



DACRYOCYSTORINOSTOMY IN A PATIENT WITH NASOLACRIMAL DUCT OBSTRUCTION DUE TO CHRONIC DACRYOCYSTITIS: A CASE STUDY

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ABSTRACT

Lacrimal duct obstruction is an eye disease due to obstruction in the lacrimal duct which is divided into congenital and acquired. Acquired nasolacrimal duct obstruction is most commonly caused by infection, of which dacryocystitis is the most common cause. Predisposing factors for dacryocystitis were age over 40 years and female gender. Other diseases such as diabetes mellitus (DM) can be a risk factor, because it can increase susceptibility to infections, including eye infections. The gold standard procedure for operative treatment of dacryocystitis is external dacryocystorhinostomy (DCR). Female, 43 years old, complained discharge from her left eye, accompanied by pain, swelling and an enlarged lump. Complaints have been come and go since the last 4 years and getting worse 3 days ago. The patient has a history of uncontrolled DM. On examination, visual acuity in the both eyes was 6/6. The anterior segment of the left eye shows erythema, a mass in the form of an ill-defined lump in the left medial canthus, and tenderness. There was reflux on both punctums in the left eyelid when the medial canthus was pressed. The Anel test was negative on the superior and inferior punctums of the left eye. The patient was diagnosed with nasolacrimal duct obstruction et causa acute on chronic dacryocystitis in the left eye and was performed external DCR. Obstruction of the nasolacrimal duct can occur due to chronic dacryocystitis, further treatment is an external DCR. The insertion of a silicone tube can increase the success of an external DCR procedure.

KEYWORDS: *Chronic dacryocystitis, Diabetes mellitus, external dacryocystorhinostomy.*

INTRODUCTION

Lacrimal duct obstruction is a common eye disease in which there is obstruction in certain parts of the lacrimal duct. Obstruction may occur in the lacrimal canaliculi, main canaliculi and/or nasolacrimal duct, which is usually referred to an ophthalmologist as a symptom of epiphora (Hou et al., 2017). The most common symptom of nasolacrimal duct obstruction is epiphora, crusty discharge or recurrent dacryocystitis (acute or chronic). Epiphora is often caused by increased tear production or inadequate drainage (Coumou et al., 2016).

Obstruction of the nasolacrimal duct is congenital and acquired. Congenital nasolacrimal duct obstruction is the main cause of epiphora in pediatric patients, whereas acquired nasolacrimal duct obstruction is further divided into primary and secondary. Primary acquired nasolacrimal duct obstruction is caused by inflammation or fibrosis in the absence of precipitating factors.

Secondary acquired obstruction is caused by inflammation or fibrosis with precipitating factors such as infection, inflammation, neoplastic, trauma or mechanical (Castañeda Angel and Levy Adriana, 2017).

Symptoms of epiphora due to nasolacrimal duct obstruction are common symptoms and account for about one third of cases. Symptomatic acquired nasolacrimal duct obstruction has an annual incidence rate of 30.47 per 100,000. Secondary acquired nasolacrimal duct obstruction can be caused by infections involving any part of the lacrimal system, including punctual abscesses, canaliculitis, dacryocystitis, and isolated nasolacrimal duct infections (Kamal and Javed, 2018). Dacryocystitis is a common lacrimal system disease. Dacryocystitis can occur at any age. Manifestations of dacryocystitis can be either acute or chronic infection (Dahlan et al., 2017).

Age is one of the predisposing factors for dacryocystitis. Several studies and literature have shown that this

disease is acquired at the age of over 40 years with prevalence in the fifth and sixth. Women are a predisposing factor for the incidence of chronic dacryocystitis. The female sex predilection in several studies and literature suffers more from dacryocystitis, possibly due to the smaller diameter of the nasolacrimal canal in women compared to men and hormonal factors. In general, dacryocystitis has a predilection for the left side, particularly in women, because of the narrower canal. The nasolacrimal duct and also the lacrimal fossa form a greater angle on the right side than the left (Dahlan et al., 2017).

