

THE POSSIBILITIES OF ULTRASOUND IMAGING IN THE DIAGNOSIS OF ACUTE IDIOPATHIC SCROTAL EDEMA IN CHILDREN

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Abstract

Despite many years of experience in the use of ultrasound in the diagnosis of acute testicular ischemia (AISE) in children, the full potential of this technique remains insufficiently studied. As part of a prospective controlled study involving 142 patients with emergency genital disorders, ultrasound was performed for Acute idiopathic scrotal edema. Ultrasound showed differences in the image of the scrotum organs in boys with AISE, depending on the duration of the disease. When using color Dopplerography, changes in perfusion were detected, such as the absence or decrease in blood flow. The localization of the inflammatory process was determined solely by the results of ultrasound of the scrotum organs. The results obtained suggest that with a decrease in blood flow in the testicles with a more pronounced degree or with a longer period of torsion, pronounced changes on the part of the scrotum were observed.

Keywords Acute idiopathic scrotal edema, children, clinic, ultrasound, Doppler, diagnosis.

INTRODUCTION

Acute idiopathic scrotal edema (AISE) is the most urgent situation in pediatric andrology. The high sensitivity of testicular tissue to hypoxia causes the urgency of providing care. AISE is characterized by disruption or cessation of testicular blood flow, which leads to the death of spermatogenic tissue

within a few hours. The complexity of the clinical picture is blurred, which emphasizes the need for accurate instrumental diagnosis and emergency treatment. Despite active research in the field of optimizing diagnosis and treatment, the incidence of orchiectomies remains high (32-41%).

The main and almost the only method of AISE radiation imaging is ultrasound (ultrasound). In recent years, ultrasound has demonstrated high diagnostic informativeness: sensitivity ranges from 85 to 100%, and specificity from 75 to 100%, however, the method strongly depends on the operator. Despite many years of experience in using Doppler ultrasound to assess testicular blood flow in children with AISE, the full potential of this technique remains insufficiently explored. For example, criteria for assessing the severity of testicular blood flow disorders in testicular torsion are little known, as well as details of the echographic picture of various "whirlpool-sign" variants depending on the intensity of the torsion.

METHODS

A prospective controlled study was conducted in which 142 patients with emergency genital disorders were hospitalized in the department of surgery and combined childhood trauma of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care in the period from 2020 to 2021.

All children with Acute idiopathic scrotal edema underwent ultrasound examination (ultrasound) with Dopplerography on expert-grade ultrasound devices TOSHIBA XARIO 200 and CANON APLIO 300 using a 3-10 MHz convex sensor, a 4-16 MHz linear sensor and a 1-8 MHz volumetric sensor.

The study included measuring the size of the testicles and appendages, evaluating their echographic structure, checking for effusion, as well as evaluating the vascular pattern in the testicles, appendages, membranes and elements of the spermatic cord. The scrotal organs were scanned in B-mode to determine the size (length, width, thickness), shape, echogenicity and uniformity of the structure of the testicle and appendage.

Color Dopplerography (CDC) was used to assess the degree of testicular vascularization by the number of vascular signals, testicular vessels (arteries and veins) in the projection of the spermatic cord and near the appendage, as well as parenchymal blood flow in the projection of

testicular tissue.

To study the viability of the testicle using color Doppler mapping, the indicators of linear arterial and venous blood flow rates in the intraorgan vessels of the testicle were analyzed.

Purpose of the research

Based on the analysis of the results of the clinical and instrumental examination, to determine the possibilities of ultrasound in the diagnosis of AISE in children.

RESULTS

Ultrasound signs of an increase in the appendage of the testicle by more than 20% compared with the intact one were found in 88% of boys with a twist of the Morgagni hydatid.

In 8 patients with uncomplicated course, who were admitted in the early hours from the onset of the disease, symmetrical testicular membranes without thickening, preservation of normal sizes and contours of the testicular echostructure, a slight increase in the linear dimensions of the appendage head and some increased blood flow in its parenchyma were observed.

In 21 patients with a complicated course, accumulation of free fluid in the testicular membranes, their thickening on the affected side compared with the contralateral side, an increase in the linear size of the appendage head, and heterogeneity of the echostructure were revealed.

Ultrasound examination revealed a diffuse increase in the twisted testicle in 29 patients (70.7%), as well as an increase in the size of the testicle and epididymis in all patients with testicular torsion. 41 boys with acute torsion had a peculiar ultrasound pattern of testicular inversion, characterized by a diffuse increase in the affected testicle and its appendage.

Color Dopplerography revealed the absence of an intratesticular vascular pattern in testicular torsion in 90% of cases. Accumulation of free fluid in the scrotum was visualized in 35 boys with testicular torsion (85.4%).

All patients with testicular torsion had a

heterogeneous parenchymal structure, and 75.6% of children with testicular torsion had a "whirlpool sign" sign - spiral twisting of the spermatic cord.

Gross heterogeneity of the parenchyma became

noticeable 12-24 hours after the moment of torsion, and heterogeneous echogenicity was more common in patients with testicular torsion (100%) than in those who did not have torsion.

Table

The distribution of patients depending on the localization of acute inflammation in the organs of the scrotum

Diagnosis	Patients number	%
Epididymitis	9	40,9
Orchoepididymite	11	50
Orchit	2	9,1
Total	22	100

It became clear from the results of the study that 40.9% of boys suffering from inflammatory diseases of the scrotum had epididymitis. This condition is characterized by inflammation of the epididymis, which can lead to soreness and swelling of the scrotum. Half of the cases (50%) turned out to be orchiepididymitis, which means inflammation of both the testicle and epididymis. However, only 9.1% of patients had isolated testicular inflammation without epididymis involvement.

Of the patients with epididymoorchitis (inflammation of the testicle and epididymis), 21 people had characteristic signs on ultrasound examination. These signs included an increase in the size of the appendage, heterogeneity of its structure, an increase in the size of the testicle and heterogeneity of its parenchyma.

In epididymitis, 40.9% of patients showed an increase in the size of the head of the appendage and heterogeneity of its structure. In some cases (11.4%), inflammatory changes were observed only in the testicle, characterized by a heterogeneous parenchymal structure and increased blood flow.

The signs of testicular rupture revealed by ultrasound examination included uneven and indistinct contours of the testicle, as well as the

presence of fluid accumulation in its cavity (hematocele).

From the data obtained, it follows that ultrasound is an important method for diagnosing inflammatory diseases of the scrotum, allowing to identify changes in the structure and size of the testicle and appendage.

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