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Research article

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Post-Operative Nasal Obstruction: Comparison between External and Endoscopic Dacryocystorhinostomy

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Abstract

Objectives: *The objectives of this study is to compare between endoscopic and external dacryocystorhinostomy (DCR) procedures with regards to both objective and subjective parameters, i.e., incidence of long term post-operative nasal obstruction and patient-reported quality of life.*

Study Design: *Prospective study*

Setting: *Tertiary Care University Hospital*

Participants: *Study population included 24 patients undergoing either endoscopic or external DCR with bicanalicular silicone, at the Department of Otorhinolaryngology and Head and Neck Surgery in (removed for blind peer review 1).*

Main outcome and measure: *Changes in nasal resistance was determined by anterior rhinomanometry, and quality of life was assessed by mini rhinoconjuctivitis quality of life questionnaire (MRLQ).*

Results: *Post-operative nasal resistance was significantly increased upon both endoscopic and external DCR ($p=0.04$); this outcome was temporary and returned to normal after stent removal. Quality of life (QOL) exhibited a significant bimodal improvement in both groups 3 months after the operation ($p=0.03$), as well as after stent removal ($p=0.01$).*

Conclusions: *While endoscopic and external DCR with silicone tube stenting both lead to an improvement in quality of life, a significant temporary objective nasal obstruction occurs, more prominently after the endoscopic procedure. Pending future studies, this observed discrepancy may be an appropriate matter to convey to prospective patients prior to choice of procedure.*

Keywords: Rhinomanometry, Stent, Quality of life, External, Dacryocystorhinostomy, Endoscopic Dacryocystorhinostomy

Introduction

Obstruction of the lacrimal drainage system is a common ophthalmic pathology that accounts for about 3% of ambulatory visits [1]. Dacryocystorhinostomy (DCR) is the main treatment and can be performed either through a cutaneous incision (i.e., external DCR) or via an endoscopic approach (i.e., intranasal endoscopic DCR) [2, 3]. Endoscopic DCR is widely implemented and is as successful as external DCR [2, 4]. Nonetheless, the surgical procedure has undergone progressive modifications in order to decrease post-operative re-stenosis; modifications suggested to improve outcomes include laser-assisted DCR, balloon dacryoplasty and powered endoscopic DCR [5-8].

Silicone stenting of the inferior and superior canaliculi is performed as part of both endoscopic and external approaches, and is suggested to minimize the incidence of re-stenosis [8, 9]. However, silicone stenting involves the prolonged retention of a foreign body in the nasal cavity, such that may cause nasal obstruction and might be accompanied by patient discomfort.

While the endoscopic approach seems to be a safe and attractive

surgical alternative to the external approach, as well as harbor a similar success rate, it has yet to be compared to the external approach by both objective and subjective parameters pertaining to nasal obstruction immediately after surgery [10].

The aim of this study is to compare the implications of external and endoscopic DCR, as per their impact on both objective and subjective parameters, i.e., nasal obstruction and self-reported quality of life 3 to 8 months post-operation.

Patients and Methods

Study population included adult patients that were diagnosed with chronic nasolacrimal duct obstruction, and were assigned to undergo DCR at the oculoplastic outpatient clinic at (removed for blind peer review 2.) (Removed for blind peer review 3).

Patients underwent a complete otolaryngological evaluation that included detailed medical history with an emphasis on sinonasal diseases, as well as a physical examination. Patients who required concomitant nasal septum or sinus surgeries, with a history of either chronic sinusitis, nasal polyposis or any previous nasal or eye surgical procedures, were excluded from the study. The patients were randomly divided into 2 groups: endoscopic DCR and external DCR. In each group the surgery was performed by an oculoplastic specialist and in the endoscopic DCR group a rhinology specialist participated in the procedure. In both techniques, a silicone tube was placed through the superior and inferior canaliculi and joined together in the nasal cavity by a small sleeve. The silicone tube was removed after 6 months in both groups.

