Management of Patients with Spontaneous Bacterial Peritonitis: A West Midlands Regional Audit

**Background**

Decompensation of cirrhosis and acute on chronic liver failure are common causes for hospital admission and are associated with a high mortality rate.[[1]](#endnote-1) Spontaneous bacterial peritonitis (SBP) is a common bacterial infection in patients with cirrhosis and ascites, with a prevalence of approximately 3.5% of asymptomatic outpatients,[[2]](#endnote-2) and between 10%-30% in hospitalized patients.[[3]](#endnote-3) Half of SBP episodes are present at the time of admission, with the rest acquired during admission.3 Approximately 70% of cases occur in patients with Child C cirrhosis.3 30% of patients with SBP develop complications of hepatorenal syndrome, which is associated with high mortality.3 Mortality following SBP is high, with an estimated 30-day mortality risk of 24%,[[4]](#endnote-4) and 1-year mortality of 31-93%.[[5]](#endnote-5) Prompt recognition and treatment of SBP and its associated complications are required to improve outcome.

The European Association for the Study of the Liver (EASL) published recommendations for the diagnosis and management of SBP in 2010.[[6]](#endnote-6) These have recently been incorporated into an acute care bundle (first 24 hours) for patients with decompensated liver disease which has been endorsed by the British Society of Gastroenterology (BSG) and British Association for the Study of the Liver (BASL).1 Recent National Institute for Health and Clinical Excellence (NICE) guidance have also recently been released, with cautious recommendation for the unlicensed use for ciprofloxacin or norfloxacin for the primary prophylaxis of SBP.[[7]](#endnote-7)

**Audit Standards**

**EASL (2010)**:6

* ***A diagnostic paracentesis should be carried out in all patients with cirrhosis and ascites at hospital admission to rule out SBP*** *(Level A1). – subsequently adopted by BSG/BASL to be performed within 24 hours.1*
* *The diagnosis of SBP is based on neutrophil count in ascitic fluid of >250/mm3 as determined by microscopy (Level A1).*
* *Some patients may have an ascitic neutrophil count less than 250/mm3 but with a positive ascitic fluid culture. This condition is known as bacterascites. If the patient exhibits signs of systemic inflammation or infection, the patient should be treated with antibiotics (Level A1).* ***Otherwise, the patient should undergo a second paracentesis when culture results come back positive.*** *Patients in whom the repeat ascitic neutrophil count is >250/mm3 should be treated for SBP, and the remaining patients (i.e., neutrophils <250/mm3) should be followed up (Level B1).*
* ***Empirical antibiotics should be started immediately following the diagnosis of SBP*** *(Level A1).*
* ***SBP resolves with antibiotic therapy in approximately 90% of patients. Resolution of SBP should be proven by demonstrating a decrease of ascitic neutrophil count to <250/mm3 and sterile cultures of ascitic fluid, if positive at diagnosis*** *(Level A1).*
* *HRS occurs in approximately 30% of patients with SBP treated with antibiotics alone, and is associated with a poor survival. The administration of albumin (1.5 g/kg at diagnosis and 1g/kg on day 3) decreases the frequency of HRS and improves survival (Level A1). It is unclear whether albumin is useful in the subgroup of patients with baseline serum bilirubin <68 μmol/L and creatinine <88 μmol/L (Level B2). Until more information is available,* ***we recommend that all patients who develop SBP should be treated with broad spectrum antibiotics and intravenous albumin*** *(Level A2).*
* *One double-blind, placebo-controlled, randomized trial performed in* ***patients with severe liver disease (Child-Pugh ≥8) with ascitic fluid protein lower than 15 g/L and without prior SBP showed that norfloxacin (400 mg/day) reduced the risk of SBP and improved survival. Therefore, these patients should be considered for long-term prophylaxis with norfloxacin*** *(Level A1).*
* ***Patients who recover from an episode of SBP have a high risk of developing recurrent SBP. In these patients, the administration of prophylactic antibiotics reduces the risk of recurrent SBP****. Norfloxacin (400 mg/day, orally) is the treatment of choice (Level A1). Alternative antibiotics include ciprofloxacin (750 mg once weekly, orally) or co-trimoxazole (800 mg sulfamethoxazole and 160 mg trimethoprim daily, orally), but evidence is not as strong as that with norfloxacin (Level A2).*
* *Patients who recover from SBP have a poor long-term survival and should be considered for liver transplantation (Level A1).*

**NICE (July 2016)**:7

*1.3.5****Offer prophylactic oral ciprofloxacin or norfloxacin for people with cirrhosis and ascites with an ascitic protein of 15 g/litre or less, until the ascites has resolved****.*

**Aims and Outcome Measures**

During the last WMRIG meeting, a regional audit with focus on SBP diagnosis and management was proposed, with particular focus on primary prophylaxis, and second tap to ensure SBP resolution. This idea has been expanded to include patient co-morbidities, additional auditable measures, and SBP related outcomes.

Although studies have correlated ascitic protein and SBP, there has been no published data assessing ascitic albumin and SBP risk over time. As some labs will only provide an ascitic albumin level, this may be used for correlation analysis.

