

Research Article

Predicting Patient Survival after Pancreaticoduodenectomy for Malignancy Based on Histopathological Criteria, Minia University Hospital Experience

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Abstract

This study aimed to identify histopathological variables that might contribute to survival, mortality of patients, and serious complications after pancreaticoduodenectomy. **Patients and methods:** This is prospective hospital based study that been done on all patients who underwent pancreaticoduodenectomy in National Liver Institute and Minia university hospital. between the first of January 2015 till the end of December 2016. in the surgical department, National Liver Institute, Menoufiya University and Minia university hospital. **Results:** We found that perineural infiltration and lymphovascular invasion were independently significant in multivariate analysis, the effects of combining them in terms of predicting longterm survival is very important. Smaller and well-differentiated tumours were associated with significantly better patient survival ($P < 0.03$ and $P < 0.01$, respectively). Positive lymph nodes were associated with reduced survival ($P < 0.003$). **Conclusion:** The analyse the histopathological parameters influencing longterm patient survival after pancreaticoduodenectomy focusing on perineural infiltration and lymphovascular invasion as predictors of longterm survival.

Keywords: Pancreaticoduodenectomy; histopathological; tumours

Introduction

Pancreatic malignancies overall are associated with poor longterm prognosis. Five-year survival rates following pancreatic resection for pancreatic adenocarcinoma remain low (<20%), even in large-volume institutions. This cohort had a median follow-up of nearly 5 years and an actuarial survival of 27%, which is comparable with the recently published MD Anderson series⁽¹⁾

Historically, pancreaticoduodenectomy (PD) has been associated with high rates of mortality and morbidity. The mortality rate was higher than 30%. Recently, several high-volume centers have reported markedly improved mortality rates, as low as 1–2%. Postoperative morbidity, however, remains common⁽²⁾. Pancreaticoduodenectomy is a therapy indicated for malignant diseases

localized in the periampullary region, Furthermore, patients with benign lesions of this area in which a malignancy cannot be ruled out pre-operatively may also benefit from this surgery⁽³⁾.

Aim of the Work

We aimed to assess prognosis and predict patient survival following pancreaticoduodenectomy based on lymphovascular invasion, perineural infiltration, lymph node status and lymph node ratio in patients candidate for Whipple operation for malignancy.

Patients and methods

Patients presented with pancreatic head mass or periampullary carcinoma candidate for whipple operation from january 2015 to December 2016, in the surgical department,

National Liver Institute, Menoufiya University and Minia university hospital on.

This study included 40 patients of presented with pancreatic head mass or periampullary carcinoma candidate for whipple operation of either sex with age not less than 18 years old; operated by open exploratory maneuver through bilateral subcostal incision.

Operative technique

All exploratory procedures were done under general anesthesia and naso-gastric tube was inserted to diminish the size of the stomach and to reduce the distension of small bowel. A Foly's urethral catheter was inserted to be removed in the recovery room.

Our technique utilizes a bilateral subcostal incision (Chevron incision). The liver and peritoneal surface is carefully examined to exclude the presence of metastatic disease, and intraoperative ultrasonography of liver and pancreas is performed. Adequate exposure is essential for proper Whipple's

operation. Good retraction with self-retaining retractor makes assistant's hands free to help the surgeon during surgical procedure. Bipolar cautery, ligaseal, harmonic scalpel are of benefits including staplers to divide stomach and duodenum. Initial mobilization is done by reflecting the hepatic flexure and transverse colon downwards; then extended Kocherisation is done by lateral duodenal ligament which exposes SMV, IVC and aorta partly. Invasion or encasement of these vessels will prevent from proceeding with resection; just essential bypass will be sufficient. Middle colic vein when traced will help in identifying the SMV.

Gastrojejunostomy is done 20 cm distal to the hepaticojejunostomy as an antecolic anastomosis. As already stomach is transected with stapler earlier during procedure, gastrojejunostomy is done using linear stapler device just proximal and posterior to the stapled line. Single layer 3-zero vicryl hand sewn anastomosis also can be done.

