A Novel Idea of Using Digital Camera for Laparoscopy Training in Urology

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INTRODUCTION

Learning laparoscopic skills is difficult in the current era of fast developing laparoscopic urology. There are many commercially available good-quality laparoscopy trainers, but their prohibitive costs have limited their use in developing countries. To answer this problem, we conceptualized a home-made economical digital camera coupled with a laparoscopy trainer. Digital camera has also been used in endourology for documenting interesting findings.[1-3]

TECHNIQUE

To test the compatibility of portable digital camera in laparoscopic urology setting, we first constructed a plywood board box of 16 × 12 × 9 inch in size, which had a space for attaching a digital camera (Figure 1). A conventional small tube light was fitted in the corner in a concealed manner. Then holes were made on the top of the box at appropriate places for passage of laparoscopic instruments (Figure 2).

We used a digital camera (Nikon Coolpix 3200, Tokyo, Japan) which has digital and optical zoom and continuous autofocusing facility and TV monitor display (Figure 3). The camera uses rechargeable nickel cadmium a-a size batteries which usually last an hour. Using this trainer with TV monitor, basic laparoscopic skills like holding suture needle while lying free on the internal organ surface, transferring needle from

Figure 1. Digital camera coupled with a trainer box.

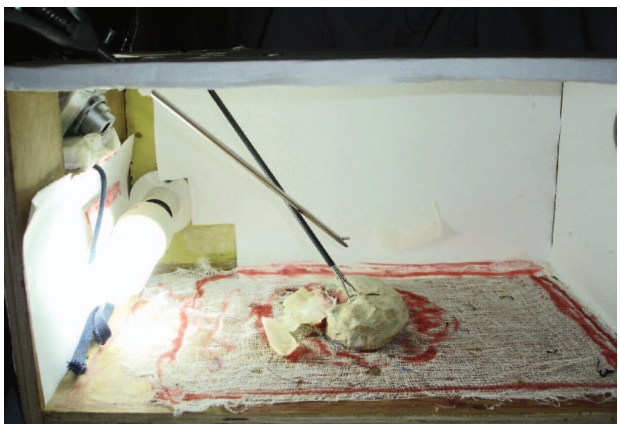

Figure 2. Inside view, displaying kidney model and laparoscopic instruments.

Figure 3. Laparoscopy trainer coupled with a TV monitor.

one hand instrument to other holding sutures, passing needle through soft objects, applying square knot, doing blunt dissection, etc, were performed. Artificial kidney, pelvis, and ureter could be kept inside the box, and laparoscopic pyeloplasty and nephrectomy could be practiced (Figure 2). One could also zoom in and out the point of interest for which no assistant was required.

RESULTS

The quality of performing procedures and their perception on the TV screen was just like real laparoscopy via the applied digital camera in the laparoscopy trainer. It tremendously increased perception of depth and hand-eye coordination. In the view of colleagues who tested the instrument, learning laparoscopic skill was just like or even better with this innovation than other expensive comparable trainers. It did not require costlier laparoscope and camera and could be easily constructed and practiced at home by a beginner during their idle time. The camera could also record the procedure, which could be reproduced.

DISCUSSION

Learning laparoscopic skills is essential for a budding urologist in the present era of minimally invasive surgery and increasing applications of laparoscopy in urology. Since laparoscopic urology is still in its developing phase, younger urologists are not provided much time in learning basic skills in live conditions. To overcome this, various laparoscopy trainers are available, both expensive and economical.[3] Some good-quality laparoscopy trainers are so expensive that they can be owned only by an institution. We designed a training module which was economical and easy to built and carry.

Revolution in electronic goods has made pocket-size high-resolution digital camera available at affordable price. We utilized Nikon (3.2 mega pixel) with optical zoom, autofocus connected to a TV monitor display facility. With the help of camera, procedures performed inside the box can be seen in a 2-dimensional way on the monitor, and with practice, perception of depth can be improved significantly. We also experienced that the regular practice with this laparoscopy trainer significantly reduces ones learning time. One can also zoom in and out the point of interest and no assistant is required for this purpose. Other laparoscopy trainers which utilize closed-circuit camera do not have the autofocus zoom facility.[4,5] Whereas the use of laparoscope requires an assistant and it is expensive.

In conclusion, this digital camera coupled with laparoscopy trainer is a good simulator of laparoscopy. Its ability of projection on TV screen and autofocus facility eliminates the need of an expensive laparoscope and single 3-chip cameras for training, and an assistant is also not required for zooming in and out the tip of laparoscopic instruments. Overall, we feel that this novel idea for learning laparoscopic skills will help new urologists arriving in this field.

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CONFLICT OF INTEREST

None declared.

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