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Even the Eyes Are Not Spared-Ocular Tuberculosis - A Case Report

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Abstract: ***Ocular tuberculosis (OTB) is an increasingly recognized form of extra pulmonary tuberculosis (TB) that poses significant risks to vision, particularly in TB-endemic regions. Although traditionally considered rare, the incidence of OTB has risen due to factors such as increased immunosuppression and the broader use of biologic therapies. Diagnosing OTB remains challenging due to its variable clinical presentation, the difficulty in obtaining microbiological confirmation, and the absence of universally accepted diagnostic criteria. Diagnosis typically relies on clinical suspicion, immunological tests (TST/IGRA), imaging, and the patient's response to anti-tubercular therapy. The mainstay of treatment for OTB is systemic multidrug therapy, though drug penetration into ocular tissues may necessitate local treatments like intravitreal or subconjunctival drug delivery. Monitoring for side effects, such as optic neuritis from ethambutol, is essential. This case report highlights the crucial role of nursing care in managing OTB. Nurses play a key role in early recognition of visual symptoms, providing patient education, ensuring adherence to treatment, and closely monitoring for potential side effects. Their proactive involvement, alongside a multidisciplinary care approach, led to a positive outcome, preventing long-term vision loss and ensuring optimal care for the patient.***

Keywords: ocular tuberculosis, vision loss prevention, nursing care, multidrug therapy, patient education

1. Introduction

Tuberculosis, caused by the airborne bacterium *Mycobacterium tuberculi*, remains a major global health concern, capable of affecting both the lungs and other organs, including the eyes[1]. Among its many manifestations, ocular tuberculosis (OTB) poses a serious threat to vision and quality of life due to its chronic, often relapsing course[1]. Despite being traditionally labelled as rare[2], OTB is increasingly recognized, especially in TB-endemic regions[3], where its varied clinical presentations can lead to under diagnosis. The diagnostic process is complex, relying heavily on clinical judgment, particularly in patients with systemic TB or unexplained eye inflammation[6]. This complexity is compounded by the lack of standardized treatment guidelines, resulting in delayed or inconsistent care[6]. Growing awareness of OTB has also been driven by factors such as immunosuppression and the broader use of biologic therapies, both of which elevate susceptibility[4]. Ultimately, regional TB burden and individual risk factors play a critical role in shaping OTB incidence and outcomes, underscoring the need for improved diagnostic strategies and tailored management protocols[17]

History

Tuberculosis (TB) has ancient roots, with evidence of the disease found in Egyptian mummies, but its link to eye involvement wasn't clearly understood until the late 19th century[22]. The breakthrough came in 1882 when Robert Koch identified *Mycobacterium tuberculosis* as the cause of TB, shedding light on its potential to affect various organs, including the eyes[22][4]. Ocular TB began to surface in medical literature in the early 1900s, primarily among patients with pulmonary TB, though it remained a rare diagnosis at the time[4].

With advancements in diagnostic tools such as the tuberculin skin test, PCR, and improved imaging, recognition of ocular TB has increased, especially in TB-endemic areas[6]. The emergence of multi-drug-resistant TB (MDR-TB) has further sensitized the importance of monitoring its ocular manifestations. Today, ocular TB is acknowledged as a significant cause of visual impairment, often presenting as uveitis, retinal vasculitis, or optic neuritis[23]. Despite this progress, diagnosis remains challenging and typically requires a multifaceted approach combining clinical assessment, imaging, and laboratory tests[5][1].

Disease Burden

Tuberculosis (TB) remains a significant global health concern, particularly in developing nations[21]. The World Health Organization (WHO) estimates that a quarter of the global population carries latent TB, with about 10% at risk of developing active disease[1]. In 2021 alone, around 10 million people were affected by active TB, leading to 1.6 million deaths. While diagnostic tools like the GeneXpert MTB/RIF have improved the detection of pulmonary TB and rifampicin resistance, diagnosing extrapulmonary TB (EPTB) remains difficult, largely due to the low number of bacteria in samples. Furthermore, diagnostic tools such as chest X-rays, sputum smear, culture, and MTB/RIF vary in sensitivity and specificity, making pulmonary TB diagnosis complex. For instance, sputum smear microscopy, one of the traditional methods, requires high bacterial loads (5,000–10,000 organisms/mL), limiting its usefulness in many cases.