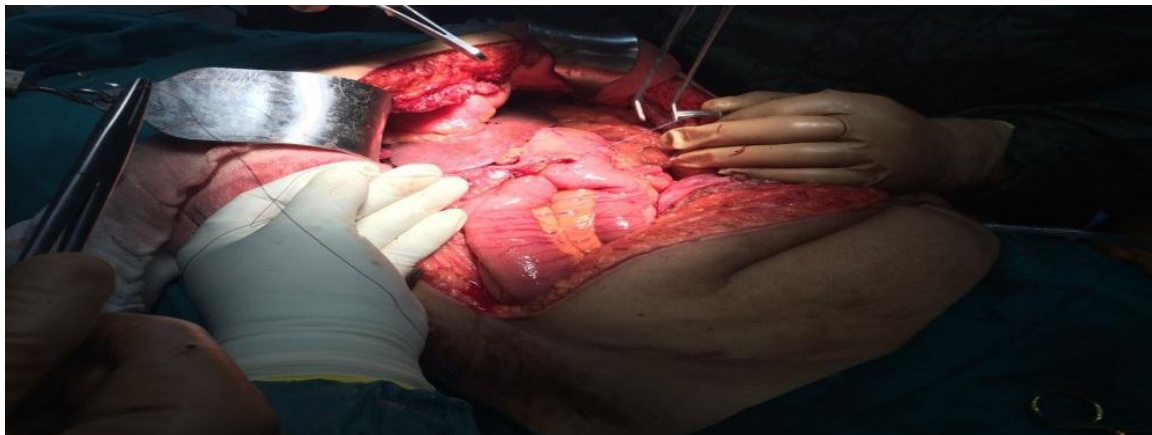


Fig. (1) gastrojejunostomy anastomosis



Fig. (2) the specimen after removal

Statistical analysis

All collected data were tabulated, graphed and mathematically analyzed. Numerical data expressed as mean \pm SD and categorical data were expressed as number and percent (%). T-student test was used to compare numerical data, and Chi-square test was used to compare categorical data. P-value was considered to be significant if it was less than 0.05

Results

This study included 40 patients presented with pancreatic head mass or periampullary carcinoma candidate for whipple operation of either sex with age not less than 18 years old; operated by open exploratory maneuver through bilateral subcostal incision from January 2015 to December 2016, in the surgical department, National Liver Institute, Menoufiya University and Minia university hospital.

** Multivariate analysis:

** When all the significant histopathological parameters on univariate analysis were

assessed using a multivariate regression model, perineural infiltration ($P < 0.03$) and lymphovascular invasion ($P = 0.05$) were the only independent factors prognostic for longterm survival.

**** Prognostic modelling using perineural infiltration and lymphovascular invasion:**

perineural infiltration ($P < 0.03$) and lymphovascular invasion ($P = 0.05$) were the only independent factors prognostic for longterm survival. As these two factors were independently significant in multivariate analysis, the effects of combining them in terms of predicting longterm survival were analysed. The 40 patients with malignancies were divided into four categories consisting of those who were positive for both parameters, those who were positive for either one of the parameters and those who were negative for both. Figure 3 illustrates that patients who were negative for both parameters had significantly better survival than the other groups ($P < 0.0001$).

