

# Management of ascites

Bible class, 02.08.2023

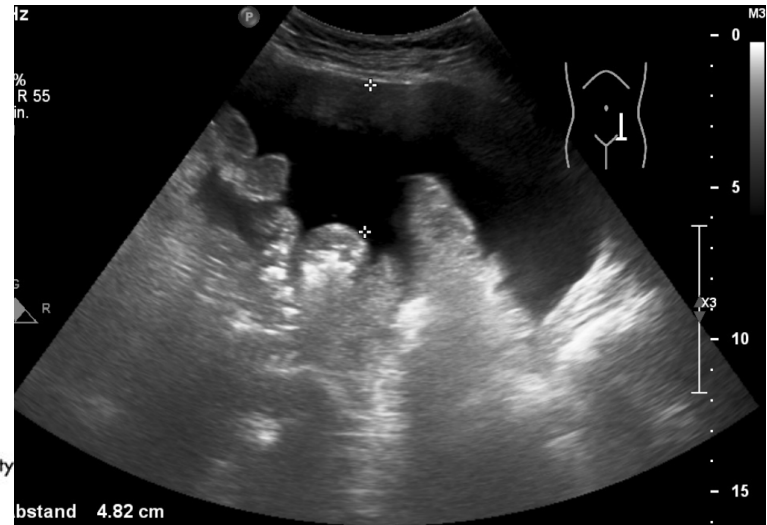
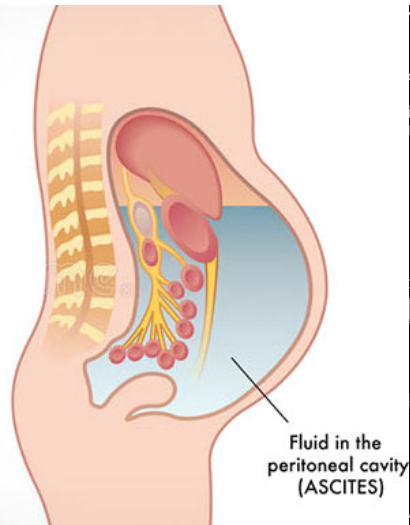
Matthias Knecht



