

# Adjunctive Albumin Infusion During Large-volume Paracentesis May Improve Days to Next Hospital Readmission In Cirrhotic Patients

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## INTRODUCTION

- Ascites is the pathologic accumulation of fluid in the peritoneal cavity and is a common complication among patients with decompensated cirrhosis. When untreated, large volume ascites can lead to a decline in the 5-year survival rate, from 80% to 30%, due to increased susceptibility of additional complications such as spontaneous bacterial peritonitis and hepatorenal syndrome<sup>1</sup>
- Current standard of care for grade 3 and refractory ascites involves large volume (>5L) paracentesis (LVP). The European Association for the Study of the Liver (EASL) and The American Association for the Study of Liver Diseases (AASLD) both recommend albumin infusion at the time of LVP to mitigate the risks of post-paracentesis circulatory dysfunction<sup>1-4</sup>

## OBJECTIVE

- Among patients with ascites who underwent LVP, we aimed to examine descriptive differences in those who received adjunctive albumin vs. those who did not

## METHODS/STUDY DESIGN

### Data Source

- This retrospective, observational study was conducted using de-identified patient data from Cerner Real-World Data, a U.S. electronic health record database

### Patient Selection

- Adult (≥18 years) patients with a diagnosis of cirrhosis who underwent LVP between January 2016 and September 2019 were selected using ICD-10 codes
- Hospital visits or encounters lasting >48 hours and patients with hepatorenal syndrome or spontaneous bacterial peritonitis were excluded from our analysis

### Study Design

- Exposure groups were ‘LVP’ (did not receive adjunctive albumin) and ‘LVP + Albumin’ (received adjunctive albumin)
- Patients were 1:1 propensity scored matched (PSM) on demographics, Charlson Comorbidity Index, Model for End-Stage Liver Disease (MELD) score, and hospital care setting
- Main outcomes of interest included days to LVP-related hospital readmission within 90 days of discharge and days to non-LVP related hospital readmission within 90 days of discharge

## RESULTS

- We identified 6,225 patients with cirrhosis requiring LVP, of which 4,578 (73.5%) underwent LVP only and 1,647 (26.5%) underwent LVP with adjunctive albumin
- Prior to PSM, the mean (SD) MELD-Na score among ‘LVP only’ encounters was 15.8 (6.9) compared to 17.2 (7.1) in encounters of ‘LVP + albumin’
- ‘LVP only’ encounters most commonly occurred in outpatient settings (41.5%), whereas ‘LVP + Albumin’ encounters mostly occurred in inpatient settings (46.8%)
- A 1:1 PSM yielded 1,016 encounters in each group. Descriptive statistics from both unmatched and matched groups are shown in Table 1
- Compared to the ‘LVP only’ group, the ‘LVP + Albumin’ group showed increases in mean days to LVP-related readmissions (29.7 ± 23.0 vs. 28.8 ± 25.0 days) and non-LVP related readmissions (25.7 ± 23.6 vs. 24.6 ± 22.9 days)

