

The Success Rate of External Dacryocystorhinostomy

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ORIGINAL PAPER SUMMARY

Purpose: To compare the success rate of external dacryocystorhinostomy with and without silicone intubation. **Methods:** This study included 129 patients with lacrimal drainage system disorders who underwent the external dacryocystorhinostomy and divided in two groups depending on whether silicone intubation was used during the surgery or not. Forty one DCR's were performed with intubation and 88 without. The data was analysed using the average, standard deviation, variation coefficient, and the statistical significance was determined using t-test. **Results:** The mean age of the patients was 38.0 ± 14.6 SD years, including 97 females and 32 males. The mean duration of tubes was 5.2 ± 0.8 SD months. The mean time of follow-up was 14.7 ± 3.5 SD months. Intraoperative complications were present more frequently in the group without intubation 19.3% compared to 12.2% in the group with intubation ($p > 0.05$). The postoperative complication was closure of the anastomosis, less frequent in the group with intubation 4.9% compared to 12.5% in the group without intubation ($p > 0.05$). The success rate was evaluated by lacrimal patency to irrigation and relief of epiphora. Patency was achieved in 89.9% of cases, whereas epiphora recurred in 10.1% of cases. By groups, patency in the group with intubation was higher 95.1% compared to 87.5% in the group without intubation ($p > 0.05$). **Conclusion:** Our findings suggest that success rate was higher in dacryocystorhinostomy with silicone intubation, although results were not statistically significant. Prospective studies involving larger patient numbers are required to confirm this beneficial effect of silicone intubation.

Keywords: external dacryocystorhinostomy, silicone intubation, success rate

1. INTRODUCTION

Dacryocystorhinostomy, a procedure that fistulizes the lacrimal sac and nasal cavity, is the most frequent lacrimal drainage procedure (1). The aim of the operation is to provide a mucosa-to-mucosa anastomosis between the lacrimal sac and the lateral wall of the nose. Some surgeons routinely intubate silicone tubes during external dacryocystorhinostomy, particularly in cases of a common canalicular obstruction, a small scarred lacrimal sac and repeated dacryocystorhinostomy (2). There is growing tendency to use silicone tubes in external dacryocystorhinostomy to improve outcomes. The aim of this study was to compare the success rate of dacryocystorhinostomy with and without silicone intubation.

2. MATERIALS AND METHODS

This study included 129 patients with lacrimal drainage system disorders who underwent the external dacryocystorhinostomy between February 2002 and March 2007, divided in two groups depending on whether silicone intubation was used during the surgery or not. 41 DCR's were performed with intubation and 88 without. We performed external dacryocystorhinostomy by using the Dupuy-Dutemps and Bourguet technique (3). For bicanalicular intubation we used Nunchaku-style

tubes (Kaneka Medix. Co. Japan), consisting of three pieces (three piece silicone tubing). One piece is the thinner central segment, and the other two are thicker bilateral segments. To push the tube from the upper and lower puncta into the lacrimal passage, a thin metal probe (0.4-0.6 mm diameter) was inserted into both sides of the tube through a small cut. By this tube there is no difficult procedure of retrieving the tip of a metal probe from the nasal cavity. Nunchaku-style tube requires no suture to secure it in position and can be easily removed by pulling the central part of the thinner segment using forceps (4, 5). The data was analysed using the average, standard deviation,

variation coefficient, and the statistical significance was determined by t-test.

3. RESULTS

The majority of treated patients 97 (75.2%) were female, and 32 (24.8%) were male. In the group with intubation 31 (75.6%) patients were female and 10 (24.4%) were male, while in the group without intubation 66 (75%) patients were female and 22 (25%) were male. Both groups have similar gender breakdown without significant difference ($p > 0.05$). By age, in the group with intubation, treated patients of the age range 40-49 were the majority (31.7%), while in the group without intubation the majority were those of age over 50 (29.5%). The mean age in the group without intubation was a bit higher 38.8 ± 14.4 SD years (range 7-65 years) compared to 36.4 ± 15.1 SD years (range 5-58 years) in the group with intubation. Variation was higher for the group with intubation (41.4%) than for the group without intubation (37.2%) (Table 1). The age difference by groups was not considerable—there was no significant difference ($p > 0.05$).

