

Features of the morphometric parameters of the light-refracting parts of the eye in children of the second period of childhood with diabetes mellitus.

G.R. Odilova, Ikromova S. B.

Bukhara Medical Institute, Department of Ophthalmology

Annotation

Diabetes mellitus (DM) type 1 is the most common endocrine pathology in children. Acute complications, severe chronic complications, premature death at a young age place diabetes mellitus on a par with the most important medical problems and require close attention of health authorities. (5) Purpose: to study the features of the morphometric parameters of the light-refracting parts of the eye of children of the second period of childhood with diabetes mellitus. Materials and methods: Data from a survey of the morphometric parameters of the light-refracting parts of the eye in children with diabetes mellitus were analyzed: 100 children from 7 to 18 years old, for the period from 2019-2022, and 60 children with diabetes mellitus and 40 healthy children (comparison group) were also examined. age and gender. Conclusions: Regardless of the severity of the disease, reactive-dystrophic pathological changes in these eye parameters were identified as a result of diabetes mellitus.

Key words: *diabetes mellitus, oct, pachymetry, echobiometry.*

Relevance

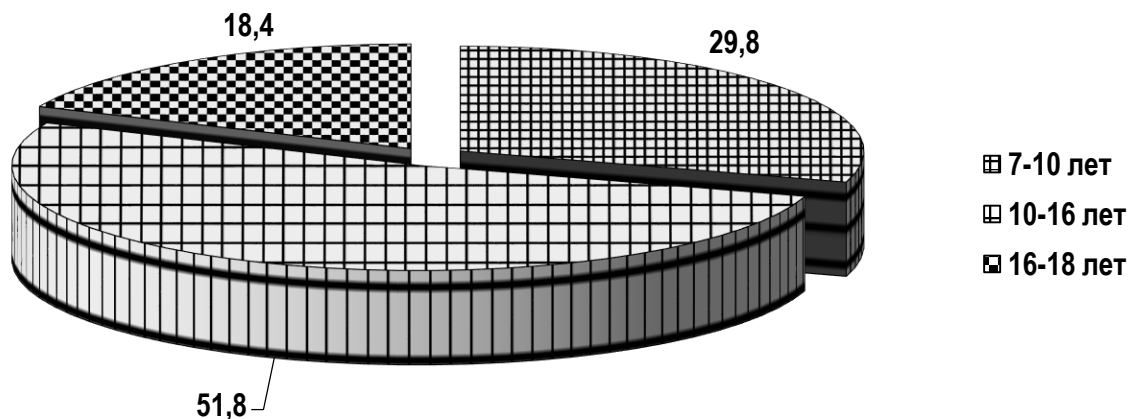
Diabetes mellitus (DM) is one of the most common chronic diseases in the world, recognized as the most important medical and social problem of our time. According to the International Diabetes Federation (IDF), the number of people with diabetes increased to 463 million in 2019, up from 108 million in 1980 (10). According to forecasts from the same IDF, by 2045 the number of patients with diabetes may increase to 630 million. It is assumed that among the causes of death worldwide, diabetes will take 7th place (9). Diabetes mellitus (DM) type 1 is the most common endocrine pathology in children. Acute complications, severe chronic complications, and premature death at a young age place diabetes mellitus among the most important medical problems and require close attention from health authorities.(7)

The complex of ophthalmological studies was supplemented with optical coherence tomography (OCT). Time-domain OCT devices, which operate in the near-infrared range, allow non-invasive, real-time diagnosis of changes in the anatomy of the posterior segment of the eye. With a resolution of 1-10 microns, images of the optic disc (ONH), peripapillary retinal nerve fiber layer (PRNL), and macular region can be imaged.(10)

Target: learn about Features of the morphometric parameters of the light-refracting parts of the eye of children of the second period of childhood with diabetes mellitus.

Materials and methods:

Survey data analyzed morphometric parameters of the light-refracting parts of the eye in children with diabetes mellitus 100 children from 7 to 18 years old, for the period from 2019-2022, and 60 children with diabetes mellitus and 40 healthy children (comparison group) of similar age and gender were examined. All children underwent a comprehensive examination, including ophthalmological, clinical laboratory, echobiometry, optical coherence tomography, ophthalmoscopy, biomicroscopic and other studies.



Rice. 2.1. Distribution of children by age and health status

- 1 - subgroup – 49 (29.8%) children aged 7 to 10 years;
- 2 - subgroup – 86 (51.8%) children aged 10 to 16 years;
- 3 - subgroup - 31 (18.4%) children aged 16 to 18 years.

Table 1.

