

HEALTHCARE-RELATED TRENDS OF SPONTANEOUS BACTERIAL PERITONITIS IN PATIENTS WITH LIVER DISEASE - A NATIONAL INPATIENT SAMPLE (NIS)-BASED STUDY

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Introduction

- Spontaneous Bacterial Peritonitis (SBP) is an acute infection in patients with decompensated cirrhosis and ascites. It can lead to organ failures and death.
- It is associated with a 20% in-hospital mortality rate. Although we know about some of the risk factors of SBP such as prior episodes of SBP, increasing age, and proton-pump inhibitors use.
- Further updated characterization of patients with SBP is still needed to better understand trends and guide healthcare resource utilization.
- The aim of this study was to evaluate the most recent healthcare trends of SBP in patients with decompensated cirrhosis.

Methods and materials

- We analyzed Nationwide Inpatient Sample (NIS) and Healthcare Cost and Utilization Project (HCUP) data from 2018 to 2019.
- We included alcoholic liver disease, hepatitis B and C, and NASH as causes of liver diseases using ICD-10-CM codes and subsequently divided them into SBP and non-SBP groups.
- We performed weighted analyses using Chi-Square and paired Student's t-test to compare the groups of SBP and non-SBP cases.
- The co-morbidities were also studied along with demographic data.

Variable	N	No SBP N = 322,078	SBP N = 2,033	p-value
Age in years at admission	3,24,111	57 (45, 65)	57 (51, 63)	<0.001
DIED	3,23,903	7,715 (2.4%)	297 (15%)	<0.001
Elective versus non-elective admission	3,23,767	40,853 (13%)	49 (2.4%)	<0.001
Total	3,24,091	181,509 (56%)	1,354 (67%)	<0.001
	Male	181,509 (56%)	1,354 (67%)	
	Female	140,549 (44%)	679 (33%)	
HOSP BEDSIZE	3,24,111			<0.001
	Small	64,263 (20%)	337 (17%)	
	Medium	92,330 (29%)	527 (26%)	
	Large	165,485 (51%)	1,769 (87%)	
HOSP LOCTEACH	3,24,111			<0.001
	Rural	20,125 (6.2%)	135 (6.6%)	
	Urban nonteaching	58,775 (18%)	290 (14%)	
	Urban Teaching	243,178 (76%)	1,608 (79%)	
HOSP REGION	3,24,111			<0.001
	North East	58,680 (18%)	307 (15%)	
	Mid West	64,370 (20%)	377 (19%)	
	South	120,583 (37%)	741 (36%)	
	West	78,465 (24%)	608 (30%)	
Length of stay (cleaned) (days)	3,24,092	4.0 (2.0, 6.0)	6.0 (3.0, 10.0)	<0.001
Insurance Type	3,23,669			<0.001
	Medicare	117,081 (36%)	696 (34%)	
	Medicaid	93,301 (29%)	736 (36%)	
	Private Insurance	77,709 (24%)	375 (19%)	
	Self Pay	21,712 (6.8%)	132 (6.5%)	
	No charge	1,989 (0.6%)	15 (0.7%)	
	Other	9,870 (3.1%)	73 (3.6%)	
RACE	3,17,968			<0.001
	White	199,014 (63%)	1,172 (59%)	
	Black	46,106 (15%)	263 (13%)	
	Hispanic	47,485 (15%)	355 (18%)	
	Asian or Pacific Islander	9,571 (3.0%)	91 (4.6%)	
	Native American	4,136 (1.3%)	41 (2.1%)	
	Other	9,686 (3.1%)	68 (3.4%)	
Total charges (cleaned)	3,22,775	38,870 (21,705, 72,187)	60,551 (32,871, 114,384)	<0.001
YEAR	3,24,111			0.003
	2018	157,447 (49%)	1,061 (52%)	
	2019	164,631 (51%)	972 (48%)	
Median household income national quartile for patient				0.009
ZIP Code	3,14,757			
	\$1-24,999	105,207 (34%)	687 (35%)	
	\$25,000-34,999	83,714 (26%)	532 (26%)	
	\$35,000-44,999	72,759 (23%)	442 (22%)	
	45,000 or more	54,043 (17%)	293 (15%)	
NASH	3,24,111			<0.001
	No	167,220 (52%)	1,659 (82%)	
	Yes	154,858 (48%)	354 (18%)	
Hepatitis_B	3,24,111			<0.001
	No	305,217 (95%)	1,814 (89%)	
	Yes	16,861 (5.2%)	219 (11%)	
Hepatitis_C	3,24,111			<0.001
	No	225,016 (70%)	887 (44%)	
	Yes	97,062 (30%)	1,746 (86%)	
Alcoholic Liver Disease	3,24,111			0.2
	No	257,242 (80%)	1,645 (81%)	
	Yes	64,836 (20%)	388 (19%)	
Hepatitis Liver Disease	3,24,111	171,432 (53%)	1,679 (83%)	<0.001
	3,24,111	322,078 (100%)	2,033 (100%)	
HTN	3,24,111			<0.001
	No	153,392 (48%)	1,131 (56%)	
	Yes	168,686 (52%)	902 (44%)	
HLD	3,24,111			<0.001
	No	227,415 (71%)	1,782 (88%)	
	Yes	94,663 (29%)	251 (12%)	
DM	3,24,111			<0.001
	No	263,576 (82%)	1,769 (87%)	
	Yes	58,502 (18%)	264 (13%)	
Age Group	3,24,111			<0.001
	18-27	11,777 (3.7%)	16 (0.8%)	
	28-37	34,122 (11%)	131 (6.4%)	
	38-47	47,089 (15%)	243 (12%)	
	48-57	79,578 (25%)	646 (32%)	
	58-67	90,120 (28%)	730 (36%)	
	68-77	42,903 (13%)	219 (11%)	
	78-87	13,369 (4.2%)	45 (2.2%)	
	88 and above	2,320 (0.8%)	3 (0.1%)	

