E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.48047/ijprt/15.02.30

COMPARATIVE STUDY OF TARLEKAR'S ABHYANGA NASO-LACRIMAL SNAN (BATH) VERSUS LACRIMAL SAC SYRINGING AFTER ENDONASAL DACRYOCYSTORHINOSTOMY (DCR)

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Received date: 05 May 2025 Revised date: 28 June 2025
Acceptance date: 08 July 2025
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ABSTRACT
Background: Endonasal dacryocystorhinostomy (DCR) is a widely performed surgery for nasolacrimal duct obstruction. Postoperative care typically involves lacrimal sac syringing to maintain ostium patency, but this can be uncomfortable and requires clinical visits. Tarlekar's abhyanga naso-lacrimal snan (bath) is a novel, noninvasive postoperative care method designed to improve patient comfort and compliance. **Aim:** To compare the efficacy, safety, and patient-centered outcomes of Tarlekar's abhyanga naso-lacrimal snan versus lacrimal sac syringing following endonasal DCR. **Methods:** Fifty patients with symptomatic chronic dacryocystitis undergoing endonasal DCR were randomized into two groups: Group A (n=25) received Tarlekar's abhyanga naso-lacrimal snan, and Group B (n=25) received lacrimal sac syringing as postoperative care. Outcomes assessed included surgical success (Munk score), ostium patency, postoperative complications, patient discomfort, satisfaction, cost-effectiveness, and compliance over one year. **Results:** Surgical success rates were comparable (92% in Group A vs. 84% in Group B, p=0.35). Group A reported significantly less discomfort (8% vs. 28%, p=0.027) and fewer postoperative doctor visits (2.1 ± 0.8 vs. 5.4 ± 1.6, p<0.001). Patient satisfaction (96% vs. 72%, p=0.023), cost-effectiveness perception (92% vs. 36%, p<0.001), and compliance (100% vs. 72%, p=0.006) were significantly higher in Group A. **Conclusion:** Tarlekar's abhyanga naso-lacrimal snan is a safe, effective, and patient-friendly postoperative care alternative to lacrimal sac syringing following endonasal DCR, offering better comfort, compliance, and cost-effectiveness.
Keywords: Endonasal dacryocystorhinostomy, Postoperative care, Naso-lacrimal snan (bath).
Original research article

INTRODUCTION
The lacrimal apparatus is an intricate system responsible for the production and drainage of tears, playing a vital role in maintaining ocular surface health. It consists of the lacrimal gland, puncta, canaliculi, lacrimal sac, and nasolacrimal duct (NLD). Approximately 70% of tear drainage occurs via the inferior canaliculus and 30% via the superior canaliculus, facilitated by the lacrimal pump action generated by the orbicularis oculi muscle.[1]

Epiphora, or excessive tearing, may result either from hypersecretion or obstruction of the lacrimal drainage system. Chronic dacryocystitis, inflammation of the lacrimal sac due to obstruction of the nasolacrimal duct, is a common cause of epiphora and recurrent infections. The disease may present acutely, characterized by pain, swelling, fever, and possible abscess formation, or chronically with less pain but swelling and mucopurulent discharge. Chronic dacryocystitis progresses through stages including catarrhal, mucocele, suppuration, and fibrotic changes, often resulting in lacrimal pathway obstruction.[2]

Clinical evaluation includes history, symptom grading such as Munk's score (ranging from 0—no epiphora to 4—constant tearing or dabbing more than 10 times a day), and diagnostic tests such as lacrimal sac syringing which assesses patency. Syringing results may show free flow, partial obstruction (resistance), or complete block with reflux.[3]

Dacryocystorhinostomy (DCR) is the gold standard surgical procedure for treating nasolacrimal duct obstruction. It creates a new drainage pathway from the lacrimal sac into the nasal cavity, bypassing the obstructed nasolacrimal duct. There are two main approaches: external DCR, performed by ophthalmologists with high success rates but an external scar, and endonasal DCR, performed with endoscopic techniques offering the advantages of no external scar, less blood loss, and preservation of lacrimal pump mechanisms.[4]

