

Birdshot chorioretinopathy

Author: Professor Hildegaard Priem¹

Creation Date: November 2002

Update: May 2004

Scientific Editor: Professor Jean-Jacques De Laey

¹Department of Ophthalmology, Gent University Hospital, De Pintelaan 185, B-9000 Gent, Belgium.
Hildegaard.Priem@rug.ac.be

[Abstract](#)

[Keywords](#)

[Disease name and synonyms](#)

[Definition](#)

[Diagnosis](#)

[Differential diagnosis](#)

[Frequency](#)

[Clinical description](#)

[Management including treatment](#)

[Prognosis](#)

[Etiology](#)

[References](#)

Abstract

Birdshot chorioretinopathy is a rare inflammatory ocular disorder mainly involving the choroid and retina, its most striking feature being the bilateral, symmetrical, cream-coloured flecks, distributed in a rather regular pattern around the optic disc and radiating towards the periphery. It is often accompanied by vitritis, retinal vasculopathy and cystoid macular oedema. Another important feature of the disorder is the association with the antigen HLA-A29 (95.9 % of patients). It affects people in middle life without predilection for sex. Most patients are Caucasian, although a few cases have been described in Japan, however without the presence of HLA-A29. The etiology is still unknown, but the strong association with HLA-A29 suggests a possible autoimmune disease. Treatment of this disorder consists of anti-inflammatory drugs when vitritis and macular oedema are present, laser photocoagulation or photodynamic therapy for secondary choroidal neovascularization, laser and/or vitrectomy for retinal and prepapillary neovascularization or vitreous hemorrhage.

Keywords

Birdshot chorioretinopathy, choroids, retina, HLA-A29

Disease name and synonyms

This disorder was first described in 1980 by Ryan and Maumenee, who named it birdshot retinochoroidopathy on the basis that the distribution of the flecks in the fundus resembled the lesions from a shotgun (1). The name birdshot chorioretinopathy is preferentially used because this term accentuates the prevalent choroidal involvement, as we now know that the flecks are situated in the outer choroid (2). Initially, other descriptive names were also used, such as "choriorétinopathie en grains de riz" by

Amalric (3), "vitiliginous chorioretinitis" by Gass (4), "salmon-patched choroidopathy" by Aaberg (5), which all described the typical flecks occurring in the fundus.

Definition

Birdshot chorioretinopathy is a rare inflammatory ocular disorder that mainly involves the choroid and retina, its most striking feature being the bilateral, symmetrical, cream-coloured flecks,

distributed in a rather regular pattern around the optic disc and radiating towards the periphery.

Diagnosis

Birdshot chorioretinopathy can be differentiated from other flecked retina diseases by the characteristic location of the flecks in the outer choroid, and by the symmetry and regularity in size and distribution of these flecks in both eyes. In addition to this major diagnostic feature, an inflammation is often found, mostly in the vitreous, and this can be accompanied by typical features of an intermediate uveitis, *i.e.* cystoid macular oedema, disc oedema, and retinal vasculopathy. The anterior segment shows also sometimes a rather mild inflammation.

The presence of the antigen HLA-A29 in a patient with birdshot chorioretinopathy is another essential diagnostic criterium. Nussenblatt was the first to point out the association of HLA-A29 with this disorder, and this disease association was found to be as high as 95.8 % in our group of birdshot patients (6-7).

To summarize, the diagnostic criteria of birdshot chorioretinopathy include:

- bilateral and symmetrical characteristic birdshot flecks in the fundus of the eye;
- a mild to severe inflammation of the vitreous often accompanied by cystoid macular oedema;
- the presence of the antigen HLA-A29.

Differential diagnosis

- Posterior and intermediate uveitis with chorioretinal lesions
- Vogt-Koyanagi-Harada disease
- Non-Hodgkin lymphoma of the choroid.

