Preoperative biliary stenting — a prequel to pancreatic resection in selected patients

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Summary

Introduction. Biliary drainage is necessary to improve immediate survival in patients with profound co-morbidities associated with jaundice. We report on our experience with this category of patients in whom subsequent pancreaticoduodenectomy was performed.

Patients and methods. In the period January 2001 - June 2002, 6 patients underwent biliary drainage to reverse potentially fatal complications or to optimise nutritional status. There were 2 female and 4 male patients (age range 50 - 70 years). The reasons for biliary drainage were suboptimal albumin levels in all patients, cholangitis in 4 patients and renal impairment in 2 male patients and profound acute jaundice in 1.

Results. There was failure of stent placement at endoscopic retrograde cholangiopancreatography (ERCP) in 3 patients. Two had an ERCP performed before referral and had a metal stent deployed at percutaneous transhepatic cholangiography (PTC). In the other a plastic stent was placed at a combined PTC/ERCP session. The 3 others had stents placed by ERCP. None of the patients had complications related to the stenting procedure. All the lesions were deemed resectable following imaging by ultrasound and computed tomography (CT) scan. Laparotomy with intent to resect was planned once the complications had resolved. The average duration of stenting before surgery was 46 days (range 12 - 100 days). All patients underwent pancreaticoduodenectomy. One patient developed postoperative superficial wound sepsis, which resolved with topical management. The postoperative hospital stay ranged from 10 to 21 days. Histological examination revealed pancreatic adenocarcinomas in 4 patients, an ampullary tumour in 1 patient and a non-functioning islet cell tumour in the other.

Conclusion. Biliary drainage for complications should not be regarded as definitive treatment. It optimises co-morbidity factors and allows staging so that resection can be carried out successfully in selected patients.

Views on preoperative biliary stenting are not uniform even among centres dealing with a large volume of pancreatic malignancies.1 Some authors2,3 advocate routine drainage, especially if there is any delay in performing definitive surgery, while others5,6 feel that preoperative stent placement increases morbidity. In patients who present with established life-threatening complications such as cholangitis and renal failure, urgent relief of biliary obstruction is necessary to reverse these complications.2 Generally such an intervention would be regarded as definitive treatment but in some it renders them fit to undergo pancreaticoduodenectomy. We report on our experience with this category of patients.

Patients and methods

In the period January 2001 - June 2002, 6 patients at our institution required biliary drainage to improve profound co-morbidity related to their obstructive jaundice. There were 2 female patients aged 62 and 70 years and 4 male patients aged 50, 62, 63 and 66 years.

Four patients were critically ill at presentation and were resuscitated with intravenous fluids, antibiotics and vitamin K before stenting. The blood indices pre-stenting are shown in Table I and define the reasons for biliary drainage. Suboptimal albumin levels were present in all patients; cholangitis in 4 patients, acute renal impairment in 2 male patients, and profound acute jaundice was the indication in 1 patient. There was failure of stent placement at endoscopic retrograde cholangiopancreatography (ERCP) in 3 patients, 2 of whom had ERCP performed at other institutions before referral. Two had a metal stent successfully deployed via percutaneous transhepatic cholangiography (PTC). In the other a plastic stent was deployed at the combined PTC/ERCP session. The 3 others had stents placed by ERCP. None of the patients had complications related to the definitive stenting procedure. The duration of stenting was 12, 18, 21, 74, 51 and 100 days before surgery. The immediately pre-surgery indices were all improved (Table II). All the lesions were deemed resectable on subsequent spiral computed tomography (CT) scan. All patients underwent successful pancreaticoduodenectomy once their complications had resolved. One patient developed postoperative superficial wound sepsis, which resolved with topical management. There were no peri-
operative deaths. The postoperative hospital stay was 10, 12, 15, 17, 18 and 21 days respectively. Histological examination revealed adenocarcinomas of the pancreatic head in 4 patients, an ampullary tumour and a non-functioning islet cell tumour.

**TABLE I. BIOCHEMICAL PARAMETERS BEFORE STENTING**

<table>
<thead>
<tr>
<th>Patient</th>
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<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Haemoglobin (g/dl)</td>
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<td>12</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>White cell count (x10^9/l)</td>
<td>15</td>
<td>23</td>
<td>19</td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Albumin (g/l)</td>
<td>20</td>
<td>17</td>
<td>20</td>
<td>26</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Bilirubin µmol/l</td>
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<td>403</td>
<td>158</td>
<td>456</td>
<td>Jaundiced</td>
<td>3</td>
</tr>
<tr>
<td>Urea (mmol/l)</td>
<td>46</td>
<td>78</td>
<td>5</td>
<td>7</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Creatinine (mmol/l)</td>
<td>242</td>
<td>127</td>
<td>92</td>
<td>112</td>
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**TABLE II. BIOCHEMICAL PARAMETERS BEFORE SURGERY**

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<th>4</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin (g/dl)</td>
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<td>11</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>White cell count (x10^9/l)</td>
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<td>8</td>
<td>12</td>
<td>7</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Albumin (g/l)</td>
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<td>30</td>
<td>31</td>
<td>30</td>
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<tr>
<td>Bilirubin µmol/l</td>
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<td>115</td>
<td>115</td>
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<td>115</td>
</tr>
<tr>
<td>Urea (mmol/l)</td>
<td>12</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>NA</td>
</tr>
<tr>
<td>Creatinine (mmol/l)</td>
<td>144</td>
<td>106</td>
<td>128</td>
<td>104</td>
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</table>

