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Original Article

Initial Experience of Laparoscopic Distal Pancreatic Resections: A Single Institution Study with Fifteen Consecutive Cases

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ABSTRACT

Objective: To review the initial experience of outcomes of a consecutive series of laparoscopic distal pancreatic resections are performed at a dedicated cancer hospital.

Study Design: Case series.

Place and Duration of Study: Department of Surgical Oncology at Tertiary Care Hospital, from Mar 2013 to Feb 2021.

Methodology: A retrospective review of consecutive series of patients in which distal laparoscopic pancreatic resections were performed. Data was collected through the Hospital information system (HIS), an electronic hospital database. All patients were discussed in a multidisciplinary team prior to surgery.

Results: Fifteen patients, including 4(26.6%) males with a mean age of 49.27±15.2, were planned for laparoscopic distal pancreatectomy. Pathologically, 12(80%) tumours were malignant, while three were benign. The procedure was converted to open in 3 patients. The mean operating time was 4.6±0.57 hours, with an estimated blood loss of around 183±28. 8mls.Mean hospital stay was 5.3±1.5 days. One patient developed a Grade A pancreatic fistula. Recurrence in the liver occurred in two patients, which was managed by systemic adjuvant therapy. However, one of them died later on because of sepsis.

Conclusion: A laparoscopic distal pancreatectomy is a safe approach for distal pancreatic tumours, with minimal complications and fast recovery in appropriate cases.

Keywords: Laparoscopic distal pancreatic resections, Pancreatic fistula, Pancreatectomy.

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INTRODUCTION

Modern advancement in laparoscopic surgery has caused the improvement of several different procedures for pancreatic pathologies including laparoscopicbiopsies.[1,2] staging laparoscopy, drainage procedures , enucleation,[3] distal pancreatectomy.[4,5] and pancreaticoduodenectomy. Unlike other gastrointestinal surgical procedures, clinical efforts to use laparoscopy for treating pancreatic malignancies have just started in recent times and are still controversial.[6]

However, much evidence favouring Laparoscopic surgery for distal pancreatic tumours is available, showing that it is a reasonable and oncologically safe procedure.[7]

In general, Laparoscopic surgeries are proven to have better outcomes in terms of post-operative recovery, small incisions, excellent cosmetic results and surgical complications.[8] Laparoscopic distal pancreatectomy (LDP) was started initially because it was technically simple and did not include anastomosis like pancreaticoduodenectomy.[9] Hypothetically, Laparoscopic Distil Pancreatectomy also allows starting earlier post-operative adjuvant chemotherapy. On the other hand, it is also said that its morbidity and rate of conversion to open is high.[10]

This study aimed to report the outcomes of a consecutive series of laparoscopic distal pancreatic resections performed at a dedicated Cancer hospital. These results will help provide evidence from our part of the world that LDP leads to decreased morbidity and enhanced recovery in the post-operative post-operative period. It will also encourage junior surgeons to switch from the open to the minimally invasive technique.

METHODOLOGY

The case series was conducted at the Department of Surgical Oncology of Tertiary Care Hospital, from March 2013 to February 2021 after IERB approval.

Inclusion Criteria: Patients of either gender aged 18-70 years who underwent Distil pancreatectomy were included.

Exclusion Criteria: Patients with tumours involving the head of the pancreas or any other surrounding Viscera were excluded. Also, patients with ischemic heart disease & any other severe co-morbid were excluded.

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Data was collected through the Hospital information system (HIS), an electronic hospital database. All patients were discussed in a multidisciplinary team prior to surgery. Standard demographic, Pre-operative clinical features, diagnostic assessment and pathologic data were collected. Information for operative time and estimated blood loss was collected from the records. Post-operative outcomes were recorded for length of hospital stay, surgical site infections, post-operative pancreatic fistula, and mortality. Oncological outcomes were also reviewed.

After induction of general anaesthesia, the patient was placed in Lloyd Davies's position. 12mm optical port was inserted using modified Hassan's technique. Four working ports were inserted. Staging laparoscopy was performed to rule out metastatic disease in case of malignant pathologies. The gastrocolic omentum was divided, preserving the gastroepiploic vessels. Splenic flexure was taken down, and short gastric vessels were divided with an energy device to gain maximum access to the lesser sac, as shown in Figure-1.

