

CLINICAL IMAGE

A New Eyelid Growth

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A 69-year-old Caucasian female presents to the eye clinic with a complaint of a new itchy growth on her left lower eyelid. Over the previous two weeks the irritation caused by the lesion has become increasingly bothersome. The lesion appears as a pink growth within the nasal canthus. She has also been experiencing excessive tearing and purulent discharge of the left eye. The patient denies having similar lesions in the past. Warm compresses and artificial tears has not relieved any of her symptoms.

On physical examination, a soft, non-tender, flesh-colored lesion is protruding from the patient's left lower puncta. The round lesion is entirely blocking the puncta (*Figure 1 and Figure 2*). It is vascularized with a smooth mucosal appearance. There is additional inflammation surrounding the lesion in the nasal region of the lower eyelid. There are no additional abnormalities to the lids, lashes, or conjunctiva of either eye.

FIGURE 1:

Lower left eyelid growth (arrow). The pupil is pharmacologically dilated.

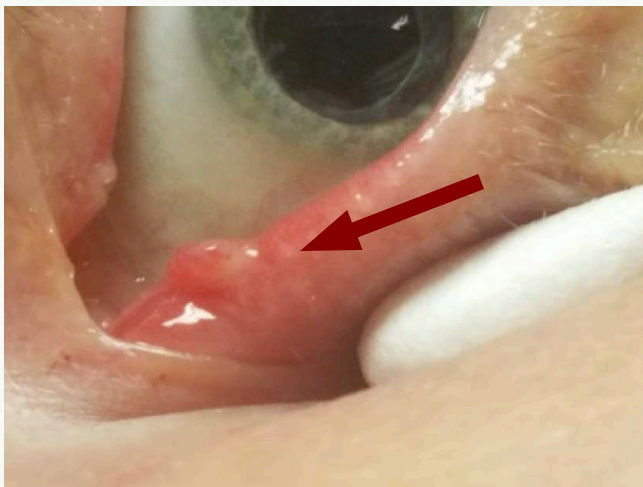
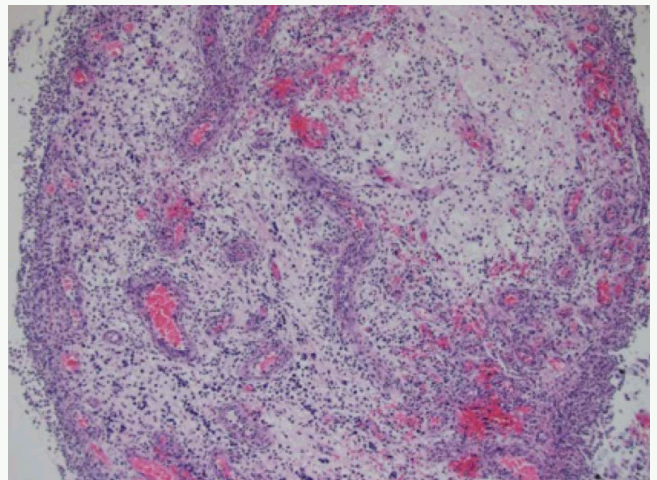


FIGURE 2:

Histology showing tissue is ulcerated with vascular proliferation and presence of acute inflammation.



The quality of her vision is not affected. She is not photophobic. The patient does not wear contact lenses but wears spectacles full time to correct her refractive error. There is no prior history of skin cancers or other suspicious lesions. She has previously been diagnosed with rosacea, hyperlipidemia, hypothyroidism, and type 1 diabetes mellitus.

QUESTIONS

1. What is this eyelid lesion?

- A. Internal hordeolum
- B. Kaposi's sarcoma
- C. Pyogenic granuloma
- D. Squamous cell carcinoma

2. What is the most likely underlying etiology for this lesion?

- A. Blepharitis
- B. Canaliculitis
- C. Dacryocystitis
- D. Rosacea

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ANSWERS:

1. What is most likely the diagnosis of this eyelid lesion?

Correct Answer:

