Overview

Do you or a family member have glaucoma? Do you wonder what this diagnosis means? Glaucoma affects tens of millions of people worldwide. Despite its prevalence, many people lack accurate information about this disease. The goal of this course is to provide glaucoma-related information that can help you take an active role in adjusting to life with glaucoma.

This course consists of five lessons. Lesson 1 discusses the human eye and several forms of glaucoma. Lesson 2 explains how glaucoma is diagnosed. Lesson 3 describes treatments for this disease. Lesson 4 discusses the emotional impact of the visual impairment that results if glaucoma is not diagnosed and treated. And finally, Lesson 5 explains ways to continue daily activities if vision loss occurs. The material in this course is informational only; it constitutes neither the advice of a medical doctor nor that of a rehabilitation specialist or professionals who are qualified to diagnose and treat glaucoma and any resulting visual impairment.
For your convenience, some lessons begin with a list of key terms to introduce and define words that may be unfamiliar. Each lesson also includes section reviews. The section reviews in the lessons are for your personal development only. Do not send your answers to your Hadley instructor. You can always contact your instructor, however, to either clarify these activities or discuss your work. Students who routinely complete the section reviews perform significantly better on assignments.

To complete this course you are required to submit five assignments, one at the end of each lesson. These assignments enable your instructor to assess your mastery of the material in the lessons. Refer to the Getting Started instructions for information about how to prepare and submit assignments.

To personalize the course, some assignment questions ask you to apply material in a lesson to you or your family member. In responding to such questions, include only information that you are comfortable revealing. Moreover, if applicable, to respect your
relative’s privacy, do not identify your relative by full name in any assignment.

If you are ready to learn about glaucoma, begin Lesson 1: What Is Glaucoma?
Lesson 1: What Is Glaucoma?

Glaucoma is an eye disease that causes damage to the optic nerve and loss of peripheral (outer) vision. Elevated eye pressure is also usually present. If left undiagnosed and untreated, glaucoma can result in blindness. Glaucoma occurs most often in people over the age of 40, but it can also affect infants, children, and young adults. What does it mean to have glaucoma? What puts a person at risk of developing this disease?

Lesson 1 explains the workings of a healthy eye. It also describes the progression and risk factors for glaucoma. First, the lesson discusses primary open-angle glaucoma, the most common form of the disease. Then it discusses some less common forms, including normal-tension glaucoma, closed-angle glaucoma, congenital glaucoma, and secondary glaucoma. Recognizing glaucoma helps you take an active role in adjusting to life with glaucoma.
Objectives

After completing this lesson, you will be able to
a. list the parts of an eye and describe their functions
b. describe primary open-angle glaucoma
c. describe several other forms of glaucoma

Key Terms

The following terms appear in this lesson. Familiarize yourself with their meanings so that you can use them in your course work.

**anterior chamber:** front compartment of the eye that is filled with a clear watery fluid and is surrounded by the cornea, iris, lens, and pupil

**aqueous humor:** clear watery fluid that fills the anterior and posterior chambers of the eye; nourishes eye tissue

**ciliary body:** tissue that is located behind the iris and that produces the aqueous humor

**closed-angle glaucoma (CAG):** an eye disease in which the space called the “angle” between the iris and the cornea is narrowed or blocked. The aqueous humor then cannot drain from the eye, causing an increase in pressure within the eye.
cornea: clear tissue that covers the front of the eye and through which rays of light enter the eye

intraocular pressure (IOP): pressure inside the eye

iridocorneal endothelial syndrome (ICE): a condition that is caused by the cornea adhering to the iris and blocking the drainage of aqueous humor from the eye

iris: thin membrane that gives the eye its color; muscles in the iris allow changes in the size of the pupil

lens: part of the eye that is located behind the iris and that focuses light onto the retina

normal-tension glaucoma (NTG): a form of glaucoma in which damage occurs to the optic nerve without eye pressure exceeding the normal range

optic disc: located in the retina, it is the site where nerve fibers from the retina come together to form the optic nerve

optic nerve: bundle of nerve fibers that is located at the back of the eye that carries electrical impulses from the retina to the brain
posterior chamber: part of the eye that is behind the anterior chamber, between the iris and the lens, and is filled with aqueous fluid

primary open-angle glaucoma (POAG): an eye disease that causes damage to the optic nerve as a result of the slower-than-normal exit of aqueous humor through the eye’s normal drainage channel

pupil: opening in the center of the iris through which light passes; in normal eyes, it appears as a dark circle

retina: innermost layer of the eye; converts light energy into electrical impulses, which are sent to the brain through the optic nerve

