# Kidney - Liver Overlap: Recognition of Kidney Disease, Impact on Symptoms and who Needs both Organs

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# Outline

- Scope of the Problem
- Recognizing the Problem
- Burden of the Problem
- Fixing the Problem
- Outcomes
- Next Steps

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## Scope of the Problem

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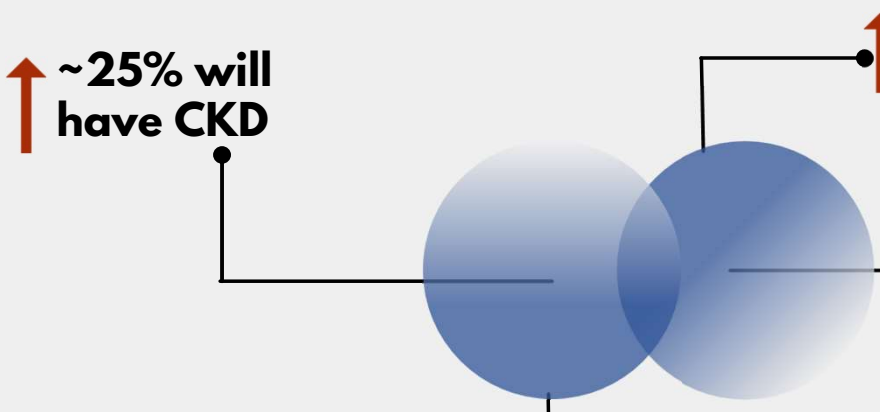
## Kidney Dysfunction among Cirrhosis Patients is Common



- ~25% will have CKD
- ~75%, especially those with decompensated cirrhosis will experience AKI
- ~10% of patients yearly receive a SLKT
- The burden of these problems is rising

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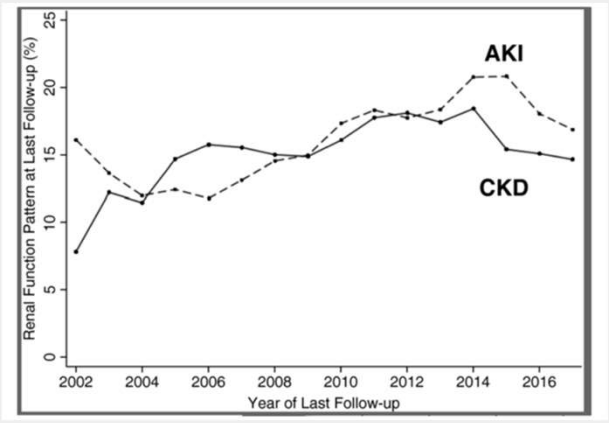
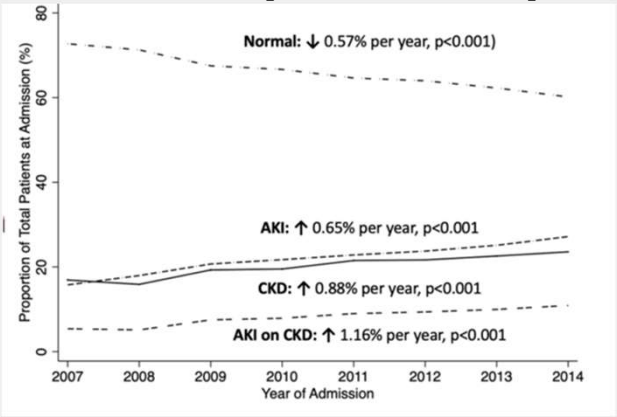
# The burden of kidney dysfunction is increasing:

## UNOS Waitlist




## National Inpatient Sample

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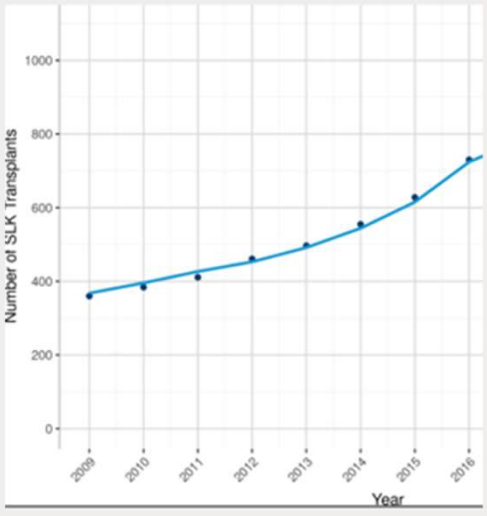
# This rising burden is leading to a greater utilization of SLKT

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## But are we even recognizing the whole problem?

