American Journal of Ophthalmology Case Reports 29 (2023) 101789

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.ajocasereports.com/

Mineralocorticoid receptor antagonists as a potential treatment option in persistent subretinal fluid following the repair of a rhegmatogenous retinal detachment

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ARTICLE INFO

Keywords:
Retinal detachment
Retinal surgery
Mineralocorticoid receptor antagonist
Spironolactone

ABSTRACT

Purpose: To report the resolution of subretinal fluid persisting more than a year following retinal detachment surgery resolving with a short term course of mineralocorticoid receptor antagonists use.

Observations: A 41 year-old, highly myopic male presented with a temporal rhegmatogenous retinal detachment involving the macula. The tear was treated with a radial sponge without subretinal fluid (SRF) drainage. Postoperatively, SRF persisted for more than 1 year with only slight improvement in visual acuity. On OCT, slow regression of subretinal fluid was noted. In order to stimulate the RPE pump, a systemic mineralocorticoid receptor antagonist (spironolactone 50 mg) was initiated after discussion with the patient. After one month of therapy, there was a complete resolution of SRF and the visual acuity improved. Two years later, there was no reaccumulation of SRF and the visual acuity remained stable.

Conclusions and importance: A short term of course of mineralocorticoid receptor antagonist is a potential treatment for persistent subretinal fluid following a successful detachment surgery.

1. Introduction

Persistent subretinal fluid (SRF) is a common occurrence after the repair of a rhegmatogenous retinal detachment (RRD). Its incidence is higher following scleral buckling procedure and in macula off cases. Complete fluid resolution can take several months to more than a year, as shown by optical coherence tomography.[1]

The pathophysiological mechanism is not completely understood, and involves an interplay of several factors. These include osmotic and hydrostatic gradient pressures between subretinal and choroidal spaces, the integrity and function of the RPE, and the physical and biochemical properties of the subretinal fluid.[2–6]

When persistent, multiple structural and functional changes at the photoreceptor and retinal pigment epithelium (RPE) level can occur, which can lead to functional visual loss.[7–9]

SRF usually resolves spontaneously in most cases. Therefore observation is the usual approach. In refractory and persistent cases, resolution can be favoured by one of several treatment options with varied success.[10–12]

Here we report on the use of a mineralocorticoid receptor antagonist (MRA) which lead to a rapid resolution of persistent subretinal fluid present for over a year, in a patient having undergone a detachment repair with a radial sponge.

2. Case report

A 41 year old highly myopic male with a spherical equivalent of −10 D presented at our consultation with decreased left visual acuity (VA) and left visual field loss for three days. On examination, corrected visual acuity was 20/80. The anterior segment was normal. Intraocular pressure was 12 mmHg. Fundus examination revealed a macula off rhegmatogenous retinal detachment between 12 and 4 o'clock with 3 small retinal holes without an apparent flap inside a region of lattice degeneration at 1 o'clock. There were no pigmented cells in the vitreous and no retinal folds. The remaining ophthalmological history and exam were unremarkable. The patient was operated with a simple external radial sponge, providing adequate support to the holes, and without fluid drainage.

One month postoperatively, visual acuity had improved to 20/50. Persistence of thin multiloculated subretinal laminar fluid pockets were

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https://doi.org/10.1016/j.ajoc.2022.101789
Received 6 November 2020; Received in revised form 14 December 2022; Accepted 25 December 2022
Available online 31 December 2022

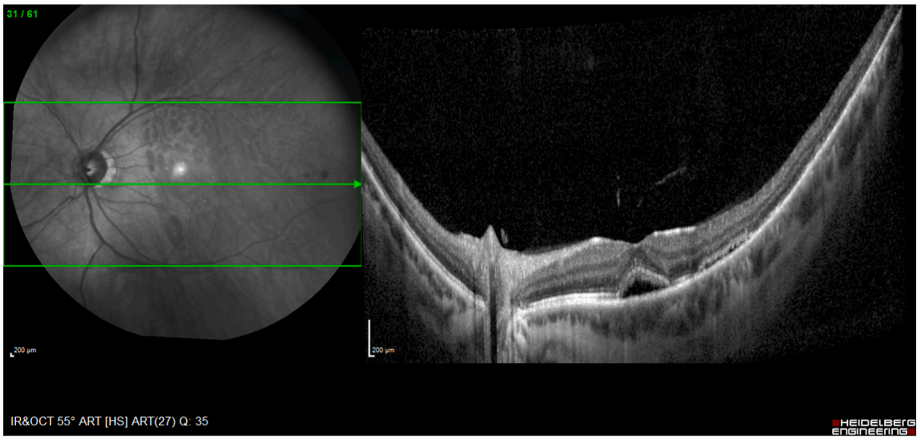

Fig. 1. Twelve months post operatively, OCT scan showing persistent subretinal fluid reaching the fovea.