Diabetes mellitus (DM) is a clinical syndrome associated with a deficiency in the secretion or action of insulin. DM is considered as one of the greatest health threats in the 21st century. It is estimated that there will be 380 million people with DM in 2025. As a result, DM increases susceptibility to infection. In general, infectious diseases are more common and/or appear more seriously in DM patients and have the potential to increase mortality and morbidity (Alves et al., 2012). Infections of the eyelids, nasolacrimal duct, conjunctiva, and corneal surface are also thought to be more common in DM patients (Ansari et al., 2017).

Nasolacrimal duct obstruction is obtained primary or secondary, surgical options are performed, including external dacryocystorhinostomy (DCR), endonasal endoscopic DCR, or balloon catheterization (Janson and Idrees, 2013). External DCR remains the gold standard procedure for the treatment of nasolacrimal duct obstruction. The principle of DCR is to remove the bone that lies between the lacrimal sac and the nasal mucosa, and create an anastomosis between the medial wall of the sac and the nasal mucosa. External DCR is a very successful procedure in treating epiphora, due to obstruction of the nasolacrimal duct. Reported success rates vary between 85% and 100% (Sajjad et al., 2015).

CASE

A woman, aged 43, came to the Eye Polyclinic of the Bali Mandara General Hospital, Denpasar-Bali with a complaint of discharge in her left eye and getting worse since 3 days ago. This complaint is a recurring complaint that has often been experienced by patients since the last 4 years. Initially, the patient was diagnosed with Dacryocystitis in 2017 (four years ago). Complaints that appear in the form of a small lump like a pimple on the inside of the left eye, then the lump enlarges and swells to show a whitish tip at the top of the lump. The ophthalmologist said the patient had a blockage in the tear duct leading to the nose and an infection had occurred in it. The therapy given was in the form of ointments and oral medication, and the complaints were said to be improving.

After a few months, similar complaints reappeared. Complaints often come and go until several episodes relapse, until in early 2020, an ophthalmologist

diagnosed this patient with Nasolacrimal Duct Obstruction due to Acute Dacryocystitis. At that time, at the Regional Hospital, minor surgery was performed by incising and removing pus from the lump in the patient's left eye. Other therapies are also given in the form of ointments and oral medication.

However, in early 2021, patient complaints reappeared. Complaints that appear in the form of discharge from the left eye. Complaints of discharge from the left inner tear duct and a whitish fluid, sometimes mixed with blood. Complaints are also accompanied by pain, swelling, enlarged lumps and discomfort in the area between the left eye and nose.

On visual examination, visual acuity in the both eyes was 6/6. Examination of the anterior segment of the patient's right eye was within normal limits. On examination of the anterior segment of the left eye, there was erythema, edema, a mass in the form of an ill-defined lump with a diameter of ± 2 cm in the left medial canthus, soft palpable, and tenderness (Figure 1). There was reflux on both punctums in the left eyelid when the medial canthus was pressed. Both eyes had clear cornea, deep anterior chamber, regular round iris, normal (+) pupillary reflex, RAPD (-), clear lens. The intraocular pressure with a non-contact tonometer in the right eye was 13.5 and the left eye was 16. Examination of the posterior segment in both eyes did not reveal any abnormalities. On the Anel test, by irrigation of the tear duct, the results of the examination was negative (-) on the superior and inferior punctums of the left eye were obtained. The patient was diagnosed with nasolacrimal duct obstruction et causa acute on chronic dacryocystitis. The patient was planned for a dacryocystorhinostomy (DCR).



Figure 1: Clinical presentation of nasolacrimal duct obstruction et causa acute on chronic dacryocystitis 2 days before surgery.

On laboratory examination, the patient was found to have hyperglycemia. After a thorough examination, the patient was diagnosed with uncontrolled type 2 Diabetes Mellitus. So the surgery was postponed in advance, and the patient was given therapy to control Type 2 DM. After about 1 month of treatment, the patient was planned for DCR surgery on March 8, 2021.

