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ORIGINAL ARTICLE

PROSPECTIVE RANDOMISED COMPARATIVE STUDY OF EXTERNAL DACRYOCYSTORHINOSTOMY AND ENDOSCOPIC DACRYOCYSTORHINOSTOMY

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ABSTRACT: AIM: To compare the primary success rate of external DCR and endoscopic DCR **MATERIALS AND METHODS:** In a prospective randomized controlled study, 50 cases of lower lacrimal passage obstruction were divided into two groups of 25 each. These two groups were surgically treated. Group I underwent External DCR and Group II underwent Endoscopic DCR after investigation and evaluation as per the predesigned proforma **RESULTS:** 50 cases (14 male, 36 female)of lower nasolacrimal passage obstruction admitted in M. S. Ramaiah Medical College, Bangalore, were operated.25 cases underwent External DCR and 25 cases Endoscopic DCR. The mean age of the patients was 38.86 years (Range 8 to 70 years).In 5 cases (10% of the cases) septoplasty was required. The success was defined by anatomical patency by sac syringing. At the end of follow up of 3 months, the success rate in group I was 92% (23 cases) and in group II was 76% (19 cases). The average surgical duration required was 74.8 minutes in group I and 36.3 minutes in group II. **CONCLUSION:** Both the procedures represent good alternative for the treatment of lower nasolacrimal passage obstruction.

KEYWORDS: Epiphora, Chronic Dacryocystitis, External Dacryocystorhinostomy, Endoscopic Endonasal Dacryocystorhinostomy.

INTRODUCTION: Epiphora is an imperfect drainage of tears through the lacrimal passage[1].The most common cause being chronic dacryocystitis, which manifests as the inflammation of the lacrimal sac and nasolacrimal duct. It causes troublesome and conspicuous symptoms leading to social handicap.

Cardinal symptoms of dacryocystitis are watering and discharge from the eye. This has got little tendency to resolve totally and has to be dealt properly. Otherwise this leads to dangerous complications like panophthalmitis, facial cellulitis, orbital cellulitis and sometimes life threatening conditions like cavernous sinus thrombophlebitis.

The External DCR is the gold standard procedure for the treatment of chronic dacryocystitis till today by which all other newer methods of dacryocystorhinostomy procedures are assessed[2].Since the original description of dacryocystorhinostomy by Toti-1904, with few modifications by Dupuy-Dutemps and Bourguet-1921, [1]it has got relatively high success rate of more than 95% compared to other techniques. This high success rate makes the surgeon to choose External DCR as first option.

With the recent introduction of endoscopes and microscopes, the original procedure of external daryocystorhinostomy with extensive dissection have been questioned by some surgeons which has led to interest in less invasive procedures like endoscopic endonasalda-cryocystorhinostomy.

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In 1989 McDonogh and Meiring[3], were the first to describe the technique of endoscopic intranasal dacryocystorhinostomy. The major advantages being avoidance of cutaneous wound, and limited tissue dissection and co-existing nasal pathology can be dealt simultaneously in the same operation. However complete visualization, removal of lacrimal bone and control of excessive bleeding were the major problems unsolved with endonasal endoscopic dacryocystorhinostomy.

In most of the previously published results till today, the success rates of endonasal endoscopic dacryocystorhinostomy with or without laser have remained lower than that of external dacryocystorhinostomy. The higher primary success rates of external dacryocystorhinostomy is probably due to the creation of a controlled epithelial lined mucosal anastomosis.[4]

This prospective, randomized study compares the success rates of external dacryo-cystorhinostomy and endonasal endoscopic dacryocystorhinostomy in patients operated at M. S. Ramaiah Medical College, Bangalore.

MATERIALS AND METHODS: The study was conducted in Department of Ophthalmology at M. S. Ramaiah Medical College, Bangalore, during August 2013 to August 2014.

Inclusion Criteria:

1) All symptomatic epiphora cases diagnosed as primary acquired nasolacrimal duct obstruction or chronic dacryocystitis.
2) Those who were willing to undergo surgery.

Exclusion Criteria:

1) Epiphora with no signs of lacrimal drainage obstruction on sac syringing.
2) Ectropion/Entropion/lower lid laxity.
3) Canalicular and punctual obstruction.
4) Post traumatic bone deformity.
5) History of radiation therapy.
6) History of sino nasal malignancy and granulomatous conditions.

The study included 50 cases that were diagnosed as nasolacrimal duct obstruction or chronic dacryocystitis and who were fulfilling inclusion criteria during the study period. All cases selected for the study were evaluated in the following manner using preformed proforma. A detailed ocular and systemic history was taken. Patients were examined with particular interest to the lacrimal apparatus and eyelid diseases. A detailed ocular examination was done, anterior rhinological examination and anterior rhinoscopy was done by an Otorhinolaryngologist and was looked for any intranasal pathology like deviated nasal septum and inferior turbinate hypertrophy at the time of examination, they were dealt simultaneously in the same single operation. The patency of lacrimal drainage passages was tested by lacrimal sac syringing using normal saline, Jones dye test (Both primary and secondary) was done. Dacryocystography was performed in selected patients if needed.

The routine blood investigations like complete blood count, bleeding time, clotting time were done along with urine routine. All patients were given a course of antibiotic prior to surgery for 5 days. Method of randomization: Plain envelopes were taken. Plain identical square pieces of white paper were taken. Plain papers were marked “Group I ”Indicating patients undergoing external dacryocystorhinostomy operation. Plain papers were marked “Group II ”Indicating patients

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undergoing endonasal endoscopic dacryocystorhinostomy operation. Papers were put into envelopes, one paper per envelope and envelopes were closed. All envelopes were shuffled. Now the two groups were randomized and patients selected for the study were given Group I for external dacryocystorhinostomy and Group II for endonasal endoscopic dacryocystorhinostomy according to the randomization schedule.

