

Prospective Evaluation of Passive Expansion of Partially Dilated Transjugular Intrahepatic Portosystemic Shunt Stent Grafts—A Three-Dimensional Sonography Study

Claus Christian Pieper, MD, Christian Jansen, MD, Carsten Meyer, MD, Jennifer Nadal, MSc, Jennifer Lehmann, MD, Hans Heinz Schild, MD, Jonel Trebicka, MD, and Daniel Thomas, MD, PhD

ABSTRACT

Purpose: To prospectively investigate early expansion kinetics of underdilated self-expanding stent grafts used for transjugular intrahepatic portosystemic shunt (TIPS) creation.

Materials and Methods: Twenty patients (7 female; mean age 66 y; range, 31–80 y) with liver cirrhosis undergoing TIPS creation for variceal bleeding (n = 5), refractory ascites (n = 14), or both (n = 1) with underdilation of 10-mm stent grafts received two-dimensional (2-D) and three-dimensional (3-D) ultrasound (US) examinations immediately after TIPS creation and 1 and 6 weeks later. Orthogonal views of the TIPS within the parenchymal tract were reconstructed from 3-D volume data sets acquired in longitudinal orientation of the stent. 2-D images and reconstructed 3-D images were used for blinded diameter measurements. Measurement technique was validated with intrainterventional plain radiographs with a sizing catheter as the gold standard. Diameter changes over time and interrelations with patient characteristics (null hypothesis: no expansion, no interrelation) were analyzed using a general linear model for repeated measures.

Results: After dilation to 8-mm diameter, 2-D and 3-D measurements showed stent recoil (mean diameter 7.7 mm \pm 0.21 and 7.6 mm \pm 0.17, respectively). Diameter increased significantly from initial measurements to measurements at 1 and 6 weeks (2-D, 8.8 mm \pm 0.24 and 9.4 mm \pm 0.15, both $P < .001$; 3-D, 8.7 mm \pm 0.27 and 9.4 mm \pm 0.11, both $P < .001$). Validation measurements showed no significant differences between 2-D or 3-D US and gold standard. There were no statistically significant associations between stent expansion and clinical parameters (sex, $P = .78$; age, $P = .82$; etiology/grade of cirrhosis, $P = .99$; indication for TIPS, $P = .78$, liver stiffness, $P = .70$).

Conclusions: Underdilated self-expanding stent grafts used for TIPS creation significantly expand within first 6 weeks after intervention. These changes can be noninvasively monitored using 3-D US.

ABBREVIATIONS

HE = hepatic encephalopathy, 3-D = three-dimensional, TIPS = transjugular intrahepatic portosystemic shunt, 2-D = two-dimensional

Creation of a transjugular intrahepatic portosystemic shunt (TIPS) can be complicated by a deterioration of liver function and hepatic encephalopathy (HE) (1).

Apart from patient-related factors, the extent of portosystemic gradient reduction seems to have an impact on the incidence of HE (1). To balance the reduction of

From the Department of Radiology (C.C.P., C.M., H.H.S., D.T.), Department of Internal Medicine I (C.J., J.L., J.T.), and Institute for Medical Biometry, Informatics and Epidemiology (J.N.), University of Bonn, Sigmund-Freud-Strasse 25, Bonn 53105, Germany. Received March 28, 2016; final revision received June 4, 2016; accepted June 19, 2016. Address correspondence to D.T.; E-mail: daniel.thomas@ukb.uni-bonn.de

C.C.P. and C.J. contributed equally as co-first authors.

C.M. is a paid consultant for W.L. Gore & Associates (Flagstaff, Arizona), Sirtex Medical Ltd (North Sydney, Australia), and PharmaCept (Berlin,

Germany). J.T. is a paid consultant for W.L. Gore & Associates. None of the other authors have identified a conflict of interest.

From the SIR 2016 Annual Meeting.

