

LAPAROSCOPIC RESECTION OF PANCREATIC CYSTADENOMAS

Ressecção laparoscópica dos cistoadenomas pancreáticos

José Francisco de Mattos FARAH^{1,2}, Renato Micelli LUPINACCI^{1,3}, Franz R APODACA-TORRES²

From ¹Departamento de Cirurgia Geral e Oncológica, Hospital do Servidor Público Estadual de São Paulo, SP, Brasil; ²Departamento de Cirurgia do Aparelho Digestivo, Universidade Federal de São Paulo, SP, Brasil; ³Service de Chirurgie Général, Digestive et Endocrinienne, Hôpital de la Pitié-Salpêtrière – APHP, Paris – France

ABSTRACT - **Background** - Laparoscopic pancreatic resections have become increasingly frequent with good results reported by several centers. However, few studies have focused on laparoscopic treatment of pancreatic cystic lesions. **Aim** - To analyze the results of minimally invasive treatment of pancreatic cystic lesions. **Methods** - Were included all laparoscopic pancreatic resections performed at three centers. Surgical procedures included resection of the pancreas and left enucleations (with or without splenectomy). The post-operative complications were classified according to the classification proposed by Clavien and Dindo⁶. The diagnosis of pancreatic fistula was confirmed if the amylase dosage of the drainage liquid in the third postoperative day was more than three times the amount of serum amylase. **Results** - Were performed 44 laparoscopic pancreatic resections. Fifteen patients underwent surgery for suspected pancreatic cystadenoma and 13 had this diagnosis confirmed. There were 12 women (92%), and the average age of patients was 50 years. Six patients had minor postoperative complications. There were five (38%) pancreatic fistulas, neither considered as severe (C), and only one patient required hospital readmission and radiological drainage. In this series, there were no conversions, reoperations, or mortality. **Conclusions** - The laparoscopic approach is a safe and effective option for the treatment of pancreatic cystic lesions. The incidence of pancreatic fistula has good evolution and not diminishes the benefits of minimally invasive surgery.

HEADINGS - Rats. Wound healing. Insufflation. Traction.

Correspondence:

José Francisco de Mattos Farah,
e-mail: jose.farah@einstein.br

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DESCRIPTORES - Ratos. Cicatrização. Insuflação. Tração.

RESUMO - **Racional** - As ressecções pancreáticas por laparoscopia tem se tornado cada vez mais frequentes, com bons resultados relatados por vários centros. Entretanto, poucos estudos se concentraram no tratamento laparoscópico das lesões císticas pancreáticas. **Objetivo** - Analisar os resultados do tratamento minimamente invasivo das lesões císticas pancreáticas. **Métodos** - Análise retrospectiva de um banco de dados prospectivo multicêntrico brasileiro. Foram incluídas todas as ressecções pancreáticas laparoscópicas realizadas em três centros. Os procedimentos cirúrgicos incluíram enucleações e ressecções do pâncreas esquerdo (com ou sem esplenectomia associada). As complicações pos-operatórias foram classificadas de acordo com a classificação proposta por Clavien e Dindo⁶. O diagnóstico de fístula pancreática foi confirmado se a dosagem de amilase do líquido de drenagem no 3o dia pós-operatório era superior a três vezes o valor da amilase sérica. **Resultados** - Foram realizadas 44 ressecções pancreáticas por laparoscopia. Quinze pacientes foram operados com suspeita de cistoadenoma pancreático e 13 tiveram o diagnóstico confirmado. Foram operadas 12 mulheres (92%), e a idade média foi de 50 anos. Seis pacientes tiveram complicações pós-operatórias leves. Ocorreram cinco (38%) fístulas pancreáticas, nenhuma considerada grave (C) e apenas um paciente necessitou re-internação hospitalar e drenagem radiológica. Nesta série não houve conversões, re-operações ou mortalidade. **Conclusões** - O acesso videolaparoscópico é opção segura e eficaz para o tratamento das lesões císticas pancreáticas. As fístulas pancreáticas são quase sempre de evolução favorável e não diminuem os benefícios do acesso minimamente invasivo.

INTRODUCTION

Cystic neoplasms of the pancreas comprise 15-20% of pancreatic cystic lesions and approximately 10% of all pancreatic cancers^{1,2}. Although infrequent, and with no specific symptoms, it has been observed an increase in diagnosis of the so called "incidental lesions", mostly because of technological improvement of diagnostic imaging methods. Belongs to this large group of neoplasms, a number of heterogeneous tumors which present very similar clinical and laboratory characteristics, however, with totally different prognosis^{23,24}.