SURGICAL PROCEDURE: External Dacryocystorhinostomy: All external dacryocystorhinostomy operations were performed under local anaesthesia.

After anaesthetizing nasal mucosa with swab sticks dipped in 4% xylocaine with adrenaline, packing of the ipsilteral nasal cavity was done with half meter of roller gauze soaked in 5cc of 4% xylocaine with adrenaline 1:2,00,000.

Under aseptic precautions all patients were given local anaesthesia for the sac region consisting of 3-5cc of 2% xylocaine with adrenaline 1: 2,00,000. Lacrimal and periorbital area were painted with betadine, spirit, and parts were draped.

A curvilinear incision of 1 to 1.5cm in length was made 3-5mm medial to the medial canthus starting 2mm above the level of the medial palpebral ligament.

The orbicularis muscle fibres were separated with artery forceps and then with blunt dissector. Rake retractors inserted into each side of the incision. The lacrimal fascia is incised 1 mm lateral to the anterior lacrimal crest and the bony attachment of the medial canthal ligament was divided with a blunt dissector the sac was separated from the lacrimal fossa.

The periosteum overlying and medial to the anterior lacrimal crest was exposed and elevated with the help of Traquair's periosteal elevator.

Lamina papyraceae, parchment like bone of the posterior half of the lacrimal fossa was fractured with smaller end of the blunt dissector.

With the help of mucoperiosteal elevator, nasal mucosawas stripped from the lacrimal bone to avoid damage to the nasal mucosa.

Bony osteotomy approximately 10-12mm in diameter was created with successive size of citelli'spunch. Oozing of the blood was controlled by packing with ribbon gauze moistened with 2% xylocaine with adrenaline or by suction tip.

After anaesthetizing the eye with 2% xylocaine drops upper punctum was dilated with punctumdilator. Bowman's probe is passed through the upper canaliculus to confirm the position of the common canaliculus and the related parts of the medial sac wall and tenting of the sac wall is noted.

With the help of a Bard Parker 11 number blade, first lacrimal sac and then nasal mucosa were opened in H shaped fashion to form larger anterior a smaller posterior flaps, then Bowman's probe was removed.

In our present study only anterior flaps of nasal mucosa and lacrimal sac were sutured by interrupted sutures of 6/0 vicryl suture material and skin incision was closed with interrupted 6/0 silk.

Antibiotic drops were instilled into the eye, antibiotic ointment was applied to the operated site and dressing was done.

The duration of the surgery was measured from the incision on the skin to the end of the closure of skin incision area by suturing.

Any complications during the surgery were noted.

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Endoscopic Endonasal Dacryocystorhinostomy: Out of 25 cases in this group, 15 cases were operated under local anaesthesia, 10 cases were done under general anaesthesia because of their age group.

Premedication: A combination of 25mg of injection promethazine, 30 mg of injection pentazocine and 0.5 mg of injection atropine intramuscularly in the deltoid or gluteal region was given 30 minutes prior to surgery. Under aseptic precaution, ipsilateral nasal cavity was packed with cotton pieces soaked in 5cc of 4% xylocaine with 1: 2,00,000 adrenaline.

Anaesthesia: After thorough facial betadine scrub, parts were cleaned with spirit and parts were draped. Surgeon was standing on the right side of the patient. Patient's head was tilted 15 degrees upwards and turned to the right of the patient. Nasl pack was removed, 4mm-30 degree Storz Hopkins endoscope was introduced into the nasal cavity and whole of the nasal cavity was visualized. The mucosa of the lateral nasal wall was infiltrated with 2cc of 2% xylocaine with 1:2,00,000 adrenaline just anterior to the uncinate process and anterior to the attachment of the middle turbinate and into the middle turbinate.

Procedure: The 1.5x 2cm piece of mucosa anterior to the uncinate process was either cauterized or peeled off after incision with sickle knife or punched with Kerrison's punch along with the lacrimal bone.

Mucosal membrane was dissected from the bone in posterior direction until base of the uncinate process was reached .Exposed bone behind the ridge was palpated from anterior to posterior with blunt spud or elevator.

At this junction, lacrimal bone, which is papery thin, was removed with sphenoidal punch. In some cases to remove the maxillary portion of the lacrimal fossa that has thick bone, a septal chisel or otologic burr was used.

Occasionally anterior end of the middle turbinate or uncinate process had been removed in order to expose sac area. Lacrimal part of fossa was removed up to the base of uncinate process carefully in posterolateral part, thus about 7x8mm of bone was removed to expose medial wall of the sac completely.

In case of interference from blood or secretion separate suction tip as used.5ml of 4% solution of xylocaine with adrenaline 1:1,00,000 adrenaline soaked rectangular cut cotton pieces used which were squeezed before placing into nasal cavity to attain hemostasis and decongestion of the operative site.

Lacrimal sac was confirmed endoscopically by putting pressure over the lacrimal sac from outside at the medial canthus, bulging of sac was noticed intranasally. If still some doubt aroused about correct identification of the sac, externally eye was anaesthetized with 2% xylocaine drops, upper punctum was dilated with punctumdilator. Bowman's probe was inserted into the superior canaliculus and directed against the medial wall of the lacrimal sac in order to tent it intranasally.