Frequency

Although the clinical features of birdshot chorioretinopathy are now well known, it is still a rather uncommon disorder. Seven out of 600 patients (1.2%) were diagnosed with the disorder at one uveitis clinic in the United States (8) and only 59 birdshot patients were seen between 1980-1999 at the National Eye Institute (9). In our study on the clinical characteristics of birdshot chorioretinopathy, only 102 patients were collected from 14 major European Eye departments in the period between 1980 and 1986 (2). The study group consisted of 47 men (average of 50.7 years) and 55 women (average 54.4 years).

Clinical description

In a study on 102 patients with birdshot chorioretinopathy (2), the ocular symptoms at onset were blurred vision (58 patients), floaters in the eye (30 patients), night blindness (8

patients), distorted vision (4 patients), photopsias (4 patients), ocular irritation (4 patients) and pain (2 patients). In most eyes the choroidal lesions (birdshot flecks) were remarkably uniform in colour, shape and size. The highest concentration of lesions was seen around the optic nerve head, giving the disc a typical petaloid appearance. The macula was sometimes involved, but in most patients no flecks were present within the vascular arcade, apart from the peripapillary lesions. In the majority of cases, the lesions showed a well-defined pattern radiating from the optic disc towards the periphery. At the periphery, the lesions often became confluent and formed long yellow-white streaks following the large choroidal vessels. Another remarkable feature was the absence of pigmentation of the flecks, differentiating them from chorioretinal scars. Signs of vitreous involvement were seen in 83 % of the eyes examined. The retinal arteries showed marked narrowing in 124 eyes (61 %). In most cases this narrowing was associated with an irregularity of the retinal veins. In addition, small flame-shaped hemorrhages were present in 27 of these eyes, mostly in the posterior pole along the large temporal vessels. In the same study, fluorescein angiographic findings revealed in the majority of cases that the birdshot flecks were not evident in the early phase of angiography, becoming apparent in the venous phase as faint hyperfluorescent flecks whose intensity did not increase in the late phase. In early cases, however, the flecks remained hypofluorescent during the entire dye transit and were not always evident. Indocyanine green angiography was found to reveal more lesions than either ophthalmoscopic examination or fluorescein angiography (10). The lesions appear in the early stage as well-defined, hypofluorescent spots, which remain unchanged throughout the angiography. These spots most probably correspond to the deep choroidal lymphocytic foci observed microscopically in the study of Gaudio *et al* (11). In this recent report of a HLA-A29 patient with birdshot chorioretinopathy, histological findings were the followings: lymphocytic aggregations with their foci in the deep choroid, with additional foci in the optic nerve head and along the retinal vasculature.

The clinical course of birdshot chorioretinopathy is characterized by several recurrences of active inflammation. Some patients may initially present with a mild to severe vitritis associated with disc oedema, retinal vasculitis, and cystoid macular oedema before the flecks become apparent; as the choroidal lesions appear, the retinal and vitreous changes may regress. At their first

examination, other patients may show the typical flecked retina with only minimal or no involvement of the vitreous and the retinal vessels. In these cases, a low-grade inflammation may also have been present for some time previously, either giving rise to a long history of floaters or not causing ocular complaints. The sequelae of retinal inflammation, such as optic atrophy, chronic cystoid macular oedema and degeneration, epiretinal membranes, peripheral retinal and disc neovascularization are common. Visual loss is usually caused by chronic macular oedema, but can also result from a vitreous hemorrhage, subretinal neovascularization and scar formation, epiretinal membrane formation and cataract (2). Recovery of visual function was reported in a patient with birdshot chorioretinopathy, but it is unclear whether this improvement was spontaneous, whether it was a late result of previous conventional treatment, or whether it was secondary to the commencement of a complex non-prescribed antioxidant preparation (12)

Pigmentary changes mimicking a pseudo-retinitis pigmentosa fundus were observed in a patient with birdshot chorioretinopathy after long-term evolution of the disease (13).