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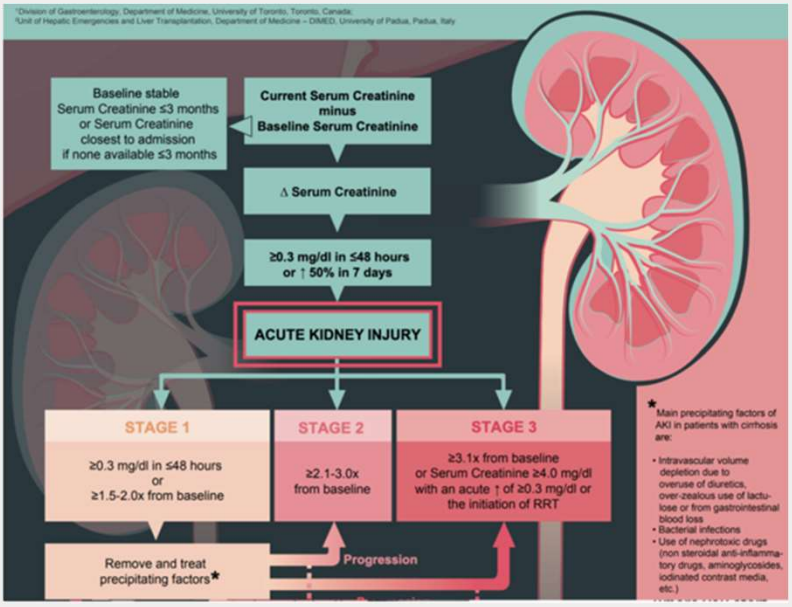
## What are the definitions we should be using:

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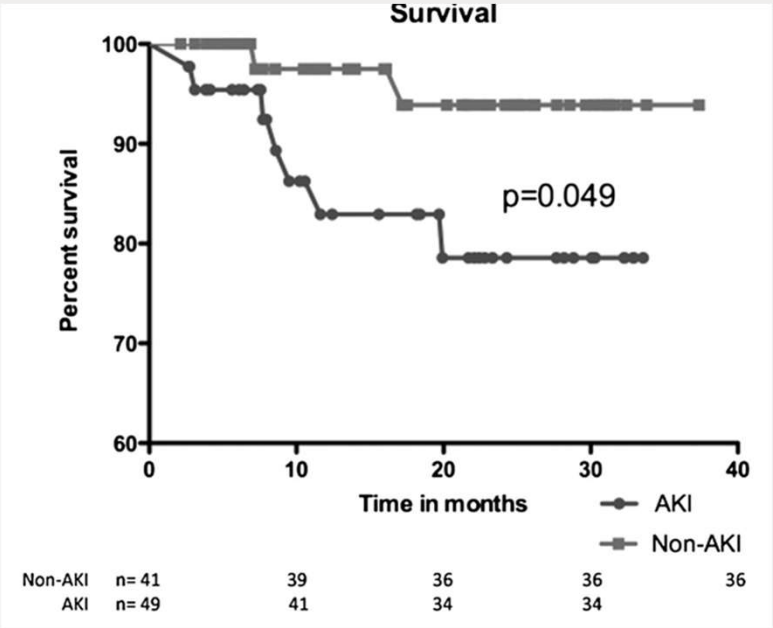
# Is 0.3 mg/dL too low?

