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.
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 of Plovdiv, new training materials (practical and educational CDs) have been introduced demonstrating organ changes in various diseases. One such tool on the Internet is eAutopsy [6]. This substitute for 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

| Disadvantage                          | N     | Mean   | Std. Deviation | Chi-Square | df | Asymp. Sig. |
|---------------------------------------|-------|--------|----------------|------------|----|-------------|
| Glossary                              | 687   | 3.58   | .079           | 2.059      | 5  | .000        |
| Collection of tests                   | 670   | 3.91   | .082           | 2.124      | 5  | .000        |
| Pocket textbook                       | 643   | 4.27   | .073           | 1.850      | 5  | .256        |
| Issue of lecture course               | 639   | 4.79   | .065           | 1.631      | 5  | .014        |
| Diagnostic atlas                      | 565   | 4.82   | .064           | 1.513      | 3  | .000        |
| Additional information                | 594   | 3.76   | .076           | 1.842      | 4  | .000        |
| Collection of teaching tables         | 670   | 3.79   | .071           | 1.839      | 5  | .000        |
| Clinicopathological conferences       | 610   | 4.12   | .074           | 1.835      | 4  | .000        |

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

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. |
|---------------------------------------|-------|--------|----------------|------------|----|-------------|
| Lack of consultations                 | 715   | 2.34   | .078           | 2.073      | 5  | .000        |
| Insufficient workload                 | 735   | 2.66   | .077           | 2.092      | 5  | .000        |
| Lack of contact with lecturers        | 706   | 2.41   | .078           | 2.071      | 5  | .000        |
| Not enough sectional observations     | 562   | 3.49   | .084           | 1.988      | 5  | .000        |
| High style of lectures                | 728   | 2.50   | .078           | 2.107      | 5  | .000        |
| Uninterested assistants               | 645   | 1.86   | .083           | 2.110      | 4  | .000        |
| Others                                | 35    | 2.97   | .415           | 2.455      | 4  | .050        |

Conclusion
Training with virtual autopsy cases cannot fully 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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