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An effective method of teaching cystoscopy to obstetrics and gynecology specialists

Bertan AKAR[1], Ali SARIBACAK[2], Yasin CEYLAN[3], Eray ÇALIŞKAN[4]

[1]Department of Obstetrics and Gynecology, İstinye University School of Medicine, Private Kocaeli Hospital, Kocaeli, Turkey
[2]Department of Urology, Private Konak Hospital, Kocaeli, Turkey
[3]Department of Obstetrics and Gynecology, University of Health Sciences Turkey, Bağcılar Training and Research Hospital, İstanbul, Turkey
[4]Department of Obstetrics and Gynecology, Okan University School of Medicine, İstanbul, Turkey

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ABSTRACT

Objectives: In this study, it was aimed to evaluate the knowledge and skills of gynecologists and obstetricians about cystoscopy theoretically and practically during the two-day urogynecology course.

Materials and Methods: Thirty-eight gynecologists and obstetricians aged 29–55 were simultaneously enrolled in cystoscopy training and evaluation in the urogynecology course, which includes theoretical, fresh cadaver and live surgery training stages. In addition, a theoretical evaluation was made with quizzes before and after fresh cadaver training. Finally, 6 months after the training, all trainees were called by phone and detailed information about their surgical experiences was obtained after the course.

Results: After the cadaver training, it was observed that the time and motion scores and instrument handling scores of the trainees increased significantly on the patients.

Conclusion: With surgical courses and simulations, the use of cystoscopy should be increased in the diagnosis and management of complications in urogynecological surgical procedures during and after the residency training of gynecologists and obstetricians.

Keywords: Cystoscopy; cadaver course; urogynecology course

INTRODUCTION

The clinical increase in endoscopic surgical procedures has necessitated training in these procedures for both surgeons and resident trainees. Many studies have been performed to examine the effectiveness of different training modalities. These modalities include anatomic models, virtual reality endoscopic video simulators, cadaver training courses and animal training courses. Although significant progress has been made in all of these surgical training models, human cadaver remains the gold standard for specific surgical training. Cadaveric tissue provides superior surgical training, so it is important to increase the availability of cadavers for training.[1]

Address for Correspondence: Yasin Ceylan, Department of Obstetrics and Gynecology, University of Health Sciences Turkey, Bağcılar Training and Research Hospital, İstanbul, Turkey
E-mail: md.yasinceylan@yahoo.com **ORCID ID:** orcid.org/0000-0001-5517-8461
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Cadaver dissection is highly effective in the perceived effectiveness in understanding the classification and interrelation of different body parts, the integration of anatomy theory and practice, touch-mediated perception, three-dimensional perspectives of structures, and the application of practical skills.[2]

Cystoscopy is used by urologists, urogynecologists, and gynecologists. Lower urinary tract damage occurs in approximately one percent of all pelvic surgeries in women.[3] However, after hysterectomy, this number rises to two percent.[4] Urogynecological operations carry the risk of ureter and bladder injuries and require cystoscopy information for diagnosis.

Intraoperative detection and recognition of urinary tract injuries is very important for patients and gynecologist because of less morbidity.[5] In a recent meta-analysis showed that proportion of ureteric and bladder injuries detected intraoperatively without routine cystoscopy is approximately 18% and 79% respectively. However, with routine cystoscopy this proportion increases to approximately 95%.[6] Also, hospitalizations from delayed diagnosis result in 1.72 times greater cost to the health system than those with intraoperative detection of injury.[7]

It is logical that the gynecologists need to improve the identifications of these injuries. Lower urinary tract injuries are hard to identify without expertise in cystoscopy.

Despite a three months of urology education during residency program most obstetrics and gynecology specialist in Turkey do not perform cystoscopy by themselves. Many of them do not have enough experience to confidently identify lower urinary tract injury and differentiate normal from abnormal findings. The aim of this study is to investigate the efficacy of fresh cadaver course for gynecologists to adapt and apply cystoscopy.