Schlemm’s canal: a draining channel that is located below the trabecular meshwork and that carries aqueous humor away from the eye

crera: a thin yet tough protective shell that surrounds the eye and is commonly called the white of the eye

trabecular meshwork: the part of the “angle” of the eye located between the iris and the cornea; aqueous humor passes through this tissue as it exits the eye
uveoscleral pathway: minor pathway that allows aqueous humor to exit the eye through the sclera

The Healthy Eye

This section describes the human eye and how it works. This information will give you a better understanding of glaucoma and its effect on vision. It will also provide you with the vocabulary necessary for discussing this disease. Note, however, that this is not an in-depth study of the eye. Such detail is beyond the scope of this course.

How does a person see? Rays of light pass through the cornea and aqueous fluid, and enter through the pupil and lens. The light passes through the space in the back of the eye that is filled with a gel called the vitreous, and the light then hits the retina. In the retina light energy is converted to electrical energy that is sent to the brain through the optic nerve. The brain interprets the received electrical energy as vision.

Now consider this process in terms of parts of the eye. To start, the sclera is a thin yet very strong protective shell that surrounds the eye and is commonly known as
the white of the eye. The cornea, the clear tissue through which light enters the eye, bends the rays of light, which then pass through the anterior, or front, chamber of the inner eye.

The cornea, iris, lens, and pupil surround this chamber, which contains the fluid called aqueous humor. In the back of the anterior chamber is the iris, a thin membrane that gives the eye its color. The opening in the center of the iris is called the pupil, and it appears as a dark circle. By controlling the size of the pupil, the iris regulates the amount of light that reaches the retina.

Light passes through the pupil and the lens, which is located behind the iris. The lens focuses incoming light onto the retina, the innermost part of the eye. The retina converts the light energy into electrical impulses, which are sent to the brain through the optic nerve. Finally, the brain interprets these impulses as images that a person sees. The optic nerve consists of more than one million nerve fibers, all of which originate in the retina. The place in the back of the eye where the
fibers come together to form the optic nerve is called the optic disc.

A few additional parts of the eye are relevant to the study of glaucoma. The ciliary body, located behind the iris, produces the fluid called aqueous humor. Aqueous humor flows into the posterior chamber, which is located between the lens and iris and then passes through the pupil into the anterior chamber. This fluid nourishes eye tissue, and its presence helps maintain the shape of the eye. This pressure is called intraocular pressure (IOP). Normally, the volume of fluid produced by the ciliary body within the eye is the same as the amount of fluid leaving the eye. This balance of production and exit of aqueous fluid creates a normal IOP that is between 12 and 21 millimeters of mercury (mmHg).

For the most part, aqueous humor leaves the eye after passing through the trabecular meshwork, a tissue located between the cornea and the iris. After passing through the meshwork, the fluid enters the Schlemm’s canal, a structure that functions like a pipe or drain to transport the fluid away from the eye. In addition, the
uveoscleral pathway is a minor route for aqueous humor outflow. In this case, the fluid passes through small channels in the sclera.

Now study the following diagram of the human eye. Although basic, it includes most of the eye parts mentioned in this discussion.

**Figure 1-1: Eye Diagram**

![Eye Diagram](image)

**Credit:** Adapted from illustration NEA08, courtesy of National Eye Institute, National Institutes of Health
Section Review

Indicate whether the following statements are true or false. If the statement is false, reword it to make it true.

1. The sclera is known as the white of the eye.
   
   True

2. Fluid leaves the eye through only one route.
   
   False. Fluid leaves the eye through the trabecular meshwork and the Schlemm’s canal and to a lesser extent, through the uveoscleral pathway.

3. The pupil controls the size of the iris.
   
   False. The iris controls the size of the pupil.

4. The optic nerve consists of more than one million nerve fibers.
   
   True
Select the best answer for each of the following items.

