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ULTRASOUND EXAMINATION - AN EFFECTIVE METHOD OF DETECTION OF DISEASES

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Abstract
This article highlights the importance of ultrasound examination (UTE) in modern medicine, its role in the diagnostic process and its advantages. Ultrasound examination is a radiation-free, painless, fast and highly accurate method, widely used to assess the condition of internal organs, soft tissues, pregnancy, heart and blood vessels. The article explains the mechanism of UTE operation, areas of application, advantages over X-ray and computed tomography, and its importance in detecting diseases at an early stage. It is also noted that due to the technological development of ultrasound devices, diagnostics are becoming more accurate and reliable.

Keywords: Ultrasound examination, UTE, diagnostics, medical imaging, disease detection, non-invasive method, sonography, organ status, pregnancy monitoring, echography.

Introduction

Modern medicine places great importance on the early detection of diseases and accurate diagnosis, as these factors significantly improve treatment outcomes. In this regard, ultrasound examination (USG) is considered one of the most widespread, safe, and effective diagnostic methods. USG provides real-time, high-resolution imaging of internal organs and tissues. Unlike X-ray

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examinations, this method does not use ionizing radiation, which makes it completely safe, especially for children and pregnant women [1].

The fields in which ultrasound diagnostics are applied are extremely broad, playing a crucial role in detecting cardiovascular diseases, abdominal organ pathologies, muscle and soft-tissue conditions, as well as gynecological and urological disorders. Its rapid execution, ability to be repeated multiple times, and cost-effectiveness have contributed to its widespread use in medical practice. This topic provides a detailed explanation of the working principles of ultrasound technology, its advantages, and its role in disease diagnosis.

Materials and methods

Ultrasound examination (USG) is based on the principle that high-frequency sound waves sent into the human body are reflected from tissues and displayed as an image on the monitor. Modern ultrasound devices consist of components such as a probe, a computer system, and a monitor, allowing real-time observation of organ movement, blood flow velocity, and structural changes [2].

One of the most important advantages of USG is that it is a non-invasive method, meaning no instruments are inserted into the body during the examination. Therefore, the patient does not experience pain or discomfort. In addition, ultrasound does not use ionizing radiation, which makes it environmentally safe and particularly convenient for newborns, children, and pregnant women [3].

Today, ultrasound examination has become one of the most commonly used diagnostic methods due to its reliability, safety, simplicity, and cost-effectiveness. USG plays an invaluable role in early disease detection, assessment of disease progression, and proper planning of treatment [4].

In the discussion, the main advantages of USG — its non-invasiveness, radiation-free nature, real-time imaging capabilities, and suitability for repeated examinations — are emphasized. These characteristics make it an ideal diagnostic tool for all age groups, especially children and pregnant women [5].

Ultrasound has proven highly effective in numerous fields, including cardiology, gynecology, urology, gastroenterology, and surgery. Doppler ultrasonography, in particular, is of great significance for detecting vascular abnormalities. New 3D

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and 4D technologies further enhance image clarity, making the diagnostic process even more convenient for clinicians [6].

Final results indicate that ultrasound examination:

• is highly effective in early disease detection;
• is safer and more cost-effective compared to other diagnostic methods;
• offers broad applicability across various medical fields;
• greatly aids in treatment planning and monitoring.

Overall, ultrasound examination is an integral part of modern medicine, and with further technological advancements, its accuracy and effectiveness are expected to continue increasing.

Conclusion

Ultrasound examination holds a special place in modern medicine as one of the safest, fastest, and most accurate diagnostic methods for detecting diseases. Its non-invasive nature, lack of ionizing radiation, and ability to clearly visualize organs in real time provide great convenience for patients. Ultrasound is highly effective in the early detection of abdominal organ pathologies, cardiac and vascular conditions, muscle and soft-tissue abnormalities, as well as gynecological and urological diseases, helping ensure proper organization of the treatment process.

In addition, the use of advanced technologies such as Doppler ultrasonography, 3D, and 4D ultrasound further expands diagnostic possibilities and ensures more precise imaging results. Studies show that ultrasound is valuable not only for diagnosing diseases but also for continuously monitoring their progression.

In conclusion, ultrasound examination is an integral part of modern medicine, and due to its high efficiency, safety, and convenience, it is expected to remain widely used in the future as well.

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