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A Study of Endonasal Dacrocystorhinostomy with Prolene Stent-Experience

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ABSTRACT
Epiphora, or the flood of tears, is a common and irritating symptom. Lacrimation is caused by an overabundance of tears. The severity of epiphora can range from a minor annoyance to a continuously annoying overflow that can cause social embarrassment. To compare the results of Endoscopic Endonasal Dacryocystorhinostomy with and without prolene stent. The study design is a prospective, single blind, randomized comparative study. It's conducted from June 2016 to June 2017 at Department of Otorhinolaryngology, R.G.Kar Medical College & Hospital. Result: Most of our patients in both groups without stent and with stent presented with epiphora 61.54% and 53.84% respectively, other major symptom in both groups without stent and with stent was epiphora with swelling 34% and 30% respectively. There were statistically no significant differences among the patients according to their symptoms between the two groups. The study of this limited series shows no disadvantages yet and this warrants further studies and evaluation using larger numbers of cases in future.

INTRODUCTION

Epiphora, or the flood of tears, is a common and irritating symptom. Lacrimation is caused by an overabundance of tears. The severity of epiphora can range from a minor annoyance to a continuously annoying overflow that can cause social embarrassment[1]. Dacryocystitis is an inflammation of the lacrimal sac that can be transient or persistent. The most prevalent cause of epiphora (approximately 87% of the time) is chronic dacryocystitis. There are two types of acquired nasolacrimal duct (NLD) obstruction: main and secondary. Inflammation and fibrosis produce primary NLD blockage in the absence of a triggering event. Infections, inflammatory reactions, neoplastic, traumatic, and mechanical obstruction can all cause secondary NLD obstruction. Obstruction of the primary NLD is more common in middle-aged and elderly women. Women have significantly smaller dimensions in the lower nasolacrimal fossa and middle NLD than men. Dacryocystorhinostomy (DCR) is a simple and successful treatment for NLD obstruction[2]. Toti described DCR for the treatment of NLD blockage via an external method in 1904.The possibility of cutaneous scarring and extensive surgery with severe blood loss are two recognised downsides of the external method DCR. Because of these possible issues, less invasive endonasal methods have grown in favour. The Endonasal approach was previously exclusively accomplished from an external approach, but the development of rigid endoscopes with endoscopic instruments has made it a reality. The nasolacrimal duct was accidentally exposed during a normal Functional Endoscopic Sinus Surgery (FESS) procedure. Functional endoscopic sinus surgery evolved into endoscopic endonasal DCR. Caldwell described the first intranasal DCR in 1893. Endoscopic transnasal dacryocystorhinostomy was first described by Mcdonough and Meiring in 1989. This sparked an idea to use it to benefit patients suffering from nasolacrimal duct occlusion. The procedure is simple and straightforward, and an Otorhinolaryngologist may learn it quickly. It is significantly less traumatic than the external technique because there is no face scar, no rupture of the medial palpebral ligaments or the angular facial arteries, and no severe problems. The most prevalent causes of DCR failure are osteotomy site obstruction and common canaliculus obstruction (it was previously considered that a suitably sized osteotomy at the conclusion of surgery would ultimately shrink to a final size of 2mm owing to scarring). As a result, several authorities hypothesised that intubating the nasolacrimal system during DCR could avoid osteotomy closure and scarring, as well as stenosis of the common canaliculus, and therefore improve the success rate. DCR, with or without stenting, has been widely utilised to treat NLD blockage. There is some debate about stenting for DCR. Several approaches are employed to avoid this, including silicone tubing, Mitomycin-c administration, and mucosal flap suturing. When employing silicone tubing, Allen and Berlin discovered a greater failure rate. While Vishwakarma et al discovered that stenting had a high success rate[3]. In the DCR surgery, silicone stent intubation is used to prevent surgical ostium restenosis. However, due to cost effectiveness issues, use is not widely embraced. Many changes have been made to surgical procedures for treating epiphora caused by NLD obstruction in the intention of enhancing surgical outcomes and minimising patient morbidity. Prolene is widely used for suturing and meshing in practically all surgical fields. When compared to bicanalicular silicone tube, it is a less expensive and more readily available material. The purpose of this study is to compare the outcomes of endoscopic endonasal DCR with and without prolene stenting, as well as to evaluate the use of prolene as an alternate stenting material in Endonasal DCR with a three-month follow-up.

AIM AND OBJECTIVES

- To compare the results of Endoscopic Endonasal Dacryocystorhinostomy with and without prolene stent.
- To evaluate the clinical efficacy and complications associated with prolene suture material as a stent.

MATERIALS AND METHODS

- **Study Area:** Department of Otorhinolaryngology, R.G.Kar Medical College & Hospital.
- **Study Design:** The study design is a prospective, single blind, randomized comparative study.
- **Study Duration:** From JUNE 2016 to JUNE 2017

Inclusion Criteria:

- All patients with recurrent epiphora or dacryocystitis and have been diagnosed to have nasolacrimal duct obstruction not fulfilling the exclusion criteria.