Clinical electrophysiological tests provide information concerning the location of the lesions within the visual pathway, the distribution of the lesions in the fundus, and distinguish between cone and rod function (14). The electro-oculography study in birdshot patients showed a subnormal L/D ratio (below 150 %) in most of the eyes and an extinguished ratio in some eyes. Electroretinography was also abnormal in most patients. Oscillatory potentials were absent in the majority of cases. Variable reduction in amplitude of all components of the electroretinogram was recorded, particularly the scotopic b-wave, as well as a prolongation of the implicit times of the responses. The relation between the a-wave and the b-wave amplitudes varied widely and was abnormally high in all patients with evidence of active or previous retinal vasculitis. The visual evoked cortical potentials were normal in the absence of manifest retinal vascular disease. In the presence of macular oedema the responses were delayed and reduced in amplitude. These results show that the electrophysiological tests are very helpful tools in establishing the degree of retinal vascular inflammation.

When colour discrimination is impaired, it shows mostly a moderate to severe blue-yellow deficiency with an additional red-green defect in a few cases. Visual field defects consist mostly in peripheral field constriction or enlarged blind

spot, but central scotoma can also be seen in patients with secondary submacular choroidal neovascularization and scar formation. Dark adaptation is impaired in most patients, even in the absence of complaints of night blindness.

Management including treatment

Management of birdshot chorioretinopathy is not yet well defined (16). A variety of anti-inflammatory drugs are used when vitreous and retinal inflammation is present, such as systemic and periorbital corticosteroids, non-steroidal anti-inflammatory drugs (indomethacin), immunosuppressive drugs (azathioprine, cyclosporin A, tacrolimus, mycophenolate mofetil), and they usually lead to improvement (17). Intravenous immunoglobins appear to be better tolerated than corticosteroids and cyclosporin A (18). Now, most commonly a combination of prednisone and cyclosporin is used, because this allows for a lower dose of steroids and has been proved more effective by some authors (19-21). But as yet there are neither controlled case studies to prove this point of view, nor proof of benefit of maintenance treatment. In view of the chronicity of birdshot chorioretinopathy, we suggest that anti-inflammatory drugs should be given only when there is recurrence of the inflammation. However, in a long-term follow-up of 19 patients with birdshot chorioretinopathy, Oh *et al* (22) suggested that prolonged corticosteroid or immunosuppressive treatment may be more beneficial in the long run than episodic treatment. Laser photocoagulation and/or vitrectomy might be necessary when vitreous hemorrhages occur in patients with peripheral retinal or disc neovascularization. Similarly, subretinal choroidal neovascularization should be treated when possible either with thermal laser or by photodynamic therapy. When cataract impairs the visual acuity, a cataract extraction should be considered only if any present inflammation is under control.

Prognosis

The prognosis is variable. Most patients show spontaneous regression of the intraocular inflammation five to eight years after the disease onset. Out of 27 patients from the European study followed for 5-13 years, visual acuity worsened in 14, remained stable in 8, and improved in 5 cases (2).

Etiology

The etiology is still unknown. The strong association between birdshot chorioretinopathy and the HLA-A29 antigen suggests an autoimmune disease (16). There are two reports

of birdshot chorioretinopathy occurring in homozygotic and HLA-A29 positive twins, but no information about the occurrence of the disorder in other siblings (23).

