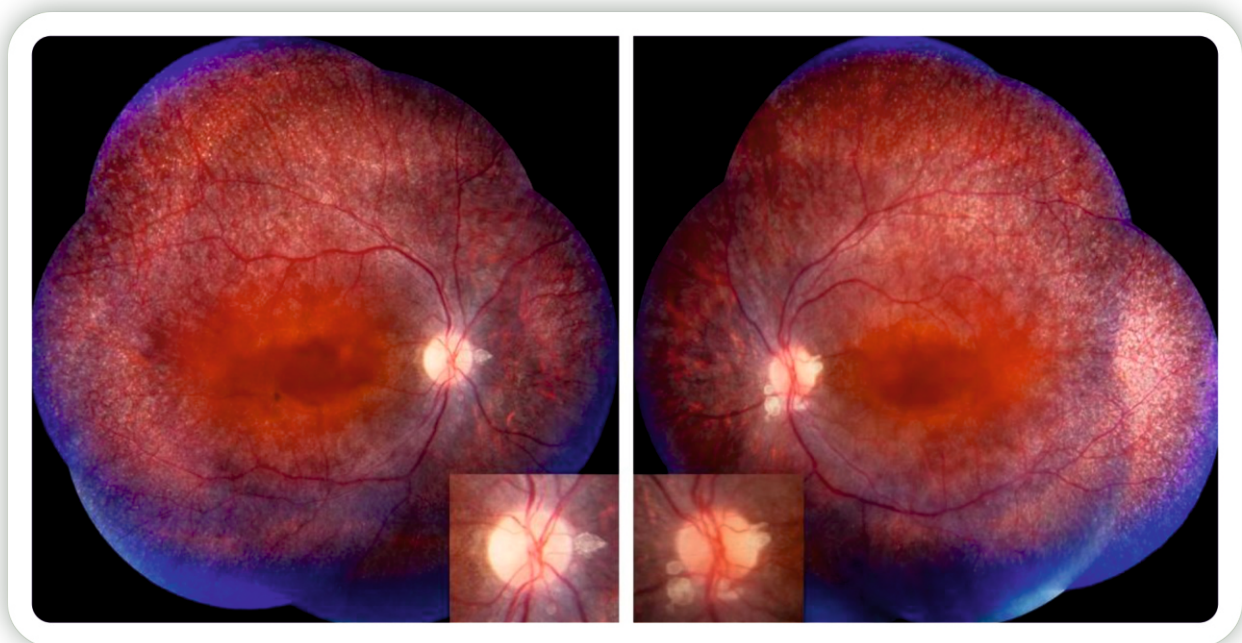




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Editorial

Respected members of Himachal Pradesh Ophthalmological Society and all the learned readers of the journal it is giving me immense pleasure while presenting first issue of Volume 3 of Himachal Journal of Ophthalmology after five issues of Vol2 to the readers. The present issue has covered topics like Retinitis punctata albescens with optic disc hamartoma, Leiomyoma of the orbit, Limbal squamous cell carcinoma, role of antioxidants in age related macular degeneration and principles of safe Ophthalmic instrument care in operation theater.

The article "Retinitis Punctata Albescens with Optic disc hamartomas: Multimodal imaging of rare association" highlights the role of multimodal imaging to find out rare association of retinitis punctata albescens which is a variant of retinitis pigmentosa with optic disc hamartoma which is a benign lesion usually linked to phakomatoses such as tuberous sclerosis and neurofibromatosis. In the article "Leiomyoma of the orbit" it has been demonstrated that "Orbital leiomyoma although rare, should be included in the differential diagnosis of well-circumscribed orbital masses. Careful histopathological and immunohistochemical evaluation is essential to distinguish it from other benign and malignant spindle cell tumors, ensuring appropriate management and favorable clinical outcomes." The article —Therapeutic Excision Biopsy in Limbal Squamous Cell Carcinoma" emphasizes the need for high index of clinical suspicion for all limbal lesions regardless of size, shape and duration. Excision biopsy and adjuvant topical chemotherapy has excellent clinical outcomes. The article "Principles of Safe Ophthalmic Instrument Care in the Operation Theatre. Handling, Cleaning, and Sterilization of Ophthalmic Operation Theatre Instruments: A Review" highlights that handling, cleaning, and sterilization of ophthalmic instruments are interdependent processes critical for safe surgical practice. Strict adherence to standardized protocols minimizes complications, ensures instrument longevity, and improves surgical outcomes. A systematic and disciplined approach to instrument care is essential for all ophthalmic surgical teams. The article "Age Related Macular Degeneration – Role of Antioxidants" clearly shows judicious use of antioxidants can prevent the onset and progression of age related macular degeneration. The last section of the journal is the PG corner which includes answers to the questions given during the previous issue and questions with expectation that all the readers may post their answers to the corresponding author. Each contribution in this issue shows our ongoing commitment to the ophthalmic knowledge, clinical relevance and scientific rigor. We extend our gratitude to all the contributors and reviewers whose expertise has enriched the scientific content of this issue. The content of this issue is diverse which is the reflection of thoughts emanating in the minds working in different situations and different social strata. We are not able to restrict to a single theme, rather it is a mosaic of academic explorations, social reflections, educational insights, creative expressions and higher order thinking skills going beyond the advanced cognitive processes. It has been tried to present the content in clear and easy to understand language

with figures wherever appropriate to support the comprehension making it relevant for all the readers. It is anticipated that this issue of the journal will act as a catalyst for knowledge upgradation, research and surgical innovation and continued medical education among the readers.

Jai Hind.

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Retinitis Punctata Albescens with Optic Disc Hamartomas: Multimodal Imaging of Rare Association

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Abstract

Retinitis punctata albescens (RPA) is a rare variant of retinitis pigmentosa characterized by progressive night blindness and multiple white retinal flecks. We report a case of a 15-year-old male presenting with nyctalopia and progressive diminution of vision. Fundus examination revealed characteristic retinal flecks with optic disc astrocytic hamartomas. Multimodal imaging supported the diagnosis. This case highlights a rare association of RPA with optic disc hamartomas and emphasizes the importance of differentiating it from fundus albipunctatus, a stationary condition.

Keywords: Retinitis punctata albescens, nyctalopia, Optic disc hamartoma, fundus albepunctatus.

Introduction

Retinitis punctata albescens (RPA) is an uncommon hereditary retinal dystrophy and a variant of retinitis pigmentosa. It is characterized by numerous small, white punctate lesions scattered throughout the retina, along with progressive nyctalopia and visual impairment. ^[1] The condition is genetically heterogeneous and is commonly associated with mutations in the *RLBP1* gene. ^[2]

Optic disc hamartomas, particularly astrocytic hamartomas, are benign glial tumors typically associated with systemic conditions such as tuberous sclerosis and neurofibromatosis. ^[3] Their occurrence in association with retinal dystrophies like RPA is rare. We present a unique case demonstrating this unusual combination.

Case Report

A 15-year-old male presented with complaints of bilateral diminution of vision for one year and night blindness for the past five years. There was no significant family history.

Best-corrected visual acuity was 20/60 in both eyes with a refractive correction of -3.00 D sphere. Anterior segment examination was unremarkable.

Dilated fundus examination revealed (Figure 1)

- Bilateral pale optic discs
- Multiple creamish globular excrescences over the optic disc surface in the left eye and a single lesion in the right eye
- Multiple whitish retinal flecks of varying size in all quadrants extending up to the macula with central sparing
- Generalized attenuation of retinal vessels

Fundus autofluorescence (FAF) showed (Figure 2 A&B)

- ❑ Hyperautofluorescent optic disc lesions
- ❑ A ring of hyperautofluorescence at the macula

Optical coherence tomography (OCT) revealed :

- ❑ Generalized photoreceptor loss sparing the fovea (Figure 2 C&D)
- ❑ Optic disc lesions with a characteristic moth-eaten appearance (Figure 2E&F)

Based on clinical findings and imaging, a diagnosis of retinitis punctata albescens with optic disc astrocytic hamartoma was made.