Table 1. Patient Demographics at Before and After Propensity Score Matching

Characteristic	Before PSM (N=6,225)		After PSM (N= 2,032)*	
	LVP	LVP + Albumin	LVP	LVP + Albumin
	4,578 encounters	1,647 encounters	1,016 encounters	1,016 encounters
Characteristic				
Age				
N	4,578	1,647	1,016	1,016
Mean ± SD	60.5 ± 12.9	60.2 ± 12.0	58.2 ± 12.7	59.0 ± 11.8
Median [25th, 75th]	61.0 [53.0, 70.0]	60.0 [53.0, 68.0]	58.0 [51.0, 66.0]	59.0 [52.0, 66.0]
Sex, n (%)				
Female	2,101 (45.9%)	584 (35.5%)	365 (35.9%)	357 (35.1%)
Male	2,474 (54.0%)	1,061 (64.4%)	651 (64.1%)	659 (64.9%)
Other	3 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Unknown	0 (0.0%)	2 (0.1%)	0 (0.0%)	0 (0.0%)
Ethnicity/Race, n (%)				
White or Caucasian	3,565 (77.9%)	1,337 (81.2%)	783 (77.1%)	791 (77.9%)
Black or African American	239 (5.2%)	85 (5.2%)	56 (5.5%)	60 (5.9%)
Other	732 (16.0%)	212 (12.9%)	170 (16.7%)	154 (15.2%)
U.S. Region, n (%) **				
Midwest	240 (5.2%)	118 (7.2%)	103 (10.1%)	112 (11.0%)
Northeast	470 (10.3%)	268 (16.3%)	230 (22.6%)	230 (22.6%)
South	546 (11.9%)	320 (19.4%)	253 (24.9%)	254 (25.0%)
West	3,322 (72.6%)	941 (57.1%)	430 (42.3%)	420 (41.3%)
CCI				
N	4,578	1,647	1,016	1,016
Mean ± SD	4.1 ± 2.7	3.9 ± 2.6	4.2 ± 2.5	4.2 ± 2.6
Median [25th, 75th]	4.0 [2.0, 6.0]	3.0 [2.0, 6.0]	4.0 [3.0, 6.0]	4.0 [3.0, 6.0]
MELD				
N	2,442	1,016	1,016	1,016
Mean ± SD	15.8 ± 6.9	17.2 ± 7.1	17.0 ± 7.2	17.2 ± 7.1
Median [25th, 75th]	15.0 [10.0, 21.0]	16.7 [11.0, 22.0]	16.8 [11.0, 22.3]	16.7 [11.0, 22.0]
Care Setting, n (%)				
Emergency	901 (19.7%)	132 (8.0%)	54 (5.3%)	65 (6.4%)
Inpatient	1,762 (38.5%)	771 (46.8%)	651 (64.1%)	635 (62.5%)
Observation	59 (1.3%)	22 (1.3%)	19 (1.9%)	21 (2.1%)
Outpatient	1,856 (40.5%)	722 (43.8%)	292 (28.7%)	295 (29.0%)

CCI, Charlson Comorbidity Index; LVP, large volume paracentesis; MELD, Model for End-stage Liver Disease; PSM, propensity score matching; SD, standard deviation. \*Age, sex, ethnicity, region, care setting, CCI and MELD scores were used for 1:1 propensity score matching. \*\*The first zip-code was used (0-1 = Northeast, 2,3,7 = South, 4-6 = Midwest, 8-9 = West).

## CONCLUSIONS

- Our findings suggest that albumin may be reserved for more severe cases of decompensated cirrhosis and ascites requiring LVP, as indicated by pre-PSM MELD scores and the difference in proportion of inpatient encounters
- Post-PSM, we found that adjunctive albumin infusion in patients with cirrhosis and ascites requiring LVP resulted in a modest increase in days to LVP- and non-LVP-related readmissions post-discharge, compared to cases where LVPs were performed without albumin
- Future analyses should examine additional effects/benefits of adjunctive albumin in patients with decompensated cirrhosis and ascites requiring LVPs

REFERENCES: 1. GBD 2017 Cirrhosis Collaborators. Lancet Gastroenterol Hepatol. 2020 Mar;5(3):245-266. 2. Mansour D, et al. Clin Med (Lond). 2018 Apr 1;18(Suppl 2):s60-s65. 3. Biggins SW, et al. Hepatology. 2021 Aug;74(2):1014-1048. 4. European Association for the Study of the Liver. European Association for the Study of the Liver. EASL Clinical Practice Guidelines for the management of patients with decompensated cirrhosis. J Hepatol. 2018 Aug;69(2):406-460. Nov;69(5):1207. PMID: 29653741.

