

A Comparative study of conventional external dacryocystorhinostomy with dacryocystorhinostomy using intracystic implant

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Abstract

Dacryocystitis is a common manifestation in ophthalmology practice. external DCR is the definitive gold standard management. however many modifications in external DCR are proposed now a days, out of which dcr using intracystic implant is one. This study aims at comparing the surgical outcome of external conventional DCR with that of DCR using intracystic implant. After a follow up period of 6 months it was observed that the success rate in conventional DCR is significantly better(97%) than DCR using intracystic implant(85%). However intraoperative blood loss and surgical time is significantly less in DCR using intracystic implant than the conventional external DCR.

Keywords: Dacryocystorhinostomy, Intracystic Implant, Syringing, Nldo –Nasolacrimal Duct Obstruction.

Introduction

Dacryocystitis is a common entity encountered by ophthalmologists in day to day practice. Acute condition is treated conservatively by prescribing oral and topical antibiotics, NSAIDS and hot fomentation. Chronic dacryocystitis needs surgical intervention which may be dacryocystectomy (DCT) or dacryocystorhinostomy (DCR). DCT is a radical kind of surgery in which whole of lacrimal sac is removed so that the patient does not have the pathological sac thus the tear drainage pathway is being interrupted. The patients complain of watering of eyes after surgery for rest of their life. DCR is a procedure where the obstruction in nasolacrimal duct is by passed and a new drainage pathway is made by creating a fistula between lacrimal sac and middle meatus of nose.¹ Lacrimal sac surgery was first performed in dynasty of Babylon in 1800 B.C.² DCR may be performed externally or by endonasal route. External DCR was first performed by Addeo Toti in 1904.^{3,4} External DCR may be done in conventional way or by using various modifications, one such modification is using intracystic implant.

Aims and Objectives

To compare the surgical outcome, surgical time and surgical blood loss in conventional external DCR and DCR using intracystic implant.

Materials and Methods

Study was conducted at BS Medical College And Hospital, Bankura. It is a prospective comparative study done from September 2016 to august 2019.

Inclusion criteria

patients diagnosed as case of chronic dacryocystitis more than 17 years of age as younger patients may need general anaesthesia and in this study all patients were operated under local anaesthesia.

Exclusion criteria

Patients having nasal pathology like atrophic rhinitis, deviated nasal septum and nasal polyps Patients having chronic granulomatous condition of sac like tuberculosis and leprosy Patients having malignancy of lacrimal sac or ocular adenexa.

Methodology

68 cases in 58 patients were included in this study from September 2016 to January 2019. All the selected patients undergone a detailed assessment with standard interview on medical history and ocular examination All the patients were evaluated by syringing to check the patency of lacrimal drainage pathway, blood sugar, blood pressure and bleeding and clotting time, HBsAg, HCV. All the patients were sent to ENT department and were evaluated for any nasal pathology. Patients having deviated nasal septum or nasal polyps were operated for respective pathology.

Patients were divided in 2 groups consisting of 34 cases each randomly in double blinding procedure. 10 patients having bilateral chronic dacryocystitis were operated with conventional procedure in one side and by using intracystic implant on other side.

Surgical procedure

All the patients were explained about the surgical procedure and the possible outcomes. Written consent of all the patients were taken

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Group 1

4% lignocaine drops were instilled in the nasal cavity and nasal packaging was done. 2% lignocaine was locally injected after checking for lignocaine sensitivity. A curvilinear incision of around 15 mm was given 3-5 mm away from the medial canthus starting from the region of medial palpebral ligament. The orbicularis oculi muscle was splitted with a straight scissor. The tissues were retracted with the help of cats paw retractor. Periosteum was dissected and elevated using a periosteum elevator. The anterior lacrimal crest was exposed and lacrimal sac was dissected from lacrimal fossa with the help of sac dissector. With the help of bone punch the cribriform plate was ruptured and a bony ostium of around 15 mm size was made. Lacrimal probe was inserted and a U shaped incision was made in the lacrimal sac and the flap was raised. Similar U shaped full thickness incision was given in the nasal mucosa and a single flap was raised. Trimming of both the flaps was done for appropriate size and the flaps were sutured together with 6,0 vicryl suture. The wound was closed in layers. Pad and bandage was applied. Surgical dressing and nasal pack was removed after 24 hours. Syringing was done at the time of dressing.



