LIGHT UP

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LVPEI
L V Prasad Eye Institute
L V Prasad Marg, Banjara Hills
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World Health Organization
Collaborating Centre for Prevention of Blindness

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Glaucoma

Glaucoma, an eye disease that damages the optic nerve, is the second leading cause of global blindness and the third leading cause of blindness in India. It is estimated that 67 million people worldwide suffer from glaucoma (The Glaucoma Foundation, 2001). In India glaucoma affects 11 million people, of which 1.5 million become blind.

Glaucoma is known as the 'sneak thief of sight' because in more than 90% cases there are no manifest signs or symptoms, so that the patient may not even realize that his field of vision has been reduced. This happens because usually the peripheral vision is lost before the central vision is affected and is not easily detectable. Many people are unaware that they are losing their vision until, at times, less than 20% of their visual field remains. Most of the loss of vision from glaucoma is preventable if the disease is treated early enough.

Diagnosis of glaucoma

The diagnosis of glaucoma requires a detailed eye examination, though three factors are considered most crucial:

a) Intra-ocular pressure (IOP): This is assessed with an Applanation Tonometer attached to the slit lamp bio-microscope.

b) Condition of the optic nerve: The optic nerve that carries images from the eye to the brain is examined through a slit lamp after the pupil is dilated.

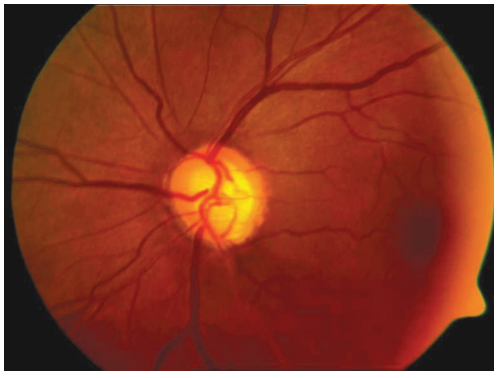

Fig 1: Glaucomatous optic nerve head

c) Visual field: The field of vision is tested by using the Automated Perimetry test.

Types of Glaucoma

Open angle glaucoma: This is the most common type of glaucoma where IOP increases due to a blockage in the eye's drainage system. The symptoms may not be apparent till too much damage has occurred.

Angle closure glaucoma: This form of glaucoma occurs due to blockage of fluid in the eye's drainage system due to structural abnormalities. A sudden onset of angle closure glaucoma can be an emergency, with accompanying symptoms such as pain, red eye, nausea and halos around lights.

Developmental glaucoma: This may be seen in infants from birth (congenital glaucoma) or in children and young adults (juvenile glaucoma).

Secondary glaucoma: Many diseases, injuries, surgeries and some medications can lead to a rise in the intra-ocular pressure.

Functional Implications of Glaucoma

- Peripheral field loss
- Reduced contrast sensitivity
- Reduced visual acuity
- Color vision deficiency
- Glare

Peripheral field loss

The diagnosis of glaucoma often happens *late* in the course of the disease, because the early stages of the disease are usually characterized by loss of peripheral vision, while the central vision is spared. Patients often fail to notice peripheral vision loss until it has progressed towards the

Fig 2: Picture that is seen through constricted field for a patient with advanced glaucoma

center of vision. Unless the patient is examined thoroughly by an eye doctor, he/she may be unaware that they have glaucoma. The only way glaucoma can be diagnosed in the early stages is by an examination by an eye doctor along with a test of the visual field, which measures the degree of vision loss due to optic nerve damage.

Reduced contrast sensitivity

Contrast sensitivity has been recommended as a screening and diagnostic test in glaucoma. Contrast sensitivity has an important role in day-to-day activities as objects in daily life have varying contrast sensitivities at different spatial frequencies.

Reduced visual acuity

Central vision may not be affected in glaucoma unless the visual field loss involves the central field.

Color vision deficiency

Glaucoma could lead to blue and yellow color vision deficiency.

Glare

Glaucoma can make the eyes severely sensitive to light and glare.

