Case Report

Orbicularis Oculi Cysticercosis: A Diagnostic Pitfall in an Endemic Region

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Abstract

Objective: To describe the diagnostic challenges and management approach in a case of vesicular stage cysticercosis of the orbicularis oculi muscle presenting as a clinically silent periorbital mass.

Methods: An adolescent male presented with a four-month history of a gradually enlarging, firm, non-tender right periorbital mass (15×10 mm) with no inflammatory signs, no visual disturbance, and no systemic symptoms. The clinical impression was a benign periorbital mass; cysticercosis was not considered pre-operatively. Complete excisional biopsy was performed under local anesthesia without pre-operative imaging. Following unexpected histopathological findings, post-operative systemic evaluation was undertaken, including non-contrast CT of the head and orbits, chest radiograph, and bilateral limb radiographs.

Results: Histopathological examination confirmed vesicular stage cysticercosis with identifiable hooklets, suckers, a coelomic cavity, and an intrinsic larval cyst wall distinct from a host-derived fibrous capsule. This distinction explained the absence of a surgical capsular plane intraoperatively. Systemic evaluation excluded concurrent neurocysticercosis and musculoskeletal disease, confirming isolated periorbital involvement. Adjuvant oral albendazole (15 mg/kg/day for 28 days) with tapering prednisolone achieved complete clinical and radiological resolution at six-month follow-up.

Conclusions: Vesicular stage orbicularis oculi cysticercosis is clinically indistinguishable from a benign periorbital tumor and is only reliably detected by histopathological examination. Unexpected histopathological confirmation mandates comprehensive systemic evaluation before anthelmintic therapy is commenced.

Keywords: Cysticercosis, Orbicularis oculi, Periorbital mass, *Taenia solium*, Vesicular stage

Introduction

Cysticercosis, caused by larval *Taenia solium*, affects an estimated 20 million people worldwide and is the leading preventable cause of acquired epilepsy in endemic regions.[1] Extraneurological manifestations occur in 13 to 46% of cases, with orbital and periorbital involvement representing a clinically significant subset that frequently brings patients to ophthalmic attention.[2,3] The anatomical spectrum of periorbital cysticercosis encompasses the extraocular muscles, subconjunctival space, eyelid, and orbital fat, each associated with characteristic clinical patterns determined by cyst stage and location.

Published series have established extraocular muscle involvement as the predominant form of periorbital cysticercosis. Rath *et al*., in the largest series to date of 171 patients, reported extraocular muscle involvement in 80.7%, with the superior rectus most frequently affected (33.3%), followed by subconjunctival involvement in 24.6%.[3] Salim *et al*. documented similar patterns in 61 patients, with the inferior rectus most commonly involved (27.9%).[4] Across these series, eyelid involvement accounted for fewer than 1% of cases, confirming its status as a rare presentation of an already uncommon disease.[3]

Within the eyelid, cyst lodgment in the orbicularis oculi muscle is documented but exceptionally rare. Sen *et al*. first described this presentation in a series of adnexal cysticercosis

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How to cite this article: Imchen MT, Dubey P, Agarwal R, Jain A. Orbicularis Oculi Cysticercosis: A Diagnostic Pitfall in an Endemic Region. UP Journal of Ophthalmology. 2026;14(2): 94-97.
Received: 14-06-2026, **Accepted:** 05-07-2026, **Published:** 01-08-2026

UP JOURNAL OF OPHTHALMOLOGY
An Official Journal of Uttar Pradesh State Ophthalmological Society, UPSOS (Northern Ophthalmological Society, NOS)
p-ISSN: 2250-1916 | DOI: 10.56692/upjo.2026140208

cases,[5] and subsequent reports have further defined its clinical features.[6] The comprehensive 20-year review of cysticercosis in ophthalmology by Pujari *et al*. confirmed that eyelid and orbicularis oculi involvement remain among the least characterized manifestations of the disease.[7] Despite prior reports, a complete description integrating intraoperative findings, histopathological-clinical correlation, systematic post-operative evaluation, and treatment outcome has not been documented specifically for this anatomical site.

A central diagnostic challenge in orbicularis oculi cysticercosis is posed by vesicular stage disease, wherein the viable larval cyst elicits minimal immune activation and generates none of the periorbital inflammatory signs that typically raise clinical suspicion.[8] The lesion instead mimics common benign periorbital tumors, creating a diagnostic trap that is only resolved by histopathological examination. We describe such a case in which orbicularis oculi cysticercosis was entirely unsuspected pre-operatively, discovered incidentally on histopathological examination, and managed with a comprehensive protocol achieving complete resolution.

Case Report

A well-nourished adolescent male (weight 60–65 kg) presented with a four-month history of a gradually enlarging mass in the right periorbital region. There was no history of trauma, seizures, diplopia, or visual change, and no family history of parasitic infection. The patient's primary concern was cosmetic.

