

Inpatient Ophthalmology Consultations



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KEYWORDS

• Inpatient ophthalmology consultation • Trauma • Hospital • Inpatient • Consultation

KEY POINTS

- There are important indications for ophthalmic inpatient consults, and it is important for the inpatient primary team to recognize these.
- The authors review the process for obtaining relevant ophthalmic history and conducting a basic ophthalmic examination with measurement of visual acuity for inpatients.
- Indications whereby an ophthalmic consultation should always be obtained are reviewed along with the presenting symptoms. These include patients presenting with sudden decrease of vision, sudden onset of visual field deficit, flashes/floaters, and severe eye pain.

INTRODUCTION

Comprehensive patient care requires an integrated approach that often includes different specialties. Of these specialties, Ophthalmology stands out with its variable pathologic conditions, unique tools, and special examination techniques, which are often not part of the standard training of internal medicine or other specialties. Consequently, ophthalmology consultation for admitted patients is commonly requested at tertiary hospitals. The consulting team plays an important role in triaging and evaluating the vision problems of their admitted patients. It is imperative for any physician to be familiar with the presentations of the potentially sight-threatening disorders as well as the less acute disorders and the nonurgent eye issues that could be better managed in an outpatient setting. Understanding these different acuity levels helps with delivering appropriate eye care to the inpatients in a timely fashion. In this article, the authors review prior studies focused on inpatient ophthalmology consultations, common reasons for inpatient ophthalmology consultation, and the recommended approach to the most common ocular complaints that could present to the inpatient provider. They also shed light on the basic ocular history and eye examination that should be obtained before requesting an ophthalmic evaluation.

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INDICATIONS FOR INPATIENT OPHTHALMOLOGY CONSULTATION

There are important indications for ophthalmic inpatient consults to evaluate patients' vision and visual functions. Patients in the hospital may experience aggravation of their preexisting ocular conditions or have a new onset of an ocular problem, for example, pain, redness, and visual loss, or ocular manifestation of their systemic disease. Moreover, the consulting team might ask for ophthalmologic evaluation to rule out certain disorders, such as optic nerve swelling in intracranial hypertension, intraocular infection in endogenous endophthalmitis, or to establish a diagnosis of a suspected genetic syndrome.

Carter and Miller¹ reviewed the Ophthalmology Consultation Service records between July 1990 and January 1997 for 1472 inpatients admitted to University of California Los Angeles Medical Center. Results showed that internal medicine requested the highest percentage of ophthalmology consults (39.7%), followed by surgery (20.9%) and trauma (13.5%). Neurology, psychiatry, pediatrics, and obstetrics and gynecology constituted the remainder. Eye problems were categorized into new eye problems that developed either on the day of admission or during the hospital course, which represented 39.6% of consultations; preexisting eye problems, which represented 31.6%; and screening eye examinations for the remaining 28.7%. Examples of the commonly requested screening examinations were consults to rule out fungal endophthalmitis, diabetic retinopathy, cytomegalovirus retinitis, retinal hemorrhage, papilledema, and requests for assistance with establishing a diagnosis of patients with suspected genetic syndromes that are known to be associated with ocular manifestation, such as glycogen storage disease. There were 92 different reasons for the consults, with the most common reasons being for decreased vision, red eye, ruling out endogenous endophthalmitis, eye pain, and ruling out ocular/orbital trauma. The investigators recorded 166 unique primary ophthalmologic diagnoses and 130 unique secondary ophthalmologic diagnoses. This finding indicates the diverse array of ocular conditions that could be seen in the admitted patients. The most common diagnoses were refractive error, ruled out endogenous endophthalmitis, conjunctivitis, diabetic retinopathy, and corneal abrasion. These data suggested that refractive error is an important cause for decreased vision in admitted patients. The most common primary hospital discharge diagnoses at that time was human immunodeficiency virus infection (HIV), which, despite being the most prevalent diagnosis, represented only 1.6% of the overall consults to ophthalmology, followed by acute myeloid leukemia (1.6%), liver cirrhosis, postoperative infection, complications of bone marrow transplantation, and infection or inflammatory reaction owing to an internal prosthetic device, implant, or graft. There were other 947 different or unique primary discharge diagnoses, which makes it difficult to predict the most susceptible patient population to have eye issues during their hospital stay.