C) *Pyogenic Granuloma*

Pyogenic granulomas are benign tumors that present on various areas of skin and mucous membranes of the body. They appear as vascularized lobular or smooth lesions, some being sessile while others may be pedunculated.¹ These findings are consistent with the presentation of the patient in this case. Internal hordeola (often referred to as a sty) are an acute and painful infection of the meibomian glands. These glands are found within the upper and lower tarsal plate of the eyelids, and open onto the eyelid margin. They produce an oily substance on the eye, which prevents tears from evaporating. This condition is not consistent with the presentation of the lesion in this case, as the growth does not involve a meibomian gland. Since internal hordeola are focal infections, they do not have the typical lobular, sessile or pedunculated presentation seen in pyogenic granulomas. Kaposi's sarcoma is a vascular neoplasia associated with immune deficiencies like human immunodeficiency virus (HIV). These lesions often grow on the skin and mucous membranes, or within internal organs and lymph nodes.² Kaposi's sarcoma is not consistent with the lesion in our case because our patient does not have HIV or similar conditions. The lesion in our case also appears in isolation, which is not characteristic of Kaposi's sarcoma. Squamous cell carcinoma (SCC) is a malignant cutaneous tumor. These lesions often occur on sun-exposed areas of the skin. Actinic keratosis is the most common precursor lesion to SCC in Caucasian patients. If left untreated, SCC invades and destroys surrounding tissue.³ SCC is not likely the cause of the new growth in our patient because it is not located in a sun-exposed portion of the eyelid nor is there any focal tissue destruction.

2. What is the most likely underlying etiology for this lesion?

Correct Answer:

B) *Canaliculitis*

Canaliculitis is an infection within the canalicular drainage system of the eyelid. These horizontally running canals drain the tears from the puncta to the lacrimal sac. It is uncommon for these structures to become inflamed leading to a high rate of misdiagnosis.⁴

When a canaliculitis presents, it is typically unilateral, and with applied pressure, purulent discharge from the puncta is released.⁵ This is the etiology of our case as the pyogenic granuloma is rooted in the involved canaliculi and infectious discharge is later discovered. Blepharitis affects individuals of all ages and ethnicities. It is an inflammatory condition involving the eyelid margin. It is a very common finding in ophthalmic examinations and often becomes a chronic issue. Blepharitis may lead to permanent changes of the eyelids including scarring, madarosis (loss of eyelashes), or trichiasis (misdirected eyelashes). Other consequences of blepharitis include superficial punctate keratopathy, corneal neovascularization, or ulceration.⁶ Also, blepharitis involves the complete eyelid margin

and is usually bilateral while canaliculitis occurs only at the medial aspect of the eyelid and is typically unilateral. These associated findings are not consistent with the presentation of our case as there was no involvement of the cornea, lashes or eyelid margin. Dacryocystitis is an infectious inflammatory response within the nasal lacrimal sac. The nasal region of the lower eyelid is often very swollen and erythematous. In these cases, the applied pressure will create great discomfort to the patient and release purulent discharge from the puncta.⁷ It is not likely that the lacrimal sac is involved as our patient did not experience edema or discomfort from prominent lacrimal sac distension as would be expected with dacryocystitis. Rosacea is a chronic cutaneous syndrome that presents with variable manifestations, often on the face. Ocular rosacea includes findings, such as lid margin telangiectasia, corneal infiltrates, conjunctival injection, dry eye syndrome, and "honey crust" collarette growth at the base of the eyelashes.⁸ Ocular rosacea does not accurately diagnose our patient's etiology as it does not result in flesh-like lesions and often compromises the integrity of the cornea, while our patient's cornea was not involved.

DISCUSSION

Pyogenic granulomas are benign rapid growing masses. They are often solitary lesions that arise spontaneously or occur after trauma. Additional etiologies may include human papilloma virus type 2, herpes virus type 1, and B-Raf proto-oncogene serine/threonine kinase (BRAF) mutations.¹ The BRAF gene serves as a primary driver of protein synthesis. The resulting proteins control cellular functions including cellular proliferation, apoptosis, and differentiation. BRAF mutations within endothelial cells are recognized to be a trigger for pyogenic granuloma formation. In a small study of three patients who were taking selective BRAF inhibitors (vemurafenib or encorafenib), the development of multiple new pyogenic granulomas have been reported.⁹

A retrospective study of thirty-eight patient records reported that there was an observed peak incidence of nasal pyogenic granulomas in women with increased hormonal action, which accounted for 40% of the involved cases. Hormonal action was defined as women who were pregnant or undergoing hormonal therapy (including oral contraceptives). The second most common cause remained idiopathic, but 18% were reported to have prior injury at the site of the pyogenic granuloma growth.¹⁰