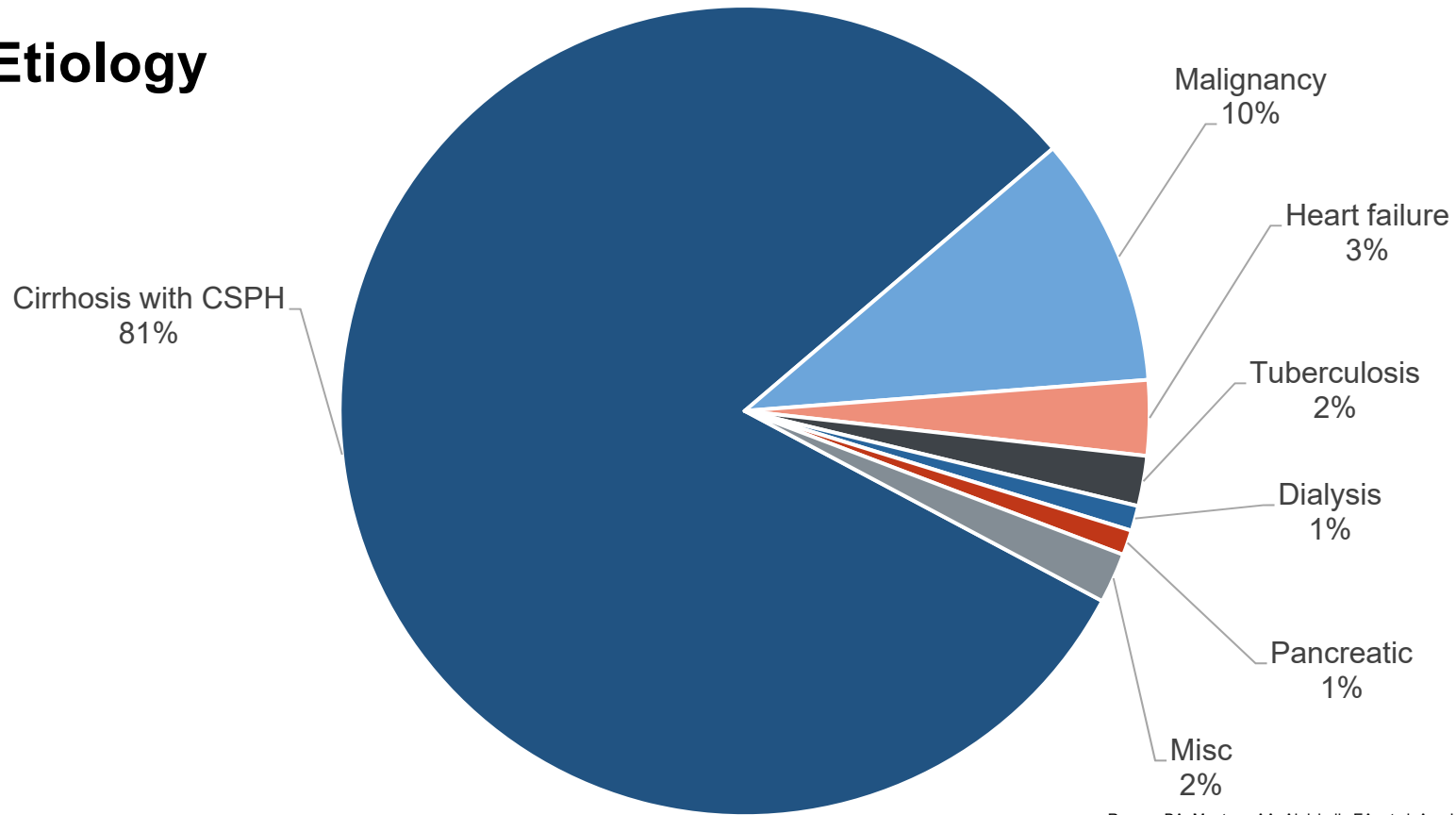
# What is uh-sai-teez

Physiologically very little fluid in males, ~20ml in females respectively

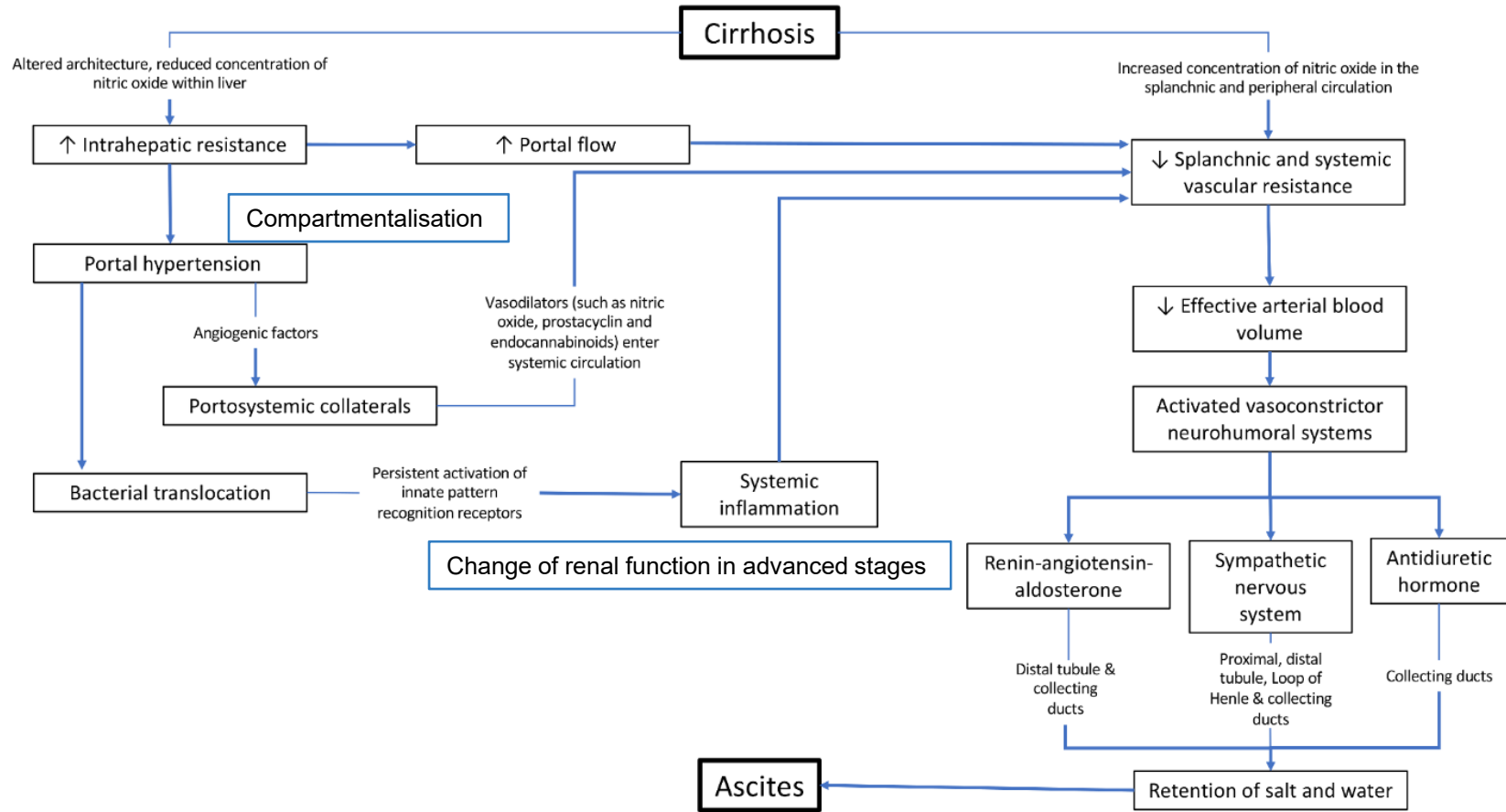
- Build up of fluid in the abdominal cavity



# Etiology

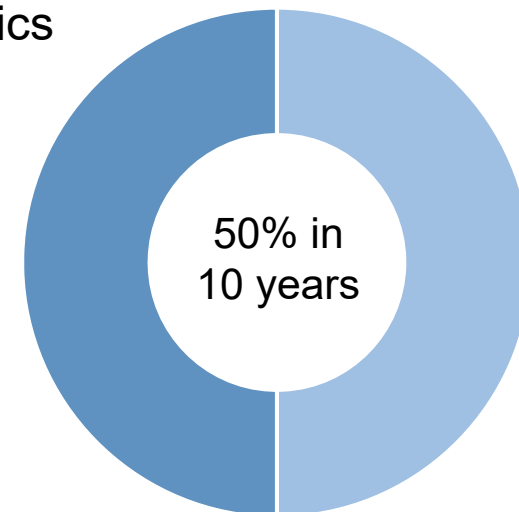


Runyon BA, Montano AA, Akriviadis EA, et al. Ann Intern Med 1992



## Epidemiology

- Most frequent cause of decompensation in cirrhotics
- 5-10% per year of compensated patients



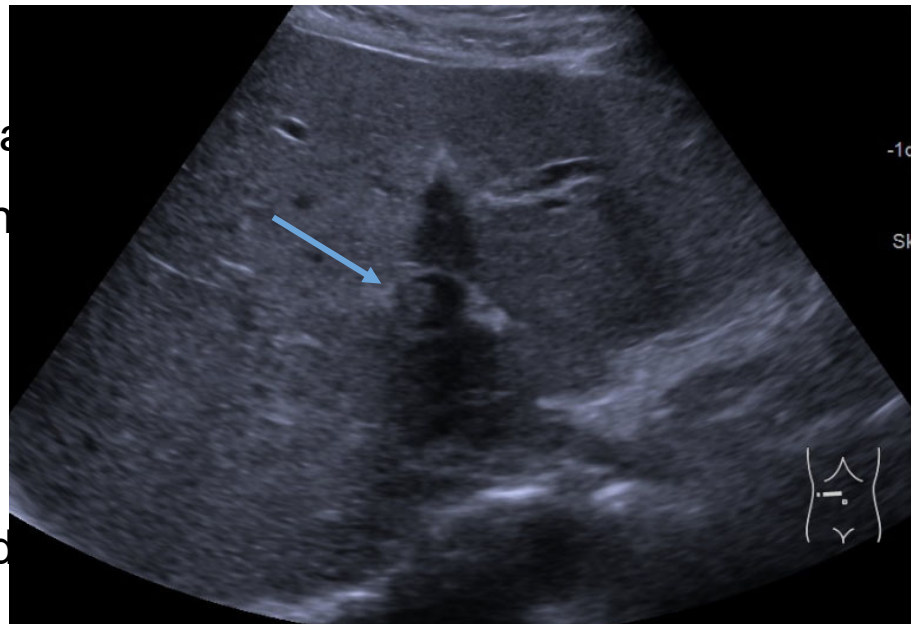
## Grading

- 
- Grade 1.** Mild ascites: it is only detectable by ultrasound examination
  - Grade 2.** Moderate ascites: it is manifest by moderate symmetrical distension of abdomen
  - Grade 3.** Large or gross ascites: it provokes marked abdominal distension
-

## Diagnostics

## Evaluation of ascites

- History and physical exam
  - Shifting dullness with
- Abdominal ultrasound
- Assessment of liver and





## When to puncture diagnostically?

New Grade 2-3  
ascites

Any  
complication of  
cirrhosis

Hospitalisation  
due to  
worsening  
ascites

## Contraindications?

- Agitated and uncooperative patients
- Pregnancy
- Skin infection on puncture site
- DIC
- Severe bowel distension



## Ascitic fluid analysis

- Cellular count, especially neutrophils
- Total protein and albumin
- Inoculation of 2 cultures (10ml ascites)
- According to clinical suspicion cytology, amylase, ADA, cholesterol

## What does it tell you

Total protein	>25g/L postsinusoidal <25g/L sinusoidal
Albumin	Serum ascites-albumin gradient (SAAG): >11g/L in portal hypertension (sens 97%), cardiac <11g/L peritoneal disease
Others	Amylase >1000 U/L pancreatic or GI perf Cholesterol >1.16mmol/L in malignancy