The patient underwent external DCR surgery. The external technique is performed by making a 5 mm incision from the medial linear canthus 2-3 cm long. The muscle is then dissected until it reaches the periosteum.

The periosteum is opened using a mess. Followed by bone drill, until the konka is found. Probing is inserted into the lacrimal sac. Next, an incision is made in the pocket in the shape of the letter "U". A silicon tube is inserted through the punctum into the sac. A "U" shaped incision is made in the conchae. Then a silicon tube is inserted into the nose. Suturing was performed between the sac and conchae with *Vicryl 6.0* thread. Suturing the flap to the orbicularis oculi muscle. The orbicularis oculi muscle was sutured using absorbable *Vicryl 6.0* thread. Next, the mucosa was sutured with *Prolene 6.0* thread. The patient was put on a tampon to prevent bleeding, then the skin was sutured. Postoperative management included Co Amoxiclav 625 mg, Cendo Xitrol eye drops on the left eye, Gentamycin eye ointment on the left eye, Paracetamol 500 mg, Ondancetron 4 mg (if necessary), and Vitamin C.

On March 9, 2021, one day after the surgery, the patient complained of pain in the area post-surgery. On physical examination of the left eye, the superior and inferior eyelids revealed intact suture (+) in the medial canthus area, silicone tube (+), calm bulbar conjunctiva, clear cornea, deep anterior chamber, round pupil, +/- light reflex, synechia. (-), the lens is relatively clear (Figure 2). No active bleeding was obtained from nasal tampon. The patient was allowed to go home with the treatment given were Xitrol eye drops, Gentamycin eye ointment, Co Amoxiclav 625 mg, and Mefenamic Acid 500 mg.



Figure 2: Clinical presentation of patient post-operative day one.

One week after the operation, the patient came to control at the Eye Polyclinic of RSU Bali Mandara, she said the pain was decreased. On physical examination of the eye, the superior and inferior eyelids found intact suture (+) in the medial canthus area, silicone tube (+), bulbar conjunctiva calm, clear cornea, deep anterior chamber, round pupils, light reflex +/+, synechia (-), the lens is relatively clear. Suture was then removed. The patient was then followed up 1 month after surgery, and after complaints and clinical conditions were good, the silicon tube was removed.

DISCUSSION

The most common symptoms associated with nasolacrimal duct obstruction (NLDO) are epiphora, crusty discharge or recurrent dacryocystitis (acute or chronic). Epiphora is often caused by increased tear

production or inadequate drainage. The clinical presentation of patients with acquired nasolacrimal duct obstruction most often comes with a history of epiphora (Coumou et al., 2016). Symptoms and signs include recurrent epiphora, swelling and redness of the medial canthus and a painless, compressible mass under the medial canthal tendon. Patients usually refer to a previous history of acute dacryocystitis or chronic unilateral conjunctivitis. The lacrimal sac is filled with mucoid or purulent fluid which is often expressed by local massage (Castañeda Angel and Levy Adriana, 2017). The patient came with complaints of discharge from the left eye. Complaints come and go and have often been experienced by patients since the last 4 years. In 2017, the first complaint appeared in the form of a small pimple-like lump on the inside of the left eye close to the nose, then the lump grew and swelled to show a whitish tip at the top of the lump. Complaints improved after being given therapy, but reappeared until several episodes of relapse. In 2020, the patient was diagnosed with nasolacrimal duct obstruction due to acute dacryocystitis. In early 2021, complaints reoccured. At that time, the complaints that emerged were in the form of discharge from the inner left tear duct, a whitish liquid, sometimes mixed with blood. Complaints are also accompanied by pain, swelling, enlarged lumps and discomfort in the area between the left eye and nose.