5. Which part of the eye produces aqueous humor?
   a. retina  
   b. cornea  
   c. ciliary body  
   d. optic nerve

   The correct answer is (c). The ciliary body produces aqueous humor.

6. Which of the following is the clear tissue that covers the front of the eye?
   a. retina  
   b. optic nerve  
   c. ciliary body  
   d. cornea

   The correct answer is (d). The cornea is the clear tissue that covers the front of the eye.
7. Which of the following is the thin membrane that gives the eye its color?
   a. iris
   b. lens
   c. pupil
   d. retina

   The correct answer is (a). The iris is the thin membrane that gives the eye its color.

8. Which part of the eye focuses light onto the retina?
   a. iris
   b. lens
   c. pupil
   d. retina

   The correct answer is (b). The lens of the eye focuses light onto the retina.

This section explained the basic parts of the human eye and their functions to help you better understand glaucoma.
Primary Open-Angle Glaucoma (POAG)

Although several types of glaucoma exist, the most common one is POAG. This form of glaucoma takes its name from the shape and size of the angle between the cornea and the iris. The term primary means occurring without a known reason. This section describes the progression and risk factors of POAG. During this discussion, you may refer to the previous section to review the parts of the eye and their functions.

POAG is an eye disease that causes damage to the optic nerve. How does this occur? Recall that the ciliary body produces a fluid called aqueous humor, which fills the posterior and anterior chambers. The aqueous humor then leaves the eye primarily by passing through the trabecular meshwork to the Schlemm’s canal. If the production and outflow of the aqueous humor is balanced, the intraocular pressure (IOP) remains normal.

Sometimes, however, the drainage of the aqueous humor from the eye is reduced due to changes in the trabecular meshwork. The aqueous humor cannot reach the Schlemm’s canal easily enough to be removed from
the eye. The eye is a closed compartment, so if the accumulating aqueous humor cannot escape, the IOP will rise. Elevated IOP is potentially dangerous. If the eye pressure is high enough for a long time, it permanently damages the eye, in particular, the optic nerve. Why the optic nerve? It is the part of the eye that is most easily damaged by the increased pressure.

Damage occurs at the part of the optic nerve called the optic disc. A normal optic disc looks like a round or slightly oval-shaped doughnut. It has an outer rim that surrounds a central area called the cup. With glaucoma, the rim progressively thins and the cup increases in size. This process is known as “cupping.” Cupping occurs as the elevated IOP destroys the fibers of the rim of the optic nerve.

When a sufficient number of nerve fibers have been destroyed, irreversible and sometimes progressive vision loss develops. The initial loss of vision is noted in the peripheral field, which includes top, right, left, and bottom fields of vision. The loss of peripheral vision is usually very gradual, often taking months or years, and affected individuals often are not aware of the vision
loss until it becomes advanced. By the time the vision loss is noticed, many optic nerve fibers have been destroyed. The fibers of the optic nerve do not regenerate, and vision loss is permanent.

If the disease progresses, the field of vision continues to narrow, resulting in “tunnel vision.” A person with tunnel vision sees as if looking through a tube or a pipe. What is seen may be sharp and clear, but peripheral vision may be totally lost. The following figures show a scene first as someone with healthy eyesight sees it and then as someone with tunnel vision may see it.
Figure 1-2: Scene as Viewed with Healthy Vision

Credit: National Eye Institute, National Institutes of Health
Reference: EDS01

Figure 1-3: Scene as Viewed with Tunnel Vision

Credit: National Eye Institute, National Institutes of Health
Reference: EDS02
In more advanced stages of the disease, the central, or straight-ahead, vision deteriorates and may ultimately be lost. Central vision is essential for reading, driving, and recognizing people or objects. Glaucoma reaches its final stage when all optic nerve fibers have died, resulting in total blindness. Although loss of vision from glaucoma is irreversible, if glaucoma is diagnosed and treated either with medication or surgery, further loss of vision can be slowed or halted.

