

# Inferior Branch Retinal Arterial Occlusion Treated with Intravitreal Triamcinolone: A Case Report

## Arterial Occlusion and Triamcinolone

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### ABSTRACT

**Purpose:** To report a case of a 48-year-old female with sudden decrease of visual acuity (VA) in the right eye (RE).

**Methods:** This is a retrospective and descriptive case report based on data from clinical records, patient observation and analysis of diagnostic tests.

**Results:** A 48 year old woman with no relevant personal or family history except for the use of oral contraceptives, presented loss of visual acuity, central and superior scotoma in the right eye. Best corrected visual acuity (BVCA) was 20/32 in the right eye (RE) and 20/20 in the left eye (LE). RE fundoscopy revealed cotton wool spots in the territory of the inferior temporal retinal artery. Optical coherence tomography (OCT) showed increased central macular thickness mainly at the level of the nerve fiber layer. RE fluorescein angiography showed stop of fluorescein at the emergence of the inferior temporal artery. RE showed a superior altitudinal defect respecting the horizontal meridian. An intravitreal injection of 3.2mg triamcinolone was given within 24 hours. RE BVCA improved up to 20/20<sup>-1L</sup> at 3 months, with improvement of the visual field defect with time.

**Conclusion:** Intravitreal steroids given within a few hours of the arterial occlusion with the objective of limiting the spreadout of apoptosis, might be a favorable approach. Further investigation is required for validation of new therapeutic options.

**Keywords:** Triamcinolone, retinal branch occlusion; Steroids.

### RESUMO

**Objetivo:** Relatar o caso de uma doente do sexo feminino de 48 anos com diminuição súbita da acuidade visual no olho direito (OD).

**Métodos:** Trata-se de um relato de caso clínico retrospectivo e descritivo, baseado em dados do processo clínico, observação da doente e análise de testes diagnósticos complementares.

**Resultados:** Doente do sexo feminino de 48 anos sem história pessoal ou familiar relevante, com a exceção do uso de contraceptivos orais, apresenta perda de acuidade visual súbita, escotoma central e superior no OD. A melhor acuidade visual corrigida (MAVC) era de 20/32 no olho OD e 20/20 no olho esquerdo (OE). A fundoscopia do OD revelava manchas algodonosas no território da artéria retiniana temporal inferior. A tomografia de coerência ótica (OCT) mostrava aumento da espessura macular central principalmente ao nível da camada de fibras nervosas. A angiografia com fluoresceína do OD mostrava paragem de circulação da fluoresceína no surgimento da artéria retiniana temporal inferior. Os campos visuais demonstravam um defeito altitudinal superior em relação ao meridiano horizontal. Uma injeção intravítrea de 3,2 mg de triamcinolona foi administrada num período inferior a 24 horas. A MAVC melhorou até 20 / 20<sup>-1L</sup> em 3 meses, com melhoria do defeito do campo visual.

**Conclusão:** A injeção de triamcinolona intravítrea realizada poucas horas após oclusão arterial, com o objetivo de limitar a extensão de apoptose, pode ser uma opção de tratamento. Existe necessidade de investigação adicional no sentido da validação de novas terapêuticas nesta patologia.

**Palavras-chave:** Triamcinolona, Oclusão de ramo arterial; Esteroides

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## INTRODUCTION

Branch retinal artery occlusion (BRAO) causes acute obstruction of blood flow in the distribution of the affected vessel. This disorder presents with acute, monocular, painless loss of vision, swelling of the nerve fiber layer and is considered a form of stroke.<sup>9</sup> Occlusion at any site is a result of embolization or seldom from thrombosis of the affected vessel. There are three main varieties of emboli: cholesterol emboli, platelet-fibrin emboli associated with large-vessel arteriosclerosis and calcific emboli arising from diseased cardiac valves. Several other endogenous or exogenous emboli and non-embolic causes have been reported.<sup>1</sup>

Typically, BRAO presents in the seventh decade of life and is rare in patients younger than 30. Among the elderly, men are 2.5 times more likely than women to have retinal emboli. This correlates with the higher rate of stroke found in men. The variety of reported management options for central retinal arterial occlusion (CRAO) and BRAO reflects the lack of a safe and efficacious treatment for this vascular occlusive event.<sup>2</sup>

Management is directed toward determining systemic etiologic factors.<sup>1</sup> For this reason a thorough out medical workup is indicated for all patients with this condition.

## MATERIAL AND METHODS

This is a retrospective and descriptive case report based on data from clinical records, patient observation and analysis of ancillary diagnostic tests.

## RESULTS

A 48 year old woman with no relevant personal or family history except for the use of oral contraceptives (estrogen/progesterone) presented to the emergency room with loss of VA and scotoma in the RE.

At the initial visit BVCA was 20/32 in the RE and 20/20 in the LE. Afferent pupillary defect was absent, intraocular pressure and biomicroscopic examination were normal.

RE funduscopy revealed cotton wool spots and nerve fiber swelling in the territory of the inferior temporal retinal artery (fig. 1). RE fluorescein angiography showed stop of fluorescein at the emergence of the inferior temporal artery (fig. 2). OCT showed increased central macular thickness mainly at the level of the nerve fiber layer (fig. 3). The review of systems was normal. Visual

fields showed a superior altitudinal defect respecting the horizontal meridian (fig. 4).