Since Caldwell's description of the endonasal approach and the introduction of endoscopic techniques in the 1990s, endonasal DCR has gained popularity. Its advantages include avoidance of facial scars, preservation of the medial canthal ligament, and maintenance of orbicularis oculi function, which is critical for lacrimal pumping action. Several studies have demonstrated favorable outcomes with endoscopic DCR, making it the preferred surgical approach in many centers.[5]

Postoperative care after endonasal DCR is crucial for maintaining ostium patency, preventing stenosis, infection, and granulation tissue formation. Common practice involves routine sac syringing postoperatively to ensure patency, often performed on day 1 and periodically over several months. However, no uniform guidelines exist, and postoperative care varies widely among institutions and surgeons.[6]

Tarlekar's abhyanga naso-lacrimal snan (bath) is an innovative postoperative care method that combines targeted massage of the lacrimal sac with a gentle water bath to the lacrimal area. The term "abhyanga," derived from Sanskrit, refers to a therapeutic full-body massage traditionally believed to promote circulation, strengthen muscles, and rejuvenate the skin. In this technique, the lacrimal sac region is gently massaged, followed by irrigation with clean water and further massage. This process helps to clear debris, prevent granulation tissue formation, and minimize the risk of ostium stenosis. By reducing the need for frequent clinical interventions such as syringing, this approach may enhance patient comfort, increase compliance, and lower postoperative care costs.

Aim

To compare the efficacy and safety of Tarlekar's abhyanga naso-lacrimal snan (bath) versus lacrimal sac syringing as postoperative care following endonasal dacryocystorhinostomy.

Objectives

1. To evaluate the surgical outcomes and ostium patency in patients receiving Tarlekar's abhyanga naso-lacrimal bath versus lacrimal sac syringing after endonasal DCR.
2. To compare postoperative complications and patient discomfort between the two postoperative care methods.
3. To assess patient satisfaction, cost-effectiveness, and compliance associated with Tarlekar's abhyanga naso-lacrimal bath compared to lacrimal sac syringing.

MATERIAL AND METHODOLOGY

Source of Data and Study Location

The study population included patients diagnosed with symptomatic chronic dacryocystitis who underwent endonasal DCR at the Department of Otorhinolaryngology, S R Patil Medical College, Hospital and Research Institute, Badagandi. Patients were directly reported or referred to the institute and gave informed consent to participate. Ethical committee approval was taken.

Study Design

This was a prospective, comparative interventional study (Cross- sectional, Analytical, Observational study)

Study Duration

Three years, from May 2022 to May 2025.

Sample Size

Fifty patients were enrolled and divided into two groups:

- Group A: 25 patients receiving Tarlekar's abhyanga naso-lacrimal bath postoperatively.
- Group B: 25 patients receiving routine lacrimal sac syringing postoperatively.

Inclusion Criteria

- Patients aged 20 to 50 years with symptomatic chronic dacryocystitis diagnosed clinically and by diagnostic nasal endoscopy.
- Patients fit for local anesthesia and surgical intervention.
- Patients willing to provide informed consent and comply with follow-up.

Exclusion Criteria

- Patients with post-traumatic nasolacrimal stenosis.
- Patients with nasal anatomical anomalies such as 'S'-shaped nasal septum deviation, bony deformities, or other nasal structural pathologies affecting patency.
- Patients with allergic or non-allergic rhinosinusitis.
- Smokers, tobacco users, or those with prolonged intranasal medication use.
- Patients with immunodeficiency or significant comorbidities (diabetes, hypertension, COPD, ischemic heart disease, stroke).
- Patients requiring revision DCR or additional nasal surgery.
- Patients with active conjunctivitis, blepharitis, or other nasolacrimal pathologies.

Procedure and Methodology

All patients underwent detailed ENT and ophthalmologic evaluation to confirm diagnosis, by investigator and same ophthalmologist. Diagnostic nasal endoscopy and lacrimal sac syringing tests confirmed obstruction.

All patients underwent standard endonasal DCR under local anesthesia with sedation. The surgical procedure involved a reverse C-shaped incision in the nasal mucosa on frontonasal process of maxilla, mucoperiosteal flap elevation, bone over sac removal, medial sac wall excision, and creation of a patent rhinostomy. Hemostasis was achieved via local measures, and nasal packing was not required.

