

Analysis of Influencing Factors of Complications after Laparoscopic Pancreaticoduodenectomy

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Abstract

Laparoscopic pancreaticoduodenectomy (LDPD) has become a major surgical method for the treatment of pancreatic and duodenal diseases. It has the unique advantages of less trauma and quick recovery after surgery, so it has been widely used. Although the procedure has achieved remarkable success rates, some complications can still occur after LDPD. The purpose of this study was to analyze the factors influencing the postoperative complications of LDPD. Through the relevant literature and practical research, it is found that the length of resection during surgery, the operation time, the patient's health status, the experience level of the surgeon and the postoperative management have an impact on the incidence of postoperative complications of LDPD. Our study shows that the experience and skill level of the surgeon is one of the key factors affecting the incidence of postoperative complications of LDPD. When performing LDPD surgery, an experienced surgeon is required to perform delicate operations. At the same time, postoperative management is also very important, including the management of the patient's diet, rest and drug therapy. Our study not only has practical significance for understanding the influencing factors of postoperative complications of LDPD, but also has guiding significance for improving the success rate of LDPD surgery and reducing the incidence of complications. Our study provides an effective basis for further research on the safety and efficacy of LDPD.

Keywords

Laparoscopy, Pancreatoduodenectomy, Surgical treatment

1. Introduction

Pancreatic tumor and duodenal diseases are common digestive system diseases, and LDPD has become a routine method to treat these diseases. The scope of resection includes pancreatic head, bile duct below common hepatic duct, distal stomach, duodenum, part of jejunum, etc. At the same time, lymph nodes in hepatoduodenal ligament, beside celiac artery, around pancreatic head and at the root of mesenteric blood vessels are removed, and then complicated digestive tract reconstruction such as pancreaticojejunostomy, choledochojejunostomy and gastrointestinal anastomosis is carried out. Compared with traditional open surgery, LDPD has many advantages, including reducing intraoperative bleeding, shortening hospitalization time and recovery period. Although LDPD has been widely used in most hospitals, postoperative complications are still an important problem. Because patients with this kind of operation are often accompanied by obstructive jaundice and malnutrition before operation, combined with liver function damage and metabolic disorder caused by the disease itself, the general basic condition is poor, and many serious complications are prone to occur after operation. As an advanced surgical technique, laparoscopic pancreaticoduodenectomy has been recognized and widely used, but the incidence of complications is still relatively high.

This paper aims to analyze the influencing factors of complications after LPD and clarify the key to control complications.

2. Brief introduction of laparoscopic pancreaticoduodenectomy

Laparoscopic pancreaticoduodenectomy is a kind of operation that resects the head of pancreas, antrum of stomach and ampulla by laparoscopy and reconstructs the remaining part of duodenum by connecting it with the head of pancreas [1]. This operation is one of the treatments for tumors and stones in the head of pancreas, antrum of stomach and ampulla of duodenum. It is a minimally invasive operation with quick postoperative recovery and good cosmetic effect [2].

The basic steps of this operation are as follows:

- 1) Preoperative evaluation: including medical history inquiry, physical examination, laboratory examination of blood and urine, imaging examination and pathological examination.
- 2) Anesthesia: Choose appropriate anesthesia methods, such as general anesthesia or spinal anesthesia, to ensure the safety of patients during the operation.
- 3) Establishment of laparoscopic approach: CO₂ gas was injected into the patient's abdomen to ensure abdominal distension, and then an approach was established in the abdomen to introduce laparoscopy into the abdominal cavity [3].
- 4) Separation of pancreatic head, gallbladder and duodenum: The pancreatic head, gallbladder and duodenum are separated layer by layer by laparoscopic instrument, and the tissues of common bile duct, pancreas and duodenum are separated.
- 5) Breaking the duodenum and pancreatic head: breaking the duodenum and pancreatic head at the position of the distal gastrointestinal stapler.
- 6) Reconstruction of pancreaticoduodenal anastomosis: connect the pancreatic head with the distal gastrointestinal stapler, and sew the duodenal wall to the neck of the pancreatic body through suture [4].
- 7) Inventory and withdrawal of laparoscopic instruments: check whether there is bleeding or leakage at the pancreaticoduodenal anastomosis site, and withdraw the laparoscopic instruments from the abdominal cavity one by one after confirming that there is no abnormality.
- 8) End the operation: put the abdominal exhaust pipe in the abdominal cavity and sew the incision.

