Albumin administration within 6 hours of diagnosis has been shown to decrease the risk of both renal impairment and mortality in patients with spontaneous bacterial peritonitis.

**METHODS**

**DATA SOURCES**
MEDLINE, EMBASE, the Cochrane Library, clinicaltrials.gov, and abstract databases from major gastroenterology and hepatology meetings were searched without restriction on language or date of publication. References of published articles and online tables of contents for hepatology and gastroenterology journals were also reviewed.

**STUDY SELECTION**
Randomized, controlled trials evaluating intravenous albumin therapy for patients with spontaneous bacterial peritonitis were included. Studies comparing different doses of albumin and those evaluating albumin plus paracentesis were excluded. All included patients received intravenous antibiotics. Outcomes of interest included renal impairment, as defined by each trial, and mortality.

**DATA EXTRACTION AND SYNTHESIS**
Three authors reviewed trials for eligibility and 2 authors extracted data from the included studies. Methodological details and supplementary data were requested from trial investigators. Heterogeneity was reported according to the $I^2$ statistic and Cochran $Q$ test. Publication bias

**RESULTS**
Four studies with a total of 288 patients were analyzed; 3 studies compared albumin with no albumin, whereas 1 study used artificial colloid as the control. $I^2$ and Cochran $Q$ tests revealed no significant heterogeneity in either outcome, and there was no evidence for publication bias. A subgroup analysis of patients with more severe illness and having a serum bilirubin level greater than 4 mg/dL, serum creatinine level greater than 1 mg/dL, or blood urea nitrogen level greater than 30 mg/dL demonstrated a trend toward a larger effect size.

**Commentary**
Spontaneous bacterial peritonitis causes significant morbidity and mortality in cirrhotic patients who present to the emergency department (ED). Prompt diagnosis and intervention is important because inhospital mortality ranges from 20% to 40%, with rates as high as 60% when there is concomitant renal impairment.\(^1\) Traditional ED management of spontaneous bacterial peritonitis focuses on the prompt administration of antibiotics.\(^2\) However, some authors suggest that albumin, in addition to increasing intravascular volume, may have the additional benefit of binding to both endotoxins and nitric oxide, which may be increased in spontaneous bacterial peritonitis.\(^3,4\) This meta-analysis demonstrated a significant reduction in both mortality and rates of renal impairment with the use of albumin in spontaneous bacterial peritonitis. In accordance with previously reported rates of renal impairment and mortality of 33% and 24%, respectively,\(^5\) the pooled odds ratios correlate to a number needed to treat of 6 to prevent 1

**TABLE 1**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Odds Ratio</th>
<th>95% CI</th>
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</thead>
<tbody>
<tr>
<td>Renal impairment</td>
<td>0.21</td>
<td>0.11–0.42</td>
</tr>
<tr>
<td>Mortality</td>
<td>0.34</td>
<td>0.19–0.60</td>
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CI, Confidence interval.
In a 2008 US-based survey, the average ED length of stay was approximately 4.5 hours for admitted patients, with greater than 15% remaining in the ED for 8 hours or more.\textsuperscript{10} Given the high mortality of patients with spontaneous bacterial peritonitis and this prolonged length of stay, it would be reasonable for emergency physicians to administer albumin to patients receiving a diagnosis of spontaneous bacterial peritonitis, particularly those with elevated levels of bilirubin, blood urea nitrogen, or serum creatinine. Specific studies comparing very early versus delayed albumin administration may further elucidate the temporal benefit in mortality and renal impairment.

Editor’s Note: This is a clinical synopsis, a regular feature of the Annals’ Systematic Review Snapshot (SRS) series. The source for this systematic review snapshot is: Salerno F, Navickis RJ, Wilkes MM. Albumin infusion improves outcomes of patients with spontaneous bacterial peritonitis: a meta-analysis of randomized trials. Clin Gastroenterol Hepatol. 2013;11:123-130.


Michael Brown, MD, MSc, and Alan Jones, MD, serve as editors of the SRS series.