

# Evaluation of Spironolactone and Furosemide use in Hospitalized Patients with Cirrhosis and Ascites

Leanne Bockstruck, PharmD Candidate; Carrie Vogler, PharmD, BCPS

## Background

- Ascites is the most common complication in patients with cirrhosis of the liver.
- Approximately 60% of patients with cirrhosis can develop ascites over a 10-year period, with a high mortality rate within 3 years of onset.
- The Journal of Hepatology and the European Association for the Study of Liver recommend the ratio of diuretics for pharmacologic management of spironolactone 100mg: furosemide 40mg (ratio 0.4) in order to maintain normokalemia and euvolemia.

## Objectives

- The objective of this study is to assess factors that impact diuretic ratios and doses among hospitalized patients with ascites due to liver cirrhosis.

## Methods

### Study Design:

- Retrospective, single site, chart review

### IRB Approval:

- Southern Illinois University Edwardsville Institutional Review Board

### Data Source:

- Springfield Memorial Hospital in Springfield, IL from May 1, 2018- May 1, 2023

### Study Population- Inclusion Criteria:

- Adults 18-89 years old
- Diagnosed ascites based on documented ICD10 code: R18
- Combined use of spironolactone and furosemide or loop diuretic during hospitalization
- Hospitalization with admission >24 hours

### Study Population- Exclusion Criteria:

- Death during hospitalization
- Pursuing hospice care
- Diagnosed malignant ascites

## Results

Table 1: Baseline characteristics

Baseline Characteristics	Total	Ratio of 0.4 During Hospitalization	Not at Ratio of 0.4 During Hospitalization
Patients, N (%)	100	48 (48)	52 (52)
Age (35-89 years), mean	66.6	63.9	69.2
Male	54	24	30
Race- White, N (%)	94	45 (47.9)	49 (52.1)
Race- African American, N	2	1	1
Race- Other, N	4	2	2
Length of Stay (1-38 days), median (IQR) <sup>1</sup>	6 (6)	5 (7)	6 (6)
Therapeutic Paracentesis, N (%)	52	31 (59.6)	21 (40.4)
Normal Serum Creatinine <sup>2</sup> , N (%)	61	29 (47.5)	32 (52.5)
Potassium 3.5-5 mEq/L, N (%)	82	38 (47.5)	44 (53.7)
	<b>Child-Pugh Class<sup>3</sup></b>	<b>P= 0.044</b>	
A, N (%)	11	2 (18.2)	9 (81.8)
B, N (%)	52	21 (40.4)	31 (59.6)
C, N (%)	34	20 (58.8)	14 (41.2)

<sup>1</sup> Interquartile range

<sup>2</sup> Serum Creatinine Male= 0.7-1.3mg/dL Female= 0.6-1.1 mg/dL

<sup>3</sup> Three patients did not have a Child-Pugh score calculated; data was excluded.

P-value reflects comparison Child-Pugh class A versus C

Figure 1: Average dose of diuretics during hospitalization based on Child-Pugh score, (mg)