References

1. Ryan SJ, Maumenee AE. Birdshot retinochoroidopathy. *Am J Ophthalmol* 1980; 89: 31-45
2. Priem HA, Oosterhuis JA. Birdshot chorioretinopathy: clinical characteristics and evolution. *Br J Ophthalmol* 1988; 72: 646-593
3. Amalric P, Cuq G. Une forme très particulière de chorioretinopathie en grains de riz. *Bull Soc Ophthalmol Fr* 1981; 81: 131-4
4. Gass JDM. Vitiliginous chorioretinitis. *Arch Ophthalmol* 1981; 99: 1778-87
5. Aaberg TM. Diffuse inflammatory salmon patch choroidopathy syndrome. Read before the International Fluorescein Macula Symposium, Carmel, California, October 1979
6. Nussenblatt RB, Mittal KK, Ryan SJ, Green WR, Maumenee AE. Birdshot retinochoroidopathy associated with HLA-A29 antigen and immune responsiveness to retinal S-antigen. *Am J Ophthalmol* 1982; 94: 147-58
7. Priem HA, Kijlstra A, Noens L, *et al.* HLA typing in birdshot chorioretinopathy. *Am J Ophthalmol* 1988; 105: 182-5
8. Henderly DE, Genstler AJ, Smith R, *et al.* Changing patterns of uveitis. *Am J Ophthalmol* 1987; 103: 131-6
9. Gasch AT, Smith JA, Whitcup SM. Birdshot retinochoroidopathy. *Br J Ophthalmol* 1999; 83: 241-49
10. Chang B, Lumbroso L, Rabb MF *et al.* Birdshot chorioretinopathy. In: Yannuzzi LA, Flower RW, Slakter JS, eds. *Indocyanine green angiography*. St Louis: Mosby, 1997; 231-8
11. Gaudio PA, Kaye DB, Crawford JB. Histopathology of birdshot retinochoroidopathy. *Br J Ophthalmol*. 2002; 12: 1439-41.
12. Dolan FM, Gavin M, Parks S, Keating D. Recovery of visual function in a patient with birdshot chorioretinitis. *Br J Ophthalmol*. 2003; 87: 657-8.
13. Willermain F, Greiner K, Forrester JV. Atypical end-stage birdshot retinochoroidopathy. *Ocul Immunol Inflamm*. 2003;11: 305-7.
14. Priem HA, DeRouck A, DeLaey JJ, Bird AC. Electrophysiologic studies in birdshot chorioretinopathy. *Am J Ophthalmol* 1988; 106: 430-6
15. Zacks DV, Samson CM, Foster CS. Electroretinograms as an indicator of disease activity in birdshot retinochoroidopathy. *Graefe's Arch Clin Exp Ophthalmol* 2002; 240: 601-7
16. Jabs DA, Rosenbaum JT, Foster CS, *et al.* Guidelines for the use of immunosuppressive drugs in patients with ocular inflammatory disorders: recommendations of an expert panel. *Am J Ophthalmol* 2000; 130: 492-513
17. Levinson RD, Gonzales CR. Birdshot retinochoroidopathy: immunopathogenesis, evaluation, and treatment. *Ophthalmol Clin North Am*. 2002; 15: 343-50
18. Cassoux N, Goichot-Bonnat L, Karmochkine M, Georges F, Kullmann N, Lehoang P, Kazatchkine M. [Efficacy of intravenous immunoglobulin in the treatment of Birdshot retinochoroiditis]. *J Fr Ophtalmol*. 2002; 25: 23-30.
19. LeHoang P, Girard B, Deray G, *et al.* Cyclosporine in the treatment of birdshot retinochoroidopathy. *Transplant Proc* 1988; 20(suppl 4): 128-30
20. Hofmann HM, Feicht W. Birdshot chorioretinopathy: systemic therapy with corticosteroids and non-steroidal anti-inflammatory drugs. *Klin Monatsbl Augenheilk* 1190; 197: 159-61
21. Vitale AT, Rodriguez A, Foster CS. Low-dose cyclosporine therapy in the treatment of birdshot retinochoroidopathy. *Ophthalmology* 1994; 101: 822-31
22. Oh K. T, Christmas NJ, Folk JC. Birdshot retinochoroiditis: long term follow-up of a chronically progressive disease. *Am J Ophthalmol* 2002; 133: 622-29
23. Fich M, Rosenberg T. Birdshot retinochoroidopathy in monozygotic twins. *Acta ophthalmol* 1992; 70:693-7