## Treatment

## Nutrition



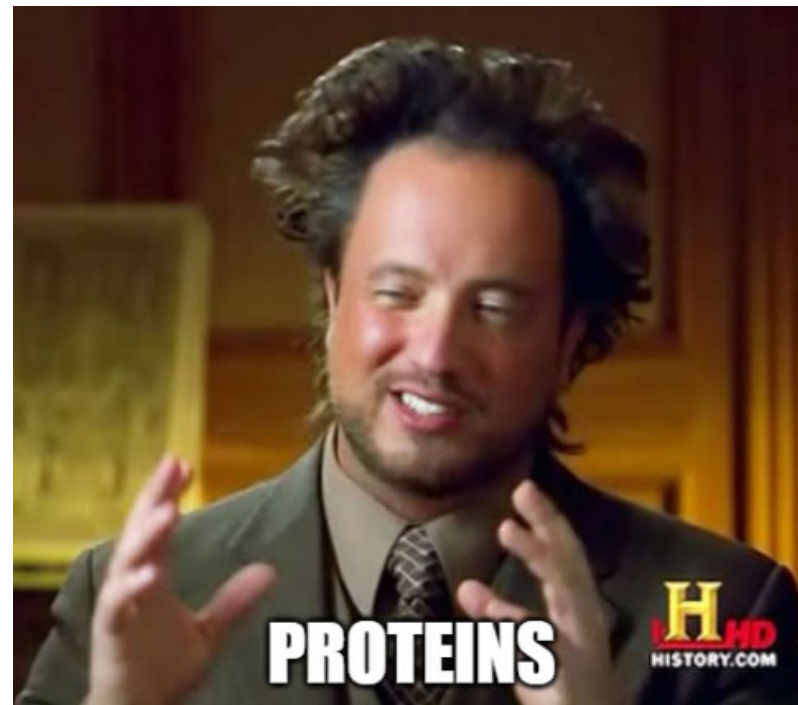
- Moderate sodium restriction of 80-120mmol/day (i.e. 4.6 - 6.9g)
  - Avoid intake of excess salt



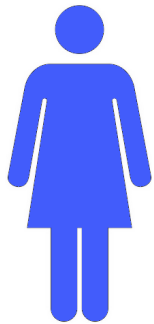
- Low sodium diet (<40mmol/day) favours diuretic-induced complications
- Means of control? Na/K ratio >1 without weight loss suggests non-adherence

## Nutrition

- Sufficient nutrient intake
- Involve a dietician



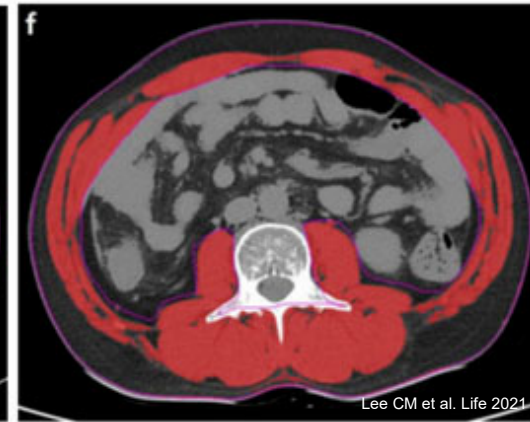
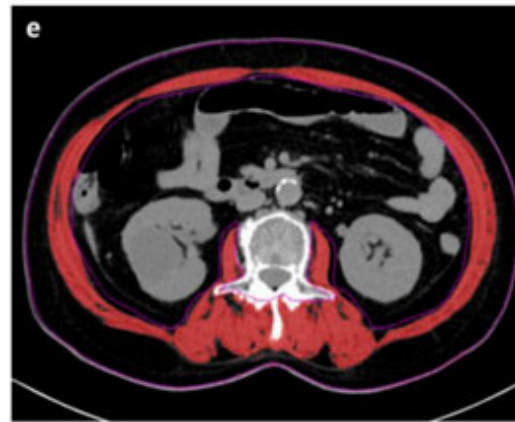
## Sarcopenia and ascites



