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Conjunctival Inclusion Cyst Following Closed-Globe Blunt Ocular Trauma: A Rare Complication with Spontaneous Resolution - A Case Report

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Abstract

Secondary conjunctival inclusion cyst is most commonly caused by ocular surgery, inflammation, and penetrating trauma. Its occurrence following closed globe blunt injury remains rarely reported. This case report aims to describe a rare presentation of a secondary conjunctival inclusion cyst developing after closed-globe blunt trauma and its successful non-surgical management with corticosteroids. A 75-year-old female on antiplatelet therapy presented with blurred vision following blunt ocular trauma from a bicycle handlebar. Examination revealed grade I traumatic hyphema, severe subconjunctival haemorrhage, and intraocular pressure of 7.6 mmHg with a negative Seidel test. Two weeks later, a 9 × 6 mm translucent cystic nodule appeared at the superior bulbar conjunctiva. Secondary conjunctival inclusion cyst was diagnosed based on clinical morphology and temporal relationship to the trauma. Complete resolution of the cyst was achieved with systemic and topical corticosteroids alone, without surgical intervention. Conjunctival inclusion cyst is a rare but possible complication of closed-globe blunt trauma. In the early post-traumatic inflammatory phase, a trial of corticosteroid therapy may represent an effective non-surgical first-line option.

INTRODUCTION

Conjunctival inclusion cyst is the most common benign cystic lesion of the conjunctiva that can be either primary (congenital) or secondary (acquired) origins (American Academy of Ophthalmology, 2023). Primary conjunctival inclusion cysts usually present at birth and often remain asymptomatic throughout life. Secondary conjunctival inclusion cysts develop as a result of disruption in the conjunctival epithelium (Shields et al., 2004; Thatte et al., 2015). The pathological basis of cyst formation involves detachment and implantation of conjunctival epithelial cells into the substantia propria, where they proliferate and form a thin-walled, fluid-filled cavity lined by non-keratinized stratified squamous epithelium (Thatte et al., 2015).

Around 80% of conjunctival inclusion cysts are of secondary origin (Thatte et al., 2015). The most common causes include ocular surgery, chronic inflammation, allergic conditions such as vernal keratoconjunctivitis, and penetrating trauma (American Academy of Ophthalmology, 2023; Nurlistyani & Lutfi, 2024; Deshmukh et al., 2018). Surgical procedures such as small incision cataract surgery (SICS), phacoemulsification, strabismus repair, scleral buckling, and sub-Tenon anesthetic injection are frequently implicated, as they may inadvertently introduce or displace conjunctival epithelium into deeper tissue planes (Deshmukh et al., 2018; Bian et al., 2022; Kim et al., 2014; Lee et al., 2021; Srinivasan et al., 2005). In contrast, closed globe injury is a rarely recognized cause, and the underlying

mechanism remains poorly understood, with only a limited number of cases reported (Nurlistyani & Lutfi, 2024; Amar et al., 2017).

Clinically, these cysts present as translucent, fluid-filled lesions that are often asymptomatic but may cause discomfort or visual disturbance when enlarged (Thatte et al., 2015). Therapeutic intervention options include surgical excision, aspiration, trichloroacetic acid (TCA) injection, and in selected cases, pharmacological management with corticosteroids (Bagheri et al., 2020; Gallagher et al., 2020; López-Fontanet et al., 2024).

We report a case of secondary conjunctival inclusion cyst developing after closed globe blunt ocular trauma in a 75-year-old female, associated with traumatic hyphema and subconjunctival hemorrhage. The cyst resolved completely with conservative, non-surgical management using systemic and topical corticosteroids. This represents one of the few documented cases of conjunctival inclusion cyst arising as a complication of closed globe injury, and the first to report complete resolution with corticosteroid therapy alone in this specific clinical context.

This case report aims to describe a rare presentation of a secondary conjunctival inclusion cyst developing after closed-globe blunt trauma in a 75-year-old female and to report its successful resolution with systemic and topical corticosteroid therapy alone, without surgical intervention. This report provides clinical awareness for ophthalmologists managing blunt ocular trauma, highlighting that conjunctival inclusion cyst should be considered in the differential diagnosis of delayed conjunctival lesions. It also offers preliminary evidence that a trial of corticosteroid therapy may serve as an effective non-surgical first-line option in the early inflammatory phase, potentially avoiding more invasive procedures in selected patients, particularly the elderly or those at higher anesthetic risk.