After the operation, the patient needs to be hospitalized to observe whether there are postoperative complications. These complications may include bleeding, pancreatic fistula, intestinal obstruction, infection and so on. After operation, patients need reasonable diet, regular follow-up and examination to ensure the effect of operation and the recovery of patients.

Second, the anatomical theory related to laparoscopic pancreaticoduodenectomy

There are complex fascias and fascial spaces around the pancreas, but the anatomical study of peripancreatic fascia and fascial spaces is not practical in traditional open pancreatic surgery, and surgeons pay insufficient attention to these anatomical knowledge. With the rapid development of laparoscopic pancreatic surgery, it is not enough to master general anatomical knowledge. Only by deeply understanding the anatomical characteristics of the fascia and fascial space related to pancreatic surgical approach can we better carry out laparoscopic pancreatic surgery, reduce surgical complications and improve surgical efficiency. Laparoscopic pancreaticoduodenectomy has the characteristics of "looking at a leopard in a tube", and there are many fascial spaces around the pancreas. During the operation, it is necessary to dissect many fascial spaces to reach the surgical target, which makes laparoscopic surgeons pay great attention to the shape, distribution, communication and surgical plane construction of peripancreatic fascia and fascial spaces under laparoscopy. The study of these anatomical problems is of great significance to the selection of the best surgical approach for laparoscopic pancreaticoduodenectomy.

Laparoscopic pancreaticoduodenectomy is a minimally invasive surgical technique for the treatment of pancreatic or duodenal diseases, which has less trauma and faster recovery than traditional surgery. During this operation, doctors need to master relevant anatomical theories, including pancreatic anatomy, duodenal anatomy, abdominal anatomy and vascular anatomy.

The pancreas is a long gland located in the deep abdominal cavity, which consists of three parts: head, body and tail. It is located in the upper left corner of the abdominal cavity, close to the spine. The pancreas secretes pancreatic juice to help digest food. Its main blood supply comes from the branches of pancreaticoduodenal artery and superior mesenteric artery, and venous blood flow is discharged through pancreaticoduodenal vein.

The duodenum is the first part of the small intestine and a long tube located in the abdominal cavity. It is located

between the pancreas and the stomach, near the spine. This passage is about 25 cm long and can be divided into three parts: the duodenal bend, the duodenal descending part and the duodenal horizontal part. The main function of duodenum is to receive bile and pancreatic juice and help digest food. In laparoscopic pancreaticoduodenectomy, doctors need to remove a part of duodenum, so it is very important to know the anatomy of duodenum.

Abdominal cavity is a cavity between the thorax and pelvis, which contains the main organs of digestive system and other important peritoneal pelvic organs. The abdominal cavity can be divided into three parts: upper abdominal region, middle abdominal region and lower abdominal region. In laparoscopic pancreaticoduodenectomy, doctors need to operate through the abdominal cavity, so it is very important to understand the anatomy of the abdominal cavity deeply.

Pancreatoduodenectomy involves a large number of blood vessels and nerves. The main arterial and venous vessels include pancreaticoduodenal artery, superior mesenteric artery, hepatic artery, portal vein, superior mesenteric vein and hepatic portal vein. Knowing the location and branches of these blood vessels can effectively reduce the risk of rupture during surgery and protect the surrounding important organs and structures, thus helping to reduce the recovery time after surgery. In addition, paying attention to protecting the surrounding nerves and blood vessels during the operation can minimize the postoperative complications.

In short, laparoscopic pancreaticoduodenectomy requires doctors to master relevant anatomical theories to ensure the safety and accuracy of the operation process. For patients, this kind of surgery can reduce trauma and recovery time and improve the quality of life.