**In summary, we aim to audit the following (based on guidelines above):**

1. **Percentage of patients with cirrhosis and ascites who undergo diagnostic ascitic aspirate**
2. Overall percentage
3. Percentage performed within 24 hours of admission (BSG/BASL standard)
4. **Management of SBP**
	1. Antibiotics acutely
	2. Day 1 (1.5g/kg) and Day 3 HAS (1g/kg)
	3. Repeat ascitic tap and cultures to assess for resolution
5. **Primary prophylaxis in patients with ascitic protein <15g/L.**
6. **Secondary prophylaxis**
7. **Whether concordance with guidelines affected hospital readmissions, SBP recurrence and mortality**

**Methodology**

1. Target population: All patients with confirmed cirrhosis (ICD-10 codes: **K70, K71.7, K72.1, K73, K74, K75.4**) *AND* ascites (**R18**).
2. Feasibility assessment: Please check with informatics/audit office if patients with above codes can be identified. Sites should have electronic access to clinical notes, outpatient letters, ascitic biochemistry, treatment chart (documenting Abx and HAS cover) and mortality details. Individual sites may wish to expand on this to audit BSG/BASL bundle of care – please let us know if this is the case.
3. Exclusion criteria:
	1. Age <18
	2. Patients on end of life (palliative) care
	3. Malignant ascites (hence the above ICD-10 codes)
4. Timeline: **Retrospective patient identification (admitted in the 3 months between 1st September 2016 to 1st December 2016), with retrospective follow-up until 1st March 2017 (all patients will have 3-6 months of follow-up).**
5. **Power calculation:**  **Assuming hospitalisation incidence of ALD with ascites of 50-100/100,000 per year,8 and 10-30% SBP rate, a DGH of 300,000 population will have approx. 37-75 patients over the 3 months timeline.**
6. Audit type: Prospective case series with 30-day measurement of outcomes – potential for this to be extended.
7. *Pro forma* features (attached):
* Demographics: Age/Gender/NHS
* Liver profile: Baseline INR / albumin / ascites (mild/mod/severe) / Encephalopathy / Aetiology / Previous SBP / SBP Prophylaxis
* Ascitic profile: Ascitic albumin / ascitic protein / WCC / PMNs / Culture / Number of taps during admission / Resolution of SBP
* SBP management: Abx / D1 HAS (1.5g/kg) / D3 HAS (1g/kg) / DC on lifelong Abx
1. Outcomes: Mortality date / Mortality Cause / SBP recurrence / SBP recurrence date
2. Analyses:
	1. As above – compliance with BSG/BASL/EASL/NICE guidance
	2. Kaplan-Meier analysis for readmissions/mortality/SBP recurrence stratified by primary/secondary prophylaxis and adherence with practice.
	3. Correlation analysis between ascitic albumin and SBP recurrence
	4. Heterogeneity between centres (χ2)
3. Feasibility & Weaknesses: As above
4. Ethics approval: IRAS approval not required. Projects should be registered at individual trusts as an audit and data anonymised before sending in for collation.
5. Timescale: Data collected for all sites by July 2017
6. Intended outcomes:
* Completion of pilot network project
* Local and regional data and development of regional protocol for SBP
* Collaborative quality improvement project
* BSG and UEGW 2018
* Publication
1. **References**

 McPherson S, Dyson J, Austin A, *et al*. Response to the NCEPOD report: development of a care bundle for patients admitted with decompensated cirrhosis—the first 24 h. *Frontline Gastroenterol* 2016;7:16–23 [↑](#endnote-ref-1)
2. Evans, L.T., Kim, W.R., Poterucha, J.J., and Kamath, P.S. Spontaneous bacterial peritonitis in asymptomatic outpatients with cirrhotic ascites. *Hepatol*. 2003; 37: 897-901 [↑](#endnote-ref-2)
3. Rimola, A., Gracia-Tsao, G., Navasa, M. et al. Diagnosis, treatment and prophylaxis of spontaneous bacterial peritonitis: a consensus document. International Ascites Club. *J Hepatol*. 2000; 32: 142-153 [↑](#endnote-ref-3)
4. TH Hung, CC Tsai, YH Hsieh, CC Tsai. The long-term mortality of spontaneous bacterial peritonitis in cirrhotic patients: A 3-year nationwide cohort study. *Turk J Gastroenterol*. 2015; 26: 159–62 [↑](#endnote-ref-4)
5. R Wiest, A Krag, A Gerbes. Recent advances in clinical practice: Spontaneous bacterial peritonitis. *Gut* 2012; 61:2 297-310 [↑](#endnote-ref-5)
6. European Association for the Study of the Liver, EASL clinical practice guidelines on the management of ascites, spontaneous bacterial peritonitis, and hepatorenal syndrome in cirrhosis. *J Hepatol.* 2010 Sep;53(3):397-417. [↑](#endnote-ref-6)
7. NICE NG50: Cirrhosis in over 16s: assessment and management, July 2016.

8 HES data: http://content.digital.nhs.uk/article/2701/One-in-11-hospital-admissions-for-liver-disease-ends-in-a-hospital-death [↑](#endnote-ref-7)