Original Article

Compare the Outcomes of Intubation Techniques in Nasolacrimal Duct Obstruction among Young Adults

Asif Mashood Qazi, Nazia Qidwai, Israr Ahmed Bhutto, Ajmal Khan Penezai, Attiya Zehra Rizvi and Umer Kazi

ABSTRACT

Objective: To compare the outcomes of intubation techniques in young adults suffering from nasolacrimal duct obstruction.

Study Design: Experimental longitudinal study

Place and Duration of Study: This study was conducted at the Ophthalmology Department, Post-Graduate Institute of Al-Ibrahim eye Hospital, Karachi, from May 2018 to November 2019.

Materials and Methods: 136 patients aged 20-40 years were selected based on convenience sampling technique and divide into two groups, A in which silicon intubation was carried out, and Group B in which dacrocysto-rhinostomy (DCR) with silicon tube was carried out by the same surgeon. Success rate, recovery, complications, postoperative treatment, regurgitation, and the lacrimal duct's patency were the parameters taken under consideration. Data were analyzed using SPSS, with the independent t-test applied to assess the level of significance.

Results: Significant difference (P value ≤0.01) was observed between Group A and B when it came to success rate and recovery. Other parameters such as complications, postoperative treatment, regurgitation, and patency of lacrimal duct were seen less in Group A as compared to Group B.

Conclusion: The study concluded that silicon intubation is a better surgical procedure, showing better recovery and success rate and being more cost-effective with minimal trauma

Key Words: Silicone Intubation, Dacrocysto-rhinostomy, Nasolacrimal Duct Obstruction

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INTRODUCTION

Nasolacrimal duct (NLD) obstruction is a congenital disorder and an acquired disorder in the pediatric population and adult age groups causing a failure in the nasolacrimal duct drainage system. It presents clinically in the form of an overflow of tears, also termed as "Epiphora" [(1)]. The Pathogenesis of NLD obstruction has to do with mechanical obstruction distal to the NLD near Hasner's valve, where the structure enters the nose[(2)]. Evidence shows that the main culprit causing obstruction is a pathological persistence of the membrane at the distal portion of the duct system, bone anomalies, stenosis of the inferior meatus leading to a narrowing of the lacrimal drainage system [(3, 4)].

Department of Ophthalmology, Al-Ibrahim Eye Hospital Isra University Karachi Campus.

Correspondence: Dr. Asif Mashood Qazi, Assistant Professor of Ophthalmology, Al-Ibrahim Eye Hospital Isra University Karachi Campus.
Contact No: 0345-2146027
Email: smartasifqazi@gmail.com

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Other factors causing NLD include infections, hormonal factors, vascular congestion, tear factors, autonomic dysregulation, gastroesophageal reflux, topical drugs, allergies, and eye makeups[(5-8)]. Treatment of this condition is through intubation. The silicon tube presented by Keth is used in NLD as an alternative to other commonly used skills [(9)]. This procedure is also used for NLD stenosis even in congenital based conditions and has a reported achievement rate of tube intubation of up to 83% [(10)]. Most applied silicon techniques are Crawford bicanalicular intubation, Quickert-Dryde technique, or silicon intubation using Nunchaku-style. The bicanalicular silicon is well applied for treatment with an unestablished fact regarding its long term efficacy in adult-based obstruction. Studies have hinted that double silicon intubation has better outcomes in adult-based groups if there is proper follow up visits [(11)]. Studies are sparse on comparing outcomes of intubation techniques in adults with NLD. Therefore we conducted a study to assess and compare the outcome of intubation techniques in young adults.

