

Laparoscopic Surgery of the Pancreas

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In 1883, Billroth stated "the surgeon who should attempt to suture a wound of the heart would lose the respect of his colleagues." Despite this admonition, heart surgery developed and thrived over subsequent years. In a similar manner, as a resident I often heard the three rules of surgery: 1. Eat when you can, 2. Sleep when you can, and, 3. Don't touch the pancreas. In the very earliest days of laparoscopic surgery, this thinking was applied to laparoscopic surgery of the pancreas. However, the first report of laparoscopic pancreaticoduodenectomy was published in 1994 [1]. Less than 30 years after the introduction of laparoscopic cholecystectomy, laparoscopic approaches to a wide range of pancreatic diseases are routinely undertaken. We have dedicated this issue of *Journal of the Pancreas* to review recent developments in this burgeoning field.

Distal pancreatectomy is one of the more common laparoscopic pancreatic surgery procedures. Sánchez-Cabús *et al.* [2] present a large series of patients who underwent laparoscopic left pancreatectomy, and reviewed the value of splenic preservation. In this careful analysis, performing a splenectomy along with left pancreatectomy was an independent risk factor for the development of major complications. They conclude that splenic preservation is important to reduce the incidence of complications, and that two techniques of splenic preservation resulted in a similarly low rate of complications compared to patients who underwent splenectomy.

Leung and Perez [3] provide a comprehensive review of the literature regarding minimally invasive pancreaticoduodenectomy from 1994-2015. One of the important features of this extensive review is that the authors limited their review to high-volume centers, in which at least 40 minimally invasive pancreaticoduodenectomy procedures had been performed. This criterion for inclusion in this review avoids some of the issues related to the "learning curve" for this advanced procedure, and

resulted in a series from 6 institutions. They provide an excellent review of outcomes for this procedure, and also discuss the important issue of the "learning curve". They compare outcomes between open and minimally invasive procedures, including complications, peri-operative and oncologic outcomes. Their extensive discussion of the learning curve and teaching this advanced procedure is an important contribution to surgical education. They describe a carefully tailored step-wise curriculum that allows gradual escalation of the difficulty of component parts of this advanced procedure.

Machado *et al.* [4] describe an interesting pancreatic anomaly (pancreatic trifurcation) which was treated by laparoscopic resection. Trifurcation of the has not been previously reported. Anatomical variants may be responsible for alterations in the flow within the pancreas that can lead to recurrent episodes of pancreatitis. This interesting report highlights the value of minimally invasive surgery, even in the presence of anatomic variants. Narita *et al.* [5] also describe the use of laparoscopic resection for an epidermoid cyst which arose in an intrapancreatic accessory spleen. This interesting report reinforces the value of detailed preoperative imaging and localization of the lesion, which is so useful in minimally invasive pancreatic surgery. Beautiful images on computed tomography scan, magnetic resonance imaging scan, and intraoperative images of this rare lesion are presented in this report.

Boutros *et al.* describe a hybrid approach to minimally invasive pancreaticoduodenectomy using laparoscopic mobilization followed by a robotic dissection and an open mini-laparotomy to perform the reconstruction [5]. This report describes a single institution experience with 11 resections performed with this innovative approach to a very advanced procedure. This may represent an excellent way to gradually integrate robotic surgery into advanced minimally invasive surgery of the pancreas. A similar approach was discussed above, by Leung and Perez [3], who also use a hybrid approach. Hybrid surgery is especially useful in meeting the demands of highly advanced procedures as both of these groups describe. Teaching robotic surgery demands a carefully delineated curriculum, as Boutros *et al.* do so nicely [6].

There are a limited number of pancreatic lesions that are amenable to enucleation, and Matsuoka *et al.* provide

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us with a review of minimally invasive approaches to the enucleation of pancreatic lesions [7]. The authors provide us with a comprehensive review of 13 studies in the literature describing results following laparoscopic enucleation of a variety of pancreatic tumors. They give an excellent description of surgical technique for lesions in various locations, with positioning and port placement and also discuss the importance of intraoperative ultrasound in these procedures.

Laparoscopic approaches to the pancreas will always be considered “advanced” procedures. The wide range of procedures reflected in the papers in this special issue of the *Journal* show that more and more surgeons are performing an ever widening range of laparoscopic procedures for pancreatic disease. This is good for our patients and for the science of surgery. As the spectrum of procedures becomes greater, we must always be sure that the laparoscopic conduct of a procedure benefits the patient, using reasonable metrics. Just because we “can”, does not mean we “should”. We also have to be sure that we are adequately training the next generation of surgeons in the conduct of these complex, low-volume procedures which demand advanced laparoscopic surgical skills. Issues regarding training experience have recently come to the fore [8]. Further study of this important issue is needed, in line with the clear discussion of these issues by Leung and Perez [3].

Conflict of Interest

Authors declare to have no conflict of interest.

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