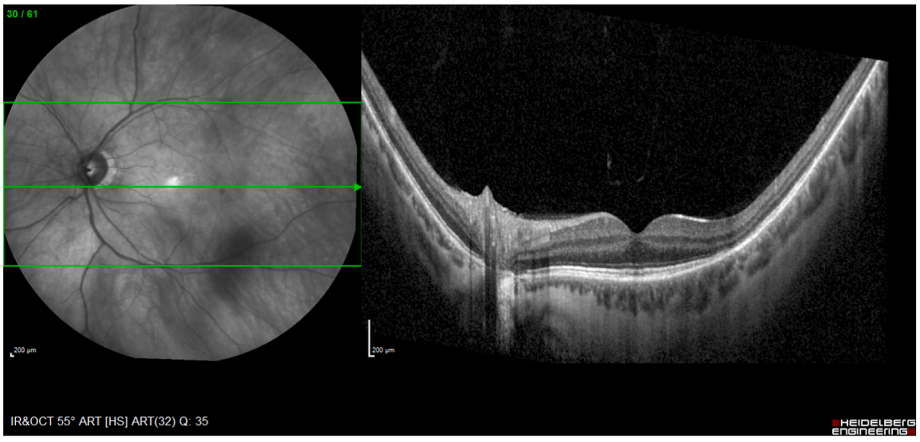

Fig. 2. Two years post MRA treatment, OCT scan showing complete resolution of subfoveal fluid

observed despite good positioning of the buckle and sufficient indentation (Fig. 1). Multiple follow-ups over a period of several months showed a slow continued diminution but persistence of subfoveal fluid without further visual improvement. The OCT showed the presence of a thickened choroid with pachychoroidal vessels. Systemic acetazolamide was tried but did not lead to a reduction in subretinal fluid. To stimulate the RPE pump, systemic mineralocorticoid receptor antagonist (spironolactone 50 mg) was initiated. One month following the initiation of the MRA, there was complete resolution of the SRF, and the visual acuity improved to 20/25 (Fig. 2). Two years later, there was no reaccumulation of SRF, and the visual acuity remained stable.

3. Discussion

In this report, a short course of mineralocorticoid receptor antagonist was effective in resolving persistent SRF and improving vision after retinal detachment surgery. This indicates a possible role of mineralocorticoid receptors in the pathogenesis of SRF.

The retinal pigment epithelium and the choroid are largely responsible for subretinal fluid resorption. However, longstanding SRF can lead to progressive photoreceptors atrophy, increased SRF protein and cellular debris, and increased fluid viscosity. These together, all lead to a further decreased capacity for fluid resorption, leading to a delay or worsening of visual recovery.[4–6]

Spontaneous resolution is the usual natural course of events with observation, the common therapeutic approach. In longstanding cases that last more than one year, several medical and surgical options have been proposed, with variable success rates.

Mineralocorticoid receptors were demonstrated to be present in many cell types within the choroid, RPE and retina.[13] Aldosterone, a specific mineralocorticoid agonist, leads to choroidal thickening and retinal congestion, while the use of an inhibitor reverses this effect, and also stimulates the RPE pump.[14] MRA were shown in several studies to promote subretinal fluid resolution in central serous chorioretinopathy (CSR) and polypoidal choroidal vasculopathy, but other studies were inconclusive.[15,16]

There are similarities between SRF and CSR, leading to the proposal that both belong to a larger pathogenic process called the pachychoroid spectrum.[2] This disease spectrum is believed to affect the choroid and RPE and includes several phenotypes ranging from simple pigment epitheliopathy to choroidal neovasculopathy.[2] Entities within this spectrum share common characteristics: increased choroidal thickness caused by dilatation of large outer choroidal vessels, attenuation and thinning of the inner choroidal and choriocapillaris layers, and RPE dysfunction.[17] Both entities are associated with subretinal fluid, and at least a partial response to MRA.[18]

Carbonic anhydrase inhibitors (CAI) has been investigated on the basis of their ability to promote the resorption of subretinal fluid.[19] However, the latter was not successful in our case. Surgical drainage can be an option, especially in the case of bullous or long standing RRD, but carries the risk of complications that in the current case outweighs the benefit.[20,21]

To our knowledge, there was only one case report to show positive effect of MRA in persistent SRF post buckle surgery. However, there was no improvement in visual acuity in that case, and the patient was lost to follow-up after only two months.[11]

4. Conclusion

SRF is a frequent finding after external retinal detachment surgery. MRA was successful in leading to a complete resolution of the SRF within a short time span 12 months after surgery. The improvement was sustained with no recurrence. The use of MRA may be a useful therapeutic tool to provide an earlier resolution of subretinal fluid following buckle surgery, and may also be of use in the immediate post-operative period. However future studies are necessary to confirm the effect and usefulness in all stages of post-operative recovery.

Patient consent

Written consent to publish this case has not been obtained. This report does not contain any personal identifying information.

Funding

"No funding or grant support".

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

All authors, (MdeS, MW) have no financial disclosures.

Acknowledgements

None.

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