

Endoscopic DCR with or without Stent in a Peripheral Tertiary Care Centre of West Bengal – Our Experience

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ABSTRACT

BACKGROUND

Dacryocystorhinostomy (DCR) operation is the gold standard treatment for management of chronic dacryocystitis due to nasolacrimal duct block. This operation directs the lacrimal flow into the nasal cavity creating an artificial opening made at the level of lacrimal bone, thus obtaining a low-pressure lacrimal bypass system which will relieve epiphora and dacryocystitis. But the commonest reason for failure of this surgery is closure of the rhinostomy (neo-ostium). To overcome this difficulty, silicone tube catheter stent insertion has been advocated. Here in this study, we wanted to compare the success rate of endoscopic DCR with or without silicone tube catheter (STC) stent.

METHODS

This study was a prospective study conducted among 50 patients divided in to two equal groups randomly. One group underwent Endoscopic DCR with silicone tube catheter stent and another group underwent DCR without stent. We compared outcomes of both groups subjectively with five-point scale and objectively examined patency of the stoma by syringing with water postoperatively after 3 months and results were compared.

RESULTS

During subjective evaluation, we used five-point scales to get the grade of epiphora relief. First three grades (grade 1 to grade 3) were considered as success. We got an overall success rate of 92 % in without stent group and we got 88 % success rate in silicone tube catheter stent group.

CONCLUSIONS

Surgical success for Endoscopic DCR surgery encompassed both anatomical patency and symptom relief. We found overall success rate of 92 % in without stent group and 88 % success rate in silicone tube catheter stent group which were closely comparable to other studies. We also found failure due to granulation tissue formation in STC stent group. So the role of stent is yet to be confirmed and further large scale trials are needed.

KEYWORDS

Endoscopic DCR, Silicone Tube Catheter (STC) Stent

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BACKGROUND

Persistent watering from eyes or epiphora may be due to myriad of causes among which one of the most important causes is impaired drainage of the lacrimal system due to nasolacrimal duct (NLD) block. This nasolacrimal duct block can lead to chronic dacryocystitis.

Dacryocystorhinostomy (DCR) operation is the gold standard treatment in the management of chronic dacryocystitis. This operation direct the lacrimal flow into the nasal cavity creating an artificial opening made at the level of lacrimal bone to obtain a low pressure lacrimal bypass system which will relieve epiphora and dacryocystitis.

Dacryocystorhinostomy (DCR) was first described via external approach by Toti¹ and modified by Dupuy Dutemps and Bourguet.² But in the external approach a visible scar sometimes with keloid formation and weakening of orbicularis oculi muscle pump function pose a great disadvantage. This give raises an alternative surgical procedure in the form of primary endoscopic Dacryocystorhinostomy (DCR) Surgery. Mc Donogh and Meiring described the endoscopic transnasal DCR.³ Though DCR by external approach was commonly performed by Ophthalmologists, the development of rigid nasal endoscope for various nasal and paranasal surgery has provided the Otorhinolaryngologist with unprecedented direct view of nasal anatomy, thus performing endoscopic DCR.³

However, the aim of DCR surgery is not only to establish a free passage between the lacrimal sac and the nasal cavity, but also to keep this passage patent because the commonest reason for failure is closure of the artificial neo-ostium. To overcome this difficulty Silicone tube catheter insertion has been advocate which is placed as a loop in the superior and inferior canaliculus into the nose by an endoscope. Here in this study we compare the success rate of endoscopic DCR with or without silicone tube catheter (STC) stent.

METHODS

This randomised prospective comparative observational study was conducted at the Department of ENT and Head Neck Surgery of a peripheral tertiary care centre of West Bengal from May 2016 to May 2019. We included 50 patients as we consider 50 as a landmark in between 10 to 70 years of age. Patients presented to the ophthalmology department of this tertiary care centre with complaints of watering from the eyes and or swelling of the medial canthal region were screened and those who were diagnosed as chronic dacryocystitis with post saccal stenosis by syringing and using probe test (hard stop in probe test) were referred to the ENT department for Endoscopic DCR. Patients were distributed into 2 groups 25 each. For randomisation we place blindly every alternative patient attended our OPD in each group. The first group underwent endoscopic DCR without stent and other 25 underwent endoscopic DCR with silicone tube catheter stent insertion.