A sickle knife incised the tented mucosa of the sac immediately, and serous or mucopurulent discharge coming out of the sac was noticed. Then with a special right angled true cut forceps or with Blakesly's forceps, inferomedial wall of the sac was removed.

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With the help of suction tip, mucopurulent discharge or blood was removed, then lacrimal sac syringing was done with diluted methylene blue dye from outside by the assistant and free flow of the methylene blue was observed endoscopically.

Medicated nasal packing was done with gauze piece soaked with soframycin ointment.

The duration of the surgery was measured from the time of infiltration on mucosa to the application of medicated nasal packing.

Any complications was during the surgery were noted.

Post-operative Care: All patients were given systemic antibiotics and analgesics for 5 days. Antibiotic eye drops were advised for 6 times daily for 3 days.

Nasal pack was removed after 24 hours in most cases and if required it was kept for 48 hours. In case of group I patients, first dressing was done after 24 hours. Sutures were removed on the fifth day.

In case of group II, after removing nasal packing after 24 hours, patient were advised to instill saline nasal drops, 20 drops 8-10 times daily for 15 days and nasal decongestant drops, 5 drops 3 times a day for 3 days.

Lacrimal sac syringing was done on third postoperative day.

Most of the patients were discharged after 3-5 days of hospitalization and called for regular follow up.

All patients were followed up at 1st week, 4nd week, 6th week and 12th week post operatively.

In every follow up, patients were asked using a questionnaire, about the presence or absence of discharge and about watering of the eye. The patency of the lacrimal passage was assessed by sac syringing.

In case of group I incision area was inspected for healthy healing, In case of group II patients anterior rhinoscopy was done in each visit and looked for any crusting, granulation, and secretions were removed.

In some patients who complained of watering and having a block on sac syringing, rhinostomy site was visualized with endoscope, any pathology was accordingly dealt with immediately.

In all patients, at 1st week and at the end of 3 months endoscopic examination was done to check for any crusting, granulation tissue formation and size of ostium.

OBSERVATION AND RESULTS: In the present study, 50 cases comprising 25 cases in the external dacryocystorhinostomy (Group I) and 25 cases in endonasal endoscopic dacryocystorhinostomy (Group II) were involved who underwent corresponding surgery, following were the observations made:

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1. AGE DISTRIBUTION OF THE CASES:

Age in years	Group I No. of Cases (%)	Group II No. of Cases (%)	Total No. of Cases (%)
0-10	-	2(8)	2(4)
11-20	3(12)	3(12)	6(12)
21-30	5(20)	4(16)	9(18)
31-40	7(28)	7(28	14(28)
41-50	8(32)	5(20)	13(26)
51-60	1(4)	3(12)	4(8)
61-70	1(4)	1(4)	2(4)

Table I: Age Distribution

In our study of total 50 patients, the maximum number of patients 14 cases (28%) was in the age group 31-40, followed by 13 cases (26%) in the age group 41-50.In group I, 8 cases (32%) were in the age group of 41-50 and 7 cases (28%) were in age group of 31-40. In group II, 7 cases (28%) were in the age group of 31-40.Inour study, the youngest case was 8 year old and oldest was 70 years old.

2. SEX DISTRIBUTION:

Sex	Group I No. of Cases (%)	Group II No. of Cases (%)	Total No. of Cases (%)
Male	4(16)	10(40)	14(28)
Female	21(84)	15(60)	36(72)

Table II: Sex Distribution

In our study of total cases 50 cases, 36 cases (72%) were females, and 14 cases (28%) were males. In group I, 21 cases (84%) were females and 4 cases (16%) were males. In group II, 15 cases (60%) were females and 10 cases (40%) were males. The sex ratio of male to female being 2.8: 7.2.

3. LATERALITY OF SYMPTOMS:

Laterality	Group I No. of Cases (%)	Group II No. of Cases (%)	Total No. of Cases (%)
Right side	12(48)	12(48)	24(48)
Left side	13(52)	13(52)	26(52)

Table III: Laterality

In our study, total number of cases affected on right side was 24 cases (48%) and on left side were 26 cases (52%). In group I, the number of cases with right side was 12 cases (48%) and on left side was 13 cases (52%) and in group II, the number of cases with right side was 12 cases (48%) and on left side was 13 cases (52%).

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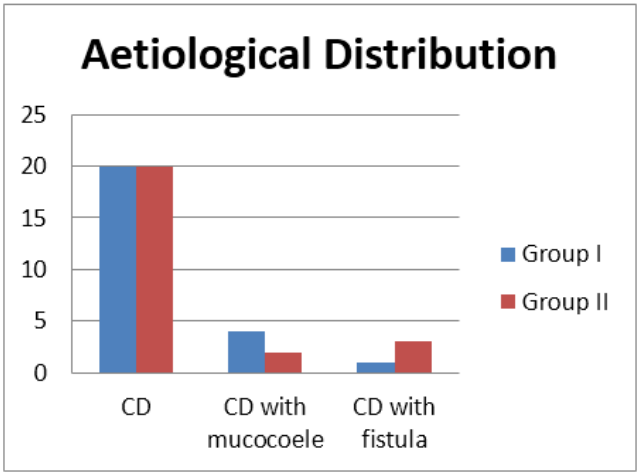
4. AETIOLOGICAL DISTRIBUTION:

Diagnosis	Group I No. of Cases (%)	Group II No. of Cases (%)	Total No. of Cases (%)
Chronic dacryocystitis	20(80)	20(80)	40(80)
Chronic dacryocystitis with mucocele	4(16)	2(8)	6(12)
Chronic dacryocystitis with fistula	1(4)	3(12)	4(8)

Table IV: Aetiological distribution of case

In our study, Chronic dacryocystitis was the most common clinical presentation accounting for 40 cases (80%), 6 cases (12%) were Chronic dacryocystitis with mucocele and 4 cases (8%) presented with Chronic dacryocystitis with fistula.