Cystic lesions of the pancreas may be divided into three groups according to their epithelial lining: 1) no epithelial lining (pseudocysts), 2) presence of epithelial lining (serous cystadenomas and mucinous cystadenomas), 3) presence of degeneration of the epithelial lining or solid lesions (solid-cystic papillary tumors, ductal adenocarcinomas, and neuroendocrine tumors).

Pancreatic cystadenomas, which surgical treatment constitutes the focus of this article, are classified according to their histopathological characteristics^{1,5,15}: 1) serous cystic neoplasms (serous cystadenoma and serous cistoadenocarcinoma); 2) mucinous cystic neoplasm (mucinous cystadenoma, and mucinous cystadenoma with moderate dysplasia); 3) mucinous cistoadenocarcinoma, which can be divided into non-infiltrating and infiltrating.

Laparoscopic pancreatic resections have become increasingly frequent, with excellent results reported by several centers^{7,10,19,26}. However, few studies have focused on laparoscopic treatment of pancreatic cystic lesions.

The aim of this study is to analyze the results of a minimally invasive approach to cystic pancreatic lesions.

METHODS

This study is a retrospective analysis of a prospective collected database started in 2006. Were included all laparoscopic pancreatic resections performed in three centers (Service of General and Oncologic Surgery, Hospital do Servidor Público Estadual de São Paulo; Department of Digestive Surgery, Universidade Federal de São Paulo; Service of Oncologic Surgery of Cuiabá, MT, Brazil). The procedures performed included enucleations and distal pancreatectomies (with or without splenectomy). Preoperatively patients were given anti-pneumococcal vaccination (two weeks before surgery) and antibiotic prophylaxis (at general anesthesia induction and two additional doses at POD 1). Liquid diet was started in the first or second POD. The most common surgery performed was distal pancreatectomy with splenectomy.

Surgical technique

Patient was placed in supine position with the surgeon standing between the patient's legs. The first assistant stands

on the patient's right side (camera and forceps traction), and the second on the left of the patient. Five portals were used: 1) a 10 mm supra-umbilical (optical); 2) a 12 mm in the left hypochondrium (for dissection and stapler firing); 3) a 5 mm in the right hypochondrium (dissection); 4) a 5 mm in epigastrium (presentation); and 5) 5 mm on the left flank, if needed for presentation. The operation began with the opening of gastrocolic ligament beneath the gastroepiploic vessels for pancreas visualization and identification of the lesion. Omental complete section was performed from medial to lateral including the splenocolic ligament, also divided. Thus, was perform the dissection of the splenic artery in its middle third (in some cases was chosen just to tie with no division of the artery at this point). Dissection continued at the lower edge of the pancreas, with section of the root of the mid-colon. The inferior mesenteric vein and the splenic vein were visualized, freed, and the splenic vein was then ligated and divided. A retropancreatic tunnel was dissected and the pancreas divided with staplers (Wirsung's duct, if identified, was sutured separately with 3-0 prolene). The splenic artery was then ligated and divided (which is extremely facilitated once the pancreas has been sectioned). The surgery ended with the complete mobilization of the splenopancreatic block. Was usually leaved a closed-suction drain in the sub-diaphragmatic space. Removal of the surgical specimen was usually done through a Pfannestiel incision.

Postoperative complications were classified according to the classification proposed by Clavien and Dindo⁶. The diagnosis of pancreatic fistula was confirmed if a drain output of any measurable volume of fluid on or after postoperative day 3 showed amylase content greater than three times the serum amylase activity, and were classified by the ISGPF statement².

RESULTS

Between June/2006 and March/2012 were performed 44 laparoscopic pancreatic resections. Fifteen patients underwent surgery for suspected pancreatic cystadenoma, and 13 had this diagnosis confirmed and two patients were classified as pancreatic pseudocysts. There were 12 women (92%), and the median age of patients was 50 years (33-74). The types of resections, the postoperative complications and the size of lesions are shown in Table 1.

There were no conversions, re-operations or mortality in this series. Six patients had minor postoperative complications (Dindo and Clavien classification categories I or II)⁶. One of the two patients who presented pancreatic fistulas classified as type B of Bassi et al. classification², required re-hospitalization and a percutaneous image-guided drainage. Of the 13 patients confirmed to have cystadenomas at final pathological examination, there were seven (54%) mucinous cystadenomas, one macrocystic serous cystadenoma (one man), and three microcystic serous cystadenomas (Figure 1).