MATERIALS AND METHODS

The experimental longitudinal study took place at the post-graduate institute of Al-Ibrahim eye Hospital,

Karachi, from May 2018 to November 2019, in which 100 patients aged between 20-40 were selected based on convenience sampling. Ethical approval from the institutional review committee of Al-Tibri Medical College and Hospital was taken before the study's commencement. All the patients were from the province of Sindh, Pakistan. The patients were divided into two groups, A and B. The patients signed a written consent and were included in the study based on positive syringing test and clinical examination. Group A was applied intubation of silicon tube alone, whereas Group B was applied dacrocysto-rhinostomy (DCR) to treat NLD block. Each group had 50 participants. Patients aged greater than 40 or less than 20 years, recurrent cases, who had a traumatic history, patients with symptoms of secondary to underlying pathology, glaucoma, eye lid disorders and secondary causes of NLD block due to facial fractures were all excluded from the study. Jones type 2 dye test was performed under local anesthesia to identify type of obstruction in patients.

Surgical techniques performed in this study: Group A Silicon tube intubation procedure for the treatment of blockage was carried out. This procedure is a less invasive and simple. In Group B, a different surgical technique, DCR, was performed under local anesthesia. However, this procedure is an invasive method with the technique also being more prolonged and complicated. Postoperatively, Group A patients were kept on oral antibiotics and pain management for a week. Topical antibiotics in eye drops were given quarterly for one month and continued accordingly for six months onwards. The tube was then removed at the 6^{th} month of follow up. Follow-ups were carried out at one week and the 6^{th} month postoperatively. Group B patients were kept under observation for one day to overcome any postoperative trauma; the patients were on oral antibiotics for ten days. Anti-inflammatory medications were given for ten days, and topical eye drops were maintained up to ^{sixth} months. Follow-ups were carried out on the 10^{th} day for skin sutures removal after surgery and then first, third, and sixth month to remove tubes.

Silicon Tube intubation: Silicon Tube intubation was performed on patients of Group A with NLD block. The procedure was more straightforward and less invasive than DCR surgery. All the patients were under local anesthesia, as the procedure is less traumatic and well tolerated by the patients. A double ended punctum dilator was used to dilate both the superior and inferior punctual openings. The bowman probe was passed vertically 2mm and then horizontally through the canalicular system and directed inferiomedially through until a distinct bony feeling was encountered in the sac area. The bowman probe size ranged from 0.7mm to 1.1mm. The probe was passed down the nasolacrimal duct to enter the nasal cavity under the inferior turbinate and spring test was performed to avoid false passage. A fine silicone tube was attached to the malleable metal rod and then introduced through both the upper and lower punctal openings and canaliculi to bring out using a Crawford hook so that the bowman probe can be engaged and retrieve both ends of tube from nostrils. After this, nasal packing with gauze dripping in the antibiotic ointment was applied and removed after an hour. Postoperatively all patients were kept for 2 hours and then were started on antibiotics, eye drops, and anti-inflammatory medications for a week. Follow up were kept on the first week, and then the third and sixth months. The silicon tubes were removed in the outpatient department under topical anesthesia.

Dacrocysto-rhinostomy (DCR) Procedure: In Group B, a DCR procedure with intubation of silicon tube was performed. All the patients in this study were also under the influence of local anesthesia. A vertical superficial skin incision was made 10mm medial to the inner canthus area with a knife, thereby securing the medial canthal tendon. Lacrimal sac was exposed and incised in H shaped manner and attached to an opening created in the nasal mucosa after rhinostomy . Once suturing of posterior flap done A silicon tube attached to a flexible metal body passed from both the superior and inferior puncti, Canaliculitis and retrieve tube after crossing new opening from nostril. Then the anterior flaps were sutured in place along with the skin. The tube remained inside the nostril devoid of adhesive with the nasal wall. General nasal packing gauze sopping with antibiotic ointment applied with pressure bandaging was done.

Postoperative therapy was started with antibiotics, topical steroids, analgesics, eye ointments, and drops, mostly quarterly. Sutures were removed after 10th day under topical anesthesia. Follow-up was sustained for six months for the assessment of abnormal findings, complications, and patency.

We studied the surgical success rate, frequency of complications postoperatively, treatment, regurgitation, and patency of the lacrimal duct in both the groups. Data were analyzed using SPSS Version 20.0 through percentage and frequency, with the Chi-square being applied to find out the P-value. The P-value was set at ≤ 0.05.

