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IP Journal of Otorhinolaryngology and Allied Science

Journal homepage: <https://www.joas.co.in/>

## Original Research Article

## Comparison of surgical outcome of endoscopic DCR using gouge or drill with or without stent

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## ARTICLE INFO

## Article history:

Received 01-11-2023

Accepted 13-12-2023

Available online 01-05-2024

## Keywords:

Endoscopy

Dacryocystorhinostomy

Stent

Epiphora

## ABSTRACT

**Introduction:** The aim of the study was to evaluate the longterm results of endoscopic endonasal dacryocystorhinostomy in the management of epiphora due to nasolacrimal duct obstruction.**Materials and Methods:** The prospective study included 30 patients of all age and either sex with features of dacryocystitis. Patients were randomly distributed for one of the following surgeries - Dacryocystorhinostomy using Stent and Powered instruments (STPI) / Dacryocysto-rhinostomy using Stents and Gouge (STGO) / Dacryocysto-rhinostomy using Powered instruments (NSPI) / Dacryocysto-rhinostomy using only Gouge (NSGO). Follow up till 365 days was done and data on outcome, recurrence and complications were collected.**Results:** Success rate of all the procedures were 100 % at Day 3 and Day 7. On Day 30, success rate of all the procedures except NSGO were 100 %. At day 90 and 180, success rates were NSGO (85.7%); NSPI (100%); STGO (100%); STPI (85.7%). At day 365, success rates were NSGO (57.1%); NSPI (100%); STGO (100%); STPI (71.4%). The difference was not statistically significant ( $p < 0.05$ ). The results indicate that the success rate of all the four modalities are comparable.**Conclusion:** Endoscopic DCR is a safe day-care procedure done which can be done under local anaesthesia with excellent results. Its efficacy ranges from 85.7-100% on Day 90 and 180; and 57.1-100% on Day 365. Success rate of all four procedures are same. In view of high success rate and low complications with all four procedures (NSGO; NSPI; STGO; STPI), endoscopic DCR using gouge or drill with or without stent were recommended.This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)

## 1. Introduction

Epiphora is a common complaint which could be secondary to excessive production of tears or arise from proximal obstruction in drainage system at the punctum or common canaliculus. The nasolacrimal obstruction is around 10% at 40 years and it increases to 35-40% at 90 years of age.<sup>1</sup> Dacryocystorhinostomy (DCR), a endoscopic assisted operation by which tears are restored into the nasal cavity through an opening made at lacrimal sac by the removal

of the lacrimal crest and mucosa over it. It is indicated when obstruction is not relieved by simple probing and syringing. The operation can be carried out using either an external or endonasal approach. The intranasal approach was initially described in 1893 by Caldwell<sup>2</sup> and the external approach was described first in 1904 by Toti<sup>3</sup> and it became the mainstay of treatment in the 1920s with the addition of flaps.<sup>4</sup> Results were further improved in 1962 with addition of silastic tube intubation by Jones.<sup>5</sup> The intranasal approach got out of favour owing to problems with visualisation but with modern endoscopes, the interests are now restored. McDonogh and Meirin<sup>6</sup> first described

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modern endonasal DCR procedure in 1989. Endoscopic DCR can be performed successfully as a day-care procedure under local anaesthesia with low complications rate and efficacy from 80 to 90%.<sup>7,8</sup> Endoscopic DCR can be done using Laser<sup>9</sup> or other methods to remove bone and mucosa including powered drills,<sup>10</sup> punches<sup>11</sup> and radio surgical electrodes.<sup>12</sup> Laser assisted DCR (ENLDCR) has not been able to convince many surgeons due to the difficulty to remove the thick bone of the frontal process of the maxilla with Laser. ENLDCR has success rates which vary from 60% to 86%<sup>9</sup> whereas endonasal DCR with other tools ("cold steel") seems to have a slightly higher success rate.<sup>10,11</sup> Some studies have shown that use of silicon intubation in nasolacrimal pathway helps in maintaining the patency of lacrimal duct.<sup>13</sup> However, few studies contradicted the finding and recommend endoscopic dacryocystorhinostomy without intubation as the treatment of choice in cases of chronic epiphora due to postsaccal stenosis of the lacrimal drainage system.<sup>14</sup> This study has been undertaken in patients undergoing dacryocystorhinostomy with an aim to compare the surgical outcome of endoscopic DCR by using gouge or drill with or without stents. The long term results and the complications associated were also evaluated in this study.