The physical examination begins with an evaluation of eyelid position and blink function. The patency and position of the punctum are also assessed. The presence of discharge in the punctum indicates canaliculitis. The lacrimal sac fossa is palpated to evaluate tenderness, determine if a mass is present, and to detect punctal reflux. Painful lacrimal sac is an indication of dacryocystitis. The presence of reflux from the punctum indicates obstruction of the lacrimal system. Slit lamp examination is performed to detect inflammation of the eyelids, conjunctiva or cornea that may be associated with hypersecretion, as well as to detect secondary infection (Or et al., 2021). In this patient, examination of the anterior segment of the left eye revealed erythema, edema, a mass in the form of an ill-defined lump with a diameter of ± 2 cm in the left medial canthus, soft palpable, and tenderness (Figure 1). There was reflux on both punctums in the left eyelid when the medial canthus was pressed. On examination of the posterior segment, no abnormalities were found.

Epiphora is a sign of obstruction of the nasolacrimal duct, or non-obstructing factors such as eyelid malposition, lacrimal pump insufficiency, tear film instability, or hypersecretion. Physiological tests for obstruction include fluorescein dye disappearance test (DDT), fluorescein appearance test, Jones I dye test, saccharin taste test, and dacryoscintigraphy. To check the location of the obstruction using a probing test and anel test. Anel test is an examination to assess the function of lacrimal excretion into the nasal cavity. This test is performed under local anesthetic induction. Then the

punctum was widened using a dilator and then physiological saline (NaCl) was injected with an anal needle through the lacrimal canal into the lacrimal sac. This test is positive if there is a swallowing reaction in the patient (Soebago, 2019). In the patient when the Anel test was performed, by irrigation of the tear duct, the results of the examination was negative (-) on the superior and inferior punctum of the left eye were obtained.

Obstruction of the nasolacrimal duct is congenital and acquired. Furthermore, acquired nasolacrimal duct obstruction is divided into primary and secondary. Primary acquired nasolacrimal duct obstruction is caused by inflammation or fibrosis in the absence of precipitating factors. Acquired secondary obstruction is caused by inflammation or fibrosis with precipitating factors such as infection, inflammation, neoplastic, trauma or mechanical (Castañeda Angel and Levy Adriana, 2017). Secondary acquired lacrimal duct obstruction (SALDO) is a term that was defined by Bartley in 1992 to define all secondary causes of nasolacrimal duct obstruction. Basically, SALDO means that the specific cause of the obstruction can be focused, and therapy that targets that cause can lead to relief of the obstruction. Kamal and Javed (2018), classified five categories of secondary obstruction, including infectious, inflammatory, traumatic, mechanical, and neoplastic with various etiologies in each category. Infection can involve any part of the lacrimal system and can include punctal abscess, canaliculitis, dacryocystitis, and isolated nasolacrimal duct infection. Etiological factors can be bacteria, viruses, fungi or parasites (Kamal and Javed, 2018). The patient was initially diagnosed with dacryocystitis in her left eye. Complaints of dacryocystitis were felt to come and go since 2017 (4 years ago), until in 2020 (2 years ago) the complaints reoccurred. In early 2020, the patient was diagnosed with nasolacrimal duct obstruction due to acute dacryocystitis, so in this patient, what happened was acquired nasolacrimal duct obstruction secondary to infection, which in this case was dacryocystitis.

The most common infection of the lacrimal apparatus is dacryocystitis (Dahlan *et al.*, 2017). Dacryocystitis is an inflammation and infection of the lacrimal sac located between the medial canthus of the eye and nose. This disease can be in the form of acute or chronic. Chronic dacryocystitis is generally encountered by ophthalmologists with symptoms of epiphora in 87.10% of cases, followed by discharge, swelling, pain, and conjunctivitis. Generally it affects women over 40 years with a peak incidence of 60-70 years. Research shows that the ratio of female to male sufferers is 3:1. The reason why women experience more chronic dacryocystitis is due to higher vascular congestive factors and a narrower nasolacrimal canal (Wadgaonkar *et al.*, 2016). Diabetes mellitus (DM) is a clinical syndrome associated with a deficiency in the secretion or action of insulin. As a result, DM increases susceptibility