The mean duration of tubes was 5.2 ± 0.8 SD months (range 3-6 months). Tubes remained for 3 months in 2 patients (4.9%), for 4 months in 3 patients (7.3%), 5 months in 19 patients (46.3%), and for 6 months in 17 patients (41.5%). The mean time of follow-up for both groups was 14.7 ± 3.5 SD months (range 6-18 months). The mean time of follow-up for the group with intubation was 14.0 ± 4.0 SD months, whereas for the group without intubation it was 15.0 ± 3.1 SD months. Lacrimal drainage system disorders included in this

| Age in years | Group with intubation | | Group without intubation | | Total | |
|--------------|-----------------------|-------|--------------------------|-------|-------|-------|
| | No. | % | No. | % | No. | % |
| 0-9 | 3 | 7.3 | 1 | 1.1 | 4 | 3.1 |
| 10-19 | 3 | 7.3 | 10 | 11.4 | 13 | 10.1 |
| 20-29 | 6 | 14.6 | 15 | 17.0 | 21 | 16.3 |
| 30-39 | 9 | 22.0 | 19 | 21.6 | 28 | 21.7 |
| 40-49 | 13 | 31.7 | 17 | 19.3 | 30 | 23.3 |
| 50+ | 7 | 17.1 | 26 | 29.5 | 33 | 25.6 |
| Total | 41 | 100.0 | 88 | 100.0 | 129 | 100.0 |
| Xmax | 58 | - | 65 | - | 65 | - |
| Xmin | 5 | - | 7 | - | 5 | - |
| Xb | 36.4 | - | 38.8 | - | 38.0 | - |
| SD | 15.1 | - | 14.4 | - | 14.6 | - |
| VC | 41.4 | - | 37.2 | - | 38.5 | - |

TABLE 1. Age distribution by groups, t-test $p > 0.05$

| Lacrimal drainage system disorders | Group with intubation | | Group without intubation | | Total | |
|---------------------------------------|-----------------------|-------|--------------------------|-------|-------|-------|
| | No. | % | No. | % | No. | % |
| Chronic dacryocystitis | 22 | 53.7 | 76 | 86.4 | 98 | 76.0 |
| Lacrimal fistula | 2 | 4.9 | 5 | 5.7 | 7 | 5.4 |
| Mucocele | 3 | 7.3 | 5 | 5.7 | 8 | 6.2 |
| Previous failed DCR | 6 | 14.6 | - | 0.0 | 6 | 4.7 |
| Nasolacrimal duct obstruction | 4 | 9.8 | 2 | 2.3 | 6 | 4.7 |
| Medial common canalicular obstruction | 4 | 9.8 | - | 0.0 | 4 | 3.1 |
| Total | 41 | 100.0 | 88 | 100.0 | 129 | 100.0 |

TABLE 2. Lacrimal drainage system disorders by groups

| Intraoperative complications | Group with intubation | | Group without intubation | | Total | |
|---|-----------------------|-------|--------------------------|-------|-------|-------|
| | No. | % | No. | % | No. | % |
| Bleeding | 2 | 4.9 | 6 | 6.8 | 8 | 6.2 |
| Inappropriate place and size of the osteotomy | - | 0.0 | 4 | 4.5 | 4 | 3.1 |
| Difficulty fashioning the mucosal flaps | 1 | 2.4 | 3 | 3.4 | 4 | 3.1 |
| Nasal mucosal tearing | 2 | 4.9 | 4 | 4.5 | 6 | 4.7 |
| Uneventful | 36 | 87.8 | 71 | 80.7 | 107 | 82.9 |
| Total | 41 | 100.0 | 88 | 100.0 | 129 | 100.0 |