POAG has no early warning signs, neither pain nor other symptoms. In fact, vision stays seemingly normal until the more advanced stages of the disease when most optic nerve fibers are destroyed. Because of this, POAG is often called the “sneak thief of sight.” Some symptoms that may develop in the later stages of the disease, however, include the following:

- night blindness
- blurred vision
- decreased response to magnification
- reduced peripheral vision
- increased illumination requirements
- inability to adjust the eyes to darkness
Once detected, glaucoma usually responds well to medical or surgical treatment, but even with proper treatment, a small number of people with POAG may still lose their vision. Also, because this disease is chronic, or ongoing, anyone diagnosed with it must adhere to a lifelong treatment plan.

Everyone has some risk of developing this form of glaucoma. Certain factors, however, increase a person's chances of developing POAG. These factors include the following:

- **Age**: POAG occurs more often in older people, especially those over the age of 60.
- **Diabetes**: POAG occurs more often in people with diabetes. Also, the longer a person has diabetes, the greater his or her risk of developing POAG.
- **Extreme myopia**: This is extreme nearsightedness.
- **Family history**: If you have family members, especially immediate relatives, with POAG, you are at a higher risk of developing this disease. Immediate relatives include parents and siblings. Not everyone with a family history, however, develops POAG.
• **Ocular hypertension**: This term refers to increased IOP, the most important risk factor in predicting whether a person will get POAG. A “glaucoma suspect” is a person with increased IOP, but without damage to the optic nerve and visual fields. People with ocular hypertension must be examined regularly so that treatment can be initiated promptly if the diagnosis changes from “ocular hypertension” to “POAG.”

• **Race**: POAG is a common cause of blindness in individuals of African origin. In fact, in the United States, African-Americans are more likely to develop POAG and more likely to go blind from the disease than other ethnic groups. Moreover, African-Americans often develop POAG at a younger age than do other ethnic groups.

Risk factors are not causes of glaucoma, but they are associated with glaucoma. Therefore, having a risk factor does not mean that a person will with certainty develop the disease. Doctors recommend that people at higher risk have more frequent eye exams. For conditions that can cause glaucoma, see the section “Secondary Glaucoma” in this lesson.
Section Review

Indicate whether the following statements are true or false. If the statement is false, reword it to make it true.

1. POAG is the most common form of glaucoma.
   
   True

2. POAG takes its name from the shape and size of the angle between the cornea and the iris.

   True

3. Age is the most important risk factor in predicting whether a person will develop POAG.

   False. Age is only one of several risk factors that make it more likely that an individual will develop POAG.

4. Risk factors for glaucoma are direct causes of the disease.

   False. Risk factors for glaucoma are associated with the disease but do not cause it.
Select the best answer for each of the following items.

5. In POAG, what does primary mean?
   a. occurring due to injury
   b. occurring without a known reason
   c. related to central vision
   d. related to peripheral vision

   The correct answer is (b). In POAG, primary means occurring without a known reason.

6. In some people, which part of the eye is damaged by elevated IOP?
   a. optic nerve
   b. ciliary body
   c. sclera
   d. cornea

   The correct answer is (a). In some people, elevated IOP can damage the optic nerve.

7. Which of the following applies to POAG?
   a. It shows early warning signs.
   b. It occurs less often in people with diabetes.
   c. It occurs more often in older people.
   d. It has no relation to family history.

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The correct answer is (c). POAG occurs more often in older people.

8. Which field of vision does POAG affect first?
   a. intraocular
   b. central
   c. aqueous
   d. peripheral

   The correct answer is (d). POAG first affects peripheral vision.

This section discussed the progression and risk factors of POAG, the most common form of glaucoma. With this disease, slowed flow of aqueous humor through the trabecular meshwork and into the Schlemm's canal causes a buildup of aqueous humor in the eye. In turn, the IOP increases, potentially damaging the optic nerve. If untreated, POAG can result in blindness. Because it has no early warning signs, POAG is often called the “sneak thief of sight.”

**Other Types of Glaucoma**

This section discusses the progression and risk factors of less common forms of glaucoma. They include
normal-tension glaucoma, closed-angle glaucoma, congenital glaucoma, and secondary glaucoma.

**Normal-Tension Glaucoma (NTG)**

With this form of glaucoma, the IOP stays within the normal range. Nonetheless, the optic nerve and visual field suffer damage typical of POAG. The two diseases follow a similar course. Risk factors for NTG include a family history of the disease and Japanese ancestry. NTG has no definitive cause. Doctors believe it is due, in part, to poor blood circulation in the optic nerve. A mechanical weakness of the optic nerve is another possible cause. This disease is also known as low-tension glaucoma or normal pressure glaucoma.