5. CHIEF CLINICAL FEATURE

Clinical feature	Group I No. of Cases (%)	Group II No. of Cases (%)	Total No. of Cases (%)
Simple epiphora	10(40)	12(28)	22(44)
Simple epiphora with Discharge	9(36)	8(32)	17(34)
Swelling in the sac area	4(16)	2(8)	6(12)
Simple epiphora with fistula	1(4)	3(12)	4(8)
Angular conjunctivitis	1(4)	-	1(2)

Table V: Chief Clinical Feature

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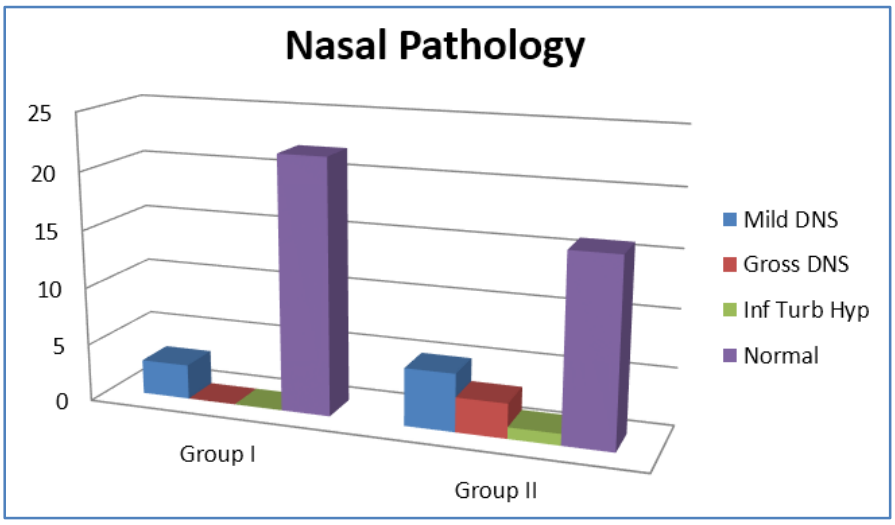
In our study of 50 cases, 22 cases (44%) were having persistent watering of the eye, followed by 17 cases (34%) that had associated discharge with watering, 6 cases (12%) presented with swelling in the sac area and 4 cases (8%) with fistula in the sac area while 1 case (2%) had angular conjunctivitis.

6. NASAL PATHOLOGY:

Nasal Pathology	Group I No. of Cases (%)	Group II No. of Cases (%)	Total No. of Cases (%)
Mild DNS	3(12)	5(20)	8(16)
Gross DNS	-	3(12)	3(6)
Inferior turbinate hypertrophy	-	1(4)	1(2)
Normal	22(88)	16(64)	38(76)

Table VI: Nasal Pathology

In our study of 50 cases, mild deviated naasl septum was present in 8 cases (16%).Gross deviation of nasal septum was seen in 3 cases (6%) in Group II. Inferior turbinate hypertrophy was present in 1 case (4%).All other cases were within normal limits.



7. INTRA OPERATIVE COMPLICATIONS IN GROUP I:

Complication	No. of Cases	Percentage
Moderate bleeding	8	32
Severe bleeding	3	12
Damage to sac	1	4
Damage to nasal mucosa	2	8
Entry into ethmoid air cells	2	8

Table VII: Intra operative complications in group I

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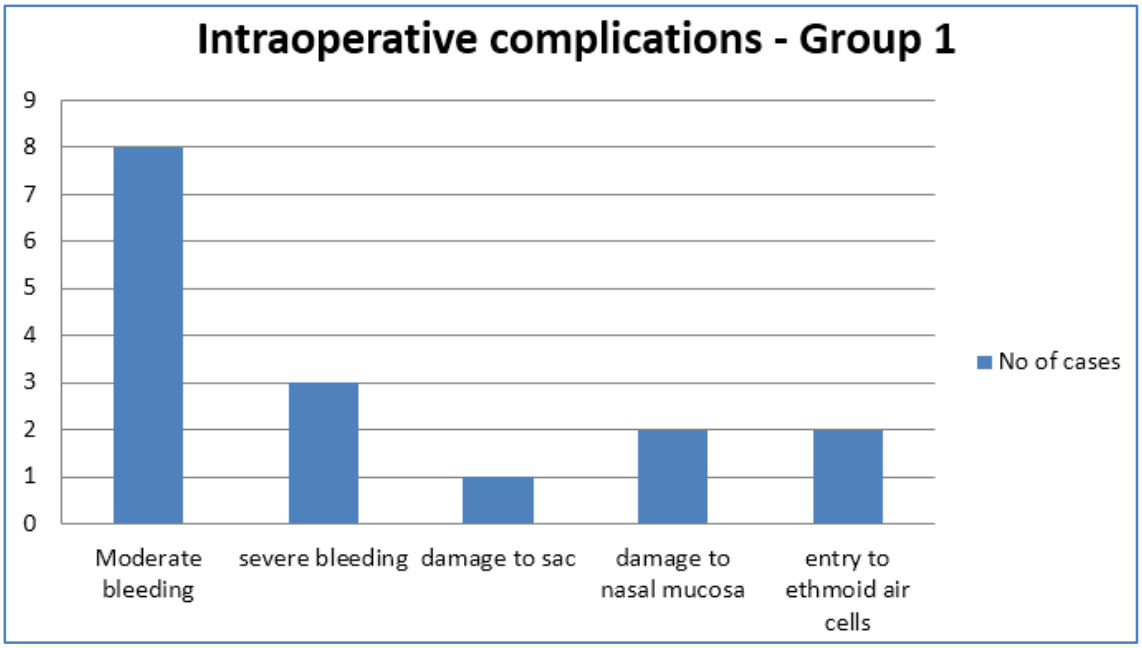
In our study, the most common intra operative complication was bleeding, which was moderate in 8 cases (32%) and was severe in 3 cases (12%). In 1 case (4%) the sac was damaged accidentally while making flaps. In 2 cases (8%) there occurred damage to nasal mucosa, while in 2 cases (8%) accidental entry was made to ethmoidal air cells.



