Nosocomial vs Healthcare-associated vs Community acquired SBP- A systematic review and meta-analysis

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Introduction: Spontaneous bacterial peritonitis (SBP) is a common complication in decompensated liver cirrhosis. SBP is defined as ascitic fluid polymorphonuclear cell count > 250/mm3. Community acquired SBP (CA-SBP) occurs within 48-72 hours after hospital admission. Healthcare associated SBP (HA-SBP) is defined as SBP occurring in patients who were hospitalized in the preceding 90 days to months. Nosocomial SBP (N-NBP) occurs 48-72 hours after hospital admission. Methods: We conducted a systematic review and metaanalysis on the studies that compared N-SBP, HA-SBP and CA-SBP. We performed a comprehensive database search in PubMed, Embase and Web of Science from inception through May 18, 2022. Randomized controlled trials, prospective and retrospective

cohort studies

and case series were included. The primary outcome was mortality rate in all types of SBP. Secondary outcome was resistance to third generation cephalosporins. The random effects model was used to calculate the risk ratios (RR), mean differences (MD) and confidence intervals (CI). A p value < 0.05 was considered statistically significant. Heterogeneity was assessed using the Higgins I2 index. Results Fourteen retrospective and prospective cohort studies comprising of 2302 SBP episodes were included. The mortality rate was statistically significantly higher in N-SBP compared to HA-SBP (RR 1.84, p<0.0001, CI 1.43-2.37, I2=0%) and CA-SBP (RR 1.69, p<0.00001, CI 1.4-1.98, I2= 33%), but not statistically significant between HA-SBP and CA-SBP (RR=1.40, p=0.34, CI=0.71-2.76, I2=53%).

Resistance to third generation cephalosporins was statistically significantly higher in N-SBP compared to HA-SBP (RR=2.02, p=0.003, CI 1.26-3.22, I2=54%) and CA-SBP (RR=3.96, p<0.00001, CI=2.50-3.60, I2=52%) and also between HA-SBP and CA-SBP (RR=2.25,p=0.002, CI=1.33-3.81, I2=0%).

Mortality rate between N-SBP and HA-SBP

	N-SBP	
Study or Subgroup	Events	Tota
Study 14	5	ş
Study 2	32	59
Study 9	15	19
Total (95% CI)		87
Total events	52	
Heterogeneity: Tau ^a :	= 0.00; Ch	i ² =1.1
Test for overall effect	Z= 4.75	(P < 0.

Mortality rate between HA-SBP and CA-SBP

		HA-SBP	
l	Study or Subgroup	Events	Total
Ī	Study 14	4	51
	Study 2	24	93
	Study 9	29	66
	Total (95% CI)		210
	Total events	57	
	Heterogeneity: Tau ² =	= 0.18; Ch	P= 4.2
	Test for overall effect	Z = 0.96	(P = 0.)

Mortality rate between N-SBP and CA-SBP

Study or Subgroup	N-SBP	
	Events	To
Study 10	3	200
Study 12	74	1
Study 13	26	
Study 14	5	
Study 2	32	
Study 3	10	
Study 4	35	
Study 6	74	1
Study 7	67	1
Study 8	14	1.3
Study 9	15	
Total (95% CI)		6
Total events	345	
Heterogeneity: Tau*:	= 0.02; Ch	1 = 1
Test for overall effect	Z= 6.48	(P <

Conclusion Our meta-analysis demonstrated that mortality rate is higher in N-SBP compared to HA-SBP and N-SBP compared to CA-SBP. Third generation cephalosporin resistance is considerably higher in N-SBP and HA-SBP compared to CA-SBP. Lower threshold to start broad spectrum antibiotics with targeted therapy guided through culture data should be undertaken for appropriate treatment of SBP and to improve mortality in N-SBP and HA-SBP.









SBP

	N-SBP	
Study or Subgroup	Events	Tota
Study 1	6	
Study 11	9	3
Study 14	5	
Study 2	27	6
Study 5	7	1
Total (95% CI)		12
Total events	54	
Heterogeneity: Tau ² =	= 0.15; Ch	i ² = 8
Test for overall effect	Z= 2.93	(P = (

CA-SBP

HA-SBP	
Events	Tota
13	2
4	5
20	7
6	3
	19
43	
= 0.00; Ch	i ² = 0.
Z = 3.04	(P = 0
	HA-St Events 13 4 20 6 43 = 0.00; Ch : Z = 3.04

CA-SBP

N-SBP	
Events	Total
6	7
23	86
14	18
5	9
27	66
13	39
7	17
16	16
	258
111	
0.22; Ch	P = 14
Z=5.84	(P = 0.
	N-SB Events 6 23 14 5 27 13 7 16 111 0.22; Ch Z = 5.84

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3rd generation cephalosporin resistance between N-SBP and HA-



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