Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/mjafi

Case Report

An interesting case of Coats' disease

Lt Col Avinash Mishra^{a,*}, Somesh Aggarwal^b, Sonali Shah^b, Puja Negi^c,
Rekha Bharwada^d, Neha Desai^b

^aClassified Specialist (Ophthalmology), Military Hospital Ahmedabad, Gujarat, India

^bAssociate Professor (Vitreoretinal Surgeon), M & J Western Regional Institute of Ophthalmology, Ahmedabad, Gujarat, India

^cClinical Tutor (Vitreoretinal Surgeon), M & J Western Regional Institute of Ophthalmology, Ahmedabad, Gujarat, India

^dProfessor (Vitreoretinal Surgeon), M & J Western Regional Institute of Ophthalmology, Ahmedabad, Gujarat, India

ARTICLE INFO

Article history:

Received 18 July 2013

Accepted 23 November 2013

Available online 12 March 2014

Keywords:

Coats' disease

Intra-vitreous long acting steroids

Laser photocoagulation

Intra-vitreous anti-vascular

endothelial growth factor

unilateral process, usually affecting young males in (85%) cases, with a mean age of diagnosis at 6–16 years of age,³ without any racial predominance. It is sporadic and nonhereditary.⁴ An adult variant of the disease is less commonly seen and is frequently associated with hypercholesterolemia. Coats' disease mimics retinoblastoma, and may present with leucocoria and strabismus, which makes it that much more important for an early and accurate diagnosis.⁵ If left untreated the disease shows progressive worsening which can lead to neovascular glaucoma and phthisis bulbi, sometimes even requiring enucleation.³

Here we report an interesting case of Coats' disease, presenting to us with a severe diminution of vision. He was managed aggressively with intra-vitreous long acting steroids (triamcinolone), laser photocoagulation and finally with intra-vitreous anti-vascular endothelial growth factor (VEGF) agents, with a successful restoration of useful functional vision.

Introduction

Coats' disease is an idiopathic exudative retinopathy characterized by abnormal retinal vascular development (telangiectasia) that results in massive intraretinal and subretinal lipid accumulation. This disease entity was first described by a Scottish ophthalmologist, George Coats, in 1908.¹ It is a relatively rare disease, with a reported incidence of 0.09 per 100,000 of the population.² Coats' disease is classically a

Case report

An 11-year-old male patient presented with a gradual diminution of vision in his right eye, for the past 6 months. Ocular examination on presentation revealed a vision of 6/60 in his right eye with no improvement. The vision in his left eye was normal i.e. 6/6. The intraocular pressure (IOP) of the right and left eye, measured using a non-contact tonometer (NCT), was 14 mm of Hg and 13 mm of Hg, respectively. Slit lamp

* Corresponding author. Tel.: +91 (0) 9408330655 (mobile).

E-mail address: avim27@yahoo.com (A. Mishra).

<http://dx.doi.org/10.1016/j.mjafi.2013.11.010>

0377-1237/© 2013 Published by Elsevier B.V. on behalf of Director General, Armed Forces Medical Services.

Fig. 1 – a – Fundus photograph showing subretinal exudation extending into the fovea. b – Fundus Fluorescein Angiography (FFA) revealing abnormal inferotemporal vessels with aneurysmal dilatation and telangiectasia, with leakage.

examination revealed no specific findings in the anterior segment and no rubeosis. Dilated indirect funduscopy revealed subretinal exudation extending into the fovea. Fundus Fluorescein Angiography (FFA) revealed abnormal inferotemporal vessels with aneurysmal dilatation and telangiectasia, which leaked profusely. Peripheral to the abnormal vasculature was an area of capillary non-perfusion [Fig. 1a & b]. Optical Coherence Tomography (OCT) done subsequently revealed cystoid macular edema [Fig. 2]. Left eye examination including funduscopy, FFA and OCT was all within normal limits (WNL). The patient was diagnosed as a case of Coats' disease and managed with intravitreal long acting steroid 4 mg (triamcinolone) injection, followed by 532 diode laser photocoagulation. Initially the patient's vision improved to 6/18 with

no further improvement, which remained stable for some time. However after 3 months he once again reported back with a diminution of vision in his right eye. Examination revealed a best corrected visual acuity of 6/36 and funduscopy showed an increase in subretinal exudation. This time around he was managed with intra-vitreous anti-vascular endothelial growth factor (VEGF) injection followed by 532 diode laser photocoagulation. The patient showed a remarkable improvement in his vision and achieved a best corrected visual acuity of 6/12. OCT too revealed a resolved macular edema [Fig. 3]. A repeat FFA showed presence of mild leakage; however the aneurysms had decreased [Fig. 4].

