

The role of laparoscopy in pancreatic surgery

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1. ABSTRACT

Carcinoma of the pancreas is extremely common, with a five-year mortality rate of about 95-99%. Radical surgery requires good technical skill and can cause complications and operative mortality, but should be avoided in patients with extrapancreatic involvement. Advances in dynamic spiral CT-scan have decreased the number of unnecessary laparotomies. VLS is indicated in cases of pancreatic mass deemed resectable or “doubtful” by CT-scan. Direct laparoscopic visualization can be combined with intraoperative laparoscopic ultrasonography (LUS), which has shown a positive predictive value of resectability of 91%. Laparoscopic pancreaticoduodenectomy (LPD) shows a high rate of

complications and should be performed by very well-trained surgeons. Laparoscopic distal pancreatectomy (LDP) with an “en bloc” splenectomy and spleen preservation should be performed.

2. INTRODUCTION

The role of laparoscopy in pancreatic surgery is still controversial and must address the following potential applications: a) staging of pancreatic cancer; b) palliation of pancreatic cancer; c) pancreatic resection for benign and malignant disease; and d) pancreatic drainage procedures.

Carcinoma of the pancreas is the fifth most common cause of cancer death in the Western world. Its incidence has almost doubled in Europe during the last twenty years. In Italy 10-12 new cases are recorded per year/100.000 inhabitants; in most cases these are ductal adenocarcinoma. The diagnosis carries a poor prognosis with a five-year mortality rate of about 95-99%. Thus, the mortality related to this pathology is quite similar to its incidence. Surgery is the only therapeutic option of pancreatic cancer. Nevertheless, radical surgery requires good technical skill and can cause complications and operative mortality. Thus, it should be addressed to patients who can really benefit in terms of survival and quality of life. Less than 20% of pancreatic cancers are resectable for cure because of extrapancreatic involvement. In these cases palliation should be provided. A correct preoperative staging is necessary to identify patients with potentially resectable disease and those unresectable. There is still some concern about the management of pancreatic cancer and clear guidelines are yet not available. Radical surgery should be avoided in patients with extrapancreatic involvement, evidence of local vascular invasion (portal vein, superior mesenteric vein and artery, aorta and vena cava), metastatic disease (liver, peritoneum, lymphnodes), and in aged patients. Up to a few years ago, 65% of laparotomies performed in patients deemed resectable showed evidence of metastatic disease. Advances in dynamic spiral CT-scan decreased the number of unnecessary laparotomies. Diagnostic accuracy of CT scan is 95% in detecting: local involvement, nodal and hepatic metastases, and vascular invasion. Sensitivity of the technique is about 67% in detecting lesions up to 15 mm; 95-100% for lesions larger than 15 mm. Thus, in the diagnostic-therapeutic protocol, videolaparoscopy (VLS) is addressed to: a) staging; b) radical surgery; and c) palliation.

3. STAGING

VLS provides further information concerning the disease, allowing the evaluation of the tumor resectability and then a better treatment strategy, decreasing unnecessary laparotomies and costs. VLS is indicated in cases of pancreatic mass deemed resectable or "doubtful" by CT-scan. VLS is not indicated in case of mass deemed unresectable by CT-scan. It has improved the resectability for pancreatic cancer from 35 to 87%, thus reducing the number of unnecessary laparotomies and palliation. Nevertheless, it should be noted that CT-scan can be diagnostic in 75-80% of cases if performed by an experienced imager. The role of VLS in the staging of pancreatic cancer goes from the simple research of hepatic, peritoneal or visceral metastases, to the extended procedure of exploration of the lesser sac, hepatic hilum, duodenum, transverse mesocolon, celiac and porto-mesenteric vessels (1). Direct laparoscopic visualization can be combined with intraoperative laparoscopic ultrasonography (LUS). This last procedure has shown a positive predictive value of resectability of 91%, enabling the recognition of vascular and nodal invasion and the detection of hepatic metastases smaller than 1 cm (2). Laparoscopy also enables the sample for peritoneal cytology (3).

