

VIRTUAL AUTOPSY (E-AUTOPSY) IN THE TRAINING OF FORENSIC STUDENTS

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Abstract. On the Department of Pathology and Forensic Medicine at the Medical University of Plovdiv, virtual autopsy cases based on Clinicopathological Conferences have been developed with the purpose to compensate for the reduced number of direct sectional observations. Each case is presented in a training CD in two text formats (PDF and Word). These multivariate virtual autopsies are used during the training sessions in case of inability for direct sectional observation.

Results. The survey of student's opinion at the Medical University of Plovdiv reveals their approval for pedagogical innovations, their criticism of some of the traditional methods of teaching, their rigor of teaching quality and their willingness to be actively involved in the training.

Conclusions. Almost unanimous is the opinion of students about the importance of autopsy as an absolute must in their training. They believe that, although stressful, autopsy is a useful method in medical education and practice.

Ключевые слова:*медицинское образование, студенты-медики, обучение судебной медицине, аутопсия, клиничко-патологическая конференция.*

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ВИРТУАЛЬНАЯ АУТОПСИЯ (E-AUTOPSY) В ОБУЧЕНИИ СТУДЕНТОВ-МЕДИКОВ*М. Балтов, И. Биволарский, К. Сапунарова*

Резюме. На кафедре патологии и судебной медицины Медицинского университета г. Пловдив разработан комплекс иллюстрации конкретных случаев аутопсии на основе клиничко-патологических конференций с целью использования во время аудиторных занятий в случае невозможности прямого наблюдения за секционным исследованием трупа. Каждый случай представлен в виде учебного компакт-диска в двух текстовых форматах (PDF и Word).

Результат. По результатам опроса студентов медицинского университета г. Пловдив, известно их одобрительное отношение к педагогическим инновациям и критику некоторых традиционных методов обучения, а также их требовательность к качеству преподавания и готовность к активному участию в тренинге. Большинство студентов считают аутопсию чрезвычайно важной и абсолютно необходимой для усвоения материала по предмету судебная медицина. По их мнению, аутопсия является полезным методом в медицинском образовании и практике.

Вывод. Обучение в случаях виртуального вскрытия не может полностью заменить присутствие в комнате для вскрытия из-за исключения тактильности, обоняния и слуха, что ограничивает общее сенсорное восприятие студентов. Тем не менее, электронное вскрытие может быть активно использовано в процессе обучения студента в качестве дополнительного метода невозможности классического вскрытия.

Ключові слова:*медична освіта, студенти-медики, навчання судовій медицині, аутопсія, клініко-патологічна конференція.*

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ВИРТУАЛЬНА АУТОПСІЯ (E-AUTOPSY) У НАВЧАННІ СТУДЕНТІВ-МЕДИКІВ*М. Балтов, І. Біволярський, К. Сапунарова*

Резюме. На кафедрі патології та судової медицини Медичного університету м. Пловдив розроблено комплекс ілюстрації конкретних випадків аутопсії на основі клініко-патологічних конференцій з метою використання під час аудиторних занять у випадку неможливості прямого спостереження за секційним дослідженням трупа. Кожен випадок представлений у вигляді навчального компакт-диску у двох текстових форматах (PDF та Word).

Результати. За результатами опитування студентів медичного університету м. Пловдив, відоме їх схвальне ставлення до педагогічних інновацій та критику деяких традиційних методів навчання, а також їх вимогливість до якості викладання та готовність до активної участі в тренінгу. Більшість студентів вважають

автопсію надзвичайно важливою та абсолютно необхідною для засвоєння матеріалу із предмету судова медицина. На їх думку аутопсія є корисним методом у медичній освіті та практиці.

