

Self Expandable Metallic Stents in Malignant Biliary Obstruction: Safety and Efficacy

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ABSTRACT:

BACKGROUND:

Endoscopic stenting has become widely accepted procedure for the relief of jaundice in patients with malignant biliary obstruction. It may offer lower morbidity and mortality, shorter hospitalization, and diminished overall cost compared with surgical or radiological approaches.

OBJECTIVE:

To assess the efficacy of the self expandable metallic stents in treatment of the patients with biliary stricture due to malignant tumors, and to compare this efficacy between proximal and distal obstruction.

PATIENTS AND METHODS:

SEMS were deployed during endoscopic retrograde cholangiopancreatography (ERCP) in a total of 41 patients with malignant biliary obstruction (proximal or distal). Clinical success was defined as the improvement of the laboratory data and a decrease of the biliary dilatation by follow up ultrasound imaging. Stent dysfunction was defined as recurrence of jaundice or cholangitis, is confirmed by ERCP or simply by elevated cholestatic parameters and treated by insertion of a plastic stent or second metallic stent inside the old one.

RESULTS:

Stent placement was achieved in 38 of 41 patients (92.7%) with malignant bile duct obstruction. SEMS was failed to be placed in 3 patients (1 with pancreatic cancer and 2 with proximal cholangiocarcinoma). Clinical improvement was seen in 36 of 38 patients (94.7%). In 4 patients (10.5%) cholangitis had developed. The overall stent patency time was 37.88 ± 18.59 weeks (range 16-76 week). Analysis in subgroup of patients classified according to the site of obstruction (34 with distal and 7 with proximal biliary obstruction). The overall success (technical and clinical) was significantly higher in the distal group (33/34, 97.1%) than in the proximal group (3/7, 42.9%); p-value was 0.02.

CONCLUSION:

SEMS implantation is a feasible, palliative method for inoperable malignant biliary obstruction. The clinical and the technical success of biliary drainage by SEMS is better achieved in distal than in proximal tumors with hilar infiltration by the tumor.

KEY WORDS: self expandable metallic stents

INTRODUCTION:

Patients with malignant biliary obstruction generally have an unfavourable prognosis with a poor quality of life⁽¹⁾. Endoscopic stenting has become widely accepted

as a standard procedure for the relief of jaundice in patients with malignant biliary obstruction.⁽²⁾ Endoscopic stent effectively reestablishes bile flow, alleviates jaundice and pruritus, and may improve quality of life.^(3,4) In addition, it may offer lower morbidity and mortality,

shorter hospitalization, and diminished overall cost compared with surgical or radiological approaches.^(5,6)

Therefore, in most centers, endoscopic stent placement is favored for palliation of inoperable malignant extrahepatic biliary^(7,8). Endoscopic insertion of a plastic or metal stent is technically successful in 90%–95% of patients with malignant extrahepatic biliary obstruction.^(9,10)

Self-expanding metal stents (SEMS), which achieve a larger luminal diameter, have been used with the goal of prolonging stent patency^(11,12)

Major complications, including sepsis, bleeding, and abscess formation, occur in 10% to 30% of patients^(13,14). Stent occlusion, leading to recurrent jaundice, fever, and pruritus, develops in about one

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fourth of patients and is usually treated with a second intervention and restenting^(15,16). The average patency of metal stents in patients with malignant obstruction appears to be between 6 months and 1 year⁽¹⁷⁾.

The frequency of endoprosthesis occlusion may be lowered by covering a metal stent with a barrier that will inhibit tumor ingrowth^(18, 19,20). Compared with surgical bypass, endoscopic placement of a stent has a comparable success rate (95% vs. 94%), with a lower procedure-related mortality rate (3% vs. 14%, $P = .01$), lower major complication rate (11% vs. 29%, $P = .02$), shorter mean hospital stay, and fewer days spent in the hospital from treatment randomization until death⁽²¹⁾. Nonoperative drainage results in a decrease in serum bilirubin levels and resolution of pruritus within 24 to 48 hours of drainage⁽²²⁾.