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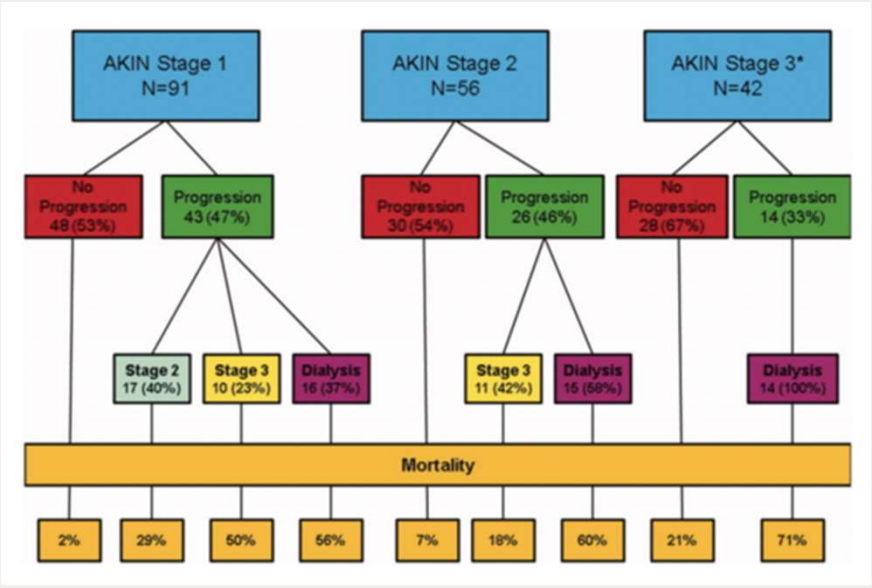
# It is really about preventing progression as best we can:

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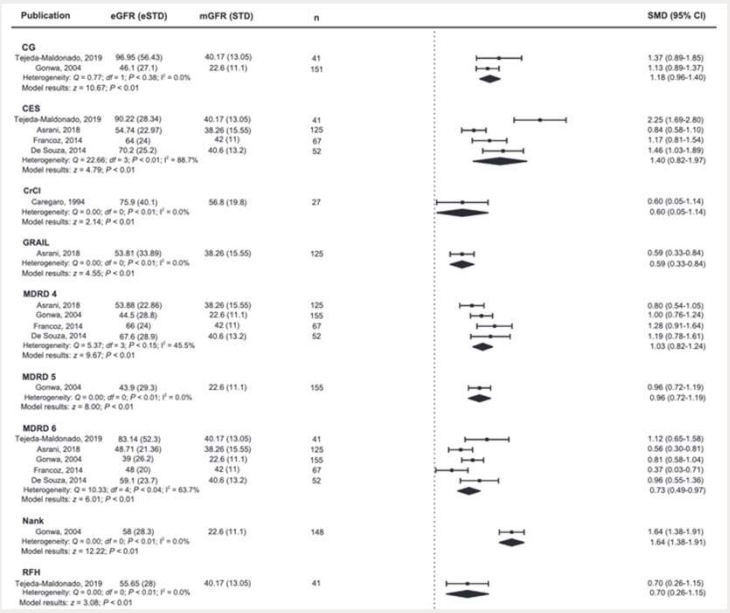
# What about CKD?




**Regardless of the formula used, eGFR overestimates kidney function in cirrhosis.**

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## Burden of the Problem

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# AKI and CKD are interrelated - and start an important cycle.

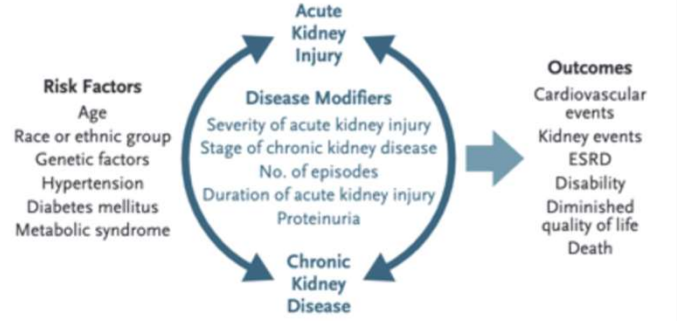


Figure 1. Acute Kidney Injury and Chronic Kidney Disease as an Interconnected Syndrome.

