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Risk Factors for Postoperative Complications of Pancreaticoduodenectomy at Ramathibodi Hospital

Narat Asavakesmanee, MD
Panuwat Lertsithichai, MD
Preda Samritpradit, MD
Department of Surgery, Ramathibodi Hospital, Faculty of Medicine, Mahidol University, Bangkok 10400, Thailand

Abstract

Objectives: **To identify preoperative and intraoperative risk factors for postoperative complications following pancreaticoduodenectomy at Ramathibodi Hospital.**

Patients and Methods: **Existing medical records of 68 patients who underwent pancreaticoduodenectomy during the 15-year period from 1989 to 2003 at Ramathibodi Hospital were reviewed. Demographic, preoperative and intraoperative factors, as well as various postoperative infectious, wound and anastomotic complications, were analyzed. Statistical associations between these risk factors and postoperative complications were assessed.**

Results: **There was a 38% (26 of 68) incidence of postoperative infectious, wound and anastomotic complications. Increased postoperative complications were observed in patients with older age, low preoperative albumin level, high preoperative total bilirubin level, preoperative pancreatitis, evidence of biliary tract lithiasis, preoperative sepsis, malignancy, increased blood loss and portal vein injury; but none of these associations was statistically significant. Preoperative stenting of obstructed common bile duct was associated with decreased risk of complications, but this was also not statistically significant. The only factor associated with a significant increased risk of complications was prolonged operative time (Odds ratio: 1.43 per hour increase, 95% Cl: 1.04 to 1.98).**

Conclusions: **Due to the small sample size of this study, only one risk factor, ie. increased operative time, was found to be significantly associated with an increased risk of postoperative infectious, wound and anastomotic complications in patients undergoing pancreatoduodenectomy.**

Introduction

Pancreaticoduodenectomy is a major operation that needs skill and experience of surgeons. The procedure requires a prolonged operative time and may cause serious complications which, once occurred, is difficult to deal with and may need multimodality therapy including medications, and parenteral nutrition.

Serious complications such as pancreatic fistula, wound complications, intraabdominal collection and anastomotic leakage may develop despite surgeon's experience. A study by Srivastava S. in India[1] showed that preoperative biliary drainage was significantly related to wound infection, intraabdo-minal abscess, anastomotic leakage and infective complications. And together with jaundice, risk of bleeding complication increased. Leffler J, et al. in Great Britain[2] found that

Correspondence address : *Narat Asavakesmanee, MD, Department of Surgery, Ramathibodi Hospital, Faculty of Medicine, Mahidol University, Bangkok 10400, Thailand. E-mail: narat_a@yahoo.com*

soft tissue of unaltered pancreas was a significant risk factor for impairing of pancreatic anastomosis. Gouma DJ in the Natherlands[3] found no significant difference in overall death rate among experienced and less experienced centers as well as patient age whether below or above 80. Sohn TA[4] found that preoperative biliary stent increased risk for pancreatic fistula and wound infection significantly. Tocchi A[5] studied risk factors for devel-oping complications after pancreaticoduodenectomy and found that operative techniques and pathological status of pancreatic remnant were significant risk factors for pancreatic leakage.

The objective of this study was to determine risk factors for postoperative complications of pancreaticoduodenectomy at Ramathibodi Hospital, Mahidol University in order to reduce the morbidity and mortality.

Materials and Methods

This retrospective study was performed by reviewing medical records during the 15-year period from 1989 to 2003 at Ramathibodi Hospital, Mahidol University, Bangkok. Demographic, preoperative and intraoperative factors together with postoperative complications in 68 patients with existing medical records who underwent pancreaticoduodenectomy during this 15-year period were reviewed. Pancreaticoduodenectomy performed in trauma was excluded from this study. Chi-square test, Fisher's exact test, Wilcoxon Ranksum test and independence sample t-test were used for statistic analysis.

Results

There was a 38% (26/68) incidence of postoperative infections and anastomotic complications. These complications included surgical site infection in 14/68 (21%), anastomotic leakage in 7/68 (10%), wound dehiscence in 5/68 (7%) and pancreatic fistula in 10/68 (15%). Gastric atony was found in 4/68 (6%) and postoperative bleeding in 3/68 (4%). Death occurred in 13% (9/68) (Table 1).