Group 2

Anesthesia, skin incision and exposure of sac are carried out exactly as that of conventional DCR. Medial palpebral ligament is not cut. After exposing the sac a vertical 4mm incision is made on anterolateral wall of the sac & cavity is washed with normal saline. Mastoid gauze of 3mm diameter is passed through the opening of sac to perforate the postero-medial wall of sac, lacrimal bone & nasal mucosa to make an entry into middle meatus. The mastoid gauze is passed into NLD when it is planned to keep the implant at that site. The sterilized implant is mounted on introducer & is introduced through the antero-lateral opening of the sac in the nasal cavity negotiating the posterior medial wall of the lacrimal sac & newly made ostium. The wider portion of the implant lies in the cavity of the sac & encored with the sac with 6-0 Vicryl suture. The cavity is irrigated with normal saline. After closing the sac the surgical wound is closed in layers with 6-0 Vicryl.⁵ Intracystic implant used in this study was designed by Dr. Pawar, is made up of silicon elastomer. The lengths of silicon intracystic implant used

in our study was 15 mm, with the inner diameter of 2.5mm & outer of 3mm. The implant has a collar of 2x5x8mm in size with multiple holes at proximal & distal end of 1mm size each.⁵



Postoperatively all the patients were given oral antibiotics and NSAIDs. Nasal decongestants drops of xylometazole was prescribed to all the patients. Syringing was done in all cases on day 1 day 7 and then monthly interval for 6 months. Success rate of the procedure was evaluated by patency of lacrimal drainage pathway on syringing.

Statistical analysis

Data were expressed in simple percentage and proportions.

Observations

In this study 68 cases were divided in 2 groups randomly and 34 cases were allotted in each group by double blinding procedure. 10 patients having bilateral chronic dacryocystitis were operated in one side by conventional DCR and the other side was operated by using intracystic implant.

Group 1 was allotted for conventional DCR

Group 2 was allotted for DCR using intracystic implant

Demographics

Out of these 68 patients, 40 were females and 28 were males. Age varied between 22 and 60 years. Sex wise distribution is shown in Table 1.

Table 1

Age	Females	Males
21-30 years	9(13%)	5(7%)
31-40 years	11(16%)	9(13%)
41-50 years	14(21%)	8(12%)
51-60 years	6(9%)	6(9%)
Total	40(59%)	28(41%)

Average Surgical time

Average time taken for conventional DCR was 31 minutes whereas time taken for intracystic implant technique was 22 minutes which is significantly low. Moreover the surgical procedure is less cumbersome and easy to perform

Table 2

Groups(procedure)	Average time taken in minutes
Group 1(conventional DCR)	31 minutes
Group 2(intracystic implant DCR)	22 minutes

Amount of intraoperative bleeding

Amount of intraoperative bleeding was assessed by counting the number of cotton pellets soaked in blood and by amount of blood collected in the jar of sucker machine at the end of surgery. If blood loss is less than 10 pellets and no sucker machine was used then it was designated as mild. If number of pellets were between 10 – 25 and no sucker machine was used it was named as moderate and if number of pellets were more than 25 and/or sucker machine was used then it was designated as severe. In this study severe bleeding was noted in 12 cases of conventional DCR, moderate bleeding was noted in 22 cases of conventional DCR and 28 patients of intracystic implant whereas mild bleeding was noted in 6 cases of intracystic implant DCR cases. This shows that in conventional DCR amount of blood loss is significantly higher than intracystic implant DCR cases.

Amount of blood loss	Group 1	Group 2
MILD	0(0%)	6(9%)
MODERATE	22(32%)	28(41%)
SEVERE	12(18%)	0(0%)

Day 1 Syringing Findings

On postoperative day 1 surgical dressing was done, nasal packing was removed and lacrimal drainage pathway patency was checked by doing syringing using normal saline. In conventional DCR group all the 34 cases were patent and in intracystic implant group 32 patients had patent lacrimal drainage pathway.