SMI  $<39 \text{ cm}^2/\text{m}^2$



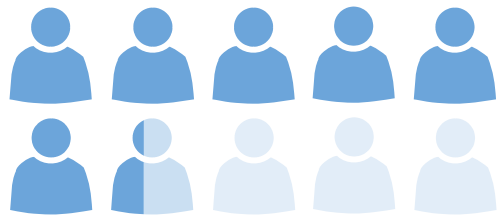
SMI  $<50 \text{ cm}^2/\text{m}^2$





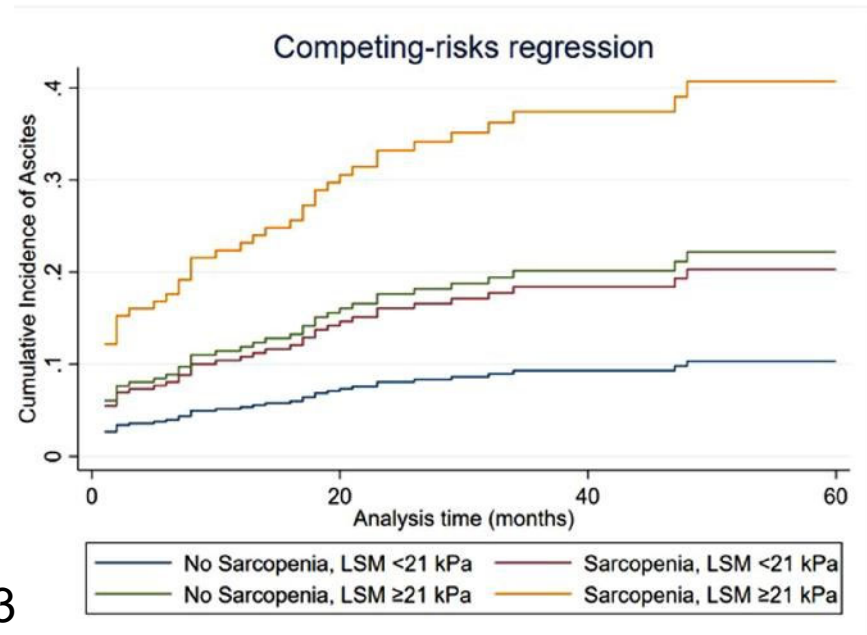
## Sarcopenia and ascites

- Retrospective analysis of 209 pts



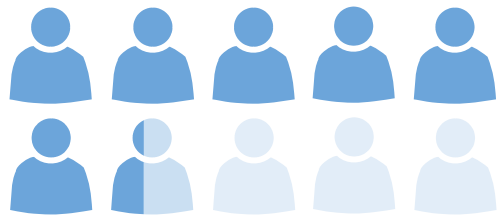
Prevalence of 64%

Decompensation with ascites OR 2.083



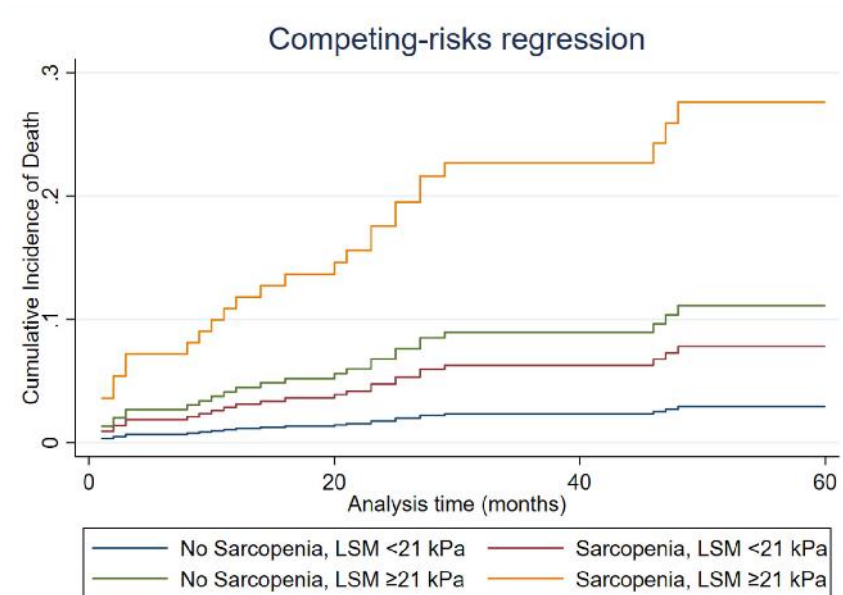
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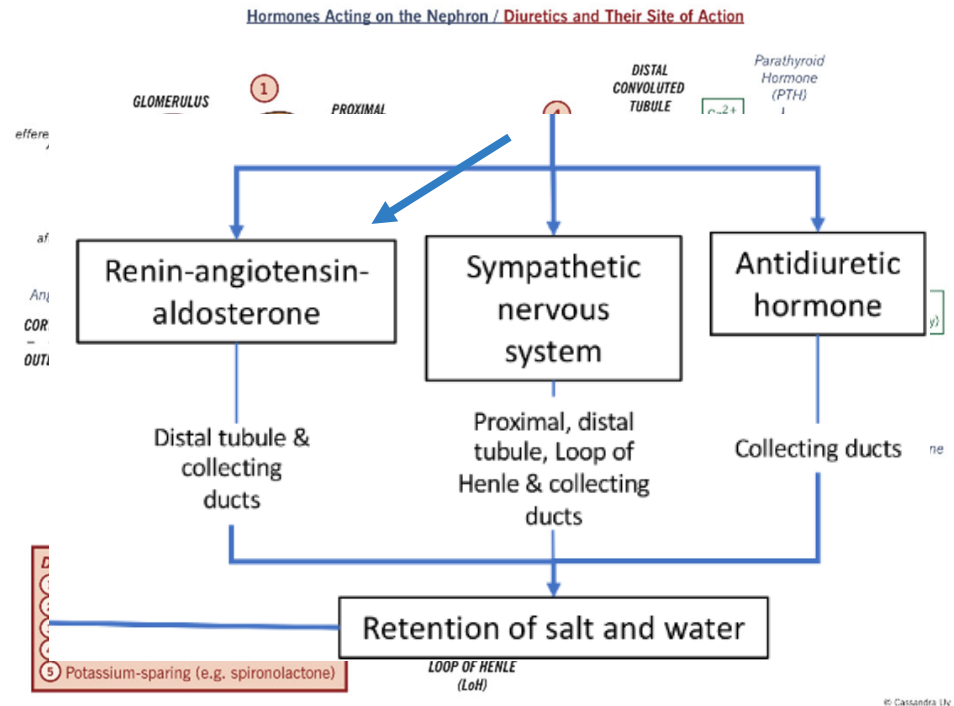


## Fluid restriction

- Not generally advisable
- Mostly in patients with hypervolemia and hyponatremia (<125mmol/L)

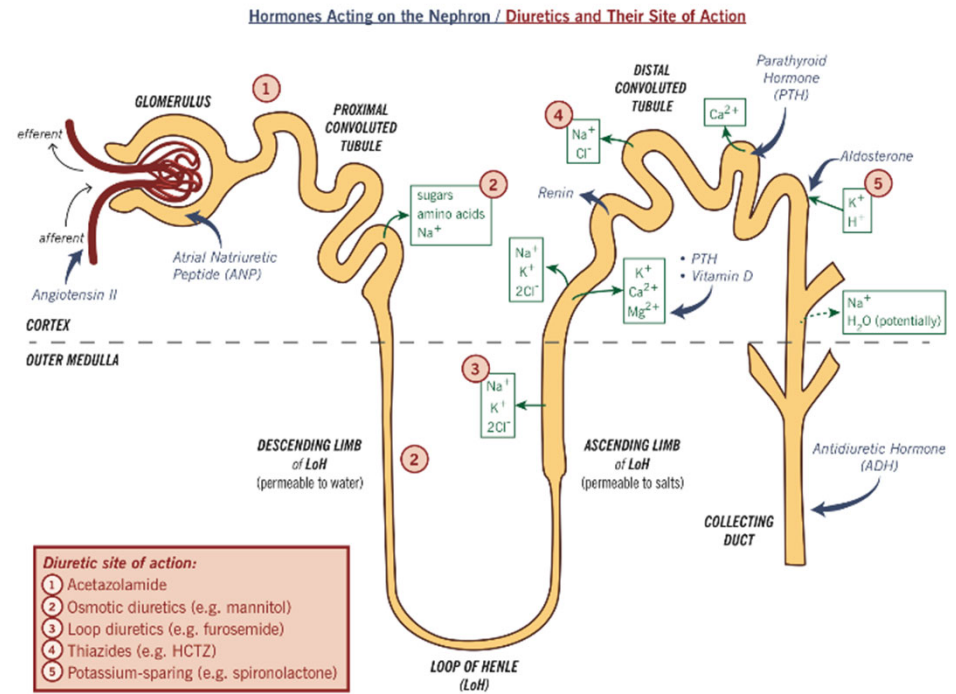
# Diuretics

- 1st line in grade 2 ascites
- Blocking hyperaldosteronism is crucial
  - Spironolacton, eplerenon
- Amilorid/triamteren: less effective



