Short communication

Maculopathy due to drug inhalation

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ABSTRACT

Case report: A case of maculopathy due to “poppers” is described.
Discussion: Poppers is a drug composed of various forms of alkyl nitrite. A 39-year-old man, who had been using poppers for years, was seen in the clinic with phosphenes, reduced visual acuity and central scotoma. The SD-OCT in the right eye showed disruption at the level of the IS/OS junction line. The SD-OCT scan in the left eye showed an outer rectangular retinal hole and an outer retinal cyst.

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Maculopatía por drogas de inhalación

RESUMEN

Caso clínico: Se describe un caso de maculopatía por popper.
Discusión: Popper es una droga compuesta por varias formas de nitratos de alquilo. Un varón de 39 años, consumidor de popper durante años, acude a la consulta por fosfenos, pérdida de agudeza visual y un escotoma central. El SD-OCT en el ojo derecho presenta pérdida de continuidad a nivel de la línea IS/OS. El SD-OCT del ojo izquierdo muestra un agujero macular externo de aspecto rectangular y con bordes rectos, y un quiste macular externo.

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Introduction

Inhalation drugs known generically as “poppers” (recreational drugs) are drugs composed of alkyl nitrites; they are socially acceptable, as they are thought of as not having side effects.1,2 They come in a colorless liquid from with a strong odor and are distributed in pipettes to be inhaled. By inhaling their vapors, a sense of comfort, pleasure and lethargic bliss occurs. One study claims that poppers are less damaging to the health of users than other drugs,1 and, due to legal tolerance for this substance, there is an alarming rise in consumption among all

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This paper reports a patient with maculopathy resulting from regular consumption of this drug.

**Case report**

A 39-year-old patient who has lived most of his life in Britain. Patient complains of being unable to “see details in a whole” for the past 2 months, and phosphenes for the past 3 months, interfering with his professional work as an architect. He has no relevant ophthalmic history; however, after a while he admits to being a regular popper user (almost every week, for years). Visual acuity in his right eye (OD) is 1 and his left eye (OS) is 0.1. Fundus has no abnormalities except an irregular foveal reflex, especially in the OS (Fig. 1). Right eye (OD) SD-OCT (3D OCT-2000, Topcon) shows thickening and loss of continuity of photoreceptor integrity line (IS/OS line) (Fig. 2). Left eye (OS) SD-OCT shows an outer rectangular hole with straight edges going from the upper pigment epithelium to the outer limiting membrane, affecting the photoreceptor’s outer and inner segments, and a cyst not breaching the photoreceptor integrity line (Fig. 3). The rest of the eye examination was normal.

**Discussion**

Poppers, as they are known, are volatile aromatic nitrates (especially isopropyl nitrite), which when inhaled produce euphoric effects lasting 2–3 min. Upon inhaling, they increase blood flow in certain organs; the brain experiences a pleasant dizziness, and in the genitals, increased sensitivity and erection. Poppers are metabolized very quickly; therefore, users attempt to prolong their effects by increasing intake or dose. There is legal tolerance and lack of regulation for this drug. Thus, 10% of the British population has tried them. Although a previous study failed to demonstrate the major adverse health effects of this type of drug, today, we know it causes neurological problems for users. When it is swallowed in liquid form instead of being inhaled, severe gastrointestinal, hepatorenal damage and even death occur. When mixed with Ecstasy and Viagra, it can produce cardiovascular shock with cerebral edema and multiple embolisms. The patient described in this case is a regular popper user, with progressive loss of vision, central scotoma and phosphenes. Vision loss is considered rare, although phosphenes by poppers are frequent. Davies et al. published...
a case of seven patients with maculopathy resulting from inhalation of volatile nitrites with loss of vision, central scotoma, phosphenes and metamorphopsia. Audo et al.\(^1\) reported the loss of foveal photoreceptor outer segments in six chronic users. Vignal-Clermont et al.\(^3\) mention 4 users with the same foveal lesions in their ocular fundus related to yellowish foveal deposits. The patient reported herein was a weekly user for years; he had bilateral photopsias for 3 months, with 2 months of vision loss and central scotoma in his left eye. This case was peculiar in that no yellowish foveal deposits were found in the ocular fundus as described in the bibliography,\(^2\) and OD OCT showed thickening and loss of continuity of photoreceptor integrity line, a rectangular outer macular hole and an outer macular cyst in OS; therefore, it is considered that OD is in an early stage, and the cyst in OS is in an intermediate stage that will progress into a hole if chronic consumption or dose increase occurs.

The mechanism by which this drug causes damage to the subfoveal region is not well known. It is believed that volatile nitrites favor induction of nitric oxide synthase (ON) enzyme, prolonging NO production and interacting with photoreceptor metabolism. This maculopathy can be confused with other macular diseases, such as adult vitelliform dystrophy, solar maculopathy (popper users, during moments of ecstasy, can stare at strong light sources) and all possible causes of outer macular holes, especially due to poor or total lack of information from the patient.\(^3\) Ophthalmologists must be aware of the possibility of severe macular changes in inhaled-drug users, and suspect use when outer macular holes of unknown cause are detected.

### Conflicts of interest

The authors declare that they have no conflicts of interest.

### REFERENCES