Spleen-preserving distal pancreatectomy

Lee S Y, Goh B K, Tan Y M, Chung Y F, Cheow P C, Chow P K, Wong W K, Ooi L L

ABSTRACT

Introduction: Splenectomy is routinely performed in conventional distal pancreatectomies. Spleen removal with its possible sequelae of infections and haematological complications has prompted the development of spleen-preserving techniques. This study aimed to evaluate the safety and clinical outcomes of distal pancreatectomy with preservation of the spleen.

Methods: A retrospective review of 24 consecutive patients who underwent spleen-preserving distal pancreatectomy in a tertiary care hospital was conducted.

Results: There were 17 female and seven male patients, and the mean age was 47 (range 14–77) years. Median American Society of Anesthesiologists score was II (range I–III). The indications were as follows: mucinous cystadenoma (n = 7), serous cystadenoma (n = 6), insulinoma (n = 3), intraductal papillary mucinous tumour (n = 2), pseudocyst (n = 3), papillary cystic adenoma (n = 1), neuroendocrine neoplasm (n = 1), and metastatic carcinoma of the thyroid (n = 1). Two patients developed postoperative pancreatic fistula and another two patients developed postoperative ileus with spontaneous resolution. Mean operative time was 172 (range 105–250) minutes. Mean length of postoperative hospital stay was 6.7 (range 5–11) days. There was no perioperative mortality in this series.

Conclusion: Spleen-preserving distal pancreatectomy can be safely performed with low morbidity, and should be considered in the surgical management of distal pancreatic disease.

Keywords: distal pancreatectomy, pancreatectomy, spleen-preserving distal pancreatectomy

Singapore Med J 2008; 49(11): 883-885

Department of General Surgery, Singapore General Hospital, Outram Road, Singapore 169608

Lee SY, MBBS, MMed, MRCS
Registrar

Goh BK, MBBS, MMed, FRCS
Associate Consultant

Tan YM, MBBS, FRCS, FAMS
Senior Consultant

Chung YF, MBBS, FRCS, FAMS
Senior Consultant

Cheow PC, MBBS, FRCS, FAMS
Consultant

Chow PK, MBBS, FRCS, FAMS
Associate Professor and Senior Consultant

Wong WK, MBBS, FRCS, FAMS
Associate Professor and Senior Consultant

Ooi LL, MBBS, FRCS, FAMS
Professor and Senior Consultant

Correspondence to:
Dr Tan Yu Meng
Tel: (65) 6321 4051
Fax: (65) 6220 9323
Email: gsutym@sgh.com.sg

INTRODUCTION

Distal pancreatectomy is the operation of choice for benign or malignant disease of the body or tail of the pancreas. This procedure has traditionally included splenectomy. Spleen removal with its possible sequelae of infections and haematological complications has prompted the development of spleen-preserving techniques. However, many authors have suggested that splenic preservation is more difficult, more time consuming and has increased blood loss from venous tributaries.[1] This study aimed to evaluate the safety and clinical outcomes of distal pancreatectomy with preservation of the spleen.

METHODS

A retrospective review of 24 consecutive patients who underwent spleen-preserving distal pancreatectomy (SPDP) in a tertiary care hospital was performed. Short-term outcome measures, such as perioperative complications, mean operating time, length of hospital stay and mortality, were analysed. The results are shown in Table I. The decision for SPDP was made based on clinical findings, preoperative imaging and intraoperative findings. In our department's practice, any pancreatic lesions that are suspicious for a malignant process are considered as contraindications for SPDP. Frozen section is not routinely performed and is based on the individual surgeon's judgment; if the frozen section is suspicious of a malignant process, the spleen will not be preserved.

RESULTS

There were 24 patients in our series, consisting of 17 female and seven male patients. The mean age was 47 (range 14–77) years. Median American Society of Anaesthesiologists (ASA) score was II (range I–III). The pathology of the resected lesions is shown in Table II. Two patients developed postoperative pancreatic fistula and another two patients developed postoperative ileus with spontaneous resolution. Mean operative time was 172 (range 105–250) minutes. Mean length of postoperative hospital stay was 6.7 (range 5–11) days (Table II). There was no perioperative mortality in this series. The mean follow-up period is 67.5 (range 12–187) months. There

Table I. Perioperative results.