Local examination revealed a solitary, well-defined mass in the medial right periorbital region overlying the orbicularis oculi muscle, measuring 15×10 mm (Figure 1).

The mass was firm, mobile, non-tender, and non-pulsatile, with normal overlying skin and no regional lymphadenopathy. Full ophthalmological examination demonstrated visual acuity 6/6 bilaterally, intraocular pressures within normal limits, full and unrestricted ocular movements, no proptosis, no relative afferent pupillary defect, and normal anterior segment and dilated fundus examinations.

The pre-operative differential diagnosis included dermoid cyst (most probable given the patient's age and location), epidermoid cyst, lipoma, and neurofibroma. Cysticercosis was not considered pre-operatively given the firm non-cystic consistency, complete absence of inflammatory signs, and overall clinical impression of a benign superficial neoplasm. No pre-operative imaging was performed, as the superficial location, absence of deep orbital signs, and firm consistency provided no clinical indication. Complete excisional biopsy was performed under local anesthesia via a skin-crease incision. Intraoperative findings revealed a firm lesion lacking a discrete surgical capsule at the orbicularis oculi level (Figure 2), relatively avascular and not adherent to the periosteum or overlying skin. The specimen measured 15×10×8 mm.

Histopathological examination (Figure 3)unexpectedly revealed an intact larval cyst with identifiable hooklets, coelomic cavity, suckers, and a thin intrinsic fibrous cyst

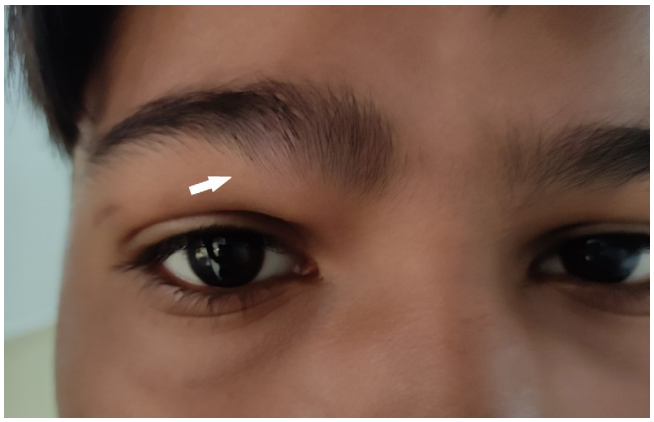

Figure 1: Clinical photograph demonstrating a well-defined, non-inflamed mass (arrow) in the medial right periorbital region overlying the orbicularis oculi muscle, measuring approximately 15×10 mm. Overlying skin is normal with no erythema or oedema, illustrating the absence of inflammatory signs characteristic of vesicular stage disease.

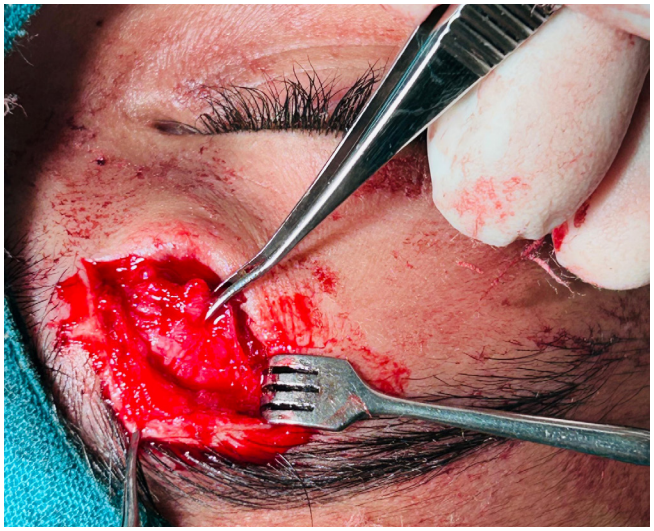

Figure 2: Intraoperative photograph demonstrating a firm lesion at the orbicularis oculi level lacking a discrete surgical capsule, with minimal surrounding inflammatory reaction and no clearly defined capsular dissection plane.

wall representing the parasite's own tegument, distinct from a host-derived fibrous capsule.

A mild chronic inflammatory infiltrate of lymphocytes, plasma cells, and eosinophils was present without calcification, consistent with vesicular stage cysticercosis. Prompted by this finding, comprehensive post-operative systemic evaluation was undertaken. Non-contrast CT of the head and orbits (Figure 4) demonstrated normal brain parenchyma without intracranial calcifications or cystic lesions, and normal bilateral orbital anatomy, excluding neurocysticercosis. Chest radiograph and bilateral femoral radiographs excluded pulmonary and musculoskeletal involvement, confirming isolated periorbital disease.

