A DISSERTATION ON

"COMPARATIVE STUDY OF SURGICAL OUTCOMES IN ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT STENT"

Submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfilment, of the requirements for the award of the degree of

M.S.BRANCH IV (OTORHINOLARYNGOLOGY)

REG NO: 221914552

DEPARTMENT OF OTORHINOLARYNGOLOGY

GOVERNMENT CHENGALPATTU MEDICAL COLLEGE

CHENGALPATTU, TAMILNADU

MAY 2022

BONAFIDE CERTIFICATE

This is to certify that the dissertation titled "**COMPARATIVE STUDY OF SURGICAL OUTCOMES IN ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT STENT**" submitted by Dr.M.A.KALAIVANI, Register Number: 221914552 post graduate student, in the department of otorhinolaryngology, Chengalpattu medical college and hospital appearing for M.S.ENT Branch IV Degree examination in May 2022 is a bonafide record of work done by her under my guidance and supervision in partial fulfilment of the regulations of the Tamilnadu Dr.M.G.R.Medical University , Chennai. I forward this to the Tamilnadu Dr.M.G.R.Medical University , Chennai, Tamilnadu , India

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CERTIFICATE

This is to certify that the **COMPARATIVE STUDY OF SURGICAL OUTCOMES IN ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT STENT"** presented by **DR.KALAIVANI.M.A.**, is an original work done in the Department of Otorhinolaryngology, Government Chengalpattu Medical College and Hospital, Chengalpattu in partial fulfilment of regulations of the Tamil Nadu Dr. M.G.R. Medical University for the award of degree of M.S. (Otorhinolaryngology) Branch IV, under my supervision during the academic period 2019-2022**.**

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DECLARATION

I, **DR. KALAIVANI M.A**, solemnly declare that this dissertation titled "**COMPARATIVE STUDY OF SURGICAL OUTCOMES IN ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT STENT**" is a bonafide work done by me in Chengalpattu Medical College, Chengalpattu during the period of April 2020 to March 2021 under the expert supervision of **DR.D.SENTHAMARAI KANNAN, M.S.ENT.,DNB.,** Associate Professor, Department of Otorhinolaryngology, Chengalpattu Medical College, Chengalpattu. This dissertation is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfilment of the rules and regulations for the award of the degree of M.S. Otorhinolaryngology (Branch IV) examinations to be held in May 2022.

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Date : **Signature of the Candidate**

Place: Chengalpattu **(DR.KALAIVANI. M.A)**

CERTIFICATE

This is to certify that the Dissertation work titled "**COMPARATIVE STUDY OF SURGICAL OUTCOMES IN ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT STENT"** of the candidate **DR.KALAIVANI.M.A**, with registration number for the award of M.S. Degree in the branch of Otorhinolaryngology. I personally verified the urkund.com website for the purpose of plagiarism check. I found that the uploaded thesis file contains from the introduction to conclusion pages and result shows **10% percentage** of plagiarism in the dissertation.

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ACKNOWLEDGEMENT

I would like to express my deep sense of gratitude to The Dean , Chengalpattu Medical College and Hospital **Prof.Dr.J.MUTHUKUMARAN MS Mch.,** for allowing me to undertake this study with much avidity.

My heartfelt gratitude to **Prof. DR. M.VENUGOPAL M.S.(ENT)**,Professor and head of the department, Department of ENT, Government Chengalpattu medical college for his constant encouragement ,motivation and expert supervision during the course of this study.

My heartfelt gratitude to **DR.D.SENTHAMARAI KANNAN M.S.(ENT).,DNB**, Associate professor, Department of ENT, Government Chengalpattu medical college for his constant encouragement ,motivation and expert supervision during the course of this study.

My heartfelt gratitude to **DR. G.SOUNDARARAJAN.M.S.(ENT).,DNB**., Former assistant professor, Department of ENT, Government Chengalpattu medical college for his constant encouragement ,motivation and expert supervision during the course of this study.

I would like to thank my Assistant Professors, **DR.K.SARAVANAN M.S.ENT** and **DR.V.NARENDRAKUMAR M.S.ENT.,DNB.,D.L.O** and Senior Resident **DR. B.SUDHA.,D.L.O** for their valuable tips and support. I am grateful to the other post-graduates who most willingly helped me during this study period.

My heartfelt gratitude to **Prof DR.G.BALAJI,MS.,** professor and head of the department , Department of ophthalmology, Government Chengalpattu medical college for his constant encouragement ,motivation and expert supervision during the course of this study.

I also thank the staff nurses, theatre personnel, OPD staff, Department of Otorhinolaryngology, Government Chengalpattu Medical college and Hospital for their cooperation and assistance in the conduct of this study.

I wish to extend my gratitude to my statistician for her expert assistance. Last but not the least, I am indebted and grateful to all the Patients who constitute the backbone of this study, who most willingly and selflessly subjected themselves to this study for the sake of the benefit of their community and without whom this study would not have been possible.

ABBREVIATIONS

CDC-Chronic dacryocystitis

BT-Bleeding time

CT-**C**lotting time

CO2- Carbon dioxide

DCR-Dacryocystorhinostomy

DC-Differential count

En DCR-Endonasal Endoscopic Dacryocystorhinostomy

LA-Local anaesthesia

Hb-Hemoglobin

PNS-Para nasal sinuses

RBS-Random blood sugar

TC-Total count

Yrs-Years

CONTENTS

INTRODUCTION

Epiphora is defined as the overflow of tears due to obstruction of lacrimal passage. Acquired nasolacrimal duct obstruction can be classified into primary and secondary. Primary nasolacrimal duct obstruction is caused by inflammation and fibrosis without any precipitating cause. Secondary nasolacrimal duct obstruction can be due to infections, inflammatory reactions, neoplastic, traumatic or mechanical obstruction . Primary nasolacrimal duct obstruction is more common in middle aged and elderly women. It has been demonstrated that women have significantly smaller dimensions in the lower nasolacrimal fossa and middle nasolacrimal duct[1].

Dacryocystorhinostomy is an effective and safe method for the treatment of nasolacrimal duct obstruction[2]. It can be performed externally or endoscopically. Caldwell was the first to describe an endonasal approach to treat nasolacrimal duct obstruction (NLDO) in 1893[3]. The popularity of intranasal dacryocystorhinostomy(DCR) was limited throughout the twentieth century due to poor visualization of the surgical site. With the advent of fibreoptic endoscopes and rigid endoscopic techniques in the late 1980s and early 1990s, there has been renewed interest over the past decade in endoscopic DCR. Endoscopic DCR has many advantages over external DCR.

The main advantages are avoidance of facial scarring, no division of the medial canthal ligament and the preservation of the pump action of the lacrimal sac of the orbicularis oculi muscle.it reduces the incidence of sump syndrome[4]. Over the past 3 decades it has become common practice for surgeons to place stents or intubation tubes at the time of DCR. Different type of stents such as silicon single channel, silicon double channel, polyurethane and prolene stents have been used. Although no large prospective study has been done to show that there is an advantage to employing a stent at the time of surgery, it has been assumed and propagated that silicone tubing offers a stabile no antigenic material that allows for stenting of the common canaliculus and rhinostomy, thereby increasing the success rate of the procedure

AIMS AND OBJECTIVES

AIMS:

- To assess the surgical outcomes of endoscopic dacryocystorhinostomy with and without stent placement.

OBJECTIVES:

- To compare the results of performing endonasal dacryocystorhinostomy for primary nasolacrimal duct obstruction with and without stent placement.
- To assess the patency of the lacrimal drainage system after endoscopic dacryocystorhinostomy.

REVIEW OF LITERATURE

HISTORICAL REVIEW

The evolution of lacrimal surgery is a fascinating story. It began thousands of years ago[6] . Around 2250 BC, the code of Hamurabi made firstreference to surgical treatment of lacrimal fistula or abscess. Then came the Greeks of Alexandrian time, Celasus from Rome (25 BC-50AD) treated lacrimal fistula with excision, cautery and burning. During the Romanempire, lacrimal punctum of animals were probed by hair. With decline of Roman empire, Arabs made little advances. In 18th century Planter in 1724, described the technique of treating chronic dacryocystitis[7].

Caldwell in 1893 for the first time described intranasal DCR[3]. In 1988, Rice reported cadaveric study demonstrating the feasibility of Endonasal Endoscopic DCR followed by review of surgery in four patients in 1990[8]. The first clinical study was published by McDonough and Meiring in 1989 wherein they have described the procedure of Endonasal Endoscopic DCR indetail[4].

Between January 1990 and December 1993, 152 DCRs were performed on 133 patients by Sprekelsen 1996. They reported “Very Good”results in 130 patients (85.50%) as “Good” results in 16 (10.50%) and no

change in 6 patients (04%)[9]

Metson 1996 operated 9 patients for revision DCRs because of recurrent epiphora or dacryocystitis after undergoing an external DCR, through an Endonasal approach with successful resolution of epiphora in 5 patients[10].

Endoscopic DCR is now being performed as a primary procedure or for revision of failed cases of external DCR. (Rebiz EE, Shapshay SM, Bowlds JM and Pankrator MM, 1992)[11].

It is more physiological because it preserves the lacrimal pump mechanism and final results are as good as external DCR. (Bambule and Chamero 2001)[12].

P.J. Wormald 2002 described powered Endoscopic DCR with full sacexposure and primary mucosal anastomosis[13].

A number of modifications using laser have also been described as a useful tool in Endoscopic DCR (Massaro 1990, Gonnering 1991, Metson 1994 and Patel 1997)[14].

Many techniques advocate the use of silicon stent which is placed as aloop in the superior and inferior canaliculi, through the common canaliculus andlacrimal sac into the nose by an endoscope. (Maier & Schmidt 2000, Siddeshi 2000)[15].

Tamura et al. used T-sheet made from penrose drain tube in seven patients[16] Kishore et al. and Erkan et al. used standard otologic T-tubes inendoscopic DCR 17,18

EMBROYOLOGY AND DEVELOPMENT

The nasolacrimal drainage system serves as a conduit for tear flow from the external eye to the nasal cavity. It consists of the puncta, canaliculi, lacrimal sac, and nasolacrimal duct[19,6].

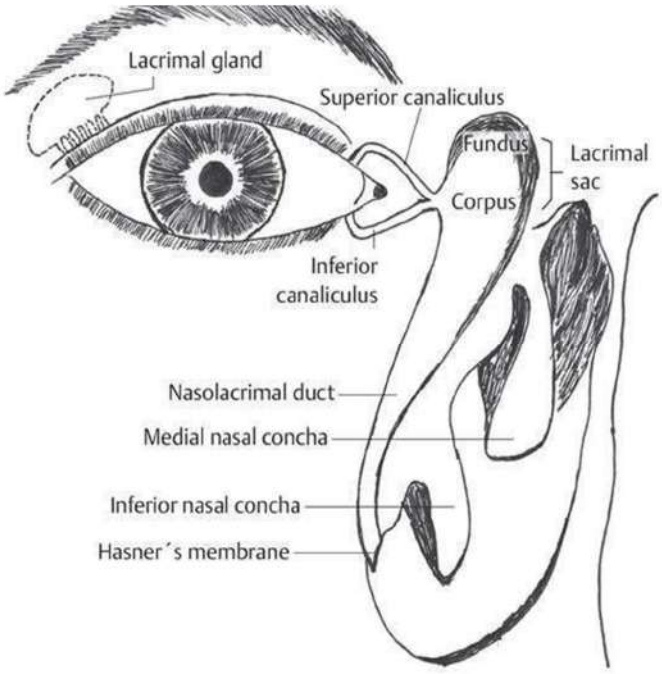


FIGURE 1 Lacrimal system

During the sixth gestational week the maxillary process and the nasolacrimal processes meet to form the naso-optic fissure. The lacrimal drainage system arises in the naso-optic fissure from a thickened cord of surface ectoderm which detaches from the surface and moves deep into the fissure[20,7].

The cord canalizes to form entire lacrimal drainage at 3-4 months of gestation. The most inferior portion of nasolacrimal system at the junction of epithelial lining the nasolacrimalduct and nasal mucosa is the most frequent site of incomplete canalization. This leads to chronic infection and necessitates a bypass procedure to overcome the obstruction[21,8].

The ectodermal epithelial cord is directed from the medial canthus to the anterior third of the inferior turbinate. As the column extends, it bifurcates in its cranial portion to become the superior and inferior canaliculi and canalize from the most cephalic part downwards[22,9].

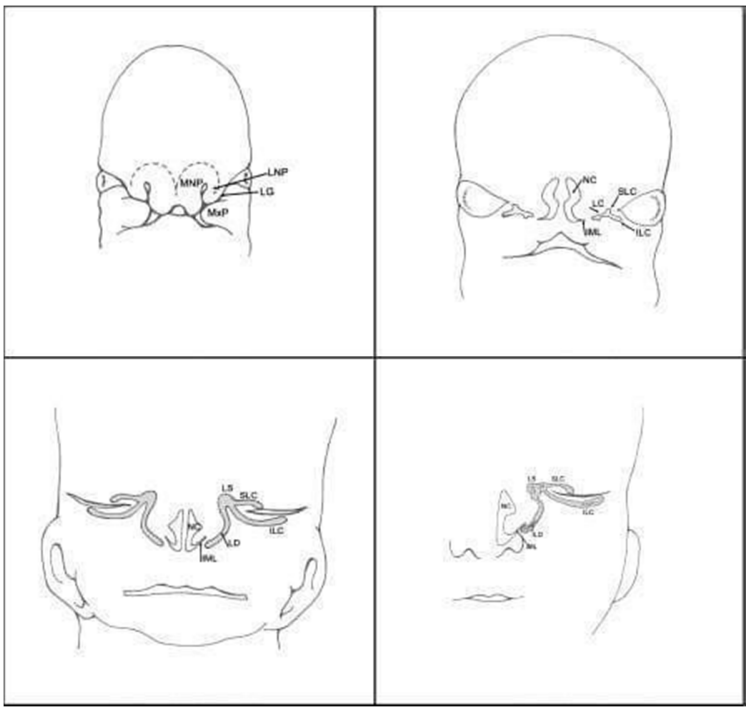


FIGURE 2:EMBRYOLOGY

ANATOMY OF LACRIMAL APPARATUS

LACRIMAL GLAND:

The lacrimal gland is a bilobed, tear shaped gland with the primary function of secreting the aqueous portion of the tear film, thereby maintaining the ocular surface[10].It is primarily located in the anterior, superotemporal orbit within the lacrimal fossa of the frontal bone. The tendon of levator palpebrae superioris bisects the lacrimal gland, giving rise to two lobes (palpebral part and orbital part)[11]. Its histological composition is mixed serous and mucinous acini, myoepithelial cells, and small interconnecting dutules [23,12].

