

LAPAROSCOPIC WHIPPLE' S PROCEDURE PRESENT PAST AND FUTURE

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Project submitted toward completion of diploma in minimal access surgery ,laparoscopy hospital, new Delhi. India, august2007

Abstract :

In the past, in the pancreas, minimally invasive technique was used for diagnostic laparoscopy only in evaluating pancreatic malignancy. Recent advances in operative techniques and instrumentation have empowered surgeons to perform virtually all procedures in the pancreas, including the Whipple procedure. Laparoscopic techniques have been applied to a growing number of pancreatic surgeries Since the early 1990s. The surgical management of pancreatic cancer has undergone a significant change in the past decade. For invasive pancreatic carcinomas Laparoscopic resections with an en bloc lymph node dissection have been performed by experienced Laparoscopic surgeons. The long-term results after laparoscopic resections for invasive pancreatic cancer, however, are still not well defined. Prospective randomized controlled trials are needed to validate these benefits. Although a laparoscopic pancreaticoduodenectomy and laparoscopic duodenum-preserving pancreatic head resection are technically feasible, laparoscopic reconstruction after proximal pancreatectomies is not yet generally practicable but limited to personal experiences by highly skilled endoscopic surgeons. Advanced surgical robotic systems offer the promise of a unique combination of advantages over open and conventional laparoscopic approaches, clinical data demonstrating improved outcomes are lacking for robotic surgical applications within the abdomen.

Laparoscopic pancreaticoduodenectomy is feasible, safe, and beneficial. We believe that pancreatoduodenectomy should be performed only in selected cases and by a highly skilled laparoscopic surgeon. If there is any doubt, an open resection should be performed.

AIM :

The aim of this review article was to evaluate and to assess past, present and future role of laparoscopic WHIPPLE'S PROCEDURE .

Following parameters were evaluated in present past and future laparoscopic whipple's procedure.

- 1) Method of patient selection.
- 2) Operative technique.
- 3) Operating time.
- 4) Intra Operative and post Operative complication.
- 5) Postoperative pain and amount of narcotics used.
- 6) Time until resumption of diet.
- 7) Post operative morbidity.

- 8) Hospital stay.
- 9) Cost effectiveness
- 10) Quality of life analysis.

Material and Methods :

A literature search was performed using search engine Google, Pubmed, High Wire, Online Springer library facility available at The Laparoscopy Hospital, New Delhi , India . Selected papers were screened for further references.

Key word's :

Laparoscopic Whipple resection - Laparoscopic duodenum-preserving pancreatic head resection - pancreatic cancer - laparoscopic pancreaticoduodenectomy - distal pancreatectomy - hand-assisted, robotic whipple's procedure

Introduction :

The incidence of pancreatic cancer is about 1per10000 population in Western Europe . The incidence rises steadily with age, and the disease is more common in men than in women [11].

Pancreatic carcinoma is a disease with a poor prognosis. And is the fourth leading cause of cancer death. Despite significant advances in the treatment of Pancreatic tumors, the 5-year survival rate for persons diagnosed with pancreatic cancer has not changed in decades and remains <5%. This is due both to the inherently aggressive biology of the disease and to its late diagnosis in most cases. Surgical resection of localized disease remains the only hope for cure of pancreatic cancer [11].

But it is not unusual to find patients who have had many negative investigations for vague upper abdominal symptoms to be diagnosed as having pancreatic carcinoma many months later. Staging the disease is equally difficult and often inaccurate. The results of treatment are to date discouraging even in those patients diagnosed early .In recent years the results for surgical resection of pancreatic lesions have improved; adjuvant treatment may finally be having an effect, although small, on this relentless disease. The most notable in road made in the management of pancreatic cancer in the last 10 years is the improvement in palliation due to the use of the endoprosthesis .

The operative mortality rate for this procedure in the 1960's and 1970's was 20%-30%. Reduction in perioperative mortality rate from 24% between 1960-1980 to approximately 3% since 1981 was shown by The Johns Hopkins Medical Institution. Over the past 2 decades, advances in diagnostic imaging, staging, surgical technique, and perioperative care have led to marked improvement in the surgical management of pancreatic cancer patients.

