Robotic State of the Art Colon and Rectal Surgery

Vincent Obias, MD

Laparoscopic surgery has been proven to have reproducible positive outcomes for the patient in colon and rectal surgery. Unfortunately, certain procedures such as Low anterior resections and abdominal perineal resections, have high conversion to open rates, worse mesorectal excisions, and increased nerve injury when done laparoscopically. Robotics is a new modality which can improve the outcomes of laparoscopic surgery.

I will discuss the current clinical robotic state of the art in reference to robotic colon and rectal surgery. We will discuss the current literature on new modalities such as the robotic firefly and single incision surgery. Not only does robotics improve the poor outcomes of laparoscopy, with new state of the art techniques and technologies such as firefly and single port surgery, robotics can go beyond simple laparoscopy.

State of the Art in Robotic Simulation and Training

Mona E. Orady MD, FACOG

Advancement in surgical techniques and instrumentation is challenging residency programs to adequately teach various methods of surgery to the surgeons of tomorrow. With ever- increasing resident work-hour restrictions limiting the time that residents can spend in hands on training, innovative curricular developments must be undertaken to help improve efficiency and quality of learning. To add to that challenge, at the same time that we are focusing on resident training, fellows, and other staff are also being trained in the rapidly spreading field of robotic surgery in many surgical specialties. Therefore organized multifaceted curricular approaches including traditional training techniques along will other tools such as simulation, videos, observation, and practice must be utilized to attain effective and efficient training while preserving patient safety. Simulation training is playing a key role in any of these educational tracts, as well as in maintenance of certification, credentialing, and privileging. This presentation will outline new and innovative approaches to resident education, as well as review state of the art methods of teaching and assessment. It will highlight the different simulator platforms available, methods of assessment, and utility of different applications. In addition, the future of simulation at it relates to robotic training will be discussed.

State of the Art with Robotic Valve Surgery

Robert Poston, MD

Robotic valve surgery has demonstrated measurable, unambiguous benefits compared to a standard open approach including smaller incisions, less pain, shorter length of stay, and quicker return to preoperative level of functional activity. As a result, it is the standard of care at many institutions. However, there remain major challenges from abandoning old ways. The first hurdle has been the training surgeons and their teams. Many cardiac surgeons have experience only with open surgical approaches and must learn how to use the robot at the same time they master a new less invasive surgical approach, making

their learning curve steep and prolonged. The team's retention of training is likely to be hindered by a slower pace of suitable candidates referred for mitral valve repair as compared to other cardiac procedures. A second issue is the requirement for interdisciplinary collaboration amongst multiple stakeholders throughout the life cycle of the robotic program. Addressing this need starts by creating trust from consistent, clear communication about the vision of the program and well designed processes for real time feedback about lessons learned from early cases. Regular review of a broad array of metrics of the program should be coupled to clear action plans for improvement. Few robotic valve programs that are initiated enter a mature, sustainable stage where this procedure becomes embedded into routine work processes and culture of the organization. Those that do often have a project champion strategically placed to prove that the challenges of robotics are congruent with the mission of the organization. We believe that this life cycle perspective provides a more comprehensive understanding of the challenges for robotic cardiac surgery and will help streamline the adoption of innovations associated with steep learning curves.

State of the Art in Robotic Thyroidectomy

Nader Sadeghi, MD

Thyroidectomy is a common surgery, primarily performed for thyroid cancer, indeterminate thyroid nodules, and compressive thyroid goiters. It is highly successful surgery. Patients with localized thyroid cancer carry a 5-year survival rate of 99.9%. Those with regional metastasis have a survival of 97.4%. Only 5% of patients presenting with thyroid nodule are diagnosed with thyroid cancer. Another 20% are indeterminate on needle biopsy.

Fine needle aspiration has obviated the need for thyroidectomy in majority of patients with small nodules under 4-5 cm, when confirmed benign. It is only very large benign nodules that may require elective thyroidectomy.

The rate of complications for thyroidectomy is low with 1-2% rate of vocal cord paralysis, and <1% rate of permanent hypoparathyroidism. Hemithyroidectomy has become an outpatient procedure. Most patients with total thyroidectomy have a short overnight hospital stay. Surgical pain is minimal and it's management easy.

Robotic assisted thyroidectomy aims at eliminating the neck incision by placing more incisions in a remote position from the neck. Hence its main aim is esthetic in nature. Techniques of robotic access to neck are evolving. Technical advances in robotic assisted thyroidectomy will be reviewed. The current techniques will be reviewed critically in the context of its challenges, benefits, risks, healthcare system, and patient population requiring thyroidectomy.

State of the Art in Robotic Vascular Surgery

Petr Štádler, Assoc. Prof., MD, PhD

BACKGROUND – The feasibility of laparoscopic aortic surgery has been adequately demonstrated. Our clinical experience with robot-assisted aortoiliac reconstruction for occlusive diseases, aneurysms, endoleak II treatment and hybrid procedures performed using the da Vinci system is herein described.

METHODS – Between November 2005 and April 2012, we performed 250 robot-assisted vascular procedures. 189 patients were prospectively evaluated for occlusive diseases, 48 patients for abdominal aortic aneurysm, two for a common iliac artery aneurysm, two for a splenic artery aneurysm, one for a internal mammary artery aneurysm four for hybrid procedures, and four for endoleak II treatment post EVAR.

The robotic system was applied to construct the vascular anastomosis, for the thromboendarterectomy, for the aorto-iliac reconstruction with a closure patch, for dissection of the splenic artery, and for the posterior peritoneal suture. A combination of conventional laparoscopic surgeries and robotic surgeries were routinely included. A modified, fully-robotic approach was used in the last 80 cases in our series.