Discussion

RPA is a progressive retinal dystrophy characterized by early-onset nyctalopia and widespread white retinal flecks. It must be differentiated from fundus albipunctatus, which is a stationary condition presenting with congenital night blindness. Unlike RPA, fundus albipunctatus shows symmetrical flecks, normal optic discs, preserved vessel caliber, and non-progressive symptoms.^[4]

RPA is associated with mutations in genes such as *RLBP1*, rhodopsin, and peripherin/RDS. The *RLBP1* gene encodes cellular retinaldehyde-binding protein (CRALBP), which plays a crucial role in the visual cycle. Dysfunction leads to accumulation of retinoids and all-trans-retinyl esters in the retinal pigment epithelium, manifesting as white deposits.^[5] The hyperautofluorescent ring observed on FAF corresponds to the transition zone between functional and non-functional retina due to lipofuscin accumulation.^[6] Electroretinography typically shows reduced scotopic responses with mild photopic involvement.

Optic disc astrocytic hamartomas are benign lesions usually linked to phakomatoses such as tuberous sclerosis. Their presence in RPA is rare and may pose a diagnostic challenge, especially in differentiating them from optic disc drusen.^[7] OCT helps in distinguishing these lesions by demonstrating their internal structure. This case highlights a rare coexistence of RPA with optic disc hamartomas, expanding the phenotypic spectrum of this disease.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent for images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflict of interest

There are no conflicts of interest.

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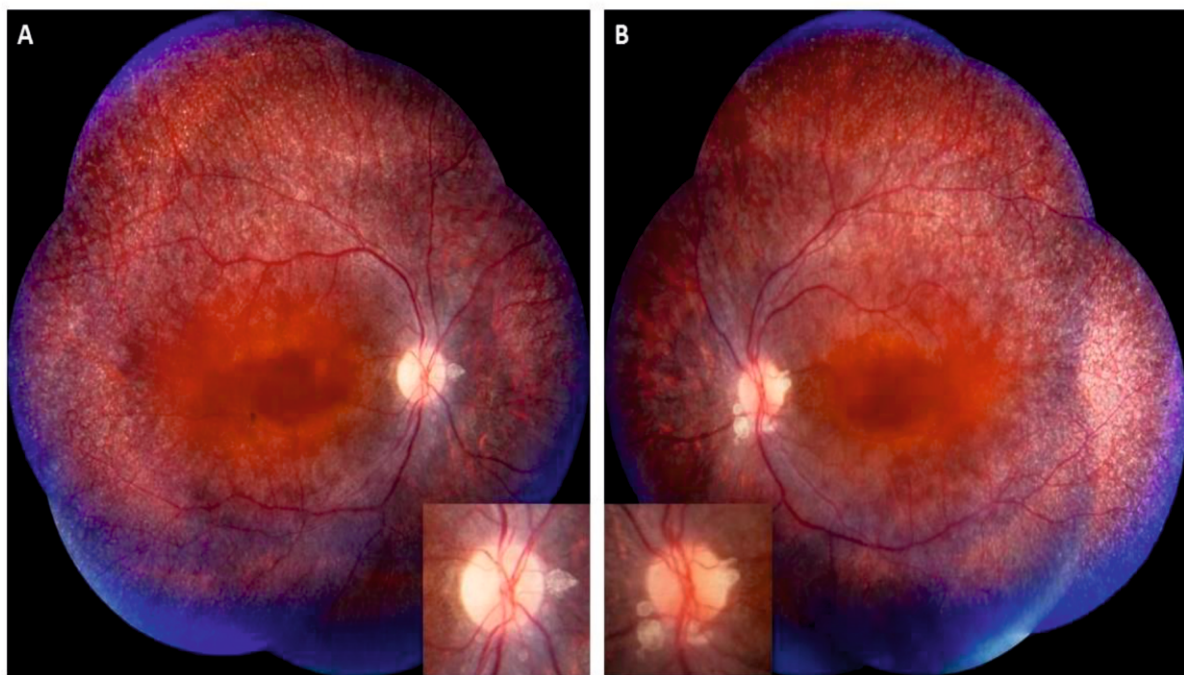


Figure 1. Bilateral pale optic discs, multiple creamish globular excrescences over the optic disc surface in the left eye and a single lesion in the right eye, multiple whitish retinal flecks of varying size in all quadrants extending up to the macula with central sparing and generalized attenuation of retinal vessels.

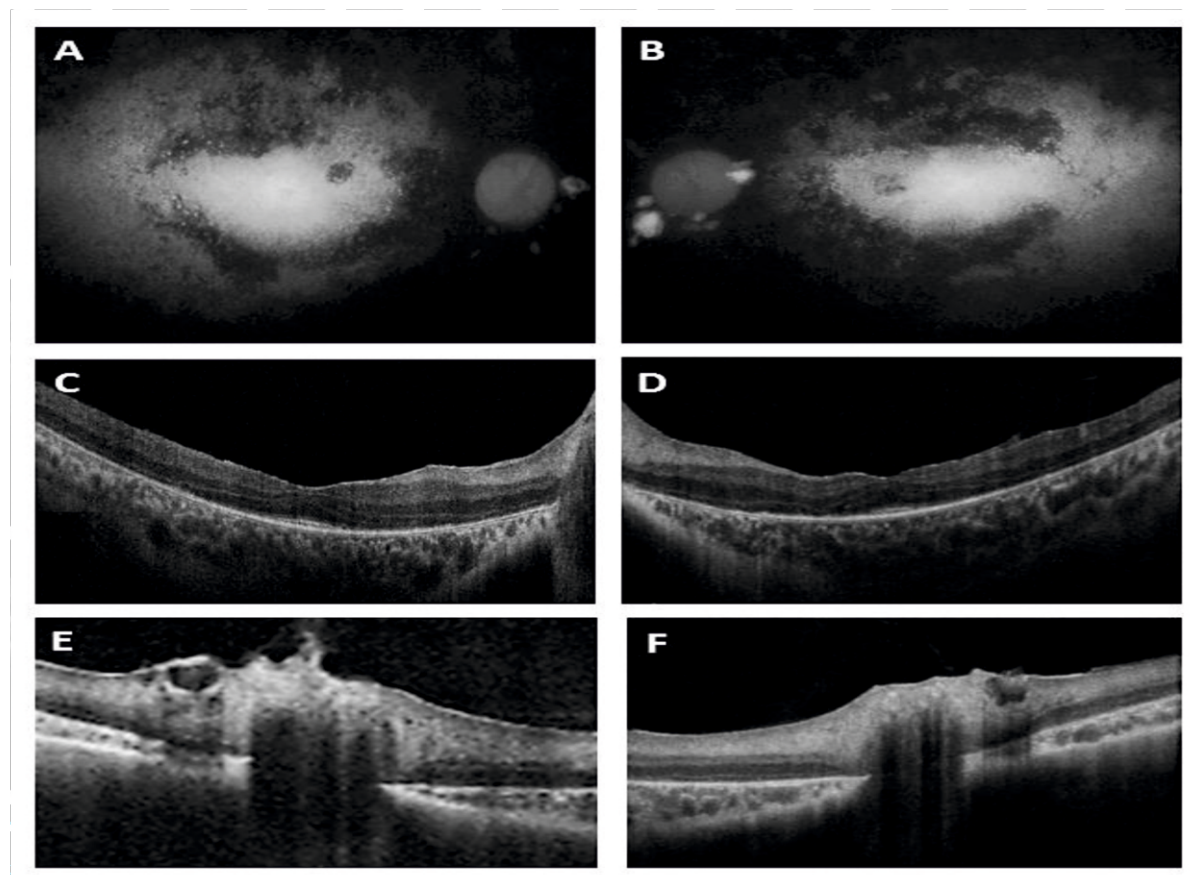


Figure 2. (Figure 2 A&B) Hyperautofluorescent optic disc lesions, A ring of hyperautofluorescence at the macula Optical coherence tomography (OCT) revealed :Generalized photoreceptor loss sparing the fovea (Figure 2 C&D), Optic disc lesions with a characteristic —moth-eaten appearance (Figure 2E&F).