# Diuretics

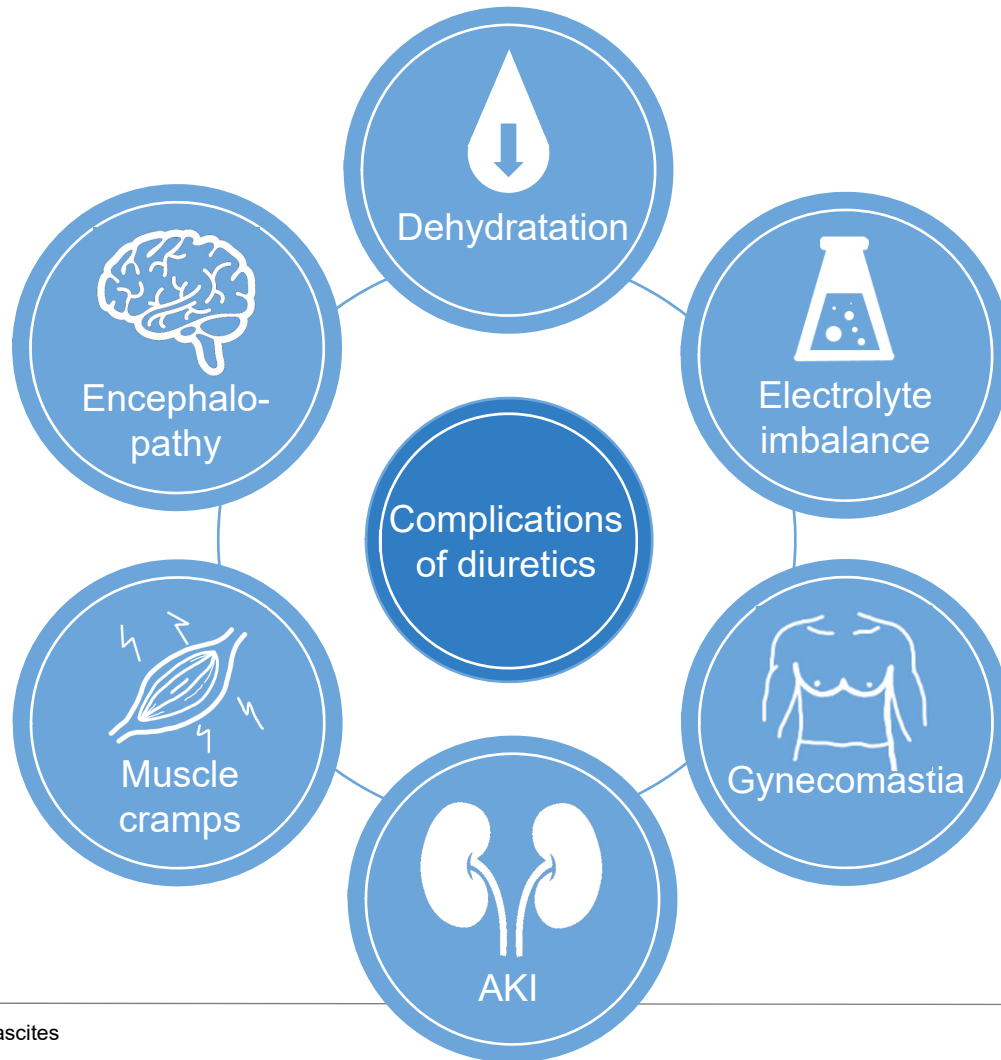
- Proximal tubular sodium reabsorption in long standing ascites
- Torasemide, furosemide



© Cassandra Uy

## Diuretics

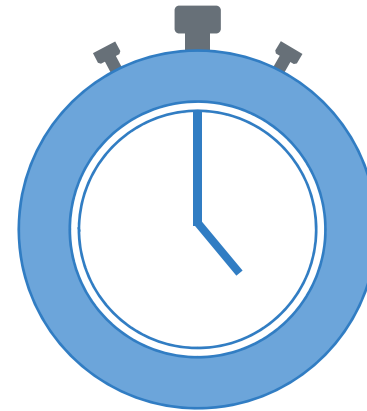
- Begin Spironolacton 100mg, increase every 3-4 days in 100mg steps up to 400mg
- In hypo- or non-response add torasemid (10mg, up to 40mg)
  - Or when faster response is needed
- Goal of weight loss -1kg with leg edema, -0.5kg without



## When not to start



- Persistent overt hepatic encephalopathy



- GI bleeding
- AKI
- Acute HE
- Alterations in sodium or potassium concentration



## When to reduce or withdraw

- Acute kidney injury
- Hyponatremia  $<125\text{mmol/L}$  (torasemide  $>$  aldosterone)
- Hyperkalemia  $>6\text{mmol/L}$  (aldosterone)
- Hypokalemia  $<3\text{mmol/L}$  (torasemide)
  
- Hepatic encephalopathy
  
- Muscle cramps not responding to therapy albumin, baclofen

## Monitoring on diuretics

### Complications

- Serial measurements of Creatinin, Na and K, signs of HE
  - In the beginning 1x/week

### Efficacy

- Urine-Na
  - Goal >78mmol/day, i.e. random Na/K ratio in spot urine 1.8-2.5

## Response to diuretics



taper dosage to least effective

## Large volume paracentesis (LVP)

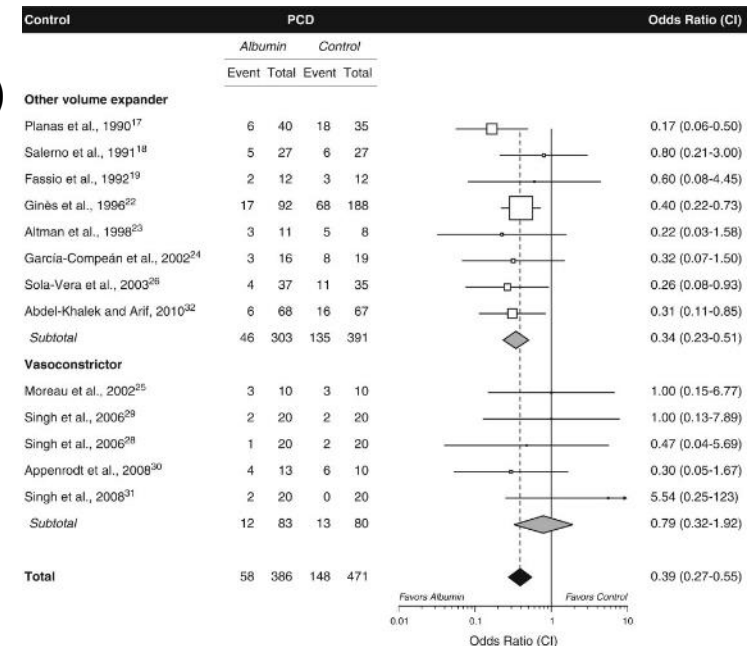
- Dominantly in grade 3 ascites
- Drainage of total volume in 1 session
- Immediate complication rate low
  - Bleeding, fluid leakage, perforation (all <3%)



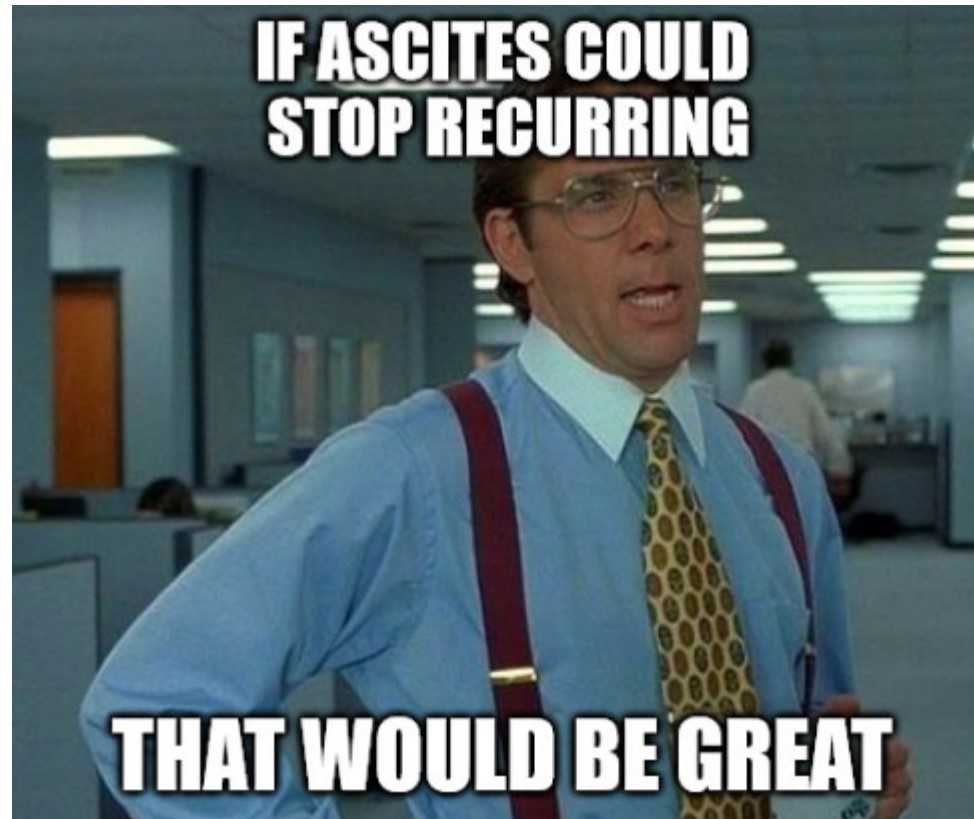
# Preventive measures after LVP



- Infusion of albumin 20% to prevent post-paracentesis circulatory dysfunction (PPCD)
  - AKI, HE, dilutional hyponatraemia and decreased survival
- 8g albumin per liter ascites (~20g/3lt)
- Additional diuretics to prevent recurrence



