

Ultrasound Diagnosis of Kidney Damage in Type 1 Diabetes Mellitus

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Abstract. This article highlights the work on ultrasound diagnostics of kidney damage in type 1 diabetes mellitus.

Key words: ultrasound, diabetes mellitus, echogenicity.

At the present stage of development of endocrinology, the problem of vascular damage in diabetes mellitus type 1 (DM 1) remains open. Interest in this pathology is determined by the high prevalence of diabetes I and the incidence of severe microvascular complications (Kasatkina E.P., 1999; Dedov I.I. and Shestakova MB., 2000;

Candido R., 2002; Cooper M.E. et al., 1998; Feener E.P. and King Gl., 1997). According to Kasatkina E.P. (1999), the prevalence of chronic diabetic complications in children under 15 years of age is extremely high and is 40.5%, and in adolescents 15-18 years old, the frequency of late complications is 85.7%.

Changes in the arterial bed in type 1 diabetes are systemic, all vital organs are involved in the pathological process, and violations prevail at the level of microcirculation. Diagnosis of hemodynamic disorders in the early stages and the timely appointment of adequate therapy can suspend, and in some cases reverse the pathological process that has begun. In the literature there is a large number of works on epidemiology, clinical course, therapy of chronic diabetic complications in adult patients (Dedov I.I., 1997; Dobronravov V.A. 1998; Kryukova N.Yu. et al., 2002; Kuntsevich G.I., 1999; Shestakova M.V., 1995; Trevisan R. et al., 1998; Warram J.H. et al., 1996). Much less attention is paid to these issues in childhood and adolescence.

It has been established that long before the clinical manifestations of microangiopathies, patients already have morphological tissue changes associated with long-existing hyperglycemia and biochemical and hemodynamic disorders mediated by it. This leads to the early development of such severe microvascular complications as diabetic nephropathy (DN), diabetic retinopathy (DR). The mechanism of the damaging effect of hyperglycemia on the structural components of the kidneys is primarily associated with disorders of renal hemodynamics, namely, with the development of hyperfiltration, intraglomerular hypertension (Viberti G.C., et al., 1997).

To evaluate renal hemodynamics in children and adolescents allows the method of ultrasound Dopplerography. It is known that ultrasonic signs of impaired renal blood flow are not specific for a certain type of pathology. Similar changes occur in various forms of glomerulonephritis, capillary toxicosis, infectious toxicosis and some other diseases. With pulsed Dopplerometry (IDM), the characteristics of renal blood flow along the large trunks of the renal artery up to the interlobular vessels change slightly and have no diagnostic value. There is a disappearance of "harmony" in terms of peripheral resistance, when resistance indices have different values at the level of the trunk of arteries, segmental branches, but rarely go beyond the norm. Absolute values of the speed of arterial blood flow vary slightly, and they cannot be used in the diagnostic process. The most noticeable changes in blood flow occur at the level of the interlobular and arc arteries, which is expressed in a sharp drop in vascular resistance (Gurevich A.I., 2002; Korostyleva E.A., 2002; Olkhova E.B., 2001; Skokov Yu.M., 1999; Pykov M.I., 1999). The value of the ultrasound method of studying renal hemodynamics is not diagnosing the nosological form - hollowex scan non-invasively represents physiological information about the renal status, reflecting the state of vascular resistance, which cannot be obtained using conventional laboratory research methods. When monitoring intrarenal blood flow, a rare opportunity is provided to detect further deepening or regression of previously noted violations (Kuntsevich G.I., 1998).

As a result of the studies, for the first time in children, adolescents and young postpubertal patients with type 1 diabetes, Dopplerographic changes were determined, the severity of which depends on the presence of diabetic microangiopathies (DMA) and the duration of the disease.

Thus, there was an improvement in the functional state of renal hemodynamics against the background of continuous renoprotective therapy, despite the absence of a significant change in the average level of UIA, which puts this method among the necessary studies for a comprehensive assessment of the functional state of the glomerular apparatus of the kidneys in patients with DN.

The study demonstrated the role of pulsed dopplerometry echography in the early diagnosis of DN, the identification of the staging of the process and the assessment of its severity in children and adolescents with type 1 diabetes. The method allows to identify prognostically unfavorable Doppler-ray criteria for kidney damage in diabetes 1 at various stages of the disease. In our opinion, the need to identify children and adolescents with diabetes 1 at the preclinical stage of the disease and the organization of dispensary observation with mandatory ultrasound with dopplerography of the vessels of the kidneys in this category of patients is justified. It is indisputable that the earlier vascular complications are detected, the easier it is to stop their progression, and possibly subject them to reverse development. The presented data allow us to recommend the study of Dopplerometric indicators of renal hemodynamics to confirm the presence of diabetic microangiopathy at an early preclinical stage of the process and assess the prognosis of its further development.

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