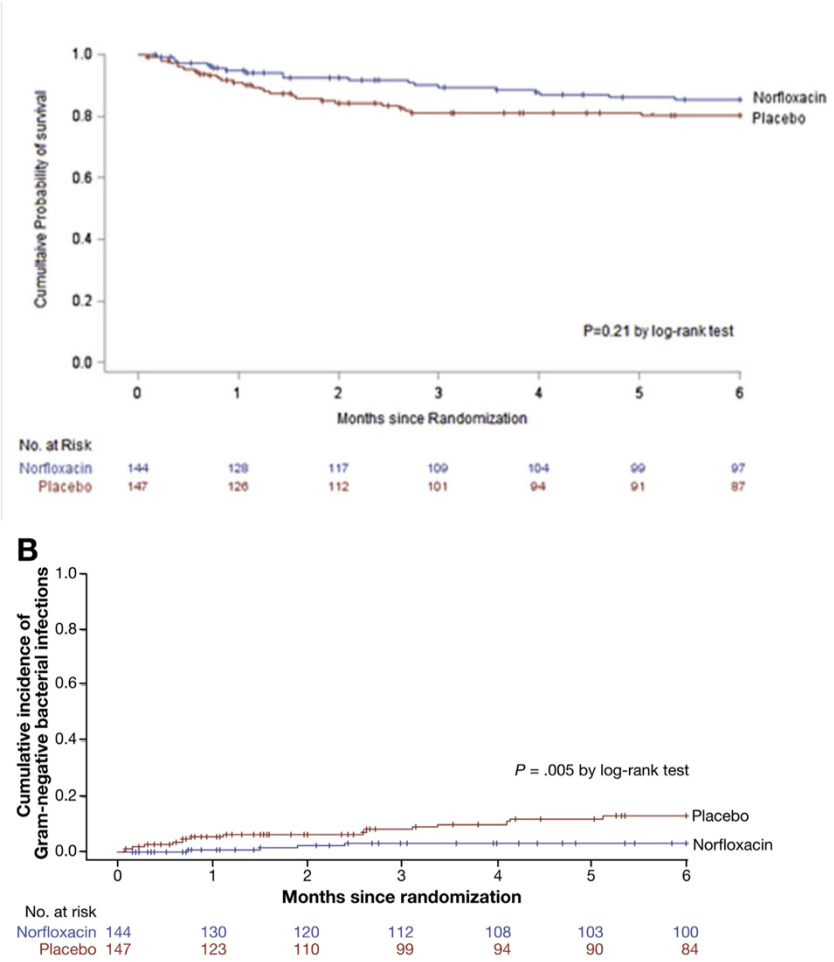
SBP Treatment

- Antimicrobial shift toward more multi-drug resistant (up to 35%!) and gram-positive organisms.
- CA-SBP first-line therapy is IV third-gen cephalosporin
- For those with recent hospitalization, nosocomial infection or critical illness:
  - Pip/tazo + vanc (for those with prior MRSA or MRSA+ nasal swab)
  - Dapto added for prior VRE or those with VRE+ swab
  - If recently exposed to pip/tazo consider meropenem +/- vanc or teicoplanin
- Given increasing initial failure rates, repeat para within 48h is recommended with a goal of drop in PMNs by 25%
  - Unless organism identified and/or clinically improving
  - Can also use this data to shorten abx course when PMN <250 (vs. standard of 5-7d)
- Albumin
  - 1.5g/kg/day on day 1 and 1g/kg/day on day 3 (although it is arbitrary)
- Do not need to stop NSBB unless hypotensive (MAP < 65)

Is It Over Now?