Leiomyoma of Orbit: A Case Report

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Abstract

Leiomyoma of the orbit represents an uncommon benign neoplasm originating from smooth muscle elements. We describe a case involving a 61-year-old male who presented with a localized, painless swelling in the anterior orbit. Clinical examination and ultrasonography revealed a well-defined lesion, which was surgically excised in toto. Histopathological evaluation demonstrated a spindle cell tumor with characteristic blunt-ended nuclei and no evidence of mitotic activity or cytologic atypia, confirming the diagnosis of leiomyoma. The postoperative course was uneventful, and no recurrence was observed over a 6-month follow-up period. This case underscores the diagnostic challenges posed by orbital leiomyoma and highlights the importance of histopathological confirmation in distinguishing it from other spindle cell tumors.

Keywords: Leiomyoma, cavernous haemangioma, cigar shaped nuclei, CD 34, STAT 6 staining.

Introduction

Leiomyoma is a benign tumor originating from smooth muscle cells, most commonly found in the uterus and gastrointestinal tract. Orbital involvement is extremely rare due to the paucity of smooth muscle tissue in the orbit. Orbital leiomyoma may originate from vascular smooth muscle cells and pericytes, capsulopalpebral muscle of Hesser or Müller's muscle in anterior orbital lesions. Clinically, these tumors are typically, slow-growing, painless, well-circumscribed and often misdiagnosed as dermoid cysts or other benign orbital lesions. Definitive diagnosis relies on histopathology and immunohistochemistry.^[1,2,3,4,5,6]

Case Report

A 61-year-old male presented with a painless anterior orbital swelling below the superior orbital margin for last 6 months. On clinical examination, the swelling was smooth, firm and non-tender. No proptosis or motility restriction. BCVA was 6/6 in both eyes. Ultrasound B-scan showed a well-circumscribed lesion measuring, 10×8×5 mm in size. The surgical excision of the tumor was planned and it was excised via a transconjunctival anterior orbitotomy. Intraoperatively, the tumor was found to be encapsulated and was carefully dissected free from adjacent extraocular structures. Complete excision was achieved without complications. The specimen was sent for histopathological examination.

Gross Pathology

The excised specimen consisted of a solitary, encapsulated soft tissue mass. On sectioning, the lesion appeared solid and exhibited a homogeneous grey-white cut surface.

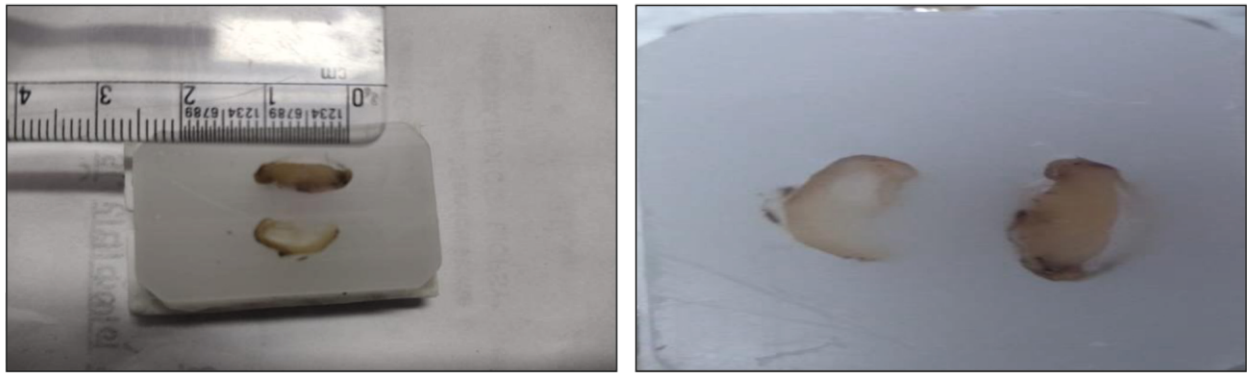


Figure1. Gross pathology of the tumor.

Histopathological Findings:

Microscopic examination revealed: Interlacing bundles of spindle-shaped cells, abundant eosinophilic cytoplasm, elongated nuclei with blunt ends. Importantly, no mitotic figures were identified, no nuclear pleomorphism or atypia was present. These features were consistent with a benign smooth muscle tumor, confirming the diagnosis of orbital leiomyoma.

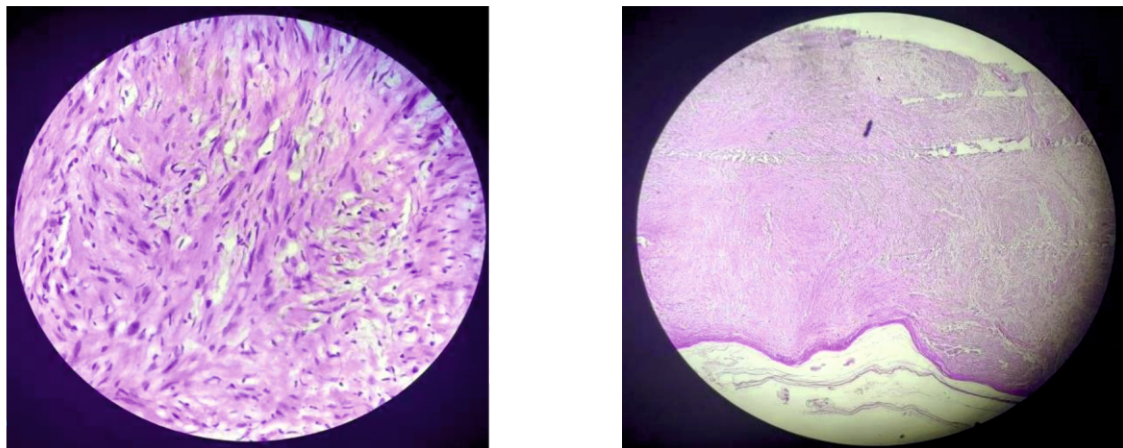


Figure2. Microscopic picture of orbital leiomyoma.

Postoperative Course

The patient's recovery was uneventful. At 6-month follow-up, there was no clinical evidence of recurrence.

Discussion

Orbital leiomyoma is an exceedingly rare benign neoplasm, a fact largely attributable to the relative paucity of smooth muscle elements within the orbit. The exact histogenesis remains incompletely understood; however, the most widely accepted theory suggests origin from vascular smooth muscle cells or pericytes capable of smooth muscle differentiation. In anterior orbital lesions, additional

potential sources include the capsulopalpebral fascia and Müller's muscle, which may account for tumors located in the preseptal or anterior extraconal compartment.^[1,3,7,8,9]

Clinically, orbital leiomyomas typically present as slowly enlarging, painless, and well-circumscribed masses, features that are common to a wide spectrum of benign orbital tumors and therefore lack diagnostic specificity. Consequently, these lesions are frequently misdiagnosed preoperatively as more common entities such as dermoid cysts, cavernous venous malformations, or peripheral nerve sheath tumors. Radiological evaluation, including ultrasonography and magnetic resonance imaging, usually demonstrates a well-defined, homogeneous lesion; however, these imaging characteristics overlap considerably with other benign orbital masses and do not reliably distinguish leiomyoma from its mimics.^[10,11]

The principal diagnostic challenge lies in differentiating leiomyoma from other spindle cell tumors of the orbit, which may share overlapping morphological features but differ significantly in origin, immunophenotype, and biological behavior. Schwannoma, one of the more common benign orbital tumors, arises from peripheral nerve sheaths and is characterized histologically by Antoni A and Antoni B areas, often with Verocay bodies, and shows strong immunoreactivity for S100 protein. In contrast, neurofibroma tends to be less well circumscribed, composed of a heterogeneous population of spindle cells embedded in a collagenous matrix, and is frequently associated with neurofibromatosis type 1. Solitary fibrous tumor represents another important differential diagnosis, displaying a so-called patternless architecture with branching —staghorn— vascular channels and demonstrating nuclear STAT6 positivity, reflecting the NAB2–STAT6 gene fusion. Similarly, fibrous histiocytoma may mimic leiomyoma due to its spindle cell composition but typically exhibits a storiform growth pattern and a different immunohistochemical profile, including positivity for factor XIIIa and CD68.