Complicating matters further, only 5–10% of TB-infected individuals exhibit classic symptoms of pulmonary TB[1].
In contrast, ocular tuberculosis (OTB) poses additional diagnostic challenges due to the absence of standardized criteria and its varied clinical presentation. Globally, OTB is estimated to account for about 4% of all uveitis cases and is recognized as a leading cause of infectious uveitis, ranging from 22.9% to 48% in countries like Indonesia and India[1]. OTB can affect nearly any part of the eye and, without prompt treatment, may result in vision-threatening complications such as glaucoma, cataracts, and cystoid macular edema[1].

Epidemiological data on OTB remain inconsistent. In earlier studies, eye involvement in TB patients ranged from 1.4% to as high as 18% in high-TB-burden countries like Saudi Arabia and Spain. Reports also vary depending on whether prevalence is measured within the uveitis population (7–10.5%) or across broader population groups, where rates range from 1–4% in low-incidence regions to 10–26% in areas with high TB burden[6]. Studies show that the prevalence of presumed ocular tuberculosis (OTB) in India varies between 0.4% and 9.8% among tuberculosis (TB) patients, with differences observed based on geographic region and the design of the study[18]. A study in central Kerala found ocular manifestations in 7.69% of TB patients, with posterior uveitis being the most frequent presentation[19]. This result aligns with a previous study from North India, which reported a prevalence of 9.86% [19].Some studies have also noted a male predominance among OTB patients[2][7]. However, due to these wide variations and limited research, more robust studies are needed to better understand the epidemiology of OTB and guide clinical and diagnostic strategies effectively[8].

Pathophysiology
The pathophysiology of ocular tuberculosis (OTB) is primarily driven by the hematogenous spread of *Mycobacterium tuberculosis* (MTB) from pulmonary or other extra pulmonary sites[9]. This blood-borne dissemination frequently affects the uveal tract, the most vascular part of the eye, leading to a range of intraocular inflammatory responses known as tubercular uveitis[10]. The condition can manifest in various forms, including anterior, intermediate, posterior, or panuveitis, depending on the specific location and extent of the infection within the eye[9][10].

2. Signs and Symptoms

Ocular tuberculosis (OTB) continues to present significant diagnostic and therapeutic challenges due to its diverse clinical manifestations, complex ocular involvement, and the absence of standardized diagnostic and treatment protocols[3][11]. Typically acquired through inhalation of infectious aerosols, the bacilli establish a primary infection in the lungs before potentially spreading hematogenously or via lymphatics to the eye, especially the uveal tract, including the choroid, iris, and ciliary body[4]. The choroid is most frequently involved, likely due to its rich vascular and oxygen supply, making posterior uveitis the most common presentation[4].

However, OTB may also arise as a primary ocular infection affecting surface structures like the conjunctiva, sclera, and eyelids[11]. In many cases, the organism is not isolated from ocular tissues, prompting alternative theories of disease: one suggesting a localized hypersensitivity reaction to Mtb antigens, and another positing an autoimmune mechanism triggered by molecular mimicry with ocular proteins. These pathophysiological uncertainties add further complexity to the diagnosis[11].

Ocular tuberculosis (OTB) can mimic various infectious and non-infectious ocular conditions without signs of systemic or pulmonary TB, with many patients showing no active TB symptoms and the disease confined to silent sites like intrathoracic lymph nodes, requiring high clinical suspicion, particularly in endemic areas or immunosuppressed individuals. [12]. Despite technological advances, a definitive diagnostic test for ocular tuberculosis (OTB) remains elusive, with limited sensitivity of WHO-approved tools like smear microscopy, culture, and GeneXpert for ocular fluids, and clinicians often relying on clinical judgment, supportive imaging, TST or IGRA positivity, and response to anti-tubercular therapy (ATT) for a probable diagnosis.[13].

The Collaborative Ocular Tuberculosis Study (COTS) group emphasizes that no single test is definitive. Diagnosis is typically based on clinical features such as choroidal tubercles, serpiginous-like choroiditis, retinal vasculitis, multifocal choroiditis, and granulomatous uveitis[2][14], particularly in patients with evidence of latent or active TB elsewhere. These features, along with systemic findings (e.g., cervical lymphadenopathy) and imaging or immunologic test results, form the foundation of clinical diagnosis[3].

