Case report

Miliary microemboli of the retinal arterioles and choriocapillaris after subcutaneous injection of triamcinolone acetonide

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Abstract

Purpose: To report a case of triamcinolone crystals associated miliary microemboli of the retinal arterioles and choriocapillaris.

Methods: A 30-year-old woman with alopecia areata on her left auriculotemporal scalp, scheduled for 10 mg/ml triamcinolone acetonide steroid injections (maximum volume of 3 ml per session) for 1 month intervals, presented with a sudden decrease in vision in her left eye after 1 ml injection in a dermatology clinic.

Results: On ocular examination her best corrected visual acuity (BCVA) was hand movement in the left eye. Retinal examination showed multiple white-yellow steroid emboli in the superior and inferior temporal branch retinal arterioles which involves macula. Also there were diffuse yellow infiltrates in the choroid consistent with choroidal microemboli. Fluorescein angiography and optical coherence tomography images were suggestive for the retinal and choroidal ischemia.

Conclusion: Subcutaneous triamcinolon injection may cause embolic occlusion of retinal and choroidal capillaries.

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Keywords: Choroidal triamcinolone crystals; Embolism; Retinal artery occlusion; Subcutaneous steroid injection

Introduction

Subcutaneous or intralesional therapeutic injection of triamcinolone acetonide in the facial region is a treatment alternative for various disorders including alopecia areata.1–3 Although the injections are commonly performed reliably with different indications, in rare cases, vision-threatening complications such as embolization of the retinochoroidal circulation may follow therapeutic injections.2,3

We present a case of simultaneous retinal arteriolar and choroidal vascular occlusion following an auriculotemporal subcutaneous injection of triamcinolone acetonide in a patient with alopecia areata.

Case report

A 30-year-old woman with alopecia areata on her left auriculotemporal scalp was scheduled for 10 mg/ml triamcinolone acetonide steroid injections for one month intervals by a dermatologist. 1 ml of triamcinolone was injected in the second visit. The patient described acute loss of vision in her left eye immediately after the injection.

On ocular examination her best corrected visual acuity (BCVA) was hand movement (HM) in the left eye with 15 mmHg intraocular pressure. Fundus examination revealed multiple white-yellow emboli in the superior and inferior temporal branch retinal arterioles and diffuse subretinal yellowish patchy infiltrates in the choroid compatible with triamcinolone embolism. Fundus photography revealed

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ischemic retinal whitening with a cherry red spot (Fig. 1A and B).

Fluorescein angiography (FA) was performed immediately. The patchy early hypo- and late hyper-fluorescent of the choroidal nonperfusion areas were suggestive of early delayed filling and late delayed draining of fluorescein due to capillary occlusions. Arteriocapillary filling defects were seen in the paramacular area (Fig. 1C and D).

Optical coherence tomography (OCT) showed retinal thickening and increased hyperreflectivity of inner layers (Fig. 2).

All observations were thought to be associated with the blockage of multiple branch retinal arteriocapillaries and choroidal vessels by triamcinolone acetonide crystals.

Anterior chamber paracentesis, ocular massage and hyperbaric oxygen therapy were performed in the patient.

During the follow-up period there was a complete resolution of the choroidal lesions and retinal hemorrhage after one month (Fig. 3A and B). OCT showed atrophy of inner retinal layers secondary to chronic ischemia (Fig. 2B). BCVA improved from HM to 10/200 on final visit.

Discussion

Although therapeutic corticosteroid injections or cosmetic fillers in the craniofacial region generally have reliable safety profiles with only minor adverse effects, in rare cases, some devastating adverse effects such as retinal and ophthalmic artery occlusion, cerebral infarction, skin necrosis, and facial scarring have been reported earlier.3–7

In this study, the patient was a 30-year-old female who developed an acute onset of multiple branch retinal artery occlusions (BRAO) and choroidal triamcinolone crystals after subcutaneous auricular injection of triamcinolone acetonide.