Table 3

Results of syringing	Number of cases in group 1	Number of cases in group 2
Patent	34(100%)	32(94.11%)
Blocked	0(0%)	2(5.89%)

6 Months syringing findings

Patency of lacrimal drainage pathway at the end of 6 months was evaluated by doing syringing with normal saline. In group 1, 33 patients have patent drainage pathway whereas in intracystic implant group 29 patients had patent lacrimal drainage pathway. Out of the 5 cases which were blocked 1 patient gave a history of extrusion of implant through nose which forceful sneezing. 2 cases which were not patent on Day 1 remained blocked at 6 months postoperatively

Table 4

Results of syringing at 6 months	Number of cases in group 1	Number of cases in group 2
Patent	33(97%)	29(85%)
Blocked	1(3%)	5(15%)

Discussion

This study was carried out in a rural area of southern part of West Bengal in a tertiary hospital. All the surgeries were performed by the authors to minimize the inter observer variation in surgical outcome, timing and blood loss. In the

present study 68 cases of chronic dacryocystitis in 58 patients were divided randomly by double blinding method into 2 groups. In group 1 patients were operated by conventional DCR and in group 2 patients were operated by using intracystic implant.

In this study minimum age of the patient was 21 years of age and maximum age of the patient was 60 years. The average age of the study population was 44 years which corresponded to *Saiju et al.*⁶ in which patients of age group between 18-82 years with the average mean age of 41 years.⁶

Demographics in this study shows chronic dacryocystitis is more common among females (59%) that too in middle aged group. Female to male ratio in this study is 1.42 which is similar with the study of Duggal et al⁷ and Zaman et al.⁸

NLDO is more common in middle aged and elderly females. It has been suggested that the menstrual and hormonal fluctuations and a heightened immune status as factors that may contribute to the disease process. These may explain the prevalence in the middle-aged and elderly females. Hormonal changes that bring about a generalized de-epithelisation in the body may cause the same within the lacrimal sac & duct.⁹

An already narrow lacrimal fossa in women predisposes them to obstruction by the sloughed off debris. Axial maxillo-facial CT scans showed women having a smaller bony diameter at the level of lower fossa and middle naso lacrimal duct compared to men. The adult inferior bony fossa increased in size with age in both men and women, while middle naso-lacrimal duct increased in size in men only.⁹

Mean time taken for conventional DCR surgery in this group was 31 minutes and in intracystic implant DCR technique it was 22 minutes which corresponded to Gupta et al,¹⁰ Chaudhari et al¹¹ and Batalia et al⁵. Our experience in this study suggests that conventional DCR is a gold standard surgery which takes slightly more time than intracystic implant technique which is easy to learn, less painful and less time consuming.

Surgical outcome of conventional DCR at the end of 6 months was excellent as 33(97%) cases were having a patent lacrimal drainage pathway. In group 2 i.e using intracystic implant 29(85%) patients have patent lacrimal drainage pathway. In group 2, 1 patient complained of extrusion of silicone implant while forceful sneezing.

Surgical outcome in conventional DCR corresponds to other studies as conducted by Emrah M, Seydi O et al.¹² The less favorable outcome of intracystic implant technique may be due to

1. Clogging of implant with blood or nasal epithelial debris
2. Injury to both walls of sac leading to intrasac fibrosis and intrasac synechia which lead to clogging of proximal part of implant¹³
3. Foreign body reaction and granuloma formation as no material is 100% biocompatible

4. This procedure and implant violates the pressure dynamics of the sac because the sac cannot generate sufficient pressure to drain the resultant lacrimal fluid (<10% of total tear drained through the eye) into the narrow pathway of the implant.¹⁴
5. Extrusion of the implant

In this study bleeding was significantly less in intracystic implant group as compared to conventional DCR procedure, which is self explanatory as the surgical time in conventional group is more and handling of vascular tissue like nasal mucosa for more time leads to more bleeding.

Conclusion

From this comparative study of two procedures of DCR, it is very clear that conventional DCR remains gold standard of surgery for chronic dacryocystitis. although the surgical time, blood loss is less in intracystic implant technique but the patency of lacrimal drainage pathway at the end of 6 months was 85% which was significantly low as compared to conventional DCR(97%).

Further research and modification on implant design, placement guideline is required. more long term and large scale studies are further required to establish a better understanding.

Source of Funding

None.

Conflict of Interest

None.

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