Published in final edited form as:

Ann Surg Oncol. 2018 December ; 25(Suppl 3): 786–787. doi:10.1245/s10434-018-6880-0.

ASO Author Reflections: The Evolution of Minimally Invasive Liver Surgery and the Future With Robotics

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Past:

Since the advent of minimally invasive surgery in the 1980s, the surgical management of primary hepatobiliary cancers has evolved significantly. Surgeons shifted from open to laparoscopic liver resections in the early 2000s and laparoscopy was declared as standard practice for certain liver resections at the first international consensus meeting in Louisville, Kentucky (1). This shift was studied significantly with results showing similar if not better perioperative outcomes along with comparable long-term oncologic outcomes of laparoscopic liver resections. Around 2014, when the second international consensus conference was held in Morioka, Japan, laparoscopic liver resections became more common and the robotic platform started to make its way into the options for minimally invasive surgery(2). Multiple centers studied the short-term perioperative outcomes of robotic liver surgery and found it to be safe and feasible (3,4). What was still missing was the long-term oncologic outcomes of robotic liver resections.

Present:

Our study combined data from six different institutions across the United States and Europe of patients diagnosed with hepatocellular carcinoma, cholangiocarcinoma, or gallbladder cancer between 2006 and 2016 who then underwent robotic liver resections (5). We showed that overall survival and disease free survival of patients undergoing robotic liver surgery is comparable to the published data on laparoscopic liver surgery. Seeing that these outcomes are comparable allows for increase in interest in utilization of the robotic platform. Due to the limitations associated with laparoscopy, including decreased range of motion, limited two dimensional view and poor ergonomics, robotic liver surgery gained popularity (3). The downside to the robotic platform that still exists is the large learning curve associated with robotic surgery. As most current liver surgeons gained exposure to the robotic platform years after residency training, robotic surgery for liver resections is in general associated with longer operating room times as well as larger financial burden due to the cost of initial purchase and maintenance.

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Conflicts of Interest: The authors have no conflicts of interest to disclose.

Future:

With the increase in utilization of robotic surgery throughout a variety of surgical specialties, more surgeons are incorporating the use of the robotic platform early in their careers and most importantly more residencies are integrating robotic surgery into their core curriculum. Similar to the transition from open to laparoscopic surgery, the hope is for robotic surgery to become more cost efficient and to allow surgeons the ability to perform more complex procedures with superior visualization and ergonomics. Due to the unique ability of the dual console robotic system allowing surgeons to teach the use of this new technology while continuing to have full control of the system itself allows residents to gain great exposure and practice. As the ability to perform robotic surgery continues to become a core skill, in the future we will commonly have more choices in forms of minimally invasive surgeries to provide patients with the best results.

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