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## Patients with AKI are at ⬆️ risk of CKD.

- 409 patients, 168 with AKI and 241 without AKI
- 25% of patients with AKI and 1% of patients without AKI developed CKD at 3 months ($p<0.001$)
- Risk factors were hospital-acquired AKI and severity of AKI
- The transition from AKI to CKD was associated with an increased rate of 3-month hospital readmission, increased frequency of AKI, bacterial infections, ascites, and refractory ascites and a trend towards a higher need for liver transplantation.

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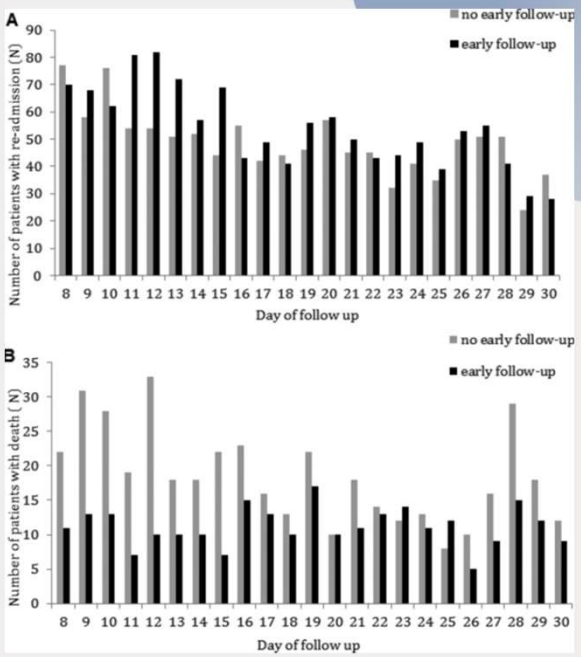
# After a hospitalization, the risk does not disappear with discharge:

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**We know in practice that these episodes of AKI and CKD lead to a greater burden of liver disease, particularly in terms of ascites, and can be difficult to manage.**

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# Fixing the Problem

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# With this understanding and in an effort to standardize practice, new SLKT guidelines were put in place in 2017:

| If the candidate's transplant nephrologist confirms a diagnosis of: | Then the transplant program must report to the OPTN and document in the candidate's medical record: |
|---|---|
| **Chronic Kidney Disease (CKD)** with a measured or calculated glomerular filtration rate (GFR) less than or equal to 60 mL/min for greater than 90 consecutive days | At least *one* of the following:<br>• That the candidate has begun regularly administered dialysis as an end-stage renal disease (ESRD) patient in a hospital based, independent non-hospital based, or home setting.<br>• At the time of registration on the kidney waiting list, that the candidate's most recent measured or calculated creatinine clearance (CrCl) or GFR is less than or equal to 30 mL/min.<br>• On a date after registration on the kidney waiting list, that the candidate's measured or calculated CrCl or GFR is less than or equal to 30 mL/min. |
| **Sustained Acute Kidney Disease (SAKI)** | At least one of the following, or a combination of both of the following, for the last 6 weeks:<br>• That the candidate has been on dialysis at least once every 7 days.<br>• That the candidate has a measured or calculated CrCl or GFR less than or equal to 25 mL/min at least once every 7 days.<br>If the candidate's eligibility is not confirmed at least once every seven days for the last 6 weeks, the candidate is not eligible to receive a liver and a kidney from the same donor |
| **Metabolic Disease** | A diagnosis of at least one of the following:<br>• Hyperoxaluria<br>• Atypical hemolytic uremic syndrome (HUS) from mutations in factor H or factor I<br>• Familial non-neuropathic systemic amyloidosis<br>• Methylmalonic aciduria |