MATERIALS AND METHODS

After institutional review board approval 38 obstetrics and gynecology specialists were enrolled in the study. This study was planted in an urogynecology course and contain a two days theoretical education, fresh cadaver application of cystoscopy and performing of cystoscopy during hands on urogynecological surgeries.

On theoretical season a 40-minute presentation was given by the primary investigator. It reviewed the cystoscopy instrumentation, indications, procedural details, normal and anormal findings and also how to manage the lower urinary tract injuries.

Every trainee had access fresh-frozen cadavers with intact urethra and bladder. Each trainee had a chance to work with a well-experienced urologist and perform a pre-determined series of cystoscopy skills one to one. These skills contained assembly of the cystoscope, additional equipment, proper set up, proper bladder and urethra observation, identification of abnormalities. At the end of the cadaver training all trainees were tested by a single physician blindly. They were scored using a modified Technical Skills checklist and global rating scale.[8,9] Also, pre- and post- cadaver education quiz assessed theoretical knowledge.

During live surgeries every trainee was asked to perform cystoscopy with a well experienced physician after urogynecology operations. They were also scored after live cystoscopy. Trainees were expected to find and locate a sign (needle) in the bladder during cystoscopy on cadaver not on live surgeries. So technical skills checklist scores were calculated over 35 on cadaver and over 30 on live surgeries. At the 6th month of education every trainee were called and interviewed about the progress they got after the education. Paired samples t-test and Pearson's correlation analysis was used to evaluate the data.

RESULTS

The mean age of the surgeons was 37.6±6.6 years. They were working as specialist for 7.3±5.9 years. Twenty out of 38 (52.6%) had never practiced cystoscopy. The demographic characteristics of the participants and their surgical application histories are given in Table 1. The quiz scores improved after cadaver education (4.8±1.3 to 6.8±0.39, $p<0.001$). Global rating scale scoring were similar both during cadaver and live surgery performance (25.9±3.9 vs 26.4±3.8, $p=0.29$). Previous hysteroscopy (r=0.48, $p=0.002$) and cystoscopy experience (r=0.44, $p=0.006$) were positively correlated with global rating scale score. Task points improved during live surgery compared to cadaver application (76±14 vs. 70±12 points, $p<0.001$).

After the cadaver training, it was observed that the time and motion scores and instrument handling scores of the trainees increased significantly on the patients. In addition, it was observed that the knowledge of instruments score increased with the positive effect of the course. Another striking positive effect of the course on the trainees was that the rate of help needed in the procedures performed on the patients decreased. Flow of operation score, knowledge of specific procedure score and overall performance score were found to be higher in transactions with cadavers (Table 2).

Thanks to the cadaver course, the trainees learned the anatomical structures better and they were able to complete the cystoscopy procedure in a shorter and safer manner (Table 3).

DISCUSSION

Cystoscopy simulation should be routinely placed in the curriculum to maximize the quality of training in the training of gynecologists and obstetricians. However, it should be known

Table 1. Trainee characteristics (n=38)				
Sex (n)	**Male**	18		
	Female	20		
Age, (year)	37.6±6.6 (29–55)			
Years of practice beyond training	7.3±5.9 (1–24)			
Practice patterns before course (n)	**Never experienced n (%)**	**Performed under guidance n (%)**	**Performed independently n (%)**	**Expert n (%)**
Cystoscopy, (n=38)	20 (52.6)	11 (28.9)	7 (18.4)	-
Hysteroscopy, (n=38)	-	9 (23.7)	24 (63.2)	5 (13.2)
Laparoscopy, (n=38)	-	11 (28.9)	22 (57.9)	5 (13.2)
n: number of the trainees				

