Endoscopic biliary drainage
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Wallstents for metastatic biliary obstruction

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Abstract
Background and Study Aims: In patients with obstruction of the common bile duct caused by primary pancreaticobiliary tumors, Wallstents have been shown to remain patent for a median duration of 273 days (range: 14-363). However, in one study that included both patients with primary pancreaticobiliary malignancies and patients with metastatic malignant disease, the reported median Wallstent patency was found to be significantly shorter. We have studied the patency of Wallstents in patients with metastatic biliary obstruction.

Patients and Methods: All patients who had received a Wallstent for metastatic biliary obstruction between January 1990 and August 1994 were analyzed retrospectively. Follow-up was achieved by contacting referring physicians and general practitioners, and lasted up to the end of the study period (November 1994) or death of the patient. Follow-up was discontinued if a polyethylene stent was inserted through the Wallstent for treatment of stent dysfunction.

Results: 28 patients were identified, 14 men and 14 women, with a mean age 61.3 years (range 24-87). Long-term follow-up was possible in 27 patients (96%), for a median duration of 140 days (range 29-561). Eleven patients died during the study period, and there were three deaths related to Wallstent dysfunction. The median duration of Wallstent patency was 265 days (range 11-519). Wallstent obstruction occurred in 13 patients; seven patients presented with cholangitis, six patients had jaundice. The cause of obstruction was established at endoscopic retrograde cholangiopancreatography in ten patients: seven had tumor ingrowth and three had tumor overgrowth. Treatment consisted of insertion of a polyethylene stent in seven and placement of a second Wallstent in three patients.

Conclusion: In patients with metastatic obstruction of the common bile duct, duration of patency of Wallstents is comparable to that reported in series of Wallstents for primary pancreaticobiliary malignancies.

Introduction
Patients suffering from metastatic malignant biliary obstruction are known to have a poor survival rate (1-5). However, it has been shown that the biliary obstruction can effectively be palliated by endoscopic or percutaneous insertion of endoprostheses (1,2,5). Recently, Wallstents have been introduced for malignant biliary obstruction (6-10). In patients with obstruction of the common bile duct caused by primary pancreaticobiliary tumors, Wallstents have been shown to remain patent for a median duration of 273 days (range: 14-363) (6). However, in one study that included both patients with primary pancreaticobiliary malignancies and patients with metastatic malignant disease (19%), the reported median Wallstent patency was found to be significantly shorter (9).

We therefore studied the patency of Wallstents in patients with biliary obstruction due to metastatic malignant disease.
PATIENTS AND METHODS
All patients who had received a Wallstent (Schneider, Switzerland) for metastatic biliary obstruction between January 1990 and August 1994 were analyzed retrospectively. Patients were included in the trial if they had a stenosis of the extrahepatic biliary system and proved malignancy of nonbiliary and nonpancreatic origin, or metastasis of a malignancy at another nonbiliary location.
A total of 28 patients were identified. There were 14 women and 14 men ranging in age from 24 to 87 years (mean age 61.3 years). The location of the primary tumor was the colon in nine patients (32%), the breast in six (21%), gastroesophageal in five (18%), bronchus in two, (7%) and miscellaneous in six patients (lymph-node metastasis with an unknown primary tumor, apudoma, multiple myeloma, larynx carcinoma, melanoma, cutaneous T-cell lymphoma).
The time from the diagnosis of the primary tumor until the insertion of the Wallstent varied from 0 to 163 months (median 29 months). Thirteen patients had had polyethylene stents inserted previously, and seven had had a polyethylene stent exchange before the placement of a Wallstent (median number of stent exchanges two, range 1-6).
The indication for endoscopic retrograde cholangiopancreatography was jaundice in 16 patients, cholangitis in seven patients, and cholestasis in five patients. Cholangitis was defined as jaundice, fever, and abnormal liver function tests; cholestasis was defined as a three times elevated gamma-glutamyl transferase level, or alkaline phosphatase level, or both. The location of the stricture of the common bile duct was distal in 20 patients, middle in seven patients, and proximal in one patient.
Endoscopic retrograde cholangiopancreatography and Wallstent insertion were carried out according to the standard guidelines (11) (Figure I). Wallstents could be placed in all patients without problems. Successful biliary drainage was defined as resolution of jaundice and fever and a drop of more than 20% in the pre-procedure gamma-glutamyl transferase or alkaline phosphatase levels.
Follow-up was achieved by contacting the referring physician and the general practitioner, and lasted up to the end of the study period (November 1994), or up to the death of the patient. If a patient had a polyethylene stent inserted through the Wallstent for treatment of stent dysfunction, follow-up was discontinued.
The stent patency rate was calculated according to the Kaplan-Meier method.

