The current state of surgeon credentialing in the robotic era

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Abstract: The unprecedented influx of technology into our operating rooms challenges surgical leaders and educators daily. Modern surgical training programs are under appropriate strict oversight to ensure rigorous, coordinated learning opportunities that provide the trainee supervision and graduated independence while maintaining the safest high-quality care possible for patients. Within this structure of residency there is a balance between training traditional techniques, exposure to new techniques and use of new technologies. Therefore, as surgical educators we must design pathways that ensure our learners are safely introduced to new tools and technologies. At the climax of this educational journey is the credentialing of newly minted surgeons to independently perform complex procedures within their various surgical practices. Specifically related to the credentialing of robotic surgeons, each institution has developed credentialing pathways. It is essential that a unified set of parameters to standardize the process of credentialing within robotic surgery is created and adopted. In this manuscript we explore the current process of surgical credentialing and privileging with robotic technology at academic institutions. We identified three distinct phases: initial credentialing, maintenance, and new device/technique adoption. Within each phase we describe a stepwise approach and highlight the variabilities within this immature process to prompt future investigation leading to a robust yet dynamic credentialing pathway that is transparent to patients, surgeons, and hospital administrators.

Keywords: Robotic surgery; credentialing; privileges; patient safety; innovation; adoption; resident training; continuing medical education

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Introduction

Competency based learning has gained substantial traction in nearly every aspect of adult education. Surgical educators have increasingly demonstrated that the development and maturation of a competent surgeon requires more than memorization of details and repetitive performance of technical skills. Through years of refinement the process of surgical education within modern residencies has become highly structured, constantly regulated and measured by defined milestones. At the conclusion of this rigorous process the American Board of Surgery (ABS) and the American Board of Obstetrics and Gynecology (ABOG) requires graduation from an accredited residency program before individuals are eligible to be candidates for the ABS and ABOG qualifying and certifying examinations. Once newly minted board-certified surgeons begin practice, oversight dissipates leaving the responsibility of a surgeon's current and future ability and patient safety in the hands of local institutions, and thus variable and occasionally absent to a peer review process. To define and address this growing concern, in 2009 Dr. Bass and colleagues (1) carefully outlined evidence-based processes and principles for surgical credentialing.

The purpose of this paper is to apply the principles and structure of Dr. Bass' manuscript to define safe robotic training within residency, to define safe robotic training for surgeons already board-certified as well as to describe a best practice model for surgeon credentialing at the hospital level.

Methods

We have dissected the three phases of credentialing specific to robotic surgery into their individual components and explore each in detail highlighting their importance and worrisome variability.

Results

When developing guidelines for robotic credentialing there are a few essential principles. First, the requirements must make sense. Practicality is the hallmark of compliance. Secondly, accountability is paramount. Creating a safe framework for robotic credentialing means that all surgeons must comply with the steps if they expect to use this technology—regardless of their prior use, level of seniority or frequency of use. Guidelines are only effective if they are universally enforced.

With the rapid adoption of this technology, robotic training pathways are emerging throughout many residency programs in the United States. As these continue to evolve, there are two distinct pathways for surgeons to gain an initial robotic training certificate: by completing a robotic curriculum during their residency training programs and by completing a defined pathway for surgeons that have already entered independent surgical practice. Once surgeons have obtained this initial robotic certificate, their pathways merge and enter a cyclic process that includes the following phases: initial credentialing, periodic recredentialing and addition of new credentials.

Foundational exposure—initial robotic certification

Robotic curriculum during residency

The initial exposure to robotic technology is becoming increasingly common in surgical residency. Evaluation of current residency robotic training programs (2) reveals that some centers with more mature, robust robotic training curriculums begin this certification process on the first day of residency, whereas other less advanced centers delay the certification process until the more senior years of training. Regardless of the timing, the initial step is understanding the basic components of the robotic platform and their functions. This is generally accomplished with self-directed online modules created by device manufactures or those developed through consensus approach by members of the Robotic Training Network (RTN) (3). These modules should be able to be completed within 2 to 4 hours and should have assurance of learning elements such as a quiz or other evaluations to ensure the most critical elements are emphasized and retained. Once completed, a report in the form of an online training certificate should be generated for inclusion in an ongoing peer and professional review file.

Closely following the didactic training, trainees should be scheduled for small group hands-on sessions with the surgical robot. Ideally this would occur with dedicated operating room support personnel and those advanced practice providers, surgical assistants, scrub technicians, and nurses who are bedside super users. These hands-on sessions ideally are led by experienced robotic surgeons in close partnership with trained industry experts to emphasize the safe use of the robotic surgical unit, instruments, controls, and emergency procedures. Following these sessions, the educators should sign a trainee-specific evaluation highlighting the elements successfully learned during the training event with emphasis on the critical safety elements specific to the safe use of the device. This document should be retained by the surgeon for future reference as well as filed as a key element to their eventual robotic credentialing application. Then and only then should trainees or surgeons be allowed to participate in a guided manor at the bedside for actual patient cases. It is our expectation that robotic surgeons participate actively as a bedside assistant in a supervised manor for at least five cases to insure a safe transition to independent direction of their robotic teams and participation in more advanced cases during residency training.