Inclusion Criteria

Patients with chronic dacryocystitis with nasolacrimal duct (NLD) block.

Exclusion Criteria

1. All revision cases or failed DCR.
2. Suspicion of malignancy.
3. Post traumatic bony deformity.
4. Any lower lid problem like ectropion, lid laxity or entropion.
5. Common canaliculus block.
6. Atrophic rhinitis.
7. Bony disease affecting the nose and orbit.

Cases selected for the study were subjected to detailed history taking, clinical examination and endoscopic examination to note anatomical deformity of nose and nasal diseases. Ophthalmic examination done by the ophthalmologist. Operative fitness was checked by the anaesthetist.

Operative Procedure

All patients were operated on by same team of surgeons. Endoscopic DCR was performed under local anaesthesia in majority of the cases (46 cases) except 4 cases which were operated under general anaesthesia due to reduced compliance of the patient under local anaesthesia.

0 degree & 30 - degree rigid nasal Hopkins Rod endoscopes were used in this endonasal surgery for visualization. DCR operation was done following standard existing technique in all cases. After achieving routine local decongestion of nasal mucosa and middle turbinate, 4 % topical lignocaine used for surface anaesthesia and 2 % lignocaine with 1 : 100000 of adrenaline used for infiltration anaesthesia at the area of interest. A 1 cm long horizontal incision was made proceed in forward direction starting from the anterior attachment of the middle turbinate using sickle knife and another horizontal incision of same length one cm below the first incision was made proceed forward and both the incision was joined anteriorly. Posterior based flap created using Feer's elevator. Adequate bone removal (using Kerrison punch and drill burr) done to open entire medial wall and anterior wall of the lacrimal sac. A vertical incision made on the anterior wall of the sac with No.11 blade. The entire medial wall of sac and a part of anterior wall of the sac removed to create an ostium of approximately 8 mm in height. Syringing and flushing was done group A with normal saline and free flow was noted endoscopically, but in second group syringing and flushing followed by insertion of STC was done through both puncta. Both ends of STC pulled into nasal cavity and multiple reef knots placed and fixed. The posterior based muco-periosteal flap was divided at the middle part and repositioned it anteriorly to cover raw areas above and below the neo-ostium.

Post-Operative Care

Post-operatively all the patients were discharged on second post-operative day and were called for regular follow-up. Syringing of lacrimal sac were done once a week for first 1 month and then at 3 monthly and 6 monthly intervals post-operatively. Endoscopic clearance of crusts was done at 7th day and then whenever needed. Post-operatively oral antibiotics, antibiotic-steroid eye drops, oral antihistamines and analgesics used for first 10 days. Gentle massage at inner angle of eye and saline nasal wash for next four weeks was advised in all the cases. STC were removed at the end of 3rd month (12 weeks). Clinical and endoscopic data were collected at different post-operative visits and analysed. In addition, information regarding post-operative morbidity and operative time for each surgical procedure was collected. Results are assessed both objectively and subjectively. Subjectively a 5-point scale was used to grade the degree of epiphora relief. Grade 1 symptom free, Grade 2 significant improvement, Grade 3 just improvement, Grade 4 No improvement and Grade 5 is worsening of symptoms. Grade 1 to 3 was considered as success whereas grade 4 and 5 considered as failure. Results were compared between two groups. The objective assessment was done with the help of endoscope at 6 months noting whether the stoma patent or not by lacrimal syringing.

RESULTS

In this study, fifty patients underwent Endoscopic DCR. Stenting was performed in twenty five cases. The observations recorded and statistical analysis was done using Microsoft excel and chi square test was done using online social science statistics software. Observations in this study were described under the following headings.

Age Group	Without STC Stent (Group A)	With STC Stent (Group B)	Total
11 - 20 yrs.	1	0	1 (2 %)
21 - 30 yrs.	4	3	7 (14 %)
31 - 40 yrs.	5	4	9 (18 %)
41 - 50 yrs.	7	9	16 (32 %)
51 - 60 yrs.	6	8	14 (28 %)
61 - 70 yrs.	2	1	3 (6 %)

Table 1. Age Distribution

In our study age ranged from 16 years to 67 years. The youngest patient was 16 years old and the oldest one was 67 years old. Most of the patients 16 (32 %) in our study group were between 41 to 50 years of age.