Laparoscopic pancreaticoduodenectomy is a surgical technique used to treat pancreatic or duodenal diseases. This kind of operation needs to master the relevant anatomical theories, including the following aspects:

- 1) Anatomy of pancreas: The pancreas is a long gland located in the deep abdominal cavity, which consists of three parts: head, body and tail. Its main blood supply comes from the branches of pancreaticoduodenal artery and superior mesenteric artery, and its largest vein is pancreaticoduodenal vein.
- 2) Duodenum anatomy: Duodenum is a small intestine located in abdominal cavity and close to spine, and its length is about 25 cm. The duodenum is a narrow passage between the pancreas and the stomach, with the mesentery on the outside and the peritoneum on the inside, which contains the duodenal bend, duodenal descending part and duodenal horizontal part.
- 3) Abdominal cavity anatomy: Abdominal cavity is a cavity between the thorax and pelvis, which contains the main organs of digestive system and other peritoneal pelvic organs. The abdominal cavity is divided into three parts: upper abdomen, middle abdomen and lower abdomen.
- 4) Vascular anatomy: Pancreatoduodenectomy involves a large number of blood vessels and nerves. The main arterial and venous vessels include pancreaticoduodenal artery, superior mesenteric artery, hepatic artery, portal vein, superior mesenteric vein and hepatic portal vein.

The above anatomical theory provides the necessary basic knowledge for laparoscopic pancreaticoduodenectomy, which is helpful for surgeons to operate and reduce the risk of operation.

Second, the possible complications and hazards of laparoscopic pancreaticoduodenectomy

Laparoscopic pancreaticoduodenectomy is an advanced surgical technique and an effective method for the treatment of pancreatic head and duodenal tumors. However, there may still be some postoperative complications, which not only prolong the hospital stay and increase the number of patients.

The hospitalization expenses of patients have brought great psychological pressure to patients and their families, and may even be the direct cause of patients' death sometimes [5]. The following are common complications and their hazards:

- 1) Bleeding: Postoperative bleeding is the most common complication, and severe bleeding may require reoperation. Severe bleeding may lead to a series of complications such as postoperative infection and hypoxia.
- 2) Pancreatic fistula: Pancreatic secretions can't be drained after operation, which leads to a series of serious complications such as pancreatic cyst and peritonitis [6-8].
- 3) Abdominal hernia: It is necessary to open the muscle incision during the operation, which may easily lead to postoperative abdominal hernia, and a series of serious complications such as obstruction and necrosis may occur in the hernia sac.
- 4) Gastrointestinal fistula: A section of the digestive tract needs to be removed during the operation, and gastrointestinal fistula may occur after the operation, which will lead to the overflow of contents in the digestive tract and increase the risk of infection [9].
- 5) Drug-resistant bacterial infection: Antibiotics are routinely used to control infection after operation, but excessive use may lead to the improvement of bacterial drug resistance and increase the risk of recurrence of

infection.

In a word, although laparoscopic pancreaticoduodenectomy is a more advanced and safe method than traditional surgery, it is not completely risk-free. Patients need to deeply understand the steps and risks of surgery and actively cooperate with doctors for surgery and postoperative treatment. Third, postoperative management

The quality of postoperative nursing is directly related to the incidence of complications. Simple surgical skills can not achieve the ideal surgical effect, and postoperative systematic treatment and nursing management are equally important [10]. Standardized postoperative rehabilitation nursing and effective intervention on postoperative adverse reactions can effectively avoid postoperative complications.

- 1) Hemorrhage: Hemorrhage after laparoscopic pancreaticoduodenectomy is a common complication. Treatment measures mainly include: quickly identify the cause of bleeding and take corresponding measures to stop bleeding; Blood transfusion and plasma exchange, blood urea nitrogen and hemoglobin monitoring, anti-infection and protection of liver function [11].
- 2) Pancreatic fistula: Pancreatic fistula is a common complication after pancreatic surgery, including endogenous and exogenous pancreatic fistula. Treatment measures mainly include: active treatment of infection, nutritional support, protection of liver and kidney function, and drug treatment or surgical treatment.
- 3) Intestinal obstruction: Postoperative intestinal obstruction often manifests as severe abdominal pain, nausea, vomiting and abdominal distension. Treatment measures mainly include fasting, catharsis, dilatation, colonoscopy and surgical treatment [12].