OTB can affect all parts of the eye[11]. In posterior involvement, findings include choroidal nodules, retinal haemorrhages, perivasculitis, and capillary non-perfusion[7]. In anterior segments, signs may include iris nodules, posterior synechiae, and long-standing corneal changes. Other reported manifestations include panuveitis, cystoid macular oedema, optic disc swelling, orbital apex syndrome, and increased intraocular pressure, each potentially leading to significant, often irreversible, vision loss if left untreated[7]. The complexity and overlap of symptoms with other ocular diseases, combined with diagnostic limitations, necessitate more research into the epidemiology and pathogenesis of OTB to improve clinical practices and patient outcomes[8].

3. Diagnosis

Diagnosing ocular tuberculosis (OTB) presents a significant clinical challenge due to its variable presentation[6], the difficulty of obtaining definitive microbiological confirmation, and the lack of a universally accepted diagnostic standard. While a confirmed diagnosis of tuberculosis (TB) is typically based on the detection of *Mycobacterium tuberculosis* (Mtb) via smear microscopy, culture, or nucleic acid amplification tests (NAAT), these methods are often ineffective for OTB

due to the disease's paucibacillary nature, which results in a low bacterial load that limits the sensitivity of conventional diagnostic tests[3]. The invasive nature and potential risk of vision loss when collecting ocular samples, such as tears, aqueous humor, or vitreous fluid particularly in inflamed eyes often lead clinicians to make a presumptive diagnosis of OTB based on indirect clinical and immunological evidence[4].

A presumptive diagnosis of OTB is typically established through a combination of clinical signs consistent with TB-related uveitis, a positive tuberculin skin test (TST) or interferon-gamma release assay (IGRA), suggestive findings on chest imaging, and the exclusion of other potential causes of uveitis[1][6]. However, a confirmed systemic TB infection does not guarantee ocular involvement, and OTB can also occur in individuals with latent or extrapulmonary TB who have no pulmonary symptoms. In these cases, a high index of suspicion is essential, particularly in TB-endemic areas or among individuals with known TB exposure[1][3].

The TST, also known as the Mantoux test, remains a widely used and cost-effective tool for detecting prior exposure to Mycobactrium Tuberculi[3], though it has limitations in specificity. False-positive results can occur in individuals who have received the Bacillus Calmette-Guerin (BCG) vaccine or have been exposed to non-tuberculous mycobacteria. Conversely, false negatives may arise in immunocompromised patients, young children, and the elderly. Furthermore, TST results may vary depending on differences in test administration and interpretation[1]. To enhance specificity and reduce the risk of over treatment, a higher induration threshold (e.g., 15 mm) is often used in TB-endemic regions[1].

In contrast, IGRAs, such as the QuantiFERON-TB Gold test, offer better specificity than the TST[1], particularly in BCG-vaccinated individuals. However, their sensitivity can vary in TB-endemic areas, and their use is limited by high costs, the need for advanced laboratory infrastructure, and the possibility of false-negative or indeterminate results in immunocompromised individuals or those with anti-IFN-γ autoantibodies, complicating interpretation[24]. Imaging, including chest X-rays, CT, PET scans, and ocular techniques like fluorescein angiography and ultrasonography, plays a role in diagnosing ocular tuberculosis by identifying suggestive changes, but cannot definitively confirm the diagnosis[1].

Molecular diagnostics, like PCR for TB DNA in ocular fluids, offer a newer approach but are not reliable as standalone tools due to the low sensitivity in paucibacillary OTB samples. Consequently, clinicians often rely on a combination of clinical evaluation, immunologic testing, imaging, and a trial of anti-tubercular therapy (ATT) to establish a presumptive diagnosis[15]. The Collaborative Ocular Tuberculosis Study (COTS) group emphasizes that typical presentations, such as serpiginous-like choroiditis, choroidal tuberculomas, or retinal vasculitis, along with supportive systemic findings and a positive immunologic test, may justify initiating ATT even without microbiological confirmation[1].

4. Treatment

Systemic multi-drug therapy is crucial for treating ocular tuberculosis (OTB), addressing both ocular inflammation and the underlying systemic infection. When initiated early and carefully monitored, it typically leads to the resolution of intraocular inflammation and enhanced vision, though the duration of treatment depends on the patient's immune status and clinical response, requiring close monitoring due to the potential for side effects, particularly liver toxicity[4][1].