Variables	Results
No. (%) overall complications	4/24 (15.4)
Pancreatic fistulas	2/24 (7.7)
Postoperative ileus	2/24 (7.7)
Mean (range) operative time (mins)	172 (105–250)
Mean (range) length of hospital stay (days)	6.7 (5–11)

Table II. Distribution of histological features

Histological features	No. (%)
Mucinous cystadenoma	7 (29.2)
Serous cystadenoma	7 (29.2)
Insulinoma	3 (12.5)
Intraductal papillary mucinous tumour	2 (8.3)
Pseudocyst	3 (12.5)
Neuroendocrine neoplasm	1 (4.2)
Metastatic carcinoma of the thyroid	1 (4.2)
Total	24 (100)

was no long-term complication, such as pancreatic insufficiency, and no pancreatic-related mortality in this series.

DISCUSSION

The technique of distal pancreatectomy was first described in 1913 by Mayo.[2] The procedure of SPDP was only outlined in 1943 by Mallet-Guy and Vachon.[3] Since then, although the technique is practised and performed by many surgeons, it has not been routinely practised nor accepted. There are two variations in techniques for SPDP, viz. with or without preservation of the splenic artery and vein. Warshaw described a technique of SPDP without the preservation of the splenic artery and vein in 1988.[4] In Warshaw's method, the splenic vessels are ligated at the splenic hilum. For this technique, the spleen's vascular supply is subsequently largely dependent on the short gastric vessels. Warshaw's method is technically less demanding and thus results in a shorter operating time. This method is favourable and indicated in patients whose splenic artery and vein are inflamed, fibrosed or involved in any neoplastic process. The disadvantages of this method, besides being associated with a higher incidence of spleen vascular insufficiency, such as splenic infarct or necrosis, are a reported higher incidence of gastric varices and gastrointestinal bleeding possibly due to an increase of venous pressure in the area of the left gastroepiploic and short gastric veins.[5]

We practised the technique of preserving both the splenic artery and vein. The level of resection may commence at the proximal body or the neck, depending on the position of the lesion, and proceed in a retrograde fashion, with preservation of both the splenic artery and vein. After careful dissection and mobilisation, a plane was developed between the splenic, portal or superior mesenteric vein and the pancreas. The splenic artery and vein were slung on a vessel loop and individual vessels supplying or draining the pancreas are meticulously ligated between ligatures until the dissection reaches the splenic hilum. After mobilisation is complete, the pancreas was then transected either with a surgical stapler or sharply divided and then over sewn. We attempted to identify the pancreatic duct after pancreatic transection and ligate it separately. This was to decrease the likelihood of a pancreatic fistula postoperation. An abdominal drain was left *in situ* and drain amylase level was analysed on the fifth postoperative day. The main advantage of preserving the main splenic blood supply is a consequent lower incidence of splenic infarction, dysfunction and necrosis,[6] however, this necessitates meticulous dissection and mobilisation to achieve a plane between the splenic vessels and the pancreas. However, until recently, study of the usefulness and safety of this procedure has been limited to trauma and pancreatitis;[7] there is little information of its benefits and safety for benign tumours.[8]

There are many retrospective studies comparing the outcomes between distal pancreatectomy with or without splenectomy.[1,7-11] Three of the reviews found that there were comparable or no significant differences between the two procedures in terms of complication rate:[7,9,11] Richardson and Scott-Conner reported no differences in complications rates between the two groups and concluded that splenectomy should not be routine for distal pancreatectomy.[7] Lillemoe et al reported that patients who underwent a distal pancreatectomy with splenectomy had a similar complication rate, operative time and intraoperative blood loss, but a shorter postoperative length of stay than the patients who had splenic preservation.[9] Aldridge and Williamson reported that the spleen could be safely preserved as the complication rates were comparable for distal pancreatectomy in the spleen-preservation and the splenectomy groups.[11] Benoist et al reported complication rates twice of that in the spleen-preserving group; this was largely attributed to the pancreatic fistula rate and frequency of subphrenic abscesses.[8] Shoup et al concluded that splenic preservation following distal pancreatectomy for benign or low-grade malignant disease was safe and was associated with a reduction in perioperative infectious complications, severe complications, and length of hospital stay, compared with conventional distal pancreatectomy with splenectomy.[1] One recent study revealed that infectious

intra-abdominal complications were significantly higher in the splenectomy group than in the spleen-preserving group, but the length of the surgery, perioperative blood loss or transfusions, perioperative mortality and length of hospital stay did not differ between the two groups. In this study, univariate analysis showed that splenectomy was the only risk factor for postoperative complication.[10]

