



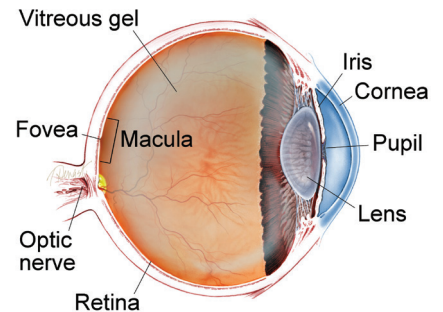
Charles Bonnet Syndrome (pronounced bo NAY) is a condition that causes people with decreased vision and various eye diseases to have visual hallucinations. These hallucinations can include seeing patterns, or more complex images such as people, animals, flowers, and buildings. CBS is named after the 18th century Swiss scientist, Charles Bonnet, who described this condition experienced by his grandfather, and who later developed it himself.

Symptoms: Hallucinations occur when the affected person is awake, and are usually purely visual and not associated with auditory (sound) hallucinations. A person with CBS is generally aware that images are not real, though he or she may initially be confused by them.

CBS hallucinations may be enjoyable or annoying, but are generally not frightening. They come and go, often over months or years, without obvious cause and occur without cognitive or psychiatric disease. About one in five people with retinal conditions such as macular degeneration experiences hallucinations, which can also occur in people with other macular diseases and ocular conditions such as glaucoma, as well as stroke.

CBS is more common in people aged 80 years and above, but can occur at any age. Experiencing CBS does not mean the individual's eye condition is worsening, and people can have visual hallucinations even if they have only mild visual loss or small blind spots in their vision. CBS is estimated to affect 10% to 30% of people with visual impairment involving both eyes, although the estimates may be lower than the true prevalence.

WHAT IS THE RETINA?



THE RETINA is a thin layer of light-sensitive nerve tissue that lines the back of the eye (or vitreous) cavity. When light enters the eye, it passes through the iris to the retina where images are focused and converted to electrical impulses that are carried by the optic nerve to the brain resulting in sight.

RISK FACTORS FOR CBS

- Visual impairment
- Older age
- Isolation
- Dark environments ●

continued next page



Figure 1
Normal vision



Figure 2
This simulation illustrates hallucinatory images characteristic of CBS. Individuals may see trees, animals or people that do not exist. Reports vary widely including those of seeing abstract hallucinations such as solid colors or patterns filling the field of vision.

Charles Bonnet Syndrome continued from previous page

Because hallucinations may cause some people to think they are “going crazy,” they may avoid telling anyone, including their doctors, for fear of what others may think. In the past, patients were sometimes mistakenly put under acute psychiatric care before it was understood that their hallucinations were due to visual loss. Doctors’ awareness of CBS has improved over the years and ophthalmologists need to consider the possibility of systemic conditions causing hallucinations. The history given by the patient can be very helpful in making the appropriate diagnosis of CBS.

Examples visual hallucinations reported by CBD patients:

- One woman sees people in her apartment, so when she sees a person, she checks her door to make sure no one has broken in, says hello, and goes back to her work.
- Another woman sees little girls with beautifully embroidered aprons. She loves looking at them but knows they can’t be real, because if they were, she would not be able to see the detail.
- One woman lost 25 pounds because she saw bugs in her food and stopped eating.
- One man thought he was seeing saints.
- Other people see houses, flowers, dogs, cats, and musical scores.
- One woman sees a grid with a pink background filling her whole visual field constantly. This has been very disturbing to her.

Causes: The exact cause of visual hallucinations is not known. Most researchers believe they are due to deafferentation: a loss of signals from the eye to the brain. There is some evidence from special MRI studies indicating that these signals normally inhibit nerve activity in the brain; when the signals are absent, there is more spontaneous nerve activity that is perceived as hallucinations.

Diagnostic testing: Visual hallucinations may be caused by other conditions, including psychiatric disease and neurologic conditions such as Parkinson’s disease and Alzheimer’s disease. Various prescription and illegal drugs can also cause visual hallucinations, as can withdrawal from drugs or alcohol. A patient should seek further evaluation if there are cognitive deficits (intellectual disabilities), or if any of these conditions apply.

Treatment and prognosis: Doctors have tried a number of medications, but there is no definitive treatment for **visual hallucinations**. Many patients improve over time; however, the hallucinations can go on for months or years. Blinking or closing their eyes helps some people with CBS. Others find it beneficial to improve their lighting or have more social interactions. ●

Clinical Terms (appearing green within fact sheet text)

Visual hallucinations: A visual perception that has the sense of reality but occurs without external stimulation of the visual system.

- Formed visual hallucination: Includes seeing objects such as people, animals, buildings, etc.
- Unformed visual hallucination: Includes seeing flashes of light, patterns, colors, etc.

THANK YOU TO THE RETINA HEALTH SERIES AUTHORS

Sophie J. Bakri, MD
Audina Berrocal, MD
Antonio Capone, Jr., MD
Netan Choudhry, MD, FRCS-C
Thomas Ciulla, MD, MBA
Pravin U. Dugel, MD
Geoffrey G. Emerson, MD, PhD
Roger A. Goldberg, MD, MBA
Darin R. Goldman, MD
Dilraj Grewal, MD
Larry Halperin, MD
Vi S. Hau, MD, PhD
Suber S. Huang, MD, MBA
G. Baker Hubbard, MD
Mark S. Humayun, MD, PhD
Peter K. Kaiser, MD
M. Ali Khan, MD
Anat Loewenstein, MD
Mathew J. MacCumber, MD, PhD
Maya Maloney, MD
Hossein Nazari, MD
Oded Ohana, MD, MBA
George Parlitsis, MD
Jonathan L. Prenner, MD
Gilad Rabina, MD
Carl D. Regillo, MD, FACS
Naryan Sabherwal, MD
Sherveen Salek, MD
Andrew P. Schachat, MD
Michael Seider, MD
Janet S. Sunness, MD
Eduardo Uchiyama, MD
Allen Z. Verne, MD
Christina Y. Weng, MD, MBA
Yoshihiro Yonekawa, MD

EDITOR

John T. Thompson, MD

MEDICAL ILLUSTRATOR

Tim Hengst