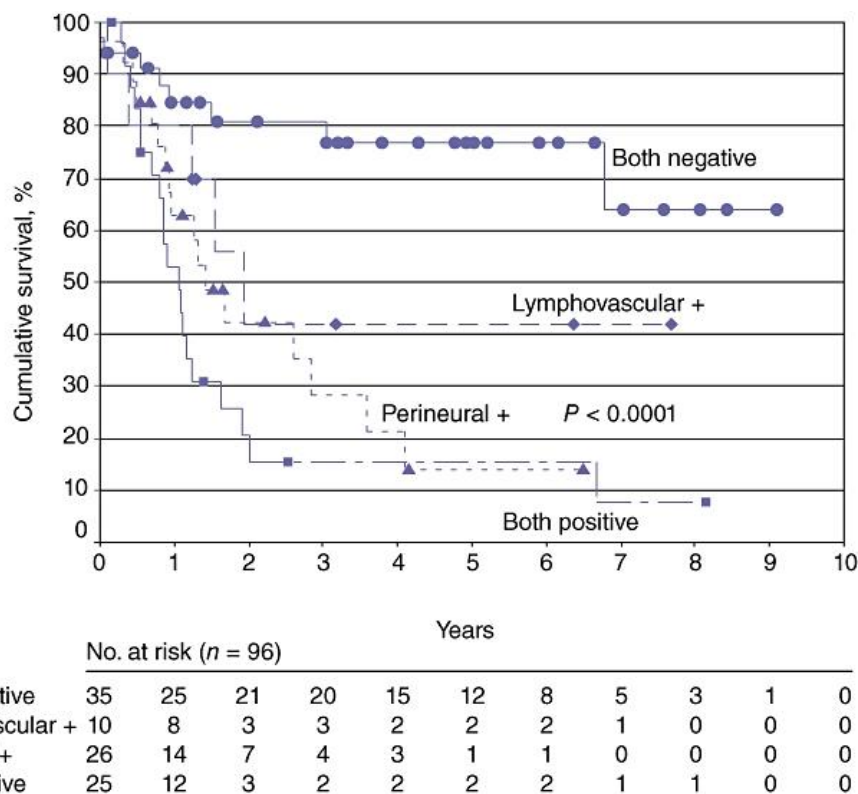


Figure 3: Cumulative patient survival in the presence or absence of perineural infiltration and lymphovascular invasion after resection. Survival is significantly improved if both features are absent on microscopic examination.

Table (1): Five-year survival rates after pancreaticoduodenectomy for pancreatic malignancies in patients positive and negative for perineural infiltration and lymphovascular invasion (n= 40)

	Perineural –	Perineural +
Lymphovascular –	77%	14%
Lymphovascular +	42%	15%

Likewise, when these parameters were applied to patients with pancreatic adenocarcinoma, those who were negative for both parameters had an excellent actuarial 5-year survival of 71% compared with the other three groups

Discussion

We studied the effect of different variables on patient’s outcome within the first 6th months and first two year survival after pancreaticoduodenectomy. The 6th month's time was chosen because the majority of the major complications and mortalities after pancreaticoduodenectomy have been reported to occur within this period.

Identification of key variables will be essential if improved clinically acceptable models are to be built in the future. Although many variables that are clinically assumed to be important in survival may not reach statistical significance in multivariable models, the ability to test the effect of clinically relevant variables will increase the face value of statistical prediction⁽⁴⁾

The 5-year survival for patients who underwent pancreaticoduodenectomy for periampullary malignancies other than pancreatic adenocarcinoma was 61%. This result is also in line with previously published results for periampullary carcinomas,

including a recently published series from Birmingham which reported an actuarial 5-year survival of 60% for ampullary carcinoma following resection.⁽⁵⁾

Also the results of our study are agree with the results of the study done by Chen JW et al., which shows that Patients who underwent resection had 1-, 3- and 5-year survival rates of 70%, 46% and 41%, respectively.

The 1-, 3- and 5-year survival rates for peria-mpullary cancers other than pancreatic adenocarcinoma were 83%, 69% and 61%, respectively; those for pancreatic adenocarcinoma were 62%, 31% and 27%, respectively ($P < 0.003$).⁽⁶⁾

In our study we confirmed that smaller and well-differentiated tumours were associated with significantly better patient survival ($P < 0.03$ and $P < 0.01$, respectively) and Positive lymph nodes were associated with reduced survival ($P < 0.003$) this is agree with the study done by⁽⁶⁾ which confirms that Poor tumour differentiation ($P < 0.02$), tumour size >3 cm ($P < 0.04$), margin ≤ 2 mm ($P < 0.02$), nodal involvement ($P < 0.003$), were associated with poorer prognosis.

In our study we confirm that Smaller and well-differentiated tumours were associated with significantly better patient survival ($P < 0.03$)

In our study presence of histopathologically positive perineural infiltration and or lympho vascular invasion carries poor prognosis regard to survival this matches with the results of the study done by⁽⁶⁾ which confirms that perineural infiltration ($P < 0.0001$) and lymphovascular invasion ($P < 0.002$) were associated with poorer prognosis. In a multivariate analysis.

Conclusion

We concluded that The absence of malignant perineural infiltration and lymphovascular invasion was associated with highly significantly improved survival.

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