The patient's vision has presently stabilized for the past one year at 6/12 and there has also been no recurrence of exudation; however he is being regularly followed up on an outpatient basis.

Pathophysiology of Coats' disease

The clinical picture of Coats' disease is that of localized, lipid-rich, subretinal exudation and abnormal vasculature, including aneurysmal dilations, telangiectasias, areas of capillary non-perfusion, and neovascularization. VEGF is a naturally occurring protein, which causes increased vascular permeability (important for the initiation of angiogenesis), endothelial cell migration and proliferation.⁶ Increased permeability of the telangiectatic blood vessels leads to leakage of lipoproteins into the retina causing retinal edema. This further leads to exudative retinal detachment. The consequence of this entire process is retinal hypoxia and further neovascularization.⁷

Shields et al defined the stages of Coats' disease as following; Stage 1 – limited to retinal telangiectasia, Stage 2 includes telangiectasia with exudation (2A is extrafoveal and 2B is foveal exudation), Stage 3 occurs with development of an exudative retinal detachment (3A subtotal and 3B total retinal detachment), Stage 4 has total retinal detachment with glaucoma, and Stage 5 is advanced end-stage disease.⁸

The natural history of Coats' disease is generally progressive, but in a variably relapsing-remitting fashion. Left untreated it can lead to neovascular glaucoma and phthisis bulbi.³ Spontaneous remissions have rarely been reported⁹

Discussion

Coats' disease is a rare idiopathic retinopathy more commonly affecting children. Most of the studies on Coats' disease are from the Western world with very few major studies reported from the Indian subcontinent. One large scale study carried out in South India revealed a male preponderance (83.4%) and unilateral involvement in (90%) cases, with a mean age of presentation at 15.67 years. The most common presenting complaint was decreased vision (77%), though unusual presentations such as pain, vitreous hemorrhage and a high incidence of anterior segment involvement, distinctive to Indian eyes, were also common.⁵

Our patient too was a young male child, who had presented with a decreased vision in the affected right eye. The IOP was

Fig. 2 – Optical Coherence Tomography (OCT) showing cystoid macular edema.

normal. Slit lamp examination too was normal with no evidence of any rubeosis. This is specially important in Indian patients who have been noted to have a high incidence of anterior segment findings like cataract, neovascularization of

the iris, anterior chamber cells, flare and cholesterosis, corneal edema and raised IOP.⁵ Dilated fundus examination pointed towards Coats' disease right eye, which was further confirmed by FFA and OCT.

Fig. 3 – OCT showing a resolved macular edema post intravitreal anti-VEGF and argon laser treatment.

Fig. 4 – FFA showing decreased aneurysms however linkage is present.

There is no universal recommendation for the treatment of advanced Coats' disease with results being sub optimum in most cases. Earlier its management varied from simple observation to laser photocoagulation, cryotherapy, and various techniques of retinal detachment surgery and if necessary even enucleation.⁸ The aim of treatment is obliterating the affected retinal vessels. Laser photocoagulation is the treatment of choice in the early stages of Coats' disease. Cryotherapy is more effective for lesions in the far periphery and in the presence of exudation. However both techniques become less effective once the retina is detached and when more than two quadrants of the retina are affected.⁹ In carefully selected cases this treatment could anatomically stabilize or improve the vision in the eye with Coats' disease in 76% cases. However, poor visual outcome of 6/60 or worse is common.⁸

The use of anti-VEGF agents in the treatment of Coats' disease is currently an area of research. It has been shown that VEGF levels in Coats disease eyes are considerably elevated in stages 2 and 3 of the disease¹⁰ Several recent case reports have been published with using anti-VEGF agents as a treatment modality.^{4,7,11,12}

It has the potential as an adjuvant therapy of vascular ablative procedures to improve the final vision and facilitate the ongoing treatment^{7,12}. However it has been shown not to reduce the time to full treatment.⁷

Studies combining intravitreal anti-VEGF agent with argon laser photocoagulation¹³ as well as triamcinolone have shown a favorable response⁹ with a significant subsidence of the macular edema and submacular fluid.

