



Hospital Utilization And Survival Analysis In A Model Of Outpatient Paracentesis By Interventional Radiology

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Introduction

There has been a significant change in outpatient cirrhosis care, as paracentesis is currently performed by interventional radiologists (IR) rather than gastroenterologists/hepatologists or internists. In this model of care, patients' access could be limited by scheduling availability, and there is no evaluation of their renal function or adjustment of their medications at the time of paracentesis. The objectives of this study were to analyze hospital utilization and cirrhosis complications within six months of index outpatient paracentesis by IR and to identify potential areas of improvement in care.

Methods

This is a retrospective study of patients with cirrhosis and ascites who underwent outpatient paracentesis by IR between October 15, 2015 and October 15, 2018 at a tertiary academic medical center. We collected demographics, data on cirrhosis etiology/complications, laboratory tests, provider notes, outpatient paracenteses dates, emergency department (ED) visits, hospitalizations, and ICU admissions within the following six months post-index paracentesis.

Associations between categorical predictors and clinical outcomes were analyzed using Pearson's chi-square test or Fisher's exact test. Associations between quantitative predictors and clinical outcomes were analyzed using Student's t-test or the Wilcoxon rank-sum test.

Overall survival was analyzed using product-limited survival estimates. Cox regression was used to analyze the survival for each cause at the average age and MELD score. Kaplan-Meier curve was plotted and hazard ratios were reported with outcomes.

Discussion

Large-volume paracentesis (LVP) is the first-line therapy recommended for patients with refractory ascites (RA) or grade 3 ascites (1). LVP is one top 20 procedures performed in the United States (2), and it is considered a low-risk procedure even in the presence of coagulopathy.

Different models have been studied to coordinate care among patients with ascites requiring paracentesis. Literature suggests that inpatient bedside paracentesis procedures result in shorter hospital lengths of stay and fewer intensive care unit transfers than procedures performed by interventional radiology (3). However, there is scarce data regarding hospital utilization among patients undergoing outpatient paracentesis.

Two-thirds of our study population had ED visits or hospital admission within 6-months; a total of 118 ED visits (2.8 per patient) and 88 admissions (2.2 per patient) following the index paracenteses. A transitional care model was studied by Wang et al. where outpatient ultrasound-guided paracentesis was performed by a physician or advanced practice provider who medically managed patients and coordinated their post-discharge care. Over the 9-month study period, they performed ten paracenteses, of which one incidence of 30-day ED visit or readmission was reported (4).

Results

There were 68 unique patients who had at least one outpatient paracentesis by IR in the study period. Most patients were men (70%), had alcohol-related cirrhosis as primary or secondary etiology (66%), had an average age of 60, and had an average MELD score at baseline of 17.6.

Within 6 months from index paracentesis, 44 patients (64.7%) underwent repeat IR outpatient paracentesis (total 187 paracenteses, 4.25 paracenteses/patient); 42 patients (61.7%) had ER visits (total 118 ER visits, 2.8/patient), 40 patients (58.5%) had hospital admissions (total 88 admissions, 2.2/patient) and 11 patients required ICU admission. Complications of cirrhosis noted during follow-up included hepatic encephalopathy (39.7%), acute kidney injury (38.2%), upper gastrointestinal (UGI) bleeding (14.7%), and spontaneous bacterial peritonitis (SBP) in 14.7%. The mortality rate at six months was 6.9%.

On multivariate analysis, the predictive factors for mortality were older age (p=0.04) and MELD score (p=0.082). Baseline MELD was predictive of acute kidney injury (p=0.0184), UGI bleed (p=0.0096), and ICU admission (p=0.0064) but not of SBP, encephalopathy, ED visits, or hospital admissions.

Among patients with more than one paracentesis, 4 underwent transjugular portosystemic shunt (TIPS) within six months, but there was no documentation of TIPS consideration in 31 patients (70.4%)

The mean overall survival was 35.6 months. Mean survival stratified by cause was 36.2 months for patients with cirrhosis due to alcohol use, and 41.7 months for cirrhosis due to hepatitis B or C

Hepatic encephalopathy was the most common reason for 6-month readmission. Our finding is similar to a retrospective analysis performed by Sobotka et al., where 22% of patients were readmitted within 30 days (5).

Our study suggests that age and MELD score were predictive factors for mortality. Similar findings were reported by Roth et al., suggesting MELD score can use used as a general prognostic tool.

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In conclusion, in a cohort of patients with cirrhosis requiring outpatient IR paracentesis, we found a high rate of short-term cirrhosis complications and hospital utilization, while TIPS consideration was very low. IR paracentesis should be integrated within a multidisciplinary management model, to actively address cirrhosis complications. Early TIPS should be considered in eligible patients, as per the current practice guidelines.

Utilization of services	n (%)
Emergency department (ED) visit	42 (61.7)
Hospital admission	40 (58.5)
Intensive care unit (ICU) admission	11 (15.94)
Repeat IR outpatient paracentesis	44 (64.7)

Most common reasons for admissions	
Hepatic encephalopathy	39.7%
Acute Kidney Injury	38.2%
Upper gastrointestinal (UGI) bleed	14.7%
Spontaneous bacterial peritonitis (SBP)	14.7%
6-month mortality rate	6.9%

Multivariate Analysis	
6-month mortality	P-value
• Age	0.0427
• MELD score	0.0082
• Not statistically significant: Causes of cirrhosis, TIPS status	
MELD score also predictive factor for	
• Acute Kidney Injury	0.0184
• Upper Gastrointestinal Bleed	0.0096
• ICU admission	0.0064

Table 1: Summary of findings in relations to Utilization of services, common reasons of admissions, and multivariate analysis of 6-month mortality and MELD score as a predictive factor

References

1. Biggins S W, Angeli P, Garcia-Tsao G 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 <http://doi.org/10.1002/hep.31884>
2. Healthcare cost and utilization project (HCUP) access
3. Barsuk JH, Cohen ER, Feinglass J, McGaghie WC, Wayne DB. Clinical outcomes after bedside and interventional radiology paracentesis procedures. Am J Med. 2013;126(4):349-56.
4. Wang J, Khan S, Wyer P, Vanderwilp J, Reynolds J, Bethancourt B, et al. The Role of Ultrasound-Guided Therapeutic Paracentesis in an Outpatient Transitional Care Program: A Case Series. Am J Hosp Palliat Care. 2018;35(9):1256-60.
5. Sobotka LA, Modi RM, Vijayaraman A, Hanje AJ, Michaels AJ, Conteh LF, et al. Paracentesis in cirrhotics is associated with increased risk of 30-day readmission. World J Hepatol. 2018;10(6):425-32.