**Closed-Angle Glaucoma (CAG)**

This disease is the second most common form of glaucoma. It commonly has an abrupt onset and is a true ocular emergency. The anatomical shape of the angle of some eyes make those eyes susceptible to an acute rise of eye pressure when the pupil dilates, or becomes larger. The dilation causes the iris to narrow and block the trabecular meshwork in the angle, effectively blocking the flow of aqueous humor from
the eye. As a result, fluid can no longer leave the eye; the sudden rise in eye pressure is called an angle-closure glaucoma attack.

In an angle-closure attack, the IOP must be lowered as quickly as possible to prevent damage to the eye. Without treatment, blindness can result in a matter of hours. Therefore, it bears repeating: CAG is a medical emergency requiring prompt treatment.

People with anatomically narrow angles are susceptible to a CAG attack whenever the pupils dilate, such as when entering a dark room. Drugs that dilate the pupil can also trigger an attack. These include some antidepressants, cold medications, and antihistamines, as well as some medications to treat nausea. The pupil normally dilates when a person is excited or anxious, so an acute glaucoma attack may occur during times of stress.

Most people develop CAG without any warning signs prior to an attack. Symptoms of an attack of CAG include a combination of the following:
• sudden onset of blurred vision
• redness of the eye
• severe eye pain
• halos around lights
• severe headache
• nausea
• vomiting

Not all people with CAG experience an acute attack. Instead, some people have minor attacks that end on their own when the pupil constricts. These attacks may have very mild symptoms that many people ignore. Other people have multiple minor attacks over a long period of time that lead to the development of chronic angle-closure glaucoma. In this case, the iris gradually blocks the outflow of aqueous humor through the trabecular meshwork. At the same time, adhesions, or scar tissue, form between these two structures. The IOP rises when a significant amount of scarring has occurred, that is, enough to block the drainage angle. In this case, treatment can prevent an acute attack, but the chronic form of the disease can persist and require lifelong treatment.
The following are risk factors for CAG:

- ages 40 and older, but it can occur at younger ages
- Asian descent
- Inuit descent
  (Note that Inuit refers to the Eskimo people of North America and Greenland.)
- family history
- farsightedness
- presence of a narrow angle

Recall that risk factors are associated with glaucoma but do not cause it. People with risk factors do not necessarily develop the disease. They should, however, have a complete eye exam at least every year or more frequently if suggested by their doctor.

Finally, CAG can be secondary (occurring after a previous illness or eye injury). This disease is also known as acute glaucoma or angle-closure glaucoma.

**Congenital Glaucoma**

This rare form of glaucoma occurs in infants and young children. The disease is commonly diagnosed within the
first year of life. Infants may have the following symptoms: abnormal sensitivity to light, enlargement of the eye, cloudy cornea, and excessive tearing. Congenital glaucoma is the result of abnormal development of the trabecular meshwork during the prenatal period. The resulting structural defects cause slow drainage, resulting in high IOP. As in other forms of glaucoma, the optic nerve is damaged. Surgery, however, when done promptly, can correct the structural defects and thereby preserve a child’s vision.

Genetics usually plays a role in this type of glaucoma. In fact, most cases are inherited. A viral infection (rubella) in the mother during pregnancy is also a risk factor. People between the ages of 3 and 30 can develop a similar, but sometimes less serious, form of the disease called juvenile glaucoma.

**Secondary Glaucoma**

Secondary glaucoma may be mild or severe. It may also be either open- or closed-angle glaucoma. It can result from other ocular conditions, including the following:

- eye surgery
- eye injuries (trauma)
• eye tumors, both benign and malignant
• eye inflammation
• advanced cataracts

Glaucoma develops when these conditions cause a mechanical disruption or physical change in the aqueous drainage system. Trauma to the eye may include a blunt trauma, chemical or thermal burn, or penetrating injury. Glaucoma as a result of trauma can develop immediately or commonly, months or years later.