Blood supply

The arterial supply of the lacrimal gland is the lacrimal artery, a branch of the ophthalmic artery[13].

Venous drainage

Venous blood returns from the lacrimal gland via the lacrimal vein, which feeds into the superior ophthalmic vein that traverses the cavernous sinus [7,14].

Nerve supply

Sensory: lacrimal nerve (from ophthalmic nerve)

Parasympathetic: greater petrosal nerve (from facial nerve)

Sympathetic: deep petrosal nerve (from internal carotid plexus) [11,15].

LACRIMAL PATHWAY:

PUNCTA:

A punctum each is present at the medial end of both superior and inferior lid. They are located on the slightly raised area known as lacrimal papilla[16]. The diameter of the puncta varies from 0.1 to 4mm[17]. They are avascular in comparison to the surrounding tissue and thus look pale in their appearance. The upper punctum is slightly medial to the lower, respective distance from the medial canthus being 6-6.5mm[18].

CANALICULI:

Superior and inferior canaliculi join the puncta to the lacrimal sac. Each canaliculus has two parts –vertical(2to2.5mm) and horizontal (7 to 10mm)which lie at right angle to each other[19]. The two canaliculi may join to form common canaliculus which opens immediately into the outer wall of lacrimal sac through valve of Rosenmuller[20].

LACRIMAL SAC:

It is situated in the lacrimal fossa and is about 12-15mm long. The lacrimal fossa lies between anterior and posterior lacrimal crest[20]. The anterior lacrimal crest

formed by frontal process of maxilla. Posterior lacrimal crest formed by lacrimal bone. It connects the lacrimal canaliculi, which drain tears from the eye's surface, and fluid into the nasal cavity. Its superficial surface is covered by a fibrous expansion derived from the medial palpebral ligament, and its deep surface is crossed by the lacrimal part of the orbicularis oculi, which is attached to the crest on the lacrimal bone. The sac is lined by stratified columnar epithelium with mucous secreting goblet cells with surrounding connective tissue[21].

The common canaliculus / lacrimal canaliculi open into its lateral wall near its upper end[26]. The lacrimal sac is encompassed by the anterior and posterior arms of the medial canthal ligament. The superior arm of the medial canthal ligament forms the roof of the lacrimal sac fossa. The preseptal and pretarsal orbicularis fibres (Horner-Duverney Muscle) insert along the arms of the medial canthal ligament as well as onto the posterior lacrimal crest adjacent to the lacrimal sac and one thought to play a role in the lacrimal pump mechanism. A layer of lacrimal fascia continues with the orbital periosteum and passes between the lacrimal crest of the maxilla and the lacrimal bone[21].

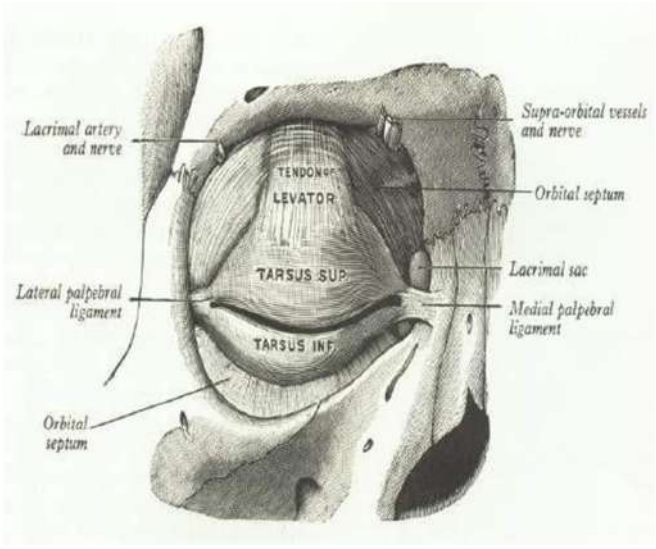


FIGURE 3 -RELATIONS OF THE LACRIMAL SAC WITH ORBITAL SEPTUM

BLOOD SUPPLY:

- Branches of ophthalmic artery
- Angular artery
- Inferior orbital artery.
- Nasal branch of sphenopalatine artery.

VENOUS DRAINAGE:

The vein drain into the angular and infraorbital vessels up, and below into the nasal veins[21].

LYMPHATIC DRAINAGE: submandibular and deep cervical nodes[22].

NASOLACRIMAL DUCT: it has a bony and soft part. The bony part of the nasolacrimal duct is formed by the maxilla, lacrimal bone and inferior turbinate approximately 10mm and the soft part is around 5mm. Diameter of nasolacrimal ductis from 3-7mm and decreases from above downward. The direction of nasolacrimal duct is oblique, backward and inward. Duct opens below the inferior turbinate. The duct is lateral to the middle meatus and it may make a ridge in the maxillary sinus.

Around the nasolacrimal duct there is rich plexus of veins, in the form of an erectile tissue which may engorge and cause obstruction to the duct[21].

VALVES OF LACRIMAL SYSTEM:

The mucosal lining of the nasolacrimal duct contains crypts and folds that usually disappear by adulthood.

The most significant fold is the one situated at the meatal opening of the nasolacrimal duct called the **VALVE OF HASNER**

Valve found at the junction between the common canaliculus and the lacrimal sac is **VALVE OF ROSENMULLER**

Fold of mucous membrane guarding the lower opening of the nasolacrimal duct is called **HUSCKE VALVE**

Valve found at the junction of the lacrimal sac and the nasolacrimal duct is **VALVE OF KRAUSE**

VALVE OF BOCHDALE : It is the first valve seen at the lacrimal punctum.

VALVE OF FOLTZ : It lies after the puncta where the vertical canaliculi start[22].

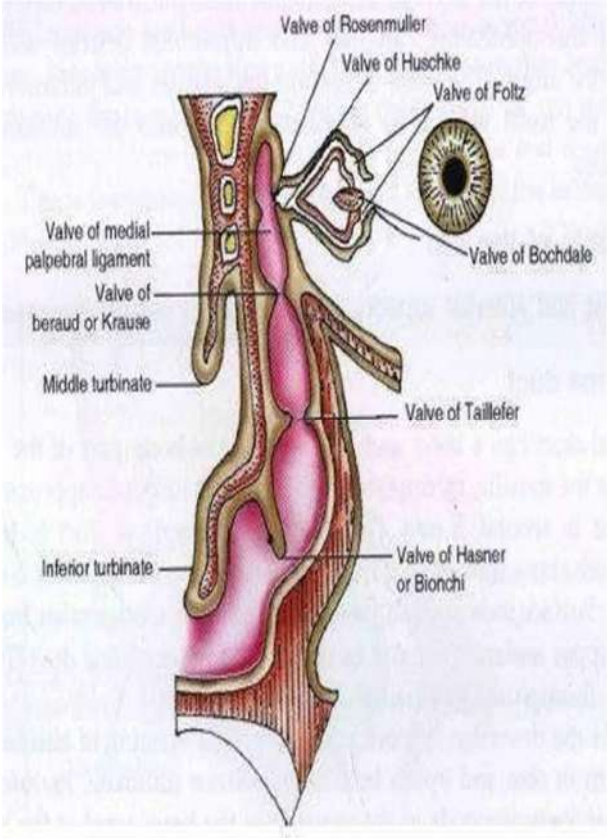


Figure 4-Valves of lacrimal passage

ENDOSCOPIC ANATOMY OF LATERAL WALL OF NOSE:

The lateral wall of nose is irregular owing to the presence of three or four bony projection called turbinate or conchae. The conchae increases the surface area of the nose for effective air conditioning of the inspired air. Below and lateral to each turbinate is a corresponding meatus[23].

Lateral wall is formed by bony and cartilaginous part.

BONY PART:

Nasal bone, Frontal process of maxilla , Lacrimal bone ,Labyrinth of ethmoid with superior and middle turbinate ,Inferior turbinate ,Perpendicular plate of palatine bone ,Medial pterygoid plate[23].

CARTILAGENOUS PART:

Lateral cartilage, Alar cartilage

UNCINATE BONE:

The uncinate process is a wing or boomerang shaped piece of bone. It forms the first layer or lamella of the middle meatus. It attaches anteriorly to the posterior edge of the lacrimal bone and inferiorly to the superior edge of the inferior turbinate. Superior attachment of uncinated is highly variable, may be attached to the lamina papyracea, or the roof of ethmoid sinus, or sometimes to the middle

turbinate. When the uncinate process is attached to the lamina papyracea, the nasofrontal recess drain between the uncinate and middle turbinate and the ethmoid infundibulum ends blindly to form a sinus terminalis[24].

MIDDLE TURBINATE:

It is a projection from the medial surface of the ethmoid labyrinth. The most anterosuperior insertion of the middle turbinate is adjacent to crista ethmoidalis of the maxilla which produces an anterior bulge known as agger nasi. The posterior end of the middle turbinate is attached to crista ethmoidalis of perpendicular plate of the palatine bone[24 21].

The intervening area of the insertion of the middle turbinate can be divided into three parts.

The anterior one third is in the sagittal plane and is attached to the cribriform plate at the junction of the medial and lateral lamellae[24].

The middle one third lies in the coronal plane and is attached to the lamina papyracea by the ground or basal lamella. It separates the anterior ethmoid cells from the posterior ethmoid cells[24].

The posterior third lies in the horizontal plane and is attached to the lamina papyracea and the perpendicular plate of the palatine bone[24].

AGGER NASI:

It is the most anterior part of the ethmoid. It is represented by a small crest or mound on the lateral wall just anterior to the attachment of the middle turbinate. When pneumatized it contains air cells, the agger nasi cells, which communicate with the frontal recess. The agger nasi cells themselves overlies the lacrimal sac and are separated from this sac by a thin layer of bone[25].

INFERIOR TURBINATE:

Unlike the superior and middle turbinates, which are the parts of the ethmoid bone, the inferior turbinate is an independent bone[25]. It is the largest one among them and it extends along the entire length of the nasal floor. Anteriorly it articulates with the conchal crest of the maxilla, the middle part of the turbinate covers the lower portion of the medial wall of maxillary sinus. Posteriorly, inferior turbinate articulates with the conchal crest of palatine bone. In the inferior meatus, the nasolacrimal duct opens about 2cm behind the nostril[26].

LACRIMAL BONE:

The lacrimal bone is both the smallest and the most fragile bone of the face. Anatomically, we can observe its four borders and two surfaces[24].

Lateral surface or orbital surface- houses lacrimal sac and nasolacrimal duct. It participates in forming the medial orbital wall

Medial surface or nasal surface- it participates in forming the middle nasal meatus and encloses some ethmoidal air cells[26].

BORDERS:

Anterior: articulates with the frontal process of maxilla

Posterior: articulates with the lamina papyracea

Superior: articulates with the frontal bone

Inferior: articulates with the orbital plate of the maxilla and the inferior nasal concha

DEVELOPMENT:

During intrauterine development, a cartilaginous membrane that covers the cartilaginous nasal capsule at the place where the lacrimal bone first develops[25]. Around 12th week of gestation, a single ossification center appears within this membrane, causing intramembranous ossification from a single ossification center, which subsequently leads into forming of the lacrimal bone[27].

FRONTAL PROCESS OF MAXILLA

It projects upward and backward to articulate

Above – nasal margin of frontal bone

Infront – nasal bone

Behind –lacrimal bone

Lateral surface is divided by anterior lacrimal crest into anterior smooth and posterior grooved. Anterior lacrimal crest gives attachment to lacrimal fascia and medial palpebral ligament[21 27].

The medial surface of frontal process of maxilla forms a part of lateral wall of the nose. The upper rough part articulates with the ethmoid labyrinth closing the ethmoidal air cells. The lower smooth part is called ethmoidal crest, the posterior part of which articulates with the middle nasal concha and the anterior part underlies the agger nasi on the lateral wall of the nose[28].

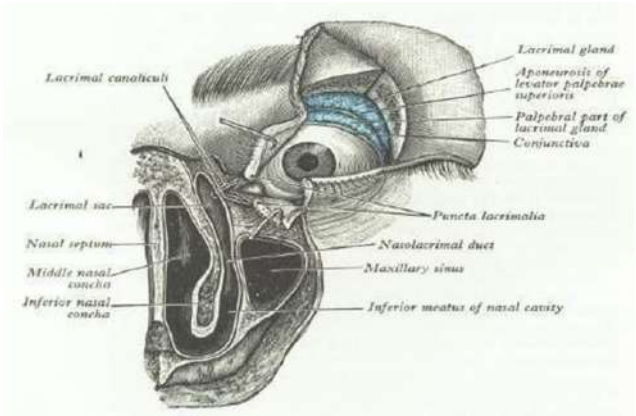


FIGURE 5 RELATIONS OF THE LACRIMAL DRAINAGE SYSTEM WITH THENASAL CAVITY

PHYSIOLOGY OF LACRIMATION

Fluid covering the cornea is called precorneal film. It consists of three layers, which from posterior to anterior are, mucus layer, aqueous layer and lipid or oily layer[28].

Mucus layer:

It is the innermost layer. It consists of mucin secreted by conjunctival goblet cells and glands of Manz

Aqueous layer:

The bulk of tear film is formed by this intermediate layer which contains dissolvedsalts, proteins, enzymes, and antimicrobial substance. It is secreted by main and accessory glands[28].

Lipid layer:

This is the outermost and thinnest layer of tear film formed at air-tear interface from the secretions of Meibomian, zeis and moll glands[28].

SECRETION OF TEARS:

Tears are continuously secreted throughout the day by main (reflex secretion) and accessory lacrimal glands (basal secretion). Reflex secretion is in response to sensations from the cornea and conjunctiva, probably produced by evaporation and breakup of tear film[29].

Afferent pathway of this secretion is formed by fifth nerve and efferent by

parasympathetic(secretomotor)supply of lacrimal gland [23 29].

