



## Review Article

# Requirement of Biliary Decompression Prior to Pancreatoduodenectomy for Distal Malignant Biliary Obstruction

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### Abstract

The role of biliary decompression prior to definitive surgery in patient with distal malignant obstruction remains controversial. Many authors put their views in favor; because of improvement of liver functions and reticulo-endothelial function after decompression resulting in uneventful postoperative outcome and many others are against because of increase the risk of postoperative morbidity and mortality. We found the patients who underwent prior biliary decompression had unusual development of organisms in their bile which are found frequently resistant to usual antibiotics and most of them developed postoperative complications. Several other studies concluded in between that preoperative drainage should be performed in selected patients; delaying of surgery for any cause, presence of severe cholangitis, severe jaundice and poor nutrition and where hepatic resection is required along with pancreatoduodenectomy. We therefore concluded that biliary decompression should not routinely be performed except in special situations in patients with distal malignant biliary obstruction before pancreatoduodenectomy.

### Introduction

Patients with obstructive jaundice due to distal biliary obstruction is referred to surgeons after performing biliary stenting almost routinely for pancreatoduodenectomy. Its role in patients who will undergo pancreatoduodenectomy for biliary obstruction remains controversial. Few authors believe that biliary decompression improves liver function and reticuloendothelial functions; therefore surgery can be formed safely without perioperative complications. Other believe that stent using for biliary decompression acts as a foreign body and it

produces infections, increases vascularity and fibrotic reaction in and around the stent. It causes surgical dissection difficult, trouble some bleeding during surgery and develops infected complications after surgery. This article addresses the fact whether biliary decompression really provides any benefit to patient by reviewing recently published data around the world.

### Indications of biliary decompression prior to surgical consultation

Generally all patients with jaundice initially consult to gastro-enterologist or hepatologist. They put a stent in common bile duct for decompressing bile after diagnosing the jaundice as obstructive one and then the patient is sent for surgical consultation. The largest population-based study of patients with distal biliary obstruction undergoing pancreatoduodenectomy published in 2013 showed that 77% patients who were referred to a surgeon already had a stent in common bile duct.<sup>1</sup> Very similar reporting of prior stent placement rate (42-79%) was also published from

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2006 to 2011 from different parts of the world<sup>2-5</sup>. These studies also found that perioperative infectious complications were increased after using the stent in common bile duct<sup>2-5</sup>. Moreover it delays the surgery as the patient has to wait 2-4 weeks after biliary decompression for improving liver function. In 1999, Povoski et al<sup>6</sup> reported that prior biliary decompression (PBD) was the only factor associated with postoperative infection and postoperative death. Bacteremia was thought to develop in some patients with biliary stents due to postoperative ascending colonization<sup>7</sup>. Many others report discourage the use of PBD in cases of distal biliary obstruction<sup>8-13</sup>. These reports recommend that more studies are required to select the patient waiting for pancreatoduodenectomy who really need prior biliary decompression. One of the largest prospective randomized trials, performed in the United States by Pitt et al.<sup>14</sup> concluded that PBD does not reduce operative risk, rather it increases hospital cost and therefore it is not recommended at all.

Cochrane Review found that PBD in patients with resectable pancreatic cancer and periampullary cancer undergoing surgery was associated with a similar mortality rate, but an increased incidence of serious morbidity, compared with patients who did not undergo PBD<sup>15</sup>. Jagannath et al.<sup>16</sup> reported that a positive bile culture in patients with drainage was associated with stent complications and duration of stenting and that uncomplicated stenting was not associated with increased rates of serious morbidity or mortality. Coates et al.<sup>17</sup> also concluded that the morbidity and mortality associated with PBD may not be as significant as previously reported due to recent refinements in endoscopic techniques and improvements in perioperative management.

Subsequent studies recommended that preoperative drainage should be performed in selected patients<sup>18,19</sup>. a) If the time from diagnosis to anticipated surgery is longer, then there is a chance of deterioration of gross liver function b) If patient with obstructive jaundice present with acute cholangitis, intense pruritus, or severe obstruction with very high bilirubin levels (>20 mg/dl). c) If patients are in poor status in terms of nutrition; develop ascites, leg edema, gross hypoalbuminemia and severe electrolyte imbalance due to obstructive jaundice, which is expected to improve with PBD d) If the tumor is locally advanced or borderline resectable; neoadjuvant chemotherapy or

chemoradiation is planned for them where PBD may prevent hepatotoxicity from chemotherapeutic agent e) Where hepatic resection (right or left lobectomy) is required along with pancreatoduodenectomy for distal bile duct malignancy with liver metastasis, PBD may improve liver functions and prevent postoperative liver failure<sup>20</sup>.