Pancreatic carcinoma, ampullary carcinoma, distal cholangiocarcinoma, and metastases to the peripancreatic nodes can cause distal CBD obstruction. The primary approach to palliation of distal lesions is endoscopic stenting⁽²³⁾. The lesions encountered most commonly in the proximal CBD and common hepatic duct are extrinsic metastatic nodal disease, cholangiocarcinomas, and gallbladder carcinomas, stenting of hilar obstructions is most easily accomplished with a percutaneous technique. Endoscopic stent insertion is more difficult because of the long distances and acute angles involved⁽²⁴⁾.

In hilar stricture, draining a single (left or right) system usually provides adequate palliation of jaundice. In patients with cholangitis, both obstructed systems must be drained. When only one system is to be drained, it is favorable to drain the left duct because the left duct has fewer branches near the hilum, and its drainage has a greater potential for long-term palliation as malignant tumor spreads into the hilum^(25,26,27).

MATERIALS AND METHODS:

From January, 2006 to June 2009, 41 patients with malignant biliary obstruction who received self expandable metallic stents (SEMS) implantation in the gastroenterology and hepatology hospital, medical city were reviewed retrospectively. The diagnosis was based on pathological examination or clinical and imaging findings.

The criteria for eligibility were bile duct obstruction due to malignancy that was either unresectable or associated with distant metastasis or the patient unfit for surgery and this was determined by the staging of the neoplasm by computed tomography (CT) scan of the abdomen or endoscopic ultrasound (EUS).

The patients were assigned to insertion of the SEMS (uncovered, zilver-cook medical, USA) if they agreed, were deployed during endoscopic retrograde

cholangiopancreatography (ERCP) by using the therapeutic duodenoscope (TGF-200, Olympus, Tokyo, Japan).

Before insertion of SEMS, cholangiogram was done and the lesions were defined as distal if the obstruction were located below the cystic duct or proximal if above this level. Over a guide wire (0.035 inch.), the stents were deployed at the site of obstruction under endoscopic and fluoroscopic guidance. Different length stents were deployed (4, 6, 8, 10, 12 cm) according to the level of the stricture. After technical success, the patients were admitted for overnight follow up and discharged at morning to be followed on an outpatient basis (if no complications occur).

Clinical success was defined as the improvement of the laboratory data from the baseline and a decrease of biliary dilatation by follow up ultrasound imaging.

Stent dysfunction was defined as recurrence of jaundice or cholangitis, either confirmed by ERCP or simply by elevated cholestatic parameters in the blood sample (total serum bilirubin 'TSB', alkaline phosphatase) whenever additional ERCP was not possible because of the poor general condition of the patient. If the stent dysfunction was confirmed by ERCP, a plastic stent or second metallic stent was inserted inside the metallic stent.

Statistics: all data were coded and entered into the computer using SPSS (Statistical package for social sciences) version 16. Association between different variables measured by using Chi-square test, differences between proximal and distal lesions were measured by using independent t-test. A p -value ≤ 0.05 was considered as level of significance.

RESULTS:

In 41 patients (34 with distal and 7 with proximal biliary obstruction). bile duct obstruction was related to the cancer of the pancreas in 23 patients (56.1%), ampullary tumours in 8 patients (19.5%), proximal cholangiocarcinoma in 7 patients (17.1%), and distal cholangiocarcinoma in 3 patients (7.3%). Table (1) shows the clinical and biochemical characteristics of the studied patients. Stent placement was achieved successfully in 38 of 41 patients (92.7%) after first attempt. SEMS was failed to be placed in 3 patients (1 with pancreatic cancer "due to tight stricture" and 2 with proximal cholangiocarcinoma due to infiltration of the hilum and both hepatic ducts).

Clinical improvement was seen in 36 of 38 patients (94.7%). In 2 patients with hilar tumors, successful biliary drainage was not achieved because of insufficient stent expansion due to entrapment of the stents in narrowed distorted area of the hilum with angulation of the hepatic ducts by tumor infiltration

(in one of them the jaundice resolved after doing percutaneous transhepatic drainage (PTCD) and the other died because of the persistent cholangitis with septicemia.

In 4 patients (10.5%), cholangitis had developed, in 2 of them was due to failure of the clinical success; the other 2 patients responded to antibiotics with gradual improvement in the biochemical data. No other complications were reported in the studied group.