Also, using steroids or cortisone for longer than a short period of time may increase eye pressure. If not treated, the elevated IOP may lead to glaucoma and optic nerve damage. Steroid eyedrops can cause the IOP to rise. Therefore, it is essential that doctors monitor people taking this form of medication. Elevated IOP can also occur with the use of oral steroids. Moreover, people who use steroid inhalers to control asthma may also develop elevated IOP. Note, however, that these cases are more likely to occur when the dosage is high and is taken for an extended period, but
some people will develop elevated IOP if low doses of steroids are taken over a long period of time.

Secondary Open-Angle Glaucoma

Two of the most common forms of secondary open-angle glaucoma are “pigmentary” and “pseudoexfoliative.” Pigmentary glaucoma may be diagnosed in younger adults, between the ages of 20 and 50. In those who are affected, very small pieces of pigment separate from the iris and are carried by the aqueous humor to the trabecular meshwork where they accumulate and obstruct the flow of aqueous humor from the eye. The IOP then increases, possibly damaging the optic nerve. Many people with this glaucoma experience transient episodes of blurred vision and mild eye pain after exercising. Most people however, have no early symptoms. Most often, it is diagnosed after a routine eye exam that detected an elevation of IOP and pigmentation loss from the iris.

Pigmentary glaucoma has several risk factors. It is more common in men than in women and in people who are nearsighted. People with pigment dispersion
syndrome, in which pigment is lost from the iris, are more likely to develop this type of glaucoma.

With pseudoexfoliative glaucoma, a whitish material accumulates on the surface of the lens of the eye. As the iris moves, this material is rubbed off the lens, and pigment also falls off the back of the iris. Both materials accumulate on the trabecular meshwork and obstruct the overflow of aqueous humor from the eye. The IOP then increases, sometimes to very high levels, thereby damaging the optic nerve. This type of glaucoma may appear in only one eye, or it may develop in one eye long before the other.

This form of glaucoma has several risk factors. It is more common among people of European descent. It is also more common in older adults, people over the age of 50.

**Secondary Closed-Angle Glaucoma**

Several forms of secondary closed-angle glaucoma exist. Iridocorneal endothelial (ICE) syndrome is one of them. With this syndrome, adhesions form where the iris and cornea are near each other in the angle of the
eye. Outflow of aqueous humor is blocked, which causes elevation of IOP. Distortion of the iris and pupil, as well as swelling of the cornea, are noted upon physical examination of the eye. The syndrome is usually present in only one eye. It is also more likely to occur in people between the ages of 30 and 50. As in other forms of glaucoma, people affected by ICE may have no symptoms. Any type of glaucoma may result in optic nerve damage and blindness. Moreover, if an acute glaucoma attack occurs, it is a medical emergency that requires immediate care to prevent rapid, permanent vision loss.

Neovascular glaucoma is another form of secondary closed-angle glaucoma. In this disease, blood vessels grow into the angle of the eye and interfere with the function of the trabecular meshwork. Neovascular glaucoma may produce no early symptoms, but many people ultimately experience a chronically red, painful eye. In addition, this glaucoma is usually very difficult to control. It is also associated with other disorders such as diabetes and poor circulation in the eye. As with other forms of glaucoma, this form of glaucoma
can lead to blindness, and in its acute form, it is a medical emergency.

**Section Review**

Indicate whether the following statements are true or false. If the statement is false, reword it to make it true.

1. Closed-angle glaucoma (CAG) results in a medical emergency.
   
   True

2. Asian descent is a risk factor for CAG.
   
   True

3. Congenital glaucoma results from a structural defect in the iris.
   
   False. Congenital glaucoma results from a structural defect in the trabecular meshwork.

4. Scars block the trabecular meshwork in neovascular glaucoma.
False. Blood vessels block the trabecular meshwork in neovascular glaucoma, whereas scars block this structure in glaucoma resulting from ICE syndrome.

Select the best answer for each of the following items.

5. Which of the following applies to normal-tension glaucoma (NTG)?
   a. It has no definitive cause.
   b. It involves elevated IOP.
   c. It results from exfoliation.
   d. It is the most common type of glaucoma.

   The correct answer is (a). NTG has no definitive cause.

