Endourological Training Models

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Introduction

Endourology is one of the most difficult techniques to learn. Safe and effective performance of diagnostic and therapeutic endourological procedures requires long-term practical experience. Training opportunities for urologists are diminishing due to reductions in the length of surgical training, appreciation of the true costs of operating room time and the pressures of long waiting lists. Furthermore, rapid developments in the endourological field, as an expanding knowledge base and emerging new techniques require continuing urological education to achieve lifelong learning and to keep the urologists up to date. Consequently, specific training is necessary to guarantee qualification of urologists. Several training modalities have been introduced for endourological training. Available training models include animal models as well as human or animal cadaver organs, synthetic organ models or computer-based simulation systems. Historically, the first endoscopic training models were cadaver models [1–4]. Particular interest has focused on using this model primarily for prostatic resection and secondarily for ureterorenoscopy [5, 6]. The performance of the procedures is similar to the clinical situation, but they are restricted by the lack of bleeding and haptic force feedback. Unfortunately, most of the synthetic organ models of the intrarenal collecting system have been inappropriate for training, and therefore the level of trainee interaction has been negligible.

In the past, several attempts have been made to overcome these problems [7]. In 1999, the first realistic computer-generated interactive simulator for transurethral prostatic resection was produced by Ballaro et al. [8]. However, this simulator was restricted to the resection of the prostate. Furthermore, the simulator lacks real-time interactivity as well as tactile feedback. In 2002, a new and improved computer-based simulation system came out with the goal of achieving a close resemblance to diagnostic and therapeutic rigid and flexible ureterorenoscopy in humans [9].

Comparing the different training models, it can be concluded that there is no all-round model that can be considered the best. Every different model has its specific advantages and disadvantages.

Synthetic Organ Models

Currently, the most frequently used models are the synthetic organ models for ureterorenoscopy (Fig. 1.1) and transurethral resection of the prostate (Fig. 1.2). These models are useful for residents in their early training, because they are able to use irrigation as well as standard instruments and tools while doing the first endourological steps. If fluoroscopic control is asked, the phantom model can be placed on an X-ray table. However, they are restricted by the lack of bleeding and the unrealistic force feedback. They are not useful for flexible ureterorenoscopy since they have no intrarenal collecting system.

Models like these can be bought by the urological department from different companies that produce these models for all disciplines in medicine. An alternative is to ask a company that produces endoscope or accessory instruments