The mean follow up period was 9.47 ± 4.65 months (range 4-18 months). During the follow up period, 2 patients died due to advanced distant metastasis and associated comorbidities.

The overall stent patency time was 37.88 ± 18.59 weeks (range 16-76 week). Stent dysfunction confirmed by ERCP was caused by tumor ingrowth. The technical success was achieved in 33/34 patients (97.1%) in distal vs. 5/7 patients (71.4%) in proximal groups; p-value was marginally significant (p-value = 0.07).

Table 1: The clinical and biochemical characteristics of the study group

Character	Minimum	Maximum	Mean	SD
Age(year)	44	90	66.95	9.90
TSB(mg/dl)	5	28	15.10	5.25
S.AST(IU/dl)	9	117	41.00	24.06
S.ALT(IU/dl)	10	205	54.41	38.32
S.ALP(IU/dl)	38	800	313.96	175.64

S.AST = Serum aspartate aminotransferase; S.ALT = Serum alanine aminotransferase; S.ALP = alkaline phosphatase

Table 2 : The clinical and technical success according to the site of the biliary obstruction

Site of the biliary obstruction	Total no. of the patients	Technical success	Clinical success	Overall success
Distal	34	97.1% (33/34)	100% (33/33)	97.1% (33/34)
Proximal	7	71.4% (5/7)	60% (3/5)	42.9% (3/7)

P. value is 0.02

Clinical success was seen in 33/33 (100%) in distal vs. 3/5 (60%) in proximal groups; the difference was significant (p-value = 0.014).The overall success (technical and clinical) was significantly higher in the distal group (33/34, 97.1%) than in the proximal group (3/7, 42.9%); p-value was 0.02. There was no significant difference in the mean time of the stent patency between the two groups (37.9 ± 18.89 weeks in the distal vs. 37.33 ± 18.27 weeks in the proximal group); p-value was 0.9. Table (2) shows the technical and clinical rates according to the site of the biliary obstruction.

DISCUSSION:

The endoscopic route of drainage of biliary obstruction had become the method of choice in comparison to percutaneous drainage or surgical biliary bypass (2).

In our study as well as in few reported series (9,10), the technical and clinical success rate of SEMS were satisfactory (92.7%, 94.7% respectively).

Deployment problems (failure to pass the guide wire and failure of stent expansion) were the main causes behind the failure of biliary stenting in 5 patients (4 with hilar cholangiocarcinoma and 1 with pancreatic tumor) in our study. These problems were also encountered in other studies (28,29).

The most striking outcome of this study is the relatively high median stent patency rate with a median of 37.47 weeks. In contrast, prospective uncontrolled long term studies showed median patency rate for the metal stents of between 23-41 weeks (30,31). Ferlitsch A et al, also found high patency rate with median of 68.14 weeks (33).The reason for the high patency rate in our study can partly be explained by the fact that large number of our patients were presented at an advanced stage.

Most of the complications in our study were related to the effects of stent dysfunction or manipulation procedures. 10% of patients developed cholangitis which was comparable to other study (14).

Many prospective uncontrolled showed that the location of the tumors didn't show any significant influence on patency rate of SEMS^(10,17). Our results are in keep with these studies in respect to this aim , nevertheless the insertion SEMS is technically demanding procedure in proximal (hilar) malignant biliary obstruction and is clinically less efficacious in relieving jaundice than in distal one . Location of malignant biliary obstruction in our study did not show any significant influence on the stent patency rate (37.9 weeks \pm 18 in distal vs. 37.33 \pm 18 weeks in proximal obstruction) .

Our results in contrary to what was found by jui-hao et al, who showed better patency rate of SEMS in patient with hilar than with distal tumour (meantime of stent patency was 421 days in proximal stricture and 168 days in distal stricture)⁽³³⁾ .

CONCLUSION:

SEMS implantation is a feasible , palliative method for inoperable malignant biliary obstruction. Although the patency time rate is not significantly different between distal and proximal biliary obstruction.The clinical and the technical success of biliary drainage by SEMS is better achieved in distal than in proximal(hilar)tumors.

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