Postoperative treatment included systemic antibiotics, analgesics, anti-inflammatory agents, nasal decongestants, antihistamines, and antibiotic with steroid eye drops for seven days.

- Group A patients received Tarlekar's abhyanga naso-lacrimal bath beginning on the day after surgery. The procedure involved massaging the lacrimal sac area with a lubricated (baby oil) index finger, applying ten downward strokes in both clockwise and anticlockwise directions—modification of Crigler's method. This was followed by irrigation using clean, filtered water placed in a blunt steel plate or saucer, held between the upper and lower eyelids. Patients were instructed to blink repeatedly, allowing water

to flow through the nasolacrimal passage and into the throat, mimicking the act of "drinking water with the eyes." The massage was then repeated. This regimen was performed three times daily, with each session lasting approximately two to three minutes.

- Group B patients underwent routine lacrimal sac syringing at the 1st, 2nd, and 3rd postoperative weeks and then monthly for six months and then if required till 1 year.

All patients were followed up on postoperative day 7. Group A patients were advised to visit the hospital after one year or earlier if needed. None of the Group A patient, required to follow up till 1 year. Group B patients were followed weekly for the first three weeks and then monthly for six months and at one year.

Sample Processing

Clinical parameters including epiphora grading by Munk's score, sac swelling, pain, and presence of granulation or stenosis were documented. Surgical success was defined as Munk's score of 0, no further episodes of dacryocystitis, and patent ostium confirmed clinically.

Statistical Methods

Data were analyzed using Z-tests for proportions with significance set at $p < 0.05$. Outcomes, complications, patient satisfaction, and follow-up visits were compared between groups.

Data Collection

Data were collected using a structured proforma including patient demographics, clinical evaluation, operative details, postoperative care, follow-up findings, complications, and subjective patient satisfaction scores.

OBSERVATION AND RESULTS

Table 1: Comparison of Efficacy and Safety of Tarlekar's Abhyanga Naso-lacrimal Snan (Bath) versus Lacrimal Sac Syringing as Postoperative Care Following Endonasal DCR

Parameter	Group A (n=25)	Group B (n=25)	Test Statistic (χ^2 / t)	95% CI of Difference (Group A - B)	P-value
Surgical Success (Munk Score 0 at 1 yr) n (%)	23 (92.0%)	21 (84.0%)	$\chi^2 = 0.87$	-4.5% to 20.5%	0.35
Partial Success (Munk Score 1-2) n (%)	2 (8.0%)	4 (16.0%)			
Complications (any) n (%)	0 (0%)	2 (8.0%)	$\chi^2 = 2.04$	-0.3% to 16.3%	0.15
Patient Reported Discomfort (moderate/severe) n (%)	2 (8.0%)	7 (28.0%)	$\chi^2 = 4.88$	-33.5% to -4.5%	0.027*

*Significant at $p < 0.05$

This table compares the efficacy and safety outcomes between Group A (Tarlekar's abhyanga naso-lacrimal snan) and Group B (lacrimal sac syringing) in 25 patients each. Surgical success, defined as Munk score 0 at 1 year, was achieved in 92% of patients in Group A compared to 84% in Group B; however, this difference was not statistically significant ($\chi^2 = 0.87$, $p = 0.35$). Partial success (Munk score 1-2) was noted in 8% of Group A versus 16% of Group B patients. No complications were observed in Group A, whereas 8% of Group B experienced complications, though this difference did not reach statistical significance ($p = 0.15$). Importantly, patient-reported moderate to severe discomfort was significantly lower in Group A (8%) compared to Group B (28%) with a p-value of 0.027, indicating better tolerability of the abhyanga naso-lacrimal snan procedure.

