

A Comparison of Single Flap Versus Double Flap External Dacryocystorhinostomy I Chronic Dacryocystitis Patients.

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ABSTRACT

Background: Purpose: The objective of present study was to compare surgical outcome of single flap and double flap external dacryocystorhinostomy. **Methods:** In this prospective randomized controlled study 70 patients of primary acquired naso-lacrimal duct obstruction and chronic dacryocystitis having complaints of watering with complete nasolacrimal duct obstruction were selected for the study. Cases were divided randomly into two groups A and B. First group (A) underwent only anterior flap anastomosis and second group (B) underwent both anterior and posterior flap anastomosis. The success rate and potential complications were recorded during the follow-up period. **Results:** Out of 70 cases maximum number of patients were between 31 to 40 years of age. Our study showed a female preponderance (M:F, 1: 2.8) and right eye was affected in 44% cases. The main presenting symptoms in our study was epiphora with or without discharge in 93% cases and only 7% cases had swelling over sac area along with or without epiphora. Postoperatively most common complication noted in our study was periorbital ecchymosis and epistaxis. At final follow-up 60 of total 70 patients (85%) had postoperative Munk's score of grade 0 and 1. No statistically significant difference was observed between group A and B in postoperative complications. **Conclusion:** Single anterior flap surgery is a safe, easy to master and effective surgical procedure for relieving epiphora without any significant intraoperative and postoperative complications and hence a good alternative.

Keywords: Dacryocystorhinostomy, Dacryocystitis, Epiphora, Nasolacrimal Duct Obstruction.

INTRODUCTION

The watering eye may be the result of excessive tear production, abnormalities of lid position or movement, lacrimal canalicular pump failure, or obstruction of the outflow tract. Nasolacrimal duct obstruction either primary or secondary is one of the important cause of epiphora, the most common cause being chronic dacryocystitis.^[1]

External DCR was first described by Toti in 1904.^[2] With external dacryocystorhinostomy (DCR), the lacrimal sac is directly incorporated into the lateral wall of the nose, so that the canaliculi drain directly into the nasal cavity.^[3] External Dacryocystorhinostomy (DCR) remains gold standard surgical treatment modality for epiphora due to lacrimal passage obstruction beyond common canaliculus for more than 100 years.^[4] Ohm (1920) was first to advocate anastomosis of nasal mucosa to sac.^[1] In 1921, Dupuy-Dutemps and Bourget supported mucosal anastomosis with suturing of mucosal flaps over periosteum.^[5] Success rate of external dacryocystorhinostomy varies from 82% to 99%.^[6,7]

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MATERIALS AND METHODS

This prospective randomized controlled study was conducted in Department of Ophthalmology, from Institute of Medical Sciences Banaras Hindu University, Varanasi U.P. from June 2011 to May 2013. The study was approved by Institutional Ethical Committee.

All patients attending Ophthalmology outpatient department of Institute of Medical Sciences Banaras Hindu University, Varanasi, presented with symptoms of epiphora with or without discharge or swelling at sac area. Probing and syringing was done in all cases and diagnosed with primary acquired nasolacrimal duct obstruction and chronic dacryocystitis, with or without mucocele, fulfilling the following criteria were included: 1. Adult patients \geq 20 years age. 2. Patients with primary acquired nasolacrimal duct obstruction (PANDO) 3. Patent common canaliculus. 4. Patients with minimum 6 months follow-up. Patients having acute dacryocystitis, secondary acquired nasolacrimal duct obstruction (SANDO), failed DCR, canalicular and punctal occlusion, lower eyelid deformity (entropion, ectropion or lid laxity), nasal mucosa pathology (atrophic rhinitis, lupus etc.), bleeding diathesis and suspected lacrimal sac malignancy were excluded from the study. Patients were divided into two groups: Group A- External DCR with single (anterior) flap anastomosis. Group B- External DCR with double (anterior and posterior) flap anastomosis.

All cases underwent detailed history and thorough examination of each eye, including examination of lacrimal drainage system for swelling, tenderness, fistula, regurgitation test. Lacrimal syringing was done in all cases along with primary and secondary Jones dye test. Anterior rhinoscopy was done to rule out gross nasal pathologies and physician checkup for surgical fitness was obtained in all patients. Pre-operative investigations included complete hemogram, blood sugar, bleeding time, clotting time and prothrombin time. Dacryocystography was done in all cases. Written informed consent was obtained from patients / relatives.