Problems in day-to-day activities

- Orienting oneself in both familiar and unfamiliar places
- Independent and safe traveling
- Crossing roads
- Searching for items
- Driving a vehicle
- Identifying vehicles while driving
- Bumping into objects frequently
- Walking down steps
- Recognizing faces
- Differentiating between 1 and 2 rupee coins
- Reading small print
- Personal care and grooming
- Signing documents, like cheques, forms, etc.
- Using a computer
- Matching the clothes

Low Vision Rehabilitation Management

Rehabilitation of patients with glaucoma depends on the functional problems in day-to-day activities. The main problem of patients is decreased mobility due to visual field loss; this can be managed only by using the other senses. Training is required for safe navigation by systematic horizontal and vertical scanning while crossing roads, and in ascending and descending stairs. The patient must be encouraged to perform outdoor activities in daylight rather than at night for proper orientation, especially in unfamiliar places. In case of advanced peripheral field loss driving must be avoided. In cases of severe visual impairment, using a cane may be useful. Using a sighted guide is another option for safe navigation, especially when crossing roads and in crowded areas. Using a flashlight in areas with poor illumination is useful especially in unfamiliar areas. For most patients, a combination of these techniques is useful.

Fig 3: A patient with glaucoma having advanced field loss being trained in outdoor mobility

The strategies for enhancing contrast are limited. Optimum lighting, minimizing glare and reversing or increasing print contrast, using common electronic devices such as closed-circuit television (CCTV) or computer based devices, are interventions used for enhancing contrast. If the contrast sensitivity is severely impaired, non-visual techniques such as audio books may be required.

Increasing the contrast of the edges of doorframes, furniture, stairs and walls by painting them in a contrast color can help in safe navigation. Non-optical devices such

as fiber-tipped black ink pens, bold line papers, and typoscopes help in enhancing the contrast while writing.

Inability to read can be managed by increasing the magnification, by using low vision devices (LVDs) such as telescopes, high add spectacles, hand and stand magnifiers and electronic devices such as CCTV. In patients with advanced field loss, the vision may not be improved with higher magnification. There may be a need to prescribe lower magnifications.

Information technology, computer literacy and information access is of crucial importance for everyone in society. Special software such as MAGic, Kurzweil 1000, and JAWS help the visually impaired to use computers.

a) MAGic: Magnifies text, menus and icons on the monitor up to 16 times. Additionally provides a speech output for the text displayed on screen. This software is recommended for people who have mild to moderate visual impairment.

b) JAWS: This screen-reading program enables the text displayed on the screen to be spoken by a speech synthesizer. This software is recommended for people who have severe visual impairment or total loss of vision.

c) Kurzweil 1000: Scans and reads printed text with accuracy, speed and reliability. Moreover, it opens and reads a broad variety of electronic text formats, and can efficiently search, download and read electronic books directly from the Internet. This software is recommended for all categories of visual impairment.

There is no treatment for color vision deficiency and, hence, alternative measures should be used. Patients with visual impairment often use other cues for identifying details. For those with additional problems, tactile clues or labels may help. For example, if buttons of the same contour are stitched on to a pair of clothes it becomes easy to match the garments.

Patients with problems of glare can be prescribed absorptive lenses such as tinted lenses, filters or polarizing glasses.

Supportive services

People who are legally blind (as defined by the Ministry of Welfare and Social Justice – best corrected visual acuity in he better eye should be less than 6/60 or the visual field loss is less than 10^0) are eligible for social benefits such as:

- Travel concessions, by bus, train, or air
- Postal – free postage of blind literature and educational materials
- Concessions in communication, i.e., telephone connections
- Customs concessions, i.e., in the import of training devices
- Conveyance allowance
- Educational scholarships
- Income tax deductions
- Bank loan subsidy and job reservations

These concessions can be availed of on production of a Medical Certificate of Blindness from a Government medical practitioner.

Case Story

Fifteen-year-old Fatima has had diminished vision since childhood due to congenital glaucoma in both the eyes. She was operated on at the age of two weeks for this condition. Over the years she lost her vision in the left eye. Her vision in the other eye was also low, even with glasses it improved only up to 6/60.