8. INTRA OPERATIVE COMPLICATIONS IN GROUP II:

Complication	No. of cases	Percentage
Moderate bleeding	6	24
Severe bleeding	1	4
Accidental trauma to uncinate process	2	8
Accidental trauma to middle turbinate	2	8
Entry into ethmoid air cells	3	12
Entry to orbital area other than sac	2	8
Resection of middle turbinate	1	4
Creation of false passage	1	4

Table VIII: Intra operative complications in group II

In group II also the most common intra operative complication was bleeding, which was moderate in 6 cases (24%) and was severe in 1 case (4%). In 2 cases (8%) there was accidental trauma to uncinate process, and in 2 cases (8%) middle turbinate was traumatized. In 3 cases (12%) accidental entry was made into the anterior ethmoid air cells. In 2 cases (8%) entry was made in to the orbit area other than the sac. Resection of the middle turbinate was done in 1 case (4%) and false passage was created in 1 case (4%).

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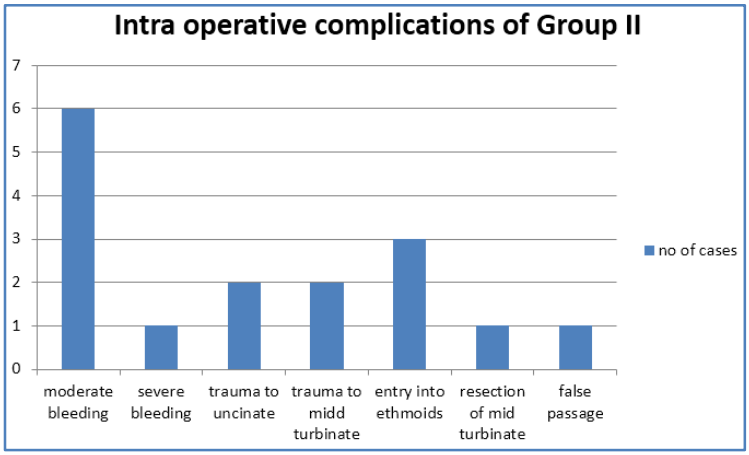


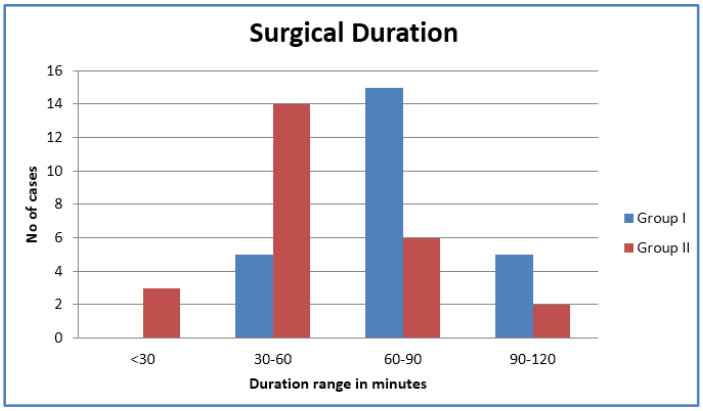
9. SURGICAL DURATION:

Duration in Minutes	Group I No. of Cases (%)	Group II No. of Cases (%)
Up to 30 min	-	3(12)
30-60	5(20)	14(56)
60-90	15(60)	6(24)
90-120	5(20)	2(8)

Table IX: Surgical Duration

In group I, the maximum number of cases were done for the duration of 60-90 minutes. In 15 cases (60%) the surgical duration was between 60-90 minutes followed by 5 cases (20%) which were done within 30-60 minutes and the other 5 cases (20%) between the duration of 90-120 minutes. The mean surgical duration was 74.8 minutes in group I.

In group II, 14 cases (56%) were done between 30-60 minutes followed by 6 cases (24%) with average duration between 60-90 minutes and 3 cases (12%) was with duration period of less than 30 minutes and 2 cases (8%) with an average duration between90-120 minutes. The mean surgical duration was 36.32 minutes in group II.