ELIMINATION OF TEARS FROM THE LACRIMAL GLAND:

The tears flow downwards and laterally across the ocular surface. A variable amount of tears is lost by evaporation from the ocular surface. The remainder of tears flow along the superior and inferior marginal strips and collects as lacus lacrimalis in the inner canthus from where it is drained by the lacrimal passage into the nasal cavity. About 70% tears is drained via inferior canaliculus and 30% via the superior canaliculus by an active lacrimal pump mechanism constituted by the fibers of orbicularis[30].

With each blink, the pretarsal orbicularis oculi muscle compresses the ampullae, shortens and compresses the horizontal canaliculi, and close and moves the puncta medially resisting reflux.

Simultaneously, contraction of the lacrimal part of the orbicularis oculi creates a positive pressure that forces tears down the nasolacrimal duct and into the nose, mediated by helically arranged connective tissue fibers around the lacrimal sac. When the eyes open, the canaliculi and sac expand, creating negative pressure that draws tears from the canaliculi into the sac[31].

PATHOLOGY:

WATERING EYE: It is characterized by overflow of tears from the conjunctival sac. The condition may occur either due to excessive secretion of tears(hyper lacrimation) or may result from obstruction to the overflow of normally secreted tears(epiphora)[32].

CAUSES OF EPIPHORA: Inadequate drainage of tears may occur due to physiological or anatomical cause[32].

PHYSIOLOGICAL CAUSE: is lacrimal pump failure due to lower lid laxity or weakness of orbicularis muscle[32].

MECHANICAL OBSTRUCTION: in lacrimal passage may lie at the level of punctum, canaliculus, lacrimal sac or nasolacrimal duct[33].

PUNCTAL CAUSES:

- Punctal obstruction
- Eversion of lower punctum

CANALICULAR CAUSES:

- Canalicular stenosis/constriction
- Complete canalicular occlusion
- Canaliculitis
- Common canalicular obstruction or obstruction of both canaliculi

LACRIMAL SAC CAUSES:

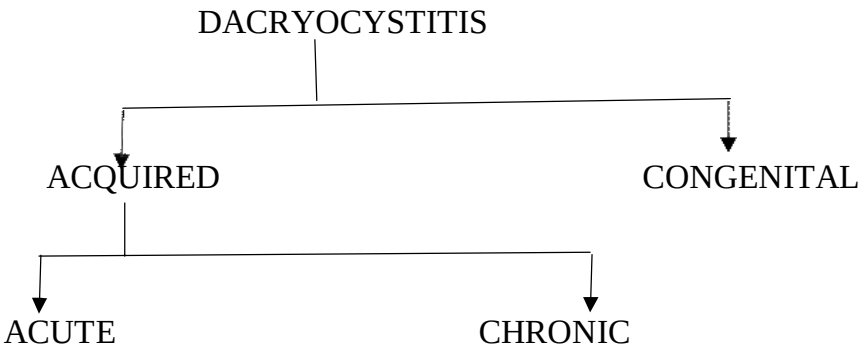
- Traumatic strictures
- Dacryocystitis
- Specific infections like TB, Syphilis
- Tumours

NASOLACRIMAL DUCT CAUSES:

- Congenital cause: non canalization , partial canalization

DACRYOCYSTITIS:

Inflammation of the lacrimal sac is known as dacryocystitis. It generally affects two age group, infants and adult. More common in female over 40 years[31].



CONGENITAL DACRYOCYSTITIS:

Due to obstruction of valve of Hasner located in the distal portion of the nasolacrimalduct. If amniotic fluid is not expelled from the nasolacrimal system a few days following delivery, it can become purulent leading to neonatal dacryocystitis[34].

ACQUIRED DACRYOCYSTITIS: it is due to

Involutional changes(ageing),

Systemic disorders (like sarcoidosis),

Trauma (such as nasoethmoid fractures),

Surgeries (such as endonasal procedures),

Neoplasms and certain medications.

ACUTE DACRYOCYSTITS:

It is due to acute inflammation of lacrimal sac or due to suppuration starting in the peri cystic tissues. It usually requires systemic antibiotic therapy prior to intervention for the nasolacrimalduct obstruction[26].

Causative organisms: staphylococcus aureus, B hemolytic streptococcus and pneumococcus [26].

CHRONIC DACRYOCYSTITIS:

Typically presents with less inflammatory signs and requires surgical therapy for the underlying cause[27].

Causative organisms: staphylococci, streptococci and pseudomonas pyocyanea.

Rarely chronic granulomatous infections like tuberculosis, syphilis, leprosy and rhinosporidiosis[26].

PATHOPHYSIOLOGY:

Dacryocystitis typically occurs secondary to obstruction of the nasolacrimal duct. Obstruction of the nasolacrimal duct leads to stagnation of tears in the pathologically closed lacrimal drainage system, with the stagnated tears providing a favorable environment for infectious organisms. The lacrimal sac will then become inflamed leading to the characteristic erythema and edema at the inferomedial portion of the orbit[35].

SYMPTOMS:

ACUTE DACRYOCYSTITIS:

- Pain of sudden onset
- Redness
- Swelling overlying lacrimal sac area
- Watering from the eyes
- Discharging wound overlying lacrimal sac
- Conjunctival redness
- Lid swelling
- Systemic features like fever

CHRONIC DACRYOCYSTITIS:

- Watering discharge from the eyes, if there is associated infection
- Conjunctival redness
- Swelling in the region of lacrimal sac

COMPLICATIONS:

- Conjunctivitis
- Lacrimal abscess and fistula
- Orbital cellulitis
- Meningitis
- Cavernous sinus thrombosis

INVESTIGATIONS

It includes

1. Pressure over lacrimal sac for regurgitation
2. Probing
3. Syringing
4. Dacryocystography
5. Scintigraphy
6. Lacrimal endoscopy
7. Helical computed tomography dacryocystography with 3D reconstruction.
8. Diagnostic nasal endoscopic examination
9. CT para nasal sinuses

REGURGITATION ON PRESSING THE LACRIMAL SAC:

Apply steady pressure with index finger over the lacrimal sac area. Look for regurgitation of mucopurulent discharge from the puncta. It signifies patent canalicular system with block in lower end of sac or NLD[33 35].

PROBING

Diagnostic probing and syringing of the lacrimal pathway are sufficient for evaluating the function of the lacrimal drainage system or to determine the location and extension of obstructions in patients with epiphora.

CANALICULAR PROBING:

Helps to differentiate between canalicular, common canalicular and nasolacrimal duct obstruction. The distance of canalicular obstruction from the punctum can be measured with canalicular probing. After punctal Anaesthesia anddilatation, a No. 0000 Bowman probe is advanced into the canaliculus[21].

Findings

(a) If an obstruction is encountered, the probe is grasped with forceps at its entrance to the punctum and then withdrawn. The distance from the forceps to the end of the probe gives the location of the canalicular obstruction.

(b) Obstruction of the common canaliculus is encountered as a “soft stop” to passage of the probe. The medial canthal tissue drags with advancement of the probe. This confirms common canalicular or internal common punctal obstruction.

(c) Passage of the probe into the lacrimal sac terminates with a “hard stop” when the probe encounters the medial wall of the lacrimal sac in the lacrimal sac fossa[21].

SYRINGING: it helps to localize the site of block in the lacrimal passage. After syringing ,

No regurgitation- normal

Regurgitation through the same punctum-canalicular block

Regurgitation through the opposite punctum-

Mucoid or purulent- nasolacrimal duct block

Clear fluid- common canalicular block

JONES DYE TEST:

PRIMARY TEST: A drop of 2% fluorescein is instilled into conjunctiva. After 5mins a cotton bud is inserted under inferior turbinate.

Positive- fluorescein recovered from nose indicates patency of drainage system

Negative-no dye is recovered indicates partial obstruction or pump failure[21].

SECONDARY TEST: The drainage system is irrigated with saline and cotton bud is placed under inferior turbinate

Positive – fluorescein stained saline is recovered indicates functional patency of upper passage

Negative – unstained saline recovered indicates obstruction of upper passage[21].

Taste Test

Taste tests have been described to evaluate lacrimal drainage system functions[21, 33].

These consist of inserting a drop of an agent such as saccharine into the conjunctival cul-de-sac. After several minutes, the patients are asked if they can taste the saccharine[21, 34].

The reliability and practicability of these tests are limited.

SCHIRMER'S TEST :

This test is done to differentiate the excessive lacrimation from epiphora due to lower down obstruction in the lacrimal passage[37].

DACRYOCYSTOGRAPHY: To identify the site of obstruction in the lacrimal pathway.

Radio-opaque contrast medium is injected into canaliculi while x ray or CT is taken. Dye should flow through the duct and drain into the nasopharynx if no obstruction is present. If obstruction is present, dilated sac is seen proximal to it[38].

INTERPRETATION

• Normal dacryocystography

• Blocked lacrimal pathway

• Level of obstruction Complete or incomplete

• Dilated sac

• Dacryocystocoele

MACRODACRYOCYSTOGRAPHY

Macrodacryocystography is very helpful for exposing the anatomy of the lacrimal sac and the location of nasolacrimal duct obstruction. Anatomical details are magnified without distortion in this image[38].

SCINTIGRAPHY

Lacrimal scintigraphy uses radioisotope dye technetium 99 pertechnetate dye. It is a dynamic study with static view taken at 5, 10, 15, and 20 minutes. The resultant scintigram is divided into

• Presac delay - isotope will not enter the sac in five minutes.

• Preductal delay – isotope will be visible in the sac in five minutes but no isotope in duct.

• Intraductal delay – isotope will be visible in the upper part of the nasolacrimal duct with no flow beyond that[39].

Helical computed tomography dacryocystography with 3D reconstruction

Plain and contrast enhanced CTs are collected and reconstructed in this procedure to see a virtual image of the complete lacrimal channel. Contrast is injected into the lacrimal channel via the punctum in this procedure. Both soft tissue and adjacent bone features can be retrieved non-invasively in this way[40].

LACRIMAL ENDOSCOPY:

Lacrimal endoscopy is a new non-invasive procedure for seeing and precisely localizing blockages. It allows for the distinction of inflammatory, partial, and full stenosis . Endoscopy allows to select the best surgical treatment for their patients[40] [41] Although it cannot currently replace the gold standard invasive procedures for detecting the location of the obstruction, it is a very important adjuvant in determining the appropriate surgical modality[41].

Endoscopes used in the lacrimal endoscopy have the following specifications:

• 0.3mm/1800pixels/22 light fibers/70 0 field of vision

• 0.5mm/3000pixels/46 light fibers/70 0 field of vision

Procedure :

Under local anaesthesia, the punctum is dilated and the endoscope inserted after irrigating and cleaning the lower canaliculus. With gentle irrigation, the endoscope is slowly advanced towards the canaliculus, and when it reaches the lateral wall of the

lacrimal sac, the endoscope is held upright and advanced towards the nasal meatus and into the nose under the inferior turbinate. For optimal imaging, continuous irrigation is required[42].

During the examination, stenosis and scarring of the lacrimal drainage system, as well as inflammation of the mucous membrane, were identified and noted[42].

Widening of the lumen during irrigation and easy manipulation of the endoscope are evidence of normal distension of lacrimal drainage system[43].

During irrigation, the stenosis could not be enlarged, and the endoscope met resistance similar to that seen with probing of lacrimal drainage system[42 43].
The mucosa of the lacrimal system is normally smooth and light pink and moves when it's irrigated. Post inflammatory condition shows
thickened mucosa of a more reddish grey colour with large papillae[42].

Endoscopic examination has the advantage of allowing direct visualization and precise location of the lacrimal drainage system and its mucous membrane. It can be used to make a decision regarding the type of surgery to be performed. It can be done without side effects in an outpatient setting[43].

DIAGNOSTIC NASAL ENDOSCOPY:

Nasal endoscopy is useful in preoperative evaluation for two important reasons

1. Determine the relationship between the septum and the lateral nasal wall.
2. Any intranasal pathology, such as polyps or tumours, must be detected and treated before dacryocystorhinostomy[44].

OPERATIVE TECHNIQUE :

Endonasal dacryocystorhinostomy is performed at our institution under local or general anaesthesia[45].

NASAL PREPARATION:

Nasal cavity is shrinked with mixture of 4% Xylocaine 30 ml and 1:100000 adrenaline 2CC soaked cotton pledgets placed in the floor of nasal cavity , frontal process of maxilla[25 45].

INFILTRATION:

Local infiltration of 2% Xylocaine with 1:200000 epinephrine is given over

(a) Lacrimal sac area

(b) Lower edge of the anterior lacrimal crest just above attachment of inferior turbinate.

(c) Anterior border, superior and inferior attachments of uncinate

PROCEDURE:

Under the above anaesthesia with patient in supine position with head end elevated 10°, local infiltration given and nose packed with mixture of 4% xylocaine and adrenaline. The endoscopes used are Hopkins 4mm 0° rod endoscope[45].

STEP 1: Using 15blade, it is placed in the lateral wall of the nose, starting slightly anterior to the attachment of the middle turbinate and moving forward for 0.5 to 0.7 cm, then vertically downward for 1.25 cm, and finally posteriorly, generating a posteriorly based muco periosteal flap. A Freer's elevator is used to raise it, and then a straight Blakesley forceps is used to remove it. The lacrimal fossa bone has now been exposed[45].

STEP 2: Using Kerrison's punch frontal process of Maxilla is nibbled for the entire length lacrimal sac, lacrimal bone removed and the lacrimal sac exposed from fundus to the origin of Nasolacrimal duct[45].

STEP 3: Medial wall of lacrimal sac is opened anteriorly with sickle knife. Superior and inferior incisions made[45].

STEP 4: Syringing done through the punctum to see the drainage. After confirming that the nasal flap mucosa trimmed and lacrimal sac mucosa is also trimmed and both were approximated so as to make continuous lining[21 45].

STEP5: Nasal packing is done with medicated Vaseline gauze if bleeding present. No packing done if there is no bleeding.

Pack removed on the 1st post operative day and advised nasal saline drops post operatively[45].