RESULTS

The mean age of Group A patients was 34.5±5.8, and the Mean age of Group B patients 32.5±4.65.

Table 1: Shows frequency and percentage of patients' recovery within six months in Group A and B. Significant Difference (P-Value ≤ 0.05) was seen between the two groups.

Figure 1.1: Shows Percentage of Post-operative Assessment among Different Groups

Table No.1: Frequency and percentage of overall success rate within six months among different Groups

Overall Rate of Success	Group A	Group B	P-value
Full	41(82%)	32(64%)	≤0.001
Partial	7(14%)	13(26%)	
Nil	2(4%)	5(10%)	
Total	50(100%)	50(100%)	

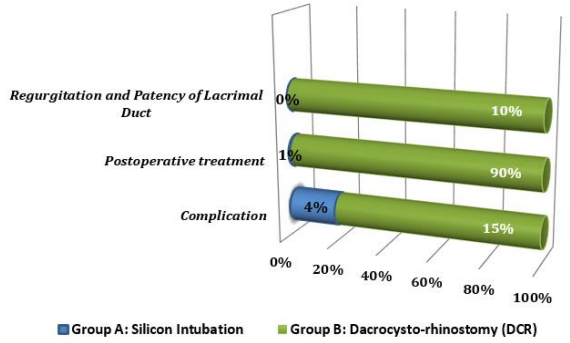

Figure 1.1: Shows Percentage of Post-operative Assessment among Different Groups

DISCUSSION

The study was conducted and designed to evaluate how successful Silicon tube intubation and DCR with Silicon tube have in adult groups with NLD obstruction. According to our experience, the procedure's success rate is negatively correlated with the age of the patient, with previous studies showing no evidence regarding age dependent success rate.

Group A, in which silicon intubation took place, had a better six-month recovery and an overall success rate than Group B in which DCR was carried out. Group B patients suffered more Complications, postoperative treatment, regurgitation, and patency of the lacrimal duct. Common complications of NLD obstruction surgery include intranasal granulation tissue, adhesion, infection, hemorrhage, and other complications related to silicon tube [(12)].

Although our study showed that silicon intubation has a better success rate, studies have found no statistically significant advantage over either of the two surgical techniques[(13,14)]. However, several prospective comparative studies have now been published that indicate that silicone intubation with DCR has led to a higher success rate than DCR without intubation [(15, 16)]. A study showed that silicon intubation prevented the ostium's closure, thereby improving the success rate [(17)]. Similar findings can be seen in our study.

Our study showed that Silicon intubation gave a higher rate of success. This was also seen in another study in which it was concluded that double silicone intubation is a highly effective minimally invasive technique for treating partial lacrimal system obstruction[(18)]. Emphasis must also be placed that surgical procedures, complications, success rate, and even recovery can alter with the age at which treatment is sought. Our study had participants aged between 20-40. Further studies can be done on different groups to see how age plays a part. A randomized control trial was done in a study where both of these surgical procedures were carried out on patients aged 39-92 years, which was found to have no significant difference among the two groups[(19)]. The past study shows us that DCR and Silicon intubation both are safe surgical procedures in advanced age groups when treating distal and canalicular obstruction. However, there are slightly more follow ups, but with a higher success rate[(20)].

CONCLUSION

Silicon intubation is a more effective and cost-effective technique with lower complications, better recovery, and a higher success rate than DCR.

Author's Contribution:

Concept & Design of Study:	Asif Mashood Qazi
Drafting:	Nazia Qidwai, Israr Ahmed Bhutto,
Data Analysis:	Ajmal Khan Penezai, Attiya Zehra Rizvi, Umer Kazi
Revisiting Critically:	Asif Mashood Qazi, Nazia Qidwai
Final Approval of version:	Asif Mashood Qazi

Conflict of Interest: The study has no conflict of interest to declare by any author.

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