Висновок. *Навчання на випадках віртуального розтину не може повністю замінити присутність в кімнаті для розтину через виключення тактильності, нюху і слуху, що обмежує загальне сенсорне сприйняття студентів. Проте, електронний розтин може бути активно використаний у процесі навчання студента в якості додаткового методу при неможливості класичного розтину.*

Introduction

The autopsy has been an important part of medical education for centuries. It reflects the knowledge and practical skills of medical students and helps to develop respect, sympathy and compassion for patients. The presence in the autopsy room allows the students to be brought in contact with the relatives of the deceased, which contributes to their emotional growth and character-building as medical specialists.

Issues in the training of medical students concerning the autopsy activities began to be seriously debated back in the 80s of the last century. It is believed that the severely reduced number of autopsies worldwide is due to many reasons - ethical, social, religious and professional. Legal provisions allowing the bodies of deceased persons to be returned to their relatives without autopsy also contribute to this [1].

Similar is the situation in the Medical University in the UK. "Autopsy has traditionally been used as an important tool in medical education, but in recent decades there has been a sharp decline in this regard. The reasons for this are complex, but the main one is the reduced autopsy rate and the confusing legal provisions and jurisdictions" [2]. "The increasing discomfort among clinicians due to diagnostic uncertainty and medical errors is directly related to the decline in autopsy activity. Iatrogenia is considered to be a major cause of increased cases of guilt, denial and other protective behavioral responses in clinicians of various specialties" [3].

Although forensic medicine is studied as an independent discipline during the tenth semester of students' training at the Medical University in Bulgaria, few are the student groups who are able to attend a real autopsy. The reasons for this are objective and are related to the professional commitment of the lecturers, the weight of the forensic medical expertise, which does not allow distraction of the specialist, the afternoon exercises (when autopsies do not take place) and the rare coincidence of the sessions with days in which there are autopsies. The medical institutions in the United Kingdom are also facing the same problem. A large-scale survey (23/28 medical institutions) assesses autopsy as an educational tool that is increasingly difficult to be used [4]. In order to fill this deficiency in the training, electronic variants of various autopsy cases were developed at the Department of Pathology and Forensic Medicine at the Medical University of Plovdiv. They are used during the training sessions, in the event of a lack of direct sectional observations.

There are a large number of video materials for autopsy monitoring on the Internet available in different

languages. Some of them show partial dissection of organs directly at their anatomical location without evisceration, which does not allow for a detailed impression of organ changes [5, 6]. Other video materials are not suitable for educational purposes, because only the evisceration is captured. Much of the videos on the Internet, suggesting that they are demonstrations of teaching autopsies, are commercial videos looking for sensation and a large audience. The few qualitative videos on the Internet are not able to fill the deficit with direct sectional observations during the teaching sessions.

For the needs of medical training, with the purpose to compensate for the reduced number of direct sectional observations, various computer programs have been developed demonstrating organ changes in various diseases. One such tool on the Internet is eAutopsy [6]. This substitute for direct sectional observation combines didactic elements of lecture, presentation and online discussion. Its main advantage is the emotional comfort of students who have passed a sectional course through eAutopsy [5].

Purpose

Researching the opinion of students from the Medical University of Plovdiv about the virtual autopsy cases included in their training.

Materials and methods

In the Department of Pathology and Forensic Medicine at the Medical University of Plovdiv, new training materials (practical and educational CDs) have been introduced since 2011. Clinical and morphological virtual autopsy cases have been developed in the disks, which have a detailed textual description. These are illustrated with preparations from the museum's collection of the Department. Students are expected to know the specific case and under the lecturer's instruction to give reasoned answers to the questions asked, in particular to formulate a clinical diagnosis and identify diseases that have not led to death (fig. 1).

The results of the survey conducted by medical students are illustrated by table 1.

Test Statistics (Kruskal Wallis Test and Grouping Variable: discipline) show that the scores of the different groups of students are statistically significant with respect to all teaching aids, except for the need for a pocket textbook ($P > 0.05$). Educational Clinicopathological conferences receive one of the highest scores in the study - 4.12.