Distribution of healthy children and children with diabetes mellitus, taking into account age and gender

Floor		Children's age						Total	
		From 7 to 10 years		From 10 to 16		From 16 to 18			
		Abs	%	Abs	%	abs	%	Abs	%
Children with diabetes and myopia	Boys	25	15.0	38	22.8	28	16.8	91	54.8
	Girls	23	13.9	35	21.0	17	10.2	75	45.2
Healthy children	Boys	5	12.5	8	20	8	20	21	52.5
	Girls	5	12.5	7	17.5	7	17.5	19	47.5

It is noteworthy that in all age groups studied, depending on gender, the number of boys prevails out of the total number of children, mainly aged 16-18 years. This pattern is difficult to explain; apparently, the reason lies in the biological sexual characteristics of the child’s body that are still unclear to us.

Results: The study showed that in boys of the second period of childhood (7-10 years old) with diabetes mellitus, the length of the vitreous body varied in the right eye from 14.9 to 16.4 mm, on average 15.6, in the left eye from 14.78 to 16, 5 mm on average 15.6 mm.

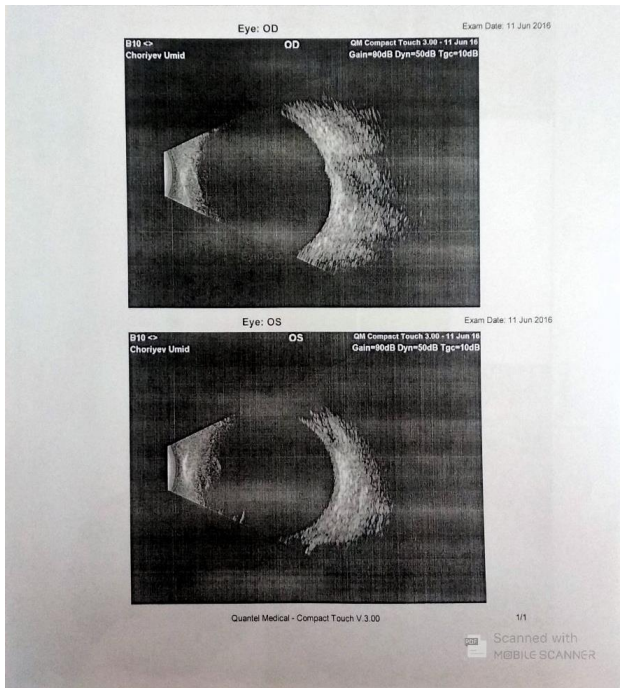


Fig. 1 Morphometric parameters of the vitreous body. Patient C.U. 10 years old, diagnosed with type 1 diabetes.

The distance of the anterior chamber in this group of boys in the right eye ranges from 2.38 to 3.75 with an average of 3.20, and in the left eye from 2.64 to 3.75 with an average of 3.26 mm. The thickness of the lens in this group of boys is in the right eye ranging from 3.31 to 4.47 mm, on average 3.73, in the left eye from 3.28 to 4.59 mm, on average 3.78. The anterior-posterior axis of the eyeball in boys of this group ranges from 21.42 to 23.0 mm in the right eye, on average 22.60 mm, in the left eye from 21.71 to 23.3 mm, on average 22.61 mm .

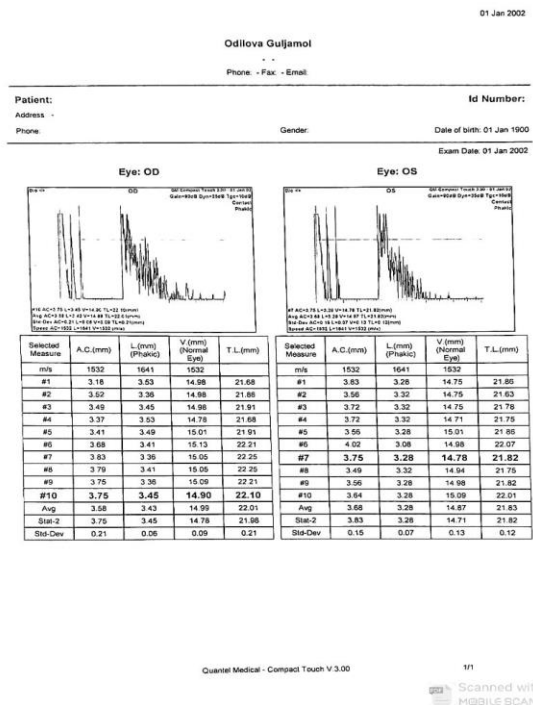


Fig 2 Morphometric parameters: distance of the anterior chamber, length of the lens, vitreous body and eyeball. Patient C.U. 10 years old, diagnosed with type 1 diabetes.