For the complications after laparoscopic pancreaticoduodenectomy, different treatment measures should be taken according to the specific situation, and surgery should be performed if necessary. Pay attention to regular review and follow-up after operation [13]. During the recovery period after operation, it is very important to maintain healthy eating habits, avoid bad habits such as smoking and drinking, and at the same time carry out appropriate exercise recovery.

3. Conclusion

To sum up, there are many factors that affect the postoperative complications of LPD. In the post-operative nursing of LPD, we should look for feasible schemes from the aspects of operation and post-operative management, such as strengthening the training of surgical teachers and establishing a perfect post-operative management system, so as to better control the post-operative complications and improve the surgical treatment effect.

References

- [1] Wang Hebin, XiongGuangbing, Zhu Feng, et al. Clavien-Dindo classification of complications after laparoscopic pancreaticoduodenectomy and analysis of influencing factors [J]. Chinese Journal of Surgery, 2018, 56(11):E007-E007.
- [2] Yuan Bo, Li Huansong, Zhang Cancan. Analysis of complications after laparoscopic pancreaticoduodenectomy [J]. Modern Instruments and Medicine, 2017, 023(006):P.26-27.
- [3] Yang Xiaorong, GaoJingui. Discussion on influencing factors of postoperative pulmonary complications in patients undergoing laparoscopic pancreaticoduodenectomy [J]. Journal of Hebei Medical University, 2019, 40(3):5.
- [4] Lu Wenqi, Lu Bangyu, Cai Xiaoyong, et al. Prevention and treatment of complications of laparoscopic pancreaticoduodenectomy [J]. China Journal of Endoscopy, 2005, 11(B11):2.
- [5] Yang Hui. Analysis of influencing factors and nursing care of pancreatic leakage after total laparoscopic pancreatoduodenectomy [J]. Health Required Reading, 2020, 28 issues, 126 pages, 2020.
- [6] Tang Rong, ZhengHui, Chen Jie, et al. Analysis of the influence of laparoscopic pancreaticoduodenectomy on postoperative complications and prognosis of pancreatic head cancer [J]. China Medical Frontier Journal: Electronic Edition, 2017, 9(2):4.
- [7] Shi Chengjian, Zhu Feng, Wang Min, et al. Clinical value analysis of implantable pancreaticojejunostomy in reducing pancreatic fistula after laparoscopic pancreaticoduodenectomy: a report of 69 cases [J]. China Journal of General Surgery, 2020, 29(9):6.
- [8] Wang Hebin, XiongGuangbing, Zhu Feng, et al. Clavien-Dindo classification of complications after laparoscopic pancreaticoduodenectomy and analysis of influencing factors [J]. Chinese Journal of General Surgery: Electronic Edition, 2021, 15(6):4.
- [9] Wu Zhike, Wu Jialun, Wang Jiajia. Study on the influence of different pancreaticojejunostomy methods on gastric emptying disorder after laparoscopic pancreaticoduodenectomy [J]. Chinese Journal of General Surgery: Electronic Edition, 2020, 14(1):4.

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- [10] Lu Shicui, Huang Xiujun, Pu Guiyu, et al. Observation and nursing care of complications after laparoscopic pancreaticoduodenectomy [J]. *Qilu Nursing Journal: the second half of the month (surgical nursing)*, 2009, 15(1):3.
- [11] Zhang Juncong, Hu Jiaping, Li Taiyuan, et al. Meta-analysis of the short-term efficacy of Da Vinci robotic surgery system and laparoscopic pancreaticoduodenectomy [J]. *Chinese Journal of Digestive Surgery*, 2017, 16(8):5.
- [12] Yan Shumeng, Yang Lina. Effect of nursing mode based on Newman theory on prognosis of patients with periampullary cancer after laparoscopic pancreaticoduodenectomy [J]. *Naval Medical Journal*, 2022(001):043.
- [13] Pan Donghua, Li Guiquan, Wu Yuting, et al. Peri-operative safety and efficacy analysis of laparoscopic pancreaticoduodenectomy for lower common bile duct cancer [J]. *Chinese Journal of General Surgery: Electronic Edition*, 2022, 16(2):5.