### **Which stent is good if PBD is required?**

There are two types of stents usually used for biliary decompression, plastic or self-expanding metallic stents (SEMSs). Plastic stents are less costly but requires frequent changing before surgery. In contrast, SEMSs are costly and no changes are required before surgery. Several studies support the use of self-expanding metallic stents (SEMSs)<sup>21-23</sup>. They demonstrated that SEMSs provide excellent patency and with very few incidence of cholangitis after 4 weeks. It does not affect surgical technique and provides minimal postoperative complications in patients waiting to undergo pancreaticoduodenectomy or in others as mentioned above. Decker et al.<sup>23</sup> reported no preoperative re-intervention was required who received SEMS. In contrast, re-intervention was required in 40% patients who underwent plastic stenting.

The other two studies comparing plastic and metallic stents for internal drainage found no significant difference in either the overall or serious complication rates between SEMSs and plastic stents<sup>24,25</sup>. However it is recommended that SEMS is very much useful in patients who are candidates for neoadjuvant chemotherapy or chemoradiation with obstructive jaundice and resectable or borderline resectable pancreatic cancer. Considering all these facts it is concluded that because of higher price of SEMSs it should be used for selected patients<sup>25</sup>.

### **Our observation (data not published)**

We prospectively studied bile of common bile duct from 65 patients with obstructive jaundice who underwent surgery for determining the type of organism growth in bile and the types of antibiotic which are sensitive to them. It has been found that 16 patients who underwent PBD, organisms grew in bile of 14/16 patients (87.5%). Ampicillin, Cephalosporin and Quinolone derivatives antibiotic were almost resistant to all these organisms. Meropenem, Tazobactam and Piperacillin, Amikacin were sensitive to 50% or less, however combination of any two of

these costly antibiotic provided 60-70% sensitivity to those growing organisms. The interesting findings were that all 14 patients developed postoperative wound infection in different grading; including burst abdomen. Their hospital stay was more and they spent more money for their recovery than who did not undergo PBD.

### Conclusions

Considering above discussion, it is concluded that biliary decompression should not routinely be performed in patients with distal malignant biliary obstruction before pancreatoduodenectomy. It should only be considered in carefully selected patients; the surgery is being delayed for any reasons, patients with severe jaundice, cholangitis, or severe malnutrition, neoadjuvant therapy is planned for potentially resectable or irresectable tumors. Although more expensive, the use of metallic stents remain a viable option to achieve effective drainage without cholangitis and reintervention.

### References

- Jenkins LJ, Parmar AD, Han Y, Duncan CB, Sheffield KM, Brown KM, Riall TS. Current trends in preoperative biliary stenting in patients with pancreatic cancer. *Surgery*. 2013;154:179-189
- Cortes A, Sauvanet A, Bert F, Janny S, Sockeel P, Kianmanesh R, Ponsot P, Ruszniewski P, Belghiti J. Effect of bile contamination on immediate outcomes after pancreatoduodenectomy for tumor. *J Am Coll Surg*. 2006; 202:93-99.
- Smith RA, Dajani K, Dodd S, Whelan P, Raraty M, Sutton R, Campbell F, Neoptolemos JP, Ghaneh P. Preoperative resolution of jaundice following biliary stenting predicts more favourable early survival in resected pancreatic ductal adenocarcinoma. *Ann Surg Oncol*. 2008; 15:3138-3146.
- Morris-Stiff G, Tamijmarane A, Tan YM, Shapey I, Bhati C, Mayer AD, Buckels JA, Bramhall SR, Mirza DF. Pre-operative stenting is associated with a higher prevalence of post-operative complications following pancreatoduodenectomy. *Int J Surg*. 2011;9:145-149.
- Isla AM, Griniatsos J, Riaz A, Karvounis E, Williamson RC. Pancreaticoduodenectomy for periampullary malignancies: the effect of bile colonization on the postoperative outcome. *Langenbecks Arch Surg*. 2007;392:67-73.
- Povoski SP, Karpeh MS, Conlon KC, Blumgart LH, Brennan MF. Association of preoperative biliary drainage with postoperative outcome following pancreaticoduodenectomy. *Ann Surg*. 1999;230:131-142
- Sung JY, Leung JW, Shaffer EA, Lam K, Olson ME, Costerton JW. Ascending infection of the biliary tract after surgical sphincterotomy and biliary stenting. *J Gastroenterol Hepatol*. 1992; 7:240-245
- Limongelli P, Pai M, Bansi D, Thiallinagam A, Tait P, Jackson J, Habib NA, Williamson RC, Jiao LR. Correlation between preoperative biliary drainage, bile duct contamination, and postoperative outcomes for pancreatic surgery. *Surgery*. 2007;142:313-318
- Lermite E, Pessaux P, Teyssedou C, Etienne S, Brehant O, Arnaud JP. Effect of preoperative endoscopic biliary drainage on infectious morbidity after pancreatoduodenectomy: a case-control study. *Am J Surg*. 2008;195:442-446
- Mezhir JJ, Brennan MF, Baser RE, D'Angelica MI, Fong Y, DeMatteo RP, Jarnagin WR, Allen PJ. A matched case-control study of preoperative biliary drainage in patients with pancreatic adenocarcinoma: routine drainage is not justified. *J Gastrointest Surg*. 2009;13:2163-2169.
- Garcea G, Chee W, Ong SL, Maddern GJ. Preoperative biliary drainage for distal obstruction: the case against revisited. *Pancreas*. 2010;39:119-126.
- Ngu W, Jones M, Neal CP, Dennison AR, Metcalfe MS, Garcea G. Preoperative biliary drainage for distal biliary obstruction and post-operative infectious complications. *ANZ J Surg*. 2013;83:280-286
- Kitahata Y, Kawai M, Tani M, Hirono S, Okada K, Miyazawa M, Shimizu A, Yamaue H. Preoperative cholangitis during biliary drainage increases the incidence of postoperative severe complications after pancreaticoduodenectomy. *Am J Surg*. 2014; 208:1-10.

