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Charles Bonnet syndrome secondary to panretinal photocoagulation[☆]

Síndrome de Charles Bonnet secundario a panfotocoagulación retiniana

To the Editor:

Charles Bonnet syndrome (CBS) is a condition characterised by the appearance of visual hallucinations in patients with impaired vision and preserved cognitive status.^{1–3} Prevalence of CBS ranges from 1.84% to 3.15% although estimates are as high as 60% among patients with severely impaired vision. These high numbers may be due to lack of awareness of CBS; also, patients fear they will be regarded as mentally ill if they mention their hallucinations.^{1,4}

Although the underlying cause of CBS is unknown, the most widely accepted theory is neuronal deafferentation.⁴ According to this theory, loss of retinal stimulation causes decreased stimulation of the occipital cortex, but unlike in amaurosis, stimulation does not disappear completely. Residual afferent signals are thought to trigger the deafferentation phenomenon by causing histological, biochemical, and anatomical changes to the synapse in an attempt to compensate for the limited stimulation received. This transforms neurons into hyperexcitable cells.

Our patient was a 60-year-old man treated with argon laser panretinal photocoagulation (PRP) due to retinal ischaemia caused by diabetic retinopathy (DR). He had undergone 4 PRP sessions with 1500 burns per session (pulses of 500 microns and an exposure time of 0.1–0.2 s). The patient reported having seen moving, chromatic images of animals and faces immediately after each PRP session. These visions lasted 48–72 hours and appeared and disappeared abruptly. His personal history also included medically treated arterial hypertension and he reported no drug allergies. No other personal or family history was relevant.

Examination evidenced a visual acuity of 0.05 in both eyes (OU) and the anterior pole exhibited stable pseudophakia in OU. Intraocular pressure was 14 mmHg in OU and eye fundus revealed a clinically significant macular oedema and pigmented laser scars from PRP. The patient was transferred to the neuro-ophthalmology department

and diagnosed with CBS secondary to argon laser PRP as treatment for DR.

CBS is characterised by the presence of complex visual hallucinations which are usually persistent and often appear suddenly. Patients do not exhibit any other sensory hallucinations. Hallucinations may be simple, appearing as basic geometric lines and figures, or else complex and structured. They typically manifest as images of people, faces, or trees, and they do not make sounds. Images may also be in black and white or in colour, and they may be static or appear to move.⁵ In most cases, these hallucinations last less than 10 minutes and are usually repetitive in the form of a persistent fixed stereotype. The course of the disease is episodic, cyclical, or chronic, with a duration generally lasting less than 18 months, although the history in some published cases had lasted several years. In those patients in whom CBS progresses to amaurosis, paradoxical cessation may occur.

The cause originating these hallucinations is still unknown, but its trigger factors may include fatigue, dim lighting, and flash blindness.⁴ Development of CBS has also been associated with ophthalmological medical treatments,^{6–9} systemic treatments,¹⁰ surgery,¹¹ and systemic disorders.¹²

Photocoagulation is a procedure that uses a high-intensity beam of light to coagulate tissues. It is used to prevent fibrovascular proliferation in patients with retinal ischaemia, which occurs in diabetic retinopathy and retinal thrombosis. When light energy is absorbed by the tissue being treated, it is converted into thermal energy. When the tissue temperature is increased by the action of the laser, it results in denaturation of tissue proteins and coagulative necrosis. The efficacy of any type of photocoagulation depends on the extent to which light penetrates the ocular media and the degree of light absorption by the pigment on the treated tissue. Argon laser emits two wavelengths of light: blue-green (488–532 nm) and green (514 nm), which are mainly absorbed by the tissues that contain melanin or haemoglobin.^{13,14} They are therefore used to photocoagulate vascular lesions on the retina and choroid. Effects of laser on tissues of the posterior segment include photochemical and thermal effects, and vaporisation. Photochemical reactions can be induced by ultraviolet or visible light, which is absorbed by tissue molecules or photosensitising drug molecules which are subsequently converted into cytotoxic molecules (free radicals, etc.). The absorption of laser energy by the tissue pigment elicits a temperature increase of 10–20 °C, with the resulting protein denaturation. Vaporisation takes place when the temperature of a substance is raised above the boiling point and micro-explosions occur, as can be seen in excessively intense burns caused by an argon laser.^{13,14}

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Therefore, PRP in diabetic patients acts as a trigger factor for CBS during the time elapsed between tissue destruction/inflammation and cellular stabilisation of retinal tissue. The intracellular physical and chemical reactions that are generated might act as trigger factors for hallucinations by stimulating deafferented and hyperexcited neuronal cells.

We report the first case of CBS secondary to PRP, but since this entity is likely to be underdiagnosed at present, its true incidence is probably much higher. Management of patients with CBS requires a multidisciplinary approach, with participation by ophthalmologists, neurologists, and psychiatrists,¹⁵ in order to establish the correct diagnosis and treatment.

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