

Original article:

Comparison of outcome of external DCR and endonasal DCR surgery among the rural population

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Abstract:

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

Materials and methods: All symptomatic epiphora cases diagnosed for primary acquired nasolacrimal duct obstruction or chronic dacryocystitis. The study included 60 cases that were diagnosed as nasolacrimal duct obstruction or chronic dacryocystitis and who were fulfilling inclusion criteria during the study period.

Results : By applying Chi-square test there is a significant association between intra-operative complications of group A and group B ($p < 0.05$)

By applying Z test of difference between two proportions there is a significant difference between proportions of intra-operative complications such as epistaxis, lid edema, obstruction of rhinostomy site, wound discharge, synechiae, and no complications when group A was compared to group B ($p < 0.05$).

The success rate 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 A was in 26 cases (86.67%) and failure was seen in 4 cases (13.33%). In group B, the success rate was seen in 21 cases (70%) and failure was seen in 9 cases (30%).

Conclusion: In the light of these results, we concluded that External DCR had higher success rate than the endonasal DCR.

Keywords: Endonasal DCR , External DCR

Introduction

The external dacryocystorhinostomy (DCR) is the gold standard procedure for treatment of chronic dacryocystitis till today by which all other newer methods of dacryocystorhinostomy procedures are assessed³. **Addeo Toti¹ (1904)** described a procedure in which a passage for tear flow could be created between the nose and the lacrimal sac by resecting

portions of the lacrimal sac mucosa, bone, and nasal mucosa. A mucosal anastomosis with suturing of mucosal flaps was later described by **Dupuy-Dutemps** and **Bourguet¹ (1921)**. As the technique has developed, so the success rate for the external procedure improved until today in the hands of properly trained oculoplastic surgeons success rate of between 90 to 95% can be expected.

With the recent introduction of endoscopes and microscopes, the original procedure of external dacryocystorhinostomy with extensive dissection have been questioned by some surgeons which has led to interest in less invasive procedures like endonasal endoscopic dacryocystorhinostomy. **Mc Donogh and Meiring²(1989)**, 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, removing of lacrimal bone and control of excessive bleeding were the major problems unsolved with endonasal endoscopic dacryocystorhinostomy.

The future of lacrimal surgery is certainly changing and though external dacryocystorhinostomy still remains the gold standard by which other methods is measured, endonasal dacryocystorhinostomy has been gaining popularity as the preferred procedure over the last few years. With this view present work was planned to compare the outcome of external DCR and endonasal DCR surgery among the rural population

Materials and methods

Inclusion criteria:

All symptomatic epiphora cases diagnosed for primary acquired nasolacrimal duct obstruction or chronic dacryocystitis.

Exclusion criteria:

Following patients were excluded from study

- 1) Canalicular and punctal obstruction
- 2) Failed cases of dacryocystorhinostomy
- 3) Ectropion/ entropion/ lower lid laxity
- 4) Post traumatic bone deformity of lacrimal region

- 5) History of radiation therapy of lacrimal region
- 6) History of sino nasal malignancy and granulomatous conditions
- 7) Atrophic rhinitis

Sample size:

The study included 60 cases that were diagnosed as nasolacrimal duct obstruction or chronic dacryocystitis and who were fulfilling inclusion criteria during the study period.

TECHNIQUE OF EXTERNAL DACRYOCYSTORHINOSTOMY

All external dacryocystorhinostomy operations were performed under local anaesthesia.

Nasal packing:

The nostril on affected side was packed with a roller pack soaked in a mixture of 4% lignocaine and 1 ampoule (2ml) of 1:1000 adrenaline. Packing was done half an hour before surgery.

Anaesthesia:

Under aseptic precautions, all patients were given local anaesthesia in the sac region consisting of 3-5 cc of 2% lignocaine with 1:2,00,000 adrenaline.

Surgery:

Lacrimal and periorbital area were painted with 5% betadine and parts are draped.

A curvilinear incision of 1 to 1.5cm in length was made 3-5 mm medial to the medial canthus starting 2mm above the level of the medial palpebral ligament. The orbicularis muscle fibers were separated with artery forceps and then with blunt dissector. Rake retractors inserted into each side of the incision. The lacrimal fascia is incised 1mm 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 papyracea, parchment like bone of the posterior half of the lacrimal fossa was fractured with smaller end of blunt dissector. With the help of mucoperiosteal elevator, nasal mucosa was 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's punch. Oozing of the blood was controlled by packing with the ribbon gauze moistened with 4% lignocaine with adrenaline or by suction tip. After anesthetizing the eye with 4% lignocaine drops upper punctum was dilated with punctum dilator. Bowman's probe is passed through the upper canaliculus to confirm the position of 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 and smaller posterior flaps and 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.

Any complications during the surgery were noted.

TECHNIQUE OF ENDONASAL DACRY-OCYSTORHINOSTOMY

All endonasal dacryocystorhinostomy operations were performed under general anaesthesia.

Nasal packing:

Under aseptic precautions, ipsilateral nasal cavity was packed with half meter of roller gauze soaked in 4% lignocaine with 1 ampoule (2ml) of 1:1000 adrenaline.

Anaesthesia:

After thorough facial povidone iodine scrub, parts cleaned with spirit and draped.

Surgeon sat on the right side of the patient. Nasal pack was removed. Nasal endoscopy was done with 0 and 30 nasal endoscope and the nasolacrimal area was visualized. The mucosa of the lateral nasal wall was infiltrated with 5cc of 2% lignocaine with 1:2, 00,000 adrenaline at the axilla of the middle turbinate till the mucosal blanching was visualized in the entire nasolacrimal area.