SBP Prophylaxis

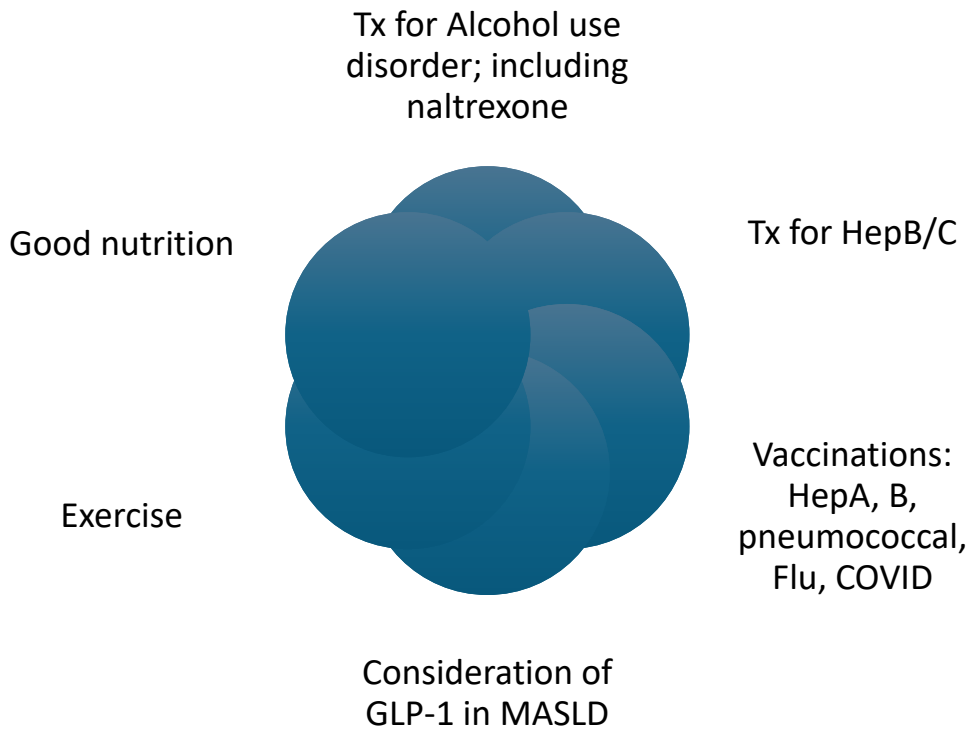
- Secondary prevention
  - No direct evidence to truly support cipro or Bactrim; norfloxacin preferred
- Primary prevention (with no GI bleed)
  - If ascitic protein < equal to 1.5 and renal dysfunction (Cr > 1.2/BUN>25), Na < 130 and/or liver failure (Child Pugh >9 and Bili >3)
  - Cipro 500 daily, Bactrim 1DS daily, rifaximin 550 BID
- Recent trial with no improved survival but less gram-neg infection on norfloxacin; consider only in those with very advanced cirrhosis and perhaps heading on to transplant
- Pentoxyfylline could reduce complications but not mortality in advanced cirrhosis



Gastroenterology. 2018;155(6):1816-1827

Out Of The Woods?