Bernardi M et al. Hepatology 2011



## Refractory ascites

- Ascites that cannot be mobilised or early recurrence that cannot be medically prevented
  - Diuretic-resistant and diuretic-intractable

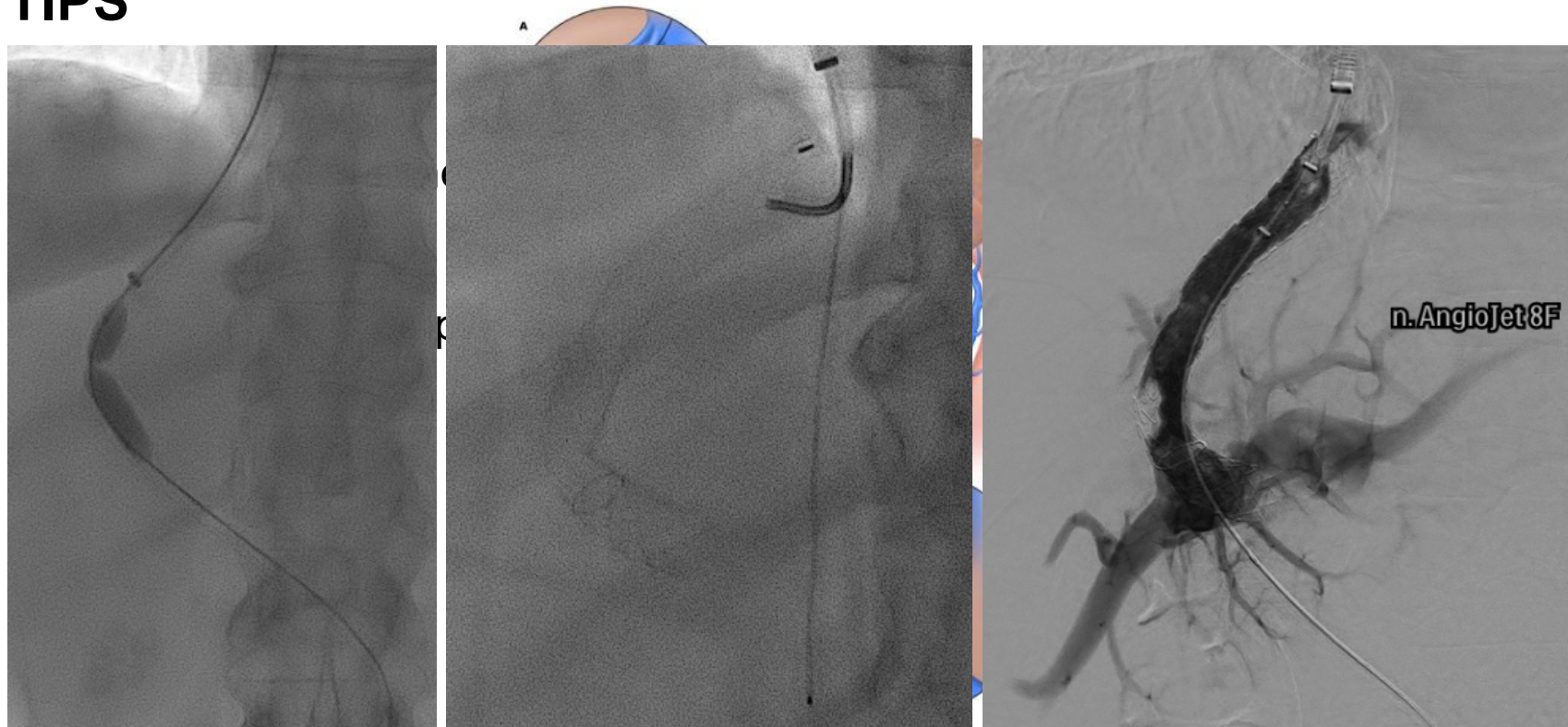
Diagnostic criteria	
Treatment duration	Patients must be on intensive diuretic therapy (spironolactone 400 mg/day and furosemide 160 mg/day) for at least one week and on a salt-restricted diet of less than 90 mmol/day
Lack of response	Mean weight loss of <0.8 kg over four days and urinary sodium output less than the sodium intake
Early ascites recurrence	Reappearance of grade 2 or 3 ascites within four weeks of initial mobilisation
Diuretic-induced complications	<p>Diuretic-induced hepatic encephalopathy is the development of encephalopathy in the absence of any other precipitating factor</p> <p>Diuretic-induced renal impairment is an increase of serum creatinine by &gt;100% to a value &gt;2 mg/dl (177 µmol/L) in patients with ascites responding to treatment</p> <p>Diuretic-induced hyponatremia is defined as a decrease of serum sodium by &gt;10 mmol/L to a serum sodium of &lt;125 mmol/L</p> <p>Diuretic-induced hypo- or hyperkalemia is defined as a change in serum potassium to &lt;3 mmol/L or &gt;6 mmol/L despite appropriate measures</p> <p>Invalidating muscle cramps</p>

## Treatment of refractory ascites

- Diuretics only when Urine-Na >30mmol/day
- Frequent LVP
- Possibly reduce NSBB to increase cardiac output
- Evaluate for TIPS