TABLE 3. Intraoperative complications by groups

study were: chronic dacryocystitis in 98 cases (76.0%), lacrimal fistula in 7 cases (5.4%), mucocele in 8 cases (6.2%), previous failed DCR in 6 cases (4.7%), nasolacrimal duct obstruction in 6 cases (4.7%) and medial common canalicular obstruction in 4 cases (3.1%) (Table 2). Cases of chronic dacryocystitis (76%) predominated among operated patients within this research. Occurrence of this disease was obviously more frequent in the group without intubation 86.4% compared to 53.7% in the group with intubation with moderate statistical significance ($p < 0.01$).

Intraoperative complications as bleeding, inappropriate place and size of the osteotomy, difficulty fashioning the mucosal flaps, nasal mucosal tearing are presented in Table 3. In general intraoperative complications were present in 17.1% of cases, more frequently in the group without intubation 19.3% compared to 12.2% in the group with intubation (Table 4). The difference was not statistically significant ($p > 0.05$).

The postoperative complication—closure of the anastomosis—was less frequent in the group with intubation in 2 cases (4.9%), compared to 11 cases (12.5%) in the group without intubation. With the relevant t-test the difference was not statistically significant ($p > 0.05$). Complications such as migra-

tion of the tube, rupture of the central thinner segment, cheesewiring of the canaliculi, and slitting of the punctum were not observed during the postoperative period. The success rate was evaluated by lacrimal patency to irrigation and relief of epiphora. Patency was achieved in 89.9% of cases, whereas epiphora recurred in 10.1% of cases. By groups, patency in the group with intubation was higher 95.1% compared to 87.5% in the group without intubation. Lacrimal patency remained after the removal of the tubes. Recurrence of epiphora in the group with intubation was only 4.9% compared to 12.5% in the group without intubation (Table

| Intraoperative complications | Group with intubation | | Group without intubation | | Total | |
|------------------------------|-----------------------|-------|--------------------------|-------|-------|-------|
| | No. | % | No. | % | No. | % |
| No | 36 | 87.8 | 71 | 80.7 | 107 | 82.9 |
| Yes | 5 | 12.2 | 17 | 19.3 | 22 | 17.1 |
| Total | 41 | 100.0 | 88 | 100.0 | 129 | 100.0 |

TABLE 4. Prevalence of intraoperative complications by groups

| | Group with intubation | | Group without intubation | | Total | |
|------------------------|-----------------------|------|--------------------------|---|-------|---|
| | No. | % | No. | % | No. | % |
| Operated | 41 | | 88 | | 129 | |
| Achieved patency | No. | 39 | 77 | | 116 | |
| | % | 95.1 | 87.5 | | 89.9 | |
| Recurrence of epiphora | No. | 2 | 11 | | 13 | |
| | % | 4.9 | 12.5 | | 10.1 | |

TABLE 5. Achieved patency and recurrence of epiphora by groups

5). The difference was not statistically significant ($p > 0.05$).

4. DISCUSSION

There are many surgical methods for treating lacrimal drainage system disorders that aim to eliminate the obstructions of lacrimal drainage and to ensure sufficient lacrimal patency. Despite numerous existing surgery methods for treating lacrimal drainage system disorders, there are cases where a sufficient patency is not achieved and epiphora recurs. In the research we analyzed 129 surgically treated cases of lacrimal drainage system disorders. From the general data is observed that the majority of treated patients 75.2% were female, and 24.8% were male. Similar female preponderance, in their study is also shown by Talpur et al. (6) 74%, Uçgun et al. (7) 76% and Soler Machin et al. (8) 73.91%. The mean age of the patients was 38.0 ± 14.6 SD years (range 5 to 65 years). Talpur et al. (6) reported that the mean age of their patients was 34 years, Uçgun et al. (7) reported the mean age of 34 years and Soler Machin et al. (8) reported the mean age of 65 ± 14.64 years.