Anthelmintic therapy commenced ten days post-operatively, allowing wound consolidation prior to systemic

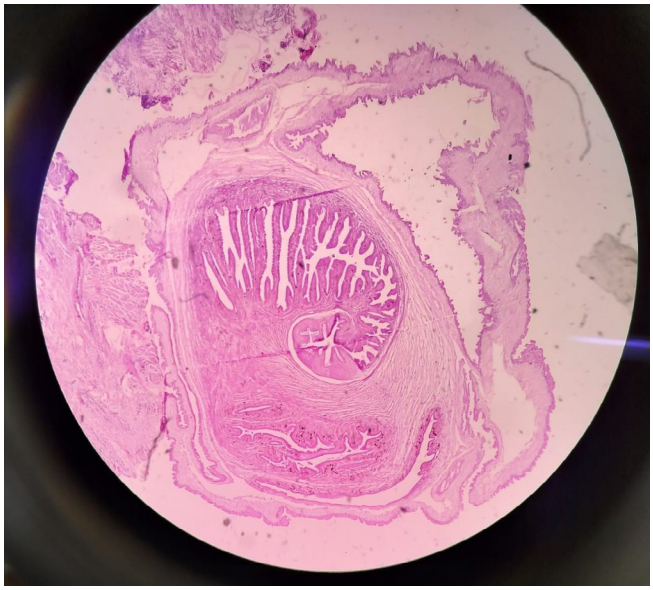

Figure 3: Photomicrograph (haematoxylin and eosin staining) demonstrating vesicular stage cysticercosis. The intact larval cyst displays an intrinsic tegumental wall (arrowhead) distinct from a host-derived fibrous capsule, identifiable hooklets, suckers, and coelomic cavity. The surrounding tissue shows a mild chronic inflammatory infiltrate of lymphocytes, plasma cells, and eosinophils without calcification.

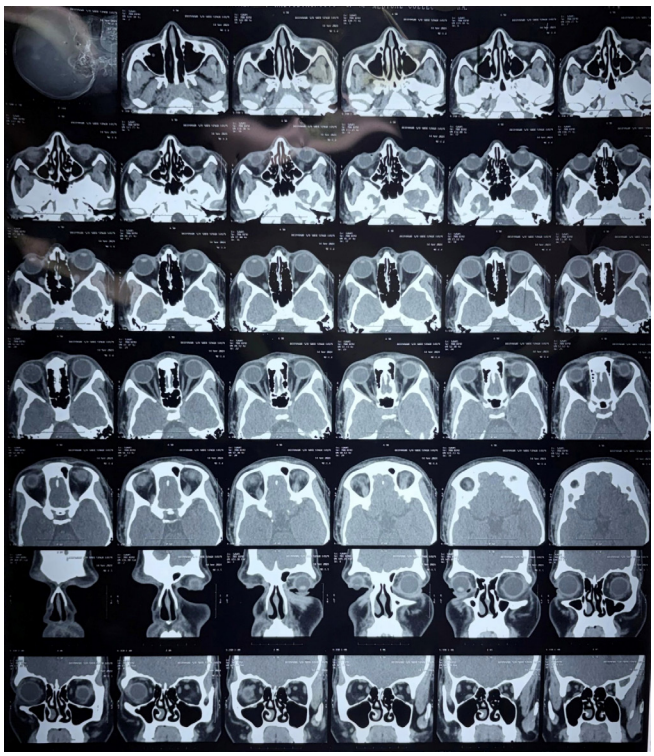

Figure 4: Non-contrast CT of the head and orbits. Axial sections demonstrate normal bilateral orbital anatomy with normal extraocular muscles, orbital fat, and no residual cystic lesion. Coronal sections confirm normal bilateral orbital and paranasal sinus architecture. Brain parenchyma is normal throughout without intracranial calcifications or cystic lesions, excluding neurocysticercosis.

drug exposure: oral albendazole 15 mg/kg/day for 28 days with concurrent tapering prednisolone over three weeks to mitigate potential inflammatory complications. Treatment was well tolerated. Sutures were removed at two weeks with satisfactory wound healing. B-scan ultrasonography at one and three months post-operatively showed no residual or new cystic lesions. MRI at six months, performed as part of post-treatment surveillance, confirmed the absence of intracranial cystic lesions, with complete clinical resolution and an excellent cosmetic outcome. The patient is enrolled in annual clinical surveillance for three years post-treatment.