A pancreaticoduodenectomy , Whipple procedure , or Kausch-Whipple procedure , is a major surgical operation involving the pancreas, duodenum, gall bladder ,common bile duct and distal part of stomach. This procedure was originally described by Alessandro Codivilla in 1898 and Kausch in 1912, and later perfected by Allen Oldfather Whipple in the 1930s.since then this technique is often called the *Whipple procedure*. Originally performed in a two-step process, Whipple refined his technique in 1940 into a one-step operation. Using modern operating techniques, mortality from a Whipple procedure is around 5% .The first resection for a periampullary cancer was performed by the German surgeon Kausch in 1909.The first laparoscopic pancreatoduodenal resection was performed by Gagner in 1992. HUMAN ROBOTIC surgery was introduced by Cadière and colleagues in March 1997 when the first telesurgical laparoscopic cholecystectomy was performed.

Types of pancreatic neoplasms :

Ductal adenocarcinoma

Mucinous cyst adenocarcinoma

Serous cyst adenoma

Mucinous cyst adenoma

Malignant exocrine

Benign exocrine

Endocrine

Gastrinoma

Insulinoma

Other

Signs and symptoms of pancreatic cancer :

Symptoms :

- Obstructive jaundice—dark urine,
- pale stools, pruritus
- Pain
- Back (common)
- Epigastric
- Vomiting
- Weight loss
- Anorexia
- Haematemesis or melaena (late)

Signs :

- Jaundice
- Epigastric mass (late)
- Palpable gall bladder
- (Courvoisier's sign)
- Cachexia, anaemia

Risk factors for pancreatic cancer :

- Smoking

-Family history of pancreatic cancer

-Partial gastrectomy

-Dietary fat

Factors predicting poor prognosis :

- Back pain

-Rapid weight loss

-Ascites and liver metastases

-Poor performance status—for example,World Health Organization
or Karnofsky scoring systems

-High C reactive protein and low albumin concentrations

Rarer presentations of pancreatic carcinoma :

-Recurrent or atypical venous thromboses (thrombophlebitis migrans)

-Acute pancreatitis

-Late onset diabetes mellitus

-Upper gastrointestinal bleeding

Tumours suitable for resection :

- 4 cm in diameter

- Confined to pancreas

- No local invasion or metastases

A Whipple operation is performed for :

1. cancer of the head of the pancreas

2.cancer of the duodenum

3.cholangiocarcinoma (cancer of the the pancreatic end of the bile)

4.cancer of the ampulla

5. whipple operation may also sometimes be performed for patients with benign (non-cancerous) disorders such as chronic pancreatitis and benign tumors of the head of the pancreas.

The problems and complications that may be seen after this operation include :

- *Pancreatic fistula* : The pancreas is a very soft organ and in some patients this suture line may not heal very well. If this happens then patients develop leakage of pancreatic juice. Usually the surgeon leaves behind a drainage catheter in the abdomen during the surgery. Any leakage of pancreatic juice after the surgery is usually removed from the body by this drainage catheter. In almost all patients who develop leakage of pancreatic juice after the surgery, the leakage heals on its own. It is uncommon for patients to be re-operated for this complication. This complication has occurred in about 4% of all the surgeries that we have performed.
- *Gastroparesis (paralysis of the stomach)*: In up to 25% of patients, the stomach may remain paralyzed after the surgery and it may take up to 4 to 6 weeks for the stomach to adapt to the changes after the surgery to function normally. The first five to six days after the surgery, you will be provided with intravenous fluids until your bowel function returns. After your bowel function have return your surgeon will begin you on a diet of clear liquids and your diet will progress to a regular diet as you tolerate it. In almost all patients the stomach function returns to normal after this 4 to 6 week period after the surgery.

Long-term consequences of the Whipple operation include the following :

- *Mal-absorption* : In some patients removal of part of the pancreas during the Whipple operation can lead to a diminished production of these enzymes. Patients complain of bulky diarrhea type of stool that is very oily. Long-term treatment with oral pancreatic enzyme supplementation usually provides relief from this problem.
- *Alteration in diet* : After the Whipple operation we generally recommend that the patients ingest smaller meals and snack between meals to allow better absorption of the food and to minimize symptoms of feeling of being bloated or getting too full.
- *Loss of weight* : It is common for patients to lose up to 5 to 10% of their body weight. The weight loss usually stabilizes very rapidly and most patients after a small amount of initial weight loss are able to maintain their weight .

Review of lettratures :

Laparoscopic resection of the pancreas in its infancy and the reported experience is very limited. Despite its retroperitoneal location, exposure and mobilisation of the pancreas can be achieved in the vast majority of patients and does not usually pose major technical problems to the surgeon, experienced in advanced laparoscopic techniques and in pancreatic surgery. pancreaticoduodenectomy for periampullary cancer has been disappointing and we have not documented any benefit from this approach. is not possible by the laparoscopic approach to perform an oncologically adequate operation (with extended lymphadenectomy) for cancer of the head of the pancreas[2][12][14][15][16].