METHOD

This study employed a descriptive qualitative method with a case report design to describe a rare occurrence of secondary conjunctival inclusion cyst following closed globe blunt ocular trauma. The subject was a 75-year-old female patient who presented to the Emergency Department of RS Mata Masyarakat Jawa Timur with complaints of blurred vision and ocular pain in the right eye after blunt trauma caused by a bicycle handlebar. Clinical data were obtained through history taking, comprehensive ophthalmologic examination, measurement of best-corrected visual acuity (BCVA), slit-lamp biomicroscopy, intraocular pressure assessment, Seidel test, and B-scan ultrasonography to evaluate posterior segment involvement. The cyst diagnosis was established based on clinical findings, cyst development and morphology two weeks after trauma. Conservative management using systemic and topical corticosteroids was administered, followed by serial clinical observation for two weeks to evaluate treatment response and lesion resolution. Data were analyzed descriptively by comparing the clinical findings with current literature regarding conjunctival inclusion cysts, closed globe ocular trauma, and ocular anti-inflammatory therapy. Patient confidentiality was maintained throughout the study, and informed consent for treatment and publication was obtained in accordance with medical research ethical principles.

Case Presentation

A 75-year-old female presented to the emergency department with blurred vision and pain in the right eye following blunt ocular trauma caused by a bicycle handlebar. She had a history of cataract surgery in the right eye more than five years prior, with no subsequent history of ocular inflammation or surgical complications. Her systemic medical history was notable for cardiac arrhythmia, for which she was on long-term antiplatelet therapy. She had no other relevant ocular or systemic history.

On initial presentation, best-corrected visual acuity (BCVA) of the right eye (OD) was reduced to light perception only. The left eye (OS) was unaffected, with BCVA of 6/6. Anterior segment examination of the right eye revealed grade I hyphema with blood coagulum occupying approximately one-third of the anterior chamber, along with severe subconjunctival hemorrhage involving all quadrants of the bulbar conjunctiva. The Seidel test was negative, confirming intact corneoscleral integrity and excluding open globe injury. Intraocular pressure (IOP) of the right eye measured 7.6 mmHg. Due to the presence of the blood coagulum, anterior chamber depth could not be assessed and the iris and pupil could not be visualized. B-scan ultrasonography demonstrated vitreous opacities suspicious for vitreous hemorrhage, with no evidence of retinal detachment.

The patient was diagnosed with traumatic hyphema and subconjunctival hemorrhage secondary to closed globe injury. Initial management following standard traumatic hyphema protocols,11,12,13 comprising topical antibiotic-corticosteroid combination drops six times daily, a topical cycloplegic agent, systemic tranexamic acid, systemic corticosteroid, and strict bed rest with head elevation.

At two-week follow-up, the patient reported a new complaint of a painless, gradually enlarging bump beneath the superior eyelid of the right eye that had developed over the preceding days. There was no associated pain, discharge, or further changes in vision. Slit-lamp examination revealed a well-defined, translucent, dome-shaped cystic nodule measuring approximately 9 × 6 mm at the superior bulbar conjunctiva of the right eye. The cyst wall appeared thin and smooth, with no surrounding injection, feeder vessels, or pigmentation. The anterior chamber demonstrated residual coagulum consistent with resolving hyphema, and the previously noted subconjunctival hemorrhage had substantially improved. IOP of the right eye at this visit measured 8.3 mmHg. BCVA remained unchanged at light perception.

Based on the clinical morphology, anatomical location, and clear temporal relationship to the preceding blunt trauma, a diagnosis of secondary conjunctival inclusion cyst was established. Given the cyst's recent onset and the concurrent post-traumatic inflammatory milieu, a trial of conservative pharmacological therapy was initiated in preference to immediate surgical intervention. The patient was prescribed oral methylprednisolone 0.5–1 mg/kg/day tapered over two weeks, topical prednisolone acetate 1% eye drops eight times daily, a topical cycloplegic agent, and topical antibiotic drops.