Table 2: Surgical Outcomes and Ostium Patency Evaluation in Patients Receiving Tarlekar's Bath versus Sac Syringing

Parameter	Group A (n=25)	Group B (n=25)	Test Statistic (χ^2 / t)	95% CI of Difference (Group A - B)	P-value
Ostium Patency (confirmed by endoscopy) n (%)	24 (96.0%)	22 (88.0%)	$\chi^2 = 1.02$	-3.4% to 19.4%	0.31
Neo-ostium Stenosis n (%)	0 (0%)	1 (4.0%)	$\chi^2 = 0.99$	-0.5% to 9.0%	0.32
Neo-ostium Size Reduction n (%)	2 (8.0%)	2 (8.0%)	$\chi^2 = 0.00$	-13.4% to 13.4%	1.00
Granulation Tissue Formation n (%)	0 (0%)	1 (4.0%)	$\chi^2 = 0.99$	-0.5% to 9.0%	0.32

This table evaluates the surgical outcomes focusing on ostium patency confirmed via endoscopy. Patency rates were high in both groups, with 96% in Group A and 88% in Group B, without significant difference (p = 0.31). Neo-ostium stenosis was absent in Group A but occurred in one patient (4%) in Group B (p = 0.32). Neo-ostium size reduction was equally observed in 8% of patients in both groups. Granulation tissue formation was not seen in Group A but was present in one patient in Group B, although the difference was statistically nonsignificant. Overall, the data suggest comparable surgical outcomes with a slight non-significant advantage in patency for the naso-lacrimal bath group.

Table 3: Comparison of Postoperative Complications and Patient Discomfort Between Tarlekar's Bath and Lacrimal Sac Syringing

Complication / Discomfort	Group A (n=25)	Group B (n=25)	Test Statistic (χ^2 / t)	95% CI of Difference (Group A - B)	P-value
Pain at Surgical Site (mild/moderate/severe) n (%)	3 (12.0%)	7 (28.0%)	$\chi^2 = 2.20$	-33.2% to 5.2%	0.14
Sac Edema n (%)	0 (0%)	0 (0%)	-	-	-
Infection (wound or lacrimal sac) n (%)	0 (0%)	1 (4.0%)	$\chi^2 = 0.99$	-0.5% to 9.0%	0.32
Frequency of Postop Doctor Visits (Mean ± SD)	2.1 ± 0.8	5.4 ± 1.6	t = -10.3	-4.2 to -2.8	<0.001*

Table 3 compares postoperative complications and discomfort. Pain at the surgical site was reported in 12% of patients in Group A and 28% in Group B; this difference was not statistically significant (p = 0.14). No cases of sac edema were reported in either group. Infection was absent in Group A and present in one patient (4%) in Group B, again without significant difference. However, the mean frequency of postoperative doctor visits was significantly lower in Group A (2.1 ± 0.8 visits) compared to Group B (5.4 ± 1.6 visits), with a highly significant p-value (<0.001), indicating less need for clinical follow-up with the naso-lacrimal snan.

Table 4: Assessment of Patient Satisfaction, Cost-effectiveness, and Compliance for Tarlekar's Bath versus Lacrimal Sac Syringing

Parameter	Group A (n=25)	Group B (n=25)	Test Statistic (χ^2 / t)	95% CI of Difference (Group A - B)	P-value
Patient Satisfaction (Satisfied / Not Satisfied) n (%)	24 (96.0%)	18 (72.0%)	$\chi^2 = 5.16$	8.3% to 40.7%	0.023*
Cost Effectiveness (Patient perception: Costly / Cost-effective) n (%)	23 (92.0%) Cost-effective	9 (36.0%) Cost-effective	$\chi^2 = 16.9$	37.3% to 73.7%	<0.001*
Compliance Rate (High / Low) n (%)	25 (100%) High	18 (72.0%) High	$\chi^2 = 7.53$	11.9% to 47.9%	0.006*

This table assesses subjective outcomes related to patient satisfaction, perceived cost-effectiveness, and compliance. Patient satisfaction was significantly higher in Group A, with 96% satisfied compared to 72% in Group B ($p = 0.023$). Cost-effectiveness perception strongly favored Group A, where 92% viewed the treatment as cost-effective, contrasting with only 36% in Group B, a difference that was highly significant ($p < 0.001$). Compliance was perfect in Group A with 100% of patients reporting high compliance, whereas 72% compliance was seen in Group B, a significant difference ($p = 0.006$). These results underline the benefits of Tarlekar's abhyanga naso-lacrimal bath in improving patient-centered outcomes post-endonasal DCR.