Figure 1. Consort Diagram

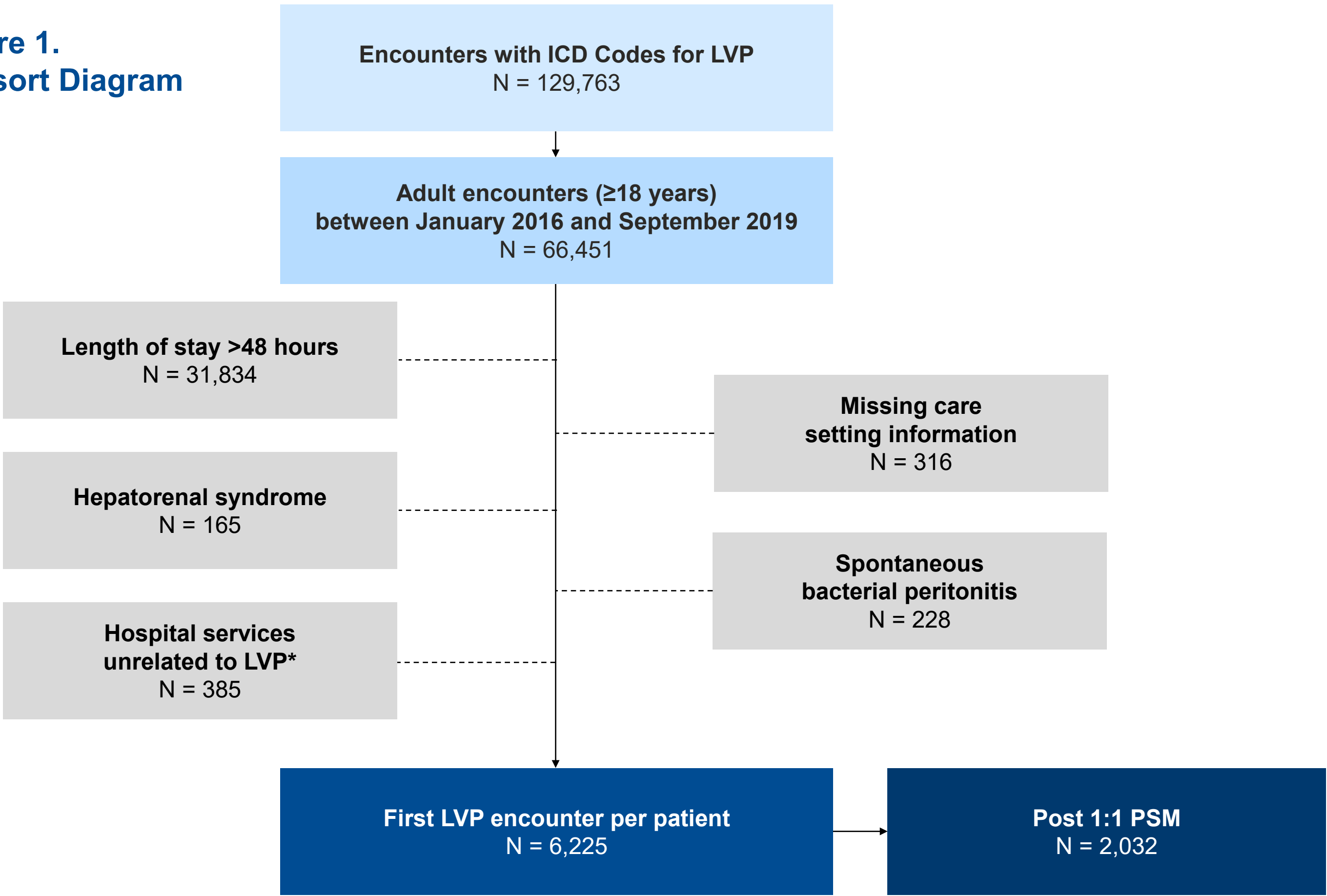


Table 2: Days to LVP- and Non-LVP Related Readmissions Within 90 days of Discharge

Characteristic	LVP (N = 1,016)	LVP + Albumin (N = 1,016)
Days to LVP Readmission within 90d of Discharge		
N	312	330
Mean ± SD	28.8 ± 25.0	29.7 ± 23.0
Median [25th, 75th]	20.5 [9.8, 42.3]	21.9 [12.0, 42.4]
Days to Any Non-LVP Readmission within 90d of Discharge		
N	543	506
Mean ± SD	24.6 ± 22.9	25.7 ± 23.6
Median [25th, 75th]	17.8 [6.8, 36.5]	17.6 [7.1, 38.0]

