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The role of simulation in urological training – A quantitative study of practice and opinions

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ABSTRACT

Introduction: Over the past few decades, simulation-based training has rapidly been adopted by many centres for effective technical and non-technical skills training, as a supplementary method to traditional operating room experience. The aim of this study is to assess the current practice in training and seek opinion regarding the future role of simulation in urological training.

Methods: A cross sectional survey was designed and distributed amongst expert and trainee urological surgeons. The survey consisted of twenty-two questions that were split into three sections; Introduction (6), Technical Skills training in urology (10) and Non-technical skills training in urology (6).

Results: A total of 91 residents and 172 specialists completed the survey. In both groups, there was an agreed consensus that laparoscopic training and exposure was insufficient as only 21% of trainees and 23% of specialists believed that they had sufficient training in this area. Furthermore, both groups lacked simulation-based training in common urological procedures including nephrectomy (62%), cystoscopy (69–74%), ureteroscopy (47–59%), transurethral resection of the prostate (56–65%) and percutaneous renal surgery (76–73%). 90% of trainees and 70% of specialists believed (agreed and strongly agreed) that there is a role for non-technical skills simulation in urological training.

Conclusions: Simulation training has been under-used thus far and trainees face an uphill challenge to enhance their skills and technical abilities in the operating room. Simulation is recommended by both trainees and specialists and may represent one of the solutions to the challenges of safe and effective urology procedural training.

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Introduction

The advance of medical technology has had a significant impact on the surgical management of urological disease, transforming it from open surgery to a more minimally invasive approach. Training surgeons are expected to embrace these advances as well as meet the increasing expectation from patients. This must all be achieved within the realms of working time restrictions such as the European Working Time Directive.[1] As a result, the time spent by trainees learning their craft has reduced significantly leading to concerns that surgical training in its current form is inadequate.[1] This has resulted in a variety of supplementary training methods being developed over the last two decades, the most widely accepted of which is simulation.

In recent years, surgical education has been much influenced by the military and aviation industries, both of whom rely heavily on intensive simulation training prior to real exposure.[2,3] In surgery, simulation will allow trainees to develop and enhance their technical and non-technical skills set outside of the operating theatre, without endangering patient safety.[4] Furthermore, simulation has been shown to enhance progression along the initial phase of the surgical learning curve, with skill sets that are learnt via simulation being shown to be transferable to the operating theatre.[5] Surgical simulation is gathering momentum for its use as a training tool and is rapidly becoming an established and valid method of training and assessment.

A variety of simulation models have been developed over the past few decades, including box trainers, synthetic bench-top models, animal and human cadaveric models and computer-assisted Virtual Reality (VR) Simulators. The aim of this study is to gain an understanding of how urology trainees and experts were and are currently trained and to gain a perspective on whether they feel their skills could be improved with the incorporation of simulation.

Methods

An online survey (www.surveymonkey.com) was developed to assess the role of simulation in urological training among urological trainees and specialists in the United Kingdom. The survey was content validated by a panel of experts (n = 10), consisting of urology, general surgery and surgical education specialists. It was piloted amongst five trainees and their sought feedback was taken into consideration before final dissemination. The 22-item survey was composed of three distinct sections: Demographics, Technical skills training and Non-technical skills training in urology. This was distributed during the Royal Society of Medicine Urology Section meetings and to members of the British Association of Urological Surgeons, through online invitations. Each question was critically analysed to minimise the possibility of ambiguity and misinterpretation.

The survey focused on various methods of technical skills simulation training including, live animal simulation, animal tissue, training with bench models, box training and VR. An additional focus was to see whether the individual felt further training was needed to improve their technical and non-technical skills. Participants who received the survey did not receive any incentives.

Statistical analysis

Data was analysed using Microsoft® Excel TM spreadsheet (Microsoft Corporation, Redmond, Washington, USA), GraphPad software version 5.0 (Prism, La Jolla, California, USA) and SigmaPlot version 12.0 (Systat Software, San Jose, California, USA). A non-parametric t-test was performed to compare trainee and specialist responses, where deemed appropriate and a p-value of <0.05 was considered significant.

Results

Demographics

The survey was completed by a total of 263 participants, consisting of 91 urological trainees and 172 specialists. The participants have been divided into two groups (trainees and specialists) for ease of analysis and to allow comparison. The mean age of the trainees was 35.6 years compared to 49.6 years for the specialists. The male:female distribution amongst participants was 74:17 in trainees and 159:13 in specialists.

Technical Skills

Sufficiency of technical skills levels were assessed, with approximately 88% of specialists agreeing that their training was sufficient for their first day in the speciality, compared to only 25% of trainees. Furthermore, participants were asked a number of questions on the adequacy of their training (Fig. 1) and whether they required further procedural training (Fig. 2). They were also asked their experience with simulation-based training (Figs. 3 and 4) and their recommendations for the role of simulation in the learning of technical skills (Table 1).

Non-technical skills

The level of non-technical skills (NTS) training was assessed by enquiring whether participants felt that training was sufficient for their first day of practice, of which 41% of trainees agreed compared to 78% of specialists, and whether it was adequate overall (Table 2). Methods of simulation for current NTS training were also investigated (Table 3) as well as recommendations for the role of simulation in the learning of technical skills (Table 2). Figure 5 demonstrates that further training is required in all aspects of current NTS.

Discussion

The introduction of working time restrictions have significantly reduced the clinical exposure of surgical trainees, reducing the amount of training time from approximately 30,000 to only 8000 h.[6] Surgery, as an experience-dependent craft, has been impacted more than other medical

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