Vascular lesions such as cavernous venous malformations (traditionally termed cavernous hemangiomas) can also present as well-circumscribed orbital masses, particularly in adults, but are distinguished histologically by large, dilated vascular channels rather than a predominance of spindle cells. Importantly, malignant spindle cell tumors, particularly leiomyosarcoma, must be excluded. Unlike benign leiomyoma, leiomyosarcoma demonstrates significant cytologic atypia, increased mitotic activity, and often areas of necrosis, all of which carry important prognostic implications.^[8,12]

Histopathological examination remains the cornerstone for definitive diagnosis. Leiomyomas are composed of interlacing fascicles of uniform spindle-shaped cells with abundant eosinophilic cytoplasm and characteristic blunt-ended, —cigar-shaped— nuclei. The absence of mitotic figures, nuclear pleomorphism, and necrosis supports a benign diagnosis. Immunohistochemistry plays a critical adjunctive role, with tumor cells typically expressing smooth muscle markers such as smooth muscle actin and h-caldesmon, and showing variable positivity for desmin. The lack of S100 expression helps exclude neural tumors, while CD34 and STAT6 staining aid in differentiating from solitary fibrous tumors. A low Ki-67 proliferative index further corroborates the benign nature of the lesion.^[12,13]

From a therapeutic standpoint, complete surgical excision is both diagnostic and curative. The choice of surgical approach depends on tumor location, with anteriorly situated lesions being amenable to a transconjunctival approach. Prognosis following complete excision is excellent, and recurrence is rare, usually associated with incomplete removal. To date, malignant transformation of orbital leiomyoma has not been convincingly documented.^[3,4,5,11]

Conclusion

Orbital leiomyoma although rare, should be included in the differential diagnosis of well-circumscribed orbital masses. Careful histopathological and immunohistochemical evaluation is essential to distinguish it from other benign and malignant spindle cell tumors, ensuring appropriate management and favorable clinical outcomes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent for images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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“Therapeutic” Excision Biopsy in Limbal Squamous Cell Carcinoma : A Case Report

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Abstract

Ocular Surface Squamous Neoplasia(OSSN) is the term coined to denote the wide spectrum of dysplastic changes involving the epithelium of conjunctiva, cornea and the limbus. It includes squamous dysplasia, corneal and conjunctival intraepithelial neoplasia and squamous cell carcinoma. Here we report a case of a female who presented with a benign looking limbal nodule which was diagnosed as Limbal Squamous Cell Carcinoma on Excision Biopsy, which eventually turned out to be therapeutic as well. This case highlights the importance of histopathological evaluation of even innocuous limbal lesions.

Keywords: Squamous Cell Carcinoma ; Excision Biopsy; OSSN ; Histopathology

Introduction

Ocular Surface Squamous Neoplasia (OSSN) encompasses a wide spectrum of dysplastic changes involving the epithelium of cornea, conjunctiva and the limbus. Limbus is the most common site due to the presence of limbal stem cells. Early diagnosis is crucial, as small lesions may mimic benign conditions like papilloma. Etiology of OSSN is multifactorial. Risk factors for OSSN include advanced age, exposure to UV radiation, cigarette smoking, viral infections like HIV, HPV (Human Papilloma Virus), Xeroderma pigmentosa and fair complexion. Mutations of p53, a tumour suppressor gene may be associated, as in other malignancies. ^[1,2]

Case Report

A 64 years old female presented with a brownish pink oval nodule at around 6 o'clock at the limbus in her left eye. She was asymptomatic but was running from pillar to post to get it excised because of cosmetic reason. She gave history that the nodule was gradually increasing in size for the last 6 months. There was no history of pain, redness, discharge or blurring of vision. No history of any other disease or ocular trauma. Slit Lamp examination revealed a brownish pink oval nodule measuring approximately 4mm by 2 mm at 6 o'clock at the limbus (Figure 1). Cornea was clear. Anterior and posterior segment examination was normal. Excision Biopsy was planned after getting the relevant blood examination done. Histopathological Examination revealed the presence of dysplastic squamous epithelial cells with pleiomorphism, hyperchromatic nuclei and keratin pearls, confirming the diagnosis of Squamous Cell Carcinoma (Figure 2 and 3). Patient was completely asymptomatic after surgery, but was referred to PGI where she was started on topical Mitomycin C as an adjuvant treatment to prevent recurrence. On subsequent follow ups, there was no evidence of any residual or recurrent lesion (Figure 4).



Figure1: Brownish pink oval lesion at limbus measuring about 4mm by 2mm

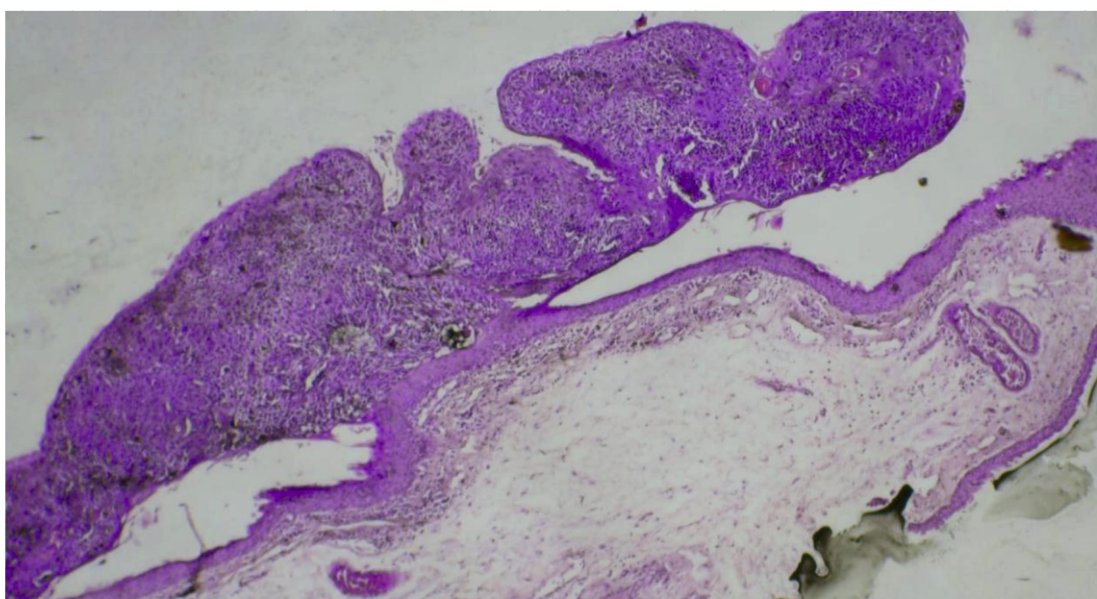


Figure2: HPE showing Exophytic growth with dysplastic changes and squamous differentiation