14. Pitt HA, Gomes AS, Lois JF, Mann LL, Deutsch LS, Longmire WP. Does preoperative percutaneous biliary drainage reduce operative risk or increase hospital cost? *Ann Surg.* 1985;201:545-553.
15. Fang Y, Gurusamy KS, Wang Q, Davidson BR, Lin H, Xie X, Wang C. Pre-operative biliary drainage for obstructive jaundice. *Cochrane Database Syst Rev.* 2012;9:CD005444.
16. Jagannath P, Dhir V, Shrikhande S, Shah RC, Mullerpatan P, Mohandas KM. Effect of preoperative biliary stenting on immediate outcome after pancreaticoduodenectomy. *Br J Surg.* 2005;92:356-361.
17. Coates JM, Beal SH, Russo JE, Vanderveen KA, Chen SL, Bold RJ, Canter RJ. Negligible effect of selective preoperative biliary drainage on perioperative resuscitation, morbidity, and mortality in patients undergoing pancreaticoduodenectomy. *Arch Surg.* 2009;144:841-847.
18. Roque J, Ho SH, Goh KL. Preoperative drainage for malignant biliary strictures: is it time for self-expanding metallic stents? *Clin Endosc.* 2015;48:8-14.
19. Lai EC, Lau SH, Lau WY. The current status of preoperative biliary drainage for patients who receive pancreaticoduodenectomy for periampullary carcinoma: a comprehensive review. *Surgeon.* 2014;12:290-296.
20. Kawarada Y, Das BC. Should biliary decompression be performed prior to major hepatectomy for malignant biliary obstruction? *Ann Coll Surg HK.* 1998;2(1):3-4
21. Roque J, Ho SH, Goh KL. Preoperative drainage for malignant biliary strictures: is it time for self-expanding metallic stents? *Clin Endosc.* 2015;48:8-14
22. Singal AK, Ross WA, Guturu P, Varadhachary GR, Javle M, Jaganmohan SR, Raju RP, Fleming JB, Raju GS, Kuo YF. Self-expanding metal stents for biliary drainage in patients with resectable pancreatic cancer: single-center experience with 79 cases. *Dig Dis Sci.* 2011; 56:3678-3684
23. Decker C, Christein JD, Phadnis MA, Wilcox CM, Varadarajulu S. Biliary metal stents are superior to plastic stents for preoperative biliary decompression in pancreatic cancer. *Surg Endosc.* 2011;25:2364-2367
24. Cavell LK, Allen PJ, Vinoya C, Eaton AA, Gonen M, Gerdes H, Mendelsohn RB, D'Angelica MI, Kingham TP, Fong Y. Biliary self-expandable metal stents do not adversely affect pancreaticoduodenectomy. *Am J Gastroenterol.* 2013;108: 1168-1173
25. Haapamäki C, Seppänen H, Udd M, Juuti A, Halttunen J, Kiviluoto T, Sirén J, Mustonen H, Kylänpää L. Preoperative biliary decompression preceding pancreaticoduodenectomy with plastic or self-expandable metallic stent. *Scand J Surg.* 2015;104:79-85.