The authors' group reviewed the electronic medical records of 974 inpatient ophthalmology consultations performed from October 2007 to October 2011 at Northwestern Memorial Hospital in Chicago.² The most common reasons for ophthalmology consultation in this study were blurred vision, trauma, or orbital fracture on computed tomographic (CT) scan, red eye, eye pain, and to rule out endogenous endophthalmitis. These results were in accordance with the findings reported by Carter and Miller¹ conducted 20 years before. This study also showed that input from the ophthalmology consult service influenced the management plan in 56.5% of consults. The ophthalmology consult service recommended initiation of topical ocular medication in 324 patients (33.3%). Systemic medications were recommended by ophthalmology in 75 patients (7.7%); neuroimaging was ordered in 41 (4.2%), and laboratory investigations were recommended in 13 (1.3%).

Oh and colleagues³ recently reviewed data obtained from 581 ophthalmology consultations requested at the University of Illinois Hospital over a 1-year period from the inpatient teams (59.4%) and the Emergency Department team (40.6%). The most common inpatient consulting services were internal medicine (21.5%), followed by neurosurgery (16.2%) and neurology (7.4%). Reasons for consultation were divided into 10 categories. Most commonly were vision changes (30.3%), followed by eye pain (19.8%), and periorbital pain and swelling (12.0%). Other categories included trauma (10.0%), papilledema (8.4%), tumor (4.8%), ruling out ocular involvement in fungemia (4.8%), syndromic evaluation (4.0%), optic neuritis (1.4%), and others (4.5%). Consultations were categorized as acute (72.3%), which indicates new eye issues that either prompted the patients to go the emergency department or developed during their hospital course; preexisting ocular conditions (6.0%); or screening (21.7%). Screening consultations were further classified into the following categories: papilledema (31.0%), to rule out ocular involvement in fungemia (20.6%), syndromic evaluation (19.8%), visual field assessment (17.5%), and miscellaneous evaluation (11.1%). Positive ocular findings were observed in none of fungemia consultations, 20.5% of papilledema consultations, 52.0% of syndromic consultations, 27.3% of visual field consultations, and 14.3% of miscellaneous consultations. The study recorded 63 different primary ocular diagnoses and classified them based on the ophthalmology subspecialty with the most common ones being cornea/external disease (18%, common diagnosis dry eye, corneal abrasion, subconjunctival hemorrhage, conjunctivitis, corneal ulcer, and hyphema), neuroophthalmology (17.2%, common diagnosis optic neuritis, cranial nerve palsy, optic neuropathy, papilledema screening, visual field defect screening, and cerebrovascular accident), and orbit/oculoplastics (16.3%, common diagnosis orbital wall fracture, preseptal and orbital cellulitis).

These large studies demonstrated that vision changes, eye pain, red eye, orbital trauma, and screening eye examinations to rule out or confirm a certain diagnosis are among the most common reasons for ophthalmology consultation in the inpatient setting. Although the ophthalmology consult team is responsible for the comprehensive evaluation and final management of all the inpatients with eye-related disorders, the inpatient primary team has an important role in triaging the acuity of the ocular disorder and determining the need for an urgent ophthalmic consultation versus scheduling an outpatient follow-up examination.

BEFORE REQUESTING AN INPATIENT OPHTHALMIC CONSULTATION

The ophthalmology consult service usually receives multiple consults per day, and triaging the acuity of each consult is helpful for optimum and efficient patient care. The primary inpatient team plays a pivotal role in assisting the different consult services, and it is important for the inpatient practitioner to be able to obtain relevant history and perform a basic eye examination before discussing the case with the ophthalmology service.

HISTORY

It is important to collect pertinent information to help assess the level of acuity of the patient's complaint and narrow down the differential diagnosis. This history includes information about severity of the presenting complaint, laterality (unilateral vs bilateral), onset (sudden/acute vs gradual), course (progressive vs stationary), duration (seconds, minutes, hours, days, months, or years), history of prior similar episodes, history of refractive error (wearing eyeglasses), and chronic eye disease, such as glaucoma or macular degeneration. History should also include any possible source of eye

trauma during or before the hospital stay, such as an unwitnessed fall. It is also important to ask about any other associated symptoms, such as nausea, vomiting, headache, fever, focal weakness, paresthesia, joint or muscle pain, headache, auras preceding migraines, flashes of light or floaters, and double vision.