It has been reported that the most common cause of BRAO is embolism.3 In this regard, craniofacial region is a risky area for injections because of common vascular anastomoses in the facial arterial system. Many researches have proposed that retrograde embolic mechanisms and negligent intra-arterial or rapid, bullous injections are responsible for the development of arterial occlusions due to anastomoses in the facial arterial system.9 The other reason for the embolism might be that the diameter of insoluble particles are larger than the diameter of the vessels in the retina.10

The mechanism in this case is most likely due to intra-arterial injection into a branch of the superficial temporal artery. As well as in the auriculotemporal region, subcutaneous injections may be more dangerous than deeper ones because of the superficial localization of temporal artery.

This is not the first case of RAO after triamcinolon injection into the facial region. However, our case is distinct from others in terms of not only miliary microemboli of the retinal arterioles but also miliary triamcinolone crystals in the choroidal vessels. Early hypofluorescence areas were detected in the choroid that indicating delayed fillings in FA. Both retinal and choroidal embolism might have caused multiple ischemic insults on the retinal tissues.

In embolic RAOs, reducing the intraocular pressure by anterior chamber paracentesis and anti-glaucomatous drugs may help to mobilize the embolism although its usefulness is

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Fig. 1. (A) Colour fundus photography (B) Red-free fundus photography (C) Early phase of fluorescein angiography (FA) (D) Late phase of FA. Diffuse yellow infiltrates in the choroid and embolism in the perimacular retinal arterioles were seen. Red-free fundus photography shows white inclusions filling the ends of multiple retinal arterioles. Choroidal triamcinolone crystals revealed hypofluorescence in the early phase and hyperfluorescence in the late phase.
limited. After migration of emboli, the infarct resolves, and it leaves a normal-looking retina on funduscopy, but the atrophy of the inner layers of the retina becomes permanent. In accordance with this finding, emboli migrated in this case, and there was a complete resolution of the retinal hemorrhage, edema, and choroidal triamcinolone crystals in one month. Retinal atrophy became permanent (Fig. 2B).

We may postulate that steroid might have also influenced the outcomes together with hyperbaric oxygen therapy. Snellen final visual acuity was 10/200 and may be considered as a fairly good outcome.

Since complications are usually due to vascular injury or cannulation, some facial danger zones where vascular anastomoses are present have been identified. Glabella, eyebrow, temporal and infraorbital region, nasolabial fold, and nose are some of these dangerous zones. Injections into these areas have an increased risk of intra-arterial injection. Careful consideration should be taken while administering any kind of injections to these regions.

Some techniques for careful consideration such as performing injections slowly, using a serial puncture technique and aspirating before injection were recommended. However, it was reported that because the peripheral arteries of the face are small and prone to collapse, blood may not come into the syringe while aspiration, even if the needle is inserted to lumen. On the other hand, injection with blunt cannulas and the lowest possible pressure as well as a small fractionated dose instead of a bolus injection were suggested. Digital pressure to occlude the vessels and using adrenaline to cause local vasoconstriction may prevent retrograde flow in the event of unintentional injection.

In conclusion, embolic retinochoroidal vascular occlusion is a vision-threatening complication of injections in the craniofacial region. RAO should be considered in every patient.

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Fig. 2. (A) Colour fundus photography after one month (B) Late phase of fluorescein angiography (FA). During the follow-up period, there was a complete resolution of the choroidal lesions and retinal hemorrhage after one month.

Fig. 3. Optical coherence tomography (OCT) (A) Acute condition (B) Chronic condition. OCT showed retinal thickening and increased hyperreflectivity of inner layers in acute condition as well as atrophy of inner retinal layers secondary to chronic ischemia in chronic condition.
whose visual acuity decreases after triamcinolone injection. Besides needing to have an understanding of the underlying anatomy and facial danger zones, it is also necessary to consider the recommendations before injection to avoid such complications. Patients must be absolutely informed about complications as well.

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