to infection. In general, infectious diseases are more common and/or appear more seriously in DM patients and have the potential to increase mortality and morbidity. The frequency of infection in DM patients is caused by a hyperglycemic environment that supports immune dysfunction (eg, impaired neutrophil function, decreased antioxidant system, and humoral immunity), micro- and macroangiopathy, neuropathy, decreased urinary antibacterial activity, gastrointestinal and urinary dysmotility. The infection affects all organs and organ systems (Alves *et al.*, 2012). Infections of the eyelids, nasolacrimal duct, conjunctiva, and corneal surface are also thought to be more common in DM patients (Ansari *et al.*, 2017). Risk factors for dacryocystitis in patients include age, female gender, and diabetes mellitus. The patient is female, 43 years old and has a history of uncontrolled diabetes mellitus.

Nasolacrimal duct obstruction is obtained primary or secondary, the surgical options performed include external dacryocystorinostomy (DCR), endonasal endoscopic DCR, or balloon catheterization. Surgical management for adults includes external dacryocystorinostomy, endoscopic dacryocystorinostomy, or balloon catheterization. External dacryocystorinostomy has a 95% success rate when performed by experienced surgeons (Janson and Idrees, 2013). However, there is concern that 5-10 percent of adult patients with nasolacrimal duct obstruction may still experience different degrees of epiphora after successful DCR surgery (Hou *et al.*, 2017). External dacryocystorinostomy (DCR) remains the gold standard procedure for the treatment of nasolacrimal duct obstruction. This method is considered cheap, short learning period, high success rate and does not require high-tech instruments (Gül *et al.*, 2015). The principle of DCR is to remove the bone that lies between the lacrimal sac and the nasal mucosa, and create an anastomosis between the medial wall of the sac and the nasal mucosa (Sajjad *et al.*, 2015). The inert and easily tolerated silicone material in DCR operation was first described by Older. Some surgeons routinely use silicone tubes, but other surgeons prefer to use silicone tubes for complicated cases. There is no consensus on the use of silicone tubing for external DCR procedures. Insertion of a silicone tube is believed to protect the passage and prevent the formation of granulation tissue at the site of osteotomy and anastomosis in the postoperative period. It is also believed to prevent major canalicular obstruction (Gül *et al.*, 2015). The patient underwent an external dacryocystorinostomy (DCR) accompanied by insertion of a silicone tube.

After surgery, patients were evaluated on the first post-operative day. Nasal tampons were carefully removed and hemostasis assessed. The wound was cleaned with Betadine 5%, and the patient was advised to be given oral antibiotics and analgesics, topical antibiotics and steroids, and nasal decongestants. One week postoperatively, sutures were removed, oral medication

was discontinued, topical steroids were reduced, and nasal medication was continued for another two weeks. Patients were reviewed after 4 weeks for tube removal, if any (Kamal and Javed, 2018). In the patient, one day after the operation, the suture was intact, and no active bleeding was obtained from the nasal tampon. So the patient was allowed to go home with treatment in the form of Xitrol eye drops, Gentamycin eye ointment, Co Amoxiclav, and Mefenamic Acid. One week after the operation, the suture was still intact, so the suture was removed. One month after surgery, the patient was re-evaluated, and the silicone tube was removed.

CONCLUSION

It can be concluded that Dacryocystitis is more prone to occur in women, and over 40 years of age. The presence of diabetes mellitus (DM) increases the susceptibility to infection, including eye infections. Acute dacryocystitis can potentially relapse into chronic dacryocystitis, resulting in obstruction of the nasolacrimal duct. Further treatment is needed, namely in the form of a dacryocystorhinostomy (DCR). External DCR is still the golden standard of treatment for nasolacrimal duct obstruction. Silicone tube insertion can increase the success of external DCR procedures.

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