

# Photodynamic therapy for choroidal neovascularisation secondary to basal laminar drusen

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## Abstract

**Purpose** Basal laminar drusen (BLD) is a rare retinal disorder that may be complicated with choroidal neovascularisation (CNV). Here we describe four patients treated with verteporfin photodynamic therapy (PDT) for CNV secondary to BLD.

**Methods** Four consecutive patients presented with subfoveal CNV secondary to BLD. Mean visual acuity was 20/50. CNV was treated with one single PDT session.

**Results** Exsudative features of CNV were resolved after one session for all patients. After 6 months, mean visual acuity was 20/25 and remained stable.

**Conclusion** In this series, PDT was an effective treatment for CNV secondary to BLD. *Eye* (2009) 23, 2115–2118; doi:10.1038/eye.2009.239; published online 2 October 2009

**Keywords:** PDT; BLD; choroidal neovascularisation

## Introduction

Basal laminar drusen (BLD) is a rare condition, described in 1977 by Gass as small yellow lesions on the posterior pole and the periphery of the retina.<sup>1</sup> Commonly appearing in early adulthood, the drusen are usually 25–75  $\mu\text{m}$  in size and are discretely round, slightly raised, subretinal nodules. Later, they often become more numerous and are grouped in clusters. They are more easily visualised angiographically than biomicroscopically, harbouring a 'star in the sky' pattern. Vitelliform macular detachment can also be observed.

Gass hypothesised that BLD are caused by nodular thickening of the retinal pigment

epithelium (RPE) basement membrane. Recent studies have shown that BLD are located between the basal lamina of the RPE and the inner collagenous layer of Bruch's membrane, just as they are in age-related macular degeneration (AMD).<sup>2</sup> This rare condition can be associated with membranoproliferative glomerulonephritis type II (MPGN II).<sup>3</sup> Occasionally, BLD may be complicated with choroidal neovascularisation (CNV), resulting in a visual loss.

Photodynamic therapy (PDT) with verteporfin is a recognised method for the treatment of subfoveal CNV in AMD.<sup>4</sup> PDT has been also used for the treatment of CNV in pathological myopia or in macular diseases, such as malattia leventinese<sup>5</sup> or vitelliform dystrophy.<sup>6–9</sup> To the best of our knowledge, treatment with PDT has not yet been described in this condition.

Here we report four patients with CNV secondary to BLD who underwent treatment with PDT.

## Case reports

A 40-year-old man, a 59-year-old woman, a 54-year-old woman, and a 38-year-old man presented consecutively at our clinic with subfoveal CNV secondary to BLD. All described metamorphopsia and visual loss on one eye for less than 3 days at presentation. All eyes were treatment naive. At presentation, mean visual acuity was 20/60. (Table 1) One patient (case no. 1) was affected by a MPGN II. Mean age at presentation was 51 years and mean age at diagnosis of BLD was 43 years. Fundus examination showed a little subfoveal haemorrhage in one patient (case no. 1, Figure 1). In all eyes, a grey subfoveal lesion

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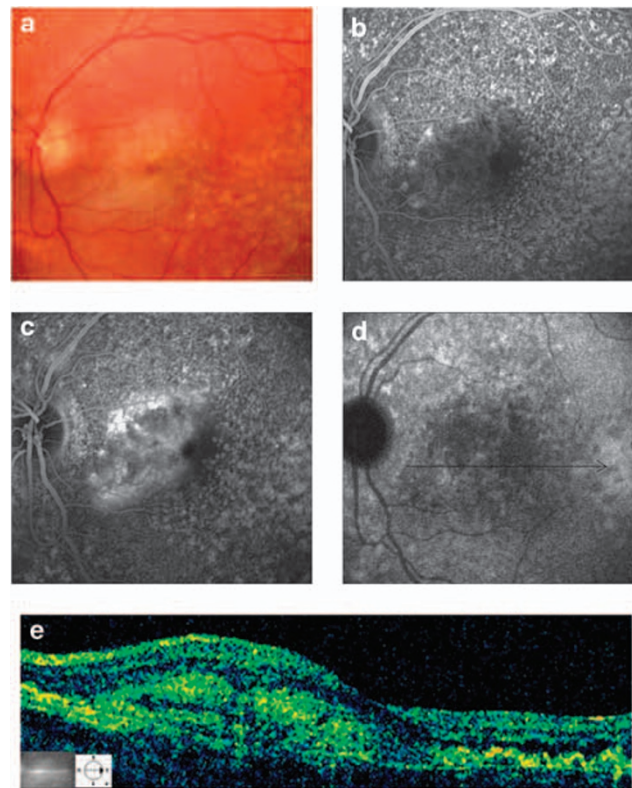
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**Table 1** Clinical features of patients with choroidal neovascularisation (CNV) secondary to basal laminar drusen (BLD)

Case	Sex	Age at presentation	Age at diagnosis of BLD	CNV	Presentation	Visual acuity at				
						3 months	6 months	2 years	4 years	9 years
1	M	40	38	LE	20/64	20/32	20/20	20/20	20/20	—
2	F	59	45	RE	20/50	20/25	20/20	20/20	—	—
3	F	54	45	LE	20/40	20/32	20/32	20/32	—	—
4	M	38	38	LE	20/80	20/32	20/20	20/20	20/20	20/20

Abbreviations: LE, left eye; RE, right eye.



