

# Impact of a gynecologic oncology cadaveric dissection course for surgical training

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## Abstract

**Objectives:** The aim of this study was to measure the educational efficacy of a gynecologic oncology cadaveric dissection course on fellows and specialists.

**Methods:** After the radical and reconstructive vulvar and abdominal gynecologic cancer surgery cadaveric course, a post-course survey was applied to evaluate the improvement in topographic surgical anatomy and the effect on broadening the surgical experience.

**Results:** Totally 10 and 16 participants attended to the vulvar cancer surgery cadaveric dissection course and abdominal gynecologic cancer surgery cadaveric dissection course, respectively. All participants stated that they had an improvement in topographic surgical anatomy and they found the cadaveric workshop beneficial to broaden the surgical experience. All participants suggested this kind of courses to learn the proper techniques of a surgical procedure in a comfortable and non-stressful setting and improve the surgical skills for rare and complicated surgeries.

**Conclusion:** Cadaveric dissection courses in the field of gynecologic oncology tailor the surgical anatomy education and improve the training.

**Keywords:** anatomy; cadaveric dissection; education; gynecologic oncology; surgery

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## Introduction

There is a trend shifting towards problem-based learning in surgical anatomy education. Facing with difficult cases increased the need for a detailed knowledge of anatomy, and many residents and junior post-graduate surgeons know little about the relevant anatomical planes of the procedure they perform.<sup>[1]</sup> Many post-graduate surgical anatomy courses which are organized nowadays brought the solution to this problem.

Cadaveric dissection constitutes the cornerstone of anatomy education since centuries; however, integration of 3D printed models and computer-based virtual and augmented reality programs improved the general teaching and learning utilities which lead to a more structured design of education.<sup>[2,3]</sup> Despite the improvements in software programs and models, cadaveric dissection provides

a different point of view especially for surgical education and training.<sup>[4]</sup>

Researchers in the field of anatomy investigated the role of many teaching tools like software, advanced imaging or multimedia-based programs, 3D printed material; however, it is widely accepted that there is no one particular way of teaching anatomy.<sup>[5]</sup> Combination of traditional and novel innovative methods provides an excellent way of teaching and learning anatomy; nonetheless, the group you intend to teach is the major determinant for the way you need to select during anatomy education.<sup>[6]</sup> In that point, the educational activities differ due to the target group. Surgeons need to learn the 3D oriented anatomy and close anatomical landmarks of the field they operate, and management of potential complications, additionally they need to practice to gain skills and confidence. On the basis of these needs, the cadaveric dissection studies give them

many vulnerable options. This study evaluated the educational results of a 'Radical and reconstructive vulvar and abdominal surgery cadaveric course' on learning anatomy and gaining surgical experience.

## Materials and Methods

Second annual cadaveric course on radical surgical procedures in gynecologic oncology was held in September 2018 at Department of Anatomy, Faculty of Medicine in Bahçeşehir University. The venue was in Istanbul, an ancient city with lots of historical and modern sightseeing places.

The course was separated into two workshops; Radical and Reconstructive Vulvar Cancer Surgery Workshop on August 31, 2018 and Radical and Reconstructive Abdominal Gynecologic Cancer Surgery Workshop on September 1-2, 2018. Both were European Society of Gynecological Oncology (ESGO) endorsed meetings. Professor Ate Van der Zee, Professor Christina Fotopoulou (ESGO Council Member) and Dr. Kamil Zalewski (President of European Network of Young Gynae-Oncologists) were the international faculty members, with collaboration of 20 national (Turkish) faculty members. Turkish Society of Obstetrics and Gynecology supervised the courses. Department of Anatomy in Bahçeşehir University supported the workshop and a clinical anatomist - Professor Çağatay Barut - was the faculty member both for theoretical lessons and cadaveric dissection. Ten participants attended to the vulvar cancer workshop in which three totally fresh-frozen cadavers were used; 16 participants attended to the abdominal surgery workshop in which four totally fresh-frozen cadavers were used. A heterogeneous group of gynecologic oncology fellows and specialists from Turkey, Azerbaijan and Europe attended the course.

