OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY AS A FOLLOW-UP METHOD IN A CHILD TREATED WITH AFLIBERCEPT DUE TO MYOPIC CHOROIDAL NEOVASCULAR MEMBRANE

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RESUME
Въведение: Оптичната кохерентна томография ангиография е метод за диагностика, базиран на технология, позволяваща получаване на образи с висока резолюция, чрез които ретиналната и хориоидалната циркулация се онагледяват, без инжектиране на контрастен агент. Този метод е полезен при случаи, когато искаме да избегнем прилагането на венозен контраст, но в същото време, има съдови изменения в макулата, които трябва да се анализират.

Цел: Да представим ОСТ-ангиография като метод за диагностика и проследяване на лечението при дете с миопична хороидална неоваскуларизация (мХНВ). Да обсъдим индикациите за интравитреално приложение на афлиберцепт при деца.

Материал и методи: Представяме клиничен случай на 13-годишно момиче с високостепенна миопия (-6.5 Dsph) и внезапна загуба на зрение поради формиране на миопична ХНВ. Клиничната диагноза беше потвърдена чрез ОСТ и ОСТ-ангиография. След писмено получаване на информирано съгласие от двамата родители, предприехме лечение с интравитреална апликация на афлиберцепт (Eylea). Инжектирането на медикамента беше повторено след 4 седмици поради наличие на ОСТА данни за активност на миопичната ХНВ.

Резултати: Използвахме ОСТ-ангиография като неинвазивен метод за диагностика на патологичните изменения в макулата. Методът демонстрира както обратно развитие на хороидалната мембрана, така и редукция в централната фовеална дебелина като резултат от проведеното лечение. Използването на ОСТ-ангиография като диагностика и проследяване на миопична ХНВ може да избегнем нежеланите странични реакции при ФА на деца и млади пациенти. Въпреки липсата на достатъчно литературни данни за лечение на деца с афлиберцепт, нашата мисъл е да използваме познанията си, за да осигурим на най-добрия възможен начин лечение на пациентите.
ABSTRACT

Introduction: Optical coherence tomography angiography (OCTA) is a diagnostic method, based on high resolution imaging technology by which the retinal and choroidal circulation is visualized without injection of a contrast agent. This method is useful in cases, we want to avoid intravenous injection, but pathological vascular changes in macula have to be analyzed.

Aim: The aim of this article is to present OCTA as a method of diagnostics and follow-up in the treatment of a child with myopic choroidal neovascular membrane (mCNVM). In addition to this we aim to discuss the indications for intravitreal application of aflibercept children.

Materials and Methods: We present a case report of a 13-year-old girl with high myopia (>6.0 DspH) and sudden decrease of visual acuity, due to formation of mCNVM. The clinical diagnosis was confirmed by OCT and OCTA. After obtaining a written informed consent from both parents of the child, we performed an intravitreal injection of aflibercept (Eylea). The injection was repeated in 4 weeks due to OCTA data for mCNV.

Results: We used OCTA as a noninvasive method for diagnostics of pathology changes in the macula. This method demonstrated both regression of the choroid membrane and reduction of central foveal thickness, as a result of the performed treatment. The medicine used was aflibercept (Eylea), which is the only officially registered drug in Bulgaria for treatment of mCNV. The initial visual acuity of our patient was 0.2. After the first injection it reached 0.8 and in the end recovered to 1.0, after the second application of aflibercept. Since then, for a follow-up period of 15 months, no recurrence of the disease has been observed.

Conclusion: OCTA is a noninvasive method suitable for repeated examinations of macular circulation, which can replace fluorescein angiography (FAG) in establishment of diagnosis mCNV in children. Thus we can avoid all side effects and risks of FAG in young patients. Although there is no sufficient clinical data for the use of aflibercept in children, our mission as physicians is to use our knowledge for best available treatment for all patients.

Keywords: OCTA, aflibercept cases with mCNV in children
CASE REPORT

We present a case of a 13-year-old girl with a sudden painless loss of vision in one eye. The child has high myopia -6.5 Dsph of both eyes. The visual acuity examined by us two days after the incident was as follows: visual acuity of right eye =0.05 with -6.5 Dsph =1.0; visual acuity of left eye =0.01 with -6.5 Dsph =0.2. Objectively, we found a fresh hemorrhage in the fundus of the left eye (Fig. 1).

Judging by the medical history and the laboratory tests, trauma and hematological disease were categorically rejected as a cause of retinal hemorrhage.

The anamnestic data obtained from the parents gave information about an allergy to an unclear agent, so we ignored the possibility of performing fluorescein angiography on a diagnostic basis.

The methods we relied on for diagnosis were indirect binocular ophthalmic biomicroscopy, optical coherence tomography (OCT), and OCTA. Our diagnosis was retinal hemorrhage due to the formation of myopic CNV (Fig. 2 and 3).

Fig. 2. OCT of the macula – edema and hyperreflective lesions over the retinal pigment epithelium

Fig. 3. OCTA of the macula – well defined neovascular membrane
After obtaining a written consent from both parents, we performed an intravitreal injection of aflibercept (Eylea), as the only one officially registered drug in Bulgaria for treatment of mCNV.