At the subsequent follow-up two weeks after initiating corticosteroid therapy, four weeks from initial presentation, the conjunctival cyst had resolved completely, with no residual mass, recurrence, or structural sequelae on slit-lamp examination. BCVA at final follow-up remained at light perception. The patient was comfortable and referred for retinal outpatient review at the next scheduled visit in two weeks, for ongoing posterior segment monitoring in view of the suspected vitreous hemorrhage.

A clinical timeline of the patient's presentation and progress is summarized in Table 1, and representative slit-lamp photographs are presented in Figure 1.

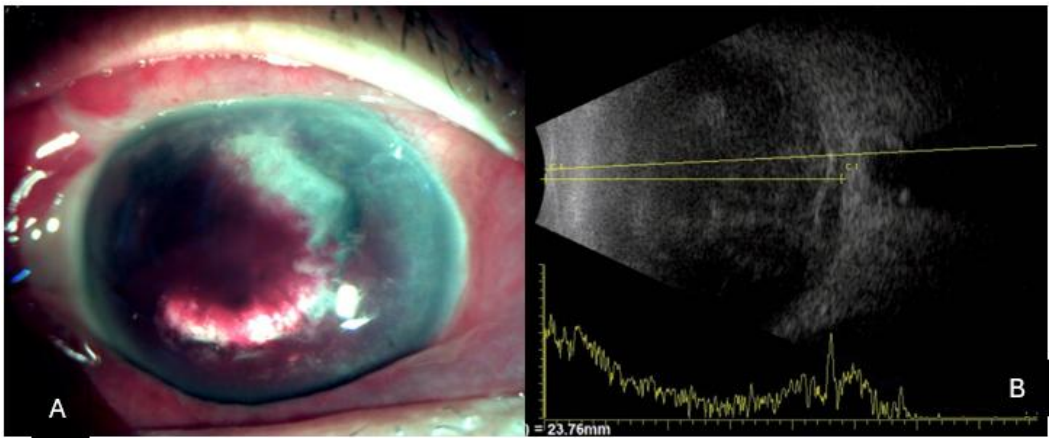

Figure 1. (A) Slit lamp examination in H0 trauma shows severe subkonjungtival bleeding and hyphaema in the anterior chamber. (B) USG examination shows vitreous opacity, possible haemorrhage in the vitreous
Source: Primary clinical documentation and imaging from the index patient, RS Mata Masyarakat Jawa Timur, 2026

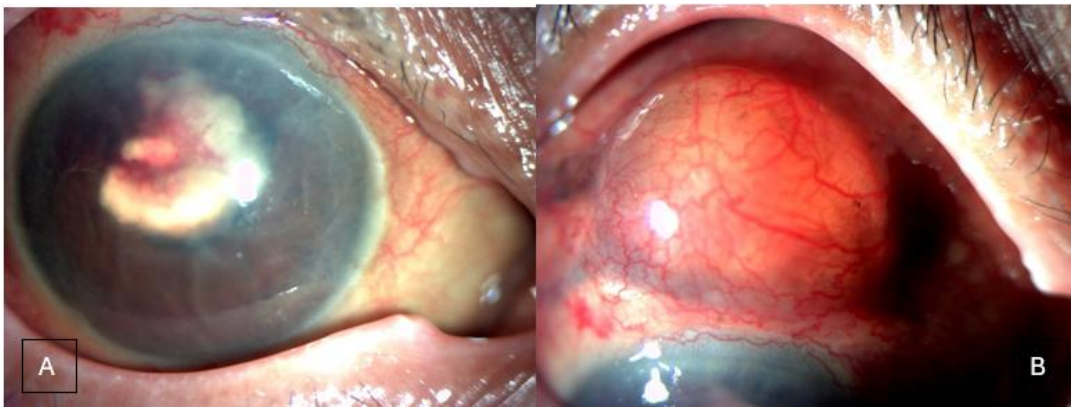

Figure 2. Slit lamp examination 2 weeks after trauma (A) resolving hyphaema and subconjunctival haemorrhage, (B) painless, cystic nodule in superior bulbar conjunctiva
Source: Primary clinical documentation and slit-lamp photography from the index patient, RS Mata Masyarakat Jawa Timur, 2026

