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StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-.

Dacryocystitis

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Last Update: June 26, 2020.

Introduction

Dacryocystitis is characterized as an inflammatory state of the nasolacrimal sac. It is typically caused by an obstruction within the nasolacrimal duct and subsequent stagnation of tears in the lacrimal sac. When the lacrimal sac inflames and swells at the inferomedial canthus, dacryocystitis can be appreciated clinically. Understanding the anatomy and flow of tears leads to a better understanding of dacryocystitis and potential multilevel involvement.[1][2]

The flow of tears will usually begin with tear production by the lacrimal gland. The tears will lubricate the eye until they are collected into the superior and inferior puncta and drained into the superior and inferior canaliculi. From there, tears will drain into the common canaliculus. At this point, they will then pass through the valve of Rosenmuller into the lacrimal sac. The lacrimal sac will then collect the tears and flow down the nasolacrimal duct, pass through the distal valve of Hasner, and finally pass into the nasal cavity.[3][4]

Etiology

Dacryocystitis can be classified into acute or chronic and acquired or congenital.

An acute infectious state typically causes acute dacryocystitis. In the United States, the most common organism is *Staphylococcus* and *Streptococcus* species, followed by *Haemophilus influenza* and *Pseudomonas aeruginosa*.

Chronic dacryocystitis is a result of chronic obstruction due to systemic disease, repeated infection, dacryoliths, and chronic inflammatory debris of the nasolacrimal system. Some common systemic diseases include Wegener's granulomatosis, sarcoidosis, and systemic lupus erythematosus.

Acquired states are typically due to repeated trauma, surgeries, medications, and neoplasms. Among traumatic causes of nasolacrimal obstruction, nasoethmoid fractures seem to be most common. Endonasal and endoscopic sinus procedures have the highest association. Common topical medications associated with acquired states are timolol, pilocarpine, dorzolamide, idoxuridine, and trifluridine. The most common systemic medications are fluorouracil and docetaxel. Primary lacrimal sac tumors and benign papillomas tend to be the most common neoplasms.

Congenital forms are due to a membranous obstruction at the valve of Hasner in the distal nasolacrimal duct. Before delivery, the nasolacrimal system is filled with amniotic fluid. When the amniotic fluid fails to be expressed from the nasolacrimal system, it becomes purulent within a few days of delivery and becomes pathologic.

Epidemiology

There is a bimodal distribution with most cases either occurring just after birth in congenital cases or in adults older than 40 years of age. Congenital dacryocystitis occurs in roughly 1 in 3884 live births. In adults, whites tend to be more affected. Females make up nearly 75% of all cases.[5]

Serious morbidity and mortality are low with dacryocystitis. However, in congenital dacryocystitis, there can be significant morbidity and mortality if not treated promptly and appropriately.

Pathophysiology

Dacryocystitis, regardless of etiology, is almost always caused by an obstruction in the nasolacrimal system with the resultant stagnation of tears. There can be obstructions at any level of the nasolacrimal system. Stagnation of tears will provide a favorable environment for infectious organisms to propagate and proteinaceous debris to form. The lacrimal sac will then inflame causing the characteristic swelling in the inferomedial portion of the orbit.

Histopathology

Findings will most commonly be consistent with fibrosis and non-granulomatous inflammation in cases of chronic dacryocystitis. Sarcoidosis, lymphoma, and papilloma are among other common findings.

History and Physical

In acute cases, symptoms may occur over several hours to several days. A careful external eye exam must be performed. The medial canthus overlying the lacrimal space will appear erythematous, tender, and edematous. It is not uncommon for the bridge of the nose to be involved. It is however uncommon that the superomedial aspect of the orbit is involved. Frequently, the mucopurulent material can be expressed from the superior and inferior puncta. There may also be an increase in tears; in chronic dacryocystitis, tearing may be the only symptom. Mattering can be present due to a tear film. Tear films will typically cause conjunctival injection and a mild decrease in visual acuity. Visual acuity testing is vital. Any acute changes not explained by tear filming should raise concern for extensive involvement. Emergent ophthalmological consultation is warranted in this scenario. Furthermore, erythema involving the whole orbit is not characteristic of dacryocystitis and should lead the examiner to an alternative diagnosis. Any pain with extraocular movement should also raise suspicion for alternative diagnoses.

