Robotic Surgery Risk Reduction Strategies

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It seems as though nearly every time the television is turned on there's an advertisement by an attorney encouraging viewers to call if the individual has suffered complications following robotic surgery. The technology is awesome and provides greater visualization and precision, but the use of the technology is not without risk. The bad news is that a patient may endure avoidable, unanticipated complications during robotic surgery. The good news is that proactive risk reduction strategies may be implemented to minimize the potential for avoidable, unanticipated complications.

The Quality and Patient Division of the Board of Registration in Medicine in the Commonwealth of Massachusetts has reported receiving “an increasing number of Safety and Quality Review (SQR) reports of patient complications associated with robot-assisted surgery” over the last two years. The root causes of the complications, identified through a review of several SQRs listed in the report, included, but were not limited to:

- Failure of the two attending surgeons to coordinate their approach during the procedure
- Failure to consider the potential for unanticipated complications associated with positioning an obese patient during the procedure
- Inexperience using the robot coupled with utilizing the robot for a procedure that was too complex for the robot's intended use

Consider the following example. Robotic surgery technology was utilized for a prostatectomy on a 67-year-old male who weighed nearly 300 pounds. The surgery was anticipated to take five hours, but it actually took more than 13 hours to complete. Unanticipated complications during the surgery left the patient incontinent and with a colostomy bag, as well as with kidney damage, lung damage, sepsis and a stroke. Lax proctoring and credentialing practices were blamed for the adverse outcome.

Unanticipated adverse outcomes related to robotic surgery may be reduced by implementing several strategies, such as ensuring that all relevant members of the surgical team complete appropriate training and identifying criteria for appropriate patient selection and thorough patient risk assessment.

Physician Training, Proctoring and Credentialing

Physician credentialing to perform robotic surgery should be based on the physician's demonstrated competency to perform robotic surgery, rather than on the number of procedures performed. According to A Consensus Statement on Robotic Surgery, prepared by the SAGES [Society of American Gastrointestinal and Endoscopic Surgeons]-MIRA [Minimally Invasive Robotic Association] Robotic Surgery Consensus Group, effective training includes:

- Training by an instructor who is an expert with specialty-specific experience and expertise in the technology
- Training which provides the physician with a complete understanding of:
  - The technology
  - Device function
  - Altered functional status
  - Basic trouble-shooting
• Training which provides the physician with knowledge of procedure-specific information, including:
  o Indications
  o Workup patient selection
  o Instrumentation
  o Preoperative preparation
  o Patient and system positioning
  o Port placement
  o Procedural steps
  o Complications and management

It is important to require a statement by the training entity that these elements have indeed been met by the surgeon seeking to perform robot-assisted surgery.

Proctoring should be provided by a surgeon who has demonstrated competency in performing robotic surgery and appreciates the unique skill required to successfully conduct this type of surgery. As has been stated:

Each surgical team members’ role needs to adapt to the introduction of a robotic system into the OR. For the surgeon this involves an entirely new way of conducting the surgery including patient selection, port placement, increased perceptual demands particularly due to limited force or haptic feedback, and increased cognitive demands. There are also additional collaboration demands due to the fact that the primary surgeon is now at a distance from the patient's side and the rest of the team.

Rather than requesting proctoring for a certain number of procedures alone, require the proctoring physician to document the training physician's competency according to these same elements. Include information about the physician's performance in the role as the provider manipulating the robot as well as performance in his/her role as the assisting surgeon. "Because the surgeon is not in the sterile field, there is a need for an assisting surgeon and additional nursing support as well as increased coordination and communication demands." Therefore, training and proctoring a physician should emphasize effective collaboration and communication with the other surgeon, nurses and anesthesia providers during the procedure.

The physician reappointment process may include monitoring performance through relevant quality indicators, continuing medical education, peer review activity and patient satisfaction information.

**Preparing the Surgical Team**

Develop a training and competency program for relevant team members (e.g., surgical nurses, anesthesia providers) on their role in the use of the equipment and care of the patient (e.g., positioning, monitoring) having robotic surgery. Educate team members on the unique needs-associated care of the patient undergoing robotic surgery and how the typical workflow may be altered during this type of procedure. For example, the anesthesia provider's role in patient monitoring and protection may be expanded to "ensure that no part of the robotic system is hitting the patient, that the robot does not knock out the airway, and that the patient is protected from soft tissue injury. ... In addition there may need to be changes to anesthetic management due to increased length of surgery."12

While surgical nurses are undergoing training and competency development, be sure to emphasize their expanded role in the care of patients having robotic surgery, team communication and team coordination. Points to underscore include proper sterilization of the robotic system, proper draping techniques, robotic system tool changes, enhanced and more precise communication skills with the surgeon and other team members, expanded patient evaluation/assessment/monitoring during the procedure, and demonstrated knowledge in working with the surgical table (e.g., changing the level of the table and placing the patient in and out of various positions, such as Trendelenburg position). Since robotic surgeries are often lengthy, nurses must also be trained to frequently evaluate the patient's skin over pressure points (as best as possible), conduct peripheral neurovascular
assessments, appreciate the potential long-term effects of the patient in a given position, and be prepared to communicate concerns to the surgical team during a procedure. For example, the potential for a brachial plexus injury during prolonged cases requires team members to re-evaluate the need for prolonged deep Trendelenburg during robotic cases.\textsuperscript{14}

Before performing the first case, have the entire surgical team, including the surgeon(s), conduct a mock surgery which is aimed at preparing the team to effectively perform their roles and critical tasks during the procedure (e.g., mechanics in using the equipment, patient monitoring), as well as manage potential complications.

**Proper patient selection**

Proper patient selection requires a thorough preprocedure evaluation for patient-specific risk factors. "Both the patient's co-morbidities and the complexity of the robotic surgical case are important risk factors to be considered."\textsuperscript{15}

In addition to clinically-focused risk reduction strategies, proactive business and financial risk reduction strategies may be addressed through proper business planning (see the *Instant Email News for Physicians* titled, "Business Planning for a New Service, Procedure or Equipment," March 2013) and ancillary practices, such as implementing a sound equipment maintenance plan (see the *Instant Email News for Physicians* titled, "Equipment Preventative Maintenance in the Physician Office," August 2012 [NOTE: Although the article was developed with a focus on equipment preventive maintenance in the physician office, similar risk management strategies may be implemented in the hospital and ambulatory surgery settings.])

References

2. Ibid, p.2
4. Ibid.
5. Ibid.
6. Ibid.
7. Commonwealth of Massachusetts, p. 3.
11. Ibid.
12. Ibid.

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