In this study cases of chronic dacryocystitis (76%) predominated among operated patients. Talpur et al. (6), out of 54 dacryocystorhinostomies, in 48 cases (88%) had chronic dacryocystitis, in 5 cases (9.26%) had mucocele and in 1 case (1.85%) had lacrimal fistula. Uçgun et al. (7), in 53 procedures of dacryocystorhinostomy, they had indications of chronic dacryocystitis in 42 cases (79.2%), recurrent dacryostenosis in 3 cases (5.6%), mucocele in 3 cases (5.6%), and common canalicular obstruction

in 5 cases (9.4%). Soler Machin et al. (8) analyzed 125 cases with symptoms that included chronic epiphora in 65 cases (52%), acute lacrimal sac inflammation in 33 cases (26.4%), mucocele in 6 cases (4.8%), recurrent conjunctivitis in 4 cases (3.2%), and 17 cases (13.6%) of lacrimal duct obstruction.

During the surgery bleeding was the most frequent intraoperative complication (6.2%); it was more present in the group without intubation 6.8% compared to 4.9% in the group with intubation. As per other intraoperative complications, there was less difference between groups, with exception of the inappropriate place and size of the osteotomy, which was present only in the group without intubation (4.5%). During the DCR with silicone tubes, problems such as failure to intubate, tearing of silicone tubes when pushing the device into the nose, and damage of the upper lacrimal apparatus did not occur. Hanna et al. (9) in their study of treating lacrimal drainage system disorders emphasize fashioning mucosal flaps or intraoperative haemorrhage as the most common encountered problems. Ezra et al. (10) in their study of ultrasonic assessment of rhinostomy size following external dacryocystorhinostomy concluded that the soft-tissue anastomosis after external DCR with sutured mucosal flaps contracts to about half of the area of the soft-tissue anastomosis at the first postoperative day, this final anastomosis size being about 30% of the area of the bone window. Small rhinostomies, are therefore more likely to fail due to the final healed soft-tissue anastomosis being very small. McLean et al. (11) in their study analyzed the bone fragments from rhinostomies in 14 cases undergoing revisional dacryocystorhinostomy, looking for evidence of new bone formation. In all cases the osteotomy was found to be small. McLachlan et al. (12) in series of 291 dacryocystorhinostomies, considered 18 cases (6%) as anatomical failures. At reoperation, in 14 cases (78%) they

found to have canalicular obstructions with predominance of common canaliculus. A closed osteotomy was found in 4 cases (22%). Welham and Wulc (13) described 19 patients from a series of 204 undergoing secondary dacryocystorhinostomy, who had no bony ostium at the time of secondary surgery. The success rate was higher in the group with intubation 95.1% compared to 87.5% in the group without intubation. Silicone intubation is likely to improve outcomes in external dacryocystorhinostomy. We believe that the silicone intubation facilitate epithelialization of the DCR fistula. Baig et al. (14) reported a success rate of 87.09% out of 62 procedures of external dacryocystorhinostomies with silicone tube intubation. Delaney and Khooshabeh (15) reported a success rate of 90% out of 50 cases with acquired partial nasolacrimal obstruction in adults, treated by dacryocystorhinostomy with silicone intubation. McLachlan et al. (12) reported success rate of 94% out of 291 dacryocystorhinostomies. Talpur et al. (6) reported success rate of 98.14% in 54 dacryocystorhinostomies. Advani et al. (16) reported a success rate of 95% out of 40 dacryocystorhinostomies with silicone intubation.

5. CONCLUSION

Our findings suggest that success rate was higher in dacryocystorhinostomy with silicone intubation, although results were not statistically significant. Prospective studies involving larger patient numbers are required to confirm this beneficial effect of silicone intubation.

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