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CASE REPORT

A CASE REPORT OF EPITHELIAL DOWNGROWTH SYNDROME FOLLOWING TRAUMATIC EYE INJURY IN A CHILD: DIAGNOSIS AND MANAGEMENT CONSIDERATIONS

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ABSTRACT

Epithelial downgrowth syndrome represents a significant complication subsequent to ocular surgery or trauma. Herein, we present a comprehensive description of a specific case of this complication following an eye trauma in a child of 8 years old. This case highlights the challenges in diagnosing and managing epithelial downgrowth syndrome, particularly in pediatric patients following traumatic eye injuries.

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INTRODUCTION

Epithelial downgrowth syndrome is considered as a major complication following surgery or an eye trauma. It is characterized by invasion of epithelial cells and growth into intraocular structures. This article aims to comprehensively describe a particular case of this complication following and eye trauma of a child.

CASE DESCRIPTION

We report the case of an 8-year-old child, with no particular history, living in a rural area, who, by accident, was injured in his right eye by a shrub branch, causing an acute drop in his visual acuityand a painful red eye for which he consulted with his family, four days later, in the ophthalmological emergency room of our hospital. Visual acuity was reduced to the level of his OD at finger movement. Eyelid examination was normal. At the anterior segment, we found a wide horizontal lower corneal wound ranging from 8 o'clock to 4 o'clock with an iris prolapse as well as bleeding from the anterior chamber. The rest of the OD exam was inaccessible. OS examination was normal. We hospitalized the child and after performing an orbital scan to eliminate an intraocular foreign body, we took him to the operating room to suture his cornea. The surgical aftermath was marked by significant inflammation treated with corticosteroid therapy. We followed him for several weeks. Unfortunately, when we saw him again at 2 months after his wire removal, we noticed on his right eye a translucent growth on the anterior surface of the iris and the posterior surface of the cornea with a corneal neovascularization and a lipid keratopathy. [Figure 1,2] Gonioscopy revealed the same growth on some parts of the angle. His IOP was normal. His ocular ultrasound revealed a transonic vitreous and a flat retina.We conducted an argon laser test and we observed a white fluffy reaction on the plane of the iris. Its treatment will be discussed during a meeting of several cornea specialists (Surgery, Intracameral chemotherapy…).

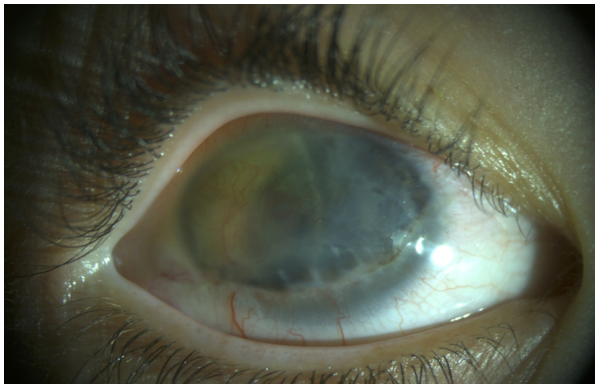

Figure 1.

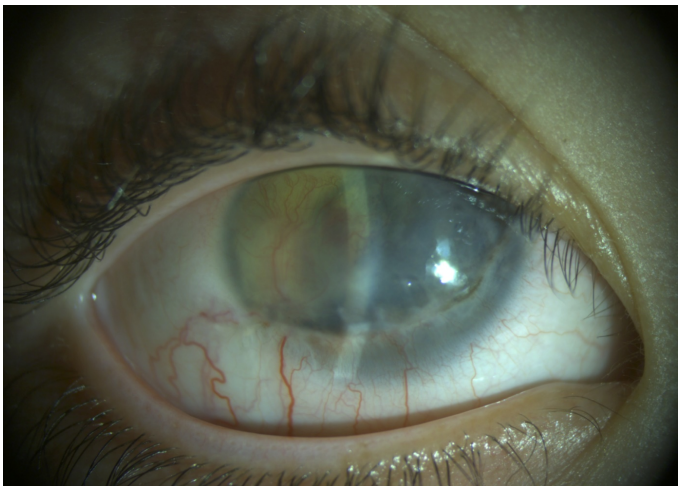

Figure 2.

Figure 1&2. Clinical aspects of Epithelial downgrowth syndrome in an 8 year-old child

DISCUSSION

Epithelial downgrowth, though uncommon, poses a significant risk to vision following penetrating eye injuries or intraocular surgeries. In this condition, epithelial cells migrate into the front chamber of the eye and multiply within its internal structures. While stratified squamous epithelium is typically absent within the eye, it can extend into various intraocular components. Epithelialization manifests in three main forms: pearls, cysts, and sheets [1]. This phenomenon was observed first, in 1832, as a semitransparent cyst within the anterior chamber of a patient subsequent to a perforating intraocular injury.[2] Subsequently, epithelial downgrowth has predominantly been noted in cases of ocular trauma and cataract surgery. However, it has also been linked with other surgical procedures, including penetrating keratoplasty, pterygium excision, aspiration of aqueous, and retinal detachment surgery. Most cases occur within the first year of the incident [3]. Epithelial downgrowth manifests when non-keratinized epithelial cells enter the inner eye structures through either a traumatic injury or surgical incision, subsequently proliferating within. Proposed pathophysiological pathways involve the implantation of epithelial cells, the introduction of a conjunctival flap into the wound, or the delayed closure of the wound.[4] These cells, originating from either the conjunctiva or cornea, have the potential to spread across various intraocular structures, including the cornea, iris, trabecular meshwork, ciliary body, crystalline lens, artificial lens, and retina [5]. Factors that increase the risk of epithelial entry and proliferation include undergoing multiple intraocular surgeries, experiencing delayed wound healing, having wound edges that remain open, developing wound fistulas, experiencing iris or vitreous incarceration, and having full-thickness sutures.[3] Additionally, damaged or denuded endothelium may contribute to the risk of epithelial migration due to the loss of contact inhibition. [6] The invasion of epithelium triggers an inflammatory response and results in tissue damage. [5]