Table 1. Trends of Spontaneous Bacterial Peritonitis (SBP) amongst hospitalized patients.

Results

- We included 324,111 patients with liver disease in the final analysis. Inpatient mortality of those with SBP (15%) was found to be significantly higher than those without SBP (2.4%) with a p-value of < 0.001.
- It was observed that males were having higher percentage to have SBP (67%) as compared to females (33%).
- The age group of 48-67 tends to have SBP more than the other age groups (p-value < 0.001).
- The length of stay (~6 days) and cost of healthcare utilization for the SBP cases (\$ 60,551) were higher as compared to the non- SBP cases (\$ 38,870).
- 35% of patients with SBP were from lower household income groups of \$1-24,999.
- Patients with Hepatitis C had higher inpatient admissions due to SBP as compared to other causes of (56% vs 44%, p-value < 0.001).

Discussion

- Mortality is quite high in SBP patients when they develop sepsis. Appropriate initiation of antibiotics leads to better outcomes.
- Patients with Hepatitis C, those aged above 50 years, and lower socioeconomic status are associated with a higher incidence of SBP.
- Despite high mortality and increased healthcare utilization in patients diagnosed with SBP, the incidence of SBP is trending down.
- Outcome improves with vigilance of diagnostic procedures and keeping a low threshold for diagnosing and prophylactically treating SBP in patients with liver cirrhosis.

References

1. Niu B, Kim B, Limketkai BN, Sun J, Li Z, Woreta T, Chen PH. Mortality from Spontaneous Bacterial Peritonitis Among Hospitalized Patients in the USA. Dig Dis Sci. 2018 May;63(5):1327-1333. doi: 10.1007/s10620-018-4990-y. Epub 2018 Feb 26. PMID: 29480417; PMCID: PMC5897146.