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Sir,

Is the mechanism of 'poppers maculopathy' photic injury?

I read with interest the excellent series by Davies *et al*,[1] describing maculopathy in patients using 'poppers.' Together with two recent series from France,[2,3] their report provides important evidence for an association between abuse of alkyl nitrite compounds and specific, sub-foveal changes. Whether this association is causal remains to be determined, and Davies *et al* suggest causality is likely.

What I find most striking about the cases attributed to 'poppers maculopathy' in the Davies series (and which is consistent with the two series from France) is the SD-OCT imaging—which has an uncanny resemblance to photic maculopathy (Figure 1). In both 'poppers maculopathy' and photic maculopathy, there is focal disruption of the IS-OS junction centred at the fovea.[1–4] Moreover, the size, shape, echogenicity, and temporal evolution of the SD-OCT lesions appear indistinguishable in the two conditions. Patients also present with the same symptoms (scotoma, reduced vision, and phosphenes) and have the same slit-lamp findings (a pale yellow foveal lesion).[1–4] Indeed, it appears that in people using poppers, the two conditions can only be reliably distinguished by eliciting a history of excess light exposure and not by clinical features.

Unfortunately, Davies *et al*[1] did not report to what extent excessive light exposure was specifically queried in their patients. In the two French series,[2,3] all patients 'denied staring at bright lights'—yet how reliable is their history? Poppers are frequently combined with psychotropic drugs and alcohol, which can alter consciousness and memory, potentially making history unreliable.[5] Poppers themselves can cause transient visual hallucinations and heighten sensory perception[5]—effects that are known to increase light-gazing behaviour in other recreational drugs such as LSD.[6] Poppers are frequently used in raves, where bright strobe lights and lasers are common.

Given the points discussed, it should be crucial when considering the diagnosis of 'poppers maculopathy' to document a thorough history of the patient's drug behaviour and light exposure. Do they take multiple drugs? Do they hallucinate or experience altered consciousness? Are they ever entranced by bright lights, candles, or the sun?

The endemic use of poppers[4] and the mere handful of reports of maculopathy suggests that compounding factors or susceptibilities may be involved. It is not inconceivable that 'poppers maculopathy' represents a sub-group of patients who have unrecognised photic injury. If poppers maculopathy is indeed a distinct entity, then the remarkable ultrastructural similarity with photic injury suggests that the two conditions share a common

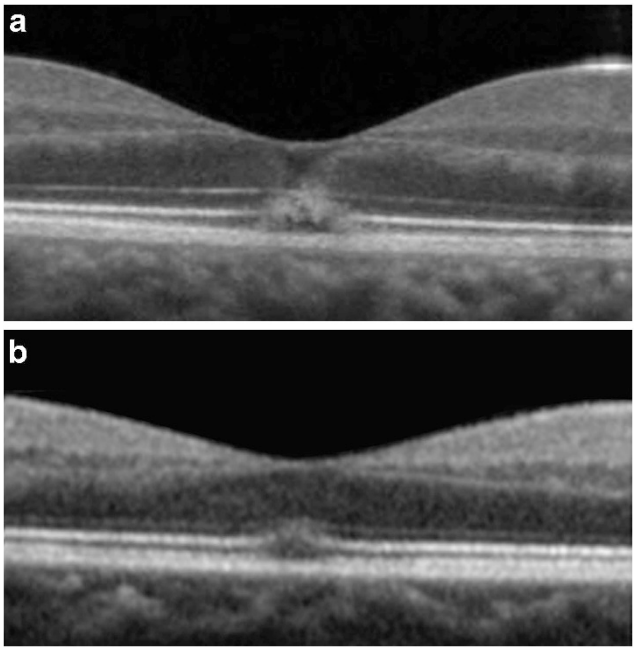

Figure 1 A comparison of SD-OCT images in (a) 'poppers maculopathy' as presented in Case 2 of Davies *et al*[1] with (b) photic retinopathy in a 30-year-old male who presented to my clinic 2 weeks after sun-gazing. Notice the similarity in location, size, shape, and echogenecity of the respective lesions in the IS-OS junction.

pathophysiological pathway. Perhaps poppers lower the threshold for retinal phototoxicity or otherwise trigger a biochemical cascade identical to that induced by photic damage.

Conflict of interest

The author declares no conflict of interest.

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Sir,

Response to Fajgenbaum

We thank Dr Fajgenbaum[1] for his interest in our recent case series of maculopathy in poppers users[2] and for debate on this matter with respect to photic maculopathy.

The similarity of clinical signs in 'poppers maculopathy' patients with those described in some patients with photic maculopathy is intriguing and as was also demonstrated in Dr Fajgenbaum's case report. We doubt the suggestion that poppers inhalation could lead to hallucinations or drastically altered consciousness, resulting in entrancement with bright lights or the sun. The psychogenic effects of poppers are well documented, but do not, in our opinion, lead to this sort of behaviour. It is also recognised that poppers use can be linked to abuse of other compounds, which may have more potent hallucinogenic effects. We also agree that as poppers are sometimes used in raves where exposure to unsafe use of laser lights is a potential risk, these matters need to be considered in the differential diagnosis of individuals with acquired foveal defects. To answer the question about substance abuse and exposure to light in our cases, a detailed drug and social history was taken. Cases were questioned about prolonged solar or other lights gazing and which was denied in all cases.

As we stated there were several features of our cases that support on the balance of probabilities evidence of causality of poppers maculopathy as based on the Bradford-Hill criteria. Mainster *et al*[3] has provided helpful advice on assessment of alleged retinal laser injury patients and which can also in our opinion be extrapolated to alleged photic retinal injury. Furthermore, it is now increasingly recognised that the signs of alleged solar maculopathy on SD-OCT imaging are varied. As discussed in our paper, it is not possible to prove causality of poppers maculopathy and we agree that differential diagnosis of outer lamellar defects can be challenging[4] and that a detailed history should be taken.

Conflict of interest

The authors declare no conflict of interest.

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