



Editorial

# One Year After First Spontaneous Bacterial Peritonitis: Who Survives?

Atoosa Rabiee\*

Washington DC VA Medical Center, Washington DC, USA

Received: 16 July 2021 | Revised: 17 August 2021 | Accepted: 7 September 2021 | Published: 26 September 2021

**Citation of this article:** Rabiee A. One year after first spontaneous bacterial peritonitis: who survives? *J Clin Transl Hepatol* 2021;9(5):603–604. doi: 10.14218/JCTH.2021.00285.

Spontaneous bacterial peritonitis (SBP) is defined as infection in ascites fluid without evidence of an intra-abdominal treatable source.<sup>1</sup> Diagnosis is confirmed by presence of  $\geq 250$  cells/mm<sup>3</sup> polymorphonuclear cells (PMNs).<sup>2</sup> Although SBP responds well to appropriate antibiotic treatment, in patients with underlying cirrhosis severe enough to develop SBP, long-term prognosis is poor. In-hospital non-infection-related mortality is 20–40% and 1- and 2-year mortality rates are 70% and 80%, respectively.<sup>3</sup>

In this issue of the journal, Wang *et al.*<sup>4</sup> report on development and validation of a prognostic model for 1-year survival in cirrhotic patients with first-ever SBP. In this study, SBP was defined based on Chinese guidelines on the management of ascites, 1) Patients must have at least one of the following: signs or symptoms of acute peritonitis; or signs or symptoms of acute inflammatory response syndrome, deteriorated liver function without obvious etiology, hepatic encephalopathy, shock, refractory ascites, sudden lack of response to diuretics, renal failure, or acute gastrointestinal bleeding. 2) Patients with at least one of following test abnormalities: ascitic fluid with PMNs  $\geq 250$  cells/mm<sup>3</sup>; or positive ascites fluid culture; procalcitonin  $>0.5$  ng/mL. It should be noted that this criterion is different from that of the American Association for the Study of Liver Diseases and European Association for the Study of the Liver guidelines.<sup>2,5</sup>

Etiology of the cirrhosis in both the derivation and validation cohorts was mainly hepatitis B infection. The goal of the study was to evaluate potential predictive variables that might be associated with long-term survival in cirrhosis with SBP and create a prediction model, which was then assessed in the validation cohort.

Independent predictors of mortality were hepatitis C, bilirubin, sodium, hypertension, and hepatic encephalopathy. These, along with age, were used to establish a nomogram. The nomogram was then used to estimate the probability of 1-year survival. Ultimately, this nomogram had a higher area under the curve (AUC) compared to Child-Turcotte-Pugh score or model for end-stage liver disease score in both the derivation and validation cohorts.

**Abbreviations:** PMNs, polymorphonuclear cells; SBP, Spontaneous bacterial peritonitis.

\***Correspondence to:** Atosa Rabiee, Washington DC VA Medical Center, Washington DC, USA. ORCID: <https://orcid.org/0000-0002-3535-2706>, Tel: +1-202-745-8456, Fax: +1-202-745-8453, Email: [Atoosa.rabiee@va.gov](mailto:Atoosa.rabiee@va.gov)

It is important to note that this study also included hypertension and diabetes as two very common comorbidities and assessed their effect on 1-year mortality. Although diabetes prevalence was only 22% in this cohort and information regarding presence of fatty liver, hyperlipidemia, obesity, and sleep apnea were not provided. These variables might be important, especially if this nomogram is going to be used in Western countries, which can have very different demographics and etiologies of liver disease. Other important risk factors that could affect mortality include cardiac function and presence of refractory ascites.<sup>6</sup>

It would be important to replicate such a study in a western cohort with mainly nonalcoholic steatohepatitis and alcohol-related liver disease as etiologies and significantly more prevalent risk factors, such as obesity, diabetes, and other features of metabolic syndrome.

Furthermore, it would be important to assess the relationship between certain types of bacteria and their resistance profile to mortality at 1 year. However, there were not many positive cultures and specifics on the type of bacteria in the current study. Given the rising incidence of multi-drug-resistant bacteria in patients with SBP, consideration of resistance profiles and culture data might be helpful in decision-making for the empirical first-line treatment.<sup>7</sup>

Nevertheless, this was an important study to develop a prognostic tool for long-term survival of patients after first SBP and to include hypertension as a comorbidity affecting mortality.

## Funding

None to declare.

## Conflict of interest

AR has been an editorial board member of *Journal of Clinical and Translational Hepatology* since January 2020.

## References

- [1] Such J, Runyon BA. Spontaneous bacterial peritonitis. *Clin Infect Dis* 1998;27(4):669–674. doi:10.1086/514940.
- [2] Biggins SW, Angeli P, Garcia-Tsao G, Pere G, Ling SC, Nadim MK, *et al.* Diagnosis, evaluation, and management of ascites and hepatorenal syndrome. *Hepatology* 2021;74(2):1014–1048. doi:10.1002/hep.31884.
- [3] Li H, Wieser A, Zhang J, Liss I, Markwardt D, Hornung R, *et al.* Patients with cirrhosis and SBP: Increase in multidrug-resistant organisms and complications. *Eur J Clin Invest* 2020;50(2):e13198. doi:10.1111/eci.13198.
- [4] Wang RR, Gu HQ, Wei YY, Yang JX, Hou YX, Liu HM, *et al.* Development and

validation of a prognostic model for one-year survival of cirrhosis patients with first-ever spontaneous bacterial peritonitis. *J Clin Transl Hepatol* 2021. doi:10.14218/JCTH.2021.00031.

- [5] 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;53(3):397-417. doi:10.1016/j.jhep.2010.05.004.
- [6] Giannelli V, Roux O, Lauenan C, Manchon P, Ausloos F, Bachelet D, *et al.* Impact of cardiac function, refractory ascites and beta blockers on the outcome of patients with cirrhosis listed for liver transplantation. *J Hepatol* 2020;72(3):463-471. doi:10.1016/j.jhep.2019.10.002.
- [7] Oliveira JC, Carrera E, Petry RC, Deutschendorf C, Mantovani A, Barcelos STA, *et al.* High prevalence of multidrug resistant bacteria in cirrhotic patients with spontaneous bacterial peritonitis: is it time to change the standard antimicrobial approach? *Can J Gastroenterol Hepatol* 2019;2019:6963910. doi:10.1155/2019/6963910.