# Trends in the Early Adoption of Terlipressin Among Hospitalized Adults with Hepatorenal Syndrome in the U.S.: A Real-World Analysis

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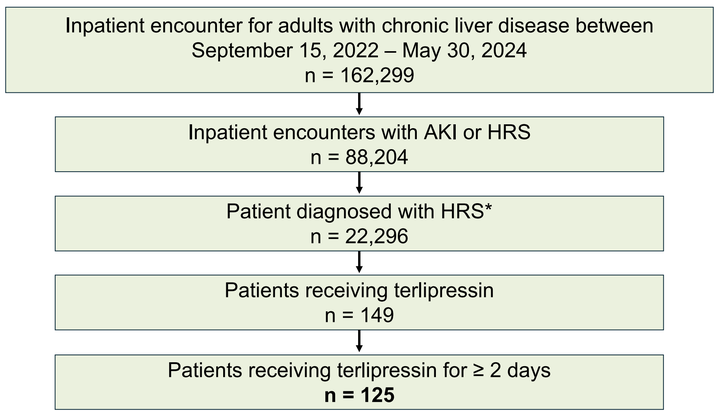
## Background

- Hepatorenal syndrome-acute kidney injury (HRS-AKI), characterized by a rapid decline in kidney function, is a serious complication of cirrhosis, contributing to high morbidity and mortality[1,2]
- Terlipressin is the only drug recently approved by the FDA for treatment of HRS-AKI in adults and is recommended as the preferred therapy by U.S. and international guidelines[3-6]
- We evaluated real-world trends and outcomes in hospitalized U.S. HRS patients treated by early adopters of terlipressin

## Methods

- This retrospective study utilized a HIPAA-compliant, hospital-based chargemaster database (Premier), to identify adult patients hospitalized with HRS and treated with terlipressin ≥ 2 days between Sep 2022 - May 2024 (Fig 1)
- ICD-10-CM/PCS, National Drug Codes, and billing codes were used to identify cases of HRS and terlipressin use
- We analyzed socio-demographics, hospital and clinical characteristics, terlipressin treatment patterns, and key clinical outcomes

### Fig 1: Flowchart of Patient Inclusion




*During encounter + 90 days lookback period from admission;
AKI: Acute kidney injury; HRS: Hepatorenal syndrome

## Results

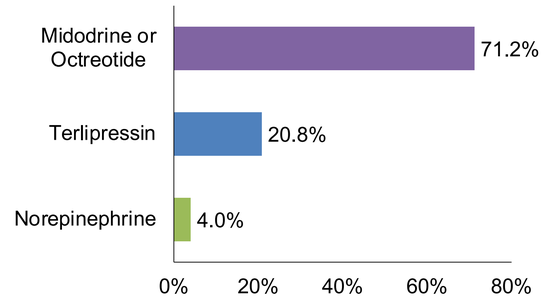
### Table 1: Patient and Hospital Characteristics

| *Patient Demographics* | n=125 |
|---|---|
| **Age (year), Mean ± SD** | 55.4 ± 12.5 |
| **Male, n (%)** | 84 (67.2) |
| **Ethnicity, n (%)** | |
| White or Caucasian | 81 (64.8) |
| Hispanic | 22 (17.6) |
| Black or African American | 11 (8.8) |
| Asian | 5 (4.0) |
| Other | 6 (4.8) |
| **Payor group, n (%)** | |
| Medicaid | 41 (32.8) |
| Medicare | 39 (31.2) |
| Managed care | 23 (18.4) |
| Commercial | 14 (11.2) |
| Other | 8 (6.4) |
| **Known admission type*, n (%)** | |
| Emergency | 90 (72.0) |
| Urgent | 32 (25.6) |
| Elective | 2 (1.6) |
| ***Clinical Characteristics*** | |
| **Etiology of liver disease**, n (%)** | |
| Alcohol-associated liver disease (ALD) | 93 (74.4) |
| MASH/ MASLD | 32 (25.6) |
| Viral hepatitis | 6 (4.8) |
| ***Hospital Characteristics*** | |
| **Hospital bed size, n (%)** | |
| ≥ 500 | 81 (64.8) |
| <500 | 44 (35.2) |
| **Setting, n (%)** | |
| Urban | 123 (98.4) |
| Rural | 2 (1.6) |
| **Teaching hospital status, n (%)** | 106 (84.8) |

*n=1 was unknown for admission type
**90-day lookback period used, not mutually exclusive
MASH: Metabolic dysfunction-associated steatohepatitis
MASLD: Metabolic dysfunction-associated steatotic liver disease