It was observed that postoperative complications increased in patients with old age, high preoperative bilirubin level, preoperative pancreatitis, evidence of biliary tract stones, preoperative sepsis and increased blood loss, but none of them was statistically significant.

Table 1 Outcomes of Pancreaticoduodenectomy

Outcomes	Number (%)
Infectious and wound complications (total)	26/68 (38)
SSI	14/68 (21)
Anastomotic leakage	7/68 (10)
Wound dehiscence	5/68 (7)
Pancreatic fistula10/68 (15)	
Death	9/68 (13)
Gastric atony	4/68 (6)
Post operative bleeding	3/68 (4)

It was found that preoperative biliary stent was associated with decreased risk of postoperative complications but this was also of no statistically significance. The only significant risk factor for postoperative complication was prolonged operative time (Oods ratio = 1.43 per hour increase, 95% CI: 1.04 to 1.98) (Table 2).

The operations performed by either young or senior surgeons were of no statistically significance for developing postoperative complications after pancreaticoduodenectomy.

Discussion

The only significant risk factor for postoperative complications was prolonged operative time. This may be due to the increase in stress and metabolic state in prolonged operation that seems to occur in older patients. This risk factor, however, may be reduced by minimizing unnecessary operative time such as prolonged anesthetic time and waiting time for instruments not readily available in the operative room.

Preoperative biliary stent was not significantly related to increased risk for postoperative infectious complications and this may be due to the advancement in technique and better postoperative care compared to the past.

As in previous study, it was found that the operation performed by either senior or younger surgeon had no statistically significant difference in increased postoperative complications. This might be because some young surgeons had excellent skill in surgical procedures. Hence, surgeons with less skills who requiremore time for the operative procedure should ask skillful surgeons for their assistance.

The limitation of this study was the small number

Table 2 Risk factors for postoperative wound infections

Risk factors	Total (N = 68)	No complications (N = 42)	With complications (N = 26)	p-values
Age (year): mean (SD)	55.0 (12.6)	54.3 (13.7)	56.1 (10.7)	0.560*
Sex (male:female): number (%)	36:32 (53:47)	24:18 (57:43)	12:14 (46:54)	0.378**
Underlying illness: number (%)	17/68 (25)	11/42 (26)	6/26 (23)	0.770**
Preop stent: number (%)	9/68 (13)	6/42 (14)	3/26(12)	0.745**
Preop albumin (mg%): mean (SD)	34.6 (8.4)	34.0 (9.5)	35.5 (6.5)	0.760*
Preop bilirubin (mg%) : median (range)	5,7 (0.3-41)	5.0 (0.3-41)	6.1(0.4-21.5)	0.484t
Preop pancreatitis: number (%)	4/64 (6)	2/42 (5)	2/26 (8)	0.633**
Preop stones (yes): number (%)	10/68 (15)	4/42 (10)	6/26 (23)	0.091**
Malignancy (yes): number (%)	60/68 (88)	36/42 (86)	24/26 (92)	0.412**
Post-op TPN: number (%)	30/68 (44)	17/42 (40)	13/26(50)	0.442**
Pylorus-preserving operation: number (%)	17/68 (25)	11/42 (26)	6/26 (23)	0.773**
Blood loss (ml): Median (range)	1350 (100-4400)	1300 (100-4400)	1550 (800-4200)	0.204t
Operative time (hour): Mean (SD)	6.1 (1.7)	5.7 (1.2)	6.7 (2.2)	0.020*

**p-values by independent samples t-test; **p-values by chi-square or Fisher's exact test as appropriate; p-values by Wilcoxon Ranksum test*

of sample size as pancreaticoduodenectomy was comparatively a rather rare operative procedure and also less available charts for reviewing. There might be some other additional significant risk factors for postoperative complication if we extended the period of the study.

In the future, we may find more significant risk factors by increasing sample size and designing a prospective study with more appropriate data and analysis.

In this study, only prolonged operative time was found to be significant risk factor for postoperative complications after pancreaticoduodenectomy, especially in older patients.

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