

ENDOSCOPIC MANAGEMENT OF ACUTE DACRYOCYSTITIS

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Abstract: Acute dacryocystitis is a painful condition usually occurs due to underlying nasolacrimal duct obstruction. Acute inflammation of lacrimal sac and peri-sac tissue is classically below the medial canthal tendon in early phases but later may spread to involve the adjacent tissues. Treatment usually consists of antibiotics, analgesics, percutaneous drainage and subsequent external dacryocystorhinostomy (DCR) at later stage. Endoscopic DCR offers several advantages including primary treatment of acute phase with internal drainage of lacrimal abscess. This leads to faster recovery and increase patient comfort. Authors here in describe the clinical manifestations, conservative management and role of endoscopic DCR in the setting of acute dacryocystitis.

Acute dacryocystitis is the acute inflammation of lacrimal sac usually secondary to microbial infection. It is defined as "A medical urgency clinically characterized by rapid onset of pain, erythema and swelling, classically below the medial canthal tendon with or without pre-existing epiphora mainly resulting from the acute infection of the lacrimal sac and perisac tissues"¹.

Clinical presentation may vary from erythema to lacrimal sac abscess. Standard treatment is conservative and often incision and drainage is performed to relieve the acute episode. External dacryocystorhinostomy (Ex-DCR) is performed at a later stage (3-4 weeks) to avoid spread of infection once superficial tissues normalizes. More often patients may have non-resolving inflammation or recurrent attacks of infection and pain which prolongs the treatment course. With the changing concepts of endoscopic dacryocystorhinostomy (En-DCR), early treatment in acute phase is possible. Moreover it offers several other advantages. The purpose of present review is to the discuss the clinical presentation and endoscopic management of acute dacryocystitis.

CLINICAL PRESENTATION

Acute dacryocystitis is a clinical diagnosis suggested by history of epiphora, discharge, prior similar acute infection. Classical findings of inflammation such as swelling, erythema, pain, tenderness in lacrimal sac area below the medial cathal tendon are seen. Clinically most common finding is swelling (85%), followed by pain (83%), erythema (48%), discharge (40%), fever (6%) and aggravated epiphora (1%). Presentation may be sometimes variable ranging from minimal erythema, and swelling over lacrimal sac area to the abscess formation, spontaneous rupture of abscess with fistula formation or infected mucocele (Figure 1). Rarely it may complicate into persistent abscess or visual threatening orbital cellulitis, orbital



Figure 1: Panel of photographs demonstrating varied presentation and some of the complications of acute dacryocystitis A. Right eye minimal erythema, swelling and pain suggestive of early acute dacryocystitis in a case with past history of multiple episodes of acute dacryocystitis B. Right eye showing typical signs of acute dacryocystitis with medial canthus discharge C. A case with right side huge non-resolving lacrimal abscess and left eye early acute dacryocystitis D. Left eye acute dacryocystitis with preseptal cellulitis E. Right eye persistent acute dacryocystitis complicating in to orbital cellulitis F. Typical findings of scarred skin with mucocele with chronic congestion of left eye indicating previous multiple episodes of acute dacryocystitis G. Left eye showing acute dacryocystitis with external skin fistula H. Non resolving acute dacryocystitis in spite of repeated course of antibiotics and incision and drainage procedure.

abscess, superior ophthalmic vein thrombosis and cavernous sinus thrombosis^{2,3}.

Clinical course is prolonged. The mean days to resolution of acute attack is about 10 days (1-4 weeks). Bilateral acute dacryocystitis may be seen in up to 9% cases. Other complications are progression to lacrimal sac abscess (23%), relapse of acute dacryocystitis (6%), orbital cellulitis (3%) and no response (2%).