Table 1. Clinical Timeline

Timepoint	Key Findings	Management
Day 0	BCVA OD: light perception; grade I hyphema with coagulum; severe subconjunctival hemorrhage (all quadrants); IOP 7.6 mmHg; Seidel (−); vitreous opacities on B-scan; no retinal detachment	Topical antibiotic-corticosteroid, cycloplegic, systemic tranexamic acid, systemic corticosteroid, bed rest with head elevation
Week 2	Resolving hyphema; new 9×6 mm superior conjunctival cystic nodule; improved subconjunctival hemorrhage; IOP 8.3 mmHg; BCVA unchanged	Oral methylprednisolone (tapered over 2 weeks), topical prednisolone 1%, cycloplegic, topical antibiotic

Timepoint	Key Findings	Management
Week 4	Complete cyst resolution; no residual mass; BCVA light perception	Retinal outpatient review scheduled

Source: Primary clinical data extracted from the patient's medical record, RS Mata Masyarakat Jawa Timur, 2026

RESULTS AND DISCUSSION

This case report describes a rare presentation of secondary conjunctival inclusion cyst as a delayed complication of closed globe blunt ocular trauma, which resolved completely with systemic and topical corticosteroid therapy. While conjunctival inclusion cysts are the most commonly encountered benign cystic lesions of the conjunctiva, their development following non-penetrating blunt injury, in the absence of prior ocular surgery or penetrating trauma, remains an underrecognized clinical entity (American Academy of Ophthalmology, 2023; Thatte et al., 2015).

Mechanical ocular trauma is classified using the Birmingham Eye Trauma Terminology (BETT) system, which divides injuries into closed globe injury (CGI) and open globe injury (OGI) based on the integrity of the corneoscleral wall (Kuhn et al., 1996). Under BETT, closed globe injury is defined as ocular contusion or lamellar laceration in which the eye wall remains structurally intact without a full-thickness wound. In CGI, the force of impact is entirely transmitted to the internal ocular structures without pressure release through a wound, making intraocular damage disproportionately severe relative to the external appearance of the globe (Agrawal et al., 2013). Epidemiologically, contusions represent as the most common form of CGI, accounting for 82.6% of cases in one large retrospective study, with falls identified as the leading mechanism of home-related injury, predominantly affecting elderly individuals with a median age of 75 years (Lee et al., 2023). This profile closely mirrors our patient, a 75-year-old female sustaining blunt trauma from a bicycle handlebar and show the particular vulnerability of older individuals to severe closed globe injury from common domestic mechanisms.

Blunt ocular trauma produces histopathological changes through a combination of compressive forces, shearing stress, shock-wave transmission, and vascular disruption (Comez & Arikan, 2022). In the anterior segment, hemorrhage into the anterior chamber results in hyphema, carrying risks of elevated IOP and rebleeding. The iris may sustain tears, sphincter injury, iridodialysis, or traumatic mydriasis; and the crystalline lens is susceptible to traumatic cataract or zonular disruption causing subluxation (Comez & Arikan, 2022). In the posterior segment, closed globe injury may result in vitreous hemorrhage, retinal hemorrhage, retinal tears and detachments, choroidal injury, and traumatic optic neuropathy (Batchelor et al., 2023). A large registry study of 417 contusion cases reported hyphema in 73%, angle recession in 71%, iris sphincter tears in 20%, iridodialysis in 10%, cyclodialysis in 3.4%, traumatic cataract in 10%, choroidal rupture in 7%, and retinal tear or detachment in 7% (Batchelor et al., 2023). Long-term complications include traumatic glaucoma, with one study reporting a 19% risk after closed globe contusion, approximately six times higher than after penetrating injury (Comez & Arikan, 2022). Patients with traumatic hyphema also carry an elevated risk of retinal break and detachment in both early and late post-injury periods, highlighting the importance of fundus examination and posterior segment monitoring (Batchelor et al., 2023).