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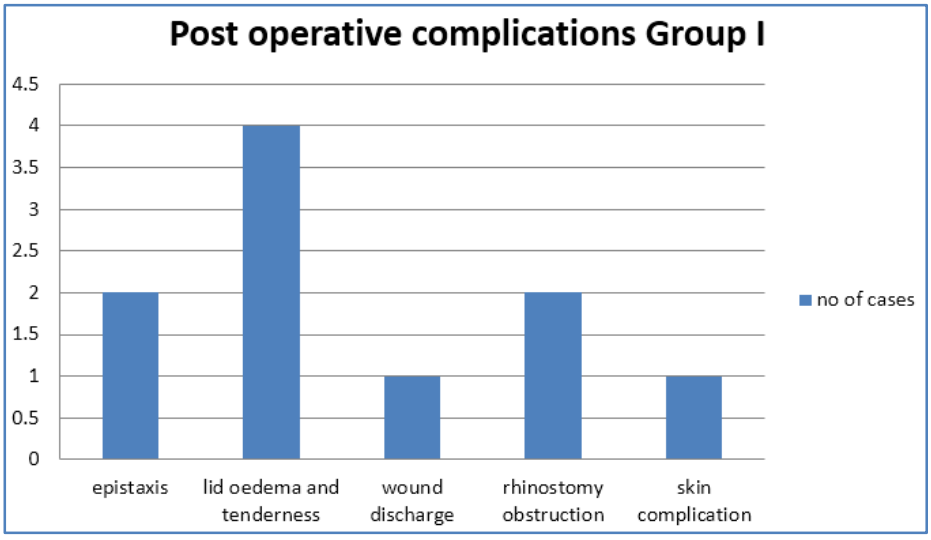
10. POST OPERATIVE COMPLICATIONS IN GROUP I:

Complication	No. of Cases	Percentage
Bleeding per nose	2	8
Lid edema and tenderness	4	16
Discharge at wound site	1	4
Obstruction of rhinostomy site(failure rate)	2	8
Skin complication(excessive pigmentation)	1	4

Table X: Post-operative complications in group I

In this group, bleeding per nose was noted in 2 cases (8%) on 1st post-operative day, lower lid edema and tenderness was present in 4 cases (16%), 1 case(4%) had discharge from the wound next day. After 4th week of follow up, 2 cases (8%) had obstruction of rhinostomy site on endoscopic examination.1 case (4%) had complained of excessive pigmentation at incision site.



11. POST OPERATIVE COMPLICATIONS IN GROUP II:

Complication	No. of cases	Percentage
Bleeding per nose	3	12
Lid edema and tenderness	4	16
Discharge at wound site	1	4
Obstruction of rhinostomy site(failure rate)	4	16
Synechiae formation	3	12

Table XI: Post-operative complications in group II

In this group, bleeding per nose was noted in 3 cases (12%) on 1st post-operative day, lower lid edema and tenderness was present in 4 cases (16%).On follow up, 3 case (12%)had synechiae formation on endoscopic examination. While out of 6 cases failed, in 4 cases (16%) the rhinostomy site was closed. The other 2 cases (8%) there was common canalicular stenosis.

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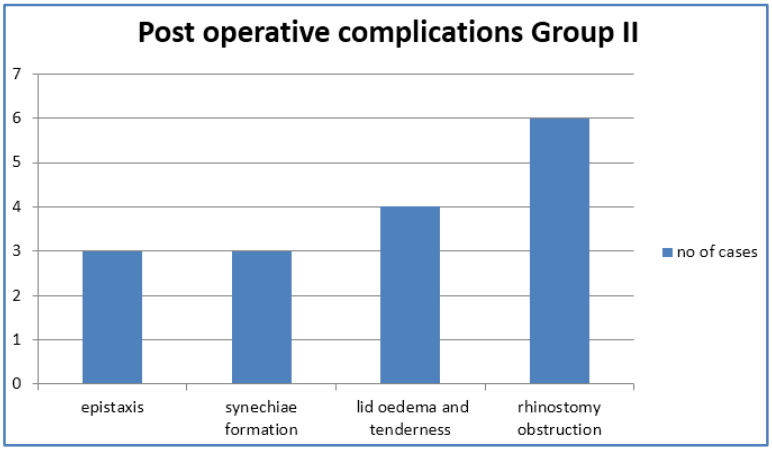

12. POST OPERATIVE EVALUATION BY SAC SYRINGING IN GROUP I:

Duration	1st day	3rd day	1st week	4th week	6th week	12th week
Patent	19	25	25	23	23	23
Percentage	76	92	92	92	92	92

Table XII: Post-operative evaluation by sac syringing in group I

Post-operative evaluation was done by lacrimal sac syringing using normal saline. In most of the cases syringing was done on 1st post-operative day with normal saline and antibiotic solution. In patients who complained of tenderness and bleeding per nose, it was done on 2nd day.19 cases (76%) were patent on first post-operative day, while all cases were patent on third day, but at 4th week follow up only 23 cases (92%) were patent and they remained patent till 3 months.

13. POST OPERATIVE EVALUATION BY SAC SYRINGING IN GROUP II:

Duration	1st day	3rd day	1st week	4th week	6th week	12th week
Patent	17	25	25	20	19	19
Percentage	68	88	76	80	76	76

Table XIII: Post-operative evaluation by sac syringing in group II

In group II sac syringing was possible only in 17 cases (68%) on 1st post-operative day because of tenderness and lid edema. On 3rd day all cases were patent. But after 4th week, only 20 cases were patent on sac syringing and at 6th week 19 case (76%) were patent. This remained patent through the follow up period.