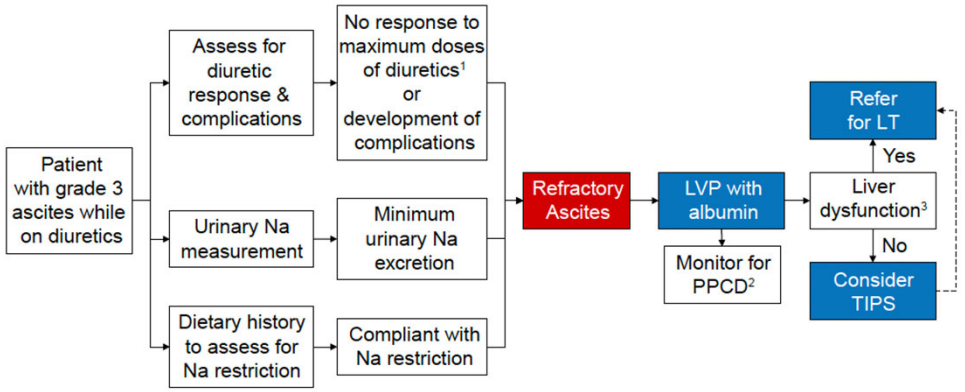
Planning for Discharge



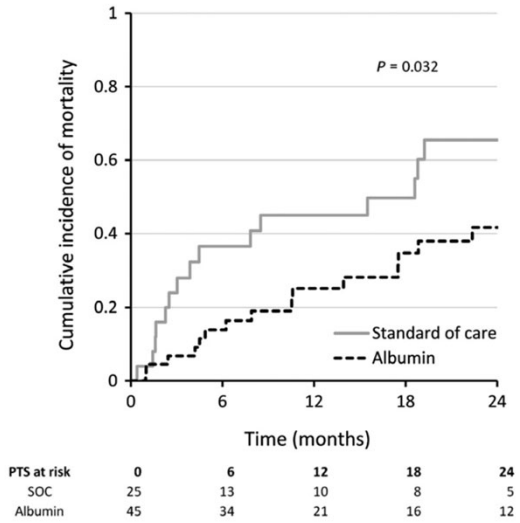
Haunted

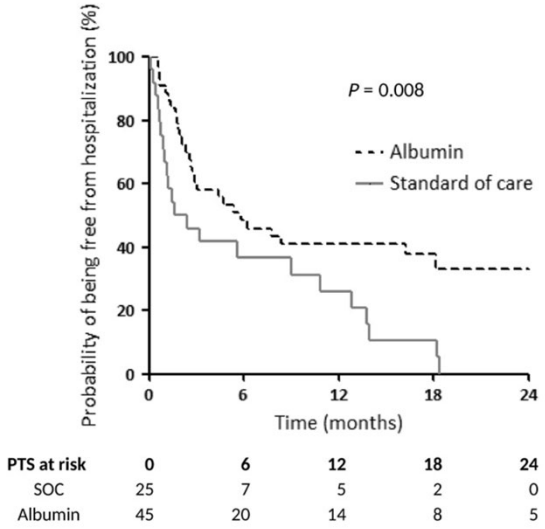
Refractory Ascites

- Chronic albumin infusion in those with refractory ascites (20g/weekly) may reduce admissions over 24m due to complications of cirrhosis and improve mortality.
- “generally safe and may be beneficial…more RCT needed”
- Perhaps earlier TIPS?



Hepatology 74(2):1014-1048, August 2021.