Figure 1: Mean Days to LVP-related Readmission Within 90 Days of Discharge

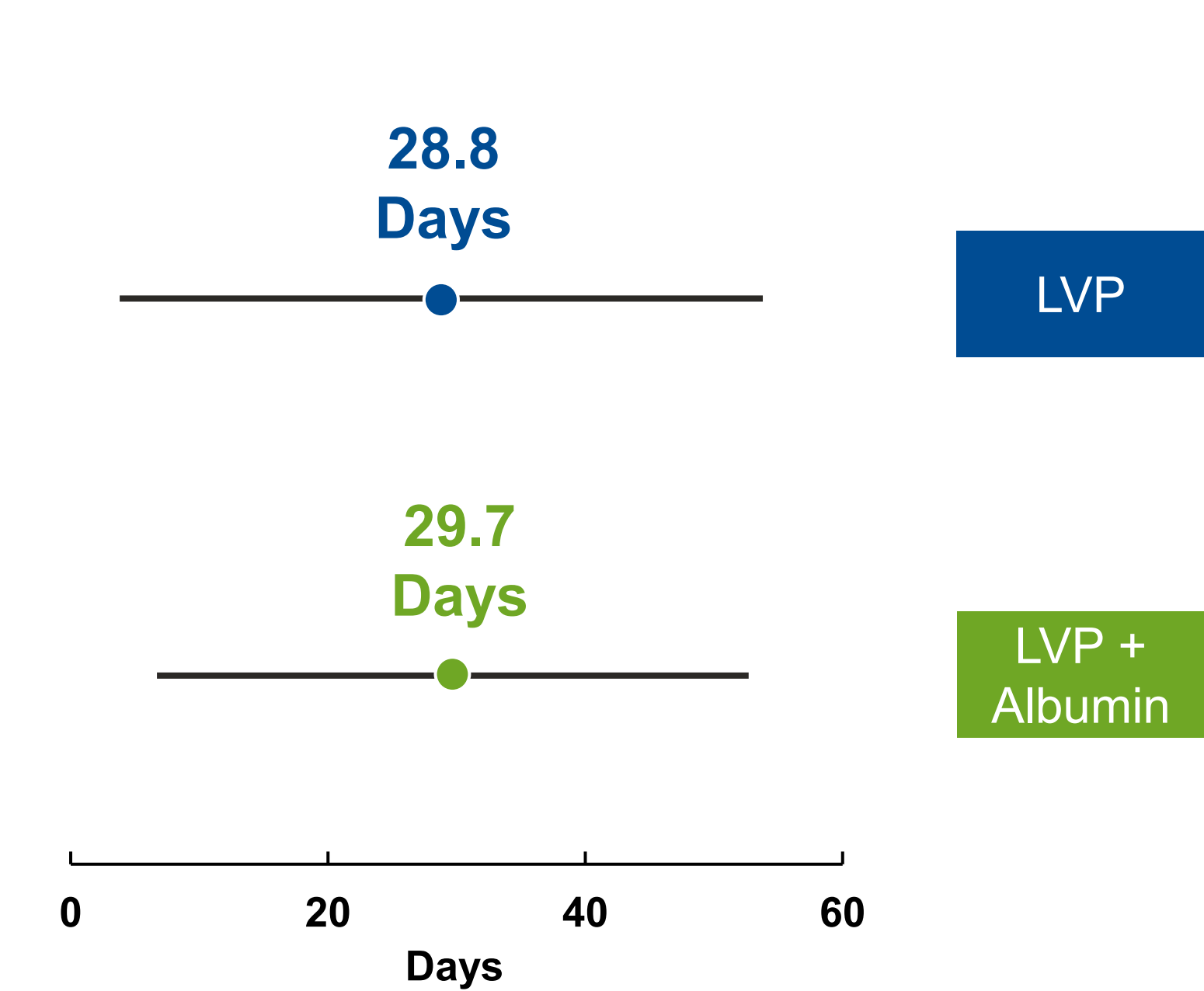


Figure 2: Mean Days to Non-LVP Related Readmission Within 90 days of Discharge