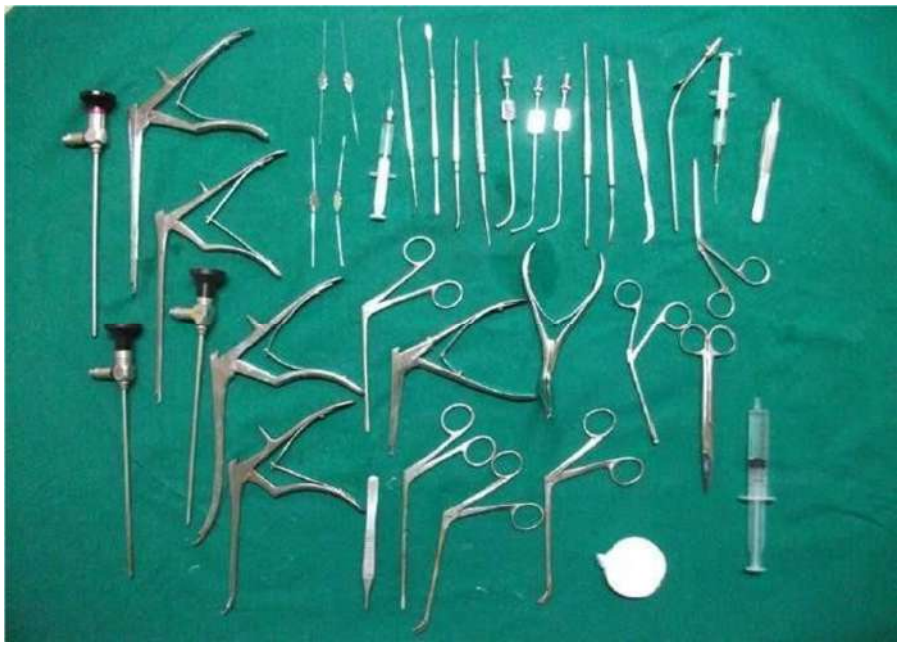


FIG-6 .INSTRUMENTS USED IN EN DCR

ENDOSCOPIC PHOTOS

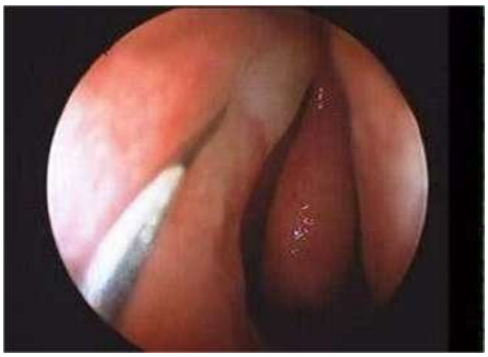


FIGURE7- INFILTRATION

FIGURE 8-REMOVAL OF LACRIMAL BONE

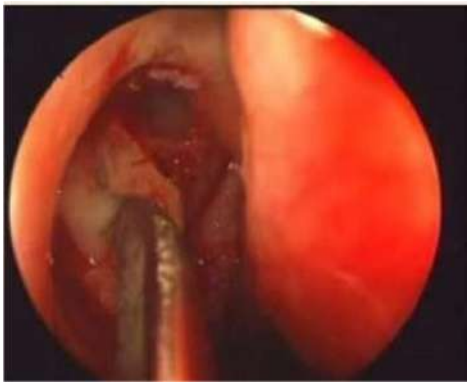


FIGURE 9- MUCOSAL FLAP ELEVATION

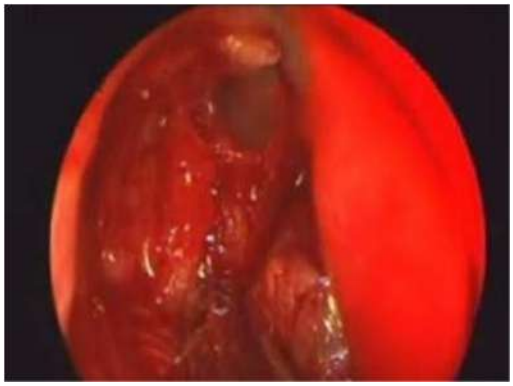


FIGURE 10- OPENING OF LACRIMAL SAC

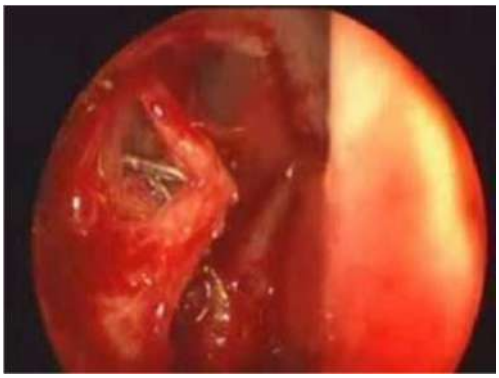


FIGURE 11-INTRAOPERATIVE SYRINGING

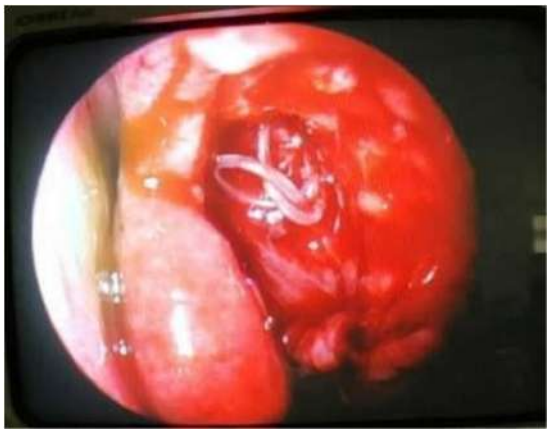


FIGURE 12-BOTH ENDS OF SILICONE STENT SEEN THROUGH RHINOSTOMA

Post Operative

The patients are discharged after pack removal and put on oral antibiotics, anti-inflammatory drugs, nasal decongestants and antibiotic eyedrops.

COMPLICATIONS OF ENDONASAL DCR

The complications of intranasal DCR are classified as intraoperative and post operative[46].

INTRA OPERATIVE

1. BLEEDING**:** Avulsion of the middle turbinate mucosa causes bleeding, which is more common when elevating the flap over the root of the anterior attachment of the middle turbinate.

True cut forceps or electro cautery can be used to avoid this[46].

Bleeding is also reduced with hypotensive anaesthesia.

2. Injury to lamina papyracea: if the dissection is extended posteriorly, this can result in injury to the lamina papyracea. It causes orbital fat to prolapse into the nasal cavity. Fat moves when pressure is applied to the eyeball (Stankiewicz sign)[46].

3. Severe lid edema - occurs less frequently as a result of repetitive probing for sac location, particularly in situations of common canalicular obstruction[46].

4. Cerebrospinal leak is a relatively rare complication that happens when a bone is broken with a chisel and hammer[46].

POSTOPERATIVE COMPLICATIONS:

Immediate postoperative complications:

1. Pain around the bridge of the nose.
2. Periorbital ecchymosis.
3. Headache.
4. Bleeding.
5. Synechiae formation.

Complications of silicon intubation.

1. Laceration of canaliculi.
2. Slitting of puncta.
3. Granuloma formation at rhinostomy site.
4. Displacement of tube.
5. False passage may be created by the tube

6. Extrusion of the tube.

7. Bleeding.

8. Rarely difficulty in removing the tube.

Difficulties encountered during endoscopic DCR

1. Thick and hard bone is difficult to remove sometimes.

This difficulty can be overcome with the use of powered instruments.

2. Visualization and instrumentation are difficult due to the narrow nasal cavity and large septal deviations.

3. Anatomical variations can lead to identification of sac difficult.

4. If the mucosa is not adequately prepared, generalized hypertrophy of the mucosa bleeds more.

5. It can be difficult to find a stenosed or narrow punctum.

6.The medial wall of the sac is difficult to open because of the small confined sac caused by repeated infection.

Factors affecting the results

- Rhinostomy made at higher level remains patent for long time. The fundus of the sac, the canaliculi, and the common canaliculi all occur

in the same axis as the superior part of the sac in this area.

- The results are better when the anatomy is favourable, such as a broad nasal cavity, a normal-sized middle turbinate, and an uncinated process.

- Clean surgery decreases and enhances the procedure's outcome by causing less harm to the surrounding structures.

- The excision of the bony process of the maxilla with an adequate size of bony window has a good prognosis and improved long-term effects.
- Cold steel devices are better than lasers at preventing granulation and scarring.
- Stenting improves prognosis in some circumstances.

Advantages of Endonasal Endoscopic Dacryocystorhinostomy are

· it avoids facial scar,

· minimal post operative discomfort,

· can be performed on both eyes,

· can be performed as day care procedure

· can be done even during lacrimal abscess presentation

· warfarin and aspirin need not be discontinued during surgery.

· Injury to the angular vein, medial palpebral ligament, orbicularis oculi are avoided.

· Revision surgery easy.

The disadvantage of endonasal DCR are

· Suturing of the mucosal flaps not possible.

· If lacrimal fistula is present then it has to be addressed separately via an external approach.

· If nasal cavity is narrow then opening of big neo ostium is difficult.

OTHER TYPES OF ENDONASAL PROCEDURES

The other endonasal dacryocystorhinostomy are

· Powered DCR.

· Endonasal laser assisted DCR

· Balloon dacryocystoplasty

POWERED DECRYOCYSTORHINOSTOMY

The thick frontal process of the maxilla is removed with a 2.5mm diamond burr in a powered endoscopic dacryocystorhinostomy microdebrider to expose the whole sac. Once the sac was revealed, the punctum was dilated and the lacrimal probe was inserted through the bone ostium formed to tent the medial wall of the nose.

The Lacrimal spear knife is used to make a vertical incision on the medial wall under

the guidance of the probe[48].

Using Lacrimal mini sickle knife releasing incisions were made at the top and bottom of the vertical incision and anterior flap is rotated over the lateral wall mucosa. A similar posterior flap is rolled over the lateral nasal wall using scissors. The agger nasi mucosa is opened, and the mucosa's margin is approximated to the posterosuperior lacrimal mucosa. The nasal flap mucosa is trimmed along the superior, posterior, and inferior margins so that it approximates the lacrimal mucosa. This approximation reduces the granulation tissue and synechiae formation. Patency of the canaliculus and the neo ostium were maintained by silastic tubing which were subsequently removed[49].

ENDOSCOPIC LASER ASSISTED DACRYOCYSTORHINOSTOMY

Carbondioxide laser, potassium titanium phosphate laser, argon laser, and yttrium aluminium garnet [YAG] laser are all commonly used lasers in dacryocystorhinostomy[50]. HO:YAG is best among them because of its enhanced bone cutting property[51].

Lasers are utilized in dacryocystorhinostomy in a variety of ways.

· Transnasal laser dacryocystorhinostomy

· Translacrimal laser dacryocystorhinostomy.

Transnasal laser assisted Dacryocystorhinostomy

Laser is used to cut the mucosa and bone via transnasal route. Although there is less bleeding, creating a large hole is more difficult, and postoperative synechiae in the neo ostium is more common when the lacrimal sac is opened with a laser. So long term results are not higher than the non laser assisted endoscopic techniques and external dacryocystorhinostomy[52].

Transcanalicular laser assisted dacryocystography

Translacrimal intervention has become more prevalent as a result of the availability of micro flexible endoscopes. Christenbury reported a translacrimal laser dacryocystorhinostomy with argon laser[53].

His success rate was 60%, and the main issue was laser bone penetration and osteotomy creation[54].

An anatomical investigation using a titanium-potassium laser to construct a 4 x 6mm bone aperture was described by Levin and stermogipson[53 54]

Advantages of the trans canalicular laser assisted DCR are

1. It is a fast technique even faster than conventional endoscopic DCR.
2. If one faces failure revision is so easy that it does not feel like a revision surgery.
3. The laser fibre is passed into the nose and directed towards the lacrimal sac thus there is no damage to the eye or its content.

Disadvantages of the transcanalicular laser assisted DCR

1. It may not be possible to address the lacrimal sump syndrome with transcanalicular DCR.
2. There is risk of canalicular injury with the technique.
3. Requires complex setup.
4. Difficult to remove the bone with this technique.
5. Inadequate size window with high chance of reclosure.
6. Success rate is very low.

BALLOON DACRYOCYSTOPLASTY:

Balloon dacryocystoplasty is a new procedure that involves recanalizing the blocked lacrimal system with a balloon. It was done because the lacrimal drainage system was completely or partially obstructed. A flexible tipped guide wire was inserted into the inferior meatus through the superior canaliculus and then manipulated out of the nasal cavity. After that, a 3 mm balloon catheter was inserted retrogradely over the guide wire and dilated at the blocked location.

The entire procedure can be performed under local anaesthesia, with stenting to maintain patency. Despite the fact that it is a straightforward process, the claimed success rate was not encouraging. Partially obstructed patients have a 50% success rate, while completely obstructed patients have a 25% success rate[55].

MATERIALS AND METHODS

AIMS AND OBJECTIVES:

Aims:

- To assess the surgical outcomes of endoscopic dacryocystorhinostomy with and without stent placement.

Objectives:

- To compare the results of performing endonasal dacryocystorhinostomy for primary nasolacrimal duct obstruction with and without stent placement.
- To assess the patency of the lacrimal drainage system after Endoscopic dacryocystorhinostomy .

Design of study:

Randomized controlled trial (RCT)

Duration of study:

12 months

Period of the study:

April 2020 to March 2021

Study centre:

Department of Otorhinolaryngology,

Chengalpattu Medical College& Hospital,

Chengalpattu.

Study population:

Chronic dacryocystitis cases admitted at Chengalpattu Medical College Hospital, Chengalpattu.

Selection criteria:-

Inclusion criteria:

Patients above the age of 18 years diagnosed as chronic dacryocystitis due to primary nasolacrimal duct obstruction.

Exclusion criteria:

- Patients less than 18 years of age
- Cases of congenital dacryocystitis
- Patients with suspected presaccal obstruction canalicular obstruction and punctal stenosis.
- Atrophic sac & failed external DCR.
- Coexisting nasal pathologies which could influence the outcome of the surgery like atrophic rhinitis, chronic granulomatous diseases of the nose, any nasal tumours.

- Post traumatic and post radiation epiphora.
- Immunocompromised patients, uncontrolled systemic diseases.

Methodology:

The study includes 60 individuals of either gender who have symptoms and signs suggestive of chronic dacryocystitis and fulfill the inclusion criteria.

