Design and Implementation of a Robotic Surgery Training Experience Logging System

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PURPOSE: Residents currently log robotic cases in the ACGME system as a "surgeon" if they performed any critical step of the procedure on the surgeon console. There is no standardization as to which steps or how much of the procedure should be performed by the resident. It was our objective to establish a tool for logging the true operative experience in robotic surgery to aid in assessing surgical competency as well as curriculum development.

MATERIALS AND METHODS: We propose a tool to log surgical skill progression, experience, and feedback for robotic cases. A web-based robotic experience logging system (RoboLog) was developed with procedures deconstructed to their major steps. Trainees may request the supervising attending review their performance. RoboLog provides automated summary reports to both residents and attendings.

RESULTS: RoboLog was successfully developed and piloted with a total of 310 cases logged over 1 year. A reporting structure was developed where residents could view statistics on several data points such as step-specific involvement and feedback from attending staff. Detailed data on resident experience were obtained. For instance, 82% of the 151 robotic prostatectomies were logged as "surgeon", yet urethral transection had $<35\%$ resident involvement.

CONCLUSIONS: Our current system for logging robotic experience is lacking given the fact that resident involvement on the surgical console is variable. Widespread usage of a logging system with more insight into step-specific involvement is needed. RoboLog fills this need and can be used to track robotic training progress and aid in development of a standardized curriculum. (J Surg Ed ▮:▮▮▮-▮▮▮. © 2017 Published by Elsevier Inc. on behalf of the Association of Program Directors in Surgery)

KEY WORDS: Education, Resident training, Robotic surgery, Accreditation, Curriculum, Urology

COMPETENCIES: Patient Care, Medical Knowledge, Practice-based learning and improvement

INTRODUCTION

Since its introduction over a decade ago, robotic-assisted surgery continues to rapidly gain popularity among urologists and is now the primary approach for performing radical prostatectomies.[1] Despite this, there is no standardization of training for residents and fellows in performing robotic surgery and there are very few recommendations provided for robotic educators in this matter. Furthermore, there are relatively few guidelines on what determines competency in the performance of robotic surgery.[2] The current Accreditation Council for Graduate Medical Education (ACGME) logging system for robotics is the same as every other type of surgery: a resident either performed the surgery or acted as an assistant. This log does not accurately reflect a trainee's actual robotic experience as there is a considerable amount of variation in participation on the console.

A system to log personal progress and specific steps performed during robotic surgery does not exist (i.e., pelvic lymph node dissection vs. vesicourethral anastomosis during a prostatectomy). The current system does not reflect actual participation as a resident who completes only the pelvic lymph node dissection during a prostatectomy will complete the ACGME case logging form identically to a resident who performs the entire surgery from start to finish. Program directors cannot know how much time the residents are spending on the console except by word of mouth. There is also no coordination among institutions as to what level of involvement on the robotic console should warrant logging as "surgeon." These

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inconsistencies may create issues in the future with graduating residents' competencies.[2]

These conditions suggest that the current mechanism of tracking true operative experience in robotic surgery is inadequate. Our objective was to establish a tool for robotic surgical training to track step-specific experience with integrated feedback. We propose a robotic training experience logging system (RoboLog) to track surgical skill progression, experience, and feedback for robotic surgery trainees.

MATERIALS AND METHODS

Logging System Development

The web-based survey software SurveyGizmo (www.surveygizmo.com) was chosen as our platform as it was the only preexisting software that allowed us to incorporate all of our proposed features into the logging system. RoboLog was developed in close collaboration with an engineer with web development and computer programming experience. Each user is provided with a unique login ID and password. RoboLog includes 11 common urologic robotic procedures deconstructed to their major steps and the procedure is selected via a drop-down menu. The amount of time in minutes to complete several of the key steps of each surgery is also logged. Figure 1 shows a screenshot of a portion of the logging process.

There is a built-in function for the resident to request that the supervising attending review their performance. When a resident requests feedback, the system sends an automated email to the attending with a link to then review the resident's performance both quantitatively and qualitatively. Trainees are rated on the following 4 different areas: respect for tissue, time and motion, instrument handling, and bimanual dexterity. There is also an overall rating and a text area for short qualitative comments.

RoboLog provides automated summary reports to both residents and attendings on a monthly basis. These summaries are also accessible at any time using the unique login information. The logging system is accessible on any device with internet access (i.e., desktops computers, tablets, and smart phones) and is compatible with multiple internet browsers as well as smart phone platforms.

Logging System Implementation

RoboLog was introduced at a departmental conference with a presentation lasting less than 10 minutes. It is important to emphasize that no patient identifying information is included in the logging system. The logging system is accessible on any device with internet access (i.e., desktops computers, tablets, and smart phones). The system was piloted at our home institution for 12 months and feedback from faculty and residents was provided with minor changes to the system. Residents were encouraged by faculty to complete the log before leaving the operating room as we believe it facilitates compliance and also accuracy of reporting. After the initial 12-month trial period, RoboLog was extended to include 2 other institutions with the goal to disseminate it to any interested robotic training program.

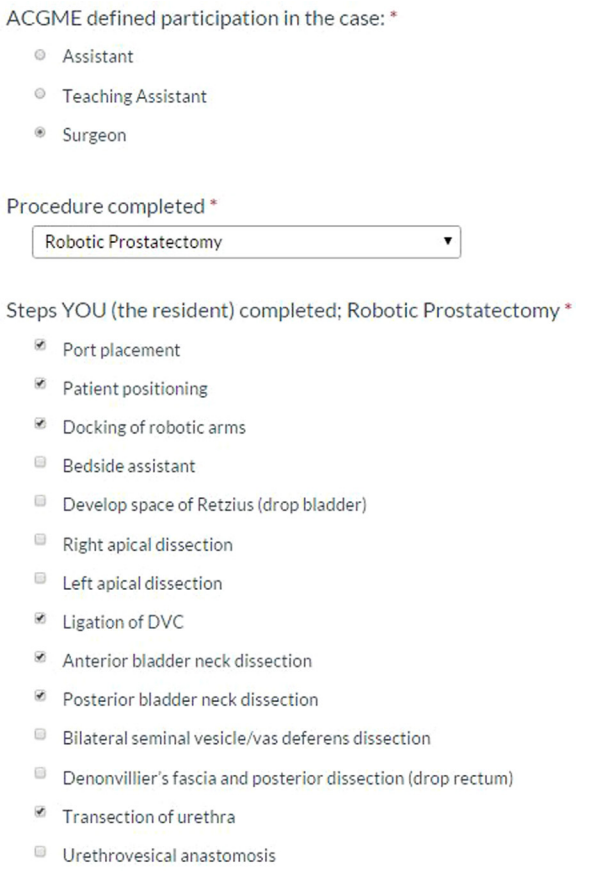

FIGURE 1. A screenshot of a trainee logging a robotic prostatectomy in RoboLog.

RESULTS

The web-based system (RoboLog) was successfully developed and piloted for 1 year with participation from 10 residents and 7 faculty members from our institution. In that period, a total of 310 cases were logged and 35 reviews by attendings were performed. The median time for resident to log a case was 59 seconds and the median time for an attending to enter a review was 53.5 seconds.

Summary reports were provided on a monthly basis to residents. Figure 2 demonstrates an example of a portion of a trainee's report on robotic radical nephrectomy. These reports include the number of procedures performed as ACGME surgeon or assistant with detailed information about which steps were performed. The report also includes the amount of time in minutes for key steps of each