EYE EXAMINATION

The basic eye examination is divided into 6 main parts: visual acuity, visual field, pupils, movement of extraocular muscle, anterior segment with intraocular pressure assessment, and posterior segment examination. Although a detailed examination of the anterior and posterior segment needs specific equipment that might not be available to the inpatient team, other parts of the eye examination should be performed for each patient with any eye complaint. Gross external eye inspection under good illumination using a penlight can also provide the inpatient team with useful information, such as THE presence of eyelid swelling, conjunctival redness, and corneal foreign body.

VISUAL ACUITY

Visual acuity should be tested 1 eye at a time, with glasses or contact lenses in place if the patient usually wears them. In the inpatient setting, near visual acuity is usually tested using a handheld visual acuity card placed at a normal reading distance, which is usually 40 cm from the patient. Each line on the near acuity card is equivalent to a certain distant acuity that is written on the card next to that specific line. If the patient is unable to read any of the figures on the card, the patient is asked to count the fingers on the examiner's hand, and the distance at which the patient can count fingers is determined. If the patient cannot count fingers, then the ability to detect hand motion is evaluated. For this, the patient's opposite eye is occluded, and a light source is directed from behind the patient to the examiner's hand that is moved at 1 motion per second at a distance of 60 cm from the eye. The patient is asked to identify whether the examiner's hand was still or moving. If the patient is unable to detect hand movements, the examiner should determine whether the patient can perceive light or not, with the light source set at maximum intensity.

VISUAL FIELD

Vision changes associated with acute visual field defects can narrow down the differential diagnosis to disorders affecting mainly the retina or visual pathway. Examples include retinal detachment,⁴ neurologic diseases, such as cerebrovascular accident, or neuroophthalmologic diseases, such as anterior ischemic optic neuropathy.⁵ The confrontation visual field test is a simple and quick method to test the 4 quadrants (superior, nasal, inferior, and temporal) of the peripheral vision to identify visual field defects. The test is done in a face-to-face position at about 1 m (3 feet). With each eye tested separately, the patient's responses are compared with the normal visual field of the examiner in the superior, inferior, nasal, and temporal quadrants. This simple test can be of a high yield in identifying homonymous field defects associated with cerebrovascular accidents affecting occipital, parietal, or temporal lobes, altitudinal field defect associated with anterior ischemic optic neuropathy, and quadratic or hemispheric defects associated with retinal detachments.

PUPILS

The pupils should be round, symmetric, regular, equal in size in dark and light, and reactive to light. Pupils examination should be performed in a dim light with patients

fixating their eyes on a distant object.⁶ An afferent pupillary defect (paradoxical pupillary dilatation in response to light) is an important sign of unilateral or bilateral asymmetric optic nerve disease, such as optic neuritis and ischemic optic neuropathy or severe retinal disorder.⁷ It is also important to recognize that certain medications, such as a scopolamine patch, may cause pharmacologic pupil dilation.

OCULAR MOTILITY EXAMINATION

Ideally, ocular motility is tested by first detecting the eye position in the primary gaze and then asking the patient to move their eyes in 8 positions (up, right, up right, down right, down, left, up left, and down left). This test should be performed for each eye separately and then with both eyes. Testing in the 4 cardinal positions (up, down, right, and left) is also acceptable as a quick screening test for ocular misalignment.⁸ The extraocular muscles should work in harmony, and eye movements should be smooth, symmetric, and with no restriction. Ocular motility examination is particularly important in cases with facial and orbital trauma. Patients may sometimes describe diplopia as blurred vision.