After the initial hands-on session, trainees should be provided opportunities outside the live operating room to learn specific robotic components required for safe and efficient use. Creating separate learning environments allows for focused skill acquisition, increases opportunities for robotic exposure and accelerates resident learning (4). One component of robotic technology is the actual use of the robotic patient side cart. In this setting surgeons can practice with training instruments, task-based models and even lifelike surgical models. Time in this setting augments the surgeon's confidence with the entire room and device. This also provides valuable time for coaching from operating room staff, peer surgeons and industry partners since these educational elements are focused on maximizing the surgeon's skill with the device and are not procedurally focused. Another opportunity for simulation is with the console based virtual simulation platform. Within this platform there is a wide library of tasks and case simulations that should be completed in the prescribed order since many of the subsequent drills and tasks build upon abilities gained in the preceding modules. Following each simulated task there is a score generated with a detailed list of variables that highlight strengths and areas that need additional training, thus promoting continued skill development for safe use of the robot. For a credentialing pathway it is impractical to review the reports of every module therefore it is important to have a few defined milestone modules with minimum scores established through an expert benchmarking process to ensure that technically the surgeon trainee reaches a predictable safe baseline of ability before sitting at the console for the first time in a live case.

Once all of these milestones are reached a training robotic surgeon may first sit at the console of a live case with an experienced robotic preceptor who is responsible for the patient's safety throughout the surgical procedure. For trainees in residency programs this best occurs in their first or second year of training to allow them the best opportunity to achieve the highest volume of cases and increase their cognitive and psychomotor robotic skills acquisition in a progressive manner. This will begin building their confidence throughout their surgical training, which leads to the safe performance of more advanced and complex cases as they enter the senior and chief years of training. This is also where the availability of two surgeon consoles, often referred to as a "dual console" system is vital for education and safety (4,5). In this setting, the teaching surgeon has complete control and can provide the training surgeon with access to the camera, zero, one, two, or all three instruments in a graduated fashion. Throughout this process the teaching surgeon also retains the ability to stop the movement of the entire system with their camera pedal that functions as an "all stop" feature.

Despite completing the milestones listed above, ensuring a trainee's readiness for robotic use in the live operative environment can be challenging. The RTN has developed a skills test known as the R-OSATS test, which was cross-validated in both OBGYN and general surgery to help with this assessment (6). High scores on this skills test would verify that learners have practiced in the dry lab and reached a benchmark skill level before performing in the operative room (7).

Throughout the process, it is critical to document the cases that are performed, the trainee's role (e.g., observer, bedside assistant, or console surgeon) and what percentage of the case they completed. This information should be recorded in a prospective case log system. It should be noted that presently the ACGME case log system does not include an option to code robotic cases other than the resident adding it into the non-searchable free text field. Therefore, it is imperative that they keep track of their own cases and their level of participation as part of a separate process. As the trainees are completing their residency or fellowship, individual requests should be submitted from the training program to the device manufacturer by the residency program director. Requests should include an outline of the program's training components and the cases performed by the trainee. Ultimately, an in-training equivalency certificate can then be awarded upon completion of the minimum elements of the steps above. At the present time a total of at least 10 cases as bedside assistant and 20 cases as the console surgeon are recommended, although these numbers are being reviewed in a national credentialing consensus conference.

Pathway for surgeons in surgical practice

For surgeons that are currently practicing and wish to obtain robotic privileging, the process similarly begins with understanding the basic components of the robotic platform. Self-directed, online modules avoids the temporal and spatial limitations of a traditional classroom (8) and the modules are designed specifically for practicing surgeons for efficient and focused acquisition of knowledge. Once completed a report in the form of an online training certificate should be generated for inclusion in the surgeon's ongoing peer and professional review file.

After completing online modules, hands-on exposure occurs at a dedicated industry training facility or simulation center with non-surgeon professional device specific trainers (9). As an example, for the past decade, Intuitive® has offered a 2-day, surgeon-led, basic training course.

Completion of this course is generally required as an important step toward certification for most institutions across the United States. Prior to attending the course, individuals complete online modules that provide basic technical and practical information about the technology, benefits and limitations and a basic overview of its functions. The two-day course is designed such that on day one surgeons operate in a porcine lab where they can practice basic surgical steps using the robotic technology. Day two is a surgeon-led cadaveric operative lab and is often pre-arranged to be specialty or even procedure specific depending on the surgeons' plan for their first cases. Documentation of the successful completion of the modules and the two-day course can be provided to credentialing committees in institutions in which surgeons seek surgical privileges.