Type of Surgery	Without STC Stent (Group A)	With STC Stent (Group B)	Total
Right Side	14	13	27 (54 %)
Left Side	11	12	23 (46 %)

Table 2. Laterality

Table 2 shows the laterality of the nasolacrimal duct blockage. Most of the cases 54 % presented with right sided disease 46 % presented with left sided disease.

Sex	Without STC Stent (Group A)	With STC Stent (Group B)	Total
Male	9	12	21 (42 %)
Female	16	13	29 (58 %)
Total	25	25	

Table 3. Sex Distribution

In the present study overall sex distribution showed a female preponderance of 58 %. Only 42 % patients were male.

Type of Surgery	Mean Time (in Minutes)
Endoscopic DCR without stent (Group A)	48.6
Endoscopic DCR with STC stent (Group B)	68.6

Table 4. Duration of Surgery

The mean surgical time for Endo DCR without stent was 48.6 minutes and Endoscopic DCR with stent was 68.6 minute. The extra time needed in second group mostly due to stent insertion and right placement of the stent.

We have to perform other surgical procedures for better access to the area of interest. In Endo DCR group without stent (n = 25), septoplasty was done in 3 cases, inferior turbinoplasty was done in 1 case. In Endo DCR with stent cases (Group B), these numbers were 3, and 2 respectively. The extra time taken for other surgical procedures were excluded during calculation of the time taken for DCR.

Grade	Endoscopic DCR without STC Stent (Group A) (n = 25)	Endoscopic DCR with STC Stent (Group B) (n = 25)
Grade 1: (Symptom free)	19 (76 %)	17 (68 %)
Grade 2: Significant Improvement	3 (12 %)	2 (8 %)
Grade 3: Just Improvement	1 (4 %)	3 (12 %)
Grade 4: No Improvement	2 (8 %)	3 (12 %)

Table 5. Subjective Evaluation at 3 Months

The chi-square statistic is 1.5111. The p-value is .679708. The result is not significant at p < .05

During subjective evaluation we use five-point scales to get the grade of epiphora relief. First three grades (grade 1 to grade 3) were considered as success. We got that in endoscopic DCR without stent group 19 (76 %) patient became symptom free 3 (12 %) patient reported significant improvement and 1 (4 %) had slight improvement, in 2 (8 %) cases the conditions were same as before. In Endo DCR group with stent (Group B) 17 (68 %) patients became symptom free, 2 (8 %) reported significant improvement, 3 (12 %) had just improvement and 3 (12 %) patients had no improvement. Grade 5 is worsening of symptoms, as no patient had worsening of symptoms so we omit grade 5 in the table. The overall success rate was 92 % in without stent group and we got 88 % success rate in silicone tube catheter stent group. The chi-square statistic is 1.5111. The p-value is .679708. The result is not significant at p < .05⁹

Patency (Syringing with Water)	Endoscopic DCR without STC Stent (Group A) (n = 25)	Endoscopic DCR with STC Stent (Group B) (n = 25)
Patent (spontaneous flow)	22 (88 %)	19 (76 %)
Partially blocked (water flow with pressure)	1 (4 %)	3 (12 %)
Blocked (no flow)	2 (8 %)	3 (12 %)

Table 6. Objective Evaluation at 3 Months

When we made objective evaluation of the patient at three month post operatively by syringing with water we got free flow of water in 22 patients, water flow with pressure in 1 patient and no flow of water in two patients in without stent group (Group A). In Group B patients we got free flow in 19 patients, partial blockage in 3 and complete blockage of water flow in 3 patients.