MANAGEMENT

Traditional conservative treatment of acute dacryocystitis consists of warm compresses, oral broad spectrum antibiotics and analgesics. Effect is usually seen in 48-72 hours in most cases but complete resolution takes much longer. In case of abscess with pus point, percutaneous incision and drainage (I & D) is done to open sac and drain pus. Although done under local anaesthesia, I & D is very painful due to inadequate effect of anaesthetic agents in inflamed tissues. If done, it is important to break open all the septae/synechiae in and around the sac and place a gauze soaked with antibiotic solution over the incision. Postoperatively cleaning with topical betadine and antibiotic ointment is advised. Procedure may need to be repeated if patient develops recurrent abscess before planned surgery. Sometimes, inflammation may chronically persist in spite of treatment. Causes of non-resolving acute dacryocystitis includes virulent organisms, presence of lacrimal sac abscess, non-penetration of antibiotics in inflamed tissues, antibiotic resistance and associated persistent inflammation.

Ex-DCR is done after 3-4 weeks when inflammation subsides. Some of the challenges faced are scarred soft tissue, fibrosed shrunken sac, fibrosis around common canaliculus leading to common canalicular obstruction and increase bleeding. Skin incision related complications are seen in up to 8% cases and include wound gape, hypertrophic scar and even cicatricial ectropion.

Disadvantages of conservative treatment are prolonged/recurrent infection (which may complicate into orbital cellulitis/cavernous sinus thrombosis), adverse effect of antibiotics, skin scar/fistula formation and failure of subsequent surgery due to scarring and granulation in sac⁴.

Endoscopic endonasal DCR can be performed in acute dacryocystitis⁵⁻⁸. Advantages include decrease morbidity, shortened duration of antibiotics,

faster recovery with acceptable and high success rate. Other advantages compared to external DCR are avoidance of cutaneous scar, less disruption of anatomy and lacrimal pump, decrease intraoperative haemorrhage and concurrent correction of nasal and paranasal sinuses abnormalities. With the advancement of nasal endoscopy equipment, increase experience and better anatomical understanding, success rate of En-DCR now compares favourably with external DCR. Wormald et al stressed the importance of complete sac exposure, mechanical removal of thick frontal process of maxilla and opening of agger nasi cell is needed to clear the fundus of sac. This combined with 360 degree nasal mucosa to sac mucosa approximation results in healing with primary intention around osteotomy⁷⁻⁹.

PROCEDURE TIMING

En-DCR can be performed in stage of acute dacryocystitis with or without abscess formation. Patients may not be started on oral antibiotics if surgery is planned early. If there is associated orbital cellulitis, orbital abscess, paranasal sinus infection then the prior treatment with intravenous antibiotics is needed. Fistulectomy can be done from cutaneous side if there is long standing fistula formation secondary to repeated attacks of acute dacryocystitis or previous incision and drainage.

SURGICAL TECHNIQUE

Anesthesia: It is best to operate cases under general anesthesia. It is more comfortable for patient and hypotensive anesthesia is maintained which reduces bleeding.

Technique: After induction, nasal endoscopy is performed with a zero degree 4 mm (for adults) or 2.7 mm (for pediatric cases) rigid endoscope. Nasal anatomy and deviated nasal septum if present is noted. Local infiltration is done with 2% lignocaine with 1:80000 adrenaline beneath the nasal mucosa anterior to the axilla of the middle turbinate and maxillary ridge (Figure 2a). Nasal cavity is packed with merocel sponge/sterile gauze pieces soaked in same solution. No.15 Bard-Parker blade or Sickel knife is used to give incision which starts about 8-10 mms above the axilla of middle turbinate and continued anteriorly for 10 mms and then inferiorly till the level of junction of upper two-

thirds and lower one-third of middle turbinate (Figure 2b). Nasal mucosal flap is then elevated using either a suction elevator or periosteum elevator to expose the maxillary ridge and frontal process of maxilla (Figure 2c). Nasal mucosal flap can be either removed just in front of uncinate process or left over to protect the middle turbinate and excise later. Lacrimal bone is punctured inferiorly and osteotomy with Kerrison punch is made (Figure 2d). The lacrimal sac is exposed completely from nasolacrimal duct to fundus and agger nasi is opened up (Figure 3e). Bowman lacrimal probe is passed and Crescent knife is used to open the sac in a book like manner to form anterior and posterior flap (Figure 3f). In cases of acute dacryocystitis and lacrimal abscess, purulent discharge can be seen from within the lacrimal sac and wall of the sac may be inflamed and thickened (Figure 3g). It is important to release all the intra-sac synechiae if present. Mitomycin-C (MMC) 0.02% is applied for 5 minutes and circumostial injection (0.1 ml of 0.02% MMC at each site) can be given as described.⁶ Silicone intubation (Figure 3h) and anterior nasal packing is done.