Surgical Protocol

4% xylocaine was instilled in ipsilateral nasal cavity to anaesthetize nasal mucosa. Nasal cavity was packed with xylocaine soaked pack. A curvilinear incision of 10 mm length corresponding to anterior lacrimal crest was deepened through orbicularis muscle, and muscle was separated by blunt dissection to expose anterior lacrimal crest. Cat's paw retractors were inserted into either side of incision and lacrimal fascia was incised 1 mm lateral to anterior lacrimal crest dividing bony attachment of the medial canthal ligament with a blunt dissector. Thereafter, periosteum was dissected from lacrimal fossa by inserting periosteal elevator. Bony ostium was created by removing anterior lacrimal crest down to entrance of nasolacrimal duct. The bony opening was enlarged with Citelli's bone punch up to 10 x 12 mm in diameter, taking care to preserve nasal mucosal membrane intact. The margins of osteotomy were smoothed.

An 'H' shaped incision was made through medial wall of the sac so as to form anterior and posterior flaps of lacrimal sac. The nasal mucosa was incised in a similar fashion along the upper and lower limit of oval opening for its full diameter. In group A patients, posterior flaps of nasal mucosa and the lacrimal sac were excised. Thereafter, anterior mucosal flaps of lacrimal sac and nasal mucosa were sutured with two to three 6-0 vicryl interrupted sutures in both groups A and B while in group B, the posterior flaps were also sutured. The surgical wound was closed in layers. Orbicularis muscle was closed with 6-0 vicryl sutures and the skin incision by interrupted or continuous subcutaneous sutures using 6-0 black braided silk sutures and a firm pressure dressing was done after antibiotic ointment application. Nasal packing was removed.

Postoperatively, all patients were given systemic and topical antibiotic drops and nasal decongestant drops four times a day for one week. First dressing and lacrimal irrigation was done after 24 hours. Skin sutures were removed after 10 days.

Follow-up examination was scheduled on the first and tenth postoperative day and thereafter at 1, 3 and 6 months. At each follow-up visit cases were examined and enquired for any complications, lacrimal irrigation and Munk's score [Table 1] were also

recorded. The surgical success was defined by the anatomical patency of lacrimal drainage system on irrigation at final follow-up. Blocked syringing was considered as surgical failure. Cases with non-patent lacrimal irrigation underwent nasal endoscopy and Dacryocystography to know the level of obstruction. Data were analysed using SPSS 16.0 software. Statistical analysis was done with chi square test and Fischer's exact test. P value < 0.05 was considered significant.

RESULTS

In the present study, 75 cases of primary acquired nasolacrimal duct obstruction with patent common canaliculus were studied, of which 5 cases were lost to follow-up. The remaining 70 patients were randomly divided into 2 groups-

Group A- 35 cases with single flap external DCR

Group B- 35 cases with double flap external DCR

In the present study, 70 cases between 20-60 years of age were included of which, maximum number of patients, 24 (34%) were between 31 to 40 years of age followed by 22 (31%) cases in age group of 41 to 50 years. Mean age of study group was 39.5 years with standard deviation of 9.8 years. Our study showed a female preponderance with 52 (74%) females and 18 (26%) males (Table 2). Right side was affected in 31 (44%) cases while 39 (56%) cases had left side disease. Bilaterality of symptoms was present in only 2 cases and each eye was taken as a different case. [Table 3]

The most common presenting symptom in our study was epiphora with discharge in 41 (58%) cases followed by 25 (35%) cases that had only epiphora. Only 3 (4%) cases had swelling over sac area along with epiphora and remaining 1 (1%) case presented with only swelling over sac area. In present study 66 (95%) cases had chronic dacryocystitis and only 3 (4%) and 1 (1%) case was diagnosed as chronic dacryocystitis with mucocele and encysted mucocele respectively. In our study intraoperative bleeding was present in 5 cases, 4 in group A and 1 in group B, of which 2 patients in group A bled from angular vein and rest 3 bled from nasal mucosa during osteotomy and flap preparation. Nasal mucosa was torn accidentally in 4 cases- 2 in each group. Intraoperatively 1 case in group A had small fibrotic sac. Rest 60 (85%) cases were uneventful. The difference in complications in groups was statistically insignificant ($p=1.0$).

