14 Complications of Robotic Surgery

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1. INTRODUCTION

Over the past 25 years, technologic advances have dramatically improved urologic care in all subdivisions of urologic care. Extracorporeal shock wave lithotripsy, intracytoplasmic sperm injection, miniaturized endoscopy, surgical stapling devices, and laparoscopic nephrectomy/adrenalectomy are just a few examples. However, every new technologic advancement brings with it a new set of potential complications that must be considered, and robotic surgery is no exception.

Multiple studies have demonstrated that robotics can enable laparoscopically naïve surgeons to perform complex minimally invasive procedures with a shorter learning curve (1–3). Nonetheless, we firmly believe robotic surgery remains a remarkable laparoscopic tool, but the procedures themselves remain laparoscopic at heart. As long as robotic surgery entails trocar insertion and insufflation, the surgeon will continue to require an understanding of laparoscopic techniques, physiology, and complications. Many adverse outcomes can be prevented with thoughtful, preoperative planning, attention to detail during surgery, and proper postoperative care.

2. PATIENT SELECTION

Patient selection begins with a thorough history and physical examination. Comorbidities should be assessed preoperatively, with the physiologic changes unique to laparoscopic surgery kept in mind. For example, an obese patient with obstructive pulmonary disease and CO₂ retention may be difficult to ventilate with resultant hypercapnia during
laparoscopy (4). Before renal surgery, radiographic studies should be carefully examined for mass size and location, level of the renal hilum, renal vein or caval involvement, duplicated renal vessels, retro-aortic renal veins, on so on. These factors allow the surgeon to anticipate minor anatomic anomalies. Similarly, the presence of a median lobe during prostatectomy and the exact location of a ureteral tumor are critical pieces of information to have before a prostatectomy or distal ureterectomy.

The most favorable patients, especially during the initial learning phase, include those who are relatively thin and that have virgin abdominal cavities. Obese patients can be a significant challenge because excessive adipose tissue can make dissection tedious and difficult (5,6). In addition, obesity increases the risk complications during laparoscopic surgery, particularly with the Trendelenberg/lithotomy position required for pelvic procedures (7). Multiple prior abdominal surgeries predispose to intraperitoneal adhesions, which are time-consuming to lyse and increase the risk of visceral injury. Patients with extremely muscular abdominal walls have reduced abdominal wall compliance that reduces the working space and may limit exposure. As the surgeon’s experience grows, patients with relative contraindications become more amenable to a robotic approach.

### 3. PREOPERATIVE PREPARATION

Patients should be appropriately informed of the surgeon’s experience, the risks and benefits of robotic surgery versus standard laparoscopy versus open surgery, and other therapeutic options. In the event that the procedure is one of the first five for the surgeon, the use of proctor/mentor or similarly experienced colleague is highly recommended and may be required by the hospital’s credentialing body. This circumstance should be discussed openly with the patient. Preoperative discussions should always include the caveat that conversion to an open procedure is possible. Consent must include permission for open surgery. Although robot malfunctions are rare, we also have a discussion with the patient as to whether it would be best to proceed with a laparoscopic or open approach in the face of an intraoperative malfunction, depending on the surgical case. Anticoagulants, including herbals, are discontinued preoperatively. A type and screen should be obtained. Although intraoperative bowel complications are rare, we still conservatively have all our patients perform a bowel preparation with clear liquids and magnesium citrate the day before surgery (8). In addition, an empty bowel helps maximize working space and allows for more comfortable dissection. The patient