http://dx.doi.org/10.1016/j.hpb.2016.12.009 HPB

ORIGINAL ARTICLE

Is routine hepaticojejunostomy at the time of unplanned surgical bypass required in the era of self-expanding metal stents?

Roberta Angelico[1,2], Shakeeb Khan[1], Bobby Dasari[1], Ravi Marudanayagam[1], Robert P. Sutcliffe[1], Paolo Muiesan[1], John Isaac[1], Darius Mirza[1] & Keith J. Roberts[1]

[1]The Liver and Pancreas Unit, Queen Elizabeth Hospital Birmingham, Birmingham B15 2TH, United Kingdom, and [2]Division of Abdominal Transplantation and Hepatobiliopancreatic Surgery, Bambino Gesù Children's Hospital IRCCS, Piazza Sant'Onofrio 4, 00146 Rome, Italy

Abstract

Background: Hepaticojejunostomy is routinely performed in patients when inoperable disease is found at planned pancreatoduodenectomy; however, in the presence of self-expanding metal stent (SEMS) hepaticojejunostomy may not be required. The aim of this study was to assess biliary complications and outcomes in patients with unresectable disease at time of planned pancreaticoduodenectomy stratified by the management of the biliary tract.

Material and methods: Retrospective analysis of patients undergoing surgery in January 2010–December 2015. Complications were measured using the Clavien–Dindo scale.

Results: Of 149 patients, 111 (75%) received gastrojejunostomy and hepaticojejunostomy (double bypass group) and 38 (26%) received a single bypass in the presence of SEMS (single bypass group). Post-operative non-biliary [7 (18%) vs 43 (38%), (p = 0.028)] and biliary [0% vs 12 (11%), (p = 0.037)] complications were lower in the single bypass group. Hospital readmissions were significantly higher in the double bypass group (p = 0.021). Overall survival and the time to start chemotherapy were equivalent (p = n.s.).

Conclusions: Complications are more common following double bypass compared to single bypass with SEMS suggesting that gastric bypass is adequate surgical palliation in presence of SEMS. This study adds further evidence that preoperative SEMS should be used in preference to plastic stents for suspected periampullary malignancy.

Received 1 May 2016; accepted 22 December 2016

Correspondence

Keith J. Roberts, Queen Elizabeth Hospital Birmingham Edgbaston, Birmingham B15 2TH, United Kingdom. E-mail: Keith.Roberts@uhb.nhs.uk

Introduction

Up to one third of patients undergoing surgical exploration for periampullary malignancy are found to have either local or distant disease that precludes curative resection at laparotomy.[1] Prior to the introduction of biliary and duodenal stenting, surgical double bypass was routinely performed as randomised studies demonstrated a significant proportion of patients developed gastric outlet obstruction at a later date.[2–4] In recent years, the majority of patients who undergo attempted pancreatoduodenectomy already have a biliary stent in situ.[5,6] In the era of removable plastic biliary stents, it remained routine to perform both hepaticojejunostomy and gastrojejunostomy (double bypass) as stent obstruction was a frequent occurrence.[7] However, endoscopic stent technology has improved and self-expanding metal stents (SEMS) are now routinely used to treat obstructive jaundice prior to planned pancreatoduodenectomy. SEMS have been shown to be safe and associated with greatly improved patency as compared to plastic stents.[8,9]

Whether hepaticojejunostomy should be performed at the time of palliative bypass among patients with a SEMS in place is unclear. Studies, which have compared the outcome of patients

Please cite this article in press as: Angelico R, et al., Is routine hepaticojejunostomy at the time of unplanned surgical bypass required in the era of self-expanding metal stents?, HPB (2017), http://dx.doi.org/10.1016/j.hpb.2016.12.009

undergoing palliative chemotherapy, have found no difference between those whose biliary obstruction was treated by endoscopic or surgical bypass.[10] Hepaticojejunostomy is associated with complications, including early bile leak, strictures and cholangitis. Patients undergoing double bypass are exposed to post-operative morbidity and mortality of 30% and 2%, respectively.[11,12] In contrast, SEMS have been associated with lower risk of morbidity and lower risk of recurrent biliary obstruction.[13,14]

The aim of this study was to compare outcomes among patients undergoing surgical bypass at the time of planned pancreatoduodenectomy, with the purpose of defining the best management of the biliary tract.