Conjunctival complications, while recognized in penetrating trauma, have been less systematically studied in the context of closed globe injury. Anterior segment conjunctival manifestations of blunt closed globe injury include subconjunctival haemorrhage, chemosis, and laceration (Comez & Arikan, 2022). Subconjunctival haemorrhage results from rupture of conjunctival vessels under the compressive and shearing forces of blunt impact, while more extensive conjunctival disruption may indicate underlying scleral injury (Comstock & Decory, 2012). When conjunctival laceration is present, careful examination for foreign bodies, underlying scleral laceration, and globe perforation is mandatory, as bullous chemosis with subconjunctival haemorrhage may herald occult scleral rupture (Comstock & Decory, 2012). Beyond these acute manifestations, development of conjunctival inclusion cyst as a delayed complication, as observed in our patient, have been rarely documented and are not well characterized in the current literature (Thatte et al., 2015; Amar et al., 2017).

The combination of findings in this patient — grade I traumatic hyphema with blood coagulum, severe subconjunctival haemorrhage, low IOP (7.6 mmHg), and a negative Seidel test — together characterize a severe closed globe injury with widespread anterior segment involvement and provide a coherent pathophysiological basis for the subsequent development of a conjunctival inclusion cyst. Importantly, even a grade I hyphema defined as blood occupying less than one-third of the anterior chamber, should not be interpreted as indicating minor trauma. Blunt ocular trauma leads to tearing of blood vessels in the anterior chamber and injury to the iris, ciliary body, and their associated vasculature, with disruption of the recurrent choroidal arteries and major arterial circle of the iris resulting in anterior chamber hemorrhage (Chen & Fasiuddin, 2021). Even a small hyphema may represent a sign of major intraocular trauma with associated damage to vascular and other intraocular tissues (Gragg et al., 2025). The presence of a formed blood coagulum within the anterior chamber, vitreous opacification on B-scan, and clinically low IOP in our patient collectively reflect the true severity of the underlying biomechanical injury, irrespective of the contained hyphema volume. Blunt ocular trauma produces injury through coup and contrecoup mechanisms, equatorial globe expansion from anteroposterior compression, and shearing forces from differential motion between ocular tissues, all of which operate simultaneously during high-energy blunt impact (Amar et al., 2017; Comez & Arikan, 2022).

Paradoxically, the IOP in this patient measured below the normal range, 7.6 mmHg, rather than the elevated IOP more typically associated with hyphema. Elevated IOP due to trabecular outflow obstruction by red blood cells and inflammatory debris is the most common complication of hyphema (Chen & Fasiuddin, 2021). The finding of reduced IOP in our patient therefore suggests that concurrent mechanisms of aqueous humor reduction were operative, outweighing any outflow obstruction from the relatively small volume of anterior chamber blood. Post-traumatic hypotony in the context of closed globe injury most commonly results from traumatic cyclodialysis, wherein axial compression and equatorial globe expansion cause detachment of meridional ciliary muscle fibres from the scleral spur, creating an aberrant communication between the anterior chamber and the suprachoroidal space, thereby simultaneously increasing uveoscleral outflow and reducing aqueous production from a compromised ciliary body (Ioannidis & Barton, 2010; Ding et al., 2012). Additional contributing mechanisms may include traumatic iridocyclitis with suppressed aqueous secretion or ciliary body detachment (Ding et al., 2012). Although an IOP of 7.6 mmHg does

not meet the strict conventional definition of hypotony (≤5 mmHg), it is clinically meaningful and consistent with partial cyclodialysis or ciliary body dysfunction. Importantly, while the combination of subconjunctival haemorrhage and low IOP may raise concern for occult open globe injury, the negative Seidel test and structurally intact anterior chamber in our patient effectively exclude this diagnosis (Kuhn et al., 1996).

