CLINICAL STUDY

Long-Term Outcomes of a Benign Biliary Stricture Protocol

Daniel M. DePietro, BS, Richard D. Shlansky-Goldberg, MD, Michael C. Soulen, MD, S. William Stavropoulos, MD, Jeffrey I. Mondschein, MD, Mandeep S. Dagli, MD, Maxim Itkin, MD, Timothy W.I. Clark, MD, and Scott O. Trerotola, MD

ABSTRACT

Purpose: To evaluate long-term outcomes of a structured protocol for percutaneous treatment of benign biliary stricture.

Materials and Methods: Seventy-one patients (37 men, 34 women; mean age, 54 y; age range, 23–84 y) entered the protocol, which consisted of staged upsizing of internal/external biliary catheters, balloon dilation (nominally 8 mm), and prolonged stent treatment (6 mo) at maximal catheter size (nominally 18 F). It concluded with a capping trial and catheter removal if the stricture remained patent. Fifty-three patients completed the protocol and 18 did not (6 died, 6 underwent alternative treatment, 4 were lost to follow-up, and 2 underwent repeat transplantation). Stricture features, treatment parameters, complications, and outcomes were reviewed, and Kaplan–Meier analysis was conducted.

Results: Strictures were anastomotic in 45 patients (64%), intrahepatic in 14 (20%), extrahepatic in 7 (10%), and multiple (intra- and extrahepatic) in 5 (7%). A right-sided approach was used in 47 patients (66%) patients, a left-sided approach in 18 (25%), and a bilateral approach in 6 (9%). Forty-six patients who entered the protocol (65%) and 46 patients who completed the protocol (87%) showed stricture patency. Four of 7 patients in whom a capping trial failed underwent surgical revision, 2 required chronic biliary drainage, and 1 received a metal stent. Follow-up (range, 0–12 y; mean, 4.7 y) was obtained for 42 of 53 patients who completed the protocol (79%). Kaplan–Meier analysis showed stricture patency probabilities of 84% at 1 year after treatment, 78% at 2 years, 74% at 5 years, and 67% at 10 years.

Conclusions: Use of a structured protocol for the percutaneous treatment of benign biliary strictures yields durable long-term results, suggesting that percutaneous treatment is an effective therapy.

ABBREVIATIONS

OLT = orthotopic liver transplantation, PTC = percutaneous transhepatic cholangiography

Benign biliary strictures represent a challenging problem to clinicians and patients as a result of their associated morbidity and difficulty to treat. The majority of benign strictures are iatrogenic, mainly because of bile duct injury during cholecystectomy, anastomotic healing after orthotopic liver transplantation (OLT), or biliary bypass

From the Department of Radiology, Division of Interventional Radiology, Perelman School of Medicine of the University of Pennsylvania, 1 Silverstein, 3400 Spruce St., Philadelphia, PA 19104. Received December 31, 2014; final revision received March 7, 2015; accepted March 9, 2015. **Address correspondence to** S.O.T.; E-mail: streroto@uphs.upenn.edu

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surgery (1). Noniatrogenic causes include inflammation resulting from choledocholithiasis, pancreatitis, primary sclerosing cholangitis, and other autoimmune diseases. Since the development of a percutaneous transhepatic dilation technique for biliary stricture treatment by Molnar and Stockum in 1978 (2), percutaneous techniques have become an accepted alternative to endoscopic and surgical treatments. Short-term results of percutaneous treatment have been previously reported, and initial success rates—with success defined as the restoration of bile flow through the biliary system into the small bowel in such a way that prevents cholestasis, cholangitis, sludge formation, and symptomatic recurrent stricture—are high, whereas short-term success rates (2–3 y of follow-up) range significantly, from 56% to 90% (1,3–7). Limited data exist regarding the long-term results of percutaneous treatment, but studies that do report follow-up greater than 3 years have reported success rates between 56% and 74% (3,8,9). Additionally, there is little consensus regarding optimal drainage catheter size, number and size of balloon dilations, duration of treatment, and other treatment parameters (10,11). The purpose of the present study was to determine the short- and long-term outcomes of a structured benign biliary stricture treatment protocol, analyze the treatment parameters, and evaluate the protocol's effectiveness in relation to other percutaneous protocols and nonpercutaneous treatments.