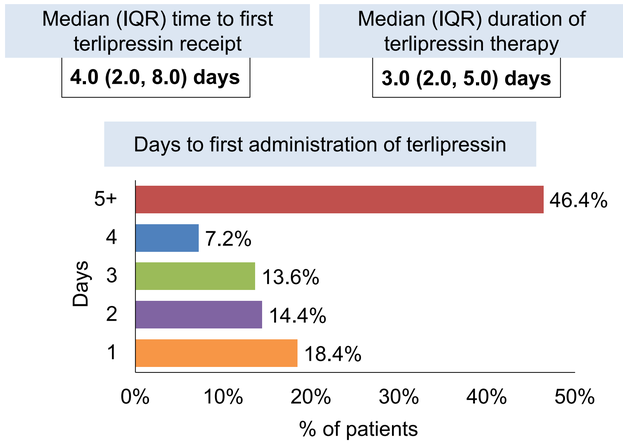
- Among the 125 patients included in this study, alcohol-associated liver disease (ALD) was the most common cause of cirrhosis (74.4%)
- 97.6% had emergent/urgent admissions, with 84.8% treated at teaching hospitals and 64.8% at large hospitals with 500+ beds
- Overall in-hospital mortality rate was 17.6%
- In a subset of 21 patients, HRS reversal, defined as the return of pre-treatment SCr to ≤ 1.5 mg/dL, was 47.6% (n=10)

### Fig 2: Overview of First-line Treatments (n=125)*

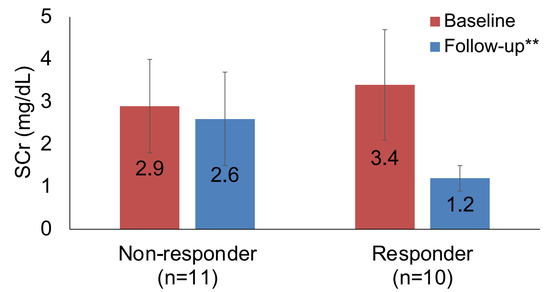



*First-line treatment was indiscernible for 4% of patients (i.e. multiple treatments on the same day)
Median [IQR] day of treatment initiation following hospitalization:
- Midodrine or Octreotide: 1.0 [1.0, 2.0]
- Terlipressin: 1.5 [1.0, 3.8]
- Norepinephrine: 1.0 [1.0, 1.0]

### Fig 3: Terlipressin Treatment Patterns (n=125)

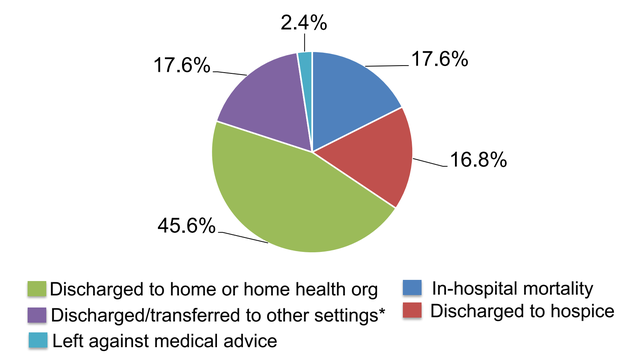



### Fig 4: Subset of Terli-treated Patients with Baseline and Follow-up SCr Values (n=21)*




*Of the 21 patients, n=3 used terlipressin as first line treatment;
**After the first terlipressin administration until discharge;
Response defined as baseline SCr > 1.5 mg/dL and follow-up ≤ 1.5 mg/dL; SCr: Serum creatinine expressed as Mean ± SD

### Fig 5: Discharge Status (n=125)




*Other facility, skilled nursing facility, health institution not in list, other rehab facility

## Conclusions

- Following its U.S. approval, this assessment of terlipressin's early adoption in real world settings, shows that the majority of HRS patients treated predominantly at large academic institutions with underlying ALD had an overall in-hospital mortality rate of 17.6%
- While only one-fifth of cases used terlipressin as the first-line treatment, nearly half of those with SCr data achieved HRS reversal

Reference: 1. Kiani C, Zori AG. Recent advances in pathophysiology, diagnosis and management of hepatorenal syndrome: A review. World J Hepatol. 2023 Jun 27;15(6):741-754. 2. Loftus M, Brown RS Jr, El-Farra NS, et al. Improving the Management of Hepatorenal Syndrome-Acute Kidney Injury Using an Updated Guidance and a New Treatment Paradigm. Gastroenterol Hepatol (N Y). 2023 Sep;19(9):527-536. 3. Mallinckrodt Pharmaceuticals. TERLIVAZ® (terlipressin) prescribing information. https://www.terlivaz.com/PI/. Accessed 25 Sep 2022. 4. Bajaj JS, O'Leary JG, Lai JC, et al. Acute-on-Chronic Liver Failure Clinical Guidelines. Am J Gastroenterol. 2022;117(2):225-252. 5. Biggins SW, Angeli P, Garcia-Tsao G, et al. 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. Hepatology. 2021;74(2):1014–1048. 6. European Association for the Study of the Liver EASL clinical practice guidelines for the management of patients with decompensated cirrhosis. J Hepatol. 2018;69(2):406–460.

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