The study also showed that in boys of this group, the thickness of the cornea in the right eye ranges from 536.8 to 636.7 μm , the radius of the cornea from 8.00 to 8.14 mm, on average 8.07, in the left eye from 555.42 to 529, 29 microns, corneal radius 7.81 to 8.56 mm, average 8.1 mm.

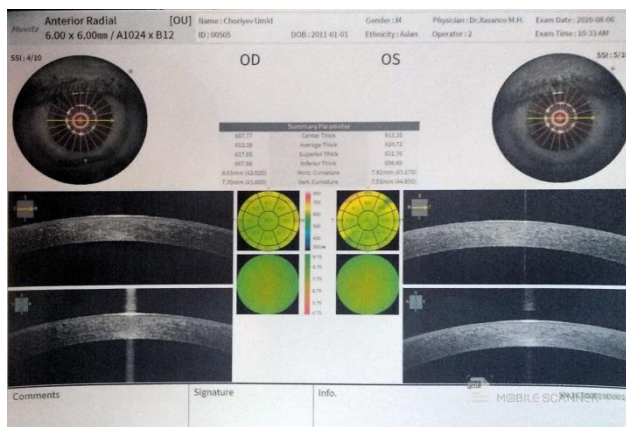


Fig 3
Morphometric parameters of corneal thickness. Patient C.U. 10 years old, diagnosed with type 1 diabetes.

In girls of the second period of childhood (7-10 years old) with diabetes mellitus, the study showed that the length of the vitreous body varied in the right eye from 16.43 to 18.31 mm, on average 17.2 mm, in the left eye from 16.51 to 18.42 mm, average 17.33 mm.

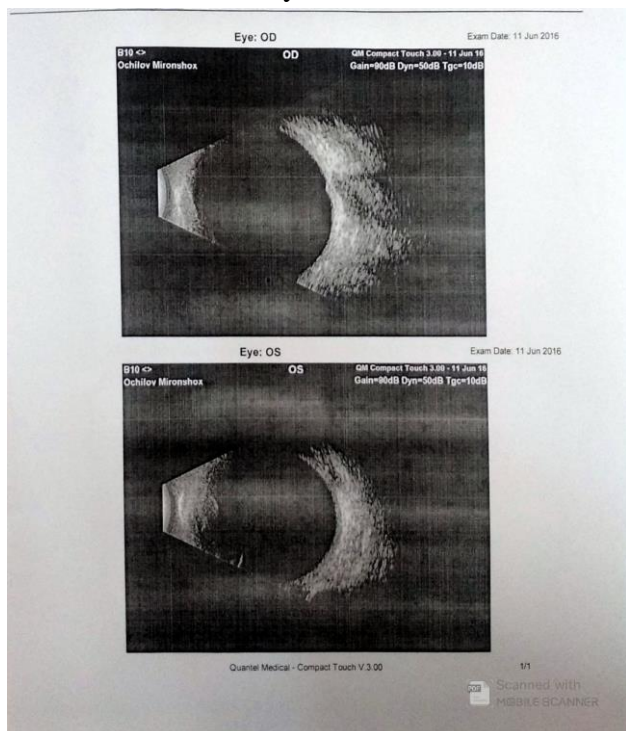
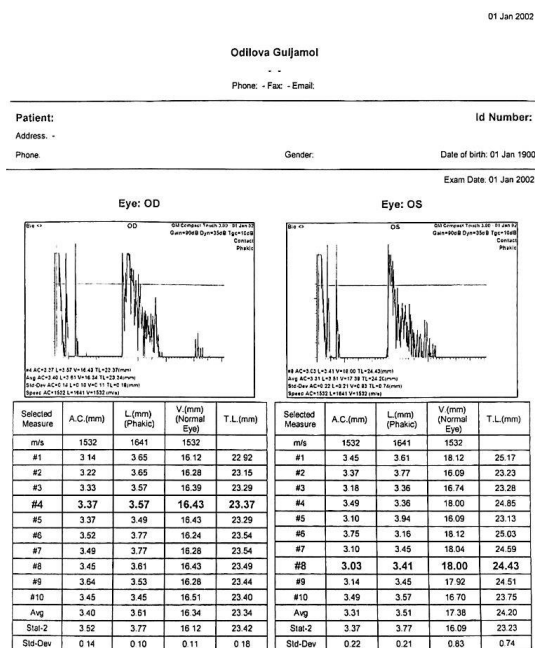


Fig. 7 Morphometric parameters of the vitreous body. Patient O.M., 8 years old, diagnosed with type 1 diabetes mellitus.

The distance of the anterior chamber in this group of girls in the right eye ranges from 3.37 to 4.32 mm, with an average of 3.83 mm, and in the left eye from 3.03 to 4.26 mm, with an average of 3.73 mm. The thickness of the lens in this group of girls is in the right eye ranging from 3.62 to 4.45 mm, on average 3.85 mm, and in the left eye from 3.45 to 4.62 mm, on average 3.88 mm.