TABLE 1 - Patient's characteristics and postoperative results of 13 laparoscopic resections for pancreatic cystadenomas

Characteristics	N (%)
Sex	
- man	1 (7,6%)
- women	12 (92,4%)
Age (median)	33-74 (50,2 years)
Tumor's size (cm)	2 – 10 cm (median 4,5cm)
Duration of operation (min.)	120-240 min (160 min)
Type of surgery	
- enucleation	2 (serous cystadenomas)
- DP with spleen preservation	1 (mucinous cystadenoma)
- DPS	10
Blood transfusion	1 (7,6%)
Hospital length of stay	5,2 days (4-9)
Clinical complication	1 (atelectasia)
Pancreatic fistula (Bassi et al.2)	5 (38%)
A	3
B	2
C	-

DP: distal pancreatectomy ; DPS: distal pancreatectomy with splenectomy

**FIGURE 1** – A) Macrocystic cistoadenoma; B) mucinous cistoadenoma

DISCUSSION

Diagnosis of pancreatic cystadenomas is a true dilemma¹². The lesions are very often completely asymptomatic or have nonspecific symptoms. The use of data such as age, sex, personal antecedents, general health status, among others, can help in formulating a diagnosis. (Figure 2)

Neoplasia	Sex	Age	% of CNP	Prognosis
SCA	Women	60-70	32 – 39	Very low potential of malignity
MCA	Women	50-60	21 – 33	Potential of malignity
IPMN	no differences	60-70	21 – 33	Variable potential of malignity
SCT (Frantz)	Women	20-30	< 10	Slow growing neoplasia. Metastatic potential

SCA, Serous cystadenoma ; MCA, mucinous cystadenoma ; CNP, cystic neoplasia of the pancreas; IPMN, intra-ductal papillary mucinous neoplasia; SCT, pseudopapillary solid-cystic tumor of the pancreas (Frantz's tumor)

FIGURE 2 - Clinical and epidemiological characteristics of primary cystic neoplasms of the pancreas, adapted from Brugge et al.⁴

The criteria for the diagnosis of pancreatic cystic neoplasms are obtained from imaging methods (morphology), aspirated fluid analysis (cytology and tumor markers), and the histological analysis of the surgical specimen^{4,5,8}. Figure 3 summarizes the expected results of the cyst's fluid analysis

Marker	SCA	MCA	IPMN	SCT
CEA	low	high	high	low
CA 72-4	low	high	high	unknown
CA 19-9	variable	variable	variable	unknown
CA 125	low	variable	low	unknown
CA 15-3	low	high	low	unknown
Amilase	low	low	high	low

SCA, Serous cystadenoma ; MCA, mucinous cystadenoma ; CNP, cystic neoplasia of the pancreas; IPMN, intra-ductal papillary mucinous neoplasia ; SCT, pseudopapillary solid-cystic tumor of the pancreas (Frantz's tumor)

FIGURE 3 - Concentration of tumor markers and amylase in the aspirated fluid of cystic neoplasms of the pancreas, adapted from Brugge et al.⁴

The highest frequency of lesions in female patients (92%), the mean age (50 years) and the distribution of the lesions (54% of mucinous lesions) in this study are similar to the literature^{1,4,5}.

Serous cystadenoma is considered a benign disease by histopathological characteristics and outcome, with a chance of malignant transformation of less than 1%. A recent review of the literature reports only 27 cases of serous cystadenocarcinoma³. Although there is no consensus, especially in asymptomatic cases, regarding the therapeutic approach there is a trend in specialized centers to indicate the resection of all cystic lesions larger than 4 cm^{1,3,5,9,11,12,13}.

Contrary to serous tumors, mucinous lesions are considered high-risk lesions of malignant transformation. Different studies have shown the presence of carcinoma in situ or invasive carcinoma in 34-48% of operated mucinous cystadenomas. Mucinous neoplasms are most commonly found in females between the 4th and 5th decades of life (over 80% of cases). Although most of these lesions are asymptomatic, some symptoms, in particular loss of weight and / or severe pain, if presented, should rise the suspicion of an associated malignant transformation. Once diagnosed, surgical resection is considered the treatment of choice for mucinous cystic neoplasms^{1,3,5,9,11,12,13}.

Pancreatic fistula is the most frequent complication of distal pancreatectomy regardless of the approach^{14,17,19,21,26}. The frequency of pancreatic fistula in this study (38%) is similar to the literature^{10,16,17}. Several techniques and pitfalls have been proposed to reduce this complication, such as suture reinforcement²⁰, individual ligation of Wirsung's duct²⁰, different types mechanical staples loads²², coating of suture lines with absorbable material²⁵, and very slow closure of the stapler¹⁸. Taken together, these results are controversial and do not, so far, indicate a particular technique.

There are no sufficient studies in the literature to

recommend the laparoscopic approach in confirmed cases of malignancy; so, a complete preoperative investigation should be performed and if relevant diagnostic doubt persists, the indication of the laparoscopic approach should be discussed individually.

CONCLUSION

Laparoscopic approach is a safe and effective option for the treatment of pancreatic cystic lesions. The incidence of pancreatic fistula has good evolution and not diminishes the benefits of minimally invasive surgery.

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