Ocular pyogenic granulomas can appear on various structures of the eye, such as the cornea, conjunctiva, or eyelid. Underlying etiologies of these pyogenic granulomas include, but are not limited to, infectious keratitis, ocular surgeries (keratoplasty, strabismus, etc.), and chalazia.^{11,12} In cases of punctal pyogenic granulomas, underlying causes often include previous insertion of silicone punctal plugs (used for dry eye management), and as seen in our case, lacrimal canaliculitis.⁵

The underlying etiology of lacrimal canaliculitis is infectious. Common causative organisms include streptococcal and staphylococcal species. In recurrent cases it is recommended to culture for fungi (*Aspergillus*, *Candida albicans*, and *Fusarium*),

less common bacteria (*Fusobacterium* and *Nocardia*), and viral (herpes simplex and varicella zoster) agents. The presence of sulfur granules or concretions is a known characteristic finding of *Actinomyces israelii*, a filamentous anaerobic gram-positive bacteria.⁵ *Actinomyces israelii* often presents with other gram-positive or gram-negative bacteria. It is also established that *Staphylococcus* alone can form these canalicular concretions.¹³ The variability of canaliculitis pathogenesis and its related concretions are an important consideration when initiating treatment.

TREATMENT

The standard treatment is excision of the pyogenic granuloma.⁵ The lesion in our case was excised under local anesthesia. Once the lesion had been removed, the pressure was applied to the lower eyelid with a cotton tip applicator. A copious amount of purulent discharge was expressed from the canaliculi through the puncta (Figure 3). Sulfur granules or concretions were also expressed from the puncta (Figure 4). These findings are commonly seen in lacrimal canaliculitis.

In canaliculitis cases, any purulent discharge, including sulfur granules, should be cultured if the clinician is unsure of the underlying infectious organism, or in chronic recurrent cases. In bacterial infectious cases, ophthalmic antibiotic solution is injected through the involved canalicular system and into the lacrimal sac immediately after the procedure.⁷ Antibiotic eye drops should also be prescribed for one to two weeks post-operatively. Depending on duration and severity of the canaliculitis, conservative treatment with topical agents and warm compress four times per day may be sufficient in mild presentations. Other more involved cases may require a canaliculotomy for complete resolution and expression of concretions or additional infectious debris.⁷ A canaliculotomy is a longitudinal incision along the canaliculus that spares the puncta and has a resolution rate of 80%-100%.¹⁴

In our case, the patient was treated empirically using moxifloxacin 0.5% ophthalmic solution, a broad-spectrum antibiotic for the intracanalicular irrigation. Moxifloxacin 0.5% eye drops were also prescribed, one drop four times per day, for one week. If a culture is obtained and the report finds fungal involvement, the treatment should include an anti-fungal agent, such as natamycin 5% eye drops. The patient is directed to use the natamycin, one drop, four times per day. The usual course of this therapy is 2 to 3 weeks, or until resolution.¹⁵ Treatment for herpetic infections should include trifluridine 1% drops dosed one drop five times per day, for two to three weeks.⁷

At one week follow-up the patient reported that the nasal aspect of her left eye was tender for about three days after her surgery. The left eye has not been itching, excessively tearing, or producing discharge as it previously did. She was compliant using the moxifloxacin 0.5% eye drops four times a day for a week as prescribed. There were no signs of active infection or inflammation indicating the drops could be discontinued. The patient was advised to return if there is any recurrence of symptoms or eyelid lesions.

FIGURE 3:

Expressing purulent discharge and concretions (arrow) from previously occluded puncta with cotton tip applicator.

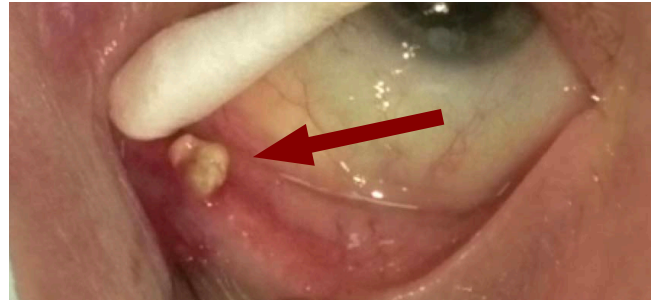


FIGURE 4:

Sulfur granule or concretion (arrow) on cotton tip applicator after expression through the lower left puncta.