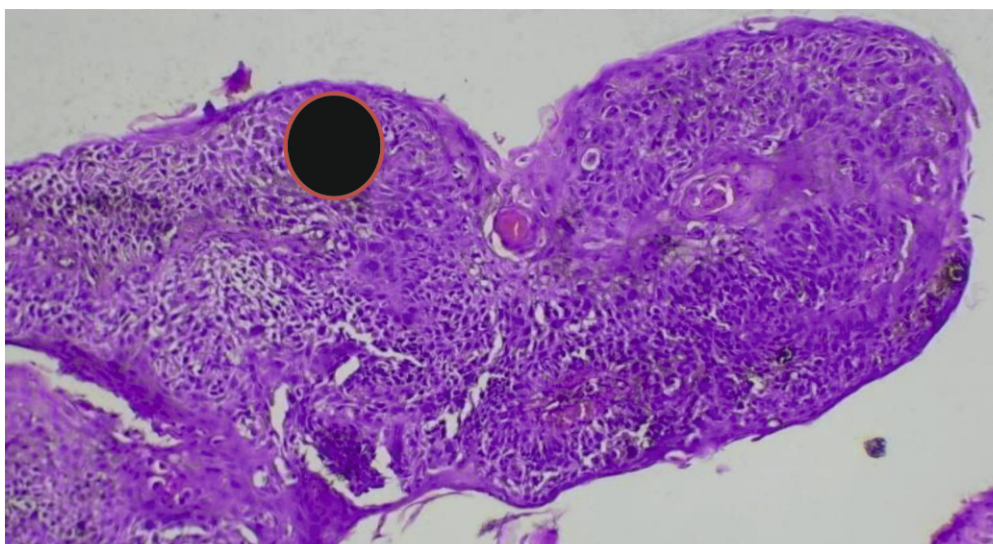


Figure:3. Keratin Pearl seen at 40X magnification

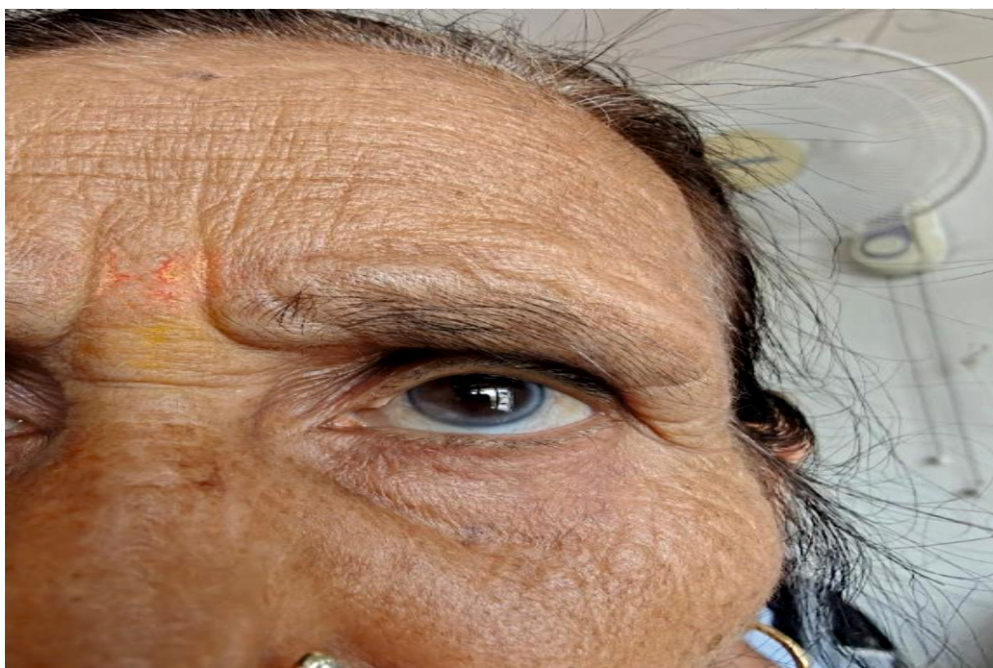


Figure:4. No evidence of any residual or recurrent lesion.

Discussion

OSSN can present with various types of clinical appearances, ranging from subtle papules to exophytic masses. Mostly it presents as CIN (Conjunctival Intraepithelial Neoplasia). Majority of CIN lesions occur at the limbus where mitotic cells reside. Clinical variants of CIN include grey or white papilliform, gelatinous or leukoplakic lesions in the inter palpebral area. Feeder conjunctival vessels may be seen. Pigment may also be present. Cornea also gets involved as a result of spread of

epithelium from adjacent limbus. Corneal lesions take on a characteristic fimbriated appearance. Excision Biopsy with characteristic histopathological appearance remains the Gold Standard for diagnosis.^[3,4] Complete excision with 2–4mm tumour free margin along with topical chemotherapeutic agents has shown excellent outcomes with reduced recurrence rates. Interferon alpha 2b is a cytokine produced by immune cells. It is used for its anti-proliferative, cytotoxic, antiviral and antigenic properties. It can be injected subconjunctival or as eye drops, qid for 1–2 months. Mitomycin C is an anti-metabolite that disrupts the production of RNA. Topical MMC can be used as 0.02% or 0.04% drops. 5-Fluorouracil (5-FU) blocks DNA synthesis and has good efficacy, late recurrence^[5]

Conclusion

This case emphasizes the need for high index of clinical suspicion for all limbal lesions regardless of size, shape and duration. Excision biopsy and adjuvant topical chemotherapy has excellent clinical outcomes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent for images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflict of interest

There are no conflicts of interest.

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4. Gichuhi S, Sagoo MS. Squamous cell carcinoma of the conjunctiva. *Community Eye Health*. 2016;29(95):52–53.
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REVIEW ARTICLE

Principles of Safe Ophthalmic Instrument Care in the Operation Theatre. Handling, Cleaning, and Sterilization of Ophthalmic Operation Theatre Instruments: A Review

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Abstract

Ophthalmic surgical instruments are highly delicate and require meticulous care to ensure optimal surgical outcomes and patient safety. Improper handling, inadequate cleaning, or sterilization failure can result in serious complications such as toxic anterior segment syndrome (TASS) and postoperative endophthalmitis. This review provides a concise, evidence-based overview of the three essential components of instrument reprocessing—handling, cleaning, and sterilization. Practical recommendations are outlined for ophthalmic operation theatre personnel to maintain instrument integrity and sterility across diverse clinical settings.

Key words: Ophthalmic instruments, sterilization, cleaning, handling, TASS, endophthalmitis

Introduction

Successful ophthalmic surgery depends on sterile instruments in optimal working condition.^[1] Given the precision required in intraocular procedures, even minor defects or contamination can significantly affect outcomes. Instrument reprocessing is therefore a critical component of surgical safety. Complications such as TASS and endophthalmitis have been strongly linked to lapses in cleaning and sterilization protocols.^[3,4] This review focuses on the key stages of instrument care and provides practical guidance applicable to both high-resource and resource-limited settings. Successful ophthalmic surgery depends on sterile instruments in optimal working condition. Given the precision required in intraocular procedures, even minor defects or contamination can significantly affect outcomes. Instrument reprocessing is therefore a critical component of surgical safety. Complications such as TASS and endophthalmitis have been strongly linked to lapses in cleaning and sterilization protocols. This review focuses on the key stages of instrument care and provides practical guidance applicable to both high-resource and resource-limited settings.

Handling of Ophthalmic Instruments

Ophthalmic instruments must be handled with extreme care at all stages—storage, transport, intraoperative use, and post-use collection.^[1]

- ❑ Instruments should never be dropped or thrown.
- ❑ Delicate tips, especially of micro-scissors and forceps, must be protected using silicone caps.
- ❑ Instruments should be arranged systematically on trays to avoid contact and damage.
- ❑ Sharp instruments must be passed safely using trays or holders, not hand-to-hand.
- ❑ Needles must be disposed of immediately in puncture-proof containers; re-sheathing is contraindicated.

Intraoperative Care

During surgery, instruments accumulate blood, ophthalmic viscosurgical devices (OVD), and tissue debris. These must be removed promptly:

- ☐ Wipe instruments with sterile moist gauze.
- ☐ Flush cannulas with balanced salt solution (BSS).
- ☐ Prevent drying of OVD, which can lead to difficult cleaning and TASS.

Phacoemulsification Handpiece

- ☐ Flush irrigation and aspiration channels with sterile fluid.
- ☐ Inspect tubing and sleeves for defects.
- ☐ Handle carefully to avoid internal damage.