Postoperatively most common complication noted in our study was periorbital ecchymosis (3 in group A and 4 in group B) followed by epistaxis (2 in group A and 3 in group B). No statistically significant difference was observed between group A and B in postoperative complications ($p=0.61$). In group A on first postoperative day 34 cases were patent on lacrimal syringing and one was not patent. This patient with non-patent lacrimal irrigation had small

fibrotic sac. 1 week postoperatively, 3 more patients became non patent and rest 31 cases were patent on syringing. At 4 weeks and 6 months of follow-up, 30 cases were patent on lacrimal irrigation. In group B all cases were patent on syringing on postoperative day 1. One week after, 1 case became non patent which was initially patent. At 4 weeks out of total 35 cases, 32 were patent which continued to be so at final follow-up after 6 months postoperatively. At final follow-up 60 of total 70 patients (85%) had postoperative Munk's score of grade 0 and 1 i.e. showed symptomatic relief of which 29 (82.5%) cases were from group A and 31 (88.5%) were from group B. The difference in Munk's score between both these groups was not significant statistically ($p=0.90$).

Table 1: Munk's scoring criteria

Grades	Munk's scoring criteria
GRADE 0	No epiphora
GRADE 1	Occasional epiphora requiring dabbing < 2 times/day
GRADE 2	Epiphora requiring dabbing 2-4 times / day
GRADE 3	Epiphora requiring dabbing 5-10 times /day
GRADE 4	Epiphora requiring dabbing > 10 times/day
GRADE 5	Constant tearing

Table 2: Age and Gender distribution of cases

Age	Male	Female	Total (%)
20-30 YRS	2	12	14 (20%)
31-40 YRS	7	17	24 (34%)
41-50 YRS	6	16	22 (32%)
51-60 YRS	3	7	10 (14%)
Total	18	52	70

Table 3: Laterality of symptoms

Laterality	Group A	Group B	Total (%)
RIGHT SIDE	12	19	31 (44%)
LEFT SIDE	20	19	39 (56%)

Table 4: Presenting Symptoms

Symptoms	Group A	Group B	Total (%)
Epiphora	10	15	25
Epiphora & discharge	22	19	41
Epiphora & swelling	2	1	3
Swelling	1	0	1

Table 5: Etiological distribution of cases

Diagnosis	Group A	Group B	Total (%)
Chronic DC	34	32	66
Chronic DC & mucocele	2	1	3
Encysted mucocele	1	0	1

DISCUSSION

In present study females (74%) outnumbered males (26%) and male female ratio was 1:2.8 and mean age was 39.5 years with standard deviation of 9.8 years. Our findings are consistent with those of Deka et al who observed mean age of 41 years with 8.4 years standard deviation in their study of which 65% were females and 35% were males.^[6] Similarly Kacaniku et al. Reported mean age of patients to be 44.6 years

with 9.9 years standard deviation, including 71% females and 29% males. The male: female ratio in their study was 1:2.8.^[7] Nasolacrimal duct obstruction is more common in females in fourth and fifth decade. According to Duke Elder, in females, incidence of dacryocystitis is 75% to 80% and 20% to 25% in males.^[1] Jorge et al. states that narrow lacrimal fossa in females predisposes them to obstruction by sloughed off debris, due to hormonal influences that bring about generalized de-epithelisation.^[8]

Table 6: Intraoperative observations

Intraoperative Observations	Group A	Group B	Total
Bleeding	4	1	5
Mucosal tear	2	2	4
Fibrotic sac	1	0	1
Total	7	3	10

Table 7: Postoperative complications

Postoperative Complications	Group A	Group B	Total
Epistaxis	2	3	5
Periorbital Ecchymosis	3	4	7
Postoperative Infection	1	0	1
Canaliculitis	1	0	1
Wound Gap	1	0	1
Suture Granuloma	0	1	1

Table 8: Postoperative lacrimal irrigation in group A

Lacrimal Irrigation	Day 1	Day 7	4 Weeks	6 months	Percentage (%)
Patent	34	31	30	30	85.7
Blocked	1	4	5	5	14.3

Table 9: Postoperative lacrimal irrigation in group B

Lacrimal Irrigation	Day 1	Day 7	4 Weeks	6 months	Percentage (%)
Patent	35	34	32	32	91.4
Blocked	0	1	3	3	8.6