Informed consent is obtained. A thorough examination of the patient is performed, including a detailed history and a complete ocular examination that includes slit lamp biomicroscopy and sac syringing. To rule out any obvious nasal or paranasal causes for the duct obstruction, a thorough clinical examination of the nose and paranasal sinuses is performed.

Routine blood (Hb percent, TC, DC, ESR) and urine examinations, X-ray PNS, CT PNS and diagnostic nasal endoscopy are done.

Systemic evaluation and fitness for the surgery is obtained. Data is collected in the proforma constructed. Detailed discussion with patients done and the patients were randomly divided into two groups A & B. The procedure EnDCR without silicone stenting was done in Group A patients, & group B patients EnDCR with silicone stenting was done. Generally the patients were taken up for surgery under LA.

Patients younger than 18 years were not included in the study.

The procedure

The nasal cavity is packed with 4% xylocaine with 1:1,00,000 adrenaline half an hour before the start of operation. With the help of 0^0 4 mm nasal endoscope, the area of the lateral wall of the nasal cavity like atrium, uncinate process and anterior part of the middle turbinate and adjacent part of the nasal septum are infiltrated with 2% xylocaine with 1:1,00,000 adrenaline.

A curvilinear incision in the shape of a 'C' is made on the lacrimal bone area of the lateral nasal wall using a 15 blade. The 'C' opens posteriorly and the two horizontal limbs are superior and inferior. The upper limb of the incision lies approximately 2 mm above the attachment of middle turbinate. The vertical part lies 2-4mm anterior to the maxillary line and the lower limb curves posteriorly, thus creating a posteriorly based muco periosteal flap.

The flap is elevated with the help of a Freer's elevator and then removed with the help of a straight Blakesley forceps.Now the bone of the lacrimal fossa is exposed.

The frontal process of maxilla is perforated with a Kerrison DCR punch forceps, the starting point of the perforation is at the maxillaryline .Once a small opening is made the frontal process of maxilla bone is removed with the Kerrison's punch. The bony dehiscence will be felt at lacrimal sac area. Pressure is applied

over the sac and the movement of the sac is confirmed by endoscope. The punctum is dilated using punctum dilator.

A lacrimal probe is negotiated through the punctum and endoscopically the sac is confirmed by pressure effect of probe on the sac.

An incision is given in the posteroinferior aspect of the medial wall of the sac with a sickle knife and widened with a 90^0 upturned Blakesley forceps. The size of rhinostome varies between 5mm and 8mm approximately.

Lacrimal syringing is done to ascertain the patency. Then bicanalicular silicone stent is inserted into the sac through both the upper and lower canaliculi and procured intranasally.

Both ends of the silicone are then fastened with several knots in the nasal cavity.

Particular attention is paid to ensure that the silicone stayed loose enough in the region of the inner canthus to prevent canalicular laceration. Nasal packing is done and the pack is removed the next day.

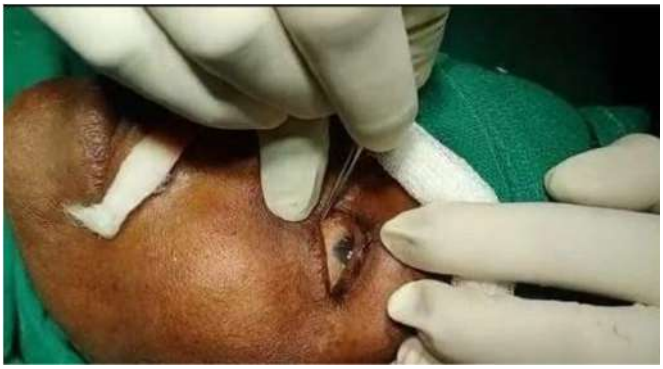


Figure 13-Punctum dilatation

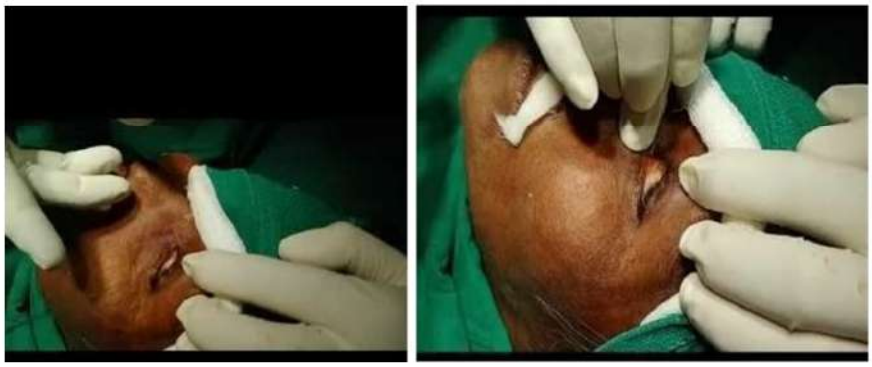


FIGURE 14-LACRIMAL PROBING

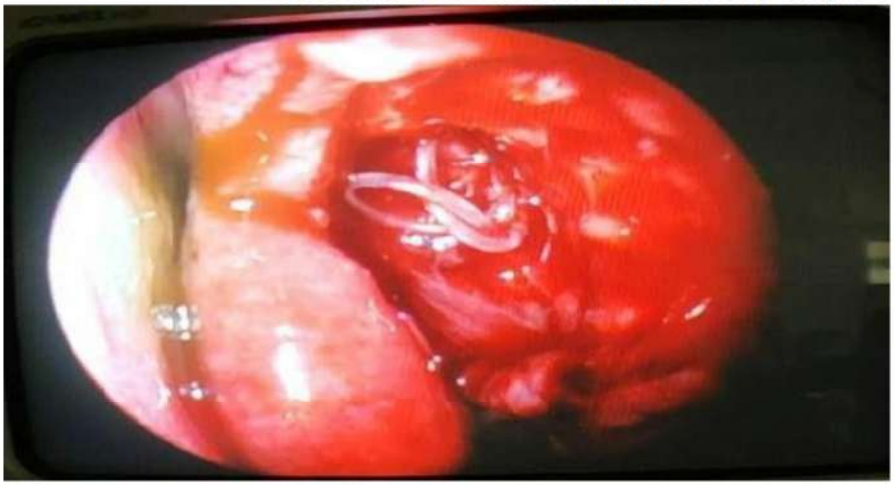


FIGURE 15-SILICONE STENT KNOTTED INTRANASALLY

POST OPERATIVE

The patients are discharged after pack removal and put on oral antibiotics ,anti-inflammatory drugs, nasal decongestants and antibiotic eyedrops.

Regular follow up of the patients is done at 2^{nd}, 3^{rd} ,4^{th} and 6^{th} month postoperatively. Nasal crusts are removed, douching is done during the follow up.The silicone stent is removed at 6^{th} postoperative week. Subjective and objective assessment is done postoperatively and results between the two groups compared. Patients are later reviewed at the end of 6th month.

RESULTS

TABLE 1:AGE DISTRIBUTION

AGE IN YEARS	SURGERY	
	ENDOSCOPIC DCR	ENDOSCOPIC DCR+STENT
24-30	2	6
31-40	7	4
41-50	4	7
51-60	8	6
> 60	9	7
CHI SQUARE TEST		
P VALUE - 0.383		
NON SIGNIFICANT		

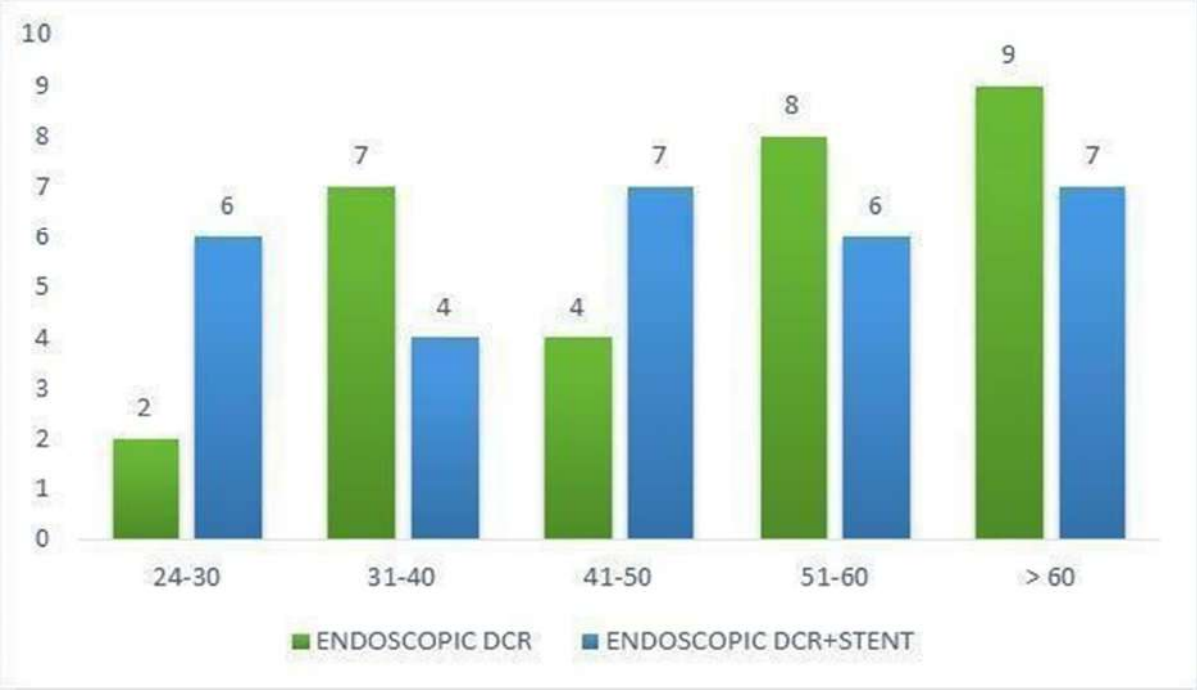


FIG. 16. AGE DISTRIBUTION

In our study of cases age of the patients range from 24 to 84yrs with most of the patients in age group of more than 60yrs(27% N=16, 9 in group A and 7 in group B).The mean age of presentation is 50.51+/-17.12(table 1,figure 16).

SEX INCIDENCE

TABLE 2: SEX INCIDENCE

SEX	SURGERY	
	ENDOSCOPIC DCR	ENDOSCOPIC DCR+STENT
MALE	11	13
FEMALE	19	17
CHI SQUARE TEST		
P VALUE - 0.598		
NON SIGNIFICANT		

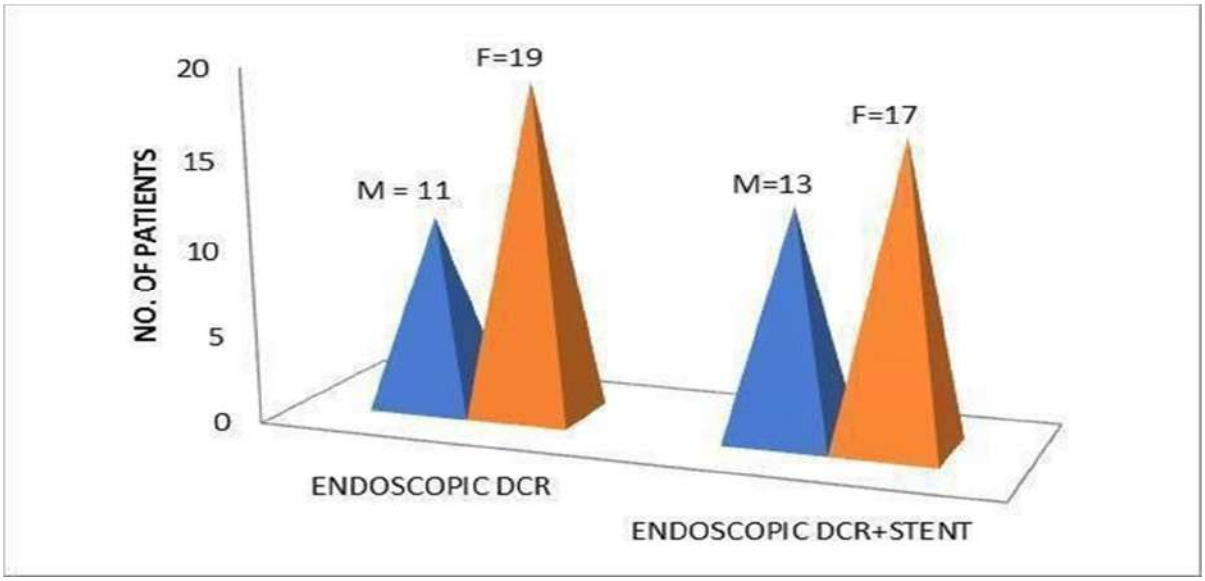


FIGURE 17. SEX INCIDENCE

In our study,

60% of the patients are females(N=36, 19 in group A and 17 in group B) and

40% are males(N=24,11 in group A and 13 in group B (table 2,figure 17).