CONCLUSION

Pyogenic granuloma is a benign, vascularized tissue that grows on various structures of the body including mucosal linings or on the surface of the skin. These rapid growing lesions are common in areas that have previously been insulted by trauma, infection, or inflammation. The standard treatment is excision of the pyogenic granuloma with biopsy to confirm the diagnosis.⁵ The common etiology of punctal pyogenic granulomas include canaliculitis or previous silicone punctal plug placement.

Lacrimal canaliculitis is an uncommon cause of inflammation and infection of the eyelid. It may involve a variety of infectious organisms including viral, bacterial or fungal so it is crucial the clinician considers cultures in recalcitrant cases for effective treatment.⁷ If caught early in the disease process, conservative therapy including warm compresses, topical and/or intracanalicular irrigation with antibiotic solution may resolve the canaliculitis. In chronic or recurrent cases, surgical canaliculotomy is usually curative.

AUTHOR DISCLOSURES:

The authors have no financial disclosures or conflicts of interest.

REFERENCES:

1. Wollina U, Langner D, França K, et al. Pyogenic granuloma – A common benign vascular tumor with variable clinical presentation: New findings and treatment options. *Open Access Macedonian Journal of Medical Sciences*. 2007; 5(4):423–426. doi: 10.3889/oamjms.2017.111
2. Yang J, Yin X, Li Y, et al. Case report of ocular Kaposi's sarcoma. *BMC Ophthalmology*. 2017;17:143. doi:10.1186/s12886-017-0525-0.
3. Johnson TM, Rowe DE, Nelson BR, et al. Squamous cell carcinoma of the skin (excluding lip and oral mucosa) *Journal of the American Academy of Dermatology*. 1992;26:467–484.
4. Freedman JR, Markert MS, Cohen AJ. Primary and secondary lacrimal canaliculitis: A review of literature. *Survey of Ophthalmology*. 2010; 56(4):336 – 347. doi:10.1016/j.survophthal.2010.12.001
5. Yuen K, Cheng A, Chan W. Pyogenic granulomas after silicone punctal plugs: A clinical and histopathologic study. *American Journal of Ophthalmology*. 2005; 140(5), 963.
6. Gault JA. The red eye. In: Gault JA, Vander JF (eds) *Ophthalmology Secrets in Color*, 4th Ed. Philadelphia: Elsevier 2016:70-82.
7. Bagheri N, Wajda B. Dacryocystitis/Inflammation of The Lacrimal Sac. *The Wills Eye Manual: Office and Emergency Room Diagnosis and Treatment of Eye Disease*. Sixth edition. Philadelphia: Wolters Kluwer. 2017:144-145.
8. Gallo RL, Granstein RD, Kang S, et al. Standard classification and pathophysiology of rosacea: The 2017 update by the National Rosacea Society Expert Committee. *Journal of the American Academy of Dermatology*. 2018;78:148.
9. Henning B, Stieger P, Kamarachev J, et al. Pyogenic granuloma in patients treated with selective BRAF inhibitors: another manifestation of paradoxical pathway activation. *Melanoma Res*. 2016;26(3):304–307. doi:10.1097/CMR.000000000000248 PMID:27116335.
10. Lopez A, Tang S, Kacker A, et al. Demographics and etiologic factors of nasal pyogenic granuloma. *International Forum of Allergy & Rhinology*. 2016;6(10):1094-1097. doi: 10.1002/alr.21781
11. Papadopoulos M, Snibson GR, McKelvie PA. Pyogenic granuloma of the cornea. *Australian and New Zealand Journal of Ophthalmology*. 1998;26:185-188. doi:10.1111/j.1442-9071.1998.tb01541.x
12. Wu D, Qian T, Nakao T, et al. Medically uncontrolled conjunctival pyogenic granulomas: Correlation between clinical characteristics and histological findings. *Oncotarget*. 2017;8(2):2020-2024. doi:10.18632/oncotarget.13961.
13. Perumal B, Carlson JA, Meyer DR. A pathological analysis of canaliculitis concretions: More than just actinomyces. *Scientifica*. 2016; 6313070. doi:10.1155/2016/6313070.
14. Khu J, Mancini R. Punctum-sparing canaliculotomy for the treatment of canaliculitis. *Ophthalmic Plastic Reconstructive Surgery*. 2012; 28(1):63-65.
15. Natacyn (natamycin). Prescribing information. Fort Worth, TX: Alcon Laboratories; April 2018. Retrieved from https://www.accessdata.fda.gov/drugsatfda_docs/label/2008/050514s009lbl.pdf