**Discussion**

Surgery in patients with obstructive jaundice has a cited mortality rate of 16%. This is thought to be largely a result of endotoxaemia and acute renal failure. Preoperative variables that have been shown to contribute independently to postoperative complications in patients with obstructive jaundice are albumin (<30 g/l), bilirubin (>150 µmol/l) and creatinine (>130 µmol/l). However, in an analysis of 98 patients undergoing operative intervention with a serum bilirubin level of 100 µmol/l or more, Pellegrini et al. found that preoperative bilirubin levels had no relationship to postoperative morbidity or mortality. Major centres with high volumes have succeeded in reducing the mortality rate of pancreatoduodenectomy to 5% and less. This advance is largely due to centralised referral patterns, and advances in intraoperative and perioperative care. However, the morbidity associated with this procedure remains in the region of 30 - 65%. The precise contribution of a host of variables remains uncertain. Following studies in animal models, internal biliary drainage has been advanced to improve the surgical outcome. A return to the enterohepatic circulation relieves biliary hypertension, improves hepatic and reticuloendothelial cellular function and benefits nutrition and immunity. Despite these experimental benefits, routine preoperative biliary drainage of patients remains controversial. Patients with complications of obstructive jaundice (cholecolithiasis, renal impairment, cholangitis and suboptimal nutrition) are a subset of patients in whom preoperative biliary drainage is considered necessary by many groups. In the trials to date these patients are usually located within the drainage arms. Criticism of some of the trials that address the controversy of preoperative biliary drainage is that this category of patients has been included in the routine preoperative drainage arm.

The stents, particularly plastic stents, may block, resulting in bacterial colonisation and may also induce a periductal fibrosis. Periductal fibrosis in a less dilated system is thought by some to complicate the biliary-enteric anastomosis. A blocked or migrated stent may require an additional procedure to effect drainage with a further delay in surgery. In this group of patients none of the stents blocked before surgery. Stenting was followed by a reduction in bilirubin and creatinine and an increase in albumin levels. Intraoperatively periductal fibrosis was not of concern; the stents were removed with the operative specimen and the anastomosis fashioned without added difficulty.

In this cohort a metal stent was used in 2 patients and plastic stents in the others. Expandable metal stents have been found to provide longer patency than plastic stents. In this palliative study plastic stents required earlier and more frequent interventions as a result of stent blockage. Stent blockage was not a factor in this cohort because the drainage periods prior to surgery were relatively short and none of the patients had complications as a consequence of ERCP or stent placement. PTC and transpyloric stent placement is a feasible salvage procedure to accomplish internal biliary drainage. Time of recovery of liver function and resolution of the complications of obstructive jaundice may be prolonged. The optimal drainage period required to derive maximum benefit from biliary drainage is not defined in the clinical situation. Experimental studies have suggested that drainage for a period of 4 - 6 weeks is the preferred period for optimising hepatocellular and immune function. The period of preoperative drainage in the randomised trials ranged from 12 to 26 days and in the retrospective trials, 10 - 32 days. In this cohort drainage, though variable, was on average more in keeping with drainage periods of 4 - 6 weeks considered optimal to allow recovery of liver function. To derive the beneficial effects of preoperative biliary drainage that are expected based on experimental data, drainage-related complications must be reduced. In a meta-analysis Sennath et al. found that if drainage-related complications were excluded, then preoperative biliary drainage provides benefit in morbidity and mortality.

As immediate low perioperative mortalities are being consistently achieved, the focus has shifted to improve the long-term outcome by the addition of adjuvant treatment. The use of neo-adjuvant therapies involves significant delay before surgery and necessitates longer drainage periods of 7 weeks or more. In one series of neo-adjuvant treatment 101
patients were stented. Fifteen developed stent-related complications, 7 of whom required admission for stent exchange and antibiotics. There were no stent-related deaths. Prolonged drainage in this setting requires good follow-up to pick up sepsis blockage and cholangitis early so that effective drainage can be re-established. More experience with this treatment approach will accrue and allow more critical analysis of the benefits of biliary drainage in this setting.

We conclude that preoperative biliary drainage is beneficial in a subset of patients who present with the severe complications related to obstructive jaundice. It should not be regarded as definitive treatment. If it optimises co-morbidity factors, pre- and intraoperative staging should be the final arbiter as to the feasibility of resection. We have shown that patients thus managed can undergo resection with an acceptable morbidity.

REFERENCES


Letter to the Editor

A nifty tip for finger (tip) dressings

To the Editor: Finger and fingertip wounds occur most commonly in blue-collar craftsmen and occasionally amateur woodcraftsmen or gardeners. Cloth or elastoplast dressings are cumbersome and may become soaked with unsterile water (fluid).

A nifty way to dress a wounded finger is to dress the wound with antibiotic cream and a gauze dressing, then select a disposable glove, cut off the glove finger and stretch it over the injured finger dressing. Waterproof tape is applied to the proximal glove finger to seal it on to the finger and keep it from sliding off.

This type of dressing allows for continued use of the hand without contaminating the finger wound.

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