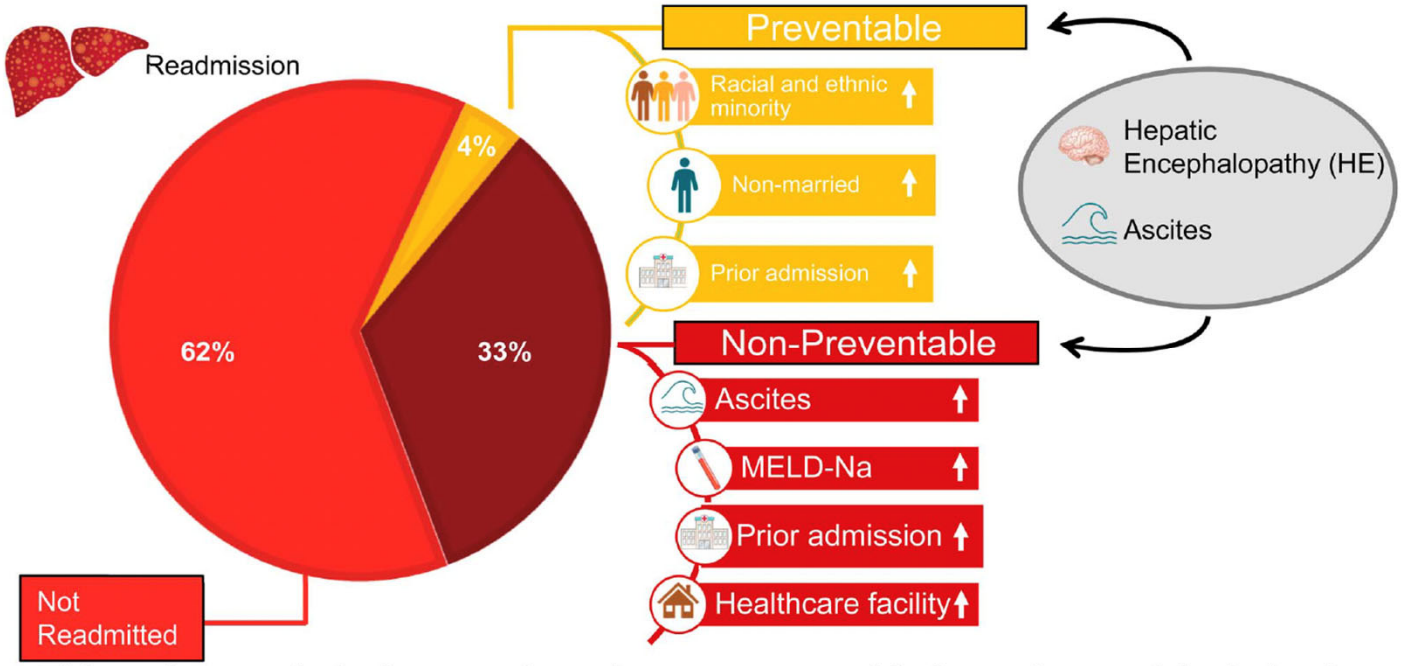




Liver Int. 2019;39(1):98-105

I Can Fix Him…Whoa Maybe I Can't

Preventing Readmissions

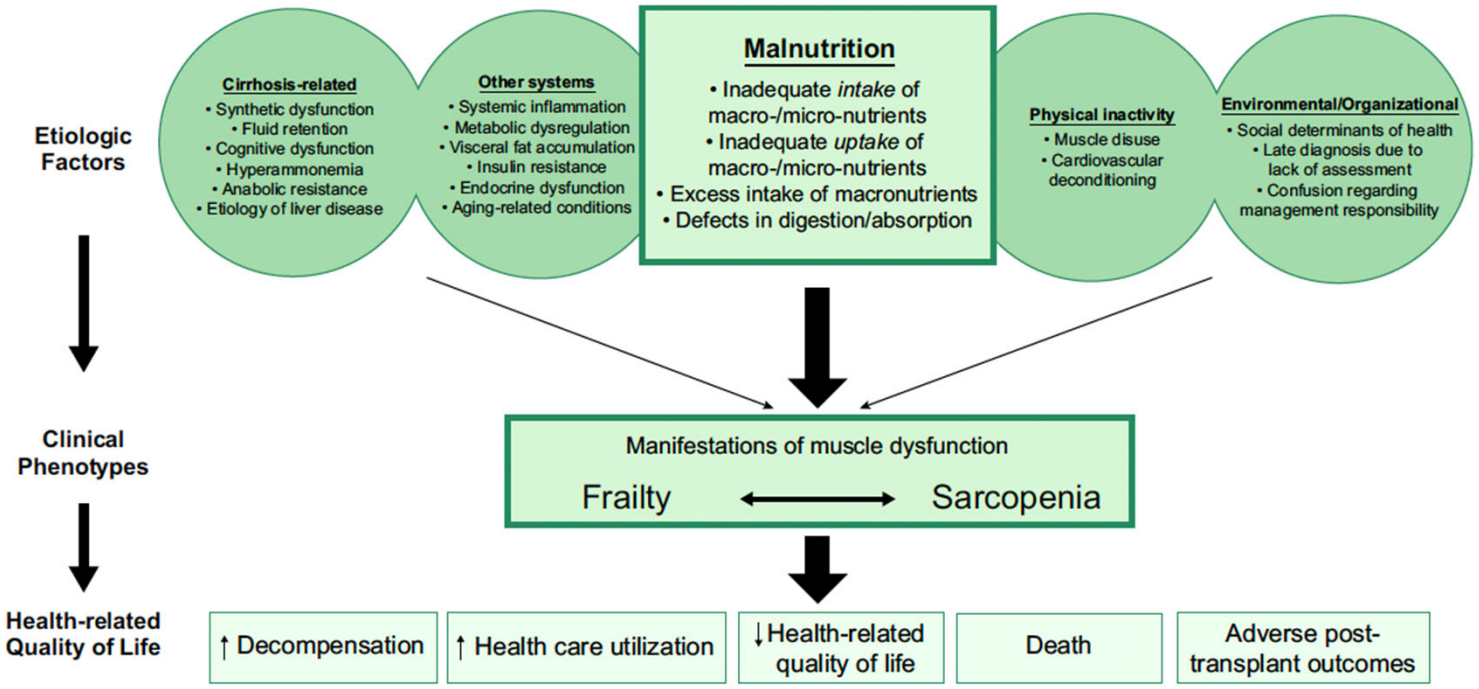


Thirty-day readmissions are largely not preventable in patients with cirrhosis

Am J Gastroenterol. 2024;119(2):287-296

Delicate

Malnutrition, Frailty and Sarcopenia

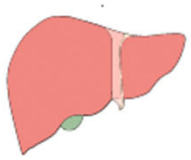


Hepatology. 2021;74(3):1611-1644

Soon You'll Get Better

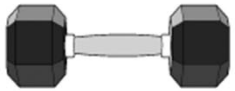
Improving Malnutrition, Frailty, Sarcopenia

Management Toolbox



Liver specific

- **Management of disease etiology**
- **Management of ascites**
- **Management of hepatic encephalopathy**

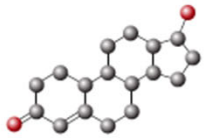


Physical activity

- **Personalized activity prescription (guided by FITT):**
  - **Frequency** – Aerobic (4-7 d/week); Resistance (2-3 d/week)
  - **Intensity** – Use the talk test (be short of breath but can still speak a full sentence); 3 sets of 10-15 repetitions at a time
  - **Time** – Start slow and build up
    - Aerobic: 150 min per week
    - Resistance: ≥ 1 days per week
  - **Type** – aerobic, resistance, flexibility and balance
- **Consult a certified exercise physiologist or physical therapist**

Intake/Uptake

- **Calorie intake of at least 35 kcal/kg (non-obese)**
- **Protein intake of 1.2 to 1.5 g/kg body weight/d**
- **Micronutrient repletion**
- **Frequent, small meals and minimize fasting (e.g. late evening snack)**
- **Address barriers to intake (e.g. liberalize sodium restrictions as needed)**
- **Consult a registered dietitian**



Other systems

- **Testosterone replacement** (men)
- **Refer to health behavior specialist**
- **Diabetes control**