6. In a person with CAG, when might an acute glaucoma attack occur?
   a. when the pupil constricts
   b. when the pupil dilates
   c. when the angle is open
   d. when the IOP is normal

   The correct answer is (b). In a person with CAG, an acute glaucoma attack might occur when the pupil dilates.
7. Which of the following is a risk factor for CAG?
   a. wide drainage angles
   b. narrow drainage angles
   c. an enlarged optic nerve
   d. an enlarged ciliary body

   The correct answer is (b). Narrow drainage angles are a risk factor for CAG.

8. Which of the following applies to pseudoexfoliative glaucoma?
   a. It is more common in children and young adults.
   b. It is more common in people of Asian descent.
   c. Whitish material accumulates on the lens of the eye.
   d. Whitish material accumulates on the ciliary body.

   The correct answer is (c). With pseudoexfoliative glaucoma, whitish material accumulates on the lens of the eye.

This section discussed the progression and risk factors of less common forms of glaucoma. They include NTG,
CAG, congenital glaucoma, and secondary glaucoma. Like POAG, these forms of the disease can result in blindness. To protect your vision, doctors recommend regular eye exams, which are discussed in Lesson 2.

**Summary**

This lesson described some basic parts of the human eye, as well as their functions. It also discussed the progression and risk factors of POAG, the most common form of glaucoma. Moreover, this lesson discussed the progression and risk factors of some less common forms of glaucoma. They include normal-tension, closed-angle, congenital, and secondary glaucoma.
Assignment 1

For general instructions on completing assignments, refer to the Getting Started instructions. Then start this assignment by giving your full name, address, and phone number. Also list the name of this course, Assignment 1, your instructor’s name, and the date. Be sure to include the question number along with each answer. This assignment is worth 100 points.

Multiple Choice

Select the best answer for each of the following items. (3 points each; 30 points total)

1. What fluid flows through the posterior and anterior chambers of the eye?
   a. ciliary body
   b. optic nerve
   c. aqueous humor
   d. trabecular meshwork
2. Which part of the eye converts light into electrical impulses?
   a. iris
   b. retina
   c. lens
   d. pupil

3. Which part of the eye carries impulses to the brain?
   a. retina
   b. cornea
   c. ciliary body
   d. optic nerve

4. What is the opening in the center of the iris?
   a. lens
   b. cornea
   c. pupil
   d. retina
5. Which part of the eye do the cornea, iris, pupil, and lens surround?
   a. ciliary body
   b. peripheral vision
   c. Schlemm’s canal
   d. anterior chamber

6. With primary open-angle glaucoma (POAG), where in the eye does clogging occur?
   a. optic nerve
   b. ciliary body
   c. posterior chamber
   d. trabecular meshwork

7. Which of the following applies to a cupped optic nerve?
   a. The cup is enlarged.
   b. The cup is smaller.
   c. The rim is bright red.
   d. The rim is enlarged.
8. How soon can blindness occur if an acute glaucoma attack is NOT promptly treated?
   a. within a few hours or days
   b. within one or two weeks
   c. within one or two months
   d. within one or two years

9. Which of the following is a risk factor for closed-angle glaucoma (CAG)?
   a. age below 40
   b. nearsightedness
   c. Inuit descent
   d. European descent

10. Which of the following applies to pigmentary glaucoma?
    a. It is a primary form of glaucoma.
    b. Flakes of pigment fall off the iris.
    c. Flakes of pigment fall off the retina.
    d. Whitish material builds up on the lens.
Short Answer

Answer each of the following items in a brief paragraph or list: (4 points each; 40 points total)

11. Explain the role of aqueous humor in a healthy eye.
12. Explain how the iris regulates the amount of light passing through the cornea into the eye.
13. What is the difference between the trabecular meshwork and the uveoscleral pathway?
14. Name four symptoms of POAG that may develop in its later stages.
15. Name four risk factors for POAG.
16. Why is POAG called the “sneak thief of sight”?
17. What is a “glaucoma suspect”?
18. Name four possible symptoms of CAG.
19. What are four possible symptoms of congenital glaucoma?
20. What are four conditions that can result in secondary glaucoma?

Essay

Respond to the following question with a brief, complete answer. (30 points)
21. How did five pieces of information in this lesson help you better understand your own or your family member’s glaucoma?

When you have completed this assignment, proceed to Lesson 2: Diagnosing Glaucoma.