The anterior-posterior axis of the eyeball in girls of this group ranges from 24.37 to 26.02 mm in the right eye, with an average of 24.8 mm, and in the left eye from 24.03 to 26.32 mm, with an average of 25 mm.



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Fig 8
Morphometric parameters: distance of the anterior chamber, length of the lens, vitreous body and eyeball. Patient O.M., 8 years old, diagnosed with type 1 diabetes mellitus.

The study also showed that in girls of this group, the thickness of the cornea on the right eye ranges from 548.65 to 618.43 microns, the radius of the cornea from 7.73 to 8.31 mm, on average 598.2 mm, and on the left eye from 541.56 to 620.72 microns, corneal radius 8.11 to 8.94 mm, average 8.5 mm.

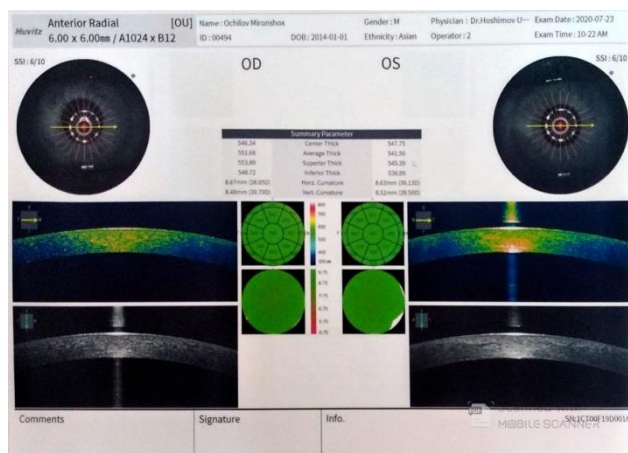


Fig 9
Morphometric parameters of corneal thickness. Patient O.M., 8 years old, diagnosed with type 1 diabetes mellitus.

Conclusions: Thus, determination of morphometric parameters of the light-refracting parts of the eye in children with diabetes mellitus. Indeed, regardless of the severity of the disease, reactive-dystrophic pathological changes in these eye parameters have been identified as a result of diabetes mellitus. These identified morphological changes help identify and diagnose pathological changes in the light-refracting parts of the eye.

Literature:

1. Avetisov S.E., Novikov I.A., Makhotin S.S., Surnina Z.V. A new principle of morphometric study of corneal nerve fibers based on confocal biomicroscopy in diabetes mellitus. // *Bulletin of ophthalmology*. – 2015 – No. 4. – P.5-14.
2. Avetisov S. E. Comprehensive morphological assessment of the anterior capsule of the lens in capsular contraction syndrome (clinical observation): // *Bulletin of Ophthalmology*. - M., 2018. - Volume 134 No. 3. - pp. 57-64.
3. Avetisov S. E. Bioinorganic chemical composition of the lens and methods of its study: review: // *Bulletin of Ophthalmology*. - M., 2018. - Volume 134. No. 2. - pp. 78-84.
4. Avetisov S.E., Egorova G.B., Kobzeva M.V., et al. Clinical significance of modern methods for studying the cornea. // *Bulletin of ophthalmology*. – 2013 – No. 5. – P.22-31.
5. Avetisov E.S., Kovalevsky E.I., Khvatova A.V. Guide to pediatric ophthalmology. - M.: Medicine, 1987. - 296 p.
6. Azova E.A. Complications of type 1 diabetes mellitus in children and adolescents: regional monitoring, optimization of medical care // *International Journal of Endocrinology*. 2019. - No. 4.- S. 24-28.
7. Akimov P. A., Terekhina N. A. Biochemical analysis of the vitreous body of the eye in the differential diagnosis of coma in diabetes mellitus // *Clinical laboratory diagnostics*. - M., 2014. - Volume 59 No. 9. - P. 119.
8. Alyabyeva Zh. Yu., Matveev M. Yu., Evgrafov V. Yu., Domogatsky S. P. Pharmacokinetics of recombinant prourokinase // *Vestn. ophthalmol.* — 2018. No. 1. - P. 38-41.
9. Antipkin Yu.G., Lapshin V.F., Umanets T.R. Type 1 diabetes mellitus in children: controversial issues. // *Health of Ukraine*, June, 2008, No. 18/1, -P.19-21.
10. Artemova E.V., Galstyan G.R., Atarshchikov D.S., et al. Confocal microscopy of the cornea is a new non-invasive method for diagnosing the initial manifestations of damage to the peripheral nervous system in diabetes mellitus. // *Problems of endocrinology*. – 2015 – T. 61. – No. 2 – P.32-38.