A significant challenge in managing OTB is the variable penetration of systemic drugs into ocular tissues. This is especially relevant in cases involving the posterior segment, where injectable drugs are preferred due to their better ocular bioavailability. For anterior segment involvement, topical or subconjunctival administration of isoniazid may be effective. In more severe or resistant cases, intravitreal injections, such as streptomycin, may be used to achieve high local concentrations directly at the affected site[16]. However, these procedures carry risks, including retinal toxicity, and should be approached with caution. Not all anti-tubercular drugs are equally effective in reaching ocular tissues. For instance, rifampin has limited penetration into the eye, and there is sparse data on the effectiveness of pyrazinamide in ocular tissues. In certain cases, laser therapy may be considered as an adjunct treatment, such as for subretinal neovascularization, but only after confirming a TB diagnosis and initiating systemic therapy[4].

Ethambutol, another critical component of the anti-TB regimen, requires careful monitoring due to its association with optic neuritis, which typically develops within three to six months of use. The risk increases with doses over 15mg/kg, making regular eye examinations essential during treatment. Patients should promptly report any changes in vision, such as blurred vision or color disturbances[4]. While many cases resolve after discontinuation of the drug, some may result in permanent vision loss and in such instances, hydroxocobalamin supplementation has been proposed, though its effectiveness remains uncertain[4][16].

Prognosis

Prompt initiation of anti-tubercular therapy (ATT) is essential for achieving favorable outcomes in ocular tuberculosis (OTB), as it reduces recurrence rates in conditions like tubercular serpiginous like choroiditis (TBSLC), promotes lesion healing with minimal residual damage, and helps prevent vision loss—though some scarring may occur depending on the severity and location of lesions. However, ATT may be less effective in immunocompromised individuals, such as those with AIDS, due to impaired immune responses[12][6].

Moreover, clinical factors such as a high anterior chamber (AC) cell grade (≥2+), retinal vasculitis, and non-specific or atypical choroidal lesions have been associated with poorer prognoses[15]. These features suggest more aggressive or treatment-resistant forms of OTB, where inflammation can

persist even after six months of therapy. In particular, retinal vasculitis and uncharacteristic choroidal lesions have demonstrated poor response to standard treatment, underscoring the need for close monitoring and possibly adjunctive therapeutic strategies in these high-risk cases[15].

5. Case Report

Mr. K, a 41-year-old male, presented to the community clinic with a one-month history of pain, redness, and progressively blurred vision in both eyes. He described the onset of redness, which had gradually worsened, accompanied by dull, aching pain. His vision had become progressively blurred, making it difficult to see objects clearly. His medical history included Type 2 Diabetes Mellitus, treated with Metformin and Glimepiride, and a past diagnosis of Pulmonary Tuberculosis (PTB), for which he had completed two courses of Antitubercular Therapy (ATT) after a relapse. He also had Chronic Obstructive Pulmonary Disease (COPD), bronchiectasis, and cor pulmonale.

On examination, Mr. K was conscious and oriented but appeared anxious. His vital signs were stable, and there were no signs of pallor, jaundice, cyanosis, clubbing, lymphadenopathy, or edema. Ocular examination revealed normal eye movements, but the conjunctiva was red in both eyes. The cornea appeared normal. His visual acuity showed finger-counting at 1 meter in the right eye (Oculus Dextrus, OD) and 6/24 in the left eye (Oculus Sinister, OS). Evidence of congenital primary aphakia was noted. Intraocular pressure was normal, and both uncorrected visual acuity (UCVA) and hand motion tests were positive bilaterally.

Further ocular examination revealed that the left eye had sheathing of blood vessels, macular edema, and a scar. There was also a festooned pupil, old keratic precipitates, and anterior chamber flare with occasional cells. The right eye showed a similar festooned pupil, with iris pigment dispersion over the old lens capsule and keratic precipitates. The anterior chamber had flare but no cells.

To assess the extent of the macular and retinal involvement, an Optical Coherence Tomography (OCT) scan was performed, revealing central macular thickening and an epiretinal membrane in both eyes. A B-scan ultrasound showed hyperchoroidal tractional bands in both eyes. Based on these findings and his medical history of Pulmonary Tuberculosis, Mr. K was diagnosed with ocular tuberculosis (OTB).