Being considered as most challenging abdominal operations, Whipple procedure is the most widely accepted approach for the surgical resection in pancreatic cancer. Factors contribute to a lowering in the morbidity and mortality rates in recent years included better anaesthesia, improved intensive care units with better support of organ failure, better control of nutrition and the availability of a skilled interventional radiologist capable of handling the complications. pancreatoduodenectomies are now being performed by surgeons who operate primarily on the liver, biliary tree and pancreas [13] [19].

Between 1989 and 1990 Edge in his study found that pancreatic resection was performed with a mortality rate of 6%. In a large unselected group of university hospitals. He also found no relationship between the number of resections performed by each surgeon and the mortality rate, though there was a higher complication rate among inexperienced hepato-biliary surgeons. In the 1980's

The New York State Department of Health found mortality rates approaching 30% in community hospitals in New York [23].

Previously minimally invasive technique was only used for diagnostic laparoscopy in evaluating pancreatic malignancy. Recent advances in operative techniques and instrumentation have empowered surgeons to perform virtually all procedures in the pancreas, including the Whipple procedure . L aparoscopy associated with laparoscopic ultrasonography in the assessment of surgical respectability and tumoural staging and extension in patients with carcinoma of the pancreatic head[1][3][13][14].

Laparoscopic Whipple operation is a complex operation for benign and malignant lesions with a high chance of developing complications if the surgeon performing the surgical procedure has limited experience. In the hands of surgeons who are experienced whipples procedure is feasible, safe, and beneficial with low complication rate. We believe that pancreatoduodenectomy should be performed only in selected cases and by a highly skilled laparoscopic surgeon. If there is any doubt, an open resection should be performed[2][10][12][18].

A prospective study of laparoscopic pancreatoduodenectomy was undertaken in patients with benign and malignant lesions of the pancreas over a period of 8-year, The mean blood loss was 162 ml; and the mean operating time was 284 min, respectively. The mean hospital stay was 13.6 days [7].

A prospective study was undertaken on 25 patients between March 1999 and June 2005. With mean age of 62 ± 14 years. Laparoscopic whipple procedure were performed without serious complications. Three patients underwent conversion to open surgery. For 13 patients, the anastomosis was performed intracorporeally. For the remaining 9 patients, the resection was performed laparoscopically, with the reconstruction performed through a small midline incision. There was no intraoperative mortality. The mean operating time was 287 ± 39 min, and the mean blood loss was 107 ± 48 ml. The mean time to the first bowel movement was 6 ± 1.5 days, and the mean time to independent self-care was 4.8 ± 0.8 days. Seven patients experienced postoperative complications. One patient died of a cardiac event 3 days after surgery. The mean hospital stay was 16.2 ± 2.7 days [10][12][20]

Giulianotti and associates have reported a series of 8 patients in whom pancreaticoduodenectomies were performed completely laparoscopically with the assistance of the robot. In this advanced technique, the hepaticojunostomies and gastrojunostomies were handsewn intracorporeally and the remnant pancreatic duct was injected with surgical glue[8].

Whether the current-generation surgical robot is advanced enough to allow routine performance of pancreatic head tumor resections remains to be seen. In an operation like the Whipple procedure, where we rely so heavily on blind palpation for careful dissection of the portal vein off the posterior pancreatic surface, it is possible that the da Vinci's lack of haptic feedback may preclude its safe application[8][9][21].

Conclusion :

Laparoscopic techniques for the diagnosis and treatment of pancreatic cancer are evolving. Apart from the advantages of laparoscopic surgery such as improved diagnosis, cosmesis, diminished pain, less blood loss, shorter hospitalization and early return to work, the incidence of atelectasis and pneumonia is less in laparoscopic than conventional open approach. Laparoscopic pancreatoduodenectomy and reconstruction for pancreatic carcinoma, though is time consuming, technically possible and may become the standard technique in future. The future of laparoscopic surgery for the management of malignancy holds exciting prospects. However, this bright future is in jeopardy if scientific evaluation, including prospective studies, of these new procedures, especially those for attempted curative resection and robotic assisted whipples procedure is not carried out to determine which procedures benefit the patient. Advancements in technology are clearly changing the way we practice abdominal surgery. Whether the current-generation surgical robot is advanced enough to allow routine performance of pancreatic head tumor resections remains to be seen. It is clear that surgical robotics has not yet arrived at a level of refinement necessary to occupy common place in the operating room, if history can help in predicting the future, it is only a matter of time. In future Surgical robots will become smaller, cost effective, easy to handle and used in major abdominal surgeries.

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