RESULTS
Early results
All patients underwent uneventful placement of a Wallstent. Successful biliary drainage, as defined above, was achieved in all 28 patients. No early complications (earlier than 15 days) of the endoscopic procedure were observed.
Long-term follow-up was established in 27 patients (96%) for a median duration of 140 days (range 29-561). One patient moved abroad, and could not be contacted.
Long-term follow-up

Eleven patients died during the study period (41%). Three patients died of cholangitis or jaundice, or both, secondary to Wallstent dysfunction, and the remaining eight patients died of extrabiliary causes.

The cumulative patency of the Wallstent in patients with metastatic malignant biliary obstruction is shown in Figure 2. The median duration of Wallstent patency was 265 days (range 11-519).

Wallstent dysfunction occurred in 13 patients (48%), with a median time to obstruction of 203 days (range 11-519). Seven patients presented with cholangitis whereas six had jaundice. ERCP was carried out in ten patients, and demonstrated tumor ingrowth in seven patients and tumor overgrowth at the distal or proximal end in three. No ERCP was performed in three patients with terminal disease.

In addition to these 13 patients with Wallstent dysfunction, two patients presented with jaundice, but were found to have a patent Wallstent at ERCP or HIDA scanning. Jaundice was considered to be due to intrahepatic metastasis, and no further treatment was instituted. These two patients died from liver failure during the same admission.

Treatment for late complications

Ten of the thirteen patients with Wallstent dysfunction underwent an ERCP for treatment of biliary obstruction. A polyethylene stent was inserted through the Wallstent in seven patients. Three patients had a second Wallstent inserted through the Wallstent in situ. Of the latter three patients, one is alive at follow-up to date, 6.5 months after insertion of the second Wallstent. Another patient died ten months after insertion of the second Wallstent, from a nonbiliary cause. The third patient had persistence of jaundice after insertion of the second Wallstent, due to extensive intrahepatic metastasis, and died three weeks later.

DISCUSSION

In this study of 28 patients with metastatic biliary obstruction, we found that Wallstents remained patent for a median duration of 265 days. This is comparable to the median stent patency of patients with primary pancreaticobiliary tumors (6). We therefore conclude that there is no evidence suggesting shorter Wallstent patency in patients with metastatic malignant biliary obstruction compared to patients with primary pancreaticobiliary tumors.

Stent dysfunction is caused by tumor ingrowth through the meshes of the stent, or tumor overgrowth at the proximal or distal end of the endoprosthesis. Optimum treatment of an occluded Wallstent is established by insertion of a polyethylene stent or a second Wallstent (12,13). We insert polyethylene stents in these patients, mainly because of the costs involved in inserting a second Wallstent. In patients responding to treatment of their primary tumor, however, we sometimes insert a second
Wallstent, since they have a much longer life expectancy. Other techniques for treating occluded Wallstents include tumor ablation by diathermy or laser coagulation (14,15). We no longer use these techniques, because of the risks of hemorrhage, perforation, and stent breakage (16). Coating the Wallstent with an impermeable membrane ought to prevent tumor ingrowth. However, in a recent study we were not able to show any difference in the patency rate between non-covered and covered Wallstents, because an increased number of patients was observed to have overgrowth proximally or distally in the group of patients with covered Wallstents (17).

Should Wallstents be used in all patients with biliary obstruction due to metastasis? The high costs of the Wallstent ($1000) compared to the polyethylene stent ($35) preclude its use in all patients. In our opinion, the choice between insertion of a polyethylene stent or a Wallstent is mainly based on the patient's life expectancy, which is determined by the primary tumor, the histological tumor type, the presence of multiple tumor spread, response to systematic anticancer therapy, and the patient's general condition.

In patients with a short life expectancy (e.g. less than three months), we prefer to insert polyethylene stents, since comparative studies did not show any benefit of Wallstents compared to polyethylene stents in the first three months after insertion (6).

In patients with a longer life expectancy (e.g. over six months), placement of a Wallstent has to be considered. This group of patients will really benefit from the advantages of a Wallstent.

Patients who present with early clogging of a polyethylene stent (within one month after insertion) should receive a Wallstent, irrespective of their life expectancy, because repeated clogging of a second polyethylene stent can be expected very quickly.

Wallstents provide successful biliary drainage and acceptable patency rates in patients with bile duct obstruction due to metastatic malignant disease. Drawbacks include tumor ingrowth through the meshes of the stent, and the costs involved. Further developments should be aimed at reducing these disadvantages.
Figure 1. Left: Distal common bile duct stenosis with proximal dilatation due to multiple myeloma. Right: Wallstent inserted through the common bile duct stenosis. There is still a relative compression of the stent immediately after insertion.

Figure 2. Kaplan Meier plot for stent patency in patients with metastatic malignant biliary obstruction. Related deaths are marked with an asterisk.
REFERENCES