Surgery:

The 1.5x2 cm 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 the 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 was used. 5ml of 4% solution of lignocaine with 1:1, 00,000 adrenaline soaked rectangular cut cotton pieces used which were squeezed before placing into the nasal cavity to attain haemostasis 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 anesthetized with 4% lignocaine drops, upper punctum was dilated with punctum dilator. 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, infero-medial wall of the sac was removed.

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. Nasal packing was done.

Any complications during the surgery were noted.

Observations and results

Table No.1: Post operative complications in Group A and Group B:

Post operative complications	Group A (n=30)	Group B (n=30)
	No. (%)	No. (%)
Epistaxis	3(10%)	4(13.34%)
Lid edema	4(13.34%)	5(16.66%)
Obstruction at rhinostomy site	2(6.66%)	0
Wound discharge	1(3.33%)	0
Synechiaie	0	3(10%)
Nil	20(66.67%)	18(60%)
Total	30	30

Value of $\chi^2 = 17.12$, d.f. = 5, significant, $p < 0.05$

By applying Chi-square test there is a significant association between intra-operative complications of group A and group B ($p < 0.05$)

By applying Z test of difference between two proportions there is a significant difference between proportions of intra-operative complications such as epistaxis, lid edema, obstruction of rhinostomy site,

wound discharge, synechiaie, and no complications when group A was compared to group B ($p < 0.05$).

The success rate 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 A was in 26 cases (86.67%) and failure was seen in 4 cases (13.33%). In group B,

the success rate was seen in 21 cases (70%) and failure was seen in 9 cases (30%).

Table No.2: Comparison of Result in Group A and Group B:

Result	Group A(n=30)	Group B(n=30)
	No. (%)	No. (%)
Success	26 (86.67%)	21 (70%)
Failure	4 (13.33%)	9 (30%)
Total	30	30

By applying Z test, difference between two proportions, there is a highly significant difference between the success rate in Group A and in Group B. (p<0.01)

Discussion:

In our series, the most common intra operative complication was bleeding, which was moderate in 9 cases (30%) and was severe in 4 cases (13.33%).

In 2 cases (6.66%) the sac was damaged accidentally while making flaps.

In 2 cases (6.66%) damage to nasal mucosa occurred.

Group A (external dacryocystorhinostomy):

In group A, 3 cases (10%) had epistaxis on 1st post operative day and 4 cases (13.34%) had lower lid edema and tenderness which were resolved by nasal packing and medical treatment. On follow up, 2 cases (6.66%) had obstruction at rhinostomy site on endoscopic examination by the blood clots. 1 case (3.33%) had developed suture abscess and discharge from the wound. Patient was given antibiotics and anti-inflammatory and the patient responded very well. **Tarbet et al**³ have reported a rate of 2.6% for excessive scarring post operatively and a rate of 3.9% for post operative haemorrhage. In our study, post operative haemorrhage was seen in 7 cases (11.66%) which is higher as compared to the study done by Tarbet et al. **Walland et al**⁴ have reported 1.6%

incidence of infection after open lacrimal surgeries. Our study correlates well with the study done by Walland et al.

Group B (endonasal dacryocystorhinostomy):

In group B, 4 cases (13.34%) had epistaxis on 1st post operative day and 5 cases (16.66%) had lower lid edema and tenderness which were resolved by nasal packing and medical treatment. 3 cases (10%) showed synechiae formation which were detected on nasal endoscopy post operatively. Synechiae was released under endoscopic guidance in the same sitting. No other complication was noticed. Post operatively out of 16 cases **Nayak et al**⁶ had 3 cases (18.75%) of synechiae formation and 2 cases (12.5%) had granulation tissue in the operated area which were successfully treated endoscopically as an office procedure. In our study the number of cases showing synechiae formation post operatively was very low (10%) as compared to this study.

8) Success rate:

In our study the success rate for group A was in 26 cases (86.67%) and failure was seen in 4 cases (13.33%). In group B, the success rate was seen in 21 cases (70%) and failure was seen in 9 cases (30%).

Hartikainen et al⁶ had primary success rate of 91% for external dacryocystorhinostomy and 75% for endonasal dacryocystorhinostomy. Study done by

Cokkesser et al⁷ showed the success rate of 89.9% for external dacryocystorhinostomy and 88.2% for endonasal dacryocysto-rhinostomy. **Ibrahim et al**⁸ in their study had success rate of 82% for external dacryocystorhinostomy and 58% for endonasal dacryocystorhinostomy. **Mirza et al**⁹ in their study had success rate of 94% for external dacryocystorhinostomy and 64% for endonasal dacryocystorhinostomy. Our study correlates well with the other studies.

Group B:

On repeat endoscopic examination, 3 patients (10%) showed obstruction at rhinostomy site by granulation tissue formation and narrow bony ostium. All of them were advised revision endoscopic surgery. Study by **Kuldeep Moras et al**¹⁰ had showed the obstruction at the rhinostomy site in 2 cases (10%). Study by **A Tsirbas** and **P J Wormald**¹¹ had showed scarring of the osteotomy in 5 cases that led to the failure of the surgery. Postoperative scarring at the site of the

rhinostomy is one of the major causes of DCR failure⁴³.

Our study correlates well with the other studies.

6 patients (20%) showed synechiae formation between the lacrimal sac flap and nasal mucosal flap. Ostium could not be visualised. The synechiae were so extensive that probe could not enter the meatus. Study by **Kuldeep Moras et al**¹² had showed the synechiae formation in 1 case (5%). **Passorn Preechawai**¹³ in their study had found that 3 cases (7.1%) out of 42 who had failed results showed fibrosis at the nasal mucosa. Our study correlates well with the other studies. Patients were advised to undergo repeat endonasal dacryocysto-rhinostomy surgery.

Conclusion

In the light of these results, we concluded that External DCR had higher success rate than the endonasal DCR.

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