He was started on prednisolone, ketorolac, and atropine for symptom relief and antitubercular therapy (ATT) for the underlying infection. Topical corticosteroids were also used. Over the following weeks, his symptoms improved gradually. The prednisolone dose was tapered over several months, and the ATT was continued according to standard guidelines. Mr. K's visual symptoms, including pain and redness, began to improve, and his visual acuity showed gradual recovery.

Regular follow-up appointments were scheduled to monitor his progress and manage any complications. Mr. K's family was involved in his care, ensuring adherence to the treatment plan and monitoring for signs of relapse. Throughout the treatment period, the family's support was crucial in his recovery. Over time, Mr. K reported steady improvements in his ocular symptoms, and his visual impairment gradually lessened. He was educated on the potential for long-term scarring or visual deficits, and his ocular health was carefully monitored to avoid relapse.

6. Nursing Care Plan

1) **Acute Pain related to inflammatory processes in the eye (e.g., uveitis) secondary to ocular tuberculosis.**
- Regularly assess the patient's pain intensity using a standardized pain scale (e.g., 0-10).
- Administer prescribed pain-relieving and anti-inflammatory medications as per the treatment plan, and evaluate their effectiveness.
- Encourage the patient to promptly report any changes in the intensity or nature of their pain.
- Provide a calm, dimly lit environment to reduce light sensitivity and alleviate eye strain.
- Use warm or cold compresses on the affected eye if recommended by the healthcare provider to ease discomfort.
- Educate the patient on the correct use of prescribed eye drops or other medications and stress the importance of adherence to the regimen.
- Offer additional comfort measures, such as adjusting the patient's head position or using supportive pillows to minimize eye pressure.
- Teach the patient relaxation techniques, such as deep breathing or guided imagery, to help manage pain and promote comfort.
- Continuously monitor for any signs of increased pain or complications, such as visual changes, and notify the healthcare provider if necessary.

2) **Disturbed Sensory Perception (Visual) related to inflammation of ocular structures secondary to tuberculosis infection, as evidenced by blurred vision, photophobia, eye pain, and patient reports of vision changes.**
- Regularly evaluate the patient's visual acuity and perception.
- Observe for potential side effects of anti-tuberculosis medications, particularly visual changes from ethambutol.
- Advise the use of sunglasses or protective eyewear to minimize light sensitivity.
- Ensure the patient's environment is well-lit and free of obstacles to promote safety.
- Provide education about ocular tuberculosis and the critical role of medication compliance.
- Coordinate care with ophthalmologists and infectious disease specialists.
- Support the patient in using visual aids such as magnifiers or large-print materials, as needed.

- Instruct the patient to promptly report any changes or deterioration in vision.

3) Ineffective Comfort related to ocular inflammation and irritation secondary to tuberculosis infection as evidenced by patient-reported eye discomfort, redness, photophobia, and sensation of a foreign body in the eye.

- Evaluate the severity of discomfort by asking the patient to rate pain and describe symptoms like irritation, redness, or light sensitivity.
- Administer prescribed eye medications (anti-inflammatory, pain-relieving, or corticosteroid drops) to manage inflammation and reduce discomfort.
- Apply cool compresses to the eyes as needed to alleviate swelling and soothe irritation.
- Encourage frequent rest for the eyes by advising the patient to close them for short periods to relieve strain.
- Recommend wearing sunglasses in bright or harsh light to decrease sensitivity to light.
- Advise the patient to refrain from rubbing their eyes to prevent further irritation or potential injury.
- Monitor for any signs of infection, such as worsening redness, drainage, or other complications, and promptly inform the healthcare provider.
- Instruct the patient on proper eye hygiene to minimize the risk of infection and further irritation.
- Encourage the patient to promptly report any new or worsening symptoms, such as increased pain or vision changes.
- Offer emotional support and reassurance to help alleviate anxiety and improve coping with discomfort.

4) Risk for Infection related to active tuberculosis infection and compromised immune response secondary to anti-tubercular therapy

- Regularly assess for early indicators of infection, such as fever, redness, swelling, or changes in eye discharge.
- Practice good hand hygiene and teach the patient and their family to do the same.
- Provide education on tuberculosis transmission and the importance of infection control measures, including personal hygiene.
- Administer anti-tubercular medications on time and ensure patient adherence to the prescribed regimen.
- Monitor for side effects of anti-TB drugs that may compromise immune function, such as leukopenia.
- Ensure the correct use of personal protective equipment (PPE) when required to reduce infection risk.
- Encourage proper nutrition and hydration to support the immune system.
- Work with the healthcare team to implement isolation protocols if there is concern for pulmonary TB.
- Educate the patient and their family on the importance of completing the full course of treatment to prevent complications.