Complications (Early)	Endoscopic DCR without STC Stent (Group A) (n = 25)	Endoscopic DCR with STC Stent (Group B) (n = 25)
Lid Oedema	1 (4 %)	3 (12 %)
Nasal Bleeding	1 (4 %)	2 (8 %)
Complications (Late)		
Granulation	1 (4 %)	4 (16 %)
Synechiae	2 (8 %)	1 (4 %)
Knot Opened	0	1 (4 %)

Table 7. Early and Late Complications

Postoperatively we got oedema of eyelid in one patient in without stent group (Group A) and post-operative nasal bleeding in one patient which was managed by Merocel pack. Whereas in Group B three patients develop lid oedema and two patients develop post-operative nasal bleeding managed by Merocel packing. 4 (16 %) patients with STC stent (Group B) had granulation tissue at or near the operative stoma whereas only one patient in Group A (without stent) had granulation tissue. In Group A two patient develop some form of synechiae between nasal septum and the lateral wall and also between middle turbinate & lateral wall. One patient in Group B developed synechiae. In Group B an opened knot found in one case.

DISCUSSION

Endoscopic DCR (Dacryocystorhinostomy) is a common surgery for epiphora now days. As most of the NLD pathway is in the nose, the rationale for Endo-nasal approach arises out of its anatomy to create a stoma over the blockage to bypass the tear. Dacryocystorhinostomy (DCR) was first described via external approach by Toti¹ and modified by Dupuy, Dutemps and Bourguet.² But a visible scar sometimes with keloid formation and weakening of orbicularis oculi muscle pump function pose a great disadvantage in the external approach. This give raise an alternative surgical procedure in the form of primary endoscopic DCR Surgery. The primary advantage of Endo-nasal DCR were, improved success rate, devoid of any external scar and it also had advantage of correction of nasal pathology in the same sitting. It keeps the lacrimal pump function of orbicularis oculi muscle intact in comparison with external DCR. Endoscopic DCR along with lacrimal stenting is done with the perception of maintaining the patency of artificially created fistula. First Rice⁴ describe the feasibility of Endo-nasal DCR and presented through cadaver study and published his work in the year 1988. In the next year McDonough and Meiring³ published their experience of Endo-DCR on four subjects.

In our study, 29 (58 %) patients were female and 21 (42 %) patients were male thus showing NLD obstruction is more common in females, which corroborates with available literature.⁵

Muscatello⁶ et al reported in their study that mean time for endoscopic DCR was 30 minutes, ranging from 15 - 110 minutes and time progressively decreased with increasing surgical experience. In our study the mean surgical time for Endo DCR without stent was 48.6 minutes and Endoscopic DCR with stent was 68.6 minute.

Higher success rates were noted in cases where STC was used by Shah⁷ he found 93.3 % success rate in STC stent group versus 92.3 % in cases without STC group. Smirnov⁸ documented 89 % success in cases with STC and 75 % success rate in cases without STC. In a prospective randomized study Al-Qathani⁹ analysed the success of use of STC in Endo-DCR, with STC the success rate was 90 % and without STC the rate was 91 %. Sahida¹⁰ found the overall success rate of 93.7 % in cases with use of STC and 86.7 % in cases without use of STC.

In our study we found overall success rate was 92 % in without STC stent group and we got 88 % success rate in silicone tube catheter stent group. We sent all the failed cases to the ophthalmologist for further assessment regarding pump failure or need for dacryocystectomy and they managed them accordingly.

Kakkar,¹¹ who found 85 % success with indwelling STC and 91 % in cases without STC stent. He also found stents to be associated with increased incidence of granulation tissue formation.

Bernal-Sprekelsen¹² and Toma's said that indwelling STC more than 3 weeks of time were complicated with increased formation of granulation tissue.

4 (16 %) patients with STC stent (Group B) had granulation tissue at or near the operative stoma whereas only one patient in Group A (without stent) had granulation tissue. Granulation managed effectively by local excision.

CONCLUSIONS

Surgical success for DCR surgery encompassed both anatomical patency and symptom relief. In our study, objective endonasal stoma patency, as well as subjective symptomatic relief of the patients both were considered, indicating overall success rate of 92 % in without stent group and we got 88 % success rate in silicone tube catheter stent group which are closely comparable to other studies.

On the other hand, some studies indicate that silicone stent can lead to failure due to granulation tissue formation. We also got increased incidence of granulation tissue in STC stent group also decrease rate of success rate, so the role of stent is yet to be confirmed and further large scale trial needed.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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