Consider PT/OT and dietician consults for all patients with cirrhosis

Review SDOH screening for insecurities

Hepatology. 2021;74(3):1611-1644

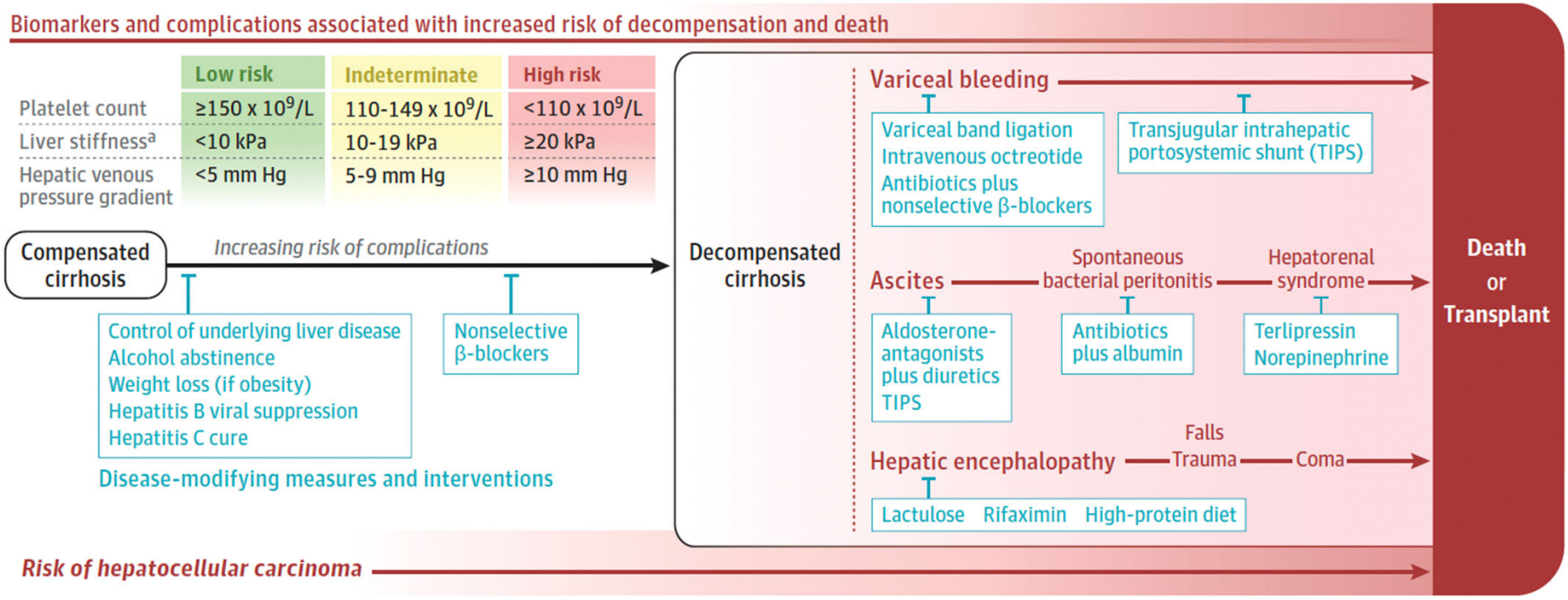
I Forgot That You Existed

Minimal evidence for:

- Milk thistle (silymarin)
- Colchicine
- Antioxidant supplements
- Vaptans for hyponatremia long-term

The Prophecy

…without intervention



JAMA. 2023;329(18):1589-1602.

You Belong With Me

Palliative Care and Cirrhosis

Symptoms are life-altering

- Pain (79%), disability (75%) and depression (47%) are common
- Muscle cramps (64%), pruritis (39%), poor quality sleep (63%) and sexual dysfunction (53%)

Consider early involvement

- Allows symptom management
- Future planning
- Caregiver support

Mastermind

Order Set Improves Adherence

Table 3. Adherence to process measures

	Preimplementation cohort (N = 202)	Pilot cohort (N = 132)	Implementation cohort (N = 133)	*P* value
Paracentesis within 24 hr of admission	29.6	34.8	57.1	<**0.001**
If paracentesis within 24 hr, laboratory test results sent for analysis	46.0	44.4	44.4	0.803
Low-Na diet	34.3	63.8	77.8	<**0.001**
GIB diagnosed	21.1	17.4	22.2	
If yes, ABX given	80.0	91.7	100.0	0.107
For patients with SUD within 6 mo of admission				<**0.001**