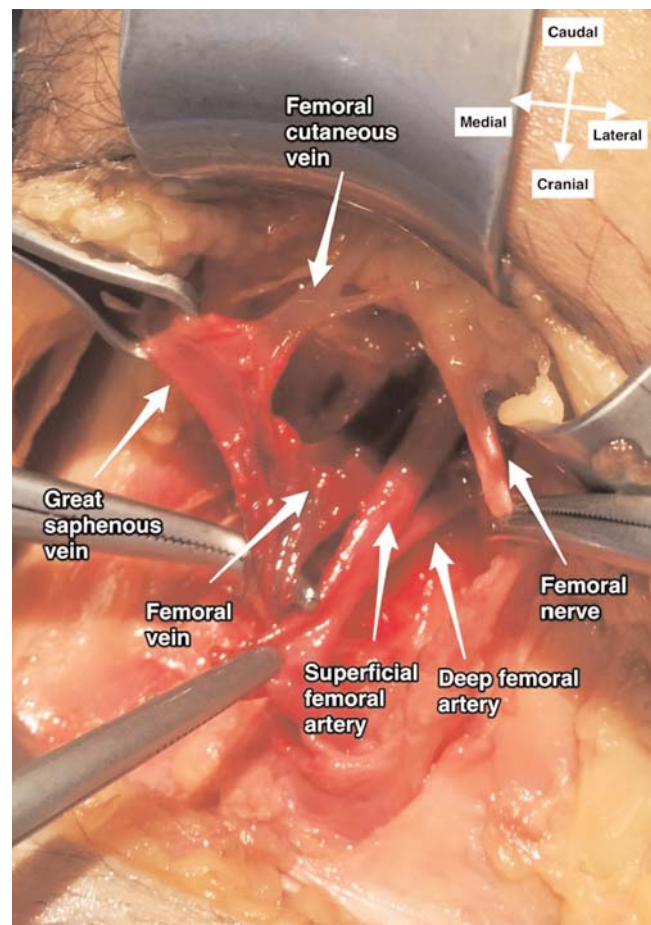
The vulvar cancer workshop was a one-day program. Theoretical lessons finished in early afternoon and three hours were spent in the anatomy laboratory for cadaveric dissection. Radical vulvectomy and inguinofemoral lymph node dissection with alternative flap reconstructions were performed at the master table; so, all the participants watched the operation live for this rare vulvar cancer surgery by a video recording system. Afterwards, participants performed the dissection and surgical procedures under the supervision of seniors (Figure 1).

Radical abdominal surgery workshop consisted of theoretical lessons for the first day and cadaveric dissection for the whole second day. Theoretical lessons covered all the advanced procedures for pelvis and upper abdomen with special sessions targeting ovarian cancer surgery,

management of complications and reconstruction techniques. At the end, all the faculty discussed 'what is not written in books, tips and tricks of surgical principles' interactively. Coffee breaks were beneficial for networking and a specially organized dinner was held after the end of first and second days which presented the beauty and history of Bosphorus in a lovely climate.

Second day focused on practical sessions with four fresh frozen cadavers covering all the open surgical procedures that will be applied in open abdomen. Additionally, participants had enough time to make dissections and perform the surgical procedures for tailoring the surgical practice. Anatomy laboratory was well designed to maintain a clean working environment. Table 1 shows the subjects of cadaveric dissections.

After the end of the course, a questionnaire was replied by all of the participants to measure the efficacy of the course, with the answers 'Yes' or 'No'. The post-



**Figure 1.** Right inguinofemoral lymph node dissection and femoral vessels on a fresh-frozen cadaver. [Color figure can be viewed in the online issue, which is available at [www.anatomy.org.tr](http://www.anatomy.org.tr)]

**Table 1**

Subjects of procedures performed during cadaveric dissections.

