

Ultrasound diagnostics of knee joint diseases

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Annotation. This article highlights a study dedicated to improving ultrasound diagnostics in diseases of the knee joint and increasing the information content of the ultrasound method.

Key words: meniscus, diplography, tendon, hypo echogenicity.

The problem of diagnosing injuries and diseases of the knee joint is very relevant for today's medicine. This is largely due to the active lifestyle of modern man, his struggle with a sedentary lifestyle and passion for sports games. An increasing number of people are actively involved in sports, hence the increasing number of sports-related injuries. The most common type of injury in gaming and active sports are knee injuries, namely damage to the menisci, ligaments and tendons. These injuries constitute a category of severe injuries leading to long-term disability and occur in men 7.5 times more often than in women. In the first place in the frequency of detection are meniscal ruptures (about 65%), then damage to the lateral ligaments of the knee joint (about 28%), much less often - ruptures of the patellar ligament and tendon of the quadriceps femoris (about 20%). The correct diagnosis of the pathological process in the knee joint is often hindered by a number of reasons, in particular, an insufficiently accurate anamnesis without taking into account the mechanism of injury, lack of information about the nature of the onset of the disease, inattentive clinical examination of the joint and, accordingly, an incorrect assessment of the signs. And therefore, timely and accurate instrumental diagnostics is extremely important. Today in the arsenal of traumatologists there is a wide range of instrumental, radiation methods of knee joint examination. Such highly informative diagnostic methods as ultrasound (ultrasound), computed tomography (CT) and magnetic resonance imaging (MRI) have come to the aid of traditional X-ray examination of the knee joints. MRI is undoubtedly the most effective method of examining knee joints, providing almost all the diagnostic information. However, the low availability of magnetic resonance imaging and the high cost of the study itself do not allow us to consider MRI as the method of choice when searching for knee joint injuries. CT has also not found wide application in the study of knee joints, mainly for the same reasons as MRI. In addition, during CT there is a negative factor associated with radial load.

Modern ultrasound examination is becoming the most suitable method for rapid and publicly available diagnosis of pathological processes in the knee joint. Thanks to new highly informative ultrasound devices using all the achievements of modern computer technology, it has become possible to obtain even more accurate and subtle information about pathological changes in the joint than with MRI. It should be emphasized that today's successes of the ultrasound method in traumatology are largely due to the introduction of new computer technologies that have marked the last few years. There was a so-called new computer ultrasound diagnostics based on the use of high-frequency, broadband and high-density sensors that provided high-resolution images of ligaments, tendons, menisci. With the help of Doppler research techniques, such as energy color mapping, three-dimensional and panoramic reconstruction, it became possible to assess the nature of the vascular reaction in the zone of changes, to monitor treatment. There is a new increased interest in the use of ultrasound in the diagnosis of diseases and injuries of the knee joint.

The aim of our research was to improve ultrasound diagnostics in diseases of the knee joint and to increase the informative value of the ultrasound method through the integrated application of new ultrasound technologies based on modern computer achievements.

The proposed comprehensive approach to the use of new ultrasound technologies in the study of the knee joint can provide an accurate and rapid assessment of pathological changes in it. The use of new techniques: tissue harmonics, as well as the use of panoramic scanning - in our opinion, allows us to accurately assess the smallest changes in the structure of the meniscus, as well as to determine the exact localization of damage to the tendon-ligamentous apparatus.

The use of ultrasound color angiography using energy mapping and three-dimensional reconstruction of blood vessels, as our studies have shown, allows us to determine and assess the presence of inflammatory

vessels" at various stages of treatment of patients.

The diagnostic algorithm proposed by us makes it possible to optimize the examination process of patients with injuries and diseases of the knee joint, which helps to determine the further tactics of patient management, conduct dynamic monitoring, and in some cases avoid ionizing, invasive and expensive studies. During the study, we came to the conclusion:

The ultrasound method in the complex radiation examination of patients with knee joint injuries is characterized as a highly informative, non-invasive, simple and available diagnostic method and should be used at the first stage of instrumental research methods.

The sensitivity of the ultrasound method when using the technique of conventional scanning in B-mode for meniscal injuries is 82%, specificity is 83%, positive predictive value is 86%, negative predictive value is 78%, diagnostic accuracy is 82%. The addition of a tissue harmonic technique during In-mode scanning increases sensitivity to 86%, specificity to 89%, positive predictive value to 90%, negative predictive value to 83%. The use of three-dimensional images using ultrasound angiography technique increases sensitivity up to 90%, specificity up to 89%, positive predictive value up to 90%, negative predictive value up to 88%.

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