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Review Article

The Current State of Urological Residency Education

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Abstract

Introduction: We reviewed literature pertaining to the current state of urological education for residents in the United States.

Methods: A literature review was performed to identify relevant manuscripts using a key word search of the PubMed® and MEDLINE® databases. Central themes of the literature were identified and summarized for the purpose of this review.

Results: A literature search identified 23 articles related to urological residency education. Key themes identified in the available literature included surgical simulation, decreasing open experience, and improving the efficiency and quality of resident education and evaluation. With increasing limitations in available resident training hours as well as increasing utilization of minimally invasive approaches in the field of urology it is important to critically assess how urological residents are trained.

Conclusions: As the scope and complexity of medical knowledge and surgical approaches evolve in the field of urology it is imperative to critically evaluate how urological residents are trained to ensure that graduating residents are prepared to provide outstanding patient care as independent surgeons.

Key Words: urology; internship and residency; surgeons; education, medical; models, educational

Abbreviations and Acronyms

ACGME = Accreditation Council for Graduate Medical Education

ACS = American College of Surgeons

AUA = American Urological Association

As the overall landscape of medical practice in the United States of America is currently undergoing its most significant evolution in more than 30 years, the state of residency education has also undergone drastic changes. These changes are particularly evident in the field of urological surgery due to significant technological advancements as well as the implementation of residency work hour limitations in 2003. After ACGME implemented residency work hour restrictions, which were then adjusted in 2011, the overall number of hours available for resident training has decreased, necessitating improved efficiency of training.[1] Additionally with the advent of

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laparoscopic surgery (with the first laparoscopic nephrectomy performed in 1991[2]) followed by the emergence of robotic surgery in 2002[3–5] the volume of open surgical procedures during a urological residency has significantly decreased.[6] As a result of these changes an appraisal of how to ensure residents are adequately trained and evaluated in open, laparoscopic and robotic procedures is required.

The training of future urologists is particularly important because the overall percentage of the United States population older than 65 years is expected to grow from 12.5% in 2008 to nearly 20% by 2030.[7] This increase in the overall aging population is mirrored by an aging work force in the field of urology as 7% of urologists are older than 70 years and 44% are older than 55 years.[8]

While there have been numerous studies focusing on urological residency education, to our knowledge there is currently no available manuscript to summarize findings. The purpose of this review is to provide the reader with a comprehensive review of the available literature.

Materials and Methods

We performed a literature review using the PubMed and MEDLINE databases. Key words searched included urology education, urology training, urology simulation, urology residency and urology graduate medical education. Identified studies ranged from 1991 to 2014.

Results

A total of 23 articles were identified by the literature search of the PubMed and MEDLINE databases. These articles included a randomized, controlled study, cross-sectional survey analyses, observational case-control studies, review articles and an editorial article. Nine of the 23 studies identified were survey based cross-sectional analyses. Of the 23 studies 18 were retrospective in nature and only 1 randomized, controlled study was identified. The small number of articles identified, which are predominantly survey based and retrospective in nature, highlights the lack of research that has been performed to look at urological residency education.

Discussion

After reviewing the available literature central themes were identified for exploration in this study, including surgical simulation, open surgical experience, and urological residency education and teaching.

Simulation

As the number of urological procedures being performed laparoscopically and robotically has significantly increased,[6] there has been increased interest in simulation in urological residency training.[9] Simulators can have an important adjuvant role in the education of trainees who believe that they are inadequately exposed to laparoscopic and robotic surgical approaches.

To our knowledge there is no study investigating the experience of residents in the United States with pure laparoscopic urological cases (ie not robot-assisted). However 1 available study from Europe showed that only 12% of residents rated their existing volume of laparoscopic procedures to be sufficient while 55% reported no regular opportunities for laparoscopic experience and 32% had not performed laparoscopic surgery as the primary surgeon.[10] Residents with limited hands-on experience may supplement operative training with simulation.

Even when attending urologists perceive that trainees are receiving adequate training in minimally invasive techniques, this may not be in accord with resident perception. Yap et al explored attending surgeon and resident perspectives on involvement in laparoscopic nephrectomy and found significant disagreement in the perceived degree of involvement at all steps of the procedure except hilar dissection and port closure.[11] This study highlights the need for supplemental training using simulation to ensure that residents gain proficiency in minimally invasive approaches during residency training.

Surgical simulation can be categorized into low and high fidelity trainers. Low fidelity surgical trainers include pegboards and synthetic suturing mats, which are widely available and reusable, and can provide basic training to novices. High fidelity trainers, which are available to provide a more realistic learning experience, include biological and nonbiological simulation models. High fidelity biological simulation includes live animal models, animal tissues and human cadavers to allow for whole or partial procedural training. High fidelity nonbiological bench models include commercially available simulators modeled after common urological procedures, including transurethral resection of the prostate (SurgicalSIM TURP™ simulator and UroSim™), ureteroscopy (URO Mentor™) and percutaneous nephrolithotomy (PERC Mentor™). These models provide the use of actual instruments and can be reused but they are limited in availability secondary to the high cost of these trainers.[9]

Surgical skill laboratories are a common component of training programs but available simulators vary significantly. A recent survey of ACGME urology program