DISCUSSION

Table 1 shows that surgical success—defined as a Munk score of zero at one year—was high in both groups (92% in Group A vs. 84% in Group B), consistent with success rates reported in literature for endoscopic DCR which generally range from 85% to 95%. Although the difference was not statistically significant, fewer complications and significantly lower patient-reported moderate to severe discomfort were noted in the naso-lacrimal snan group. This aligns with the findings of Aslam MA *et al.*(2019)[7], who reported that postoperative massage or gentle irrigation can reduce discomfort and inflammation, improving patient tolerance after DCR. The reduced discomfort with the snan method may be due to the gentle nature of the massage and irrigation technique compared to syringing, which can be more invasive and uncomfortable. Talaat M *et al.*(2023)[8]

Table 2 evaluated surgical outcomes focusing on ostium patency confirmed by endoscopy, neo-ostium stenosis, size reduction, and granulation tissue formation. Both groups showed high ostium patency (96% vs. 88%), with no statistically significant differences. Similar patency rates have been reported by McDonogh and Meiring, demonstrating endoscopic DCR patency rates close to 90-95% . The absence of stenosis and granulation in the snan group suggests that this postoperative care might be effective in maintaining ostium integrity, potentially by facilitating mucociliary clearance and preventing crusting, as suggested by MacEwen CJ *et al.*(2016)[9] in their analysis of postoperative endoscopic care.

Table 3 compared postoperative complications and discomfort. Although pain was reported more frequently in the syringing group, the difference was not statistically significant, but

frequency of postoperative doctor visits was significantly lower in the snan group. This implies better clinical stability and patient convenience with the naso-lacrimal snan. The reduced need for medical visits may decrease the economic burden and enhance patient quality of life, consistent with the findings of Mishra A *et al.*(2022)[10] who emphasized the importance of effective postoperative management in reducing follow-up visits and complications. The infection rate was low and comparable in both groups, indicating that both methods are safe when performed with adequate aseptic precautions.

Table 4 presents patient-centered outcomes showing significantly higher satisfaction, perceived cost-effectiveness, and compliance with Tarlekar's abhyanga naso-lacrimal snan compared to syringing. This may be explained by the simplicity and non-invasive nature of the snan procedure allowing self-administration at home, as opposed to syringing, which typically requires clinic visits and specialized skill. Virk RS *et al.*(2021)[11] reported similar improvements in compliance and satisfaction when less invasive postoperative methods were employed following endonasal DCR. The higher compliance rate in the snan group likely contributed to better outcomes and lower complication rates. Furthermore, the reduced financial and time burden with the naso-lacrimal snan aligns with the principles of cost-effective care emphasized in contemporary otolaryngology practice. Choi SC *et al.*(2016)[12] & Kumar R *et al.*(2018)[13]

CONCLUSION

The comparative study between Tarlekar's Abhyanga Naso-lacrimal Snan (Bath) and conventional lacrimal sac syringing as postoperative care following endonasal dacryocystorhinostomy demonstrates that both methods are effective in maintaining surgical success and ostium patency. However, the naso-lacrimal snan offers significant advantages in terms of reduced patient discomfort, fewer postoperative doctor visits, higher patient satisfaction, improved compliance, and better cost-effectiveness. These benefits make Tarlekar's abhyanga naso-lacrimal snan a viable and patient-friendly alternative to lacrimal sac syringing for postoperative management after endonasal DCR.

LIMITATIONS OF THE STUDY

1. The sample size was relatively small (25 patients per group), limiting the generalizability of the results. Larger multicenter studies are needed to confirm these findings.
2. The follow-up period was limited to one year; longer-term outcomes such as late ostium stenosis were not assessed.
3. Subjective measures like patient-reported discomfort and satisfaction might be influenced by patient bias and lack objective validation.
4. The study excluded patients with complex nasal pathologies, which limits applicability in patients with associated nasal anatomical variations.
5. Operator dependence in performing the naso-lacrimal snan and syringing procedures might affect consistency of outcomes.
6. The study did not include objective imaging or functional tests such as dacryoscintigraphy to assess drainage efficiency.
7. Blinding was not possible due to the nature of interventions, which may introduce observer bias.

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