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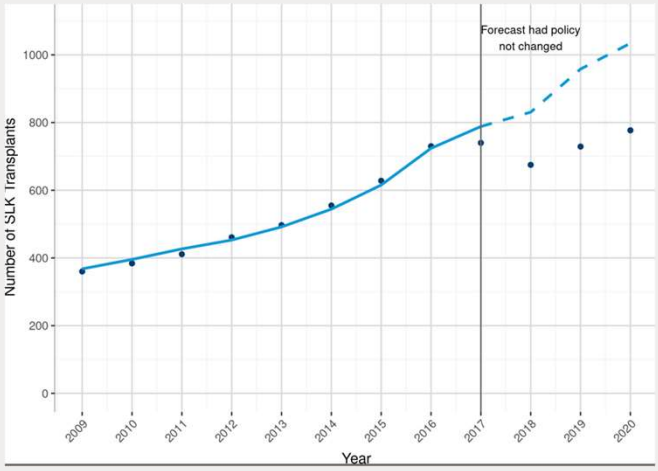
# And it seems that this has slowed the growth in SLKT:

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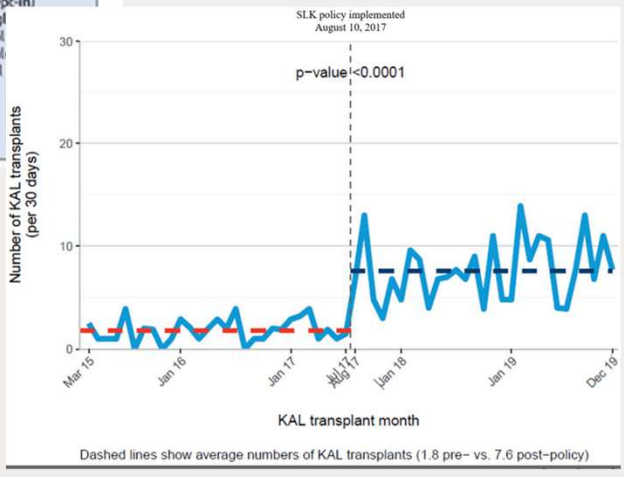
# The Safety Net

| Sequence A* KDPI 0-20% | Sequence B KDPI 21-34% | Sequence C KDPI 35-85% | Sequence D KDPI 86-100% |
|---|---|---|---|
| Highly Sensitized | Highly Sensitized | Highly Sensitized | Highly Sensitized |
| 0-ABDR mismatches | 0-ABDR mismatches | 0-ABDR mismatches | 0-ABDR mismatches |
| Prior living donor | Prior living donor | Prior living donor | Local KAL safety net |
| Local pediatrics | Local pediatrics | Local KAL safety net | Local Single |
| Local top 20% EPTS | Local KAL safety net | Local | Local Dual (Opt-in) |
| 0-ABDRmm (all) | Local adults | Regional | Regional Singl |
| Local (all) | Regional pediatrics | National | Regional Dual |
| Regional pediatrics | Regional adults | Local Dual (Opt-in) | National Singl |
| Regional (top 20% EPTS) | National pediatrics | Regional Dual (Opt-in) | National Dual |
| Regional (all) | National adults | National Dual (Opt-in) | |
| National pediatrics | | | |
| National (top 20% EPTS) | | | |
| National (all) | | | |

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## How are we doing in terms of outcomes?

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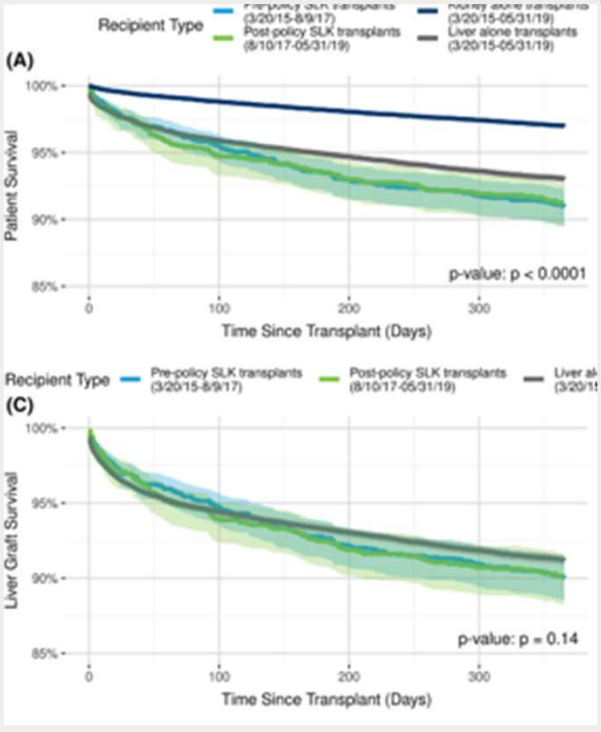
# SLKT Outcomes