Initial credentialing

At this point, whether surgeons obtained their certificate through a residency program or through the practicing surgeon pathway, all surgeons desiring credentialing should complete a minimum number of cases with a preceptor and then a proctor. It is important to note the distinction between preceptors and proctors. We define a preceptor as a surgeon who is solely responsible for the patient, is able to conduct the entire robotic case, and provides interactive instruction for the training surgeon during and after the procedure. This is very different than a surgical proctor that is defined as an experienced robotically credentialed surgeon who regularly performs the robotic procedures that are being proctored and is sufficiently qualified to provide a structured evaluation of a surgeon's competence (e.g., his/her ability to safely and efficiently perform the procedure). The proctor functions solely as an observer and evaluator and does not directly scrub in or sit at the surgeon console to perform any portion of the operation. Many times proctors are used from other institutions, so they do not know the operating surgeon to eliminate bias in the evaluation. Most institutions require at least three proctored cases, but this varies from zero to ten or more cases throughout the country. At the successful completion of these required proctored cases the surgeon submits their documented experience for institutional consideration of privileging for use of the robotic platform for specific procedures.

Periodic recredentialing

Once a surgeon is credentialed, they should immediately enter an ongoing maintenance of credentials pathway. The obvious emphasis of this process must be patient safety through the prospective capture of outcomes in case logs. After the first 12 months, or sooner if there are adverse events, the case outcomes should be presented to the robotic steering committee for review. Also at the completion of the each year, the surgeon should have a minimum monthly/yearly case volume that should be reviewed intermittently by the steering committee. Many institutions have adopted a case minimum of 20 cases over a rolling 12- to 24-month period and it has been recommended that there be no absence of cases longer than 4 months. Some institutions have substituted case limits for objective video performance reviews or other internal review processes arguing surgeon skill should be determined based on technique rather than a defined number of procedures. If there is an extended time between cases due to clinical practice changes, health concerns, or other reasons the surgeon's return to full privileges should be planned with potential proctors or at a minimum oversight of other robotic surgeons for a designated period of time upon return to performing robotic cases.

In addition to simple case numbers, it is imperative that a robotic steering committee follow patterns and trends, preferable through a live dashboard, to be able to catch concerning trends. The key outcome measures that are easily identified through the electronic health record include: cases extending beyond 6 hours, cases extending beyond twice the average length of specific cases, blood loss over 500 mL, transfusion of greater than 1 unit of blood, need to call in emergent intraoperative surgical consultation, conversion to an open procedure, any re-operation or readmission within 30 days, surgical site infections, and mortality.

Credentialing for new procedures

When surgeons plan to add new procedures to their practice or begin a completely different approach to procedures that they are already performing it is recommended that this also be submitted to the robotic steering committee for review. In some instances the approach variance is minimal and no additional training or proctoring is needed but in other scenarios, such as a trans-oral thyroidectomy one could need a comprehensive strategy to build a sound business case for the innovative approach as well as a plan to train for robotic application in a completely new surgical approach. In this scenario, or with an advanced procedure such as a robotic pancreaticoduodenectomy, restarting the entire process including case observations with experts, cadaveric-based robotic lab training, offsite preceptoring and proctoring of initial cases should be implemented. Then the initial cases should be followed by post case reviews with the expert surgeon so that patient safety and the highest standards are being maintained even within a surgeon's learning curve.

Discussion

Today's surgeons are bombarded with ongoing technological advances that require retooling and continuous maintenance of knowledge and skill in the ever-evolving methods of surgical care. The expansion of robotic technology into surgical practices illustrates the challenges for surgical educators to ensure learners are exposed to new technology safely and appropriately. Ensuring our surgical teachers are adequately credentialed is the first step in this very important process. We illustrate a step-wise approach surgical leaders can reference when establishing robotic credentialing and privileging policies and procedures with the goal to reduce the tremendous variation in these policies and procedures in the United States.

In addition, to address this variability the Institute for Surgical Excellence convened over 40 experts in surgical credentialing from multiple surgical societies and experienced institutions to determine the present state of credentialing and privileging policies, gaps in prerequisite education and training qualifications, assessment of the surgeon's performance, and the ongoing monitoring and surveillance of practicing surgeons. Three rounds of a Delphi survey process to drive consensus has been completed. The data is being analyzed and will be presented in subsequent publications.

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Footnote

Conflicts of Interest: CA Green has no conflicts of interest to declare. JS Levy: Interim Executive Director for Institute of Surgical Excellence. MA Martino: Board of directors for Institute of Surgical Excellence; Teaching site/consultant and patient safety consultant: for Intuitive, Medtronic and Ethicon, which designs platforms for robotically assisted minimally invasive surgery; JR Porterfield Jr: Teaching site/consultant for Intuitive, which designs and builds the da Vinci Surgical System, a platform for robotically assisted minimally invasive surgery; Board of Directors for Association of Program Directors in Surgery; American College of Surgeons Committee on Education; Board of directors for Institute of Surgical Excellence.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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