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Periocular Swelling, Fever, and Organomegaly in a 4-Year-Old Child

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A Swelling and erythema

B CT scan

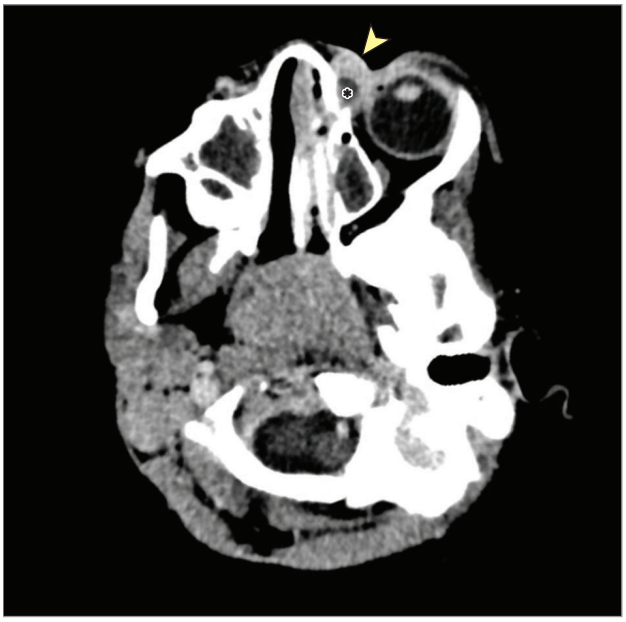

Figure 1. A, A 4-year-old child presented with left-sided swelling and erythema overlying the left lacrimal sac and left lower eyelid. Systemic examination revealed cervical lymphadenopathy and hepatosplenomegaly. B, A computed tomography (CT) scan of the orbits with contrast showed a 17 × 13-mm collection within the left lacrimal sac (asterisk) and adjacent soft tissue thickening (arrowhead), consistent with acute left-sided dacryocystitis, lymphadenopathy, and hepatosplenomegaly.

A 4-year-old child attended the eye emergency department with a 3-day history of worsening painful swelling and redness over the left side of her nose and left lower eyelid (**Figure 1**A). She had been unwell for 5 days before presentation with a temperature of 39 °C, managed at home with acetaminophen.

On examination, she had swelling and erythema over the left lacrimal sac and left lower eyelid. Her visual acuity was 20/20 OU. The anterior segment examination was normal, the extraocular movements were full and pain free, and the optic discs appeared normal. On systemic evaluation, the child had marked cervical lymphadenopathy and hepatosplenomegaly. Her past medical history included a previous episode of left lower eyelid swelling at 6 months of age, which was treated with a course of oral antibiotics. The parents denied any tearing or eye discharge before, or after, this episode.

Blood workup revealed raised C-reactive protein level (27.4 mg/L, normal range, 0-5.0 mg/L; to convert to milligrams per deciliter, divide by 10), elevated white blood cell count (22.20 × 10^9/L, normal range, 6.0-18.0 × 10^9/L; to convert to per microliters, divide by 0.001), and elevated liver function enzyme levels: alanine transaminase (403 U/L, normal range, 10-35 U/L; to convert to microkatals per liter, multiply by 0.0167), aspartate transaminase (300 U/L, normal range, 0-35 U/L; to convert to microkatals per liter, multiply by 0.0167), and alkaline phosphatase (430 U/L, normal range, 142-335 U/L; to convert to microkatals per liter, multiply by 0.0167).

There was no improvement after 3 days of intravenous ceftriaxone. A contrast computed tomography (CT) scan of the orbits identified a collection within the lacrimal sac (Figure 1B).

WHAT WOULD YOU DO NEXT?

- **A.** Trial of alternative intravenous antibiotics
- **B.** Lacrimal probing with nasal endoscopy
- **C.** External incision and drainage of the abscess
- **D.** Endoscopic dacryocystorhinostomy

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Diagnosis

Pediatric acute dacyrocystitis secondary to infectious mononucleosis

What to Do Next

B. Lacrimal probing with nasal endoscopy

Figure 2. Three-month postoperative follow-up with complete resolution of the left-sided pediatric acute dacryocystitis.

Discussion

After testing positive for Epstein-Barr Virus (EBV) on serology, the patient was diagnosed with infectious mononucleosis. The acute dacyrocystitis did not improve after 3 days of intravenous ceftriaxone. Nasal endoscopy showed an anatomically normal inferior turbinate, with no impaction or distal obstruction. On probing, there was some resistance entering the nasolacrimal duct but no membrane at the valve of Hasner. Intravenous ceftriaxone was continued for 48 hours after surgery, and the patient was discharged home with a 7-day course of oral combination amoxicillin/clavulanic acid. At 10-day follow-up, the patient's symptoms had resolved (**Figure 2**).