The severity of subconjunctival haemorrhage in this patient was likely exacerbated by two compounding systemic factors: age-related conjunctival vascular fragility and long-term antiplatelet therapy for cardiac arrhythmia. Antiplatelet agents such as aspirin and clopidogrel impair platelet aggregation and weaken the normal haemostatic response at sites of vascular disruption, allowing haemorrhage to persist and extend beyond what would be expected from the mechanical injury alone (Mimura et al., 2009). In elderly patients, conjunctival vessel wall fragility caused by arteriosclerosis and degenerative changes in supporting connective tissue further amplifies this risk (Wirbelauer, 2006).

The majority of secondary conjunctival inclusion cysts emerge due to iatrogenic causes, such as small incision cataract surgery, phacoemulsification, strabismus repair, and scleral buckling procedures. During tissue manipulation, conjunctival epithelial cells implanted into the substantia propria (Thatte et al., 2015; Deshmukh et al., 2018; Bian et al., 2022). The entrapped cells proliferate to form a fluid-filled cystic cavity lined by non-keratinized stratified squamous epithelium (American Academy of Ophthalmology, 2023; Thatte et al., 2015). Chronic inflammation and allergic conditions have similarly been implicated, with inflammatory mediators disrupting epithelial basement membrane integrity and facilitating epithelial migration (Nurlistyani & Lutfi, 2024). Unlike penetrating trauma, where direct inoculation of epithelial cells into deeper layers is mechanistically straightforward, blunt trauma presents a more nuanced pathway. The rapid compressive and decompressive forces generated during blunt impact produce shear stress at the conjunctival epithelial–stromal interface, causing micro-disruption without frank laceration, allowing epithelial cells to become entrapped within the substantia propria (Amar et al., 2017). Appearance of the cyst approximately two weeks post-injury, coinciding with the active inflammatory resolution phase, further supports a trauma-driven rather than coincidental primary pathogenesis.

The differential diagnosis of a new conjunctival cystic lesion following blunt ocular trauma includes several conditions. Conjunctival lymphangiectasia may appear morphologically similar but typically appears multiloculated, without a clear precipitating traumatic history (Thatte et al., 2015). Conjunctival dermoid cysts are congenital lesions and most commonly found at the inferotemporal limbus from birth (American Academy of Ophthalmology, 2023). Retention cysts of the accessory lacrimal glands of Krause or Wolfring typically arise in the fornices rather than the bulbar conjunctiva (Thatte et al., 2015). In elderly patients, conjunctival mucosa-associated lymphoid tissue (MALT) lymphoma should be considered, although these lesions characteristically appear as salmon-pink, fleshy, non-translucent masses rather than clear cystic structures (Thatte et al., 2015). In this patient, the smooth, thin-walled, translucent, serous-filled morphology with a clear temporal relationship to blunt trauma and a negative Seidel test was sufficient for a clinical diagnosis of secondary conjunctival inclusion cyst, without the immediate need for biopsy or histopathological confirmation.

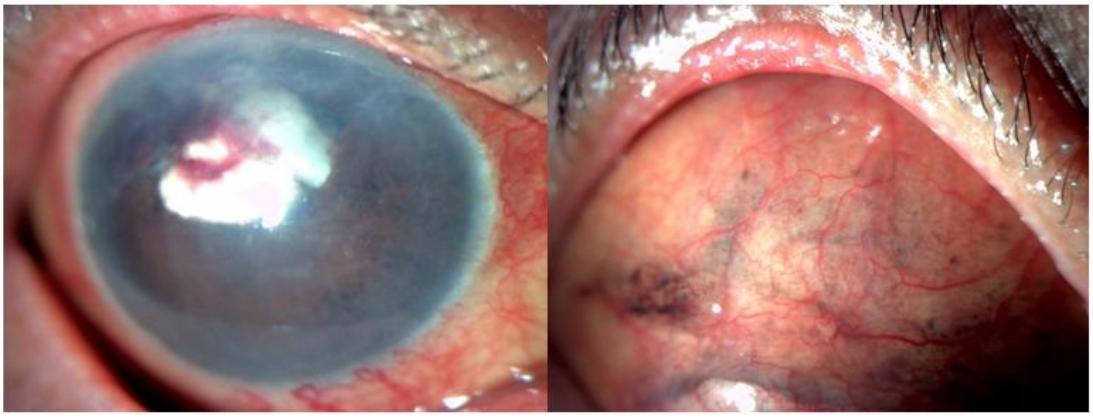

Figure 3. Slit lamp examination after 2 weeks of topical and systemic medication. (A) The condition of COA is remain unchanged (B) Complete cyst resolution.
Source: Primary clinical documentation and slit-lamp photography from the index patient, RS Mata Masyarakat Jawa Timur, 2026