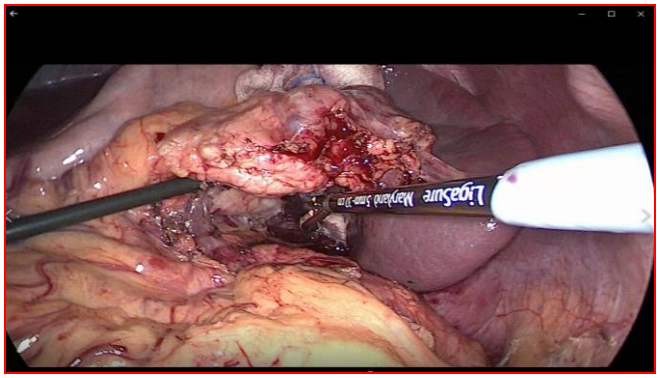

Figure-1: Mobilization of the Splenic Fexure of the Colon and Exposure of the Pancreas

This allows retraction of the stomach over the left lobe of the liver, and intra-operative ultrasound was performed to confirm the relation of the tumour to the portal vein and celiac axis. Mobilization of the gland was undertaken from the inferior border of the gland. Thus, beginning with the inferior approach facilitates the dissection of the posterior aspect of the gland from the retroperitoneal bed. The splenic artery and vein branches can be visualized from underneath the pancreas. Control of splenic artery and vein were taken, ligated and divided between hem-o-lock clips. Subsequently, the spleen was mobilized by taking down the ligaments with an energy device. Intra-operative ultrasound was performed to ensure tumour-negative margins before transecting the pancreas with an Echelon endo stapler (Figure-2).

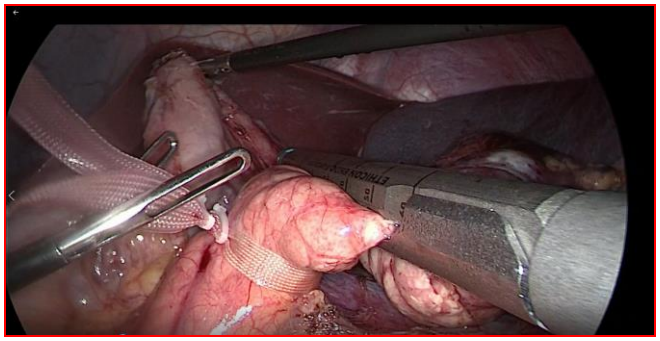

Figure-2: Pancreatic Parenchymal Division

Washout was performed, and a silicon flat drain was placed in the resection bed. After extending the optical port site, the specimen was retrieved in an endo bag.

Statistical Package for Social Sciences (SPSS) version 25.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages.

RESULTS

A total of 15 patients with a mean age of 49.27±15.2 underwent Laparoscopic distal pancreatectomy. Of 15 patients, 10(66.6%) were female, while 5(33.3%) were male. Eight of the patients presented with abdominal pain as the main symptom, while hypoglycemia was the second most common (n=4) clinical presentation. Most of the tumours were in the body of the pancreas (n=11,73.3%). The rest of the Demographic and clinical data, including the pre-operative clinical size of the tumours, is shown in Table-I. Pathologically, 13 tumours were malignant. At the same time, three came out to be benign. Details of the pathological and oncological outcomes are shown in Table-II. Twelve patients underwent minimally invasive distal pancreatectomy, and three patients underwent conversion to open. The spleen was preserved during the laparoscopic procedure in three patients, with great care given to the splenic and short gastric vessels. The mean operating time was 4.6±0.57 hours, with an estimated blood loss of around 183±28.8 ml. The mean hospital stay was 5.3±1.5 days, including one day in ICU post-operatively in almost all patients.

The overall frequency of both major and minor abdominal complications was 5(33%), comprising one patient of post-operative Grade C pancreatic fistula, two patients with superficial surgical site infections and two of post-operative intra-abdominal collections which were drained radiologically. Two patients

developed recurrence in the liver, which was managed by systemic adjuvant therapy. However, one patient died later on because of post-operative sepsis. We are currently following some of our patients for re-currence. The rest of the Operative and post-operative outcomes are shown in Table-III.