Cleaning of Ophthalmic Instruments

Cleaning is the most critical step in reprocessing, as sterilization is ineffective in the presence of organic material. ^[2] Cleaning is the most critical step in reprocessing, as sterilization is ineffective in the presence of organic material.

Immediate Post - Use Care

- ☐ Instruments must not be allowed to dry.
- ☐ Immerse immediately in water.
- ☐ Transport promptly for cleaning.

Manual Cleaning Method (Three - Container Technique)

Container 1: Detergent Cleaning

- ☐ Use warm water with mild detergent.
- ☐ Clean each instrument individually using a soft brush.
- ☐ Open all hinged instruments during cleaning.
- ☐ Avoid cotton wool to prevent fiber damage.

Container 2: Lubrication

- ☐ Apply water-soluble lubricant to hinged instruments.
- ☐ Do not soak; dip briefly.
- ☐ Cannulas should not be lubricated.

Container 3: Final Rinse

- ☐ Use clean hot water (preferably distilled or boiled).
- ☐ Remove all detergent and lubricant residues.
- ☐ Flush cannulas thoroughly.

Drying

- ☐ Instruments must be completely dried to prevent rust.
- ☐ Use absorbent cloth or warm air.
- ☐ Ensure joints and lumens are dry.

Inspection

Each instrument must be checked before sterilization:

- ☐ Alignment of forceps and scissors
- ☐ Sharpness of cutting edges
- ☐ Smooth movement of joints
- ☐ Patency of cannulas
- ☐ Absence of rust or stains

Corrosion and Damage Prevention

Corrosion can result from moisture, saline exposure, or poor drying. Preventive measures include:

- ☐ Avoid prolonged soaking
- ☐ Use distilled or boiled water
- ☐ Ensure complete drying before storage
- ☐ Apply anti-rust agents where appropriate

Regular lubrication and maintenance reduce stiffness and prolong instrument life.

Sterilization of Ophthalmic Instruments

Sterilization eliminates all microorganisms, including spores. All intraocular instruments must be sterilized according to standard guidelines.^[5,6] Sterilization eliminates all microorganisms, including spores. All intraocular instruments must be sterilized.

Steam Sterilization (Autoclaving)

- ☐ Most reliable and widely used method
- ☐ 134°C for short cycles or 121°C for longer cycles
- ☐ Suitable for most metal instruments

Precautions:

- ☐ Do not overload autoclave
- ☐ Ensure proper packaging
- ☐ Position cannulas to allow steam penetration
- ☐ Monitor cycles using physical, chemical, and biological indicators

Low-Temperature Sterilization

Used for heat-sensitive instruments:

Ethylene Oxide (ETO):

- ☐ Effective but requires long aeration to remove toxic residues

Hydrogen Peroxide Plasma:

- ☐ Rapid and residue-free
- ☐ Not suitable for long or narrow lumens

Chemical Disinfection

- ☐ Used only for semi-critical instruments
- ☐ Not suitable for intraocular instruments
- ☐ Requires thorough rinsing to prevent toxicity

Maintenance and Repair

- ☐ Damaged instruments must be removed immediately from use
- ☐ Regular servicing and sharpening are necessary
- ☐ Professional repair is more cost-effective than replacement

Storage and Transportation

- ☐ Store in dry, clean, and well-ventilated areas
- ☐ Use trays with individual slots to prevent contact
- ☐ Avoid stacking instruments
- ☐ Use protective covers for delicate parts
- ☐ Use instrument trays or rolls for safe transport

Infection Control and Safety

- ☐ Follow universal precautions
- ☐ Dispose of sharps safely
- ☐ Report needle-stick injuries immediately
- ☐ Avoid reuse of disposable items

Administrative Measures

- ☐ Maintain inventory records
- ☐ Assign responsibility for instrument care
- ☐ Conduct regular audits
- ☐ Train staff in standard protocols

Discussion

Most complications related to ophthalmic instruments arise from failure to follow established protocols rather than inherent instrument defects. ^[3,4] Proper cleaning, particularly removal of OVD and biological debris, is crucial in preventing TASS. Most complications related to ophthalmic instruments arise from failure to follow established protocols rather than inherent instrument defects. Proper cleaning, particularly removal of OVD and biological debris, is crucial in preventing TASS. Use of inappropriate water sources and inadequate drying are common causes of corrosion and contamination.

In resource-limited settings, simplified but effective methods such as the three-container cleaning technique remain highly relevant. Emphasis should be placed on staff training and adherence to standard procedures to ensure patient safety.

Conclusion

Handling, cleaning, and sterilization of ophthalmic instruments are interdependent processes critical for safe surgical practice. Strict adherence to standardized protocols minimizes complications, ensures instrument longevity, and improves surgical outcomes. A systematic and disciplined approach to instrument care is essential for all ophthalmic surgical teams.

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5. Association for the Advancement of Medical Instrumentation (AAMI). *Comprehensive Guide to Steam Sterilization and Sterility Assurance*. 2017.
6. Spaulding EH. Chemical disinfection and antisepsis in the hospital. *J Hosp Res*. 1972;9:5–31.
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Age Related Macular Degeneration - Role of Antioxidants

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Age related macular degeneration (ARMD) is the leading cause of blindness in the world. As the life expectancy has improved; the unfortunate side-effect, that is the quality of life has deteriorated due to this handicap making a person who has been very independent in his youth reliant on people around him in the twilight of his life. But every cloud has seen the sun and the misery in the old age can be ameliorated to a certain aspect by making few changes in the lifestyle in one's youth. This characteristic can be now ascertained as the pathology behind ARMD unfurls with each passing day.

Role of Antioxidants

Retina is perhaps the only structure in eye which is constantly exposed to oxidative stress. The moment we open our eyes in the morning till late at night, when our lids droop and we finally fall asleep, our rods and cones are continuously working. No wonder then that the lipids and the proteins that make up these photoreceptor cells are damaged due to reactive oxygen species (ROS). These ROS may arise: a) from the light exposure b) by product of metabolic events.

Undoubtedly, then if our diet is supplemented with anti-oxidants like Vitamin C, E & carotenoids, sourced from fruits, vegetables, nuts and oils, these ROS are neutralized by them. In addition, augmentation of our diet with Zn and Se obtained from meat, dairy and grain also complements the working of the co-enzymes. These micronutrients stabilise the cell membranes by virtue of its action on cell membranes in the aqueous (Vit C) and the lipid (Vit E) compartments of the cell. It is however pertinent to mention that single or dual high dose of anti-oxidants have not been associated with lower risk of progression of AMD. In Age Related Eye Disease Study (AREDS) which was more than 6-year randomised placebo control clinical trial, the administration of the anti-oxidants in the dose of Vitamin C 500 mg, 400 IU of Vitamin E, 15 mg of beta carotene and 80 mg of Zn delayed the progression of intermediated AMD to advanced AMD by 28%. This potent dose reduces the oxidation of cysteine in blood. A fact was also established in Rotterdam study that though the concentration of anti-oxidant in food is less as compared to supplements, yet, diet provides wide array of other protective nutrients to retina.

Lutein And Zeaxanthin

Both are carotenoids with zeaxanthin being the structural isomer of lutein. Present in the macular area, accountable for giving a characteristic yellow colour, hence liable for the area full of cones to be named as Macula Lutea. They are similar to beta carotenoids that are utilised in the formation of Vitamin A, but for the addition of 'hydroxyl' group making them polar hence not utilised for the synthesis of Vitamin A. They are found concentrated in the Henle Layer and inner plexiform layer, working like an —OPTICAL FILTER. Here, they absorb short wavelength visible blue light, acting as a guard to dampen the effect of oxidative damage due to incident energy as well as improve the visual resolution. By virtue of this property, it reduces the formation of A2E a principal component of lipofuscin which if accumulated intracellularly is toxic to the cell DNA. An interesting fact to be noted while studying the macular configuration is that the central macula is predominated by zeaxanthin and the peripheral macula by lutein. While the xanthophyll carotenoids are in abundance

peripheral retina in rod outer membranes providing a robust front-line defence against oxidative stress.