TABLE 3: LATERALITY

LATERALITY	SURGERY	
	ENDOSCOPIC DCR (GROUP A)	ENDOSCOPIC DCR+STENT (GROUP B)
BILATERAL	1	2
LEFT	16	13
RIGHT	13	15
CHI SQUARE TEST		
P VALUE - 0.675		
NON SIGNIFICANT		

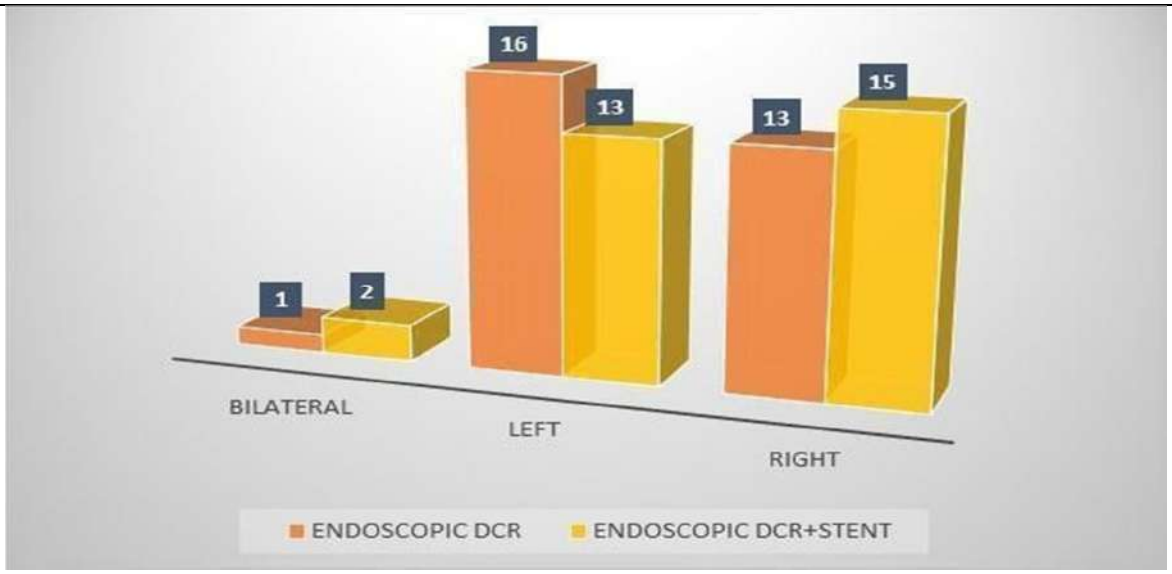


FIG 18.LATERALITY

In our study 48% of the cases presented with disease on left side (N=29, 16 in groupA and 13 in group B), 47% (N=28, 13 in group A and 15 in group B) had disease on the right side and 5% (N=3,1 and 2 in group A and group B respectively) had the disease bilaterally.(table 3,figure 18).

TABLE 4-MODE OF PRESENTATION

DIAGNOSIS	SURGERY	
	ENDOSCOPIC DCR (GROUP A)	ENDOSCOPIC DCR+STENT (GROUP B)
CDC	28	29
CDC+PYOCELE	0	1
CDC+MUCOCELE	2	0

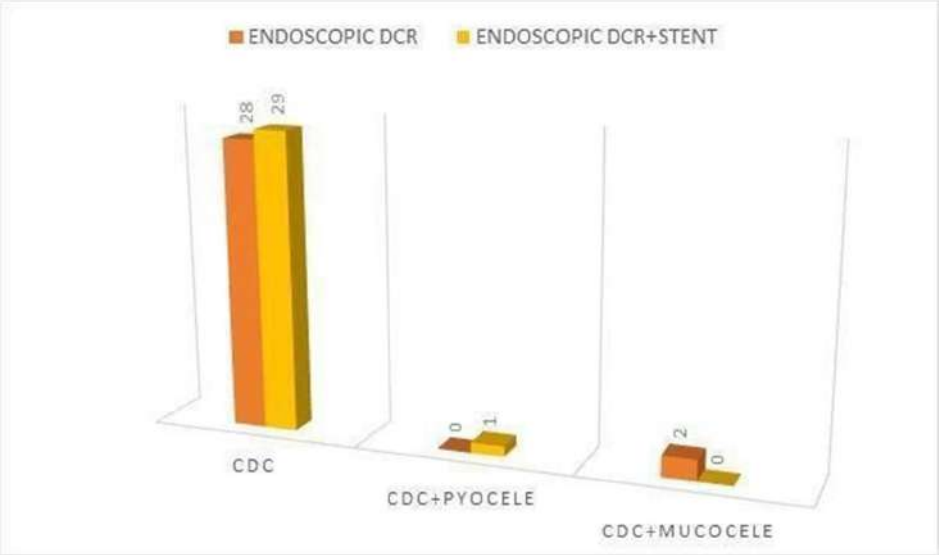


FIG-19: MODE OF PRESENTATION

In our study majority of the patients (95%) presented with chronic dacryocystitis and 3% (N=2 , 2 in group A) presented with mucocele and 1%(N=1 , 1 in group B) presented with pyocele(table 4,figure 19) chi square test p=0.221 , the presence of pyocele or mucocele did not affect the results.

POST OPERATIVE PERIOD FOLLOW UP

SYRINGING RESULTS

TABLE 5: SYRINGING RESULTS AT 6TH MONTH

DIAGNOSIS	SURGERY	
	ENDOSCOPIC DCR (GROUP A)	ENDOSCOPIC DCR+STENT (GROUP B)
CDC	28	29
CDC+PYOCELE	0	1
CDC+MUCOCELE	2	0
CHI SQUARE TEST		
P VALUE - 0.221		
NON SIGNIFICANT		

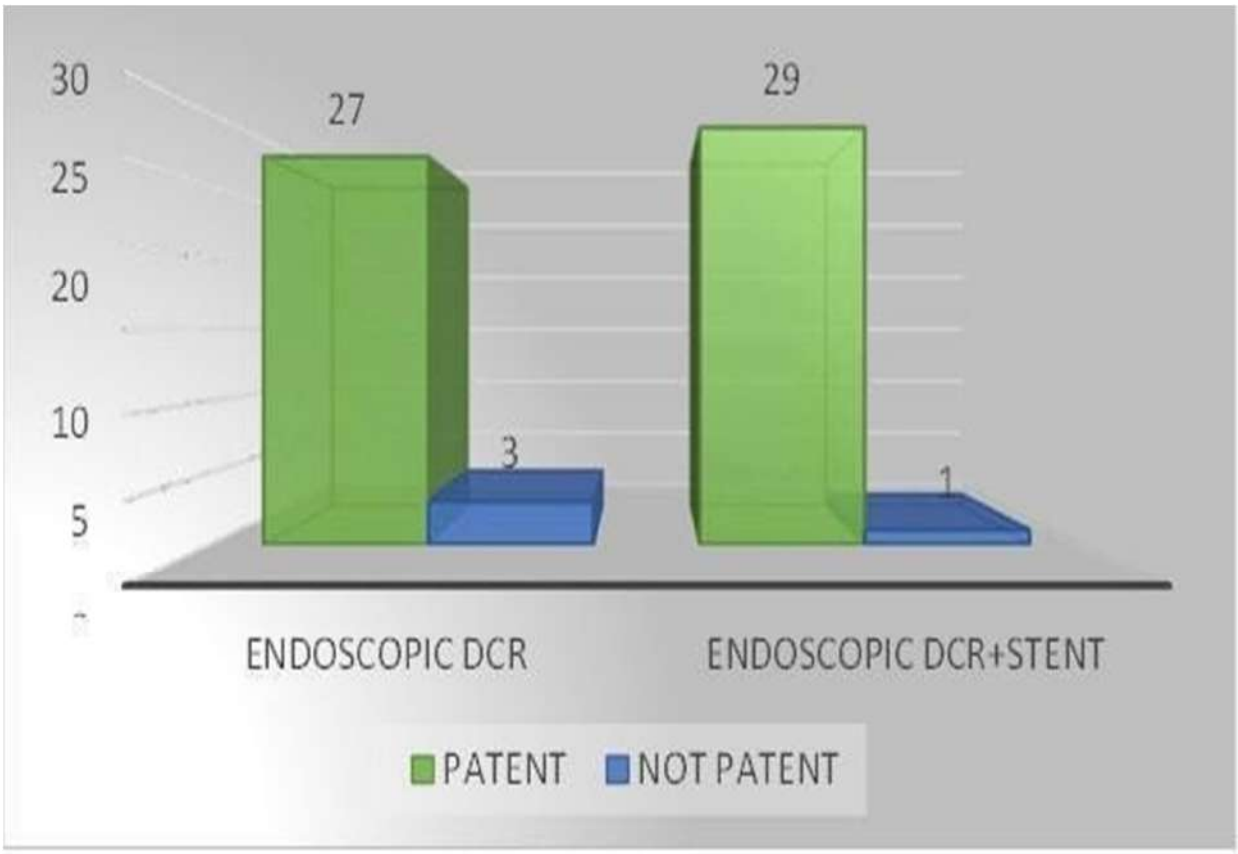


FIG 20- SYRINGING RESULTS

Objective analysis was done by syringing(table 5,figure-20) in our study all the patients who underwent Endo DCR with or without stent followed up 2^{nd},3^{rd},4^{th} and 6^{th} month.

At the end of 6^{th} month syringing in group A was patent 27 and non patent in 3 of cases. In group B syringing patency was seen in 29 and was non patent in 1 of the cases.

At 6^{th} month p=0.301 ,p>0.05. this test for objective analysis between the two groups stastistically stands insignificant.

SUBJECTIVE ASSESSMENT

TABLE 6: SYMPTOMATIC RELIEF

RELIEF AT 6TH MONTH	SURGERY	
	ENDOSCOPIC DCR(GROUP A)	ENDOSCOPIC DCR+STENT(GROUP B)
RELIEVED	28	27
NOT RELIEVED	2	3
CHI SQUARE TEST		
P VALUE - 0.512		
NON SIGNIFICANT		

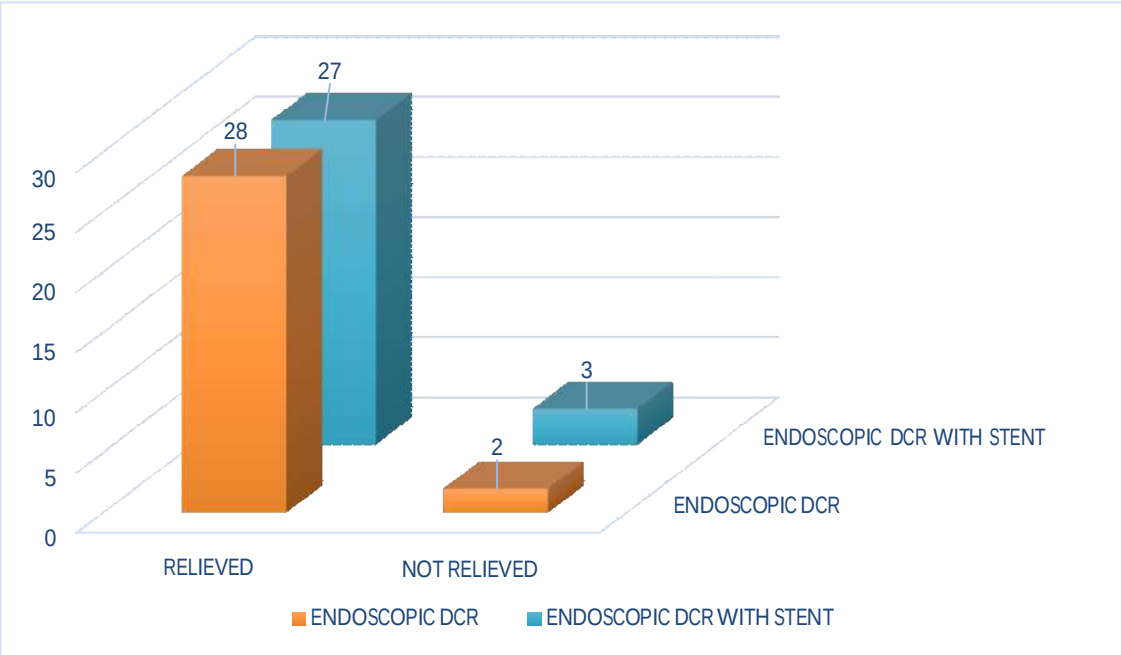


FIGURE 21-SYMPTOMATIC RELIEF

In our study all the patients who underwent Endo DCR with or without stent followed up 2^{nd},3^{rd},4^{th} and 6^{th} month.

At the end of 6^{th} month in group A 28 cases reported complete relief and 2 cases reported no symptom relief. In group B complete relief was reported by 27 cases and 3 cases had no symptoms relief.(table 6,figure -21)

At 6^{th} month $p=0.512$, $p>0.05$. this test for subjective analysis between the two groups statistically stands insignificant.

TABLE 7-RESULT AFTER 6TH MONTH

6TH MONTH	OBJECTIVE ANALYSIS		SUBJECTIVE ANALYSIS	
	PATENT	NOT PATENT	RELIEVED	NOT RELEIVED
ENDOSCOPIC DCR	27(90%)	3(10%)	28(93%)	2(7%)
ENDOSCOPIC DCR+STENT	29(97%)	1(3%)	27(90%)	3(10%)

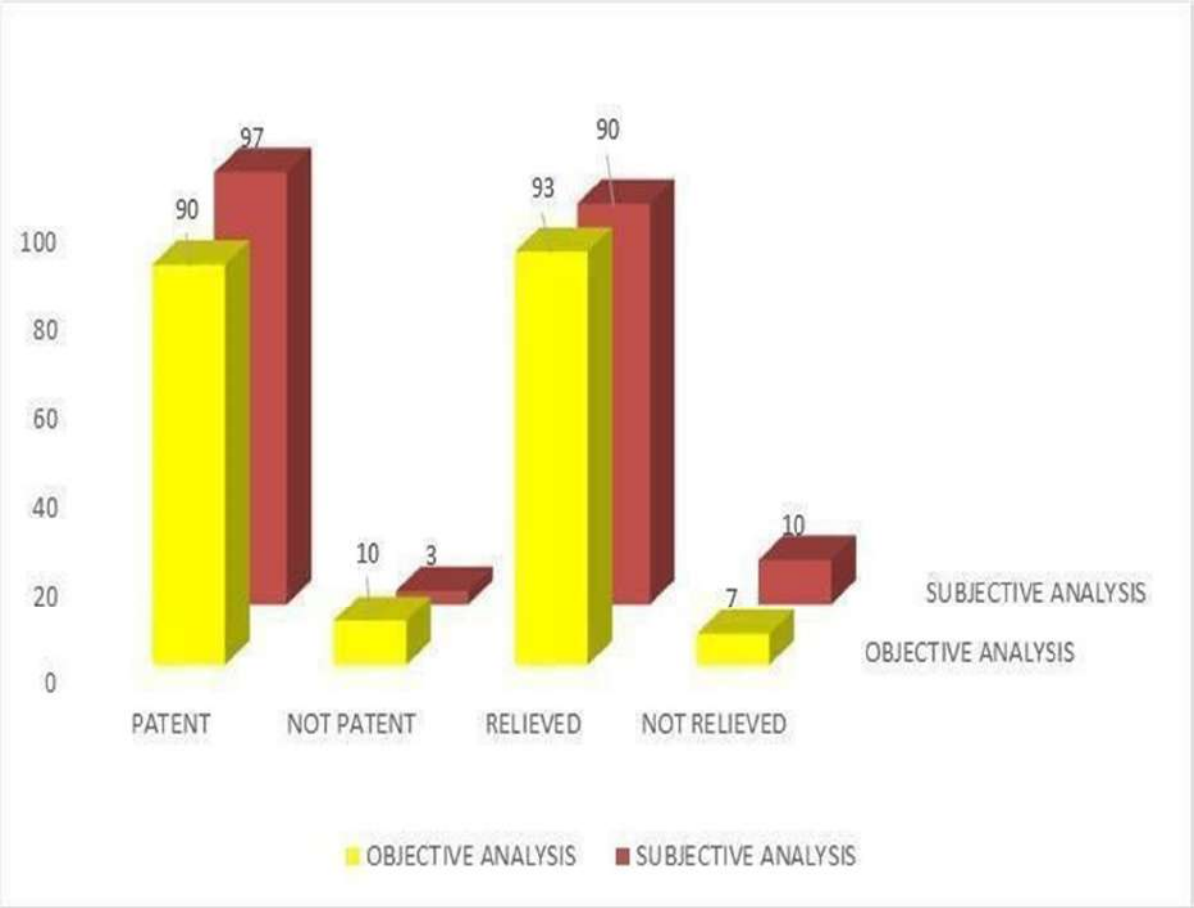


FIG -22.RESULT AFTER 6TH MONTH

The overall success results at six month (table 7, figure 22) in group A without stenting is objective analysis 90% and that in group B with stenting is 93%, p=0.301 is statistically not significant. One patient with failure in group B had granulation tissue around the stent and in one patient there was closure of the rhinostomal opening. In group A closure of the rhinostomal opening was seen in two cases which led to failure and in another patient there was fibrosis at the rhinostomal opening which led to failure.