ANTERIOR SEGMENT

The anterior segment of the eye is formed of the sclera, conjunctiva, cornea, anterior chamber, iris, and lens. The examiner can use simple illumination with a penlight to screen and inspect the structures of the anterior segment. The sclera and conjunctiva should be examined for discharge and vascular injection. The cornea should be examined for clarity, transparency, and luster (sheen). Corneal opacification or loss of luster may indicate a corneal pathologic condition, such as corneal ulcer. The anterior chamber is the space between the cornea and the iris that is filled with clear aqueous humor. This space can be filled with hypopyon (pus) in cases of infections, such as endogenous endophthalmitis, or with blood (hyphema) in cases following trauma or with neovascularization.⁹

POSTERIOR SEGMENT

The posterior segment includes the vitreous, the retina, and the optic nerve, and evaluation requires certain skills and special tools (indirect ophthalmoscopy and a 20- or 28 D lens) that are usually used by the ophthalmologist. However, if the practitioner feels comfortable with using the direct ophthalmoscope, they can obtain important information about the posterior segment. Examples include evaluation of the red reflex, which can be abnormal in certain cases, such as retinal detachment and vitreous hemorrhage. Moreover, the optic nerve head can also be evaluated, which normally appears flat with well-defined edges. The background of the fundus view by the direct ophthalmoscopy represents the retina, which is normally flat and without hemorrhages or exudates.⁸ Dilation of the pupil by eye drops facilitates examination of the posterior segment; however, it should usually be performed after discussion with the ophthalmology team.

After obtaining a history and performing a basic eye examination, the inpatient team should be able to triage the patient's ocular condition and obtain pertinent information so that a differential diagnosis can be formulated that is helpful to determine the need for an urgent ophthalmic evaluation.

In the following section of this article, the authors discuss the differential diagnoses of the common reasons for ophthalmology consultation as well as other less common but important reasons for requesting ophthalmology evaluation for an admitted

patient. They also shed light on the recommended approach for evaluating these complaints by the inpatient team.

DIFFERENTIAL DIAGNOSES AND APPROACH TO COMMON REASONS FOR INPATIENT OPHTHALMOLOGY CONSULTATION

Vision Changes/Blurred Vision/Loss of Vision

Blurred vision is considered the most common reported ophthalmic complaint.⁸ It is a broad complaint that can present in multiple ways and has a wide range of differential diagnoses with variable levels of acuity.

Causes of blurred vision

As discussed above, history taking and a basic eye examination can help triage the acuity of the vision changes and the need for urgent inpatient ophthalmology consultation. It is helpful to have a diagnostic approach for the common causes of blurred/decreased/loss of vision in the inpatient based on the onset (sudden/acute vs gradual), laterality (unilateral vs bilateral), duration (seconds, minutes, hours, days, months), and the presence or absence of pain.

Transient visual loss. Transient visual loss (TVL) usually presents as sudden painless vision loss (vision returns to normal within 24 hours, usually within 1 hour). Unilateral or more commonly bilateral TVL that occurs for a few seconds and often triggered by postural changes is usually seen with papilledema.¹⁰ Patients with papilledema might also complain of headache, nausea, vomiting, tinnitus, and diplopia. Unilateral TVL that occurs for a few minutes is typically seen with amaurosis fugax, which may be indicative of retinal or optic nerve ischemia secondary to a thrombotic vascular cause, such as carotid artery stenosis, an embolic source, such as valvular heart disease, or vasculitis, as in giant cell arteritis (GCA).¹¹ Consequently, a stroke work up and obtaining history about GCA symptoms are important in these patients. It is also helpful to obtain a complete blood count with platelets, erythrocyte sedimentation rate, and C-reactive protein in suspected GCA cases. Stroke work up is warranted in bilateral TVL that lasts for a few minutes, as this might indicate vertebrobasilar insufficiency.¹² If TVL lasts between 10 and 60 minutes, a retinal migraine may be suspected, which is a TVL in the setting of a typical migraine.¹³ Inpatient ophthalmology consultation is warranted in these cases to rule out other less common causes of TVL, including an impending central vein occlusion, central retinal artery occlusion, optic disc drusen, angle closure glaucoma, and ocular ischemic syndrome.¹¹