It is no wonder then a diet deficient in xanthophyll carotenoids cause RPE atrophy while diet rich lutein and zeaxanthin led to reduction in RPE atrophy as well as incidence of neovascular AMD. This fact has been corroborated by the Carotenoids in Age-Related Eye Disease (CAREDS). So, the elderly wisdom of using fruits and raw vegetables have a scientific basis, fact well established in Beaver Dam Study where the deficient diet led to development of large drusen in five years.

Zinc

The role of Zinc is well established during gut disorders. However, its importance in eyes especially retinal health cannot be negated. As a part of co-enzymes, catalysing various reactions as well as stabilizing the photoreceptor membranes; its depletion leads to catastrophic circumstances. Not only the anti-oxidants like glutathione are depleted but the phagocytosis of the outer segments also suffer. There is apoptosis of RPE cells as well as the vulnerability of these cells to damage on exposure to light increases. Moderate intake of zinc in form of dairy, meat and fish led to lower risk of AMD as postulated in the Beaver Dam Eye Study.

Dietary Fat

A triple edged sword, fats good quality and low density; promote nutrient absorption and reducing risk of AMD. But the same fat, if denser and in bulk contributes to the development of AMD. So, avoidance of processed sweet and salty snacks will be beneficial as well as indulging in omega 3 fatty acids in fish, whole grains and green leafy vegetables lowers the risk of progression of AMD. All types of fats saturated fatty acids, MUFA, PUFA have been implicated in causing AMD. But one thing has consistently remained that high intake of fish or omega-3 PUFA have protective role.

Vitamin D

The new age fad. All the things occurring in body have been associated with it at one point or the other. Here also, low vitamin D levels lead to elevated CRP levels that are associated with neovascular AMD.

Role of Diet in AMD

- ☐ Eat in abundance fruits & vegetables of various colours with 2-4 servings of fruit to minimise chronic diseases. Consuming dark green leafy vegetables which are rich source of lutein & zeaxanthin & micronutrients help in delaying AMD.
- ☐ Taking the current fad of consuming millets help in providing strong anti-oxidant Vitamin E.
- ☐ Eat dairy and poultry sources for proteins and Vitamin D.
- ☐ Restrict the use of processed fats.

Role Of Pharmacological Agents:

Hypoxia is a stimulus for release of VEGF's that cause ocular neovascularisation. Though the role of hypoxia in causing choroidal neovascularisation (CNV) is lacking, yet VEGF plays an important role in CNV. So, till date anti-VEGF therapy remain an effective treatment for neovascular AMD.

1. Pegaptanib:

It was the first anti-VEGF agent approved by US FDA for ophthalmic use as 0.3ml intravitreal given every six weeks injection in December 2004. It is RNA aptamer which

binds with isoform of VEGF. The VISION study (VEGF Inhibition Study in Ocular Neovascularisation) reported that its use prevented moderate vision loss in sub-foveal CNV. It has good safety profile, with some side effects reported were due to the method of administration of drug rather than drug itself.

2. Ranibizumab:

It is a recombinant, humanised monoclonal antibody fragment & was approved for intra-vitreous injection in June 2006. The dose to be given is 0.5 mg and it binds with all isoforms of VEGF. The efficacy of this drug in preventing vision loss in classic & occult CNV is well established in MARINA study in which as high as 40% patients achieved visual acuity of 6/12. Further, its supremacy was proven in the ANCHOR study which verified the drug to be superior to PDT in cases of classic CNV. The PIER study looking at the safety of Ranibizumab in cases of sub-foveal CNV, three monthly injections are given followed by mandated doses every three months. The safety profile is similar to pegaptanib with the incidence of hypertension or arterial thromboembolic events as negligible.

3. Bevacizumab

Famous as Avastin, it was the first anti-VEGF drug to be used. It is a full length humanised monoclonal antibody, binding with all isoforms of the VEGF. A monthly injection can be given for three months in the dose of 1.25mg, causing progressive decrease in central macular thickness.

4. VEGF Trap

Novel molecule developed to block VEGF mediated angiogenesis. It has both immunoglobulin domain of VEGFR 1 & VEGFR 2 fused to constant region of Ig. It is now given as a single monthly dose of 0.05 to 4 mg and has shown to improve visual acuity as well as decrease in macular OCT.

5. RNA Interference

The latest technology developed which targets by inhibiting function of selected genes known as RNA interference is being studied as a new line for the Anti-VEGF drugs. It being more specific in locating its target acts on the phenomena in which the small double stranded DNA associates with RNA protein complex resulting in selective degradation of m-RNA transcript containing a sequence homologous to siRNA. Two drugs have been developed and under trial these days with promising outcomes to depict decrease in the central retinal thickness measured by OCT. They include: Bevasiranib and Sirna-027 which are at present in their Phase II trial phase.

6. Anecortave Acetate

AMD is not a single pathologic process and is an ongoing cycle. It also involves a course in which there occurs degradation of capillary basement membrane & extracellular matrix to cause migration of endothelial cells leading to neovascularisation. This involves activation of enzymes like urokinase-type plasminogen activator. This particular drug targets this process & upregulates the expression of plasminogen activator inhibitor-1 and thus eliminating all action of u-PA. It being a cortisol derivative is chemically modified to remove all glucocorticoid activity. Administered in the juxta scleral area in three different doses of 3, 15, 30mg, at six

monthly intervals have shown to be effective in stabilising vision in sub-foveal neovascular AMD in the dose of 15mg. Ongoing Anecortave Acetate Risk Reduction trial (AART) is studying the efficacy of anecortave acetate 15mg in preventing wet AMD in patients with high-risk dry AMD over 4-year period.

7. Squalamine Lactate

A unique antiangiogenic molecule, inhibits growth factor induced proliferation & migration of endothelial cells. It is an aminosterol derivative; has a very interesting mechanism of action. It causes redistribution of calmodulin within endothelial cells resulting in disruption of various intracellular signalling pathways involving Ca. It also induces changes in cytoskeletal framework of cells. The drug has completed the Phase II trials and is now in its Phase III trial.

8. Pigment Epithelium - Derived Factor

PEDF is the most potent inhibitor of endothelial cell migration in viro. It also has neurotrophic factor in retina, so evidence suggests that its use in wet AMD enhances the apoptosis of endothelial cells in choroidal neovascular membranes. Phase I clinical trial of PEDF gene transfer using intravitreal injection of adenoviral vector expressing human PEDF has been completed with promising results.

Conclusion:

As the future unfurls, new drugs are being investigated with specific target approach. As the pathogenesis of the disease unveils so do the ideas to stall a specific process. As various protein kinases- C (PKC) are known to have a role in permeability and angiogenesis, so many PKC – inhibitors have been developed to reduce retinal and CNV. Vatalanib, an orally administered drug is in its Phase II trial. As also various anti- Platelet derived growth factors. It is very hopeful, targeting the disease process will help in stalling the now leading cause of blindness.

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Post Graduate Students Corner

Mnemonic Corner (CAUSES FOR BLUE SCLERA)

MAGPIE drank **BRANDY** and sang a **POEM**

M-Marfan Syndrome

A-Alkaptonuria

G-Glaucoma

P-Poems Syndrome

I-Iron Deficiency Anemia

E-Ehler Danlos Syndrome

B-Brittle Cornea Syndrome

R-Rheumatoid Arthritis

A-Acid Phosphatase Deficiency

N-Nevus of Ota

D-Drugs(Minocycline,Amiodarone etc.)

Y-(Y)Incontinenti Pigmenti

P-Pseudoxanthoma Elasticum, Pagets Disease

O-Osteogenesis Imperfecta

E-Episcleritis And Scleritis

M-Marshall Stickler Syndrome

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Questions and Answers of Vol 2 Issue V

Q1.A neurological condition whereby stimulation of one sense or perceptual stream results in the subjective experience of a different perceptual stream.