5) Anxiety related to uncertainty about the progression of ocular tuberculosis and fear of potential vision loss, as evidenced by restlessness, increased tension, and verbalization of fear.

- Evaluate the patient's anxiety level using a standardized tool to identify specific anxiety triggers.
- Create a calming and supportive environment that helps reduce anxiety and encourages relaxation.
- Encourage open communication by allowing the patient to express their concerns and fears about their condition and its potential impact on vision.
- Provide clear and accurate information about the disease process, treatment options, and expected outcomes to alleviate uncertainty and reduce fear.
- Teach relaxation methods such as deep breathing, guided imagery, or progressive muscle relaxation to help the patient manage anxiety.
- Build trust with the patient by actively listening to their concerns and acknowledging their feelings of anxiety.
- Promote participation in support groups or facilitate contact with others facing similar challenges to decrease feelings of isolation.
- Involve the patient in their treatment decisions to foster a sense of control and empowerment.
- Monitor for signs of worsening anxiety and refer the patient to a mental health professional if anxiety becomes more severe or prolonged.

6) Deficient Knowledge (Disease Process) related to lack of information regarding tuberculosis (TB) and its ocular manifestations, as evidenced by questions about the treatment plan, misconceptions about the disease, and non adherence to prescribed medications.

- Assess the patient's current understanding of tuberculosis (TB) and its ocular manifestations to identify areas requiring further explanation.
- Provide clear, simple, and accurate information about TB, its effects on the eyes, and the prescribed treatment regimen.
- Use educational materials (e.g., pamphlets, videos, or diagrams) to enhance the patient's understanding and reinforce key points.
- Encourage the patient to ask questions to clarify any misunderstandings and address concerns about their disease or treatment.
- Educate the patient on the importance of medication adherence, explaining potential side effects and emphasizing the need to complete the entire treatment course.
- Explain the warning signs (e.g., vision changes, increased eye discomfort) and encourage the patient to report them to the healthcare provider.
- Provide written instructions regarding treatment and self-care, so the patient can review the information at home.
- Tailor teaching to the patient's preferred learning style (e.g., visual, auditory) to optimize understanding.
- Encourage active participation by having the patient keep follow-up appointments and engage in decisions regarding their treatment.

7) **Risk for impaired family coping related to the stress of managing a family member's diagnosis of ocular tuberculosis, uncertainty about prognosis, and potential impact on the patient's quality of life.**
- Assess the family's current understanding of ocular tuberculosis, the prescribed treatment plan, and possible outcomes to identify areas that require further clarification.
- Provide emotional support and reassurance to family members by acknowledging the emotional strain they may experience and offering a listening ear.
- Offer detailed information and educational resources about ocular tuberculosis, including treatment options, side effects, and how to manage the patient's care at home effectively.
- Facilitate open communication within the family, allowing members to express their concerns, fears, and challenges related to caregiving.
- Provide practical guidance on caregiving for the patient, such as administering medications, managing symptoms, and recognizing complications early.
- Introduce community resources and support systems like local support groups, financial assistance, or counseling services to help alleviate stress and promote coping.
- Encourage family involvement in treatment decisions, ensuring they feel included in planning the patient's care and making informed choices.
- Promote regular breaks and self-care for family caregivers, emphasizing the importance of maintaining their health and well-being to avoid burnout.
- Observe the family for signs of stress, burnout, or poor coping, and refer them to counseling services or mental health professionals if necessary to ensure ongoing emotional support.

8) **Risk for Social Isolation related to the physical limitations caused by ocular tuberculosis, fear of stigma, and potential visual impairments.**
- Evaluate the patient's social support system to identify family members, friends, or community connections that can help minimize isolation.
- Encourage the patient to stay in touch with loved ones or support networks through phone, video calls, or online platforms to foster connections.
- Provide educational materials and resources about ocular tuberculosis, treatment options, and coping mechanisms to reduce fear and stigma associated with the disease.
- Create a supportive and understanding environment by encouraging the patient to openly discuss the emotional impact of their condition and the importance of maintaining social ties.
- Recommend joining community support groups or online forums to connect with others who share similar experiences for encouragement and mutual support.
- Encourage participation in accessible social or recreational activities that align with the patient's abilities and promote social interaction, even with visual limitations.
- Help the patient manage visual impairments by offering suggestions for adapting their living space or recommending tools to enhance their ability to engage in social activities.
- Support the patient in maintaining a sense of purpose by assisting them in staying involved with daily activities or hobbies that they can enjoy alone or with others.
- Monitor the patient for signs of withdrawal or depression, and refer them to mental health professionals if feelings of isolation become overwhelming.