4. LAPAROSCOPIC PANCREATIC RESECTION

Laparoscopic pancreatoduodenectomy (LPD) was first described by Gagner in 1996 (4). There is concern that the patient undergoing LPD receives a compromised cancer operation, because it is difficult to avoid leaving a remnant of the uncinate process of pancreas on the superior mesenteric vein or artery. The surgery has been prolonged to an average of nine hours and post-operative stays have averaged close to three weeks. The complication rate has been on the order of 50%. There is also a higher rate of conversion (up to 40-60%) with higher costs. Lastly, this procedure requires very good laparoscopic technical skill and should be performed by well trained surgeons (5). Although the role for LPD is limited, laparoscopic distal pancreatectomy (LDP) with an "en bloc" splenectomy as well as with preservation of the spleen may provide significant patient benefit. The procedure has been attempted for both benign and malignant pancreatic pathology (islet cell tumors, chronic pancreatitis, cystadenomas) (6). The LDP surgical procedure takes a relatively short three to five hours and allows a faster post-operative stay (5-6 days) with a conversion rate of 25%. LDP should be performed in cases of neuroendocrine tumor of the pancreatic body or tail. It has shown fewer complications than simple enucleation. The surgical technique has also been improved thanks to the use of the harmonic scalpel, RF vessel sealing system (Ligasure®), and endoscopic linear stapler. Laparoscopic enucleation (LE) of pancreatic tumors should be performed in the case of a solitary, small benign neuroendocrine tumor, sited on the anterior pancreatic surface. Such intervention appears suited even for the same lesions placed in the head and the uncinate process of the pancreas. In these cases, in fact, LDP would be excessive (7).

5. PALLIATION

A total of 80% of patients with pancreatic cancer are not resectable at the time of diagnosis. The surgical alternative provides biliary and digestive decompression as well as pain reduction. If jaundice is associated with digestive obstruction, the suggested therapeutic option is biliary stenting plus laparoscopic gastroenterostomy (Braun). Laparoscopic gastroenterostomy (LGE) is a straightforward procedure allowing good gastric drainage if performed at the lower part of the stomach (antecolic-sited-8 cm of size) LGE shows less morbidity and mortality, decreased post-operative stay and costs, and a better quality of life for patients. Laparoscopic pancreatic surgery represents a relatively new surgical domain with great potential. Advanced laparoscopic skill and correct staging of the disease are necessary both to avoid unnecessary extensive surgery and to perform laparoscopic resection. Better results in terms of complications and survival have been obtained with laparoscopic distal pancreatic resection but not with pancreatoduodenectomy. Laparoscopic gastroenterostomy is technically feasible and a straightforward means of palliating obstruction.

6. SUMMARY

Carcinoma of the pancreas is the fifth most common cause of cancer death in the Western world. The

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diagnosis carries a poor prognosis with a five-year mortality rate of about 95-99%. Surgery is the only therapeutic option of pancreatic cancer. Nevertheless, radical surgery requires good technical skill and can cause complications and operative mortality. Less than 20% of pancreatic cancers are resectable for cure because of extrapancreatic involvement. In these cases palliation should be provided.

A correct preoperative staging is necessary to identify patients with potentially resectable disease. Radical surgery should be avoided in patients with extrapancreatic involvement. Advances in dynamic spiral CT-scan have decreased the number of unnecessary laparotomies. VLS is indicated in cases of pancreatic mass deemed resectable or "doubtful" by CT-scan. Direct laparoscopic visualization can be combined with intraoperative laparoscopic ultrasonography (LUS), which has shown a positive predictive value of resectability of 91%. Laparoscopic pancreatoduodenectomy (LPD) shows a high rate of complications and should be performed by very well-trained surgeons. Laparoscopic distal pancreatectomy (LDP) with an "en bloc" splenectomy as well as with preservation of the spleen should be performed in cases of neuroendocrine tumor of the pancreatic body or tail. Laparoscopic enucleation (LE) of pancreatic tumors should be performed in cases of solitary, small benign neuroendocrine tumors, sited on the anterior pancreatic surface. 80% of patients with pancreatic cancer are not resectable at the time of diagnosis and thus require palliation: laparoscopic gastroenterostomy (LGE) or stenting plus laparoscopic gastroenterostomy (Braun) in case of jaundice.

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