Table 10: Munk's Score

Grades	Group A	Group B	Total (%)
Grade 0	17	21	38 (54.0%)
Grade 1	12	10	22 (31.0%)
Grade 2	2	1	3 (4.5%)
Grade 3	2	1	3 (4.5%)
Grade 4	1	2	3 (4.5%)
Grade 5	1	0	1 (1.5%)
Total	35	35	70

In our study, right eye was affected in 44% cases while 56% cases had left eye disease. Bilaterality of symptoms was rare. This observation is consistent with the study on 35 cases conducted by R Pandey, who reported 18 cases with right sided and 14 with left sided symptoms and only 3 with bilateral symptoms.^[9]

In present study 95% cases had chronic dacryocystitis and only 3 (4%) and 1 (1%) case was diagnosed as chronic dacryocystitis with mucocele and encysted

mucocoele respectively. However in other study by Pandey chronic dacryocystitis accounted for 80% cases, cases of lacrimal fistula and mucocoele being few in number.^[9] Trimarchi et al. stated that all patients in their study were affected by chronic dacryocystitis with epiphora.^[10]

Kacaniku et al. reported intraoperative complications in form of haemorrhage in 3 cases (5.8%) and damage of nasal mucosa in 2 cases (3.8%), and surgery was uneventful in 47 cases (90.4%) in their study which is in accordance with our series.^[7] Saha et al. studied 50 cases undergoing endoscopic DCR and reported bleeding in 5 cases and loss of mucosal flaps in 2 cases.^[11] Similar findings were reported by Moras et al.^[12] There was no statistically significant difference in intraoperative findings between our study and the above mentioned studies. Deka et al. reported 5 cases with postoperative complications in their study, out of which 3 patients had periorbital ecchymosis and remaining two patients complained of mild epistaxis.^[6] Moras et al reported immediate postoperative bleed as the most common complication of endoscopic DCR in their study. There was no statistically significant difference in postoperative complications between above and present study.^[12]

In our series, except for 1 case with fibrotic lacrimal sac which was not patent on day 1, rest of the failed cases had non patent lacrimal irrigation between seventh postoperative day and 4 weeks. Welham et al. proposed inappropriate size or location of ostium (53%), common canalicular obstruction (52%) and scarring within rhinostomy (13%) as important causes of failure of DCR in their study on 208 failed subjects.^[13] Walland et al. studied past history of facial trauma, history of episode of acute dacryocystitis and post-operative infection as significant factor causing DCR failure.^[14]

In our study, after final follow-up of 6 months, favourable surgical outcome as defined by patency on lacrimal irrigation was seen in 88.5% while in 11.5% had surgical failure. In group A it was observed in 85.7% and in group B in 91.4% cases. The difference in the favourable surgical outcome between two groups was found to be statistically insignificant. ($p=0.90$) which is in accordance with several other studies. The difference in success rate could be attributed to difference in size of sample in different studies. However, Welham et al and Kansu et al. have propagated that 'both anterior and posterior mucosal flaps should be sutured', as it increases the probability of primary healing of the mucosal anastomosis and decreases the tendency of primary and secondary haemorrhagic episodes and formation of granulation tissue.^[13,15] Shun-Shun et al. in their study combined the results of a total of 799 cases and showed an overall success rate of 91% for primary external DCR which is in accordance with our series.^[16]

Surgical failure was noted in 14.3% patients of group A and 8.6% of group B patients. Similar findings were

also observed by Walland et al who reported a failure rate for primary surgery as 12%. However, several authors have reported failure rates of 0 to 18%.^[6,17-19] These differences in failure rates can be attributed to many factors including position and size of ostium, common canalicular obstruction, scarring within the anastomosis due to infection or non-absorbable suture, persistent mucocoele and SUMP syndrome.^[13,19]

CONCLUSION

To conclude, the future of lacrimal surgery is changing with the introduction of endoscopes and lasers but external DCR still remains the treatment of choice. The surgical outcomes of both procedures were same in our study. Due to inaccessibility, through a difficult anatomical region and extremely small surgical field, handling of posterior flaps in double flap surgery becomes strenuous. So, for greater surgical maneuverability modification of classical DCR surgery by removing posterior flaps and suturing only the anterior flaps is simple and fast. Single anterior flap surgery is a safe, easy to master and effective surgical procedure for relieving epiphora without any significant intraoperative and postoperative complications and hence a good alternative.

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