## 2. Materials and Methods

This prospective study was undertaken at a tertiary care hospital and conducted on 30 patients. The following eligibility criteria were used for recruitment of patients in the study. Patients of all age and either sex with symptomatic distal obstruction of nasolacrimal duct that is not relieved by simple probing and syringing were included for study. All patients with clinical features of chronic dacryocystitis underwent dacryocystogram and based on inclusion criteria, patients were included and randomly distributed for one of the following surgeries.

1. Dacryocysto-rhinostomy using Stent and Powered instruments (STPI).
2. Dacryocysto-rhinostomy using Stents and Gouge (STGO).
3. Dacryocysto-rhinostomy using Powered instruments (NSPI).
4. Dacryocysto-rhinostomy using only Gouge (NSGO).

All the patients were followed on Day 3, 7, 30, 90, 180 and 365. On each visit, the patency of dacryocysto-rhinostomy were assessed. Data on duration, outcome with and without using stent, recovery time, recurrence and complications were collected. All the captured data were entered into the excel database and statistical analyses performed. Chi-Square test was applied as appropriate for comparison of nominal data. P value of 0.05 was considered as statistically significant.

## 3. Results

In our study females (73.33%) were more than males (26.67%). Mean age of the patient was  $56.23 \pm 11.81$  (Standard deviation) with the youngest patient being 30 years old while the oldest was 75 years old. The overall distribution of symptomatology was similar in all 4 groups ( $p > 0.05$ ). Discharge was present in 11 (36.66%) patients. Other reported symptoms were sticky eyes 10 (33.33%) and red eye 10 (33.33%), blurred vision 20 (66.66%), itching of eye 12 (40 %), eye ache 3 (10%), headache 13 (43.33 %), deviated nasal symptom 6 (20 %), hypertrophic turbinate 7 (23.33%), nasal polyp 1 (3.33%), atrophic rhinitis 5 (16.66%). Medial canthus swelling was present in only one patient (3.33%). Out of 30 patients included in our study, Stent and Powered instruments (STPI) were used in 7 (23.3%) patients. In 8 (26.7%) patients, Stents and Gouge (STGO) were used. In 8 (26.7 %) patients, only Powered instruments (NSPI) were used and in 7 (23.3%) patients, only Gouge (NSGO) was used (Table 1). In our study, hypertrophic turbinate 2 (6.66 %), atrophic rhinitis 6 (20%), complete blockage 1 (3.33%), DNS 9 (30%) were observed during performing surgeries (Table 2). Additionally with endonasal DCR, other surgeries can be performed on nasal pathologies or those that are prone to recurrence. Septoplasty was done in 8 (32.0%) patients concomitantly in the same procedure combined with endonasal endoscopic DCR. The overall distribution of concomitant surgeries was similar in all 4 groups ( $p > 0.05$ ). The most common post operative complication associated was all four operations was periorbital edema followed by granulation formation. Punctal trauma and synechiae formation was seen only with NSGO and NSPI, however p-value was not significant (Table 3). All the complications healed with conservative treatment within 7-10 days post operatively. In our study, success rate of all the procedures were 100% at Day 3 and Day 7. On Day 30, success rate of all the procedures except NSGO were 100%. At day 90 and 180, success rates were NSGO (85.7%); NSPI (100%); STGO (100%); STPI (85.7%). The difference was not statistically significant ( $p < 0.05$ ). At day 365, Success rates were NSGO (57.1 %); NSPI (100%); STGO (100%); STPI (71.4%). The results indicate that the success rate of all the four modalities is comparable, though some blockage was observed with NSGO and STPI on Day 30 onwards.

## 4. Discussion

Endoscopic DCR has been gaining popularity due to advanced endoscopes and other modern instruments of rhinology surgery. This study was undertaken to compare the surgical outcome of endoscopic DCR using gouge or drill with or without stents and total of 30 patients with symptomatic distal obstruction of nasolacrimal duct that was not relieved by simple probing and syringing.