Visual loss lasting greater than 24 hours

Sudden, painless loss of vision Sudden, unilateral, persistent, painless loss of vision often results from disorders in the posterior segment of the eye. Common causes include vitreous hemorrhage more commonly associated with diabetes or trauma,¹⁴ retinal detachment, central retinal artery or vein occlusion, anterior ischemic optic neuropathy (arteritic as in GCA, or nonarteritic ischemic optic neuropathy). Urgent inpatient ophthalmologic consultation should be requested in case any of these disorders is suspected.¹⁵ Also, it is important to note that cerebrovascular accidents affecting the retro-chiasmal visual pathway can cause bilateral vision loss in the form of a homonymous hemianopic or quadrantanopic field defect. However, this field deficit is usually interpreted by the patient as a unilateral vision loss in the affected side of the field deficit. For example, a right hemianopia could be perceived by the patient as right monocular vision loss, as patients often are unable to appreciate their nasal field deficit and only notice their temporal field deficit.¹¹

Sudden, unilateral, painful loss of vision Common causes are acute angle closure glaucoma, uveitis (usually also associated with light sensitivity), endophthalmitis, keratitis, corneal ulcer, optic neuritis (usually in younger patients, associated with pain with eye movements), and orbital cellulitis. Urgent evaluation by ophthalmology is needed in these cases.¹⁵

Gradual, unilateral, or bilateral, painless loss of vision (over weeks, months, or years) Common causes include refractive error, cataract, open angle or chronic angle closure glaucoma, chronic retinal disorders, such as age-related macular degeneration and diabetic retinopathy. Outpatient referral to ophthalmology is recommended in these cases.⁸

Less common causes that require outpatient monitoring by ophthalmology are conditions caused by ocular toxicity of certain medications, such hydroxychloroquine and ethambutol.¹⁶

CLINICS CARE POINTS

- Acute vision loss can be transient vision loss (vision returns to normal within 24 hours, usually within 1 hour) or persistent (lasting more than 24 hours).
- Transient vision loss that lasts for a few seconds (more with postural changes) can be seen in papilledema, more commonly bilateral.
- Amaurosis fugax is a unilateral painless transient vision loss that occurs for a few minutes and indicates retinal or optic nerve ischemia secondary to a thrombotic, embolic, or inflammatory vascular cause. Obtain stroke work up and rule out giant cell arteritis by careful history, erythrocyte sedimentation rate, and C-reactive protein. Vertebrobasilar insufficiency can present with bilateral transient vision loss.
- Acute persistent, painless loss of vision is an indication for an urgent ophthalmic evaluation to rule out certain retinal and optic nerve disorders. Stroke work up should be obtained if the ophthalmology team ruled out an ocular cause or the patient has additional neurologic symptoms.
- Acute persistent, painful loss of vision is an indication for an urgent ophthalmic evaluation to rule out certain sight-threatening disorders, such as acute angle closure glaucoma, uveitis, endophthalmitis, keratitis, corneal ulcer, optic neuritis, and orbital cellulitis.
- It should be pointed out that certain surgical interventions could be complicated by vision loss in the immediate postoperative period, such as cardiac catheterization owing to distal spread of emboli resulting in central retinal artery occlusion,¹⁷ and endoscopic sinus surgery.¹⁸

Red Eye

Red eye is a common presenting symptom in the inpatient setting.¹⁻³ Examples include subconjunctival hemorrhage, corneal abrasions, most cases of conjunctivitis, and blepharitis.^{19,20} In **Table 1**, the authors briefly review the differential diagnosis and approach to red eye, focusing mainly on the conditions that warrant an urgent ophthalmology consultation.

Eye Pain

Common causes of eye pain are conjunctivitis, dry eye, corneal abrasion, and hordeolum, which can often be managed by the primary care team.³⁰ It is estimated in some studies^{31,32} that these conditions constitute more than 50% of all eye problems. Most of the ocular conditions that present with eye pain usually originate from the anterior

Table 1
Ocular conditions presenting with eye redness that require urgent inpatient ophthalmology consultation