On the other hand some studies have also advised caution while using these agents as they may increase the chances of tractional retinal detachment.¹⁴

Conclusion

Given the rarity of Coats' disease and its variable course, therapeutic strategies have to be tailored to each individual

patient. As with other diseases, a search for approaches that improve outcomes with fewer side effects is warranted. While angiogenesis inhibitors are already widely used to treat retinal disease like diabetic retinopathy in adults, only limited reports are currently available for the use of anti-VEGF in pediatric vitreoretinal diseases such as retinopathy of prematurity and Coats' disease.¹⁵

A promising new addition to our pediatric retinal tool kit is peri-operative intra-vitreous anti-VEGF agents. With reduction of vascular permeability, there have been reports of reduction in subretinal lipid exudation, exudative retinal detachment, and macular edema in patients with Coats. This enables more effective laser photocoagulation, as the retina is better apposed to the retinal pigment epithelium following anti-VEGF treatment. The promising efficacy signals observed with anti-VEGF agents suggest that VEGF plays a role in the pathophysiology of Coats' disease. Areas of retinal ischemia are present in the disease, and anti-VEGF therapies presumably act by reducing vascular permeability secondary to VEGF blockade.

In summary, a multimodality and stepwise approach to the treatment of Coats' disease, including the use of tools that target the pathophysiology of the disease, appears to provide encouraging results.

Conflicts of interest

All authors have none to declare.

REFERENCES

1. Coats G. Forms of retinal disease with massive exudation. *Royal London Ophthalmic Hospital Rep.* 1908;17(3):440–525.
2. Morris B, Foot B, Mulvihill A. A population-based study of Coats disease in the United Kingdom I: epidemiology and clinical features at diagnosis. *Eye (Lond)*. 2010 Dec;24(12):1797–1801.
3. Shields JA, Shields CL, Honavar S, Demirci H. Clinical variations and complications of Coats disease in 150 cases: the 2000 Sanford Gifford Memorial Lecture. *Am J Ophthalmol*. 2001;131:561–571.
4. Kaul S, Uparkar M, Mody K, Walinjar J, Kothari M, Natarajan S. Intravitreal anti-vascular endothelial growth factor agents as an adjunct in the management of Coats' disease in children. *Indian J Ophthalmol*. 2010;58(1):76–78.
5. Rishi P, Rishi E, Uparkar M, et al. Coats' disease: an Indian perspective. *Indian J Ophthalmol*. 2010 Mar–Apr;58(2):119–124.
6. Haritoglou C, Kook D, Neubauer A, et al. Intravitreal bevacizumab (Avastin) therapy for persistent diffuse diabetic macular edema. *Retina*. 2006;26:999–1005.
7. Jonas JB, Holbach LM. Clinical-pathologic correlation in Coats' disease. *Graefes Arch Clin Exp Ophthalmol*. 2001;239:544–545.
8. Shields JA, Shields CL, Honavar SG, Demirci H, Cater J. Classification and management of Coats disease: the 2000 Proctor Lecture. *Am J Ophthalmol*. 2001;131:572–583.
9. Cakir M, Cekiç O, Yilmaz OF. Combined intravitreal bevacizumab and triamcinolone injection in a child with Coats disease. *J AAPOS*. 2008;12(3):309–311.
10. Sun Y, Jain A, Moshfeghi DM. Elevated vascular endothelial growth factor levels in Coats disease: rapid response to

- pegaptanib sodium. *Graefes Arch Clin Exp Ophthalmol*. 2007;245(9):1387–1388.
11. Entezari M, Ramezani A, Safavizadeh L, Bassirnia N. Resolution of macular edema in Coats' disease with intravitreal bevacizumab. *Indian J Ophthalmol*. 2010;58(1):80–82.
 12. Lin KL, Hirose T, Kroll AJ, Lou PL, Ryan EA. Prospects for treatment of pediatric vitreoretinal diseases with vascular endothelial growth factor inhibition. *Semin Ophthalmol*. 2009;24(2):70–76. Review.
 13. Wang KY, Cheng CK. A combination of intravitreal bevacizumab injection with tunable argon yellow laser photocoagulation as a treatment for adult-onset Coats' disease. *J Ocul Pharmacol Ther*. 2011 Oct;27(5):525–530.
 14. Ramasubramanian A, Shields CL. Bevacizumab for Coats' disease with exudative retinal detachment and risk of vitreoretinal traction. *Br J Ophthalmol*. 2012 Mar;96(3):356–359.
 15. Lin CJ, Hwang JF, Chen YT, Chen SN. The effect of intravitreal bevacizumab in the treatment of Coats disease in children. *Retina*. 2010 Apr;30(4):617–622.