Test Statistics and Grouping Variable: discipline: A large difference between the groups is established only

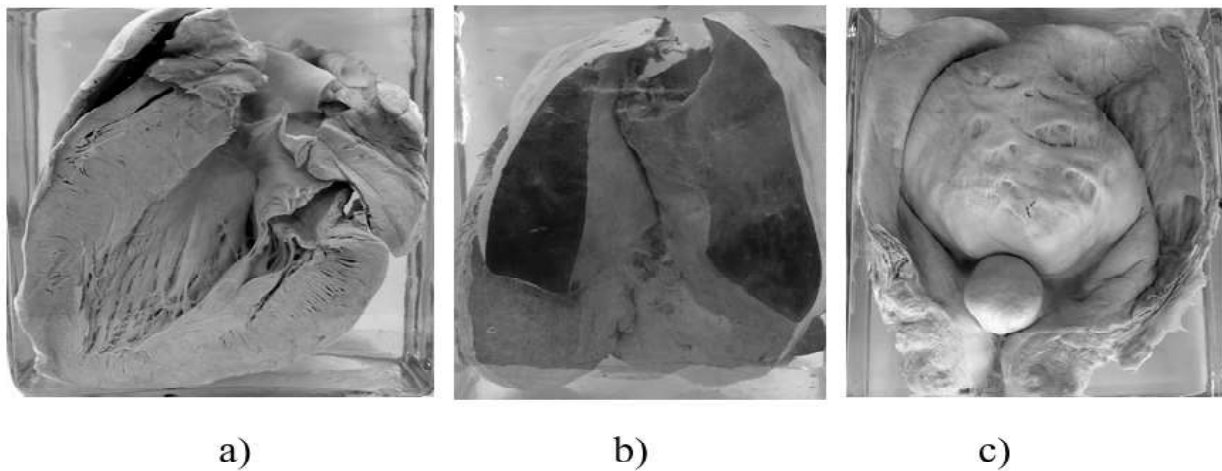


Figure 1. Examples of images of cases of autopsy: a) heart; b) lungs; c) prostate gland

Table 1
Scores of the students (from 0 up to 6) for the need of teaching aids and additional materials concerning their preparation for the discipline

Scores of the students for the need of:	N	Mean		Std. Deviation	Chi-Square	df	Asymp. Sig.
	Statistic	Statistic	Std. Error	Statistic			
Glossary	687	3,58	,079	2,059	106,634	5	,000
Collection of tests	670	3,91	,082	2,124	85,062	5	,000
Pocket textbook	643	4,27	,073	1,850	5,316	4	,256
Issue of lecture course	639	4,79	,065	1,631	10,914	4	,028
Diagnostic atlas	565	4,82	,064	1,513	23,481	3	,000
Additional information	594	3,76	,076	1,842	51,607	4	,000
Collection of teaching tables	670	3,79	,071	1,839	85,129	5	,000
Clinicopathological conferences	610	4,12	,074	1,835	125,037	4	,000

with regard to the lack of sectional activities (P = 0.116). (Table 2)

Conclusion

Training with virtual autopsy cases cannot fully

Table 2
Scores of the students (from 0 up to 6) for the need of teaching aids and additional materials concerning their preparation for the discipline

Disadvantage	N	Mean		Std. Deviation	Chi-Square	df	Asymp. Sig.
	Statistic	Statistic	Std. Error	Statistic			
Lack of consultations	715	2,34	,078	2,073	20,294	5	,000
Insufficient workload	735	2,66	,077	2,092	37,319	5	,000
Lack of contact with lecturers	706	2,41	,078	2,071	40,144	5	,000
Not enough sectional observations	562	3,49	,084	1,988	5,909	3	,116
High style of lectures	728	2,50	,078	2,107	27,524	5	,000
Uninterested assistants	645	1,86	,083	2,110	73,086	4	,000
Others	35	2,97	,415	2,455	9,498	4	,050

replace the presence in the autopsy room due to the exclusion of tactility, smell and hearing, which limits the overall sensory perception of the students. However, electronic autopsy can be actively used in the student's learning process as an additional method for the impossibility of classical autopsy.

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