

## Editorial: Laparoscopic Distal Pancreatectomy

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Laparoscopy became a major part of the surgical armamentarium in 1989, after the initial introduction of laparoscopic cholecystectomy in 1987. Following the incredibly rapid adoption of this approach to abdominal surgery, surgeons applied the techniques to an ever-widening variety of procedures. Notably lacking throughout this period were controlled trials to demonstrate at least equal outcomes with traditional approaches to surgery. Market forces and improvements in instruments and imaging technology were powerful drivers for laparoscopic surgery. Within a short time, surgeons had shown that all organs in the abdomen and retroperitoneum could be approached laparoscopically. To many, it seemed to be only a matter of "Can we do this laparoscopically?" and rarely a question of "Will our patient benefit from a laparoscopic procedure?". Of course, the word "benefit" has many meanings. Surgical resections of the liver, spleen, stomach, colon, kidney, and small bowel are now commonly performed in addition to the routine resections of the gallbladder and appendix. When one considers the use of laparoscopic resection in the treatment of malignancies, a multitude of new issues arise.

Although laparoscopic resection of the gallbladder, appendix, colon or spleen is considered the standard approach, resection of the pancreas remains one of the most challenging procedures to perform laparoscopically, and many surgeons do not perform this procedure, but rather use traditional open surgical resection as their standard approach. Laparoscopic resection of the pancreas began with the report of the laparoscopic conduct of a pancreaticoduodenectomy in 1994 [1]. Laparoscopic distal pancreatectomy (LDP) was first reported in 1996 [2]. Despite this relatively long history in the total timeframe of laparoscopic surgery, pancreatic resection has had relatively slow adoption worldwide. To date, there have been a large number of meta-analyses comparing LDP

with open distal pancreatectomy (ODP). We shall review a number of them here, although there is no attempt to be comprehensive in this review.

In a meta-analysis of 18 studies with a total of 1814 patients, Venkat and colleagues compared LDP and ODP in regard to intraoperative outcomes, postoperative recovery, oncologic safety, and postoperative complications [3]. Of the 1814 patients in this meta-analysis, there were 43% LDP and 57% ODP. They found that LDP had significantly lower blood loss, overall complications (including wound infection) and hospital stay. There were no significant differences in operative time, oncologic safety (margin status), incidence of fistula formation and mortality. These authors conclude that the lower incidence of complications as well as similar status of the surgical margin support the conduct of LDP in select patients with pancreatic malignancies.

Nakamura and Nakashima reviewed both LDP/ODP and laparoscopic pancreaticoduodenectomy [4]. In this meta-analysis, they reviewed 24 studies of LDP including a total of 2904 patients undergoing distal pancreatectomy (36% LDP and 64% ODP). The authors point out that every study reviewed was retrospective in nature and that there were no prospective trials to review. Studies were evaluated using a fixed effect model and a random effect model, and there were some differences in the comparisons depending on which model was used. When comparing LDP and ODP, they found that the studies showed significantly lower blood loss, transfusion rate, wound infection rate, mortality rate and length of stay for patients undergoing LDP. Overall costs were also lower for LDP compared to ODP, but only in the fixed effect model.

Rehman and colleagues retrospectively reviewed a single center experience of 101 patients who underwent distal pancreatectomy, including 22 patients with confirmed diagnoses of adenocarcinoma [5]. Of these, eight patients underwent LDP and 14 patients underwent ODP. The two groups were well matched for age and tumor size. Intraoperative blood loss was less, but not significantly so, in patients undergoing LDP. Operative time was significantly shorter in patients undergoing ODP, while total length of stay was shorter in patients who underwent LDP. Complication rates were similar in the two groups. The oncologic outcomes as measured by rate of R0 resection and number of lymph nodes, was similar in the two groups. The authors conclude that LDP is a viable

**Received** May 01st, 2015– **Accepted** May 19th, 2015

**Keywords** Laparoscopy; Pancreas

**Abbreviations** ODP open distal pancreatectomy; LDP laparoscopic distal pancreatectomy

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option for the resection of adenocarcinoma in the body and tail of the pancreas. While this is a small retrospective study, its value is that it represents the experience at a single institution.

In another single center retrospective review, Lee and colleagues reported the results of 805 distal pancreatectomies performed over a 14-year period, including 37 robotic pancreatectomies, 131 LDP, and 637 ODP [6]. All three groups were similar in regard to age, gender, body mass index, rate of fistula formation and 90-day morbidity and mortality. They found that robotic and LDP had comparable outcomes, and concluded that both of these techniques may have advantages over ODP in select patients. There was a significantly higher blood loss reported in the ODP group, which also had a longer hospital stay, although not significantly so. They report that all three techniques had similar oncologic outcomes based on the rates of R0 resection, but that the ODP had a significantly higher lymph node yield. The authors conclude that LDP and robotic distal pancreatectomy are safe and feasible in selected patients. They state that minimally invasive surgical techniques do not compromise the oncologic safety of the procedure.

In a recent meta-analysis, Mehrabi and coworkers reviewed 29 studies with a total of 3701 patients [7]. They also included five existing meta-analyses in this review. All of the studies reviewed were comparisons of ODP and LDP, and included both benign and malignant diseases of the body and tail of the pancreas. The authors made a great effort to assure the quality of studies included in their review, and used a random effects technique of data analysis. Through this analysis, they found that LDP was superior to ODP in terms of blood loss, time to oral intake and overall length of stay. There were no differences in mortality or overall safety. The data regarding oncologic radicality and effectiveness were limited. The authors conclude that LDP is a safe and effective alternative to ODP. Importantly, they also state that there is no need for further nonrandomized trials. They state that a large randomized trial is warranted at this time, and suggest that it focus on oncologic effectiveness, defined end points and cost-effectiveness.

The papers reviewed here reflect the relatively long chronologic history of LDP, at least in comparison to the overall history of advanced laparoscopic abdominal surgery. Despite this, there have been no major randomized trials conducted to date. In general, the studies reviewed here found similar results, with LDP showing superiority over ODP with regard to blood loss and length of stay. LDP remains a technically demanding procedure that may

never be adopted by a large percentage of surgeons, as well as the fact that distal pancreatectomy is not as commonly performed as many other abdominal operations, no matter how it is performed. We agree with the conclusions of Mehrabi *et al.* [7] that it is time to conduct a large multi-center randomized trial to obtain robust data about the true benefits of LDP, compared to ODP. We also agree that the data presented to date regarding oncologic effectiveness and safety is somewhat limited.

We owe it to our patients to do the procedure that is truly in their best interest, and must be able to demonstrate the actual benefits using high-quality data. Furthermore, we must be cognizant of the fact that while a shorter length of stay or lower blood loss may be of importance to a patient undergoing an elective laparoscopic cholecystectomy for symptomatic cholelithiasis, it may not be as important to a patient with a malignancy of the distal pancreas. We must assure our patients with malignancies of the pancreas that the oncologic outcomes are at least equal, and concentrate on these factors in data collection and analysis.

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#### Conflict of Interest

Authors declare to have no conflict of interest.

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