Patient Safety Risks of Basic Urological Procedures Performed by Junior and Senior Residents

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OBJECTIVE: To investigate the current performance of urological residents regarding basic urological procedures in relation to patient safety issues and the identification of specific training needs.

DESIGN: Observational data of 146 urethrocystoscopies (UCSs), 27 transrectal ultrasounds of the prostate (TRUSs), 38 transrectal ultrasound-guided prostatic biopsies (TRUSPs), and 30 transurethral resections of bladder tumor (TURBTs) were collected. Performance was evaluated using scoring lists including details on completeness of procedural steps, level of independence, time, and the incidence of unintended events. The causal factors contributing to the unintended events were identified by 2 expert urologists and classified according to the recognized PRISMA method.

SETTING: This study was performed in 5 teaching hospitals in the Netherlands.

PARTICIPANTS: We included 11 junior residents and 5 senior residents in urology in the final study cohort.

RESULTS: Senior residents showed a lower degree of completeness in material usage than junior residents did during UCS ($p < 0.01$) and in preparation, material usage, and procedure during TRUSP (all $p < 0.05$). In UCS and TURBT, senior residents received significantly less feedback than junior residents did (both $p < 0.01$). Incidence of unintended events for junior vs senior residents was 11% and 4% in UCS, 0% and 7% in transrectal ultrasound of the prostate, 36% and 62% in TRUSP, and 41% and 23% in TURBT, respectively. Overall, unintended events were mainly caused by human factors, in particular, verification and skills-based issues.

CONCLUSION: Present performance of basic urological procedures involves a high percentage of unintended events, especially in TRUSP and TURBT, which are mainly caused by human factors and are a potential threat for patient safety. Junior residents are less independent but more thorough in the performance of UCS and TRUSP than senior residents are. Targeted skills training including assessment should be implemented before privileges for independent practice are granted to reduce the incidence of unintended events and optimize patient safety. (J Surg Ed 72:918-926. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: task performance, resident, urology, adverse event, patient safety, practical skills training

COMPETENCIES: Patient Care, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Traditionally, urological residents learned their practical skills according to the master-apprentice type of training.[1] However, times are changing, and the former way of training is facing multiple challenges. Owing to evolving medical technology in combination with decreasing

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numbers of patient-related training hours, barriers are raised in achieving appropriate levels of proficiency during residency training.[2-4] The introduction of technically complex minimally invasive surgery has resulted in an increased frequency of complications, particularly during the early learning curve.[5] Furthermore, nowadays, performing a first procedure directly on the patient is becoming unacceptable. The standards for clinician proficiency are higher, and more importance is placed on patient safety in today's legal environment.[6,7] Consequently, there is a need for alternative forms of training to reduce errors and shorten the patient-related learning curve. Thus, simulation training is a growing field in addition to the master-apprentice approach.[8-11]

"The learning curve of a certain urological procedure is the period during which a surgeon in training finds the procedure more difficult, takes longer to complete, there is higher rate of complications and lower efficacy due to inexperience."[12] Owing to interindividual differences in technical ability and previous experience, it is impossible to specify a standard number of procedures for residents to reach proficiency. Instead, it has been suggested to define proficiency levels that have to be met before a resident or urologist is deemed to be competent to perform a certain procedure.[12]

In literature, relatively many studies have been described that investigated learning curves, risks, and training needs of complex urological procedures, such as (robot assisted) laparoscopic radical prostatectomy.[12-14] However, very little is known about the learning curves and training needs of more basic urological procedures, such as prostate biopsies or transurethral resection of bladder tumors (TURBT). Although these procedures are less complex, they do have a large effect on patient safety, comfort, and outcomes, oncological or otherwise.[15-17] Every urologist should fully master these practical skills.

In this study, we investigated the current performance of urological residents regarding basic urological procedures, in relation to patient safety issues and the identification of specific training needs. The aim was to answer the following research question: "How well do junior and senior residents perform on the patient regarding 4 basic urological procedures, considering completeness of procedural steps, level of independence, intervention time, and the incidence of unintended events?"

MATERIAL AND METHODS

We observed the procedures, urethrocystoscopy (UCS), transrectal ultrasound of the prostate (TRUS), transrectal ultrasound-guided prostatic biopsies (TRUSP), and TURBT, performed by urological residents in 5 teaching hospitals spread across the Netherlands between July 2012 and February 2013. The urological residency program consists of a 4-year traineeship in which practical skills are trained in a patient-related setting. Before this traineeship, all residents participate in a 2-day practical course. During this mandatory course, the basic urological skills (including UCS, TRUS[P], and TURBT) are trained in a non–patient-related setting on simulation models. Moreover, the 4 years of urology training include 8 other obligatory practical skills courses (e.g., sonography, endourology, and electrosurgery).

Residents in their first and second year of urological training and residents waiting for acceptance as full residents were categorized as "junior residents." Participants in their third and fourth year of urological training were categorized as "senior residents." Written informed consent was obtained from all participants, and the data were processed anonymously. Ethical approval was obtained from the institutions ethics committee.

Practice Setting and Supervision

The diagnostic procedures UCS and TRUS(P) are performed at the outpatient clinic, and the TURBT in the operating room. Faculty supervision is a routine part of training and practice in the residency program. However, for the diagnostic procedures (UCS, TRUS, and TRUSP), continuous faculty supervision is only present in the first months of residency training. When a supervisor considers the resident to be competent in the performance of the diagnostic procedure, the resident performs the procedure without continuous supervision, although supervision is available upon request. Moreover, supervision after the procedure, by means of discussing images or pictures that are saved during the procedure, is a routine part of training. For procedures performed in the operating room (such as TURBT), a faculty supervisor is always present. The only exception is for residents in the final phase of residency training. In preparation for their upcoming independent practice, it is possible to perform a procedure without continuous supervision. Again, this occurs only if the responsible faculty member considers the resident to be competent in the performance of the procedure.

Observations

To evaluate the performance of residents, a scoring list was developed for the 4 procedures. This scoring list contained information on completeness of procedural steps, level of independence, time, and the incidence of unintended events.

Completeness of Procedural Steps

For each procedure, all separate steps were identified by consulting 2 expert urologists and 2 residents. A detailed list of procedural steps was composed and divided into 5 categories: preparation, communication, material usage, procedure, and registration. Completeness of procedural