RESULTS

Four days after the incident and two days after the final diagnosis: myopic choroidal neovascularization with retinal hemorrhage, we performed an intravitreal injection of 2 mg aflibercept (Eylea). The initial visual acuity of our patient was 0.2. At the 3-week follow-up, visual acuity had already reached 0.8 with the optic correction of the patient (-6.5 DspH). In addition to examining visual acuity, we performed OCT and OCTA (Fig. 4 and 5) as non-invasive methods for objective follow-up of the disease. Both examinations demonstrated a reduction in central foveal thickness in comparison to baseline and partial regression of the choroidal neovascular membrane.

Fig. 4. OCT – reduction of the macular edema

Fig. 5. OCTA – constriction of the neovascular membrane

Due to the persistence of mCNV, despite reduced area and improved vision, we decided to perform a second application of aflibercept. Four weeks after the first injection, we performed a second dose of the drug intravitreally in the affected eye. Three weeks later, we examined the visual acuity again and performed OCT and OCTA. The best corrected visual acuity with -6.5 DspH of the patient was completely restored to 1.0.

On OCT the macular surface profile was similar to that of the healthy eye, with typical foveal depression, but slight paracentral elevation was still observed at the retinal pigment epithelium (RPE) level (Fig. 6). OCT-angiography data did not show an active choroidal membrane (Fig. 7), which was treated and visualized in OCT-angiography before the treatment and at week 3 after the first injection of aflibercept. This objective finding helped us to make a decision to stop the therapy. For a 15-month follow-up, no recurrence of the disease has been observed and the patient’s visual acuity remained unchanged.
DISCUSSION

Excessive degenerative myopia often includes: chorioretinal atrophy, ruptures of Bruch’s membrane, mCNV, posterior staphyloma, myopic foveoschisis and macular hole (6,7). Some of these changes are progressive and irreversible, but there are those that respond well to medical or surgical treatment. An example of this is mCNV.

The product aflibercept (Eylea), which is officially registered in Bulgaria, has several indications of application. According to its characteristics, mCNV is one of the indications.

The recommended dose of Eylea in this particular disease is a single intravitreal injection of 2 mg of aflibercept, equivalent to 50 microliters. Additional doses can be applied if the visual and/or anatomical results indicate that the disease persists. Recurrent events should be considered as a new disease manifestation. The schedule for observation is determined by the attending physician. The interval between two doses should not be less than one month (8).

Due to understandable reasons there are no wide clinical trials for the use of Eylea in children. The assessment of the treatment with this medical product is a responsibility only of the attending physician, based on his clinical experience (9). In 2014, the European Medical Agency (EMA) gave its opinion on an Eylea study in children with mCNV (10).

As far as OCTA is concerned, it is a non-invasive method that can be repeated many times without having any side effects in regards to the child’s organism. With good patient collaboration, the study can be performed even without dilatation of the pupils (2).

Repeated OCTAs, in the follow-up of mCNV, give us an accurate idea of the therapeutic effect of the treatment being conducted, and are also an objective method for determination of the number of injections of an intravitreal medication needed.

OCTA is a valuable method of assessing activity of pathological choroidal membranes (11). Thanks to the objective results, we could increase the number of injections over the recommended in the product brochure. An example of this is our clinical case in which we...
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da има станични ефекти върху детския организъм. При добра колаборация от страна на пациента, изследването може да се извърши дори без разширение на зениците (11).

Многократно провежданите OCT-ангиографии, при проследяването на миопична хороидална невааксуляризация, ни дават точна представа за терапевтичния ефект на провежданото лечение, а освен това са обективен метод за оценка по отношение определение броя на необходимите инжекции с интравитреален медикамент.

ОСТ-ангиографията е ценен метод за оценка на активността на патологични хороидални мембрани (12). Благодарение на обективните резултати бихме могли да модифицираме броя на приложените инжекции над препоръчаните в кратката характеристика на продукта. Пример за това е нашият клиничен случай, при който постигнахме пълно обратно развитие на патологичния процес и стабилизиране на функционалното и анатомично състояние на макулата при лекуваната пациентка.

ЗАКЛЮЧЕНИЕ

ОСТ-ангиографията е неинвазивен метод на изследване, който може напълно да измести класическата флуоресценцова ангиография (FA) при диагностика и проследяване на пациенти с миопична ХНВ. Този метод ни дава възможност да избягаме нежеланите странични реакции при FA на деца и алергични пациенти.

Въпреки липсата на достатъчно литературни данни за лечение на деца с афлуберцепт, нашата мисъл е да използваме пълно обратно развитие на патологичния процес и стабилизиране на функционалното и анатомично състояние на макулата при лекуваната пациентка.

В представения клиничен случай не наблюдавахме няколко нежелани реакции при intravitrealно приложение на Eylea.

CONCLUSION

OCTA is a non-invasive method of examination that can completely replace classical fluorescein angiography (FA) in the diagnosis and follow-up of patients with myopic CNV. This method enables us to avoid the undesirable side effects during FA in children and allergic patients.

Despite the lack of sufficient literature about the treatment of children with aflibercept, our mission as physicians is to use our knowledge to provide the best possible treatment for patients.

In the reported clinical case, we did not notice any adverse reactions associated with the intravitreal administration of Eylea.

REFERENCES