- A.Synesthesia
- B Dysthesia
- C.Paresthesia
- D Anaesthesia

Q2.Omidenepag isopropyl (OMDI, Santen) is used to treat:

- A.Cystoid Macular Edema
- B.Retinoschisis
- C.Glaucoma
- D.Optic Neuritis

Q3.Molecular weight of ranibizumab is

- A.50kD
- B.149kD
- C.48kD
- D.115kD

Q4.Rapid, repetitive conjugate eye movements that are involuntary, arrhythmic, chaotic, and multidirectional (horizontal, vertical, and torsional components) without intersaccadic intervals is

- A.Opsochoria
- B.Nystagmus
- C.Ocular flutter
- D.Opsoclonus

Q5.Heaf test was used for diagnosis of

- A.Tuberculosis
- B.Syphilis
- C.Sarcoidosis
- D.Leprosy

Q6.Most common extraocular muscles involved in cysticercosis is

- A. Inferior rectus
- B. Superior Rectus
- C. Lateral rectus
- D. Medial rectus

Q7. Traumatic rupture of an extraocular muscles involves which muscle most often

- A. Superior Rectus
- B. Inferior Rectus
- C. Medial Rectus
- D. Lateral Rectus

Q8. Purtscher like Retinopathy after polymethyl methacrylate (PMMA) injection into the buttock for achieving cosmetic enhancement is also known as

- A. Brazilian booty retinopathy
- B. African booty retinopathy
- C. Russian booty retinopathy
- D. Indian booty retinopathy

Q9.—Wake and seel disease is another name for

- A. Demodex blepharitis
- B. Paederus dermatitis
- C. Caterpillar hair
- D. VKC

Q10. Avacincaptad Pegol is used to treat

- A. Dry eye
- B. Glaucoma
- C. Geographic atrophy
- D. Thyroid eye disease

Answers

Q1. Ans.A. Synesthesia

Synesthesia is an extraordinary perceptual phenomenon, in which the world is experienced in unusual ways. In this condition, a particular stimulation in a given sensory modality (e.g. touch) or cognitive

process (e.g.computing) automatically triggers additional experiences in one or several other unstimulated domains (e.g., vision, emotion).

Reference:Safran AB, Sanda N. Color synesthesia. Insight into perception, emotion, and consciousness. *Curr Opin Neurol.* 2015 Feb;28(1):36-44. doi: 10.1097/ WCO.0000000000000169. PMID: 25545055; PMCID: PMC4286234.

Q2.Ans.C. Glaucoma

Approved by the FDA in 2022, OMDI is a selective, non-prostaglandin, prostanoid EP2 receptor agonist. Mechanism of action: It is found to increase both conventional and uveoscleral outflow.

Reference: Matsuo M, Matsuoka Y, Tanito M. Efficacy and patient tolerability of omdinenepag isopropyl in the treatment of glaucoma and ocular hypertension. *Clin Ophthalmol* 2022;16:1261–79.

Q3.Ans.C.48kD

Reference: Singh RP, Kaiser PK. Role of ranibizumab in management of macular degeneration. *Indian J Ophthalmol.* 2007 Nov-Dec;55(6):421-5. doi: 10.4103/0301-4738.36475. PMID: 17951897; PMCID: PMC2635972.

Q4.Ans.D. Opsoclonus

Opsoclonus persists during convergence and when eyelids are closed, in the dark, and during sleep. Opsoclonus differs from opsochoria, which involves disconjugate eye movements and ocular flutter, which is also an ocular dyskinesia that is restricted to the horizontal plane of eye movements.

Reference:Margolin E, Jeeva-Patel T. Opsoclonus. [Updated 2022 Nov 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK564353/>

Q5. Ans.A.Tuberculosis

Reference: Dacso CC. Skin Testing for Tuberculosis. In: Walker HK, Hall WD, Hurst JW, editors. *Clinical Methods: The History, Physical, and Laboratory Examinations.* 3rd edition. Boston: Butterworths; 1990. Chapter 47. Available from: <https:// www.ncbi.nlm.nih.gov/books/NBK369/>

Q6.Ans B.Superior Rectus

In cases of extraocular muscle involvement, superior rectus muscle is the most common site.

Reference: Rath S, Honavar SG, Naik M, Anand R, Agarwal B, Krishnaiah S, Sekhar GC. Orbital cysticercosis: clinical manifestations, diagnosis, management, and outcome. *Ophthalmology.* 2010;117(3):600–605. doi: 10.1016/ j.opthta. 2009.07. 030.Q7.

Ans.C.Medial Rectus

Traumatic rupture of an extraocular muscles is most commonly found to occur in medial rectus,followed by inferior rectus, superior rectus and lateral rectus respectively.The postulated reason is the close proximity of medial and inferior rectus to the corneroscleral limbus.

Reference: Paysse EA, Saunders RA, Coats DK.Surgical management of strabismus after rupture of the Inferior rectus muscle. *J AAPOS* 2000;4:164-71.

Q8. Ans.A.Brazilian booty retinopathy

A Purtscher-like retinopathy with paracentral acute middle maculopathy was seen in a patient after filler injection into the buttock muscles bilaterally for cosmesis to achieve a "Brazilian booty."

Reference:Khatibi A. BRAZILIAN BOOTY RETINOPATHY: PURTSCHER-LIKE RETINOPATHY WITH PARACENTRAL ACUTE MIDDLE MACULOPATHY ASSOCIATED WITH PMMA INJECTION INTO BUTTOCKS. Retin Cases Brief Rep. 2018 Winter;12(1):17-20. doi: 10.1097/ICB.0000000000000380. PMID: 27552117.

Q9. Ans.B.Paederus dermatitis

Lesions are commonly noticed on awakening in the morning and hence it is known as —wake and seel disease in Nigeria and as —night burnl in Turkey. Reference:Karthikeyan K, Kumar A. Paederus dermatitis. Indian J Dermatol Venereol Leprol 2017;83:424-31.

Q10. Ans.C. Geographic atrophy

Intravitreal injection for treating Geographic atrophy secondary to age related macular degeneration. It binds to and inhibits complement protein C5.

Reference: Banerjee N, Shrinkhal, Garg P, Singh SP, Shukla R. Advancements in Ophthalmic Therapeutics:FDA Drug Approvals from 2019 to 2023. DOS Times 2024;30(3):35-3.

Questions for Vol3 Issue1**Q1. During accommodation AC depth will**

- A. Remain same
- B. Decrease
- C. Increase
- D. None of the above

Q2.Following structure does not pass through annulus tendinous

- A. Nasociliary nerve.
- B. 6th cranial nerve
- C. 4th cranial nerve
- D. 2nd cranial nerve

Q3.Fischer - Khunt spot is located on

- A. Eyelid
- B. Iris
- C. Sclera
- D. Lens

Q4.In trachoma the patient is infectious when there is:

- A. Arlt's line
- B. Herbert's pits
- C. Post-trachomatous concretions.
- D. Follicles and papillae in the palpebral conjunctiva.

Q5.The first pars plana vitrectomy was done by

- A. Robert Machemer
- B. David Kashner
- C. Harvey Lincoff
- D. None of the above

Q6.Listers perimeter is used for

- A. Kinetic Visual field testing
- B. Static Visual field testing
- C. Both
- D. None

Q7.Spasm of accommodation has features of

- A. Presbyopia
- B. Hypermetropia
- C. Myopia
- D. None

Q8.Most common orbital tumor is

- A. Nervesheath tumor
- B. Hemangioma
- C. Lymphoma
- D. Meningioma

Q9.Vitamin B12 deficiency causes?

- A. Centrocaecalscotoma
- B. Binasalhemianopia
- C. Constriction of peripheral field
- D. Bitemporal hemianopia

Q10.Maddox V test is used in diagnosis of

- A. Astigmatism

- B. Heterotropia
- C. Heterophoria
- D. None

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