<b>Vulvar cancer surgery cadaveric workshop</b>
<ul style="list-style-type: none"> <li>• Vulvar dissection</li> <li>• Radical vulvectomy and wide local excision</li> <li>• Skinning vulvectomy</li> <li>• Dissection of uretra and anus, excision and repair</li> <li>• Inguino-femoral dissection, femoral vessels</li> <li>• Vaginal surgery</li> <li>• Vulvar/vaginal reconstruction</li> <li>• Vulvar flaps and step by step flap techniques</li> </ul>
<b>Abdominal gynecologic cancer surgery cadaveric workshop (open surgical procedures)</b>
<ul style="list-style-type: none"> <li>• Anatomy of abdominal wall, different incision types</li> <li>• Mobilizations of right and left hepatic lobe</li> <li>• Identification and dissection of hepatoduodenal ligament and portal triad</li> <li>• Pringle maneuver</li> <li>• Step by step segmental hepatectomy and port hepatic</li> <li>• Cholecystectomy</li> <li>• Diaphragm stripping and resection</li> <li>• Repair of diaphragm and chest tube insertion</li> <li>• Cardiophrenic lymph node excision</li> <li>• Mobilization of stomach, dissection of subpyloric area and partial gastric resection</li> <li>• Bursa omentalis, lesser sac and celiac trunk dissection</li> <li>• Splenectomy and pancreas tail excision</li> <li>• Omentectomy</li> <li>• Retroperitoneal right side medial visceral rotation; Kocher and Cattel-Braasch maneuver</li> <li>• Retroperitoneal left side medial visceral rotation, Mattox maneuver</li> <li>• Resection/anastomosis of small and large bowel, rectum</li> <li>• Techniques in opening stoma</li> <li>• Mobilization of kidney, nephrectomy and adrenal gland resection</li> <li>• Pelvic lymphadenectomy</li> <li>• Para-aortic lymphadenectomy</li> <li>• Radical hysterectomy and nerve sparing radical hysterectomy</li> <li>• Total mesometrial resection</li> <li>• Laterally extended endopelvic resection</li> <li>• Trachelectomy</li> <li>• Radical oophorectomy en-bloc rectosigmoid resection and pelvic peritonectomy</li> <li>• Total pelvic exenteration (isolated anterior/posterior)</li> <li>• Mobilization and injury repair of vena cava, aorta and common iliac vessels</li> <li>• Partial resection and repair of ureter and bladder</li> <li>• Radical cystectomy</li> <li>• Continent urinary pouch and neo-bladder</li> </ul>

course survey aimed to measure the improvement in topographic surgical anatomy and surgical experience. Results were analyzed with a computer-based calculation system.

## Results

All of the participants, 10 for the Radical and Reconstructive Vulvar Cancer Surgery Workshop and 16 for the Radical and Reconstructive Abdominal Gynecologic Cancer Surgery Workshop, stated that they had an improvement in topographic surgical anatomy (100%) and found the cadaveric workshop beneficial to broaden the surgical experience (100%) (Table 2).

Additionally, all of the participants suggested this kind of courses to learn the proper techniques of a surgical procedure in a comfortable and non-stressful setting (100%) and improve the surgical skills for rare and complicated surgeries (100%) (Table 2).

## Discussion

Irrespective of the medical specialty, anatomy education is the supplementary part of clinical practice. Despite many ways of teaching anatomy, simulation based hands-on models are becoming an increasing demand among the surgical residents and post-graduate surgeons. There are many deficiencies that surgical residents come across during the residency or post-residency. Most importantly, feeling fully prepared to perform a surgical procedure or manage the surgery independently is lacking among the junior surgeons. This deficiency arises from the gap in anatomy education and projecting the anatomic knowledge into surgical practice.<sup>[7-9]</sup> This study focuses on the effect of gynecologic oncology cadaveric dissection course on surgical anatomy knowledge and practice.

The results of this study revealed that a single cadaveric course improves the topographic surgical anatomy knowledge and broaden the surgical experience. However,

**Table 2**

Post-course evaluation of educational efficacy.

	<b>Vulvar cancer workshop (n, %)</b>		<b>Abdominal surgery workshop (n, %)</b>	
	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>
Improvement in topographic surgical anatomy	10 (100%)	None	16 (100%)	None
Beneficial to broaden the surgical experience	10 (100%)	None	16 (100%)	None
Suggest this course to learn proper techniques of surgical procedures in a comfortable and non-stressful setting	10 (100%)	None	16 (100%)	None
Suggest this course to improve surgical skills for rare and complicated surgeries	10 (100%)	None	16 (100%)	None

the limited number of the study population and measuring the effectivity subjectively are the major limitations of this study.

The practical way of surgical training is shaped on a learning method in which the skills are gathered from the senior surgeons during the operations performed on patients. The educational curriculum of surgical residency does not involve anatomy rotation and the ethical dilemma of performing a procedure for the first time on a patient reveals restrictions in surgical education. First of all, residents watch the surgical operations many times, afterwards they assist the first surgeon, lately they perform the procedure under mentorship and finally they perform the procedure independently. However, occasionally they do not find the opportunity to perform a surgical procedure independently. The study by Gultekin et al.<sup>[10]</sup> which analyzed the gynecologic oncology training systems in Europe showed that many of the countries did not have a dedicated gynecologic oncology training program (47%) and 41% of the fellows do not have an access to advanced laparoscopic surgical procedures. This brings the feeling of anxiety during the junior post-graduate period while operating. Moreover, many of the residents do not observe management of complications during the surgery, by the way they will be unexperienced to manage a difficult case or complication during the surgery.