MATERIALS AND METHODS

This retrospective study was approved by the institutional review board and performed in compliance with the Health Care Portability and Accountability Act. Institutional review board approval was obtained for contacting patients, and consent waivers were obtained. All patients in whom a biliary duct dilation procedure had been performed in the host institution between July 2001 and April 2014 were identified by using the interventional radiology quality assurance database (HI-IQ; Conexsys, Lincoln, Rhode Island). Patients with malignant strictures, patients who underwent dilation for reasons other than stricture (stone removal, sphincteroplasty, biliary drain placement), those in whom there was no stricture present on further investigation, those who were treated outside the set time period, and those who did not enter the structured protocol were excluded during the analysis (**Fig 1**). Patients treated twice for discrete and unrelated strictures (ie, not stricture recurrence; n = 2) were counted as two separate patients for the purposes of this study. Data regarding patient characteristics and treatment was gathered by using the electronic medical record. Follow-up was obtained through the electronic medical record or by phone interview with the patient (n = 42).

Seventy-one patients entered the protocol (34 male, 37 female; age, 23–84 y; mean age, 54 y). Sixty-four patients had undergone operative treatment, and seven patients had no history of surgery affecting the biliary system. Causes of stricture for all patients are shown in **Figure 2**. Time to presentation, defined as the time from previous surgical intervention or diagnosis of stricture-causing disease to the beginning of treatment, was able to be determined in 52 patients. Mean time to presentation was 4 years ± 4.9 (range, 0–24 y).

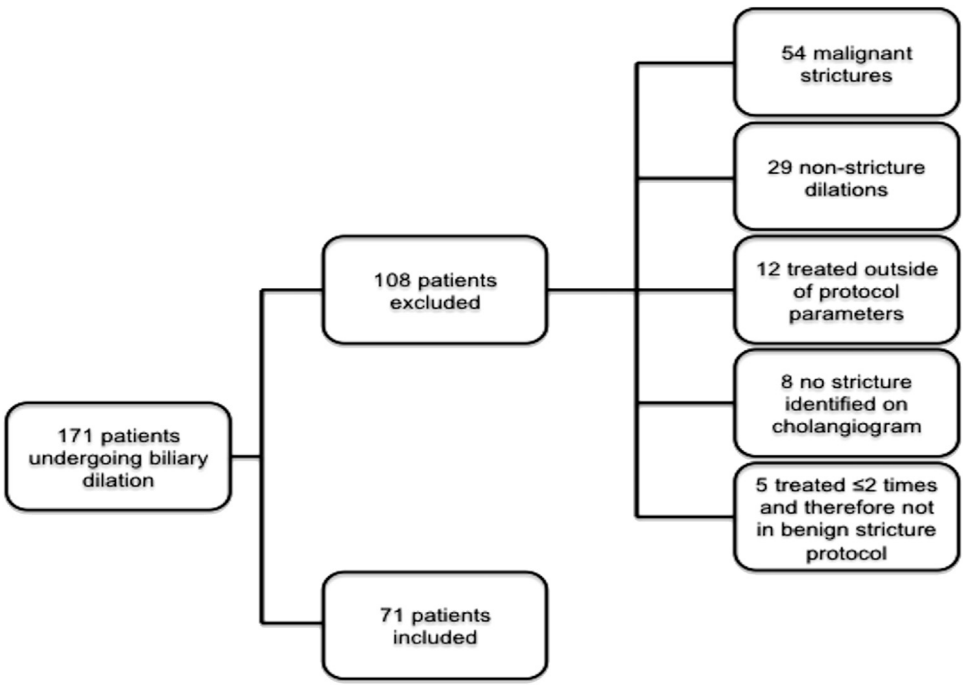

Figure 1. Flow chart showing included and excluded patients and reasons for exclusion.