Patients affected by epithelial downgrowth typically seek medical attention within a year of the triggering incident, presenting with a range of symptoms such as declining visual clarity, redness, discomfort, tearing, and sensitivity to light.[3] The sheet-like manifestation often accompanies significant inflammation and pain.[7] During slit-lamp examination, a characteristic finding is a translucent growth with a scalloped, advancing border observed on the posterior surface of the cornea or anterior iris, or alternatively, a cyst emerging from a wound site.[8] Gonioscopy may reveal epithelial coverage over the iris and angle, frequently associated with the development of glaucoma.[9] However, intraocular pressure can vary.[10] Numerous diagnostic techniques for identifying epithelial downgrowth have been documented in scientific literature. In cases where iris involvement is suspected, argon laser photocoagulation can prove beneficial for detecting epithelial cells.[11] Typically, the normal iris responds to photocoagulation by darkening; however, the presence of epithelial cells elicits a distinct fluffy white reaction, which serves as a characteristic indicator.[12] If free-floating cells are present, cytology can be conducted using an anterior chamber aspirate. Papanicolaou staining is often employed to identify cells of epithelial origin.[13] Specular microscopy, exhibits a pattern characterized by a distinct and well-defined boundary separating the endothelium from the epithelial downgrowth.[9]In confocal microscopy, the presence of circular, highly reflective nuclei is a distinguishing feature indicating epithelial cell infiltration. Additionally, this method aids in differentiation between fibrous and epithelial downgrowth when a retro corneal membrane is present, and it may identify alterations in epithelial appearance following treatment.[14] In Anterior segment optical coherence tomography (AS-OCT) we can observe the epithelial downgrowth as a hyperreflective layer.[5]

Histopathological examination stands as the definitive method to confirm the presence of epithelial downgrowth. The diagnosis relies on the characteristic observation of one to three layers of stratified, non-keratinized squamous epithelium on the posterior cornea and anterior iris, though any intraocular structure may be affected.[3] Furthermore, the origin of the epithelial cells can be discerned. Presence of goblet cells within the epithelium indicates conjunctival rather than corneal origin.[15] While immunohistochemistry can also be utilized, its supportive evidence remains limited. [13] Other diagnosis similar are Fibrovascular Downgrowth and Secondary Endothelial Proliferation [5]. Historically, many therapeutic modalities have been used to treat epithelial downgrowth. These include surgical interventions such as iridectomy, vitrectomy, cautery, penetrating keratoplasty, cryotherapy, photocoagulation, and mechanical debridement. Medical treatments historically include radiation, alcohol, steroids, and antibiotics. Many of these are no longer used due to complications or high recurrence rates.[2] Regardless, the management of epithelial downgrowth depends on the extent of the involvement and whether it is the cystic or the diffuse, sheet-like form. Often, aggressive surgical management is required; however, some of the more conservative approaches listed below may be used alone or in conjunction with others. Various therapeutic approaches have been employed to address epithelial downgrowth. These encompass surgical procedures like iridectomy, vitrectomy, cautery, penetrating keratoplasty, cryotherapy, photocoagulation, and mechanical debridement. Additionally, medical interventions have historically included radiation, alcohol, steroids, and antibiotics. Many of these methods have fallen out of favor due to complications or high rates of recurrence [7].

For instance, Cryotherapy can effectively eradicate epithelium when it is confined to the posterior cornea, drainage angle, or ciliary body.[11] This method can be integrated with other surgical strategies like penetrating keratoplasty (PKP), fistula resection, or Descemet's membrane endothelial keratoplasty (DMEK) to enhance clarity and improve vision.[7]Photocoagulation utilizing an argon laser is commonly employed for managing the cystic variant of epithelial downgrowth. This method is less intrusive compared to cryotherapy, resulting in reduced inflammation. Nevertheless, there is a risk associated with photocoagulation wherein the cyst may rupture, potentially giving rise to the development of the diffuse, sheet-like form.[5] The administration of antimetabolites like 5-fluorouracil (5-FU) and Mitomycin-C (MMC) via intracameral injection has also been documented as potential therapies for epithelial downgrowth [16]. The visual prognosis following a diagnosis of epithelial downgrowth is typically unfavorable, primarily due to recurrence, refractory glaucoma, and corneal decompensation.[6] The outlook is particularly grim in cases presenting the diffuse, sheet-like form, as it

poses challenges in identification and necessitates more extensive surgical interventions.[7] Historically, numerous cases have resulted in enucleation, often attributed to severe secondary glaucoma.[3]

CONCLUSION

Preventing epithelial downgrowth requires careful alignment of wound edges and diligent monitoring of incisions during and after surgery. It's essential to assess and address any wound leaks promptly to mitigate the risk [5].

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