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ASO AUTHOR REFLECTIONS

ASO Author Reflections: Robot is the Missing Link for Vascular Resection During Minimally Invasive Pancreatoduodenectomy

Marcel Autran Machado, MD, FACS, Augusto C. Carvalho, MD, and Fabio Makdissi, MD

Department of Surgery, Nove de Julho Hospital, São Paulo, Brazil

PAST

Pancreatoduodenectomy (PD) is one of the most complex procedures in oncologic surgery and is the procedure of choice for resectable tumors located in the head of the pancreas. Until recently, invasion of the great vessels, particularly the portal vein and superior mesenteric vein, was a relative contraindication to a minimally invasive approach. With few exceptions, most patients with invasion of the portomesenteric axis were treated with open PD.[1,2] The number of patients with laparoscopic PD increased over time, and selected patients with vascular invasion could be treated with this approach. However, this experience was concentrated in a few centers with highly skilled surgeons. With the introduction of new and more effective chemotherapeutic agents and technical improvements, the indications for PD and the complexity of these operations have increased. Vascular resections and neoadjuvant therapies are becoming more common, making the resection phase of PD more challenging.[3–6] Venous vascular infiltration in pancreatic cancer is not only a technical problem but also a sign of poorer prognosis compared with resectable tumor.[2] Nevertheless, surgical treatment remains the only curative option in these patients, and surgical treatment of borderline resectable and locally advanced pancreatic cancer is offered in selected high-volume tertiary centers.[1–6] When infiltration of the portomesenteric axis is confirmed, intraoperative surgical options include tangential or segmental resection, depending on the extent of vein involvement. In the case of a tangential resection, reconstruction with a patch or venous reconstruction can be performed.[1,6]

PRESENT

Available data suggest that robotic interventions improve outcomes of minimally invasive PD.[7] Compared with laparoscopic PD, robotic PD reduces the overall risk of conversion to open surgery and the risk of emergency conversion due to major bleeding, addressing one of the major concerns regarding the safety of minimally invasive PD.[8,9] Despite the current excellent data, the full potential of robotic-assisted PD has not been fully explored. Currently, robotic PD is at least equivalent to open and laparoscopic surgery in terms of the incidence and severity of postoperative pancreatic fistula, incidence, and severity of postoperative complications, as well as postoperative mortality.[7] In patients diagnosed with pancreatic cancer, robotic PD is associated with similar rates of R0 resection but with a higher number of lymph nodes examined, less blood loss, and less need for blood transfusion.[10,11] Multivariate analysis shows that robotic PD may improve patient survival.[12] Recent studies have shown that robotic PD with vein resection and reconstruction is feasible and safe;[13,14] however, it appears that improvements in performance may only be observed after 35 cases of robotic PD with vascular resections.[15]

FUTURE

In the future, as robotic platforms become increasingly available and more competitively priced, it is likely that centers with expertise will move to use the robot for minimally invasive PD. Despite the excellent data currently available, the full potential of the robot PD has not yet been fully explored. Indeed, recent studies show that after 250 pancreatic resections, the results of robot-assisted PD are optimized and may be superior to those of its open counterpart.[16,17] We believe that the full robotic approach will be easier to adopt

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M. A. Machado, MD, FACS
e-mail: dr@drmarcel.com.br

for surgeons performing the procedure without prior laparoscopic experience, as the availability of articulated instruments will allow surgeons to mimic the techniques of open surgery. As experience increases, so will the indications for more complex procedures such as vascular resections. In summary, the robotic approach to vascular resection is safe and feasible during robotic PD. When we reach the magic number of 250 robotic pancreatic resections, we will be able to perform almost any pancreatic procedure, including vascular resections, using the robotic platform, resulting in a high level of competence. However, achieving proficiency requires commitment, dedication, and high volumes.[7,16,17]

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