Post-operative outcomes included an anterior rhinomanometry, and a mini rhinoconjuctivitis quality of life questionnaire (MRLQ) [11]. These were collected prior to the operation and then at 3, 6 and 8 months after the operation. Anterior rhinomanomtry measures the transnasal pressure [9]. Briefly, during nasal respiration, total resistance in one side can be calculated from the difference between the pressure in the tested nostril and the nasopharyneal pressure; thus, a sealed pressure probe is placed in the non-involved nostril and measures the nasopharyngeal airway pressure (PC RHINO 200 rhinommanometer, ATMOS, Germany). The upper normal limit of resistance is defined as 0.3 Pascal/cm3/sec at a pressure of 150 Pascal.

Quality of life in patients suffering from nasal and eyes symptoms is assessed by the self-administered questionnaire, MRLQ [11]. This questionnaire is comprised of 14 forced choice questions in 5 domains: activity limitations, practical problems, nose symptoms, eye symptoms and other symptoms. For each symptom, 0 represents an absence of symptom and 6 represents the most severe manifestation of the symptom. Total MRLQ scoring therefore ranges from 0 to 84.

Statistical analysis

Chi^2 test was used to compare between pre- and post-operative pathologic rhinomanometric results, and between the two operative groups. Student t-test was used to evaluate the differences in MRLQ scores between the two operative groups and also before and after tube removal in each group. P value of less than 0.05 was considered significant.

Results

Study population

Twenty-four patients were recruited for the study: Twelve patients underwent external DCR and 12 patients underwent endoscopic DCR. Three patients were excluded from the study due to post-operative complications, e.g., preseptal abscess (2 after endoscopic DCR and 1 after external DCR). Complete follow up data was therefore obtained for 19 patients: 9 that had underwent external DCR (mean age 38.5 years, 1 male and 8 females, 5:4 right to left ratio) and 10 that had underwent endoscopic DCR (mean age 41 years, 1 male and 9 females, 3:7 right to left ratio). There was no significant difference in patient ages between the two groups (p=0.07).

Rhinomanometric results

Rhinomanometric results are shown in (Table 1). In 6 asymptomatic patients (3 in the external DCR group and 3 in the endoscopic DCR group) normal rhinomanometric results were not obtained bilaterally before surgery; these patients were excluded from that part of the study. As shown, in the external DCR group, 3 (50%) of patients had pathologic rhinomanometric values 3 months after the operation. As shown in (Figure 1), the difference from pre-operative scores per patient was significant (p=0.04). All the patients had normal rhinomanometric results after 8 months. The difference in normal rhinomanometric results between 3 months and 8 months after the operation was significant (p=0.04). In the endoscopic DCR group, 6 (85.7%) of patients had pathologic rhinomanometric results 3 months after the operation. The difference from the pre-operative results was significant (p=0.001). After 8 months, those patients had again normal rhinomanometric measurements. The difference in normal rhinomanometric results between 3 months and 8 months after the operation was significant (p=0.007). One patient in this group had abnormal rhinomanometric results 8 months after the procedure.

The difference in rhinomanometric results between the endoscopic and external groups at any time point (before the operation, 3 and 8 months after the operation) did not reach statistical significance (p=0, p=0.16 and p=0.33, respectively).

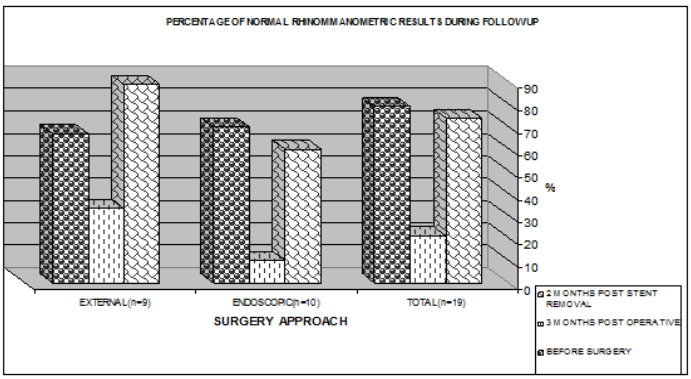

Figure 1

Quality of life results

MLRQ scores before the operation, 3 and 8 months post-operatively are presented in (Figure 2). The mean pre-operative MLRQ score was 23.8±14.88 (mean±SD) for the external DCR group and 35.1±9.55 for the endoscopic DCR group. The difference