Post-graduate courses are held with the aim of improving the surgical anatomy knowledge and surgical skills. Nevertheless, the most beneficial courses which contribute to the surgical education are hands-on practical activities. Cadaveric dissection courses are the practical way of understanding the anatomy and surgical planes that the participants watch the anatomical dissection of the mentor and they find the chance to self-practice and explore. On the other hand, the difficulties to maintain a cadaver, high-costs and limited number of participants per cadaver are the major drawbacks of cadaveric dissection courses.

Barton et al.<sup>[11]</sup> stated that there was a significant improvement in surgical anatomy knowledge of pelvis and upper abdomen among the gynecologic oncology fellows after the cadaveric workshop of surgical procedures in gynecologic oncology and all of the participants found that the course was valuable and recommendable. After the anatomy of complications workshop to improve the training of gynecologic oncology fellows, Hammond et al.<sup>[12]</sup> reported that cadaveric dissection courses provided practice of less common surgical procedures and assisted to learn how to manage complications. Additionally, Hammond et al.<sup>[13]</sup> performed a similar study to shape an

educational program for obstetricians and gynecologists. They designed a course based on interactive surgical anatomy lectures, practical surgery videos, cadaveric dissection and specific learning tasks, and aimed to teach how to deal with unexpected injuries and complications via cadaveric dissection. This combination of observational and practical learning improved the knowledge, confidence, competence and performance. Heisler<sup>[14]</sup> emphasized the point of gross anatomy education at the laboratory which maintains discovering the anatomic landmarks and their relationships, developing tissue planes, good handling of instruments and self-dissection under mentorship. Despite the lacking objective criteria to evaluate the clinical application of gross anatomy education, there are many evidences that a structured anatomy education during junior residency or post-graduate period will improve the anatomical competence and surgical capability.<sup>[15,16]</sup>

There may be an option to mimic some surgical procedures where a fully-equipped material defining nearby anatomical landmarks is not needed, like performing a loop electrosurgical excision procedure.<sup>[17]</sup> On the other hand, gynecologic oncology practice is related with performing major surgical procedures on abdominal visceral organs and aorta or inferior vena cava or branches and tributaries of them. Based on this reality, simulating operations like retroperitoneal lymphadenectomy, splenectomy, bowel or liver mobilization, or resection after developing the accurate surgical planes is not easily applicable on models or will not be highly-effective, because these procedures need the three-dimensional view of relevant anatomic structures and dissection of surgical planes. Procedure-based learning provides many gains for the residents and fellows, therefore cadaveric dissections will yield an important area of self-practice for particular surgical procedures.<sup>[18]</sup> From a different point of view, simulation models or animal models will generate an area of practice for some abdominal procedures like ureteric or vascular repair or bowel anastomosis.<sup>[12]</sup> Thus, the target population, aim of the course and selected procedures are the key elements to determine the style of teaching. This study was based on a cadaveric model to teach the vulvar and abdominal surgical procedures after dissection of all relevant surgical spaces and planes.

Cadaveric dissection courses may also tailor the surgical practice due to the needs of participants and may focus on a specific issue by performing proper dissections. Cadaveric dissection improves the basic surgical skills and confidence; yet, transfer of skills from the laboratory to the operation room is questionable. It is not easy to evaluate the gains which were reflected to the operation room while performing a procedure independently. Considering

this, the degree and level of the skills and abilities transferred to the operation room are subjective and not totally measurable.<sup>[19,20]</sup> However, it is obvious that cadaveric dissection courses improve the topographic surgical anatomy knowledge and dissection techniques used in surgery to develop proper tissue planes, which is the main result of this study.

One important issue as the limitation of cadaveric courses is that, since a single cadaver is shared by three or four participants, generally none of the participants complete all the steps of a single surgical procedure individually. However, all of the participants observe the master table cadaveric dissection, perform dissections under mentorship and apply the procedures by sharing the steps.

## Conclusion

Cadaveric dissections improve the anatomical knowledge and surgical experience. However, there is a need for further investigations to demonstrate the objective efficacy of these courses.

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