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Review article

Covered metal stent or multiple plastic stents for refractory pancreatic ductal strictures in chronic pancreatitis: A systematic review

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ABSTRACT

Background and aims: Refractory chronic pancreatitis has been proposed as a challenge for endoscopists following routine single plastic stenting. However, data on the efficacy and safety of further endoscopic stenting are still controversial. The current systematic review aimed to assess the efficacy and safety of placement of fully covered self-expandable metal stent (FCSEMS) and multiple plastic stents.
Methods: Databases including MEDLINE, EMBASE, the Cochrane Library, CBM, CNKI, VIP, and WANFANG Database were used to search relevant trials. Published studies were assessed by using well-defined inclusion and exclusion criteria. The process was independently performed by two investigators.
Results: A total of 5 studies provided data of 80 patients. Forest plots and publication bias were not carried out because few studies were relevant and screened studies were all case series. The technical success rate was 100% both in placement of FCSEMS and multiple plastic stents. The functional success rate after placement of FCSEMS was 100%, followed by multiple plastic stents (94.7%). Complications occurred 26.2% after FCSEMS placement, which was not described in detail in multiple plastic stents. The stent migration rate was 8.2% for FCSEMS and 10.5% for multiple plastic stents. Reintervention rate was 9.8% for FCSEMS and 15.8% for multiple plastic stents. Pain improvement rate was 85.2% for FCSEMS and 84.2% for multiple plastic stents.
Conclusions: FCSEMS appeared to be no significant difference with multiple plastic stents in treatment of refractory chronic pancreatitis. We need to develop more investigations.

1. Introduction

Chronic pancreatitis is a progressive inflammatory disease due to biliary disorder, alcoholism or other factors, leading to pancreatic damage and fibrosis. The typical performances are abdominal pain, calcification, pseudocyst, diabetes and steatorrhea. Among these, pain is the main symptom of chronic pancreatitis. One of the mechanisms of pain is poor drainage of the pancreatic juice resulting from duct stricture. Endoscopic transpapillary placement of a plastic stent is widely used in symptomatic chronic pancreatitis associated with pancreatic duct stricture, and in most patients the pain eased [1–6]. After definitive stent removal, however, a subset of patients seems refractory to conventional stenting as a result of recurring pain suffering from persisting stricture of the main pancreatic duct [7–10].

According to experience of malignant biliary diseases, uncovered self-expandable metal stent (uSEMS) was introduced to keep smooth drainage to obtain larger diameter [11]. However, tissue ingrowth and difficult removal limited its application. Thus, FCSEMS was used instead of uSEMS depending on prevention of epithelial hyperplasia [12–15]. On the other hand, inspired from the success in benign biliary stricture [16], the potency of multiple plastic stenting for refractory pancreatic duct stricture was also evaluated [7].

Due to failing to try single plastic stenting, the endoscopic intervention for the patients of chronic pancreatitis will be difficult to choose, FCSEMS or multiple plastic stents. Little information involving the feasibility and safety of different stent types for refractory benign pancreatic strictures is available. To date, it is still controversial. We therefore performed an up-to-date systematic review to evaluate technical and functional success, and complications.

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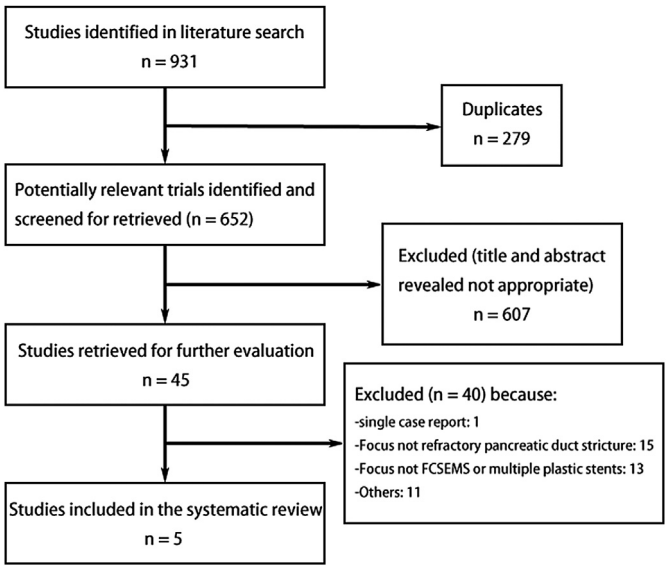

Fig. 1. Flow chart of the literature search in the systematic review.