Pediatric acute dacyrocystitis (PAD) has an incidence of 8.7% (28 of 320 in a 20-year period) and is classically caused by persistent congenital nasolacrimal duct obstruction (NLDO).[1] Stagnant secretions build up proximal to the obstruction causing lacrimal sac dilatation, providing a medium for microorganism proliferation.[2]

EBV-induced PAD is increasingly recognized.[1,3-6] The incidence is likely underreported due to the asymptomatic nature of EBV infections during infancy and its ability to persist as an immune evader.[7] After primary infection via aerosols or mucosal contact, the virus first amplifies within the nasal and oropharyngeal mucosal epithelium before migrating to deeper lymphoid tissue and causing widespread systemic dissemination (infectious mononucleosis). It is hypothesized that EBV-induced PAD is due to viral infiltration of the nasolacrimal duct at the sac-duct junction, causing local inflammation, luminal narrowing, and subsequent NLDO.[2,6] Anatomical variation of this junction within the pediatric population may increase susceptibility to obstruction secondary to EBV infection.[8]

EBV-induced PAD may resolve with medical treatment alone, including simple analgesia and broad-spectrum antibiotic prophylaxis.[3,5,6] Anti-inflammatory nonsteroidal and corticosteroid medication may have an adjunctive role in reducing local tissue swelling.[1,6] Patients who are nonresponsive to medical treatment, or show signs of clinical deterioration, require surgical intervention to address the NLDO.[1,4,9] Complications of PAD include orbital cellulitis, cavernous sinus thrombosis, meningitis, brain abscess, and sepsis.

General advice is to consider surgical intervention in PAD if there has been no response to systemic antibiotics after 24 to 48 hours.[2,9] Observing or trialing other antibiotic regimes (option A) is not recommended as younger patients can deteriorate rapidly.[1,2] Nasal endoscopy and probing of the nasolacrimal system is successful in the majority of PAD cases.[1,2,9] In EBV-related PAD, the obstruction is likely at the sac-duct junction, necessitating probing. The use of systemic antibiotic therapy, for at least 24 hours, before probing is advised to reduce the risk of probing-induced bacteremia.[2,10] In patients with cervical lymphadenopathy, an anesthesiologist consultation should be sought; early surgical intervention may be indicated to mitigate the risk of a difficult airway.

In the described case, lacrimal probing (option B) successfully treated the PAD. A total of 60% to 100% of obstructive PAD cases require surgical intervention, and few cases require further surgical management after probing.[4,9] Dacryocystorhinostomy (option D) is considered for cases complicated by abscess formation, mucoceles, trauma, or refractory to probing. Incision and drainage via the skin (option C) is reserved for cases of rapidly evolving cellulitis that require urgent control of infection.[2,9]

ARTICLE INFORMATION

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REFERENCES

1. Ali MJ, Joshi SD, Naik MN, Honavar SG. Clinical profile and management outcome of acute dacryocystitis: 2 decades of experience in a tertiary eye care center. *Semin Ophthalmol*. 2015;30(2):118-123. doi:10.3109/08820538.2013.833269

2. Ali MJ. Pediatric acute dacryocystitis. *Ophthalmic Plast Reconstr Surg*. 2015;31(5):341-347. doi:10.1097/IOP.0000000000000472

3. Steele RJ, Meyer DR. Nasolacrimal duct obstruction and acute dacryocystitis associated with infectious mononucleosis (Epstein-Barr virus). *Am J Ophthalmol*. 1993;115(2):265-266. doi:10.1016/S0002-9394(14)73942-X

4. Campolattaro BN, Lueder GT, Tychsen L. Spectrum of pediatric dacryocystitis: medical and surgical management of 54 cases. *J Pediatr Ophthalmol Strabismus*. 1997;34(3):143-153. doi:10.3928/0191-3913-19970501-04

5. Ghauri AJ, Keane PA, Scotcher SM, Clarke JL, Madge SN. Acute dacryocystitis associated with Epstein-Barr virus infection. *Orbit*. 2011;30(5):245-248. doi:10.3109/01676830.2011.584933

6. Bothra N, Ali MJ. Epstein-Barr virus-associated acute dacryocystic retention. *Ocul Immunol Inflamm*. 2024;32(1):131-133. doi:10.1080/09273948.2022.2159448

7. Cohen JI. Epstein-Barr virus infection. *N Engl J Med*. 2000;343(7):481-492. doi:10.1056/NEJM200008173430707

8. Juniat V, Lee J, Sia P, Curragh D, Hardy TG, Selva D. High nasolacrimal sac-duct junction anatomical variation: retrospective review of dacryocystography images. *Orbit*. 2021;40(6):505-508. doi:10.1080/01676830.2020.1817101

9. Prat D, Magoon K, Revere KE, Katowitz JA, Katowitz WR. Management of pediatric acute dacryocystitis. *Ophthalmic Plast Reconstr Surg*. 2021;37(5):482-487. doi:10.1097/IOP.0000000000001932

10. Baskin DE, Reddy AK, Chu YI, Coats DK. The timing of antibiotic administration in the management of infant dacryocystitis. *J AAPOS*. 2008;12(5):456-459. doi:10.1016/j.jaapos.2008.04.006