

## How quickly does ascites respond to TIPS? Clinical follow-up of a cohort of eighty patients

We previously reported on the safety, efficacy, and clinical outcomes of transjugular intrahepatic portosystemic shunt (TIPS) creation for treatment of medically refractory ascites, and identified prognostic factors for clinical response, morbidity, and mortality (1). In examining the outcomes of 80 patients (male-female ratio, 52:28; mean age, 56 years; mean Model for End-Stage Liver Disease score, 15) who underwent hemodynamically successful elective TIPS (mean final portosystemic pressure gradient, 7 mmHg) for refractory ascites between 1999 and 2012, we found initial complete response, partial response, and nonresponse rates as 35% (28 of 80 patients), 43% (34 of 80 patients), and 22% (18 of 80 patients); complete response, partial response, and nonresponse were defined as no further paracentesis procedures, reduction in paracentesis procedure number, and no change or more frequent paracentesis procedures in the three months immediately post-TIPS, respectively. While this study confirmed the effectiveness of TIPS in eliminating or reducing the need for serial paracentesis procedures in the setting of intractable ascites, outcomes assessment was limited to short-term analysis of efficacy, and the intermediate-term natural history of initially partial responsive and nonresponsive patients was not presented. As the rapidity with which ascites responds to TIPS is not well-defined in the literature and it is not well known how quickly response is to be expected, we undertook further evaluation of our previously published cohort in order to better elucidate the time frame for clinical response after TIPS creation in the setting of medically refractory ascites.

In this institutional review board-approved follow-up investigation, medical records of patients previously determined to have partial response or nonresponse were reviewed up to one-year post-TIPS, to assess for progressive ascites resolution. Clinical follow-up of paracentesis frequency revealed that by six months post-TIPS, 20 of 34 partial response patients (59%) converted to complete response and 10 of 18 nonresponse patients (56%) converted to complete response (n=5) or partial response (n=5). By 12 months post-TIPS, two additional partial response patients

(two of six patients, 33%) converted to complete response and one of two nonresponse patients (50%) converted to complete response. At one year follow-up complete response, partial response, and nonresponse rates were 85% (40 of 47 patients), 11% (five of 47 patients), and 4% (two of 47 patients); of the initial 80 patient cohort, 26 patients expired, were lost to follow-up, or lacked adequate clinical follow-up at one year, and seven patients were transplanted.

While response of refractory ascites to TIPS predominantly occurs during the first three months post-procedure, the results of our expanded analysis indicate that additional clinical response may occur up to one year later. To this end, most of our partially responsive patients became completely responsive to TIPS therapy and most of the nonresponsive patients eventually manifested partial response. With the caveat that absolute number of paracentesis procedures is an imperfect surrogate marker for ascites response, our findings indicate that TIPS should not be deemed ineffective in controlling ascites based merely on early (less than three months) clinical outcomes, and that response may in fact be more gradual, in line with the expected timing of renal function improvement and normalization of urinary sodium excretion (2). Patients and referring physicians should be counseled as such, prior to TIPS intervention.

### Conflict of interest disclosure

The authors declared no conflicts of interest.

### References

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