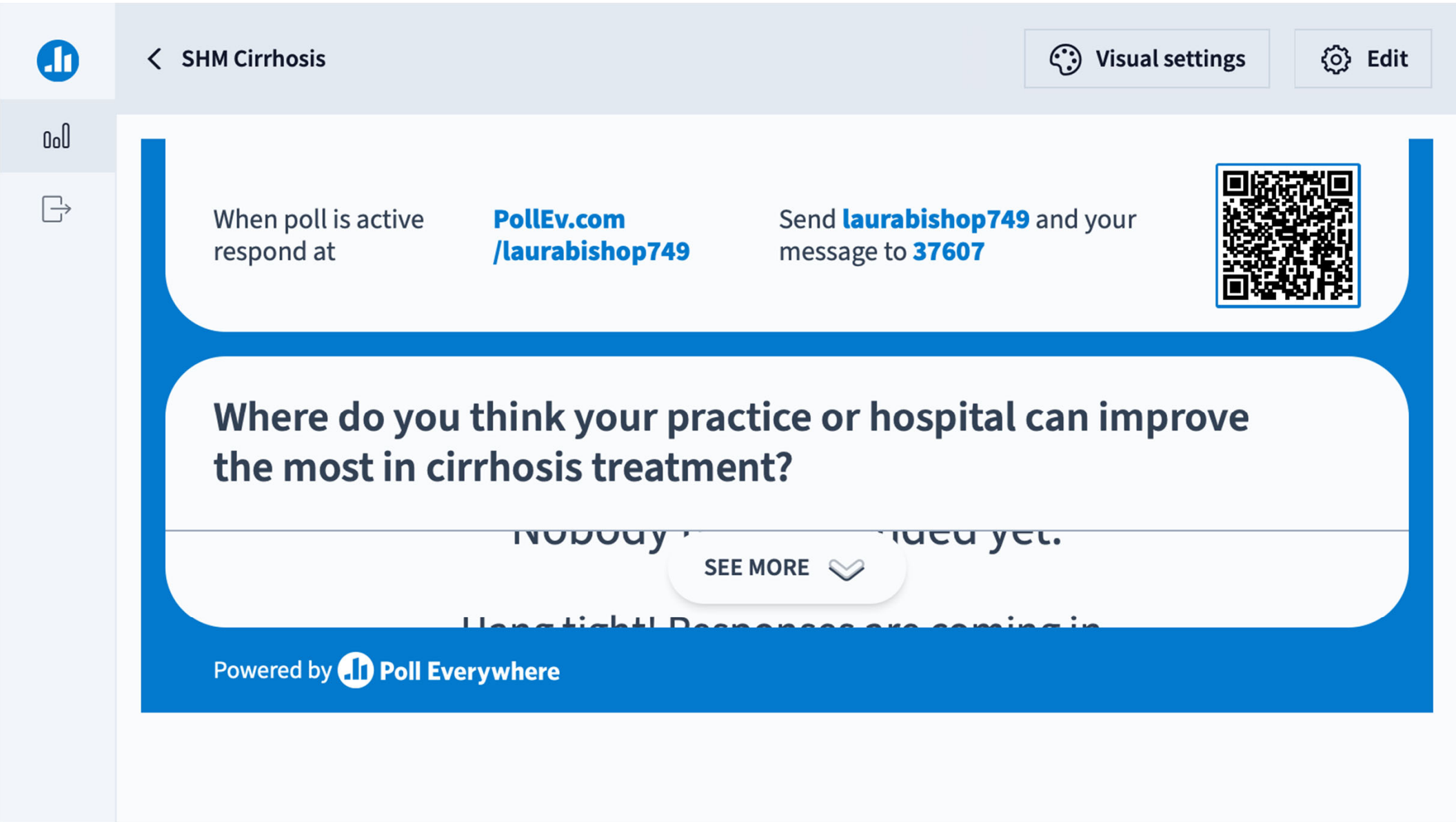
Table 4. Outcomes measures

	Preimplementation cohort (N = 202)	Pilot cohort (N = 132)	Implementation cohort (N = 133)	*P* value
ICU stay (%)	22.9	16.4	11.1	0.074
ICU LOS (d) (mean, SD)	7.0 (8.0)	8.5 (10.2)	3.0 (3.1)	<**0.001**
In-hospital development of infection	17.4	10.1	0.0	**0.002**
In-hospital development of AKI	18.8	17.4	11.1	0.174
Hospital LOS (d) (mean, SD)	8.8 (11.1)	7.4 (8.4)	5.3 (3.5)	**0.011**