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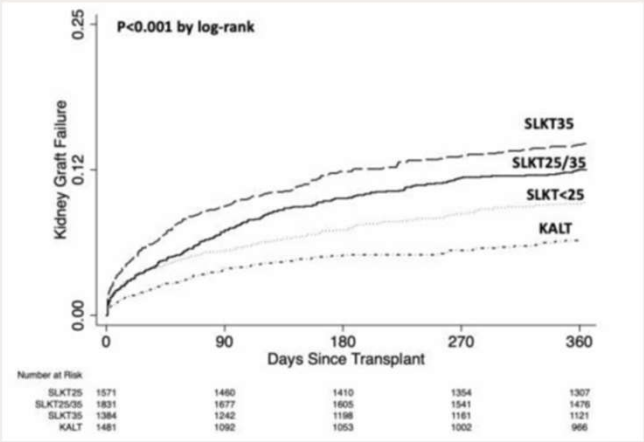
# SLKT Outcomes

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## But transplant is for the few, what can we do for the many?

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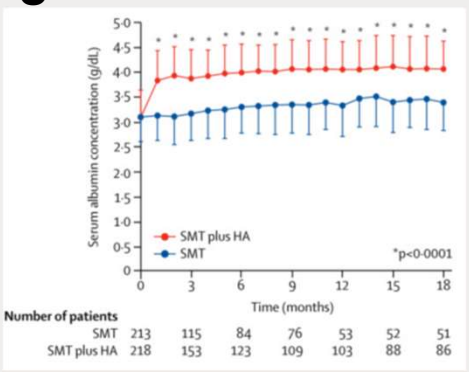
# Opportunities to prevent AKI in the clinic:

- **Albumin, particularly in those receiving LVPs, the jury is still out among those with low serum albumin.**

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# Opportunities to prevent AKI in the clinic:

**2. Pay attention to those with CKD, low MAP, DM/HTN/NAFL, and refractory ascites - they are the ones most at risk.**
**3. Trials have attempted to augment MAP, but have been mostly negative.**

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# Opportunities to prevent CKD when patient hospitalized with AKI:

- **Early recognition and intervention.**
- **If HRS-AKI, earlier treatment with vasoactive agents. Terlipressin soon; Trials for HRS-AKI ongoing; please consider referral.**
- **Watch for recurrence, be vigilant, and monitor diuretics and potential other insults.**

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## And what about the opposite scenario - of patients with ≥ Stage IV CKD, how do we identify underlying liver disease?

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# Of Patients with CKD, who to refer for SLKT?

**Limited data, as data for fibrosis, are lacking in SRTR.**

**Often, we are sent these patients by the Kidney Transplant team with a request to risk stratify.**

**If a patient has an elevated FIB-4 or splenomegaly on ultrasound, we tend to consider first-noninvasive tests of fibrosis (FIBROSCAN, MRE)**

**If a patient clearly has CSPH - varices on endoscopy or ascites, then we will recommend SLKT.**

**If a patient has clear signs of fibrosis but no clear CSPH, then we will complete an HVPG and depending on trajectory and degree consider TIPS and KTA or SLKT.**

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# Conclusions

- **Kidney dysfunction is an increasingly more common issue among patients with cirrhosis.**
- **Recognition and definitions are key to earlier diagnosis.**
- **Early intervention can help improve outcomes.**
- **SLKT is a common procedure with good outcomes, as is KALT.**
- **We are attempting to investigate ways to prevent these complications.**
- **The management of kidney dysfunction is difficult both for patients and providers.**

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# Thank you

Questions?
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