The impact of vision loss on Fatima was not noticed as she had the support of her caring parents, teachers and loving friends. She passed her ninth standard exam without much complaint, by doing her blackboard work from the front row and reading small print from a close distance. It was in the tenth standard that Fatima realized she was lagging behind her peers in her studies as she had problems in reading small print such as in a dictionary, maps, subscripts and superscripts in mathematics. The vision in her better eye had now reduced to 3/60.

It shook her confidence and self-esteem when she could not cope with the class work with her reduced vision. It was a miracle for Fatima when she found she could read the blackboard again using the 4X monocular telescope. She could also read fine print with a 3x foldable pocket magnifier. She was given a structured training program in the use of the devices. She also received a medical certificate certifying to her visual handicap that helped her get extra time allotment in her board exams.

Fatima says she is very grateful to the Vision Rehabilitation Centres for boosting her self-confidence and helping her to compete with her peers.

Low vision training – LVPEI to Zambia

Ms Florence Mwansa, Clinical Research Officer, from Zambia underwent a short-term fellowship in low vision rehabilitation and she was extremely satisfied with the training program. In her own words this is what she has to say about the training program, "…. I was sponsored by Christoffel Blindenmission to do a three months training program in low vision care at L V Prasad Eye Institute from July to September 2006. The training has really been beneficial to me and my country; there is a need to set up a low vision centre at my hospital, because there is none in the whole country…I am happy to go back to my country, ready to attend to all the patients whose vision cannot be improved even after the best treatment, best refraction and best surgery".

Low vision awareness program: The 15th Low vision Awareness Program (LAP) for eye care professionals was conducted successfully from August 11-13, 2006. A total of 21 professionals from all over the country participated in the program.

3-month short-term fellowship program: Mr Manish Mayer, Eye and Child Care Clinic, Lucknow, completed the fellowship program in low vision care from August 1 – October 31, 2006.

Mr Birendra Pratap Singh, Neelkanth Paramedical Institute, Sirsaganj, Ferozabad, Uttar Pradesh, joined the fellowship program from October 1 – December 31, 2006.

Mr Samrat Sarkar, Rajan Eye Care Hospital, Chennai, joined the fellowship program from November 1 – January 31, 2007.

Support

Prof Lee Hae Jung, YeoJoo Institute of Technology (YIT), Korea, gave a donation for the Vision Rehabilitation Centres.

Visitors

Mr Leonor Beleza, President, Champalimaud Foundation, Portugal, visited the Vision Rehabilitation Centres on October 8, 2006.

World Sight Day celebrations

L V Prasad Eye Institute commemorated **World Sight Day** from October 12 – 14, 2006, through a three-day program conducted at Prasad's IMAX complex. The Vision Rehabilitation Centres set up a desk at the exhibition, displaying optical and non-optical devices and assistive devices, useful for persons with low vision and irreversible blindness. The VRC staff was supported by its committed volunteer base.

Awareness campaigns on eye donation and the rights of the disabled were conducted with focus groups of industrialists, corporate leaders and the general public, from October 13-15, 2006. This program was supported by UTI Bank, Secunderabad.

Fun Camp

A fun camp for visually challenged children was conducted by the Vision Rehabilitation Centres on November 26, 2006, at Jalagam Vengala Rao Park. The A total number of 174 children participated enthusiastically, including 54 visually challenged children, 50 siblings, and 70 family members. The children included some with no vision, some with low vision and some with multiple handicaps. Several group and individual sports and games were conducted; prizes were awarded to the winners and runners-up. The competitions conducted included sack race, frog race, musical chairs, running, singing, and a quiz program. All the children received a special gift for participation.

You can make a difference

Your contribution can help the Vision Rehabilitation Centres in several ways: provision of low vision devices to underprivileged children, training optometrists in detection and rehabilitation of the blind and those with incurable low vision, and conducting community programs for rehabilitation of persons with visual impairment.

Contributions to the Hyderabad Eye Institute and Hyderabad Eye Research Foundation are tax deductible. Donations above Rs 250 are exempt under Section 80G of the Income Tax Act 1961 for Hyderabad Eye Institute and under section 35(i) (ii) for Hyderabad Eye Research Foundation.

For more information please contact

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Greeting cards based on paintings by children with visual impairment are available for sale. Please contact Vision Rehabilitation Centres, LVPEI.