between the two groups was not significant (p=0.07). Three and 8 months after external DCR, MLRQ score was 11.11±5.27 and 4.22±4.73, respectively. Three and 8 months after endoscopic DCR, mean MLRQ was 12.11±14.95 and 4.5±4.24, respectively. The difference in mean MLRQ score before and 3 months after the operation was statistically significant in both groups (p=0.03 in the external DCR group, p=0.002 in the endoscopic DCR group). The difference in mean MLRQ score between 3 months and 8 months after the operation was also statistically significant (p=0.01 in the external DCR group, p=0.04 in the endoscopic DCR group).

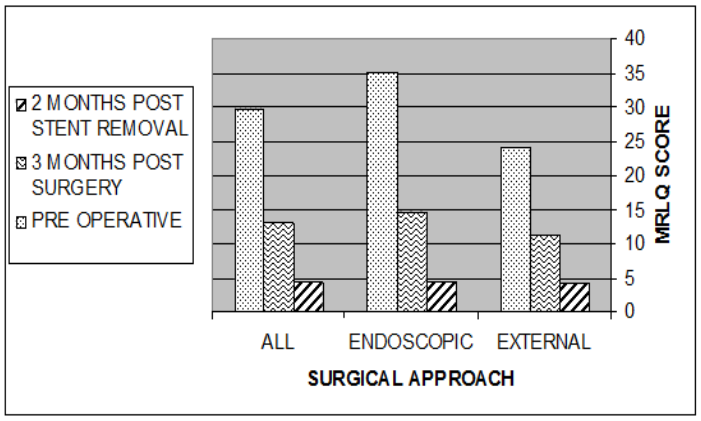

Figure 2

Discussions

Dacryocystorhinostomy is a continuously evolving procedure and many of its aspects are being actively investigated in order to establish a preferred approach. Although the success rate of endoscopic DCR was found to be slightly lower than the success rate of external approach, both external and endoscopic DCR are performed on a regular basis worldwide [2, 4, 12].

The use of canaliculi silastic tubes to maintain continuity with the nasal cavity is still controversial. Prospective randomized studies demonstrate similar post-operative results after DCR with and without silastic stents in both external and endoscopic approaches. In addition, De Souza reports that endoscopic DCR with excision of the medial wall of the lacrimal sac is as successful as insertion of silastic lacrimal intubation stents [14-16].

Okuyucu et al. and Semsettin et al. report that endoscopic and external DCR have a negative effect on nasal mucociliary clearance function; those effects might be due to post-operative edema and the continuous washing effect of the lacrimal fluid through the neo ostium. Nonetheless, the influence of these procedures on nasal airflow has yet to be studied [12, 17].

The results of the present study demonstrate that the post-operative period is characterized by an increase in nasal resistance, both in the endoscopic and the external approaches. This is most probably due to the presence of a foreign body, the silatic stent, left inside the nasal cavity. The higher increase in nasal resistance observed in the endoscopic group may be due to greater manipulation, and thus swelling, of the nasal mucosa compared to the external approach. Two months after stent removal, the nasal airflow returns to normal value in almost all of the patients (not shown). This finding emphasizes the contribution of the silastic stent to post-operative nasal obstruction and also the reversibility of the phenomenon.

Quality of life evaluation after DCR is traditionally performed by the Glasgow questionnaire that assesses the effect of an intervention on the health status of patients [13]. Here, an inventory of nasal and eye symptoms were used in order to specifically evaluate the quality of life in a relevant context. A bimodal improvement in quality of life was observed after both endoscopic and external DCR: The first after the operation, and the second after stent removal. This is the first depiction of a contribution of stenting to quality of life. However, no difference in quality of life was found in the post-operative period between the two surgical approaches.

Conclusion

Post-operative improvement in subjective reporting of quality of life is observed in both external and endoscopic DCR techniques. It is also evident after stent removal. Both external and endoscopic DCR cause objective post-operative nasal obstruction, more prominently after the endoscopic procedure, though this obstruction is temporary and is largely resolved after stent removal. Pending future studies, the observed discrepancy may be an appropriate matter to convey to prospective patients prior to choice of procedure.

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