

## Do we see spontaneous bacterial peritonitis in patients with malignant ascites?

Since incidental pain and fever may coexist in patients with malignant ascites, the diagnosis of spontaneous bacterial peritonitis (SBP) may be considered.<sup>1</sup> But how often do we really see it? In order to answer this question, we did a search in PubMed. The search was performed in May 2005 using the terms "spontaneous bacterial peritonitis" and "cancer". Out of more than 5000 articles appearing after searching for SBP, only 65 related with oncology. During the revision of these articles, we defined SBP based on the current criteria, which includes one of the following: 1) the combination of a positive peritoneal fluid culture and an ascitic fluid polymorphonuclear (PMN) cell count  $>250$  cells/mm<sup>3</sup> and no evidence of intra-abdominal source of infection; or 2) culture negative neutrocytic ascites: the combination of negative peritoneal fluid bacterial culture and polymorphonuclear cell count  $>500$  cells/mm<sup>3</sup>, without antibiotics within 7 days, no obvious source of infection or any other explanation for elevated polymorphonuclear cell count.<sup>2</sup> This is still reminiscent to the original descriptions of SBP in 1971.<sup>3</sup>

The reported prevalence of a PMN count  $>250$  cells/mm<sup>3</sup> is to be expected in up to 77% of the patients with ascites and peritoneal carcinomatosis, and in 30% of the cases with hepatocellular carcinoma in liver cirrhosis.<sup>1,4</sup> This represents a major difference with the 6 to 10% incidence of SBP in ascitic patients with cirrhosis. The proposed mechanisms for this high prevalence are either a reaction to intraperitoneal tumor cell infiltration, or a consequence to tumor infiltration in neighboring lymph nodes.<sup>1</sup> Although neutrocytic ascites may be observed in some cancer patients, positive ascitic fluid culture should not be present. A retrospective study of Kurtz and Bronzo analyzed 101 patients with malignant ascites, most of them adenocarcinoma. Only 3 had positive culture, all of them with a secondary cause. The investigators concluded that SBP, as a rule, does not occur in patients with malignant ascites.<sup>5</sup>

The classical article of Isner et al in 1977, described one patient with gastric adenocarcinoma who developed SBP after chemotherapy. At autopsy, 75% of the patient's liver parenchyma was replaced by tumor.<sup>6</sup> Since then, less than 10 cases of SBP in patients with malignant ascites have been reported. Five of them had extensive metastasis in the liver, supporting the hypothesis stated by Isner: "it is possible that the extensive degree of metastatic involvement may be the functional equivalent of the cirrhotic liver".<sup>6-9</sup> A case report of SPB in a patient with gastric carcinoma without liver metastasis, led the author to consider gastro-intestinal bleeding as a risk factor for SBP in malignant ascites.<sup>10</sup> We believe that two of the reported cases should not be counted as SBP because they did not have more than 250 PMN/mm<sup>3</sup> in the peritoneal fluid.<sup>8,9</sup> These cases should be classified as "monomicrobial nonneutrocytic bacterascites". Other variations in the classification of infectious ascites are polymicrobial bacterascites, defined as a positive culture to more than one pathogen and less than 250 PMN/mm<sup>3</sup>. And secondary bacterial peritonitis are usually positive to more than 1 organism, but more than 250 PMN/mm<sup>3</sup> often appear in the ascitic fluid analysis.<sup>2</sup>

SBP is a questionable diagnosis in patients with malignant ascites.<sup>5</sup> Furthermore, any case should be considered as an exception only after ruling out secondary causes. Extensive liver metastasis and gastrointestinal bleeding may be considered as risk factors for SBP in malignant ascites. Finally, an isolated PMN count  $>250$  cells/mm<sup>3</sup> and culture-negative peritoneal fluid may indicate the presence of peritoneal carcinomatosis, more so in a non-cirrhotic patient.

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