14. SUCCESS RATE FOR GROUP I:

	No. of Cases	Percentage
Success	23	92
Failure	2	8

Table XIV: Success rate for group I

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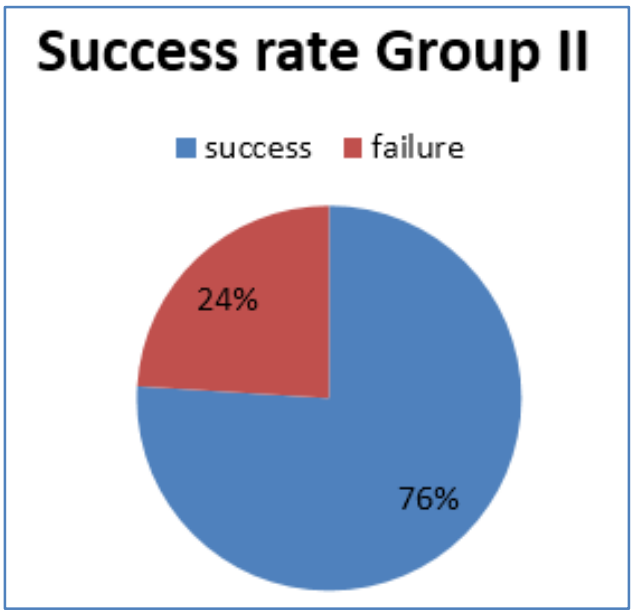
The success was defined by the presence of patent lacrimal passage by lacrimal sac syringing at the end of complete follow up. In our study the success rate for Group I was in 23 cases (92%) and failure was seen in 2 cases (8%).

15. SUCCESS RATE FOR GROUP II:

	No. of Cases	Percentage
Success	19	76
Failure	6	24

Table XV: Success rate for group II

In Group II, the success rate was seen in 19 cases (76%) and failure was seen in 6 cases (24%).



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DISCUSSION: In the present study of "Prospective randomized comparative study of External Dacryocystorhinostomy and Endoscopic Endonasal Dacryocystorhinostomy", 50 cases of lower lacrimal passage obstruction were selected randomly and divided into two groups, Group I- External Dacryocystorhinostomy and Group II- Endoscopic Endonasal Dacryocystorhinostomy.25 cases were submitted for External Dacryocystorhinostomy and 25 were submitted for Endoscopic Endonasal Dacryocystorhinostomy.

AGE DISTRIBUTION: In the present study, 54% of cases were between the age group of 31-50 years. Next common age group operated was 30% between 11-30 years. The average mean age of our study was 38.86 years with average of 41.45 years in Group I and 36.3 years in Group II. Other studies show following mean age distribution.

Study	Group I	Group II
Hartikainen et al[4]	64.8	61.0
Tsirbas et al[5]	59.6	62.9
S. David et al[6]	34.4	41.9
Our study	41.4	36.32

Table XVI: Comparison of age distribution

When compared to other studies, our study subjects mean age group was lower in both the groups. Chronicdacryocystitis is preferentially more common in adults over middle life with peak incidence in 5th decade but also occurs in advanced age.[1]

SEX DISTRIBUTION: In our study there was female preponderance with 36 cases (72%) and 14 cases were males (28%).

Study	Male	Female
Hartikainen et al[4]	13(20.3%)	51(79.7%)
Tsirbas et al[5]	15(30%)	35(70%)
Ben Simon et al[7]	48(33.5%)	95(66.5%)
	14(28%)	36(72%)

Table XVII: Comparison of sex distribution

Our study correlates well with that of the both the above studies in sex distribution, the female preponderance can be attributed to the presence of narrow lumen of the bony canal and a high nasal index.[1]

LATERALITY OF SURGERY: In our study of 50 cases, 24 cases (48%) were operated for right sided obstruction and 26 cases (52%) were operated on left side.

Study	Right	Left
Hartikainen et al[4]	30(45%)	34(55%)
Our study	24(18%)	26(52%)

Table XVIII: Comparison of laterality

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Our study correlated very well with Hartikainenet al[4] study with respect to laterality of surgery, but as such this disease has no special predilection to the laterality as per the available literature.

AETIOLOGICAL DISTRIBUTION: In our study, chronic dacryocystitis was the most common etiology for nasolacrimal duct obstruction, which accounted for 40 cases (80%), followed by chronic dacryocystitis with mucocele in 6 cases (12%) andin 4 cases (8%) patients were having lacrimal fistula.

We observed a good success rate in patients with chronic dacryocystitis when compared to patients with mucocele and lacrimal fistula.

NASAL PATHOLOGY: In our study, the associated nasal pathologies were deviated nasal septum and hypertrophied inferior turbinate.

Mild to moderate amount of DNS were noted in 8 cases (16%) while gross DNS was presented in 3 cases (6%) and in 2 cases (4%) we encountered inferior turbinate hypertrophy.

Out of these patients, Septoplasty was done only in 5 cases (10%) concomitantly in the same procedure combined with endonasal endoscopic dacryocystorhinostomy.

In Tsirbas et al[6] study, 11 cases (22%) out of 50 cases, required septoplasty at the time of surgery.

According to Dipak Ranjan Naik et al,[8] they have done 8 cases of concomitant septoplasty procedure in their study.

INTRA-OPERATIVE COMPLICATIONS: In our study, the major complication in both the Groups was bleeding, which was encountered in 18 cases (36%).

In Group I, it was moderate in 8 cases (32%) and severe in 3 cases (12%).In Group II it was moderate in 6 cases (24%) and severe in 1 case (4%).

But in only 4 cases (8%) which were severe was dealt with ribbon gauze piece soaked in 2% xylocaine with adrenaline after giving pressure for some minutes. The bleeding was encountered mainly while incising nasal mucosa.

Next common complication was entry into the anterior ethmoidal air cells in 5 cases (10%), which was attributed to anatomical variation.

Other minor complications in Group I were damage to lacrimal sac and nasal mucosa.