2. Methods

2.1. Systematic search

Relevant trials were identified by searching electronic databases including MEDLINE (January 1950 to April 2013), EMBASE (January 1980 to April 2013), CENTRAL (the Cochrane Library 2013, Issue 4), the Chinese Biological Medicine Database (CBM) (1978 to April 2013), China National Knowledge Infrastructure (CNKI) (1994 to April 2013), WANFANG Database (1999 to April 2013) and VIP (1989 to April 2013). Bibliographies from the trials selected by electronic searching were hand searched for further relevant trials. No language restriction was applied. Finally, 931 abstracts were evaluated and then 279 studies were excluded because they were duplicates. The following inclusion criteria were applied: (a) study population: chronic pancreatitis patients with refractory pancreatic duct strictures; (b) intervention: fully covered self-expandable metal stenting or multiple plastic stenting; (c) outcome measures: technical success, functional success, complications and short-term clinical outcome. Animal studies, letters, editorials, reviews and single case reports were excluded. Because of the curious etiology for their chronic pancreatitis, pancreas divisum, we excluded a retrospective study containing only 3 patients [17]. Finally, 5 studies were retrieved for data extraction (Fig. 1).

2.2. Definition of events

Stents placement outcomes were evaluated according to the following parameters: (1) technical success, was defined as successful stent insertion by transpapillary endoscopes, (2) functional success, as indicated by successful drainage, (3) safety, was defined as procedure-related complications, such as pancreatitis, pancreatic sepsis, stent-related duct change and cholestasis, and (4) short-term clinical outcome, including stent migration, pancreas reintervention and pain improvement. Additionally, short-term clinical improvement was assessed on the basis of follow-up ERCP after FCSEMS or multiple plastic stents placement. Pain relief was evaluated on a visual analog scale or decrease of narcotics. Stent-induced duct change referred to de novo focal pancreatic duct strictures on the proximal portion of intraductal tip of the stents.

2.3. Data extraction

All data were extracted independently by two investigators. The following clinical data were extracted for each trial, where available: study design, number and age of patients, proportion of female patients, etiology of chronic pancreatitis, location of the stricture, previous treatment, route of stent placement, stent type, diameter and length of stent, complications, technical, functional and clinical success rates.

2.4. Statistical analysis

Statistical analysis of the data was performed using the software package SPSS 13.0. The comparisons among different groups were evaluated by chi-square test, using crosstabs methods. Results were considered statistically different when the analysis returned a P value of <0.05.

3. Results

3.1. Principal characteristics of the studies

The screened 5 articles were all case series (Table 1), all of which were prospective [7,12–15] in design. A total of 80 patients, with a sample size ranging from 6 to 32, were contained in the 5 trials. Of these, 61 patients were treated with FCSEMS and 19 with multiple plastic stents. In 4 of the 5 studies [7,12,13,15], the gender and age information could be available. The identifying relevant patients were predominantly male and middle-aged. 4 studies [7,12,13,15] involved in the etiology of chronic pancreatitis, of which 29 patients were alcoholic and 19 idiopathic. Only 1 study [12] concerned the specific stricture location, of which most strictures were located in pancreatic head (76.9%), followed by pancreatic neck (23.1%). And the same study involved the number of stent replacements (mean 3.5) and mean duration of patency per stent (mean 7.8 months). In the stent choice, Niti-S was the improvement of the Niti-D. 2 studies [12,15] demonstrated the diameter and length of stent, which could influence the efficacy of stent.

3.2. Comparison between two stent types

4 articles [7,12,14,15] demonstrated the technical success rate involving 74 patients, other than 1 article [13]. Encouragingly, the

Table 1
Characteristics of the included trials.

Author, year and country	Study design	N	Age (range) (years)	Female	Etiology	Stent type
Do Hyun Park et al. [12], 2008, South Korea	Prospective	13	Mean 51 (33–74)	4	8 alcoholic, 5 idiopathic	FCSEMS, Niti D-type
Bryan Sauer et al. [13], 2008, USA	Prospective	6	Mean 55 (42–64)	2	4 alcoholic, 2 idiopathic	FCSEMS, VIABIL
Sung-Hoon Moon et al. [14], 2010, South Korea	Prospective	32	–	–	–	FCSEMS, Niti-S (bumpy type)
C. Giacino et al. [15], 2012, France	Prospective	10	Mean 55.7 (31–84)	2	6 alcoholic, 4 idiopathic	FCSEMS, Wallstent or WallFlex
G. Costamagna et al. [7], 2006, Italy	Prospective	19	Mean 45 (23–67)	3	11 alcoholic, 8 idiopathic	Multiple polyethylene Amsterdam-type or "Cremer" C-loop stents