In an attempt to decrease nerve fiber inflammation and swelling, an intravitreal injection of 3.2 mg triamcinolone<sup>3</sup> (Kenalog<sup>®</sup>) was given within 24 hours. Blood tests, echocardiogram and doppler ultrasound scan of the carotid arteries were normal.

This patient had a good clinical progression with RE BVCA increasing up to 20/20<sup>-1L</sup> at 3 months and improvement of the visual field (fig. 4). A base-up prismatic lens was prescribed to improve the quality of image focusing onto the retina.

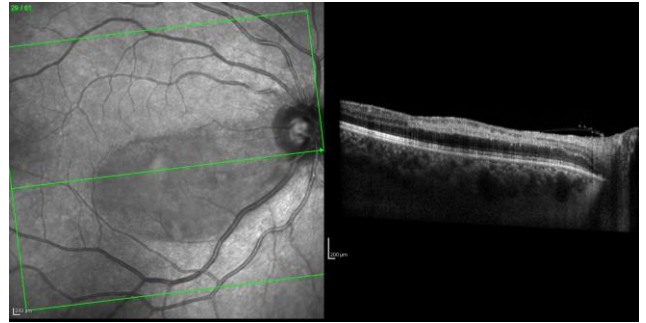


Figure 3 - OCT showing increased central macular thickness mainly at the level of the nerve fiber layer. RE fluorescein angiography showed stop of fluorescein at the emergence of the inferior temporal artery.

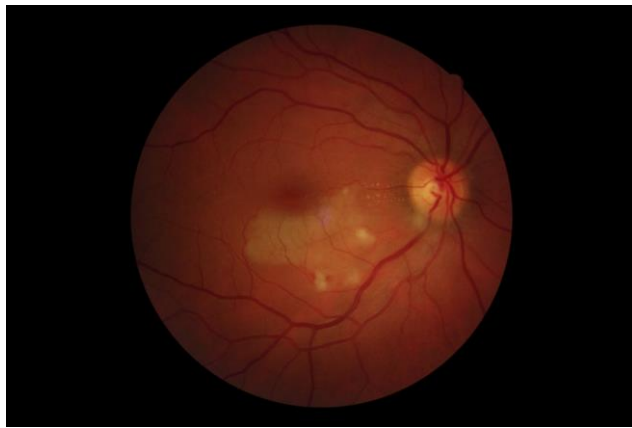


Figure 1 - RE funduscopy revealing cotton wool spots and nerve fiber swelling in the territory of the inferior temporal retinal artery.

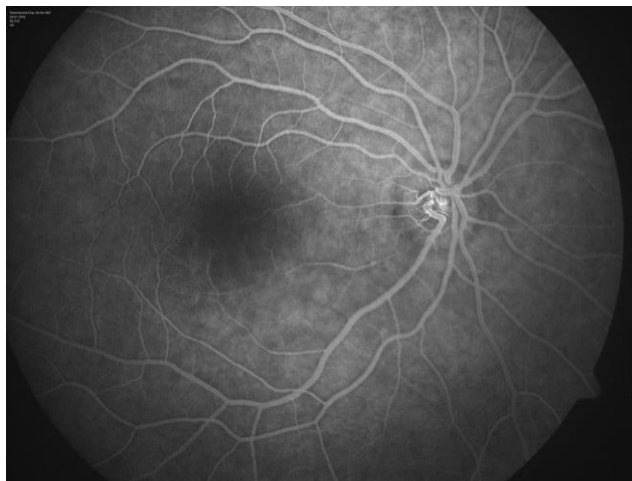


Figure 2 - RE fluorescein angiography showed stop of fluorescein at the emergence of the inferior temporal artery.

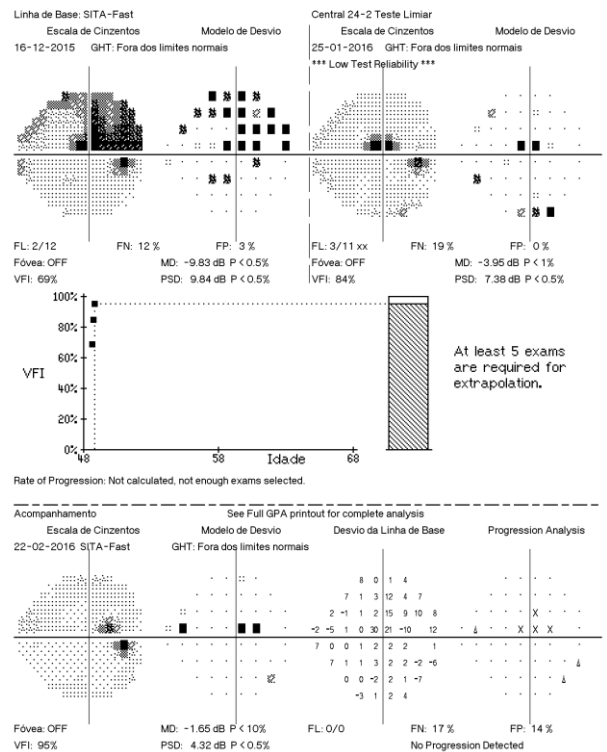


Figure 4 - Visual fields showed a superior altitudinal defect respecting the horizontal meridian initially and its improvement over time

## DISCUSSION

Combined oral contraceptives are one of the risk factors for arterial and venous occlusion in women.<sup>1</sup> In this young patient the only identifiable risk factor was the use of oral contraceptives.