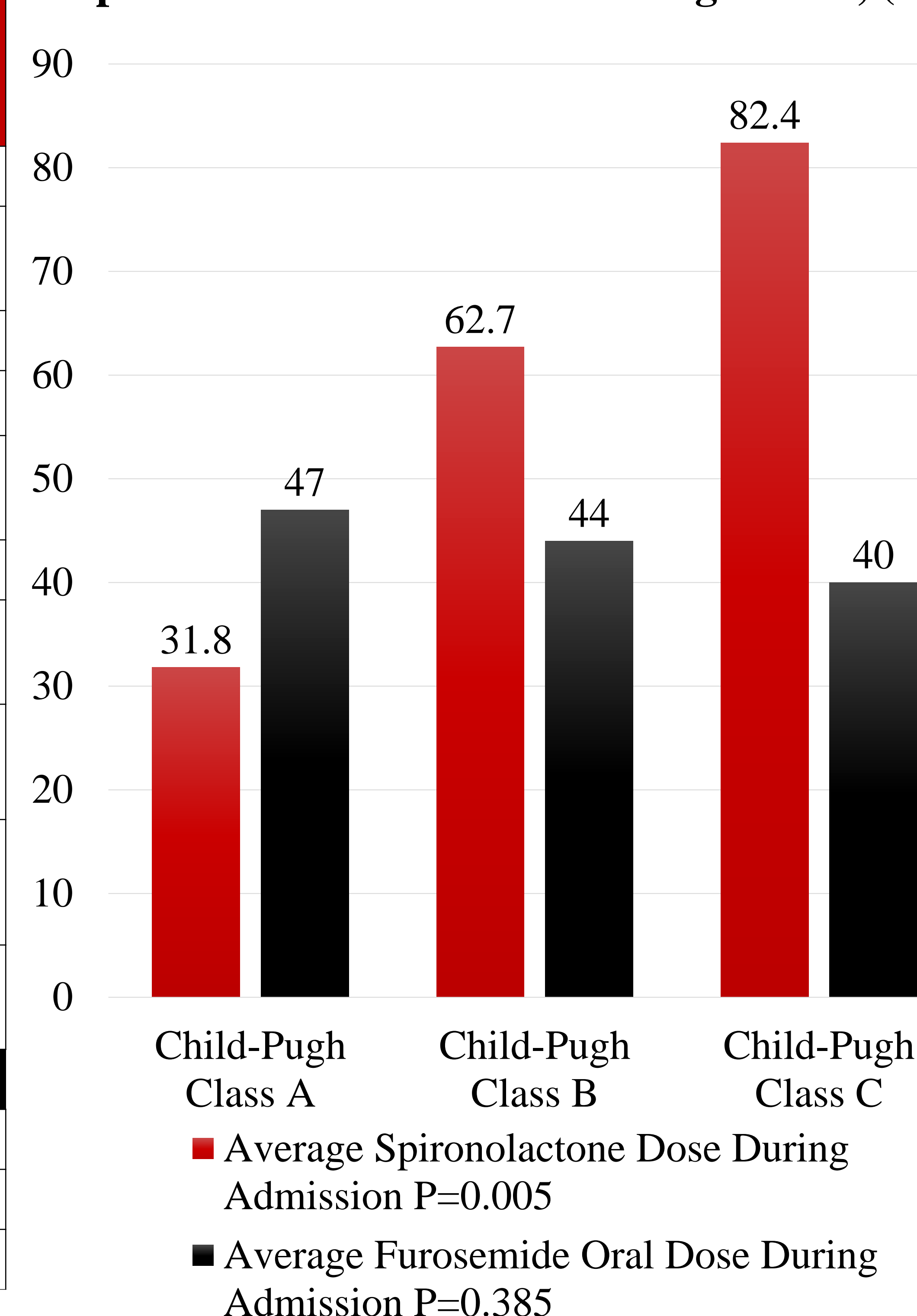


Table 2: Diuretic dosing per patient from admission to discharge and disease severity

	Admission, N	Hospitalization, N	IV*, N	Discharge, N	Child-Pugh Score (N)		
					A	B	C
<b>Spironolactone Dose</b>							
>199 mg/day	4	7		10	0	3	4
100-199 mg/day	15	26		28	0	12	13
<100 mg/day	25	66		57	11	37	17
<b>Furosemide Oral Dose</b>							
>80 mg/day	3	3	1	5	1	1	1
40-80 mg/day	39	59	11	69	4	31	22
<40mg/day	19	27	35	24	6	20	11
<b>Furosemide/Spironolactone Ratio (40mg/100mg)</b>							
>0.4	17	42	22	47	9	21	11
0.4	18	40	11	39	2	25	21
<0.4	65	14	67	14	0	6	2

\*IV= intravenous, IV dose converted to equivalent oral dose, during hospitalization

## Results

Table 3: Receipt of guideline recommended ratio of diuretics by specific factors

	On Guideline Recommended Ratio		P-value
	Yes	No	
<b>Paracentesis Completed, N (%)</b>			
Yes	28 (53.8)	24 (46.2)	0.027
No	15 (31.3)	33 (68.8)	
<b>High Volume ≥5L Paracentesis, N (%)</b>			
Yes	10 (47.6)	11 (52.4)	0.631
No	33 (41.8)	46 (58.2)	
<b>Hypokalemia, N (%)</b>			
Yes	9 (60)	6 (40)	0.168
No	34 (40)	51 (60)	
Mean Potassium Level, mmol/L	4.0	4.0	
<b>Potassium Supplementation, N (%)</b>			
Yes	21 (45.7)	25 (54.3)	0.621
No	22 (40.7)	32 (59.3)	
Mean Systolic Blood Pressure, mmHg	119	126	0.061
Mean Diastolic Blood Pressure, mmHg	68	71	

## Limitations

- Small sample size, single institution, retrospective
- Patients only had to be on ratio once during hospitalization to be included in the study
- Excluded patients on monotherapy with spironolactone or furosemide
- Subjectiveness of the Child-Pugh score

## Conclusions

- Patients with ascites due to cirrhosis were less likely to be treated with the ratio of spironolactone 100mg: furosemide 40mg then alternative treatment.
- Patients were more likely to receive the ratio when in Child-Pugh class C compared to class A.
- There is a statistical difference between spironolactone dosing for patients with Child-Pugh class A compared to class C.
- Patients were more likely to have paracentesis completed when on the recommended ratio.

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