Exclusion Criteria

- Watering due to causes other than nasolacrimal duct obstruction.
- Patients with lacrimal trauma or lacrimal sac tumours.
- Patients with uncontrolled hypertension or diabetes mellitus.
- Unwillingness for endoscopic surgery and those not fit for anesthesia.
- Revision endonasal dacryocystorhinostomy and failed external dacryocystorhinostomy.

RESULT AND DISCUSSION

The ultimate goal of Endoscopic endonasal DCR is to remove the obstruction in NLD and to make lacrimal system patent by creating a new opening in the lateral wall of the nose.

In the present study a total of 52 patients of chronic nasolacrimal duct obstruction with complaints of chronic epiphora were studied in terms of surgical outcome of Endoscopic endonasal DCR surgery by divided them randomly into two equal groups of 26 patients each, one group with stent and another group without stent. An attempt has been made to see whether there is any difference in the outcome of surgery with usage of stenting that could be statistically proven.

Age distribution: In our study maximum numbers of patients were found in age group of 40-50years in group without stent and in age group of 50-60 years group with stent. As the incidence of chronic nasolacrimal duct obstruction increases with age, it was commonly seen in elderly age group. Age distribution has no significant relation with the outcome of the surgery as failure was seen in patients of both extreme of ages.

Gender distribution: In our study females were predominant in both groups with around 69.23% in group without stent and 61.54% in group with stent. So there is an increased prevalence of the disease in the middle-aged and elderly females. According to Shellinni et al found Female are more affected by chronic dacryocystitis as compared to males 76.25%.

Laterality: In our study of 52 cases (53.85%) had left sided disease in group A, and in group B (42.31%) had right sided disease , hence showing that left side was more affected than the right side. It was observed that nasolacrimal duct and lacrimal sac formed a greater angle on right side than left side. It increases the chance of stasis and obstruction of nasolacrimal duct and lacrimal sac on left side. It was therefore, attributed as the cause for preponderance of chronic dacryosystitis on left side.

Stallard (1973) quoted that left side is more affected than the right side. Mortimore *et al.*[4] in their studies showed left sided predominance of the disease in their patients.

Mode of presentation of symptoms: Pande 1967 discovered that the majority of patients had chronic simple dacryocystitis, the most prevalent pattern of presentation of dacryocystitis (69.2%) (Table 1).

Duration of symptoms: In our study patients presenting with duration of symptoms were ranging from 6-12 months accounting (48%) in group B, showing that nasolacrimal duct obstruction is a chronic disease. As epiphora can be due to various other causes which are more common than chronic nasolacrimal obstruction, so diagnosis of nasolacrimal duct obstruction may be delayed. Kazuhiro Nomura stated that the duration of symptoms would not influence the outcome (Table 2)[5].

Post-operative complication: A major post-operative complication in endoscopic endonasal DCR includes granulations and synechiae. In our study presence of granulations were checked on follow up weeks to months by nasal endoscopy and observed that granulations are more in group without stenting at 3rd month than group with stent .Granulations were seen in an increasing trend from 14th day to 3rd month in group A but granulations in group B there was increasing trend from 7th day to 2nd month seen and they remained the same till 3rd month. When post-operative problems were compared, there was no statistically significant difference between the two groups. Granulations could have been reduced using various techniques like application of topical steroids or Mitomycin C to the neo ostium but due to the lack of availability in our setup the same couldn't be done. reported 2 cases of synechiae and 3 cases of

Table 1: Mode of presentation of symptoms

	Without stent (n = 26)		With stent (n = 26)		Total (n = 52)	
Complications	No.	Percentage	No.	Percentage	No.	Percentage
EPI	16	61.54	14	53.84	30	57.69
EPI + IT	0	0.00	1	3.85	1	1.93
EPI + SW	9	34.61	8	30.77	17	32.69
EPI + SW + IT	1	3.85	3	11.54	4	7.69

Table 2: Overall results among the patients

	Without stent (n=26)		With stent (n=26)		Total (n=52)	
Results	No.	Percentage	No.	Percentage	No.	Percentage
Success	22	84.62	24	92.31	46	88.46
Failure	4	15.38	2	7.69	6	11.54

granulations out of 30. Basil *et al.* reported granulations in 3 cases out of 25, after application of steroid nasal drops. Post-operative complications like presence of granulations showed no effect on the outcome of the surgery as patients with granulations after 8 weeks also showed patency of the neo-ostium on syringing at the end of the study.