Marked resolution of symptoms and signs usually occurs within one day (Figure 4). Postoperative systemic antibiotic and analgesics, topical antibiotic eyedrops and nasal decongestants are given for 3-4 weeks. Nasal endoscopy with silicone tube removal and ostium evaluation is done at 4 weeks in OPD. Anatomical and functional success can be demonstrated with the functional endoscopic dye test (FEDT) (Figure 5). FEDT is performed by instilling fluorescein dye in conjunctival sac which is seen flowing through internal common opening and filling up the concavity of ostium through the endoscope.

DISCUSSION

Endoscopic DCR because of its approach from nasal side has many advantages when there is inflammation outside over the sac area. Nasal mucosa and bone is never inflamed in such cases and lacrimal sac marsupialization helps in internal drainage of abscess and purulent discharge thus relieving the symptoms and signs of acute attack. Percutaneous incision and drainage of lacrimal abscess is a painful procedure and may promote intra-sac scarring and granulation tissue which may lead to failure of subsequent DCR surgery.

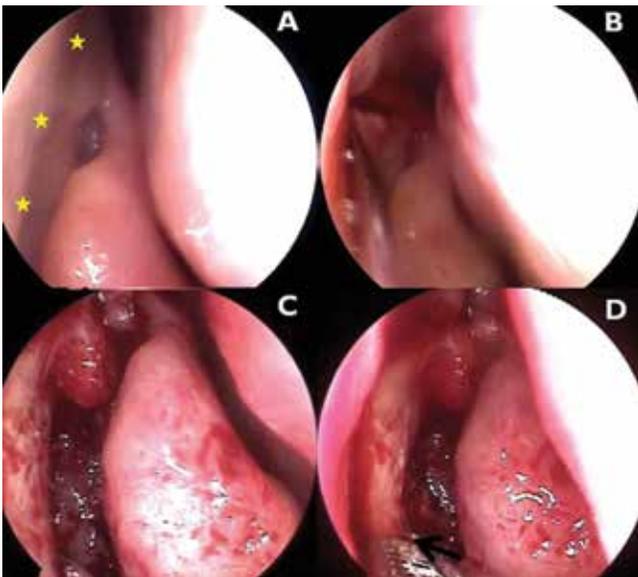


Figure 2A: Endoscopy view of right nasal cavity showing the markings for local anesthesia infiltration B. Incision of nasal mucosa carried out with sickle knife C. Exposure of the frontal process of maxilla after mucosal flap removal D. Initiation of osteotomy inferiorly.

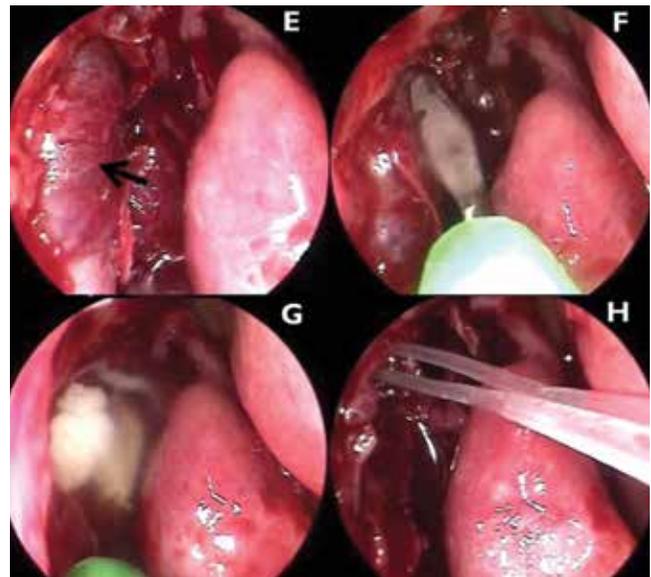


Figure 3E: Exposure of lacrimal sac after osteotomy (note the inflamed angry looking sac in a case of acute dacryocystitis) F. Crescent knife use to make anterior and posterior flap G. Purulent discharge seen from lacrimal sac in a case of lacrimal abscess H. Appearance at the end of surgery, note the sac is open in book like fashion with silicone tube in situ.