Table 2. Global scores			
Global domain	**Mean rating score on cadavres (SD)**	**Mean rating score on patients (SD)**	**p-value**
Time and motion	3.2±0.7	3.7±0.6	<0.001
Instrument handling	3.4±0.7	3.8±0.6	<0.001
Knowledge of instruments	3.6±0.7	3.8±0.8	0.01
Flow of operation	3.9±0.6	3.8±0.7	0.2
Use of assistance	3.8±0.8	3.7±0.8	0.1
Knowledge of specific procedure	3.7±0.7	3.6±0.6	0.6
Overall performance	4±0.6	3.9±0.7	0.1
Total global rating score (over 35)	25.9±3.9	26.4±3.8	0.29
SD: standard deviation; n: number			

that simulation should be used as an auxiliary instrument rather than a replacement for clinical training.[10] The first assistants see the anatomical structure in the real body, but without blood and safely on the cadaver. They can then use the information in surgical procedures of living bodies. During the learning period, it may be advisable to use surgical steps to determine the lack of training. The aim of this study is to investigate the efficacy of fresh cadaver course for gynecologists to adapt and apply cystoscopy. We carried out theoretical and fresh cadaver trainings by accepting them as the pioneer and complement of clinical training. We think that these simulations and applications on cadavers will be able to bypass the early steps in the training of trainees more quickly.

Increasing cystoscopy skills and a more comprehensive cystoscopy examination by gynecologists is important, as identification of lower urinary tract injuries, complications, and urinary pathologies allows earlier diagnosis, improved treatment modalities, and a better understanding of pelvic floor anatomy. In addition, the need for cystoscopy with increasing surgical interventions for mid-urethral sling surgery and pelvic organ prolapse repair will continue to be an important component of gynecology and obstetrics residency training in the coming years.[11] Our aim of organizing this course is to help gynecologists and obstetricians learn the anatomical structures on the cadaver better and increase their manual skills, shortening the time of cystoscopy and increasing its quality.

In the study by Bowling et al.[11], they stated that the ability of assistants to bring together the cystoscopy and perform cystourethroscopy improved significantly after the bladder model didactic application. In our study, it was observed that the ability of the trainees to recognize, put together and use the cystoscope developed significantly at the end of the course.

Table 3. Practice time and task scores and duration on cadavers and patients	
Evaluated variable	**Results**
Practice time on cadavres (min)	76.3±21.9 (48–144)
Task application score on cadavre (over 100)	70.3±12.6 (45–94)
Cystoscopy time on patients (min)	65.8±11 (48–88)
Cystoscopy task completion time on patients (min)	19±3.7 (6–24)
Task application score on patients (over 100)	77.5±10.9 (48–96)

Brehmer and Swartz[12] reported in their study that repeated training on a bench-top simulator for semi-rigid ureteroscopy significantly improved established performance and made trainees feel more comfortable with instruments and procedures. In our study, it was observed that the trainees felt more comfortable in the cystoscopy procedure performed on the cadaver together with the theoretical training later in the course, which increased the overall performance and the flow rate of the procedure. They were also found to be more successful in performing specific procedures on cadavers.

CONCLUSION

The American College of Obstetricians and Gynecologists (ACOG) has advised to train all gynecologist and obstetrician residents in cystoscopy, but not all gynecology and obstetrics residency programs formally teach cystoscopy to their residents. In addition to the new ACOG recommendations, there is a growing body of evidence suggesting that cystoscopy should not only be performed during routine hysterectomy but is also cost-effective when rates of ureteral injury are exceeded. 1.5% for abdominal approaches and 2.0% for vaginal or laparoscopic approaches. Because of new suggestions and increasing demand for routine cystoscopy in gynecology and obstetrics field, teaching the basics of cystoscopy should be considered firmly.[11,13]

Our aim is to reach more trainees in the following course programs and make cystoscopy a surgical procedure that gynecologists and obstetricians can routinely perform.

ETHICS

Ethics Committee Approval: Since this is a cadaver study, approval by an ethics committee was not required.

Informed Consent: Informed consents were obtained from each patient.

Peer-review: Externally peer-reviewed.

Contributions

Concept: Y.C.; Design: B.A., A.S., Y.C., E.Ç.; Data Collection and/or Processing: Y.C.; Analysis and/or Interpretation: A.S.; Project Development: E.Ç.; Writing/Editing: B.A., E.Ç.

DISCLOSURES

Conflict of Interest: No conflict of interest was declared by the authors.

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