Iridocorneal Endothelial Syndrome: Case Report of Essential Progressive Iris Atrophy

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ABSTRACT

Background: Iridocorneal endothelial (ICE) syndrome is a group of ophthalmic disorders, first reported by Eagle and Yanoff in 1979, a disease characterized by abnormalities of the iris and the corneal endothelium, and mainly occurs unilaterally in young and middle-aged women, with no family history. ICE syndrome comprises a spectrum of three clinical variants: Progressive essential iris atrophy (corectopia, iris atrophy or iris hole), Chandler syndrome (corneal oedema with mild to absent iris change), and Cogan - Reese syndrome (nodular pigmented lesion of the iris). Objective: We are presenting this case because of its rarity, diagnostic intricacy and therapeutic challenge. Case report: We report in this study a case of Essential Progressive Iris Atrophy, an Iridocorneal Endothelial Syndrome variant in a 40 years old patient, female, complaining about the shape of the pupil in the left eye, as well as photophobia in the same side. In the first evaluation, we observed visual acuity of 1.0 in both eyes. Intraocular pressure was 14 mm Hg in the right eye and 12 mm Hg in the left eye. On the biomicroscope, we had a proper right eye finding, on the left eye Iris atrophy with deformity in the direction from 12 to 6 hours. We performed gonioscopy, an ultra sound (UBM), spectral microscopy, pachymetry, OCT and Octopus perimetry. Conclusion: We confirmed the diagnosis of essential iris atrophy based on the clinical findings, and in abnormalities in complementary exams. Nowadays, the patient is being followed in the Ophthalmology department at JZU Brcko District Bosnia and Herzegovina.

Keywords: Iridocorneal endothelial syndrome, Corneal diseases, Endothelial corneal, Glaucoma.

1. BACKGROUND

Iridocorneal endothelial (ICE) syndrome is a group of ophthalmic disorders, first reported by Eagle and Yanoff in 1979, a disease characterized by abnormalities of the iris and the corneal endothelium, and mainly occurs unilaterally in young and middle-aged women (1), with no family history (2). ICE syndrome comprises a spectrum of three clinical variants: Progressive essential iris atrophy (corectopia, iris atrophy or iris hole), Chandler syndrome (corneal oedema with mild to absent iris change), and Cogan - Reese syndrome (nodular pigmented lesion of the iris).

The etiology of ICE syndrome is not clear, and there is still no effective treatment for halting this disease. A recent hypothesis indicates Herpes Simplex Virus (HSV) infection as responsible for initiating ICE syndrome by the integration of viral genetic material into the human genome (3). According to this theory, HSV infection is capable of changing the activity and morphology of endothelial cells, allowing them to mitoses with abnormal proliferation (3). Specular microscopy studies (4) and scanning electron microscopy (5) showed that the abnormal endothelial cells of ICE patients acquire an epithelial like phenotype with the presence of desmosomes, filopodia and microvilli.

The pathological elements observed in the endothelium are the most important clinical findings seen in ICE syndrome, namely “the ICE cell” which is pathognomonic. These cells are abnormally large and show increased pleomorphism (6). Desmosomes, tonofilaments and numerous microvilli (100 versus 10 in a normal endothelial cell) (7). Immunohistochemistry studies revealed the presence of vimentin and cytokeratin, typical of epithelial cells (8). The abnormal endothelial cells may migrate posteriorly, forming a membrane that covers the adjacent structures, iris and trabecular meshwork (9). The contraction of this membrane leads to characteristic iris changes, iri-
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dotrabecular synechiae, corectopia with the pupil being drawn towards the area where the synechiae are most prevalent and to secondary angle-closure glaucoma (6). Glaucoma may appear in the absence of synechiae, due to membrane migration phenomenon that can functionally close the angle, but still allow for an open angle on gonioscopy (2). The degree of angle closure is not associated with the IOP level (10).

Even though associated with distinctive clinical features more than half of the cases are originally misdiagnosed (11).

2. OBJECTIVE

We are presenting this case because of its rarity, diagnostic intricacy and therapeutic challenge.

3. CASE REPORT

A female patient 40 years old came to our clinic, complaining that she noticed a change in the shape of the pupil in the left eye without other ophthalmic disorders. She is wearing glasses without other systemic diseases.

At the ophthalmologic examination we noted visual acuity in both eyes is 1.0 with correction. External examination was normal for both eyes. Intraocular pressures (IOP) by Goldmann applanation tonometry were 14.0 mm Hg OD and 11.0 mm Hg OS. On the biomicroscope a completely normal finding of the right eye is recorded, in the left eye the cornea is epithelialized, without edema, iris dystrophy stretched in the direction from 11:30 to 5:00 o’clock, lens in place. Both lenses were clear with a normal vitreous cavity. Fundus examination revealed healthy macula and vessels with an intact retina in both eyes.

On gonioscopy OD the angle was grade 3, with iris processes. The left angle had broad based peripheral anterior synechiae (PAS) from 6–6:30 o’clock. At the UBM right normal finding, on the left eye from 6–6:30 o’clock, we find iris root glued to the corneal endothelium so that the iris root cannot be separated from the hyperechogenic echo of the corneal endothelium. The structure of the iris is preserved, which is thickened here because it is folded, the echogenicity and homogeneity of the iris stroma are normal, dystrophic stroma is seen in front of the synechiae as an irregular iris defect. The structure of the ciliary body is completely orderly. The rest of the circumference is normal.

We concluded at UBM that there was no tumor alteration of the iris and ciliary body. Spectral microscopy of the right eye showed density 3211 cells / mm, on the left we could not get a shot even though the cornea had no changes as well as “Hammered silver”.