**Table 1:** Distribution of operation done

Op Done	No of patients (n)	Percent (%)
NS GO	7	23.3
NS PI	8	26.7
ST GO	8	26.7
ST PI	7	23.3
Total	30	100.0

**Table 2:** Distribution of intra operative findings as per the operation done

Op Done	AR		CB		HT		DNS		No findings	
	N	%	N	%	N	%	N	%	N	%
NS GO	2	33.3	-	-	-	-	3	33.3	2	16.7
NS PI	-	-	-	-	1	50	3	33.3	4	33.3
ST GO	2	33.3	1	100	1	50	1	11.1	3	25
ST PI	2	33.3	-	-	-	-	2	22.2	3	25
Total	6	100	1	100	2	100	9	100		100

AR – Allergic Rhinitis, CB – Concha Bullosa, HT – Hypertrophic Turbinate, DNS – Deviated Nasal Septum

**Table 3:** Distribution of post-operative complications as per the operation done

Operation done	Post operative Complications							
	Synechia		Granulation		Periorbital edema		Punctal trauma	
	Number	%	Number	%	Number	%	Number	%
NS GO	1	50	5	41.7	4	25	1	33.3
NS PI	1	50	3	25	3	18.8	2	66.7
ST GO	-	-	2	16.7	3	25	-	-
ST PI	-	-	2	16.7	5	31.3	-	-
Total	2	100	12	100	16	100	3	
P value	0.539		0.258		0.614		0.283	

The demographic findings of our study are in line with the literature. Half of the patients 15 (50 %) were operated for right side blockade and in remaining in left side. Our study suggests that the disease has no special predilection to the laterality which correlates with the study done by Hartikainen et al.<sup>15</sup> Endoscopic DCR has been demonstrated to be a safe and low morbidity technique. It can be performed successfully as a day-care procedure under local anaesthesia with excellent results and with great satisfaction to the patients. Its efficacy ranges from 80 to 90%<sup>7,8</sup>. The advantages of endoscopic DCR are absence of external scars, less bleeding and in addition with endonasal DCR, surgeries can be performed on other associated nasal pathologies if any. To achieve hemostasis and prevent scar formation, various materials such as dissolvable foam, topical hemostatic sealants, or non-resorbable packs have been tested in the middle meatus after endoscopic nasal surgery.<sup>16</sup> Similarly, to prevent the obliteration of the intranasal lacrimal sac ostium, many surgeons prefer to insert bicanalicular silicone tubes to stent the rhinostoma.<sup>17</sup> Some authors advocate silicone intubation while others think it may be a reason for failure.<sup>18</sup> Others object that the silicone tubes keep the lacrimal sac flaps separate.<sup>19</sup> In our study, results indicate that the success rate of all

the four modalities is comparable, though some blockage was observed with NSGO and STPI on Day 30 onward. In our study, post-operative complications included synechia (6.66 %), granulations (40%), periorbital edema (53.33%), punctal trauma (10%). The overall complications were similar in all 4 groups ( $p > 0.05$ ). This shows that the post-operative complications are more or less similar with all the procedures. Kakkar et al observed that the use of stent was found to be associated with granulation tissue formation, patient discomfort and increased risk of complications.<sup>20</sup> In a study by Brookes et al, 5 (2.5%) had tube loss or prolapse or both within the first month after surgery. The tubes were repositioned initially in four patients, but prolapse recurred in two patients necessitating further intervention.<sup>21</sup> The results of our study are in the line with published literature.

## 5. Conclusion

To conclude, endoscopic DCR has been demonstrated to be a safe and low morbidity technique which can be performed successfully as a day-care procedure under local anaesthesia with excellent results. Its efficacy ranges from 85.7-100% on Day 90. The advantages of endoscopic DCR are absence of external scars, less bleeding and

additionally other associated surgeries can be performed on nasal pathologies. Success rate and complications of all four procedures are same. In view of high success rate and low complications with all four procedures, endoscopic DCR using gouge or drill without stent is recommended. No significant difference was found in our study and a large, randomized, long term prospective study is necessary for a more definitive comparison between all four procedures.

## 6. Abbreviations

Dacryocysto-rhinostomy (DCR), DCR using Stent and Powered instruments (STPI), DCR using Stents and Gouge (STGO), DCR using Powered instruments (NSPI), DCR using only Gouge (NSGO), Laser assisted DCR (ENLDCR)

## 7. Source of Findings

No funding sources

## 8. Conflict of Interest

None declared

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**Cite this article:** Singh K, Kour A, Raj P, Gupta A. Comparison of surgical outcome of endoscopic DCR using gouge or drill with or without stent. *IP J Otorhinolaryngol Allied Sci* 2024;7(1):3-6.