Am J Gastroenterol. 2023;118(1):114-120

Long Story Short

- Stay tuned for evolving therapies as cirrhosis landscapes are changing due to increased MASLD and decreasing viral causes
- FIB-4 + eTE can predict cirrhosis without need for biopsy
- Paracentesis (without correcting thrombocytopenia or INR) to exclude SBP in all patients with cirrhosis and ascites in the hospital
- Pause prior to ordering unlikely tests to evaluate for etiology of cirrhosis or unusual causes of ascites
- Consider adding broad-spectrums for SBP if critically ill, (+) MRSA/VRE swab or nosocomial infection
- SBP prophylaxis isn't as thoroughly studied for cipro/bactrim and may be less useful with changing antimicrobial landscape
- Albumin does more than we understand
- Terlipressin + albumin has the most data for HRS-AKI; chat with your institution for availability
- NSBB may not be as helpful in advanced cirrhosis, don't stress if MAPs don't allow you to give them
- Consider early palliative care involvement, PT/OT, dietician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Where do you think your practice or hospital can improve the most in cirrhosis treatment?
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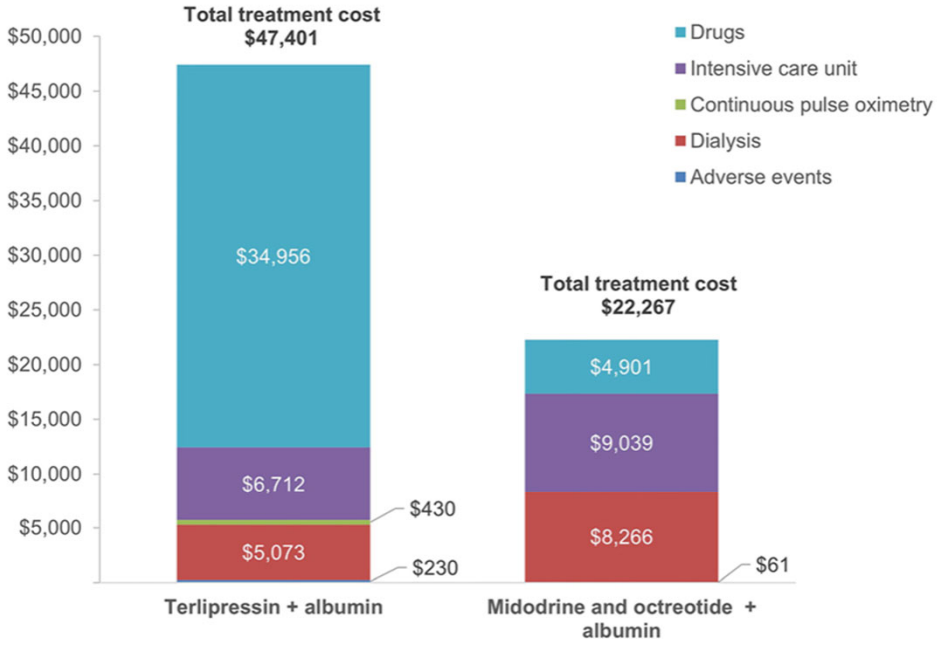
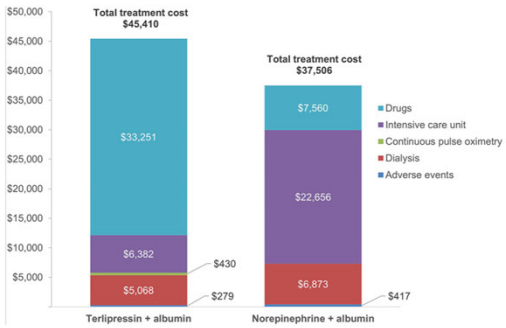
Terlipressin (Terlivaz)

- Limitations are institutional
  - Economic modeling demonstrates cost per response is favorable even though the total treatment cost is higher right now
    - Terlipressin vs. midodrine/octreotide
      - $85,315 vs. $467,794 ; NNT 2
    - Terlipressin vs. norepi
      - $81,614 vs. $139,324; NNT 4





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