Condition	History	Symptoms	Signs
Episcleritis	Usually idiopathic but may be associated with autoimmune disorders in 25%–30% of cases ^{21,22}	<ul style="list-style-type: none"> Mild to moderate eye pain Vision is usually intact 	Focal or diffuse conjunctival and episcleral injection of blood vessels
Scleritis	May be the first sign of an autoimmune disorder in 30%–50% of cases ²³	<ul style="list-style-type: none"> Moderate to severe eye pain Vision might be reduced 	Focal or diffuse conjunctival and episcleral injection of blood vessels, usually at a deeper level than episcleritis
Keratitis/corneal ulcer	Contact lens wear, immunosuppression, eye trauma, and corneal abrasion. ²⁴ History of prior herpetic keratitis	<ul style="list-style-type: none"> Photophobia, moderate to severe eye pain Reduced vision 	Abnormal corneal light reflex, loss of corneal luster and transparency, corneal opacity, and conjunctival injection
Anterior uveitis/iritis	Prior episodes of anterior uveitis and associated autoimmune disorders, such as ankylosing spondylitis ²⁵	<ul style="list-style-type: none"> Eye pain and photophobia Normal or reduced vision 	Circumcorneal injection of blood vessels, ± irregular pupil
Acute angle-closure glaucoma	History of angle closure glaucoma or prior episodes of acute angle closure glaucoma, hyperopia	<ul style="list-style-type: none"> Severe eye pain, photophobia Reduced vision ± Headache, nausea, and vomiting 	Circumcorneal injection of blood vessels, hazy cornea, middilated nonreactive pupil
Endogenous endophthalmitis ^a	Bacteremia/fungemia in patients with diabetes mellitus, urinary tract infection, immunosuppression (especially associated with underlying malignancy, neutropenia, and HIV), intravenous drug abuse, and indwelling catheters ²⁶	<ul style="list-style-type: none"> Severe eye pain Marked reduction of vision 	Diffuse conjunctival injection ± hypopyon in the anterior chamber ± corneal haze

Orbital cellulitis ^a	History of sinus disease ²⁷	<ul style="list-style-type: none"> • Periocular pain, pain with eye movement, and swelling of upper and lower eyelids • Normal or reduced vision 	<ul style="list-style-type: none"> • Tender swollen eyelids • Diffuse conjunctival injection with conjunctival chemosis • Limited extraocular muscle movement • Proptosis • ± Relative afferent pupillary defect in severe cases
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^a It is important to note that immunocompromised patients have difficulty in mounting an immune response, so symptoms of orbital cellulitis²⁸ and endophthalmitis²⁹ might be very mild. Higher index of suspicion and lower threshold for consulting ophthalmology, even with mild symptoms, are recommended in these cases.

Data from Refs.^{21–29}

segment or ocular adnexa and in many cases are associated with red eye.³⁰ One important exception to the commonly associated eye redness with eye pain is optic neuritis, which usually presents with eye pain, pain with eye movement, reduced vision, and no eye redness.³³

New onset of dry eye symptoms (eg, eye pain, gritty or foreign body sensation, with or without eye redness) after hematopoietic stem cell transplantation could be an early manifestation of graft-versus-host disease.³⁴ There are also certain classes of chemotherapy medications, such as MEK inhibitors, that can cause inflammation or blurred vision, and these warrant an ophthalmic consultation.

Flashes and Floaters

Flashes of light (photopsia) refer to the perception of streaks or spots of light in the absence of external light stimuli. Flashes can be a symptom of vitreoretinal traction as in posterior vitreous detachment (PVD), retinal tear, or retinal detachment.^{35,36} Also, patients with migraine (or ocular migraine) might report seeing shimmering arcs of light during the visual aura.³⁷ Therefore, history of migraine should be ruled out in cases presenting with flashes of light.

Floaters refer to seeing dark spots in the visual field that are caused by vitreous opacities. These opacities could be due to vitreous degeneration with or without PVD, retinal tear, retinal detachment, vitritis as in endophthalmitis, and vitreous hemorrhage as in proliferative diabetic retinopathy.^{35,36}

Urgent ophthalmology consultation is mandatory in these cases especially if the flashes and/or floaters are of recent onset and associated with eye pain, eye redness, reduced vision, or visual field deficits.³⁸

Orbital Disorders

Orbital floor fracture

In these cases, ophthalmology consultation is usually requested after stabilizing the patients and obtaining the standard imaging protocol in trauma patients. Although CT scan is the standard imaging modality for diagnosing orbital floor fracture,³⁹ it does not replace careful history or a basic eye examination by the admitting provider. History taking should include mode of injury, vision changes, double vision, and eye pain. All parts of the basic eye examination are important in these cases. Special consideration should be given to the globe position, contour, symmetry between both globes, pupil examination, and extraocular movement with special attention to any sign of oculocardiac reflex (bradycardia or hypotension with eye movement).⁴⁰