© SIR, 2016

J Vasc Interv Radiol 2016; XX:■■■-■■■

<http://dx.doi.org/10.1016/j.jvir.2016.06.023>

portal hypertension and the occurrence of HE as a result of excessive shunting, some authors have recommended routine or selective initial underdilation of the TIPS stent graft to help adjust the gradient after TIPS creation to an intended level (usually a GORE VIATORR stent graft [W.L. Gore & Associates, Flagstaff, Arizona] with 10-mm nominal diameter, which is dilated only to 6–8 mm) (1–5). However, the advantages of this technique have been brought into question by 2 published studies. These retrospective studies demonstrated that passive expansion of the self-expanding GORE VIATORR stent graft occurs after initial underdilation (6,7). This phenomenon has already been observed for the WALLSTENT (Boston Scientific, Marlborough, Massachusetts) (8). The available studies on expansion of the GORE VIATORR stent graft are limited by their retrospective designs, and data regarding early stent expansion kinetics are lacking. The aim of the present study was to prospectively investigate passive stent expansion of underdiluted GORE VIATORR stent grafts after intervention in a longitudinal study design using serial US examinations within the first 6 weeks after TIPS creation.

MATERIALS AND METHODS

Patient Cohort

This prospective study was approved by the local institutional review board, and patients gave written informed consent to participate in the study before TIPS creation. Patients were recruited between August 2014 and July 2015 and were eligible for study enrollment if they underwent TIPS creation with a 10-mm GORE VIATORR stent graft with balloon dilation to a

diameter of 8 mm. A noncompliant balloon (8 × 40 mm Mustang; Boston Scientific, Galway, Ireland) was used in all cases with inflation to the nominal pressure of 10 bar using an inflator (BasixCOMPAK, Merit Medical Systems, Inc, South Jordan, Utah). Further inclusion criteria were availability of clinical and imaging baseline data and follow-up data and written informed consent to participate in the study. Patients were excluded from the study if TIPS revision with additional balloon dilation of the stent occurred during the first 6 weeks of follow-up, patients withdrew consent for further US examinations, or patients did not complete the scheduled follow-up examinations. All patients underwent routine clinical and laboratory examinations before TIPS creation.

During the study period, TIPS creation was performed in 72 consecutive patients. Of 72 patients, 16 received emergency TIPS creation because of variceal bleeding and/or required intensive care treatment and could not be included into the study, and 27 patients did not give their consent to participate in the study so that 29 patients were enrolled. Of these patients, 9 were excluded from analysis (7 patients did not complete the follow-up examinations, 1 patient underwent TIPS revision with dilation to 10 mm before the 6-week follow-up examination, and 1 patient underwent liver transplantation before the 6-week follow-up examination), and 20 patients completed all follow-up examinations. Patient characteristics are summarized in [Table 1](#).

US Examination

US examinations occurred immediately after TIPS creation and at 1 and 6 weeks. Examinations were performed with the patient in supine position by

Table 1. Baseline Patient Characteristics before Transjugular Intrahepatic Portosystemic Shunt Creation

Parameters	Values
Sex (male/female)	13/7
Age, y	60.9 ± 14.2 (32–80)
Etiology of CLD (alcohol/viral hepatitis/others)	14/2/4
Bleeding/ascites/both	5/14/1
Child-Pugh class (A/B/C)	8/12/0
Ascites (absent/mild/severe)	3/3/14
SWE liver before TIPS creation, kPa	37.56 ± 16.81 (9.70–76.53)
Portal hemodynamics	
Before TIPS	
Right atrial pressure, mm Hg	6.65 ± 4.12 (0–16)
Portal pressure, mm Hg	27.15 ± 5.39 (18–38)
PHPG, mm Hg	20.7 ± 4.66 (13–29)
After TIPS	
Right atrial pressure, mm Hg	10.65 ± 5.61 (2–25)
Portal pressure, mm Hg	19.25 ± 4.83 (10–30)
PHPG, mm Hg	8.60 ± 3.52 (2–17)

Note—Values are numbers or mean ± SD (range).

CLD = chronic liver disease; PHPG = portal vein–hepatic vein pressure gradient; SWE = shear wave elastography; TIPS = transjugular intrahepatic portosystemic shunt.

Download English Version:

<https://daneshyari.com/en/article/5727726>

Download Persian Version:

<https://daneshyari.com/article/5727726>

[Daneshyari.com](https://daneshyari.com)