COMPLICATIONS

TABLE 8: COMPLICATIONS

COMPLICATIONS	SURGERY	
	ENDOSCOPIC DCR	ENDOSCOPIC DCR+STENT
GRANULATION	0	1
IRRITATION	0	2
SYNECHIAE	2	1
RHINOSTOMAL CLOSURE	3	1
NONE	25	25
CHI SQUARE TEST		
P VALUE - 0.363		
NON SIGNIFICANT		

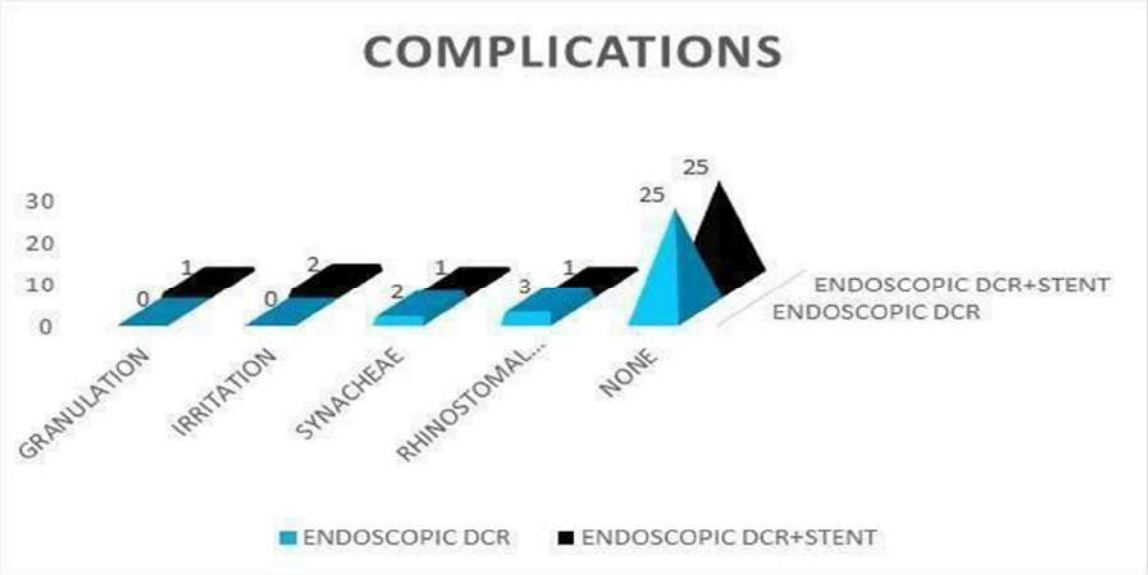


FIGURE 23-COMPLICATIONS

There was no major surgical complications (table 8, figure-23) such as orbital injury or diplopia. Granulation was observed in 1 case of group B and none in group A. Irritation was reported by 2 cases of group B. No patient in group A reported by irritation. Synechiae was seen in 2 cases of group A and 1 case of group B. Closure of the rhinostoma was seen in 3 cases of group A and 1 case of group B. The silicone stenting material did not cause either punctal stenosis or canalicular laceration in any of the cases.

DISCUSSION

In our present study of 60 cases of chronic dacryocystitis, EnDCR without silicone stenting was performed in 50% of randomly selected patients (GROUP A), and with stenting in the remaining 50% of cases (GROUP B). The purpose of our study is to compare the results of EnDCR with and without silicone stenting.

Age incidence

Most of the patients in our study are in the age group of 50-70 yrs.

H.Basil Jacobs (1959) in his study found the maximum incidence of this condition between 40-55 years of age[1]. Sarda et al (1961) noted maximum incidence of chronic dacryocystitis in the third and fourth decade of life [48].

R.Dalgleish (1967)stated that 35-40 years was the earliest expected age of onset ofacquired idiopathic nasolacrimal duct obstruction[50].

Saxena R.C. and Garg (1969) quoted a maximum age incidence in the fourth decade, which was similar to that quoted by S.R.K. Mallik, A.K.Gupta et alin 1969.

Our results were similar to those quoted by most authors. Duke Elder

states that the disease preferentially affects adults over middle age, being relatively rare in children and adolescents. The highest incidence quoted by him was in the 4th decade of life

Sex incidence

In our study the disease is seen predominantly in the females (60%)

Duke Elder states that while the disease in the newborn affects both the sexes equally, its occurrence among adults is in the ratio of 75-80% females to25-30% males[49].

H.Basil Jacobs (1959) found a female to male ratio of 3:1 in his series of patients. He claimed that females were more affected by chronic dacryocystitis as they had a higher vascular congestive factor and a narrower bony canal[1].

R.Dalgleish(1967)[50] reported a percentage of 54% amongst females. Saxena R.C. (1969) has an incidence of 84.6%, Mallik, Chatterjee et al (1970) of 71.2%,Nahata of 92% and Sangha S.S. (1979) an incidence of 75% amongst females. Chronic dacryocystitis is observed to be common in women of low socio- economic group due to their bad personal habits, long duration of exposure to smoke in kitchen and dust in external environment. Other possible cause could be congenital anatomical narrowing of nasolacrimal drainage system in females as compared to males.

Laterality

In our study of 60 cases 48% had left sided disease, 47% had right sided disease & 5% had bilateral disease, hence showing that left side is more affected than the right side. It is observed that nasolacrimal duct and lacrimal sac formed a greater angle on right side than left side. It increases the chance of stasis and obstruction of nasolacrimal duct and lacrimal sac on left side. It is, therefore, attributed as the cause for preponderance of chronic dacryosystitis on left side(Arisi 1960).

H.Basil Jacobs (1959)[1] in his study found that right side was affected 53 times and the left side 37 times in 90 unilateral cases and only 14 cases were bilateral.

Dalgleish (1967)[50] stated that there was no significant difference in right sided and left sided affection, and that the incidence of bilaterality increases with age. Mallik, Chatterjee et al (1970) reported an increase in left sided blocks (55.8%). Nahata in his series of 30 patients, found that 20 (66.6%) patients had left sided blocks.

Stallard (1973) quoted that left side is more affected than the right side. In general the disease has no predilection to any side as it may affect both the sides equally.

Results of our study in comparison with others

Author	Procedure	Result %
Weiden Becker [2] (1994)	En DCR with stent	95
Zhou[52] (1996)	En DCR with stent	93.70
Yung & Hardman[53] (1998)	Inferior En DCR with stent	90
Sprekelson[11] (1996)	En DCR	96
Maier & Schmidt[17] (2000)	En DCR with stent	90
Bambule&Chamero[14] (2001)	En DCR with stent	91.7
Bruno Fayet[47] (2002)	En DCR with stent	86
Peter J. Wormald[15] (2002)	Powered En DCR with stent	95.7
S. Mortimore[58] (1999)	En DCR without stent	87
Sundus aslan 2009[51]	En DCR with prolene stent	92.9%
Present study	En DCR with silicone stenting Without stenting	97% 90%

In our study the success rate of En DCR with silicone stenting is 97%.

Complete symptomatic relief was seen in 27(92%) cases, & 3(8%) reported no symptomatic relief.

Sundus aslan 2009[51] in their study of 42 eyes with silicone stent reported a success rate of 92.9%. They reported that the results were very good in 81%, as good in 11.9% and no change in 7.1%. which is similar to our results with siliconestenting.

Many variations of endoscopic dacryocystorhinostomy with little modifications like the use of stents, laser and mitomycin-C have been described in the last decade, with equally good results.

The purpose of using a silicone stent is to maintain the opening of the rhinostomy,prevent or correct stenosis of the canaliculi and in cases of poor mucosal flap formation.

In the literature, several other materials have been used to retain the lacrimal aperture following endoscopic DCR. Tamura et al used T- sheet made from a penrose drain tube in seven patients[18]. They reported that the results were very good in four patients(57%), good in two patients (29%), and showed no change in one patient(14%). In another two reports, kishore etal[19]. and Erkan et al[20] used standard otologic T- tubes in endoscopic DCR. Erkan reported that the results were very good in 11 patients(50%), good in five patients(23%), and showed no change in six patients(27%).

Thus the success rate in group B with stent in our study is 97% which is found to correlate well with studies of weidenbacker 1994, Zhou 1996,Yung & Hardman 1998,Bambule & Chamero 2001, PJ Wormland 2002, [2,14,15,52,53]. The procedure was a failure in 3% (N=1) in group B. In one patient with failure in group B, granulation tissue was observed around the stent and in one patient there was closure of the rhinostomal opening.

Cannon et al, in their prospective series of 129 cases, standardized their follow up at 4 weeksand 12 months after surgery and showed that routine intubation is not always required in cases of postsaccal obstruction with patent lacrimal puncti and canaliculi , demonstrating a combined functional and anatomic success rate of 90.7% in EnDCR without stent at 12 months followup.

A metanalysis of primary dacryocystorhinostomy with and without stent placement by feng etal revealed that there was no significant difference in the success
rate between EnDCR with and without stent intubation groups

The success rate in group A without stent is 90%. 28 patients reported a complete

symptom relief and 2 cases reported no relief in the symptoms. Review of literature shows 82 to 95% success rate with EnDCR.[15,56,57,58]. The procedure was a failure in 10%(N=3) cases. Closure of the rhinostomal opening was seen in two cases which led to failure and in another patient there was fibrosis at the rhinostomal opening which led to failure. In our study there was no statistically significant difference found between the surgical out comes in the two groups (p=0.301).

In the present study, patients are assessed subjectively and objectively at 6th months. Evaluation of postoperative results involves subjective improvement of epiphora(Sperkelsen 1996) [11]. Some (Metson R 1990, Mauriello J 1999) [12, 54]however, used objective methods to monitor patients. Durvasula VSP (2004) has found no need to assessthe patients objectively on a longterm basis once the patency of the stoma was observed at six month [55].

During our study no major complications were observed. There was no major surgical complications such as orbital injury or diplopia. Granulation was observed in 1 case of group B and none in group B. Irritation was reported by 2 cases of group B. No patient in group A reported by irritation. Synechiae was seen in 2 cases of group A and 1 case of group B. Closure of the rhinostoma was seen in 3cases of group A and 1 case of group B. The silicone stenting material did not cause either punctal stenosis or canalicular laceration in any of the cases. Hence silicone can be efficiently used as a stenting material in En DCR.

SUMMARY

In the present study, we compared the results of En DCR based on subjective and objective analysis with and without silicone stenting in 60 cases of chronic dacryocystitis where silicone material was used as stent in 50% of the randomly divided cases. Based on the available data and from literature, we conclude that:

- Maximum number of cases (27%) of chronic dacryocystitis belong to the fifth decade of life.
- Chronic dacryocystitis affected females (60%) more than the males.
- Chronic dacryocystitis affects both sides equally, but there is a slight higher percentage of affection towards the left side (48%).
- Epiphora was the major presenting complaint followed by associated swelling and irritation.
- Endoscopic DCR is a minimally invasive surgery as it is a direct approach to the lacrimal sac and no other structure is to be dissected.
- It can be performed in cases of mucocele and pyocele which are contraindicated for external DCR.
- Silicone can be safely used as a stenting material in primary cases with lacrimal sac or nasolacrimal duct obstruction. The success rate in our study with silicone as stent is 97% and that without stenting is 90%.
- Complete symptomatic relief was reported by 93% of cases in group A and 90 % in group B.

LIMITATIONS OF THE STUDY

- Because of the corona outbreak, there was decrease in the patientsdiagnosed with chronic Dacryocystitis visiting OPD. Hence the

  sample might not reflect the actual scenario.

- Involvement of multiple surgeons.
- Patency only checked by syringing not depends on the neo ostium size.

CONCLUSION

A comparative study of En DCR with and without silicone stenting is done in 60 cases of chronic dacryocystitis where silicone was used as a stenting material in 50% of the randomly divided cases. This study was done at Chengalpattu Medical College Hospital, from April 2020 to March 2021.

- The overall success rate in our study with silicone as stent is 97%(Group B)and that without stenting is 90%(Group A).
- Complete symptomatic relief was reported by 93% of cases in group A and 90% in group B.
- Based on our study and results, to conclude that stenting did not make much difference statistically in the surgical outcomes of the two groups.