# TIPS

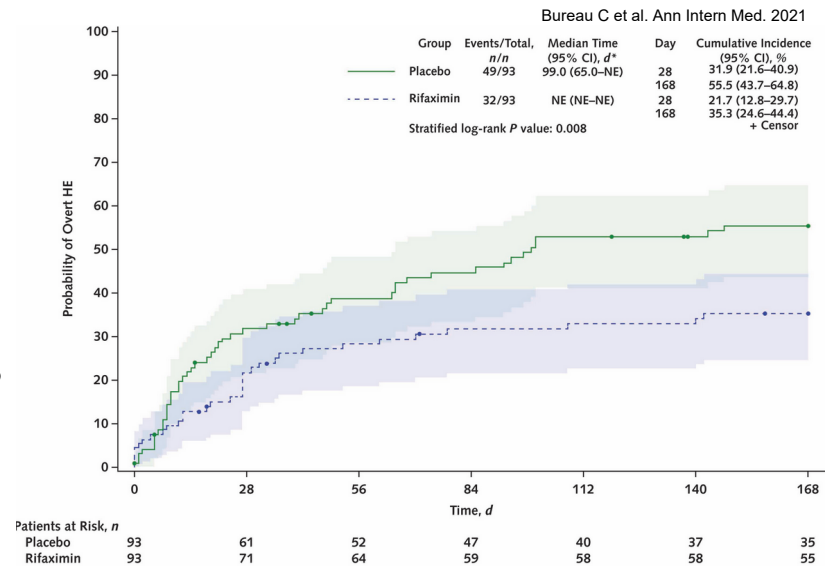


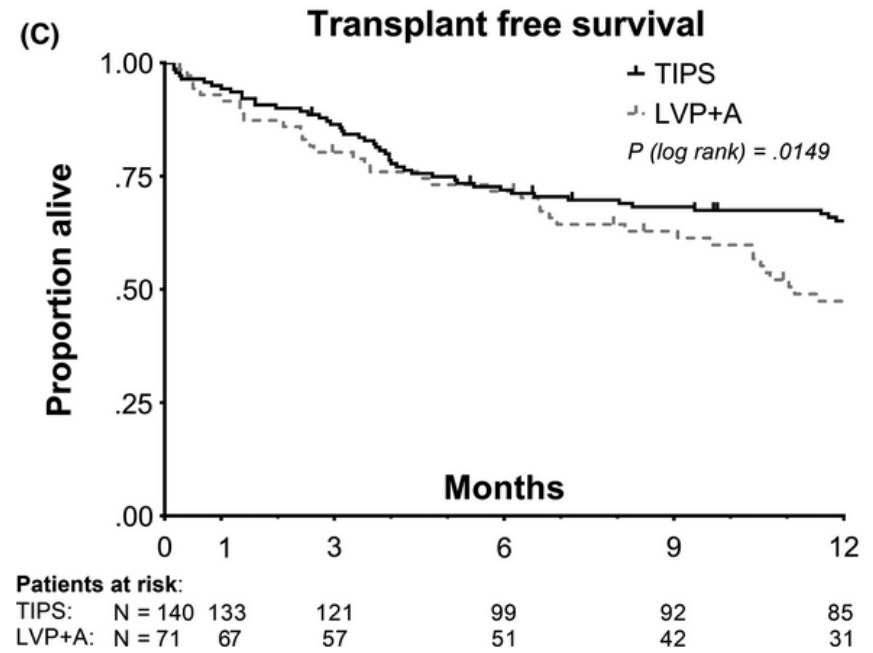
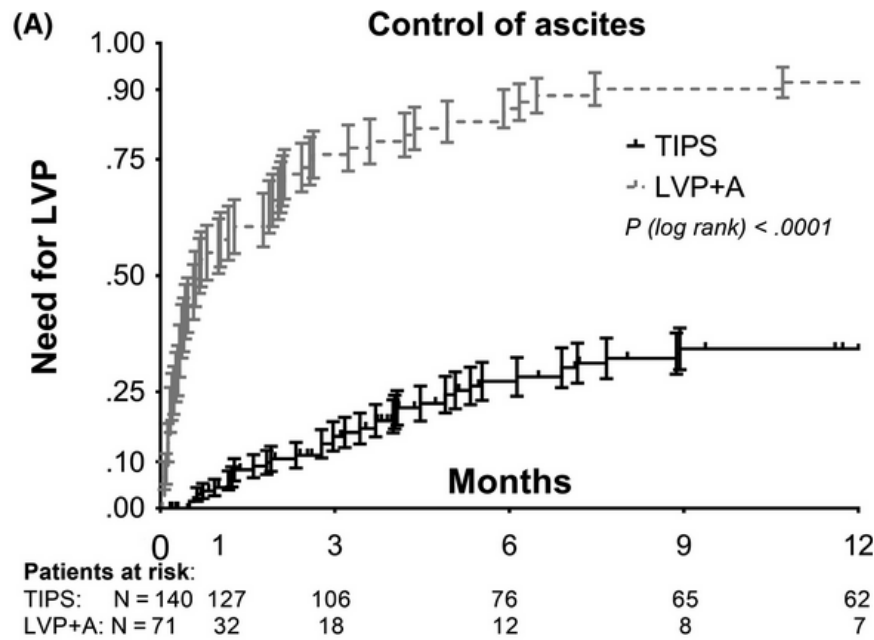
# TIPS



Contraindications	Possibly no benefit
Significant pulmonary hypertension	Age >70y
Heart failure or severe cardiac valvular insufficiency	MELD >18
Rapidly progressive liver failure	Bilirubin >50 umol/L
Severe or uncontrolled hepatic encephalopathy	Platelets <75 G/L
Uncontrolled systemic infection or sepsis	
Unrelieved biliary obstruction	
Polycystic liver disease	
Extensive primary or metastatic hepatic malignancy	

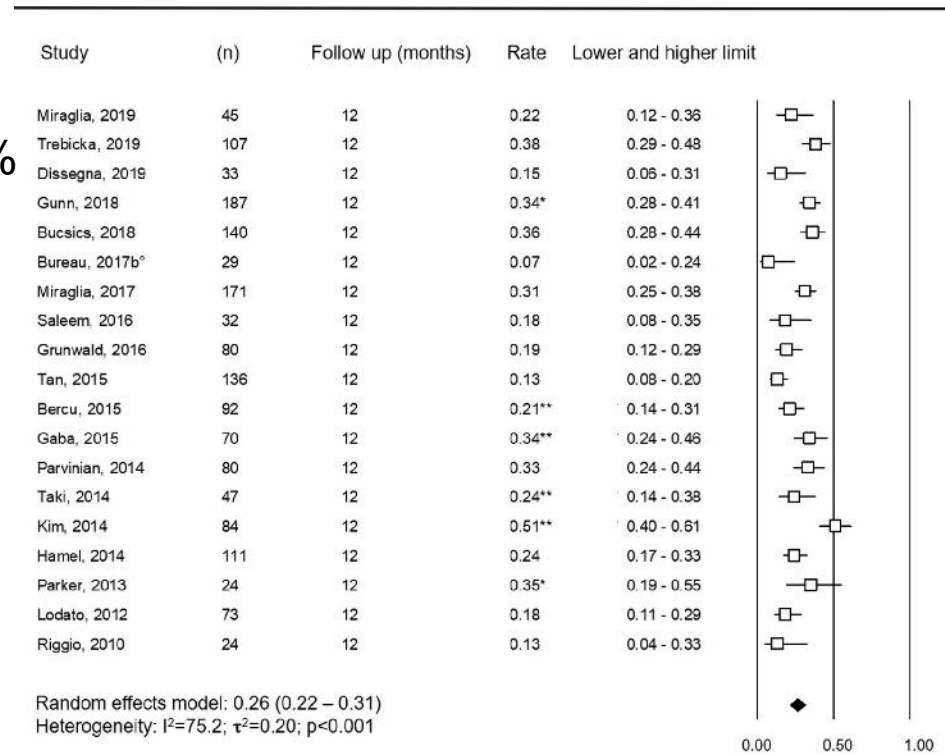
- 8mm to avoid hepatic encephalopathy
- Start Xifaxan before
- Continued salt restriction and diuretics until resolution of ascites





