

Risk of Hernia Incarceration following Transjugular Intrahepatic Portosystemic Shunt Placement

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ABSTRACT

Purpose: Hernia complications after creation of a transjugular intrahepatic portosystemic shunt (TIPS) have been reported, although the incidence of this complication is unknown. This study was designed to determine the incidence, morbidity, and outcome of hernia complications in patients with preexisting abdominal or inguinal hernias after TIPS creation.

Materials and Methods: The medical records of 244 consecutive patients undergoing TIPS creation between 1999 and 2007 at a single institution were reviewed. The study population was 57 patients (23%) with a preprocedural abdominal or inguinal hernia. The investigated outcome was small bowel obstruction or postprocedural incarceration of a preexisting hernia. Demographic and procedural variables were evaluated for an associated increased risk of hernia complications.

Results: Hernia complications developed in 25% of patients (14 of 57) after TIPS creation at a mean presentation of 62 days (range, 2–588 d). Thirteen complications (93%) required emergent surgery, of which four (29%) required bowel resection for necrosis. There were no resulting deaths. Ninety-eight percent of patients with a hernia complication had the procedure to treat refractory ascites. The indication of refractory ascites was significantly associated with the risk of a hernia complication ($P = .002$).

Conclusions: A 25% incidence of hernia complications following TIPS creation in patients being treated for refractory ascites is higher than expected; emergent surgery is required in most cases. Further investigation to formulate a plan for elective management is warranted.

ABBREVIATION

TIPS = transjugular intrahepatic portosystemic shunt

Umbilical hernias are found in 20% of patients with cirrhosis (1). Without treatment, hernia enlargement, pressure necrosis, skin breakdown, ascitic leak, and spontaneous bacterial peritonitis may occur (2). Incarceration is uncommonly reported in the literature; the large peritoneal fluid volume may keep the muscular defect of the hernia large enough to permit bowel to

move through the defect without obstruction, incarceration, or strangulation (3–8).

Rapid decompression of ascites has been associated with hernia incarceration (3–8). Diuretic therapy, peritoneal shunting, paracentesis, and, more recently, creation of a transjugular intrahepatic portosystemic shunt (TIPS) have been implicated as causing hernia complications in small numbers of patients (3–8). These complications occurred following gradual and relatively rapid decompression of ascitic fluid and at variable times after the procedure (3–8).

There are several case reports describing hernia complications after TIPS creation, but, to our knowledge, the incidence and morbidity of this complication remain unknown (8,9).

MATERIALS AND METHODS

With approval of the institutional review board, 244 consecutive patients undergoing TIPS creation at a single institution from February 1999 to October 2007 were

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retrospectively identified by using an interventional radiology database. Medical records were reviewed to identify a study population of patients experiencing hernia complications. A database of the study population was created that included patient demographic information, procedural data, and complication details.

Fifty-seven patients (23%) were found to have preexisting abdominal or inguinal hernias. Demographic and procedural information is presented in **Table 1**. TIPS were created by using standard previously described techniques (10). General anesthesia and endotracheal intubation were used in all patients. Ten-millimeter Wallstents (Boston Scientific, Natick, Massachusetts) were used to create the TIPS in cases before 2003, and VIATORR stent-grafts (W.L. Gore and Associates, Flagstaff, Arizona) were used from 2003 to 2007. The target postprocedural portosystemic gradient was less than 12 mm Hg. Ascites was drained at the time of TIPS creation at the discretion of the performing physician to improve respiratory effort or reduce radiation dose required for adequate visualization.

The investigated outcome was a postprocedural hernia complication, which included clinical or imaging findings of small bowel obstruction or incarceration (**Fig**). The complication, the time to presentation after TIPS creation, the treatment, and the presence of ascites at the time of the complication were recorded for each patient.

Statistical Analysis

Dichotomized predictor demographic and technical variables were evaluated by using a two-tailed χ^2 test or a two-tailed Fisher exact test, whereas continuous

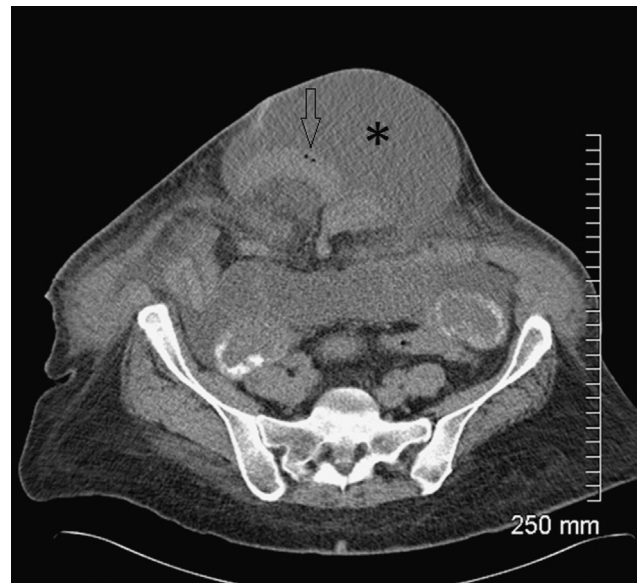


Figure. Axial CT scan demonstrates an umbilical hernia with loops of small bowel (arrow) and ascites (asterisk) in the hernia sac.

variables were evaluated by using a *t* test for independent variables to determine an association with increased risk of hernia complications (with Excel [Microsoft, Redmond, Washington] and Vassar Stats). A two-tailed *t* test was used to evaluate paracentesis as an independent variable for hernia complication.

RESULTS

Hernia incarceration occurred in 14 of 57 patients (24.6%) who had preprocedural hernias (**Table 2**). There were 10 male and four female patients, ranging in age from 47 to 65 years. Twelve patients had umbilical hernias, and two had inguinal hernias. The etiology of liver disease was related to alcohol in five patients (31%), viral hepatitis in three patients (21%), mixed disease in four patients (29%), and cryptogenic in two patients (14%). The average Model for End-stage Liver Disease score was 14 (median, 16; range 6–20). TIPS creation was performed for the indication of refractory ascites in 13 of 14 patients. The one patient who underwent TIPS creation for bleeding had evidence of moderate ascites on a preprocedural computed tomography (CT) scan. Five of the 14 patients had paracentesis before TIPS creation, with removal of 2.7–20 L of peritoneal fluid.

The median time to presentation with a hernia complication was 62 days (range, 2–588 d). Five patients presented within 30 days, and nine patients presented within 3 months. Thirteen patients (93%) required emergent surgery. Seven (50%) had incarceration of an abdominal hernia that necessitated surgical reduction, two (14%) had incarceration of an inguinal hernia that was repaired with mesh, and four (29%) presented with strangulation and small bowel necrosis that ultimately

Table 1. Demographic Characteristics of 57 Patients Undergoing TIPS Creation with Pre-existing Hernia

| Characteristic | Value |
|---|------------|
| Sex | |
| Male | 42 (73) |
| Female | 15 (26) |
| Mean age (range) | 54 (37–73) |
| Hernia type | |
| Umbilical | 44 (77) |
| Inguinal | 5 (9) |
| Both | 8 (14) |
| Etiology of liver disease | |
| Alcoholic liver disease | 19 (33) |
| Hepatitis C virus | 8 (14) |
| Mixed alcoholic liver disease/hepatitis C | 13 (23) |
| Cryptogenic | 3 (5) |
| Other | 14 (25) |
| Indication for TIPS | |
| Bleeding | 4 (7) |
| Ascites | 39 (68) |
| Mixed | 14 (25) |

Values in parentheses are percentages unless specified otherwise.

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