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PROFORMA

NAME

AGE/SEX

ADDRESS

IP NO

MODE OF INJURY

PRESENTING COMPLAINTS

EPIPHORA

DISCHARGE

FEVER

NASAL OBSTRUCTION

HEADACHE

OTHER COMPLAINTS

PAST HISTORY

H/O PREVIOUS LACRIMAL SURGERY

SMOKING HISTORY

DRUG/ALCOHOL ABUSE

EXAMINATION

TEMPERATURE

PULSE

BLOOD PRESSURE

CARDIO VASCULAR SYSTEM

RESPIRATORY SYSTEM

ABDOMEN

CENTRAL NERVOUS SYSTEM

LOCAL EXAMINATION:

EYE EXAMINATION: ROPLAS

Whether the Swelling over medial canthus is present or not.

ENT EXAMINATION:

NOSE: External contour:

DORSUM

ALA

COLUMELLA

ANTERIOR RHINOCOPY Right left

SEPTUM

INFERIOR TURBINATE

INFERIOR MEATUS

MIDDLE TURBINATE

MIDDLE MEATUS

POSTERIOR RHINOSCOPY :

COTTLE TEST

COLD SPATULA TEST

COTTON WOOL TEST

PARANASAL SINUS EXAMINATION

EAR: Right Left

Preauricular region

Pinna

Postauricular region

External auditory canal

Tympanic membrane

THROAT:

Oral cavity: Lips

Angle of mouth

Teeth

Tongue

Gums

Retromolar trigone

Hard palate

Oropharynx: Uvula

Soft palate

Anterior pillar

Posterior pillar

Posterior pharyngeal wall

NECK EXAMINATION

SPINE EXAMINATION

.INVESTIGATIONS:

SYRINGING

BLOOD TESTS-

- WBC COUNT
- RANDOM BLOOD SUGAR
- BLEEDING TIME
- CLOTTING TIME

DIAGNOSTIC NASAL ENDOSCOPY

CT-PNS

TREATMENT GIVEN

- ENDOSCOPIC DACRYOCYSTORHINOSTOMY

COMPLICATIONS

- Neo-ostium stenosis
- Reduction in diameter of neo-ostium
- Endonasal scar and obstruction
- Synechiae
- Peristomal granuloma
- Stent dislocation

INFORMED CONSENT FORM

Title of the study : "**COMPARATIVE STUDY OF SURGICAL OUTCOMES IN ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT STENT"**

at Chengalpattu Medical College&Hospital,Chengalpattu.

Name of the participant :

Name of theInvestigator :Dr.M.A.KALAIVANI

Name of the Institution : Chengalpattu Medical College& HospitalDocumentation of the informed consent.

I_____have read the information in this form (or it hasbeen read to me).I was free to ask any questions and they have been answered. I am over years of age and, exercising my free power of choice, hereby give my consent to be included as a participant in I have read and understood this consent form and the information provided to me.

1. I have had the consent document explained to me.
2. I have been explained about the nature of the study.
3. I have been explained about my rights and responsibilities by the investigator.
4. I have been informed the investigator of all the treatments I am taking or have taken in thepast including any native (alternative) treatment.
5. I have been advised about the risks associated with my participation in this study.
6. I agree to cooperate with the investigator and I will inform him/her immediately ifI sufferunusual symptoms.
7. I have not participated in any research study within the past_____.

8. I am aware of the fact that I can opt out of the study at any time without having to give anyreason and this will not affect my future treatment in this hospital.
9. I hereby give permission to the investigators to use the data obtained from me to thesponsors, regulatory authorities, Govt.Agencies, and IEC.
10. I have understood that my identity will be kept confidential at all points of time.
11. I have had my questions answered to my satisfaction.
12. I have decided to take part in the research
13. I am aware that if I have any question during this study, I should contact the Investigator (7397153559).By signing this consent form I attest that the information given in this document has been clearly explained to me and understood by me, I will be given a copy ofthis consent document.

Signature of the Participant Signature of the Investigator

ஒப்புதல் படிவம்

செங்கல்பட்டு அரசு மருத்துவ கல்லூரிமருத்துவமனை காது மூக்கு தொண்டை பிரிவில் **f z eh ig mi lgG** அறுவை சிகிச்சை தொடர்பாக ஆய்வு மேற்கொள்ளப்படுகிறது.இந்த ஆய்வில் பங்குபெற என் முழு மனதுடன் சம்மதிக்கிறேன். இந்த ஆய்வின் தகவல்கள் மற்றும் முழு விவரங்கள் எனக்கு தெரிவிக்கப்பட்டுள்ளது.

1. இந்த ஆய்வின் போது எனக்கு இருக்கும் உரிமைகளும், பொறுப்புகளும் எனக்கு விளக்கப்பட்டுள்ளது.
2. ஆய்வின் தன்மைகள் விளக்கப்பட்டன.
3. இந்த ஆய்வில் பங்கு கொள்ளும்போது ஏற்படும் நன்மை தீமைகளை மருத்துவர் விளக்க நான் புரிந்துகொண்டேன்.
4. நான் இதற்கு ஒப்புக்கொண்டு ஒத்துழைப்பேன் மற்றும் ஏதேனும் வழக்கத்திற்கு மாறான உடல் உபாதைகள் ஏற்படின் உடனடியாக மருத்துவரின் ஆலோசனையையும் , உதவியையும் நாடுவேன்.
5. மேலும் இந்த ஆய்விலிருந்து எப்போது வேண்டுமானாலும் விலகிக் கொள்ள எனக்கு முழு சுதந்திரம் உள்ளது என அறிந்துகொண்டேன். அதனால் என் சிகிச்சை பாதிக்கபடாது என்பதையும் புரிந்துக்கொண்டேன்.
6. எங்கள் அடையாளம் இந்த ஆய்வின் போது பாதுகாக்கப்படும் என்பதையும் அறிந்துகொண்டேன்.
7. நான் இந்த ஆய்வில் பங்குபெற முழு மனதுடன் சம்மதிக்கிறேன்.

8. இந்த ஆய்விற்கு ஒத்துழைத்து , இந்த ஆய்வின் போது ஏதேனும் அறிகுறிகள் தென்பட்டால் உடனடியாக மருத்துவரிடம் (7397153559)தெரிவிப்பேன் என்று சம்மதிக்கிறேன்.

இந்தஆய்வில்ஏதேனும்சந்தேகங்கள்ஏற்பட்டால்உடனடியாக மருத்துவரை (7397153559)இந்ததொலைபேசிமூலம்அணுகுவேன். இந்த படிவத்தில் நான் கையெழுத்துயிடுவதன் மூலம் அதிலுள்ள தகவல்கள் எனக்கு புரியும் வகையில் விளக்கமாகவும் தெளிவாகவும் அதில் தெரிவிக்கப்பட்டிருந்தது.மேலும்இந்தபடிவத்தின் ஒரு பகுதி எனக்கு அளிக்கப்பட்டது .

நோயாளியின் கையொப்பம்

KEY TO MASTER CHART

M	–	Male
F	–	Female
Rt	–	Right
Lt	–	Left
Bl	–	Bilateral
Ep	–	Epiphora
Sw	–	Swelling
I	–	Itching
R	_	Redness
CDC	–	Chronic dacryocystitis
Py	–	Pyocele
Mu	-	Mucocele
En DCR	-	Endoscopic Dacryocystorhinostomy
St	–	Stent
LA	–	Local anaesthesia
GA	–	General anaesthesia
Pt	–	Patent
R	-	Relieved
NR	-	not relieved
St gr	-	stent granuloma

MASTER CHART

NAME	AGE	SEX	LATERALITY	PRESENTING COMPLAINTS	SAC	DIAGNOSIS	SURGERY	ANAESTHESIA	SYRINGING (IN MONTHS)				SYMPOTAMATIC RELIEF(IN MONTHS)				COMPLICATIONS
									2nd	3rd	4th	6th	2nd	3rd	4th	6TH	
SEKAR	54	M	LEFT	Ep+I+R	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
SAVITHRI	27	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
REVATHI	24	F	RIGHT	Ep	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
SHANMUGA PRIYA	55	F	LEFT	Ep+R	NOT Pt	CDC	EnDCR+st	GA	pt	Pt	pt	pt	R	R	R	R	SYNECHIAE
TAMILARASI	24	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
MEENA	46	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
MURUGAN	58	M	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
KUPPUSAMY	46	M	LEFT	Ep	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
CHINNAPPAN	45	M	BILATERAL	Ep+R	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
GOWRI	35	F	RIGHT	Ep+I+R	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	GRANULATION
LAVANYA	27	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
MUTHUMEENAL	60	F	RIGHT	Ep+I+Sw	NOT Pt	CDC + Py	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	IRRITATION
VELU	75	M	LEFT	Ep+R	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
SANTHIYA	29	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
ELLAMMAL	70	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	GA	pt	Pt	pt	pt	R	R	R	R	NONE
KARUPANNASAMY	45	M	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
VEERAPATHIRAN	47	M	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	not pt	not pt	not pt	R	R	R	R	RHINOSTOMAL CLOSURE
LAKSHMI	55	F	LEFT	Ep	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE

KRISHNAMOORTHY	62	M	RIGHT	Ep+R	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
GOKULNATH	28	M	RIGHT	Ep	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
NADHIYA	35	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	IRRITATION
PADAVATTAN	60	M	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
KALI	80	M	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
RENUKA	45	F	RIGHT	Ep	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
NAGAPPAN	67	M	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
PARIMALA	37	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
CHELLAMMAL	70	F	BILATERAL	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
SRINIVASAN	84	M	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	GA	pt	Pt	pt	pt	R	R	R	R	NONE
KUMARI	35	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
VASANTHA	46	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR+st	LA	pt	Pt	pt	pt	R	R	R	R	NONE
SEKAR BABU	36	M	RIGHT	Ep	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	R	R	R	R	SYNECHIAE
VASANTHI	53	F	RIGHT	Ep	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	R	R	R	R	NONE
SOKKAMMAL	70	F	LEFT	Ep+I+R	NOT Pt	CDC	EnDCR	LA	pt	not pt	not pt	not pt	R	NR	NR	NR	RHINOSTOMAL CLOSURE
LAKSHMI	60	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	R	R	R	R	NONE
MUNIYAMMAL	58	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	R	R	R	R	NONE
CHINNA KOZHANTHAI	70	F	RIGHT	Ep	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	R	R	R	R	NONE
VEERARAGAVAN	78	M	LEFT	Ep+R	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	R	R	R	R	NONE
RAJESHWARI	70	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	R	R	R	R	NONE
VASANTHA KUMARI	35	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	Pt	pt	pt	NR	NR	N	NR	NONE
GOPALA KRISHNAN	54	M	LEFT	Ep+R	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
SELVARANI	70	F	RIGHT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
BHARATH	21	M	BILATERAL	Ep	NOT Pt	CDC	EnDCR	GA	pt	pt	pt	pt	R	R	R	R	NONE
PANJA	40	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE

VEERASAMY	67	M	LEFT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
KUPPAMMAL	65	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
SOUNDARAJAN	64	M	LEFT	Ep+I+Sw	NOT Pt	CDC +Mu	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
KALAIVANI	40	F	RIGHT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	NR	N	N	NR	SYNECHIAE
PONNUSAMY	37	M	RIGHT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
PADMAVATHY	24	F	RIGHT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
SUBRAMANIYAM	67	M	LEFT	Ep+R	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
SUNITHA	35	F	LEFT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	not pt	not pt	not pt	R	N	N	NR	RHINOSTOMAL CLOSURE
SUBALAKSHMI	60	F	LEFT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
DEVAGI	48	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
MUNIYANDI	54	M	LEFT	Ep+I+Sw	NOT Pt	CDC +Mu	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
GANESAN	35	M	LEFT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
CHELLAMMAL	55	F	RIGHT	Ep+R	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
JAYALAKSHMI	45	F	RIGHT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
KUPPAMMAL	47	F	RIGHT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	not pt	not pt	not pt	R	N	N	NR	RHINOSTOMAL CLOSURE
CHINNA PAIYAN	55	M	LEFT	Ep+I	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE
ETTIYAMMAL	47	F	LEFT	Ep	NOT Pt	CDC	EnDCR	LA	pt	pt	pt	pt	R	R	R	R	NONE

ETHICAL COMMITTEE CERTIFICATE

INSTITUTIONAL ETHICAL COMMITTEE
CHENGALPATTU MEDICAL COLLEGE, CHENGALPATTU
CDSCO Reg. No: ECR/774/INST/TN/2015

No. IEC-CMC/Approval/5945/2020 Dated: 29.03.2020

Protocol No: CMCH – 19 – PR - 033

Title of Work	:	Comparative study of surgical outcomes in endoscopic dacryocystorhinostomy with and without stent placement
Principal Investigator	:	Dr.Kalaivani.M.A
Designation	:	1st Year PG
Co-Investigators	:	Dr.D.Senthamarai Kannan, MS.,DNB., Associate Professor Department of Otorhinolaryngology Dr.G.Balaji, MS., Professor and HOD Department of Ophthalmology Chengalpattu Medical College Chengalpattu
Department	:	Otorhinolaryngology

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 19.03.2020 at the Medical Education Unit, Chengalpattu Government Medical College, Chengalpattu at 11.00 AM for the IEC - Chengalpattu Medical College members.

The Members of the committee, the Secretary and the Chairperson are pleased to inform you that your proposed project mentioned above is **Approved** in its presented form.

1. You should inform the IEC in case of any changes in study procedure, methodology, sample size investigation, investigator or guide or any other changes.
2. You should not deviate from the area of work for which you had applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reactions, if encountered during from study.
4. You should abide to the rules and regulations of the institution(s).
5. You should complete the work within the specific period and if any extension is required, you should apply for the permission again for extension period.
6. You should submit a copy of the trial work to the ethical committee on completion of the study.

MEMBER SECRETARY
INSTITUTIONAL ETHICAL COMMITTEE
CMCH, CHENGALPATTU

PLAGIARISM CERTIFICATE

Curiginal

Document Information

Analyzed document	KALAIVANI THESIS.docx (D123273015)
Submitted	2021-12-20T19:18:00.0000000
Submitted by	Kalaivani M.A.
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Sources included in the report

W	URL: https://www.aijcr.com/doi/AIJCR/pdf/10.5005/jp-journals-10013-1284 Fetched: 2021-12-20T19:19:14.0530000	2
W	URL: http://article.sapub.org/10.5923.j.otolaryn.20150404.02.html Fetched: 2021-11-15T13:36:51.6830000	9
SA	**thesis.docx** Document thesis.docx (D58560381)	1