In Group II, the minor complications encountered were trauma to uncinate process in 1 case, trauma to middle turbinate (2 cases), accidental entry into orbital area other than the sac was made in 2 cases (8%).

“In external dacryocystorhinostomy though majority of operative interventions go well, most of them are complicated by hemorrhage creating exposure difficulty”.[9]

So it is clear from these words that the most common but major complication of dacryocystorhinostomy surgery is bleeding.

Hartikainen et al[4] encountered the ethmoidal sinuses in 7 cases(22%) while doing endoscopic endonasal dacryocystorhinostomy and 6 cases(9%) in external DCR group. When compared to this our study has low incidence of entry into ethmoidal air cells.

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SURGICAL DURATION:

In Group I: The duration of surgery was measured from the incision on the skin to the end of closure of skin incision by suturing.

In Group II: The duration of surgery was measured from the infiltration of anaesthesia on mucosa to the application of medicated nasal packing.

In Group I, the maximum number of cases i.e, 15 cases (60%) were done between the duration periods of 60-90 minutes.

The mean surgical duration in case of External Dacryocystorhinostomy was 74.8 minutes.

In Group II, the majority of cases i.e, 14 cases (56%) required the time between 30-60 minutes.

The mean surgical duration in Endoscopic Endonasal DCR was 36.32 minutes.

The shortest time taken in Group I was 33 minutes and longest was 112 minutes and in Group II, shortest time taken was 27 minutes and longest was 103 minutes.

Study	External DCR	Endoscopic DCR
Hartikainen et al[4]	78 min	23 min
Dolman P.J[10]	34.3 min	18.5min
Our study	74.8 min	36.32 min

Table XIX: Comparison of surgical duration

Our study correlates almost well with Hartikainenet al[4]except for slight more time required in case of endonasal endoscopic DCR. This may be attributed to the associated nasal pathological conditions dealt in the same procedure.

Whereas in Hartikainenet al[4]study they does not mention about intervention of any nasal pathology. Furthermore it has been well documented that one of the disadvantage being relatively steep learning curve of this procedure itself.[9]

The limitation of endonasal endoscopic DCR include the need for sophisticated equipment on the learning curve.[8]

So the higher mean average duration of surgery in endonasal endoscopic DCR was attributed to the learning curve of our many surgeons.

SUCCESS RATE: In our study of 50 cases which were divided into groups of 25 cases each, the success rate in case of Group I was 92% (23 cases), and 2 cases (85) were failure. The success rate in case of Group II was 76% (19 cases) and 6 cases (24%) were failure.

Study	External DCR (%)	Endonasal DCR (%)
Hartikainen et al[4]	91	63
Cokkesser et al[11]	89.8	88.2
Ibrahim et al[12]	82	58
Mirza et al[13]	94	64
Dolman P.J[10]	90.2	89.1
Tsirbas et al[5]	100	93.5
Our study	92	76

Table XX: Comparison of success rate

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Our study correlates with the success rates of Hartikainen et al,[4] Ibrahim et al[12] and Mirza et al.[13] However, when compared to Cokkesser et al,[11] Dolman P. J[10] and Tsirbas et al,[5] our Endoscopic DCR group has a lower success rate.

POST OPERATIVE COMPLICATIONS: In Group I, 2 cases (8%) had bleeding from the nose on the 1st post-operative day and 4 cases (16%) had lower lid oedema and tenderness which resolved without any treatment. Other complications were 1 case (4%) had discharge from wound site, 1 case (4%) and excessive pigmentation at the incision site. In 2 cases (4%) there was obstruction at rhinostomy site on endoscopic examination which was labeled as failures of surgery. In Group II, 3cases (12%) had bleeding per nose on the 1st post-operative day and 2 cases resolved with nasal packing for next 24 hours.

In 2 cases (8%) we noticed synechiae formation at follow up of 4th week on endoscopic examination, this was released in the same sitting.

Other complications were lower lid oedema and tenderness in 4 cases(16%).Out of 6 cases (24%) which have failed, 3 cases (12%) had obstruction of ostium by granulation tissue on post-operative endoscopic examination.1 case(4%) had canalicularstenosis. In other cases, the ostium size was too small and was not patent on sac syringing. Dipak Ranjan Naik et al[10] had 3 cases of synechia formation and two had granulations in the operated area which were successfully treated endoscopically as a office procedure.

POST OPERATIVE FOLLOW UP: All cases were advised to come for follow up after 1st week.4th week, 6th week and 12th week in both groups.

In Group I: All patients completed follow up for 3 months, 2 patients who were having block after 4th week follow up were advised to undergo revision endonasal endoscopic DCR.

At the end of the 12th week, 23 cases (92%) were patent on sac syringing and all were free of watering.

In Group II: All patients were followed up for 3 months;those who were having block on syringing were advised revision surgery.

At the end of 12th week follow up 19 cases (76%) were patent on sac syringing and were free of watering.

CONCLUSION: In the light of these results, we concluded that External DCR had higher success rate than endoscopic endonasal DCR. However, the surgical duration required for the External DCR is significantly longer than the required for endoscopic endonasal DCR. Anendonasal procedure has the advantage of dealing with associated DNS, avoidance of cutaneous scar and preservation of lacrimal pump function. But the disadvantages and limitations include the need for costly and sophisticated equipment, the training in the usage of those instruments and a steep learning curve. Both the surgical procedures have a minimal risk of intra and post-operative complications.

Therefore, after studying our observations and comparing with other studies we concluded that both the procedures represent good alternative for the treatment of lower lacrimal passage obstruction.

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