Table-I: Patient Demographics and Pre-Operative Clinical details (n=15)

Parameters	n(%)
Age (Mean)	49.17±14.45 years
Sex (M/F)	5/10 (33.3/66.6%)
Symptoms	
Abdominal pain	8(53.3%)
Diarrhea	2(13.3%)
Hypoglycemia	4(26.6%)
Incidental finding on radiology	1(6.6%)
Pre-operative albumin Levels	
(Mean)	4.32±0.37
Site of tumor	
Body	11(73.3%)
Tail	4(26.6%)
Pre operative Clinical Tumor size	
T1(<2 cm)	6(40%)
T2 (> 2cm)	5(33.3%)
T3(Peripancreatic tissue excluding vessels)	4(26.6%)
Clinical lymph node status	
N0	11(73.3%)
N1	1(6.6%)
Clinical Stage	
Stage I	7 (46.6%)
Stage II	4 (26.6%)
Stage II	1 (6.6%)

Table-II: Pathological/ Oncologic Outcomes (n=15)

Pathological diagnosis	
Neuroendocrine	9(60%)
Mucinous cystadenoma	1(6.6%)
Mucinous cystic adenoma	1(6.6%)
Serous cystadenoma	2(13.3%)
Solid pseudopappillarytumour	2(13.3%)
Pathological Tumor size pT	
T1	5(33.3%)
T2	6(40%)
T4	1(6.6%)
(Benign)	3(20%)
Pathological Lymph node status (pN)	
N 0	12(80%)
N1	3(20%)
Pathological Stage	
Stage I	9(60%)
Stage II	1(6.6%)
Stage III	2(13.3%)

Table-III: Operative and Post-Operative Outcomes (n=15)

Name of surgery	
Distal Panc. with Spleenectomy	12(80%)
Distal Panc. without Spleenectomy	3(20%)
Post Operative Pancreatic Fistula	
Yes (Grade C)	1(6.6%)
No	14(93.3%)
Post operative infection	4(26.6%)
SSI	2(13.3%)
Intra abdominal	2(13.3%)
Pre and post operative	
Diabetes status Pre operative DM	6(40%)
Pre operative HbA1c (Mean±SD)	110±29.31
Post operative DM	4(26.6%)
Post operative sugar levels (Mean ±SD	264±49.1
Adjuvant Systemic Therapy	
Yes	2(13.3%)
No	13(86.6%)
Recurrence	
Yes	2(13.3%) (Liver)
No	13(86.6%)
Overall Current Status	
Alive	14(93.3%)
Dead	1(6.6%)

DISCUSSION

Recently, LDP has become a preferred choice for non-malignant pathologies of the pancreas. At present, many pancreatic procedures are done laparoscopically all around the world.[11] With the advancement of technology and the development of laparoscopic skills, minimally invasive pancreatic surgery will also be-come the first option for the management of pancreatic tumours as well.[12] Nevertheless, respect should be given to the oncological principles while performing pancreatectomy by minimally invasive method.[13] Laparoscopic distal pancreatectomy is a better and more useful technique for resection of tumours of the body and tail of the pancreas with considerable benefits for both patient and surgeon. Despite that, surgeons' utilization of this valuable procedure is still very low.10Our results for this procedure show that approximately 80 % of the cases can be performed by the laparoscopic method, which is also reported by Asbun *et al*.[14]

In relation to complications which occur postoperatively, the most frequent complication after distal pancreatectomy is a pancreatic fistula, which is more often than not self-resolving.[15] Besides it, a few other complications which are usually seen after pancreatic surgeries are surgical site infections, intra-abdominal collections, abscesses and pseudocysts. In this study, the overall incidence of both major and

minor abdominal complications was 33%, which is better than the 40% results of Sümer *et al*.[16] They also experienced some other major complications like splenic artery aneurysm, pancreatic pseudocyst stand intra abdominal abscesses, which fortunately were not seen in our patients.

The safe oncological outcome is of immense significance while doing any pancreatic resection. The tumour margins and lymph node clearance were reported to be equivalent in laparoscopic distal pancreatic resections.[17] Zhao *et al*. reported in their results that minimally invasive surgery for treating distal pancreatic lesions is sufficient and safe according to oncological values.[18] In our patients, resection margins were clear in all cases. The main limitation of the study is its small sample size and retrospective nature. However, we plan to compare open and Laparoscopic distal pancreatectomy with a large sample size. Even though it is still early to say, it is to be expected that single-incision pancreatic resections will turn out to be a more useful technique in future.[19]

CONCLUSION

To conclude, the laparoscopic technique for distal pancreatectomy is a better treatment option for distal pancreatic tumours. The benefits of a Minimal invasive approach over open surgery include reduced hospital stay and early recovery with fewer complications.

Conflict of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

NB & OS: Conception, study design, drafting the manuscript, approval of the final version to be published.

SB & SIK: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

AAS: Data acquisition, drafting the manuscript, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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