Material and methods

A retrospective observational study of consecutive patients undergoing attempted pancreatoduodenectomy but found to have unresectable disease at the time of surgery was performed. Patients who underwent palliative surgical bypass between January 2010 and May 2015 at the Queen Elizabeth Hospital, Birmingham, United Kingdom were included. Patients with a final histological diagnosis of pancreatic ductal adenocarcinoma, cholangiocarcinoma, ampullary carcinoma or duodenal carcinoma were included with all other patients excluded. The decision to proceed with palliative surgery was made at the time of laparotomy, due to intraoperative findings of unresectable locally advanced disease or identification of previously unknown metastatic liver or peritoneal disease.

During the study period it had been departmental practice to routinely perform gastrojejunostomy in this cohort of patients, however the addition of the hepaticojejunostomy varied for two reasons. Firstly in the presence of SEMS some surgeons stopped performing a routine hepaticojejunostomy and secondly in patients where the tumour mass widely infiltrated the liver hilum it was deemed technically unsafe to perform a hepaticojejunostomy. In this scenario post-operative SEMS was performed. Patients were therefore stratified by whether they received a single bypass (gastrojejunostomy) with SEMS or double bypass (gastrojejunostomy and hepaticojejunostomy – regardless of there being a SEMS or not).

A side-to-side gastrojejunostomy was performed in all patients. Any hepaticojejunostomy consisted of a Roux-en-Y end to side hepaticojejunostomy with a 50 cm Roux limb. Any biliary stent present was removed where possible at the time of hepaticojejunostomy. Bile was routinely sent for culture and sensitivity to guide post-operative antibiotic therapy. Every patient was reviewed daily with complications and outcomes recorded prospectively by a dedicated data manager (CC).

Preoperative mortality and morbidities were recorded using the Clavien–Dindo scale.[15] The need for post-operative biliary treatment was defined as any post-operative intervention (surgical or otherwise) on the biliary tract and/or need for hospital readmission for a biliary tract complication such as cholangitis. These were observed until death or last follow-up. Survival was determined and crosschecked by review of clinical follow-up information in the surgical and oncological services. The last update of the clinical data and follow-up was performed in December 2015.

Statistical analysis

Data were recruited from a prospectively collected consecutive database (Microsoft Access 2.0; Microsoft Corporation, Redmond, WA, USA). Demographic characteristics and clinical data are shown (wherever applicable) as either median with interquartile range (IQR) or mean ± standard deviation. Univariate data were analysed using the Mann–Whitney test and Fisher's exact test. Normal distribution continuous data were analysed by parametric test (Student's t-test). A p-value of <0.05 was considered significant. Survival was defined as overall survival from the time of surgery to death. Survival rates and the treatment free duration were calculated using the Kaplan–Meier method. The program used for statistical analysis was SPSS® 13.0 (233 South Wacker Drive, Chicago, USA) for Windows.

Table 1 Demographic characteristics of the study population

Variables	Double bypass group	Single bypass group	p-Value
Number of patients	111	38	–
Median age (years)	65 (IQR: 12)	60 (IQR: 9)	0.583
Gender (male)	66	21	0.705
Indication for palliative surgery:			
- Tumour locally advanced	58 (52)	23	0.451
- Liver metastasis	43 (39)	10	0.239
- Peritoneal metastasis	10 (9)	5	0.533
Histological diagnosis:			
- Pancreatic adenocarcinoma	82 (74)	25	0.404
- Ampullary tumour	11 (10)	1	0.297
- Cholangiocarcinoma	16 (14)	10	0.135
- Duodenal tumour	2 (2)	2	0.269
Comorbidities:			
Hypertension	37 (33)	14	0.697
Diabetes mellitus	22 (20)	13	0.080
COPD	9 (8)	1	0.453
CVA	3 (3)	2	0.602
IHD	9 (8)	6	0.212

Continuous values are reported as medians and interquartile ranges (IQR). Histological diagnoses were intraoperatively confirmed. Abbreviations: COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; IHD, ischemic heart disease.

Please cite this article in press as: Angelico R, et al., Is routine hepaticojejunostomy at the time of unplanned surgical bypass required in the era of self-expanding metal stents?, HPB (2017), http://dx.doi.org/10.1016/j.hpb.2016.12.009