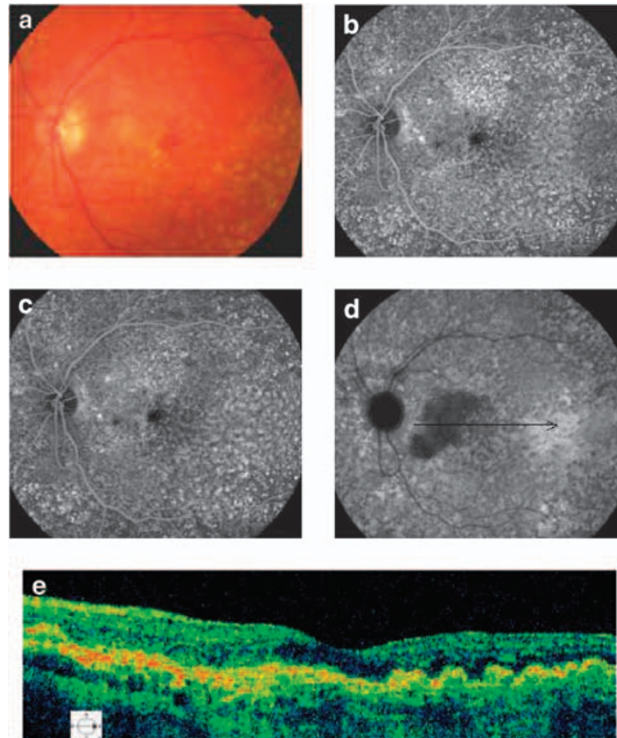
**Figure 1** Patient no. 1 affected with basal laminar drusen (BLD) and choroidal neovascularisation (CNV). At presentation, visual acuity is 20/64. (a) Colour fundus photograph shows a grey subfoveal lesion with a little haemorrhage. (b) Early phases of fluorescein angiography (FA) reveal a hyperfluorescence of the lesion associated with innumerable hyperfluorescent BLD harbouring a 'stars in the sky' pattern. (c) On the late phases of FA, a leakage of the lesion is observed corresponding to a subfoveal classic CNV. (d) On the late phases of indocyanine green angiography (ICGA), we observe a heterogeneous hyperfluorescence corresponding to the neovascularisation. (e) Optical coherence tomography (OCT) scan (arrow) shows a hyperelective mass above the retinal pigment epithelium corresponding to a subfoveal CNV with macular thickening. Central macular thickness is 298  $\mu\text{m}$ .

was observed, associated with BLD. In all cases, fluorescein angiography revealed numerous early and intense hyperfluorescent dots like 'stars in the sky' corresponding to BLD. Furthermore, we observed a hyperfluorescence of the lesion on early phases, with leakage on late phases corresponding to subfoveal classic CNV. Vitelliform macular detachment was observed in one patient (case no. 2). Optical coherence tomography (OCT-3, Humphrey-Zeiss, San Leandro, CA, USA) confirmed the presence of a subfoveal CNV, showing a

moderately hyperelective mass above the RPE with the neurosensory retina elevation and little macular thickening (Figure 1).

One single PDT session was performed, in accordance with the standard protocol used for treating CNV secondary to AMD,<sup>4</sup> after obtaining a written informed consent, in agreement with the French legislation and our local ethics committee.

Three months later, the four patients reported improvement of their visual symptoms. Mean visual



**Figure 2** Patient no. 1 affected with BLD and CNV. At 4 years after treatment with PDT, visual acuity is 20/20. (a) Colour fundus photograph shows regression of the grey lesion. (b) Early phases of FA show a hyperfluorescent atrophic area. (c) Late phases of FA also show the hyperfluorescent atrophic area without any leakage. (d) The lesion is strictly hypofluorescent on the late phases of ICGA. (e) On OCT scan (arrow), there is no retinal fluid or macular thickening. Central macular thickness is 171  $\mu\text{m}$ .

acuity improved to 20/32 (Table 1). Fundus examination revealed regression of the grey lesion (Figure 2). On late phases of fluorescein angiography, no more leakage was observed. OCT showed the absence of macular fluid in all cases. No recurrence occurred and no re-treatment was needed. After 6 months, mean visual acuity was 20/25 and remained stable throughout the follow-up (2 years for two patients, 4 years for one, and 9 years for one).

## Discussion

Choroidal neovascularisation is the main complication of BLD occurring in 10–31% of cases.<sup>10,11</sup> We describe here for the first time four patients with CNV complicating BLD who were successfully treated by one single session of PDT. Visual acuity improved in all patients without metamorphopsia at the end of the follow-up (2 years at least).

It could be hypothesised that vascular endothelial growth factor (VEGF) is probably implicated in the occurrence of CNV in BLD patients. To our knowledge, anti-VEGF antibodies have not been reported yet for treatment of CNV secondary to BLD.

In conclusion, in our small series, PDT was an effective treatment for CNV secondary to BLD. However, additional data are needed to establish the visual benefit

of PDT in this condition. Furthermore, intravitreal anti-VEGF treatment should also be evaluated.

## Summary

### What was known before

- Basal laminar drusen (BLD) is a rare retinal disorder that may be complicated with choroidal neovascularisation (CNV).

### What this study adds

- In this series, PDT was for the first time an effective treatment for CNV secondary to BLD.

## Conflict of interest

The authors declare no conflict of interest.

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