Discussion

Orbicularis oculi involvement in cysticercosis, while real, is a poorly characterized and rarely reported entity within the spectrum of periorbital parasitic disease. Eyelid cysticercosis accounts for fewer than 1% of cases in the largest published series,[3] and orbicularis oculi muscle involvement, which is distinct from subcutaneous eyelid deposits, has been documented in only isolated reports since Sen *et al*.'s initial description in 1980.[5,6] This rarity contrasts with the well-established extraocular muscle tropism that defines the overwhelming majority of cases.[3,4] The pathophysiological basis for periocular muscular predilection in cysticercosis is incompletely understood; hematogenous dissemination of oncospheres with lodgment in terminal muscular vascular beds has been proposed as the operative mechanism, a process that may extend to the periocular musculature beyond the classically described extraocular muscles.[2,7]

This case illustrates the behaviour of vesicular stage disease at a rare anatomical site. Major published series report periorbital swelling in 38.6%, restriction of ocular motility in 64.3–85.2%, and proptosis in up to 24% of periorbital cysticercosis cases.[3,4] Our patient exhibited none of these features. In vesicular stage disease, the viable larval cyst maintains immune tolerance through active suppression of host inflammatory responses,[8] producing a firm non-tender mass whose mechanical properties correspond far more closely to a dermoid cyst than to the inflammatory orbital mass typically associated with cysticercosis. This clinical silence is what makes vesicular stage orbicularis oculi cysticercosis a diagnostic trap. The lesion generated no clinical trigger for pre-operative imaging or parasitic workup, and diagnosis was entirely dependent on routine histopathological examination of what was believed to be an elective excision specimen.

The intraoperative absence of a discrete surgical capsule appeared discordant with the histopathological finding of a fibrous cyst wall. This apparent contradiction reflects two distinct anatomical entities. The absence of a host-derived fibrous capsule accounts for the intraoperative behavior: unlike dermoid or epidermoid cysts, the cysticercus does not induce organized host fibrosis that creates a clean surgical dissection plane. The fibrous wall seen on histopathology, however, represents the parasite's own intrinsic tegument, a thin laminated structure inherent to the organism and not

equivalent to a surgical capsule. This distinction has practical importance: surgeons anticipating a capsulated mass may inadvertently rupture the cyst, releasing antigenic content into the wound and risking a severe local inflammatory reaction. The relatively avascular nature of the lesion and absence of adhesion to surrounding structures, both noted in this case, may serve as intraoperative cues warranting careful dissection and intact specimen preservation for histopathology.

Transmission of *T. solium* in India occurs predominantly through feco-oral routes via contaminated water and vegetables, independent of pork consumption.[9,10] More than 95% of Indian cysticercosis patients maintain vegetarian diets, reflecting environmental exposure rather than dietary acquisition.[9] Vegetarian dietary history must therefore not be used as a discriminating feature, and clinical suspicion in endemic settings should remain independent of dietary background.

Pre-operative B-scan ultrasonography or MRI should be considered for periorbital masses in endemic regions even when clinical suspicion is low, as imaging can identify the characteristic intracystic scolex in a substantial proportion of cases.[11] The decision not to image pre-operatively was clinically defensible, since the lesion was superficial, firm, and showed no deep orbital signs. That very defensibility makes the case instructive: vesicular stage cysticercosis at an unusual site gave no indication for imaging. When histopathological confirmation occurs unexpectedly, CT or MRI of the head is mandatory before initiating anthelmintic therapy, as these agents can precipitate cerebral edema in concurrent undiagnosed neurocysticercosis.[12] In this case, CT of the head and orbits combined with a systematic radiological survey of the chest and limbs comprehensively excluded systemic disease prior to commencing treatment. Combined excision with adjuvant albendazole and corticosteroid cover, the approach described by Sihota and Honavar,[13] achieved complete resolution.

Limitations include the absence of pre-operative and post-operative serological evaluation for anti-cysticercal antibodies, which would have strengthened systemic assessment. The histopathological section does not include identifiable adjacent skeletal muscle fibers; orbicularis oculi localization is based on the intraoperative assessment of the lesion's anatomical level rather than direct histopathological demonstration of intramuscular positioning. These limitations notwithstanding, this case provides a comprehensive intraoperative, histopathological, radiological, and treatment record for an underreported and diagnostically challenging presentation.

Vesicular stage orbicularis oculi cysticercosis can present as a firm, non-inflammatory periorbital mass that is clinically indistinguishable from a benign periorbital neoplasm. Three practical points follow. Orbicularis oculi involvement should be retained in the differential diagnosis of firm periorbital masses in endemic regions. Histopathological examination of excised periorbital specimens is essential, because vesicular stage disease produces no pre-operative clinical trigger. Finally, incidental confirmation warrants systematic post-operative evaluation before anthelmintic therapy to exclude concurrent systemic disease.

Informed Consent

Written informed consent was obtained from the patient and his parents for publication of this case report and accompanying images.

Acknowledgments

None.

Financial support & Sponsorship

No funding support or sponsorship received from national or international funding agencies.

Conflicts of interest

No conflicts of interest among authors

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