Subjective assessment of symptoms: It was difficult to compare the published success rates of lacrimal surgery since different studies utilise different success criteria and diverse patient selection. The Royal College of Ophthalmologists produced a clinical governance guideline in 1999 that states that independence from epiphora for three months after surgery is a good indicator of a successful procedure. Kong quoted follow up of at least 6 month is recommended to detect failure as majority of failures occur within the first four months of surgery. Due to time constraint, we had taken subjective improvement in epiphora for 3 months as per the Royal College of Ophthalmologists, which was taken as a criterion for success of the surgery. In our study overall subjective success rate of the surgery i.e. patients showing relief in symptoms in group A is 84.62% and in group B is 92.31% at the end of the study. Even though the success rate in group with stent was more than that of group without stent, no statistical difference noted between the two groups regarding the subjective success of the surgery.

Objective assessment of the size of the neo-ostium by nasal endoscopy: The size of the lacrimal ostium generated by endoscopic DCR was critical to the surgery's outcome stated by Mann *et al*.[6] study. All the patients in our study both in group A and group B we had created a larger ostium of size >8×5 mm to facilitate the easy drainage of the tears and to prevent early closure of the ostium even after healing.

In our study we observed that large ostium was seen more in patients without stenting at initial follow up, this disparity may be due to continuous monitoring and regular crust removal. Size of the neo ostium had decreased over a period of time in both the groups and remained same at the end of 2nd and 3rd month.

Cokkeser discovered that the rhinostoma site gradually closed down between 1 and 2 months following the operation.

In our study we found that there was no relation between the size of the neo ostium and the patency of the neo-ostium. Ostium size was not predictive of overall surgical outcome.

Objective assessment of patency of the neo-ostium by lacrimal syringing: In our study on objective assessment of patency of the neo-ostium by lacrimal syringing on nasal endoscopy, we found that patency was seen in 23 patients in group A and in 24 patents out of 26 in group B. We observed that 2 patients in group with stent and 3 patients in group A showed blocked ostium on nasal endoscopy on post operative follow up.

The cause of occlusion in one group A patient was granulation tissue around the stent, while in another patient, the rhinostomal aperture was closed. 2 patents in group A with blocked ostium showed excessive scar tissue formation and 1 patient in group A who showed blocked ostium had turbinoseptal synechiae near the neo-ostium. There was no spontaneous expulsion of stent seen in our patients.

The overall success results at three months in group A is 84.62% and that in group B is 92.31%.

Complications seen in our study were the most common type of complications which are usually seen with endonasal DCR surgery.

Gupta had reported that an improper selection of cases may also lead to failure of the surgery.

Results of our study in comparison with others: The successful resolution of epiphora with patent ostium following nasal endoscopy was accepted.

The success rate is determined by establishing a wide intranasal stoma with appropriate bone removal around the stomal area, which reduces the likelihood of postoperative stenosis and adhesions. The most common cause of surgical stomal stenosis was insufficient bone removal. Sundas observed granulation tissue around Prolene in the nasal cavity in only two patients out of 36 and Vishwanath reported granulation tissue in one patient out of twenty, which was consistent with our study, which found granulation tissue in two patients in post-operative follow up.

Tuli in his study of 20 patients observed 100% success rate in endoscopic dacryocystorhinostomy using prolene suture. Vizesi was cited. Prolene is a well-known synthetic monofilament suture that has a low host reaction, is temperature sensitive, and does not adhere to the tissue. In endoscopic DCR procedures, Aslan et al employed polypropylene suture material instead of silicone stent[7].

In several trials, silicone stent intubation was utilised in DCR procedures to prevent surgical ostium re-stenosis. However, due to cost effectiveness issues, use is not widely embraced.

According to Onerci, the most prevalent reason of failure in endonasal DCR with stenting is granulation tissue formation surrounding the silicone tubes and synechiae formation between the lateral nasal wall and middle turbinate.

Ambani *et al*.[8] noted that Endoscopic DCR failed due to granulations and scarring near the stoma, especially when no stent was employed.

CONCLUSION

In primary cases of lacrimal sac or nasolacrimal duct occlusion, we believe our technique is beneficial. Prolene's inertness as a stent for preventing scarring or closure of the neo-ostium or new tract in endoscopic dacryocystorhinostomy aids in preventing re-stenosis and maintaining postoperative passage patency. Because of its strength, inertness, retention of strength after application, minimal tissue reactivity, and resistance to bacterial contamination, Prolene is utilised in practically all surgical disciplines for suturing and meshing. It is a low-cost substance that is widely available in practically all operating rooms, and it allows tear flow into the nose after surgery. Adjunctive use of a stent increased the success rate of endoscopic endonasal DCR and prolene suture has proved itself as a low-cost effective stent. Its intraoperative use seems to be easy and safe, even in the hands of relatively inexperienced surgeons, giving good results. Further, no specific training or expertise is required to perform this technique. The study of this limited series shows no disadvantages yet and this warrants further studies and evaluation using larger numbers of cases in future.

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