The management of conjunctival inclusion cyst depends on its clinical course. Spontaneous resolution has been documented, particularly in recently formed, small, or inflammation-associated cysts (Thatte et al., 2015; Nurlistyani & Lutfi, 2024). Medical intervention is indicated for persistent or symptomatic cyst such as surgical excision, needle aspiration, trichloroacetic acid (TCA) injection at concentrations of 10–20%, and thermal cauterization (Bagheri et al., 2020; Gallagher et al., 2020; López-Fontanet et al., 2024; Owji & Aslani, 2005). Surgical excision with intact cyst wall removal remains the definitive treatment, as incomplete removal or intraoperative cyst rupture carries a significant recurrence risk (Thatte et al., 2015). TCA injection has gained traction as a minimally invasive alternative, acting through chemical ablation of the cyst epithelium, with multiple case series reporting satisfactory outcomes and low recurrence rates (Bagheri et al., 2020; Gallagher et al., 2020; López-Fontanet et al., 2024).

The most clinically notable finding in this case is the complete resolution of the conjunctival inclusion cyst with corticosteroid therapy alone, without surgical or invasive intervention. Nurlistyani and Lutfi (2024) similarly reported corticosteroid-mediated resolution of a secondary conjunctival cyst in a patient with injection-related ocular inflammation, proposing that suppression of the underlying inflammatory stimulus was the primary mechanism of resolution. A comparable mechanism is plausible in our patient. The post-traumatic inflammatory milieu rich in cytokines and vascular mediators sustained by the hyphaemia and extensive subconjunctival haemorrhage likely maintained cyst wall tension and fluid accumulation. Systemic corticosteroids, through their broad anti-inflammatory effect reducing vascular permeability, inhibiting cytokine release, and promoting epithelial remodelling may have facilitated cyst collapse and resorption, augmented by topical corticosteroids providing localized activity at the ocular surface (Nurlistyani & Lutfi, 2024). It must nonetheless be acknowledged that spontaneous resolution of a recently formed post-traumatic cyst cannot be entirely excluded, which is an inherent limitation of single-case reporting.

This case carries important clinical implications. Clinicians managing closed globe ocular trauma should maintain awareness of the potential for delayed conjunctival cystic

lesions developing days to weeks after the primary injury. When a conjunctival inclusion cyst is identified in the early post-traumatic inflammatory phase, a supervised trial of corticosteroid therapy may represent a reasonable and effective non-surgical first-line option, particularly in elderly or high-anesthetic-risk patients. The principal limitations of this report are its single-case design, which precludes conclusions regarding causality, treatment efficacy, or generalizability; the absence of histopathological confirmation, which was clinically accepted given complete resolution without surgical excision; and the inability to fully disentangle the contribution of corticosteroid therapy from spontaneous resolution. Future prospective studies or case series comparing pharmacological and surgical management of post-traumatic conjunctival inclusion cysts are warranted to establish evidence-based treatment guidelines for this uncommon but clinically instructive condition.

CONCLUSION

We report a rare case of secondary conjunctival inclusion cyst arising as a delayed complication of closed globe blunt ocular trauma in a 75-year-old woman. The absence of prior surgery or penetrating injury, together with the clear temporal sequence, supports a trauma-related mechanism driven by epithelial disruption and post-traumatic inflammation. Notably, the cyst resolved completely with systemic and topical corticosteroid therapy alone, without surgical intervention. This case highlights that conjunctival inclusion cyst should be considered in patients presenting with new conjunctival lesions following blunt trauma, even when the globe is intact. In selected cases, particularly during the early inflammatory phase, corticosteroid therapy may offer an effective non-invasive first-line approach. Further studies are needed to better define the incidence, pathophysiology, and optimal management of this uncommon complication.

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