OCT of the anterior segment showed CCT corneal thickness of 608 µm in the right eye and 595 µm in the left eye, OCT of the posterior segment showed normal macular region values. The RNFL thickness of the right eye was 103µm, and of the left eye 104 µm, whereas C / D of the right eye was 0.54 and of the left 0.53. The visual field in the right eye was MD -0.27, PD 0.88, and in the left one -0.17, PD 2.54.

Based on these findings, we made the final diagnosis of Essential Progressive Iris Atrophy (ICE Syndrome) without secondary glaucoma.

A diagnosis was made based on the epidemiological data (unilateral symptoms in a young female with no family history), patient history, clinical examination (ocular symptoms with no systemic manifestations), and ancillary tests (specular microscopy being useful).

We discharged the patient without therapy with a recommendation for regular check-ups at 3-month intervals.

4. DISCUSSION

Iridocorneal Endothelial Syndrome (ICE SD) is a rare condition characterized by abnormalities in the corneal endothelium, iridocorneal angle obstruction and iris abnormalities. The exact etiology of ICE-S is uncertain with researchers implicating Herpes Simplex and Epstein Barr viruses. Role of a low-grade chronic inflammation has also been suggested in the pathogenesis. All subtypes show aberrations of the cornea, anterior chamber angle and iris. The term “primary proliferative endothelial degeneration” emphasizes the pathogenic origin. It seems that the endothelial cells undergo a metaplastic
transformation into “epithelial-like” cells that migrate in a membrane like form over the anterior chamber angle on to the iris (12). Clinical condition ICE SD is unilateral and progressive, usually diagnosed in women between the third and fifth decades of life, and occurs almost exclusively in Caucasians, in general patients seek ophthalmological care because they perceive predominantly morning visual haze due to corneal decompensation. They may also complain of constant decreased visual acuity and halos in vision due to glaucoma, or patients seek medical care when they see changes in the shape or position of the pupils (13).

Essential iris atrophy is characterized by atrophy and thinning of the iris stroma, causing holes throughout the iris thickness, as well as precocious formation of anterior synechia leading to pupillary distortions. In gonioscopy, anterior peripheral synechiae are present in varying degrees, which are responsible for angular closure, and consequently an increase in the IOP (intraocular pressure). Chandler’s Syndrome: in this variant, the iris changes are less pronounced, and what draws more attention to diagnosis is the corneal edema. When the diagnosis is delayed, iris abnormalities may be more pronounced and with iris holes, which generally do not permeate the entire iris thickness. Glaucoma can occur due to angle obstruction by peripheral synechiae. Cogan-Reese Syndrome: in the third variant of the syndrome, iris atrophy can be observed; however, the presence of iris nodules is more evident. In their early stages, they are thin and yellowish, and with the progression of the disease they become brownish and increase in size. In general, they are surrounded by iris stroma with fewer crypts and the appearance of entanglement (14).

Differential diagnosis: although it has a characteristic appearance, ICE SD should have as differential diagnosis any condition that presents corneal edema or unilateral glaucoma in young adults, such as, for example, posterior polymorphic dystrophy, Fuchs endothelial dystrophy, Axenfeld-Rieger syndrome, iris melanoma, and inflammatory iris nodules. Currently, the use of ultrasound biomicroscopy (UBM) may represent a useful means to detect anterior chamber angle changes, especially in the presence of corneal edema that does not allow visualization by gonioscopy (15).

The goal of the treatment is to prevent complications of the disease, such as corneal edema and glaucoma. Management of ICE-S should be dictated by the degree of corneal oedema and severity of secondary glaucoma. Antiglaucomatous medications are the first line of treatment; however, they can worsen the corneal edema. Agents decreasing aqueous production are more effective than those increasing outflow or miotics. Laser trabeculoplasty and iridotomy are ineffective for the same reason. It is important to note that although there is still controversy regarding the role of the Herpes Simplex virus in the pathogenesis of the syndrome, it is recommended not to use prostaglandin inhibitors to reduce IOP in these patients, since these drugs are related to recurrences of infections by the same. Filtration surgery is eventually required in most cases. Trabeculectomy finds more satisfactory results in patients...
with Chandler’s Syndrome. Bohiuk et al. presented a series with nine cases of Chandler’s syndrome, five of which underwent trabeculectomy, presenting good results despite the presence of glaucoma not controlled by medication (16). However, cornea may remain oedematous even at the lowest attainable IOP so filtering surgery cannot be recommended exclusively for resolving oedema. Hypertonic saline drops and soft contact lenses are helpful in mild oedema. Iris defects can be corrected by reconstruction with multipiece endocapsular prosthesis. If visually significant corneal oedema persists, then keratoplasty is indicated. Provided intraocular pressure remains controlled, the prognosis of keratoplasty is primarily good. One report states that all cases of penetrating keratoplasty for ICE-S have failed within 2 years (17).

A better surgical option is deep lamellar endothelial keratoplasty (DLEK). It provides patients rapid visual recuperation with minimal refractive changes. Replacement of the dysfunctional endothelium through descemet stripping with endothelial keratoplasty (DSEK) can successfully treat corneal oedema and associated visual loss. Progression in ICE-S is variable and unpredictable. A long-term follow-up is necessary because the disease itself is progressive in nature. Studies suggest follow-up at 2-3 months intervals when glaucoma is associated and depending on its severity. Serologic testing is also recommended (Epstein-Barr and Herpes Simplex viruses) (18).

5. CONCLUSION

We confirmed the diagnosis of essential iris atrophy based on the clinical findings, and in abnormalities in complementary exams. Nowadays, the patient is being followed in the Ophthalmology department at JZU Brcko District Bosnia and Herzegovina.

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