9) **Fear and anxiety related to uncertainty about the diagnosis and potential progression of ocular tuberculosis, including the risk of vision loss as evidenced by restlessness, verbalization of fear, increased tension, and excessive worry about the future and potential complications.**
- Evaluate the patient's emotional state, including specific fears and levels of anxiety regarding vision loss or treatment outcomes.
- Deliver accurate, easy-to-understand information about ocular tuberculosis and the treatment process to help reduce uncertainty and fear.
- Create a safe space for the patient to talk openly about their worries and emotional responses to the diagnosis.
- Offer consistent reassurance, highlighting how treatment can help manage symptoms and protect vision.
- Involve the patient actively in their care decisions, helping them regain a sense of control and participation.
- Teach stress-reduction techniques such as deep breathing exercises, mindfulness, or calming visualizations.
- Refer to mental health professionals if the patient shows signs of severe or persistent anxiety that impacts daily functioning.
- Encourage family involvement or support persons to participate in care discussions and provide emotional support.
- Monitor for physical signs of anxiety, including restlessness, changes in sleep, or increased heart rate, and respond accordingly.

10) **Risk for Emotional Distress related to uncertainty about the disease process (ocular tuberculosis), fear of potential vision loss, and concern about prognosis.**
- Monitor the patient's emotional well-being regularly, watching for early indicators of stress, anxiety, or low mood.
- Communicate accurate, easy-to-understand information about the illness, treatment options, and potential outcomes to help ease uncertainty.
- Encourage open conversations where the patient feels safe to express fears, concerns, or emotional reactions.
- Reassure the patient that emotional responses are valid and support is available throughout their care.
- Involve the patient in care-related decisions to foster empowerment and reduce feelings of helplessness.
- Introduce and support the use of coping techniques, such as mindfulness, guided relaxation, or breathing exercises.
- Engage family members or trusted individuals in the care process to offer encouragement and emotional support.

- Refer to mental health professionals if signs of emotional strain become more pronounced or interfere with daily functioning.
- Encourage joining peer support groups where patients can connect with others facing similar health experiences.

11) Risk for Complications (Short- and Long-Term) Associated with Anti tubercular therapy related to the potential adverse effects of tuberculosis medications, including hepatotoxicity, optic neuritis, peripheral neuropathy, and gastrointestinal disturbances.

- Monitor liver function tests (ALT, AST, bilirubin) regularly.
- Assess for visual changes, such as blurred vision, color blindness, or eye discomfort.
- Perform a neurological assessment to check for peripheral neuropathy signs (e.g., numbness, tingling, weakness).
- Monitor for gastrointestinal symptoms such as nausea, vomiting, or abdominal pain.
- Educate the patient on the potential side effects of medications and the importance of reporting any new symptoms.
- Encourage adherence to the prescribed medication regimen and attend follow-up appointments.
- Administer vitamin B6 (pyridoxine) as prescribed to prevent peripheral neuropathy.
- Promote hydration and a balanced diet to alleviate gastrointestinal side effects.
- Collaborate with the healthcare provider to adjust or substitute medications if complications are identified.
- Provide emotional support and counseling to address concerns about potential medication side effects.

7. Conclusion

Effective management of ocular tuberculosis relies on early recognition, a high index of suspicion, and a well-coordinated multidisciplinary approach. This case underscores the pivotal role of nurses in the care team, where they enhance patient education, ensure treatment adherence, and monitor for potential side effects. By working closely with ophthalmologists, physicians, and other healthcare professionals, nurses help facilitate timely diagnosis and intervention, preventing vision-threatening complications. A collaborative approach ensures comprehensive and patient-centered care, ultimately leading to better outcomes. Growing awareness of OTB highlights the importance of teamwork, where each healthcare provider, including nurses, plays an essential role in optimizing patient care and promoting long-term health.

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