The aim of treatment in a retinal ischemic event is to increase the perfusion pressure of the retinal circulation or to dislodge or lyse the obstructing thrombus or embolus.

The perfusion pressure of the retinal circulation can be increased by reducing intraocular pressure (IOP); dilating the ophthalmic and central retinal arteries or increasing the ophthalmic artery pressure. Lying the patient flat, in order to increase the pressure of the ophthalmic artery, giving an initial dose of acetazolamide (500 mg) intravenously or instructing the patient to perform ocular massage is probably the most widespread form of treatment for acute CRAO and BRAO, but the outcome is still disappointing. Other possibility is to perform anterior chamber paracentesis. Several techniques to induce retinal arterial vasodilatation have been reported and these include ocular massage, retrobulbar administration of vasodilator drugs and inhalation of carbogen. Retrobulbar injections of vasodilators and the inhalation of carbogen are of doubtful clinical benefit, and are therefore not in widespread use.<sup>2</sup>

It has been claimed by Mason *et al.*<sup>10</sup> that YAG laser embolysis/emblectomy would result in photodisruption of the embolus within the occluded CRAO or BRAO and that could cause rapid reperfusion of the retina with anatomic and visual acuity improvement.

Garcia-Arumi *et al.*<sup>5</sup> reported that in 4 of 6 eyes with temporal BRAO, surgical embolus removal resulted in VA improvement. In a few centers with appropriate neuroradiological and ophthalmic support selective intra-arterial fibrinolytic therapy may be considered.<sup>2</sup>

Hitherto, none of the treatments proposed has achieved a better outcome than the natural history and all are associated with serious complications.<sup>7</sup>

Hayreh SS<sup>7</sup> showed that a significant VA improvement may spontaneously occur in both CRAO and BRAO and such benefit is erroneously attributed to various advocated treatments. His study included 133 eyes of patients with permanent BRAO and 18 with transient BRAO. In those with permanent BRAO a final VA of 20/40 or better was seen in 89% and on follow-up within 7 days of onset, central visual field defect improved in 47% while 6% worsened. Of the 18 patients with transient BRAO 94% initially had VA of 20/40 or better and maintained vision of 20/40 or better on follow-up. Central and peripheral visual fields remained stable during the entire follow-up period. These findings show that visual acuity of 20/40 or better is seen initially in 74% of permanent BRAO and in

94% of transient BRAO; and at the end of follow-up, in 89% and 100% respectively.

Mason *et al.*,<sup>10</sup> in a retrospective study of 52 eyes with BRAO, reported that 60% of all eyes had a final VA of 20/40 or better. Furthermore, 89% of the eyes with initial VA of 20/40 or better remained stable, while 25% of those with a VA of 20/50 or worse improved to 20/40 or better.

According to Hayreh *et al.*<sup>8</sup> there are two reasons for spontaneous VA improvement in BRAO: when the junction between the normal and infarcted retina passes through the fovea, as is the case in the majority of temporal BRAO eyes, the VA may suddenly deteriorate initially, but improves within several days or weeks, from 20/200 or worse even to normal. VA improvement may also be due to the patient learning to fixate eccentrically.

N Hausmann and G Richard<sup>6</sup> in 1991 reported four cases of occlusion of CRAO treated with a single intravenous i.v. bolus injection of 1000mg prednisolone. All these patients recognized contours 10 to 15 minutes after the injection. Three patients had a functional retinal circulation with almost normal circulation times 60 minutes after the steroid injection. The conclusion that prednisolone would decrease endothelial edema and allow a rapid canalization was refuted the following year by JC Pandit and F Tamiyu,<sup>11</sup> who claimed that reperfusion would be hardly achieved in 10-15 minutes as the glucocorticoids mechanism of action would require longer to relieve vasospasm. Reviewing glucocorticoids effects,<sup>4</sup> it is well-known that they can impair the generation of inflammatory exudates by decreasing production or increasing degradation of various pro-inflammatory mediators.

Our patient had an outstanding visual recovery from 20/32 to 20/20<sup>1L</sup> and also had a good improvement in visual fields over time. The base-up prismatic lens that was prescribed was helpful to residual limitation. In this case, an intravitreal injection of triamcinolone was performed as an attempt to limit the spreadout of apoptosis in transition zones nearby ischemic areas. This treatment option has not proven to be beneficial in randomized clinical trials and we admit that improvement might just be attributed to the natural history of the disease. Nevertheless, this may be an interesting pathway for future clinical research.

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### Statement of Ethics

The authors state that the subject of this article gave informed consent and the study protocol has been approved by the institute's committee on human research.

### Disclosure Statement

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