Evaluation

Diagnosis of dacryocystitis is primarily clinical based on history and physical exam findings. Cultures and gram staining can be obtained by expressing purulent material via the Crigler massage. In toxic appearing patients, particularly those with fever or acute visual changes, laboratory studies and blood cultures should be considered. Also, consider emergent ophthalmological consultation in these cases. Strong consideration should be given to CT scan if orbital cellulitis or extensive infection is suspected. If there are anatomical concerns, a plain-film dacryocystogram (DCG) can be performed by qualified personnel. Subtraction DCG technique will potentially help improve the viewing quality of the image.[3][6][7][8]

In chronic cases, appropriate serologic testing can be performed if systemic diseases are suspected as the underlying cause. Antineutrophilic cytoplasmic antibody testing can be performed if Wegener's granulomatosis is suspected. Likewise, antinuclear antibody (ANA) testing can be pursued if systemic lupus erythematosus is suspected.

Treatment / Management

Treatment of acute dacryocystitis includes conservative measures such as warm compresses and attempts of Crigler massage. For uncomplicated cases, consideration of oral antibiotics should be given. Coverage should be aimed at gram-positive organisms, particularly antistaphylococcal agents. In complicated cases or patients who appear toxic, intravenously antibiotics should be administered. Empiric antibiotics should include gram positive and gram negative coverage. Lacrimal probing is discouraged in the acute phase. For recurrent infections, referral to ophthalmology for surgical evaluation is advised.[9][10][11]

Chronic dacryocystitis is almost always managed surgically with high success rates. Probing is accepted as first-line management in chronic cases and can be done in the outpatient setting. Inevitably, patients will likely need to progress to further surgical options to treat the condition. Balloon dacryoplasty, nasolacrimal intubation, and nasolacrimal stenting have all been attempted with variable first-time success rates. If these therapies fail, evaluation for percutaneous dacryocystorhinostomy (DCR) or endonasal dacryocystorhinostomy (EN-DCR) is then pursued.

Treatment of congenital dacryocystitis includes conservative measures first. Crigler massage should be taught to parents or caregivers to perform at home. Topical antibiotics can be considered for acute flares. About 90% of congenital dacryocystitis will resolve by six months to one year of age with conservative measures. If conservative measures happen to fail, a referral is then made to ophthalmology for nasolacrimal probing. Nasolacrimal probing is successful in more than 70% of cases. If symptoms recur, balloon dacryoplasty, nasolacrimal intubation, or nasolacrimal stenting can be pursued. Ultimately, if these measures fail, then dacryocystorhinostomy by percutaneous or endonasal approach will serve as the definitive treatment.

Differential Diagnosis

The differential diagnosis includes:

- Preseptal/periorbital cellulitis
- Orbital cellulitis
- Sebaceous cyst
- Frontal, ethmoid, or maxillary sinusitis
- Neoplasm
- Ectropion of lower eyelid
- Dacryoadenitis

Prognosis

In general, the prognosis for dacryocystitis is good. Simple probing techniques are highly successful. DCR has been reported to be more than 93% to 97% successful. In congenital cases, 90% will resolve by one year of age with conservative measures alone.

Pearls and Other Issues

Disposition from acute care settings are dependent on the extent of infection, comorbidities, and access to prompt

ophthalmological follow up. Uncomplicated cases can be discharged with appropriate treatment, and adequate follow up. Complicated cases, particularly those with fever or acute visual changes, should be admitted with ophthalmology consultation. Complications of dacryocystitis can be devastating. These can include orbital cellulitis, the formation of lacrimal fistulas, meningitis, brain abscess formation, cavernous sinus thrombosis, severe sinusitis, permanent loss of vision, and even death.

Enhancing Healthcare Team Outcomes

Patients with dacryocystitis often initially present to the emergency room, primary care clinic, urgent care or see a nurse practitioner. In general, dacryocystitis is managed by the ophthalmologist and primary care providers should avoid probing or manipulating the nasolacrimal duct. The treatment of acute dacryocystitis includes conservative measures such as warm compresses and attempts of Crigler massage. For uncomplicated cases, consideration of oral antibiotics should be given.

In complicated cases or patients who appear toxic, intravenously antibiotics should be administered. Empiric antibiotics should include gram positive and gram negative coverage. Lacrimal probing is discouraged in the acute phase. For recurrent infections, referral to ophthalmology for surgical evaluation is advised.

The outlook for most patients with simple obstruction is good but for those with complex obstruction, the outcomes are guarded and can interfere with vision and lifestyle.^{[12][13][14]}

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