Orbital cellulitis

Orbital cellulitis most commonly occurs when bacterial infection spreads from the paranasal sinuses. It is a sight-threatening infection that might be sometimes difficult to differentiate from preseptal cellulitis. The presence of vision changes, proptosis, external ophthalmoplegia, and pupillary abnormalities suggests orbital cellulitis. CT scan of the orbit is important in identifying the extension of the cellulitis and the presence of any abscesses or sinus disease. The most common organisms in orbital cellulitis are usually gram-positive cocci like streptococci.⁴¹ However, in immunocompromised patients as in poorly controlled diabetics with diabetic ketoacidosis, malignancies such as leukemia and lymphoma, mucormycosis might be the causative organism. It is an aggressive opportunistic fungal rhino-orbital infection with poor prognosis and high risk of morbidity and mortality. Symptoms are consistent with eyelid and facial swelling, acute or chronic sinusitis; blood-tinged secretions; headaches; fever; and malaise in an immunocompromised patient. Direct visualization of

the palate or nasal mucosa and paranasal sinuses can reveal dark, necrotic tissue and a characteristic black eschar, which results from vascular invasion and tissue infarction.⁴²

Inpatient Screening Eye Examination

Screening examinations constitute a significant number of inpatient ophthalmic consultations.^{1–3,43} Screening for papilledema and endogenous endophthalmitis in septicemia or fungemia is a common consultation request for the inpatient ophthalmology service.

Papilledema

Papilledema is swelling of optic nerve head owing to elevated intracranial pressure.⁴⁴ The inpatient team usually requests ophthalmic consultation to either confirm or rule out optic nerve head swelling to assist in the evaluation of cases with suspected intracranial hypertension. The presence of optic nerve head swelling in a patient with headache is highly suggestive of elevated intracranial pressure; however, it is important to highlight that patients may have elevated intracranial pressure without apparent optic nerve head swelling.⁴⁵ Therefore, ophthalmology evaluation in these cases should be interpreted within the context of the overall clinical picture of the patient.

Endogenous endophthalmitis

Endogenous endophthalmitis occurs in less than 0.04% of patients with bacteremia and 0.5% of patients with fungemia.⁴⁶ However, it is a common reason for inpatient ophthalmic consultation. Endogenous endophthalmitis can be asymptomatic⁴⁷ or present with eye pain, red eye, blurry vision, and floaters.⁴⁸ The risk is higher in patients with longer hospital stay, HIV infection, endocarditis, meningitis, lymphoma or leukemia, and abscess of an organ or joint.⁴⁶ The most common cause of bacterial endogenous endophthalmitis is gram-positive bacteria, especially methicillin-resistant *Staphylococcus aureus*.^{9,46,47} *Candida* is the most common fungal cause of endogenous endophthalmitis.⁴⁶ Current guidelines strongly recommend continuing the current practice of requesting ophthalmic evaluation in all patients with fungemia given the subtle presentation in some cases.^{3,49,50}

CLINICS CARE POINTS

- Patients might have intracranial hypertension with no papilledema on fundus examination.
- Ophthalmology consultation is warranted for all inpatients with fungemia even if the patients have no eye symptoms.

SUMMARY

Inpatients might present with a broad spectrum of ocular disorders that have variable levels of acuity. Obtaining a detailed history and performing a basic eye examination by the inpatient provider are a key step in triaging these conditions. In general, ophthalmic consultation should be obtained in all patients presenting with sudden loss or decrease of vision, sudden onset of visual field deficit, flashes/floaters, and severe eye pain especially if associated with vision changes. Advanced in imaging and health care delivery with remote imaging and teleophthalmology may help improve the delivery of ophthalmic care to hospitals without an active inpatient ophthalmology consult service. Clear communication between the inpatient and ophthalmology

teams is critical for delivery of optimum eye care to the inpatients presenting with eye complaints.

CONFLICT OF INTEREST

No conflicting relationship exists for any author.

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