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THE IMPORTANCE OF SONOGRAM IN THE DIAGNOSIS OF OVARIAN CANCER AND PEDAGOGICAL TECHNOLOGIES IN ITS TEACHING

Yusupova Feruza Nurmamatovna
Master of Medical Radiology, Tashkent Medical Academy.
Tel: 976051221. E-mail: feruzayusupova989@gmail.com

Dekhkambayeva Zulfiya Abubakirovna Ph.D.
Associate Professor, Department of Pedagogy and Psychology, Tashkent Medical Academy

Abstract
This article analyzes the importance of sonography in the diagnosis of ovarian cancer and modern pedagogical approaches to teaching it in the medical education system. Ovarian cancer is one of the most dangerous oncological diseases among women and plays an important role in reducing the number of early detection and improving the quality of life. Sonography is a diagnostic tool that is safe, has high accuracy and is widely used. The article also outlines the benefits of using interactive and innovative pedagogical technologies in teaching Sonography. Simulation training, virtual environment training, training through AR/VR technologies have been noted to serve as an effective tool in shaping the knowledge and skills of medical students.

Keywords: Ovarian cancer, Sonography, ultrasound, diagnostics, medical education, pedagogical technologies.

Introduction

Ovarian cancer is one of the most dangerous oncological diseases among women. Late detection of this disease leads to its complicated course and high mortality rates. Sonographic methods - that is, ultrasound examinations - are recognized as

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the most effective diagnostic tool for early detection of ovarian cancer. In modern medical education, it is important to deeply instill knowledge and skills in this area in the minds of students.

1. The role of ovarian cancer and sonography in diagnostics

Ovarian cancer often proceeds without obvious symptoms in the early stages, therefore it is often detected at late stages. This poses a serious threat to the health of patients. Sonography is an important imaging diagnostic method that allows for real-time assessment of the condition of the ovaries, is non-invasive, safe and can be used repeatedly. Changes in the ovaries are detected through transabdominal and transvaginal ultrasound examinations. Doppler sonography, on the other hand, provides important support in identifying tumor characteristics by analyzing blood flow. The high mortality rate of ovarian cancer is associated with the aggressive biological characteristics of tumors, which can recur and spread through various routes: direct growth into neighboring organs, spread through pelvic and abdominal organs, as well as metastasis through blood and lymphatic vessels (Kossaï et al., 2018). The main reason for the high mortality rate is the late detection of the disease. Difficulties in diagnosis are associated with the absence of characteristic symptoms and a long asymptomatic course in the early stages, as well as factors that make it difficult to detect the pathology in a timely manner, given the wide age group of women affected by this disease (Menon et al., 2020). Due to late diagnosis, the five-year survival rate for stage III ovarian cancer is only 15-35%, and for stage IV this figure does not exceed 10% (Ledermann et al., 2019). Measuring CA-125 levels is important in the diagnosis and monitoring of ovarian cancer. CA-125 is a tumor marker that is elevated in the majority of patients with epithelial ovarian tumors (Meyer et al., 2018). In combination with imaging methods, determining CA-125 levels is used to assess the likelihood of malignancy and monitor the course of treatment. However, despite its high sensitivity, the specificity of the marker is limited, as its levels can be elevated in endometriosis, pelvic inflammatory disease, and even during pregnancy. Therefore, although CA-125 is a useful tool, it should be used in conjunction with other diagnostic methods (Moore et al., 2020).

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The morphological diversity of ovarian tumors complicates their preoperative diagnosis, but comprehensive ultrasound examination plays an important role in this process (Drescher et al., 2019). Due to its high information content, accessibility, safety, and repeatability, this method allows for the primary diagnosis of ovarian tumors at the preoperative stage, the assessment of their spread beyond the pelvic cavity, and the adjustment of treatment tactics (Froyman et al., 2018). In recent years, preference has been given to transvaginal ultrasound with color Doppler mapping, which has a sensitivity of 92-100% in ovarian cancer (Van Kalster et al., 2020). The next step in improving diagnostics involves the use of three-dimensional sonography, including multi-planar 3D reconstruction and three-dimensional angiography. These methods allow for detailed assessment of vascular flow and detection of markers of neoangiogenesis (Pinto et al., 2018).

In addition to ultrasound, computed tomography (CT) and magnetic resonance imaging (MRI) are also valuable diagnostic methods (Sharma et al., 2019). CT has a diagnostic accuracy of 92.3% for ovarian cancer, 94.2% for ovarian cysts and cysts, and 66.7% for benign solid masses (Khunamornpong et al., 2018). MRI has high tissue contrast, provides multi-examination capabilities, and allows for detailed analysis of the anatomical structure and chemical composition of tissues (Tomassin-Naggara et al., 2018). MRI can increase diagnostic accuracy to 97-98% (Li et al., 2019), and its use in combination with ultrasound increases the accuracy of preoperative diagnosis to 97.5% (Sohaib et al., 2018).