# TIPS

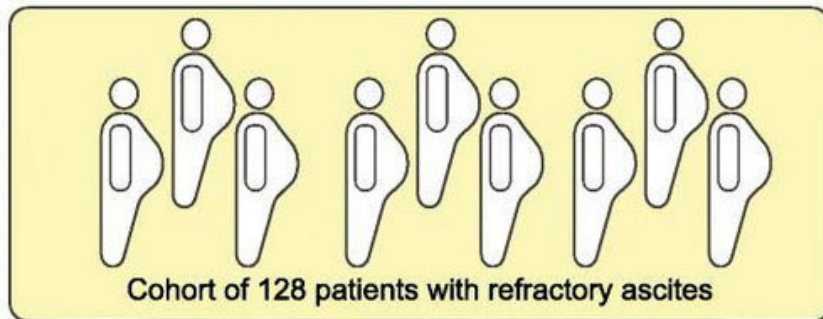
- 1y mortality in newer studies 26%
- Rate of encephalopathy 30%



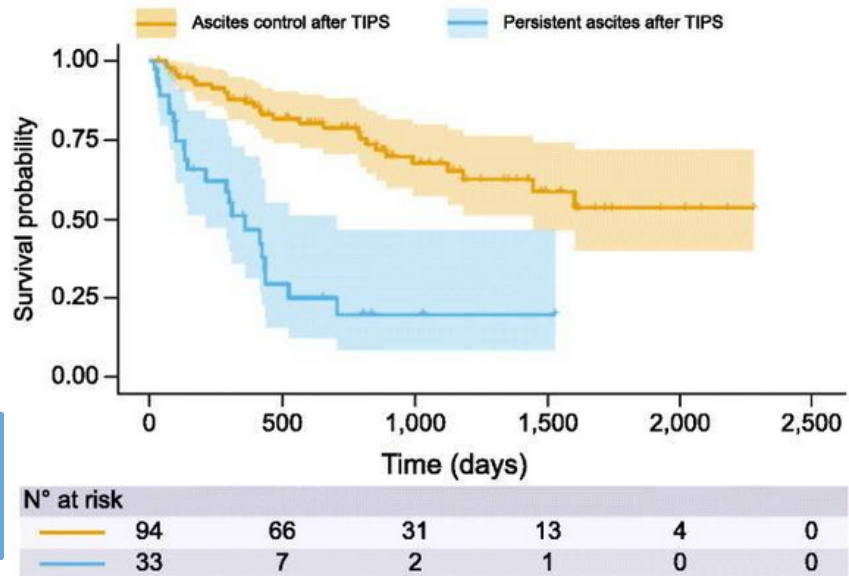
Will V, Rodrigues SG, Berzigotti A. Dig Liver Dis. 2022

# Who profits the most?

Piecha F et al. JHEP Rep 2019



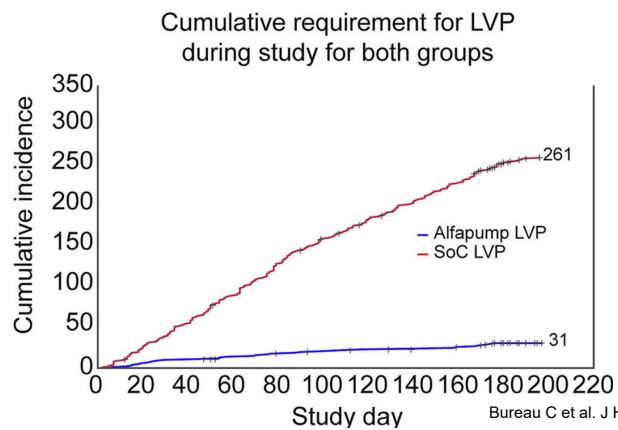
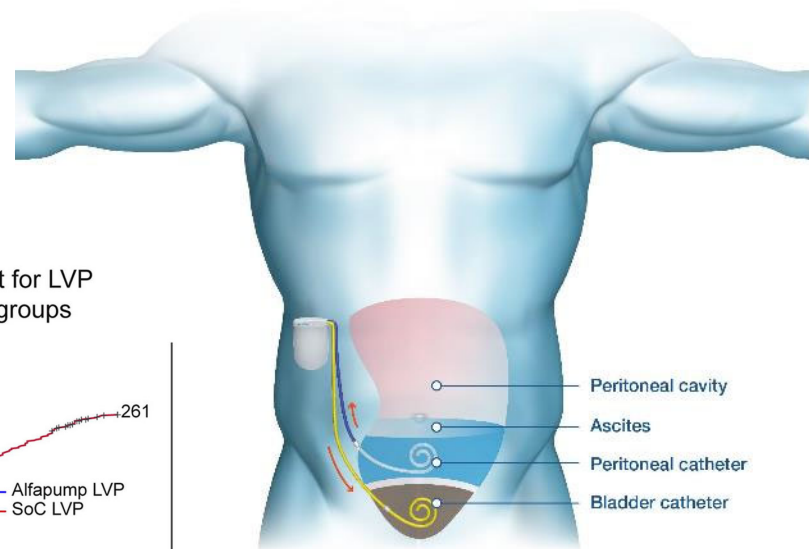
**Rik factors for persistent ascites:**  
 Paracentesis frequency (OR 1.672, CI 1.253-2.355)  
 Baseline creatinine (OR 2.640, CI 1.201-6.607)



# Alfapump

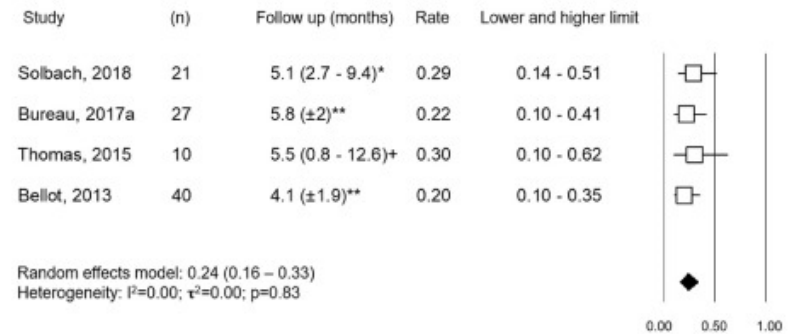
- Automated, low-flow ascites (alfa) pump
- In patients not amenable to TIPS

alfa pump



# Alfapump

- Mortality around 6 months 24%
- Non negligible complication rate
  - Infection 41%
  - AKI 36%





## Indwelling catheter (i.e. PleurX)

- Very few studies published
- High technical success rate
- Device related infection 17%
  
- Preferably in end-stage liver disease not fit for LT
  - Mortality according to ESLD (6 weeks to 5 months), same as carcinomatosis

## Prognosis

- Decrease of 5y-survival from 80% (compensated) to 30% (ascites)
- 1 and 2 year mortality 40% and 50% respectively
- Median survival of 6 months in refractory ascites
  - Mostly due to development of other complications

Refer for OLT evaluation

## Complications

- Volume effect
  - Hernias, restrictive ventilation, anorexia
- HRS-AKI
- SBP
  - Risk of infection in protein  $<15\text{g/L}$ , Bilirubin  $>50\mu\text{mol/L}$ , hyponatremia or renal insufficiency

## TAKE HOME MESSAGES

- Most frequent complication in cirrhosis
- Diagnostic paracentesis in almost any new complication of cirrhosis
- Low salt diet and nutrition is key
- Diuretics if needed
- LVP in recurring ascites
- Albumin for PPCD
- Think of TIPS
- Think of liver transplant

# Thanks for your attention

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