In this series, we demonstrated an overall complication rate of 15.4% (4/26) with a pancreatic fistula rate of 7.7%, which are comparable to reports in the literature.[1,9] The mean hospital stay was 6.7 (range 5–11) days, and length of surgery was 2.87 hours (172 minutes), which are also similar to other studies.[9] Shoup et al reported an overall complication rate of 39%, operation time of 2.9 hours and a mean hospital stay of 7 days.[1] Lillemoe et al reported an overall complication rate of 31%, pancreatic fistula rate of 5%, operation time of 5.1 ± 1.7 hours and a mean hospital stay of 21 days.[9] Two patients developed postoperative ileus, but this was not significantly longer than the mean operation time in this series, and it was attributed to delayed postoperation mobility. These results were compared to a group of patients who had undergone distal pancreatectomy with splenectomy alone (n = 117). In comparison to the group of patients who undergone distal pancreatectomy with splenectomy, there were no significant differences with regard to perioperative complications, mean operating time, pancreatic fistula rate, length of hospital stay and mortality.[12] The mean follow-up period in this series was 67.5 (range 12–187) months. There was no long-term complication, such as pancreatic insufficiency, and no pancreatic-related mortality, in this series. In conclusion, SPDP can be safely performed as it is associated with a low complications rate, a short hospital stay and has low infective complications with low morbidity and mortality. It should be considered in the surgical management of distal pancreatic disease.

REFERENCES

1. Shoup M, Brennan MF, McWhite K, et al. The value of splenic preservation with distal pancreatectomy. Arch Surg 2002; 137:164-8.
2. Mayo WJ. The surgery of the pancreas. Ann Surg 1913; 58:145-50.
3. Mallet-Guy P, Vachon A. Pancreatites Chroniques Gauches. Paris, France: Mason, 1943.
4. Warshaw AL. Conservation of the spleen with distal pancreatectomy. Arch Surg 1988; 123:550-3.
5. Miura F, Takada T, Asano T, et al. Hemodynamic changes of splenogastric circulation after spleen-preserving pancreatectomy with excision of splenic artery and vein. Surgery 2005; 138:518-22.
6. Yoshinobu S, Satoshi S, Nobuo T, et al. Evaluation of splenic circulation after spleen-preserving distal pancreatectomy by dividing the splenic artery and vein. Dig Surg 2000; 17:519-22.
7. Richardson DQ, Scott-Conner CE. Distal pancreatectomy with or without splenectomy: a comparative study. Am Surg 1989; 55:21-5.
8. Benoist S, Duque L, Sauvanet A, et al. Is there a role of preservation of spleen in distal pancreatectomy? J Am Coll Surg 1999; 188:255-60.
9. Lillemoe KD, Kaushal S, Cameron JL, et al. Distal pancreatectomy: indications and outcomes in 235 patients. Ann Surg 1999; 229:693-700.
10. Carrère N, Abid S, Julio CH, Bloom E, Pradère B. Spleen-preserving distal pancreatectomy with excision of splenic artery and vein: a case-matched comparison with conventional distal pancreatectomy with splenectomy. World J Surg 2007; 31:375-82.
11. Aldridge MC, Williamson RCN. Distal pancreatectomy with and without splenectomy. Br J Surg 1991; 78:976-9.
12. Goh BKP, Tan YM, Chung YFA, et al. Critical appraisal of 232 consecutive distal pancreatectomies with emphasis on risk factors, outcome, and management of the postoperative pancreatic fistula: a 21-year experience at a single institution. Arch Surg 2008; 143:956-65.