Editorial

Pancreas-related complications following gastrectomy

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Although gastric cancer is relatively uncommon in the United States and Europe, it is a prevalent malignancy in Asia, particularly Japan and South Korea (1). Throughout surgery, minimally invasive techniques (MIS), including laparoscopic and robotic platforms, have gained popularity for their benefit in shorter post-operative patient recovery. While this is true in surgery for benign disease, minimally invasive surgery has not yet proven to be superior to open surgery for cancer. Increasing data from multiple centers, however, continues to show non-inferiority of the MIS approach.

Pancreatic complications, while uncommon following gastrectomy, can cause morbidity and, at times, necessitate further intervention. Guerra F, et al performed a meta-analysis of open versus minimally invasive gastrectomy for cancer and specifically reported on pancreatic complications (2). Briefly, the authors utilized the PubMed, Embase and Cochrane databases and ultimately included 20 studies, of which 6 were randomized trials of MIS *vs.* open gastrectomy and 14 were non-randomized trials. This incorporated 7,336 patients and looked at the development of acute pancreatitis or pancreatic fistula. The authors further delineated their inclusion of non-randomized trials, including only those who had matched patients across body mass index, lymphadenectomy, tumor location, size and stage between the open and MIS group. Overall, 14 studies were from Asia, 5 European and 1 from the United States. The study population included 3,583 (49%) who underwent open gastrectomy and 3,753 who underwent an MIS approach.

Pancreatic complications occurred in 1.07% of all patients undergoing gastrectomy, with pancreatic fistula occurring more frequently than acute pancreatitis. The authors report that pancreatic complications occurred more frequently in the MIS group than open gastrectomy group (1.24% *vs.* 0.91%), although this was not statistically significant. In a subgroup analysis, acute pancreatitis occurred in 6 patients following open gastrectomy compared with 11 in the MIS group, P=0.03. There was no difference in development of pancreatic fistula between the MIS and open group.

While there was a statistically significant increase in incidence of acute pancreatitis following gastrectomy, depending on surgical approach, the absolute incidence of occurrence is quite low and must be interpreted with some caution. While acute pancreatitis can certainly precipitate a systemic inflammatory response and lead to organ failure, it is unclear whether this is the case following gastrectomy or if the pancreatitis is manifest mostly as a biochemical response. The occurrence rate is so low that there is no reporting on whether time to oral intake or hospital length of stay is longer in this group, or if other intervention is required.

Pancreatic fistula, however, can cause significant impact, sometimes necessitating percutaneous drainage or other intervention. Again, it is unclear based on this study if occurrence of pancreatic fistula correlates with lengthened hospital stay or increased incidence of further procedures. However, there is no difference in incidence of pancreatic fistula when comparing operative platform. Although the majority, 74%, of patients underwent D2 lymphadenectomy, it is also unclear if the more extended lymphadenectomy, compared to D1+, also led to increased incidence of these pancreatic complications.

What is unknown is whether these complications are related to a more meticulous lymph node dissection and if there are worse oncologic outcomes because of them. For example, does having a pancreatic fistula correlate with longer time to chemotherapy or more patients not receiving chemotherapy? Is survival worse in those with pancreatic complications? Fortunately, because pancreatic complications are so infrequent, it would take compiling multiple studies with a cohort of thousands of patients to be powered enough to determine this outcome.

Clinically, there are several grades that describe the significance of pancreatic leak or pancreatic fistula (3). Grade A is essentially a biochemical leak of no clinical significance, whereas Grade B requires leaving the surgical drain in place and potentially drain manipulation. Grade C leaks, however, are associated with single/multiple organ failure or require reoperation. From pancreatectomy outcomes associated with pancreatic cancer, grade C leaks are associated with worse survival; however grade A and B leaks do not adversely impact survival (4). It is not yet universal in the gastrectomy-for-cancer literature that this grading system of pancreatic fistula has been adopted, as it seems that groups utilize either the ISGPS definition *vs.* standard Clavien-Dindo description. With respect to the question of minimally invasive *vs.* open gastrectomy, a single center study from Japan found equivalent grade B pancreatic leaks following total gastrectomy, either open or laparoscopic (3.7% *vs.* 2.7%, respectively, P=0.38) (5). A broader, multicenter Japanese study evaluated 5,288 patients in 169 institutions, propensity score-matched 1,067 patients in the open and laparoscopic group, and found a higher association of grade B or higher pancreatic fistulas in the laparoscopic distal gastrectomy group compared to open (6). It is still unclear, however, if this impacts overall survival or return to adjuvant therapy.

In conclusion, it certainly behooves the surgeon and perioperative team to focus on the possibility of pancreatic complications following gastrectomy for cancer. Although the MIS approach may be associated with a higher incidence of pancreatic fistula or pancreatitis, it is unclear what clinical impact this has, and patients may still derive post-operative recovery benefit. Further study, with combined cohort data, is needed to truly determine the incidence of clinically significant post-operative pancreatic complications, the impact on survival of these complications, and whether this outweighs the benefit of a MIS platform.

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