Figure 4: Clinical photograph of a two cases presenting with acute dacryocystitis where En-DCR was performed A. Preoperative photograph of first case with Right acute dacryocystitis with evolving lacrimal abscess B. Postoperative photograph at first day showing marked resolution of swelling and erythema C. Preoperative photograph of second case presenting with Right non-resolving lacrimal abscess and left evolving acute dacryocystitis. D. Postoperative photograph at 3 days after bilateral simultaneous En-DCR showing resolution of signs bilaterally.

It is known that episode of acute dacryocystitis is a risk factor for the failure of DCR surgery¹⁰. In a prospective randomized case series comparing delayed external DCR with early endoscopic endonasal DCR in acute dacryocystitis, success rate of 90% was seen with endoscopic approach compared to 66% with external approach ($p < 0.05$). Mean time to the resolution of pain was 1 day for endoscopic DCR compared to 5.5 days for external DCR. Authors concluded that the endoscopic approach achieves higher success rate with minimal tissue manipulation and trauma to the lacrimal

system. Functional success rate achieved with endoscopic endonasal DCR in acute dacryocystitis ranges from 90-95% at 6 months follow up and is 81% with long term follow up over one year. With the improved instrumentation such as use of powered drill and diamond burr for superior osteotomy, complete exposure of sac up to the fundus is achieved and adequate clearance around internal common opening is possible. Moreover, endoscopic endonasal approach helps to correct nasal abnormalities such as deviated nasal septum.

Use of adjunctives such as

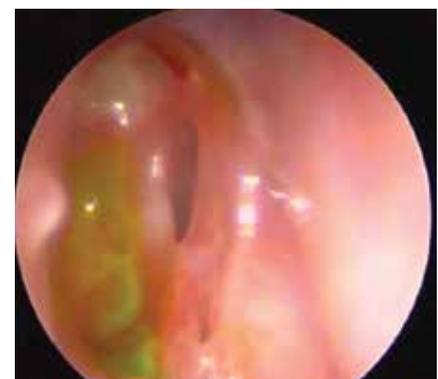


Figure 5: Nasal endoscopy view of right nasal cavity of first case showing a large, well healed ostium with positive functional endoscopic dye test (Fluorescein seen) at 3 months follow up.

mitomycin-C and silicone intubation in DCR is known to increase the success rate especially in cases with risk of failure. There is no adverse effect of Mitomycin-C such as mucosal necrosis, increase infection or bleeding observed in cases of acute dacryocystitis so far. Similarly silicone intubation appears to be safe without any adverse effects such as increase granulation tissue, nidus for infection or canalicular cheese wiring.

Acute pediatric dacryocystitis needs special mention. Mostly acute dacryocystitis in cases of congenital nasolacrimal duct obstruction (CNLDO) in young infants is managed with systemic antibiotics and irrigation and probing under endoscopic guidance¹². DCR is indicated in cases with recurrent acute attacks in which probing and adjunctive procedures such as silicone

intubation has failed, and for persistent cases of CNLDO requiring early intraocular surgery. En-DCR because of its advantages over external approach especially in acute dacryocystitis can be done in children. Debate exists over minimal age when it can be performed although it has been performed even up to 8 months to 1 year age^{13,14}. There are certain challenges in performing En-DCR in children like narrow nasal cavity, limited working space and anatomical variations, but the results of En-DCR are comparable to external approach.

To conclude En-DCR is safe, effective and appear promising for the primary treatment of acute dacryocystitis with or without lacrimal abscess formation. Furthermore it leads to rapid resolution of symptoms without any recurrence and corrects the underlying nasolacrimal duct obstruction thus relieving epiphora.

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