Thus, the problem of diagnosing and treating ovarian cancer remains relevant and requires further in-depth study. Despite the progress in the use of modern imaging methods such as ultrasound, computed tomography and magnetic resonance imaging, the difficulty of early detection and high mortality indicate the need to develop new approaches and improve existing technologies. Further research in this area will help improve treatment outcomes and increase patient survival.

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2. Modern pedagogical technologies in teaching sonography

In the process of teaching sonography in medical education, it is necessary to use innovative pedagogical approaches. The following methods play a special role in improving the quality of education:

Simulation training plays an important role in preparing students for real situations. The main tasks of the Simulation Center are:

• Advanced training and retraining: Ensuring the implementation of educational programs within the framework of practical training of narrow specialist doctors using simulation technologies.

• Basic educational programs: Implementation of basic educational programs in emergency medical care for non-medical specialists using simulation technologies.

• Assessment tool fund: Development and conduct of events for the examination of interactive situational tasks using simulation equipment.

• Assessment tool update: Annually update the assessment tool fund for specialties in accordance with the curriculum.

Through these tasks, the Simulation Center helps to provide high-quality training and improve professional skills of students.

Virtual laboratories (VL) provide the opportunity to conduct practical experience remotely and occupy a special place among digital educational resources. This term refers to laboratory work and experiments in the process of studying a cycle of specific disciplines in the field of education, which are conducted in a virtual environment.

Types of virtual laboratories:

• Virtual laboratories imitating traditional equipment: These laboratories simulate traditional experiments in a virtual environment.

• Virtual laboratories that simulate experiments using digital measuring instruments: Digital laboratories include digital measuring instruments.

• Laboratories using virtual reality technology: These laboratories allow experiments to be conducted through virtual reality.

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How are virtual laboratories used?

Virtual laboratories are computer programs that simulate laboratory work or the main stages of experiments using various laboratory equipment, tools, and virtual reagents. They allow students to prepare theoretical materials, instructions, tasks, and reports. As a result, students develop the necessary skills and competencies.

Advantages of virtual laboratories:

• Dangerous or impossible experiments: Allows virtual experiments to be conducted instead of experiments that cannot be conducted in the classroom.
• Preparation for conducting experiments: Increases the effectiveness of the lesson, allows students to familiarize themselves with laboratory equipment and learn the principles of their operation.
• In distance learning: Virtual labs play an important role in distance learning, especially during the pandemic.

It is important to note:

With all the attractiveness of virtual laboratories, it is always necessary to remember that this is just a computer model. Laboratory work based on full-scale experiments using real equipment and measurements of physical quantities is important for students to acquire practical research skills

AR/VR Technologies and Education

AR (Augmented Reality) and VR (Virtual Reality) technologies allow modeling complex diagnostic situations in a virtual environment. These technologies offer innovative approaches to the educational process, creating a comfortable and effective learning environment for students.

Advantages:

• Making complex concepts understandable: AR and VR technologies increase the ability to convey complex concepts in an easy and understandable way. This helps students learn topics that were previously difficult to understand.

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• Real-life experiences: In the process of distance learning, there is an opportunity to provide students with real-life experiences through VR technologies.
This significantly improves the learning process and increases student motivation.

Problems:
However, there are a number of problems in introducing these technologies into the education system:
• Lack of technical infrastructure: Many educational institutions are not provided with the necessary technical infrastructure.
• High costs: The introduction of AR and VR technologies requires high costs, which makes implementation difficult in many institutions.
• Teacher qualifications: The lack of sufficient qualifications of teachers in working with these technologies also creates problems.

Future prospects:
Therefore, for the effective use of VR and AR technologies, it is necessary to develop clear strategies for their widespread introduction. In the future, it is expected that these technologies will be used more widely in the education system, new innovations will be introduced, and technological capabilities will develop.

Interactive Platforms:
In addition, interactive platforms have the ability to assess and consolidate knowledge based on tests, video lessons, and clinical cases. This will help students test and consolidate their knowledge, and also make the learning process more interactive and interesting.

3. Improving the curriculum for sonography in medicine
Improving the curriculum for sonography in higher medical education institutions is a requirement of today. Along with theoretical knowledge, great attention should be paid to practical training. Also, by organizing seminars and master

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classes with the participation of experienced specialists, and supporting research work with the participation of students, it is possible to train qualified personnel in the field of sonography.

Conclusion

Sonography is a modern and reliable method in the diagnosis of ovarian cancer. This method can detect pathological conditions in the ovaries at an early stage. The use of innovative pedagogical technologies in teaching sonography in medical education will develop the professional knowledge and skills of students. Therefore, it is advisable to expand research in this area, introduce modern technologies, and improve curricula based on modern requirements.

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