

# Crawford Tube Stenting after Failed Medical Treatment and Failed Probing in Patients with Congenital Nasolacrimal Duct Obstruction

Crawford Tube Stenting with Congenital Nasolacrimal Duct Obstruction

Anum Fatima<sup>1</sup>, Muhammad Faaz Malik<sup>1</sup>, Attaullah Shah Bukhari<sup>2</sup>, Faiza Rameez<sup>1</sup>, Saira Bano<sup>1</sup> and Kaleemullah<sup>1</sup>

## ABSTRACT

**Objective:** Assess reduction in post-operative symptoms after Crawford tube stenting in patients with congenital nasolacrimal duct obstruction (CNLD)

**Study Design:** Experimental / longitudinal study

**Place and Duration of Study:** This study was conducted at the Isra postgraduate institute of Ophthalmology, Al-Ibrahim eye hospital Karachi from January-2020 to December-2020

**Materials and Methods:** After seeking approval, a longitudinal study was conducted in which 103 patients aged 1-5 years with CNLDO were selected. In all the patients probing was carried out. After probing, a Crawford tube stent was inserted through the upper and lower punctum with the probes removed and the free ends tied to the nose. Data was analyzed using SPSS Version 21.0. Post stratification, Chi-square/Fisher exact test will be applied to assess significant association between success of the treatment. P-value<0.05 will be considered significant.

**Results:** 103 patients were included in the study, 70 (68.6%) male and 33 (31.4%) female with the mean age of patients being 3.1±1.7 years. No significant difference was seen in the 1<sup>st</sup> week and 1<sup>st</sup> month regarding discharge and regurgitation test (P=0.310, P=0.555). However, significant difference was seen in the 3<sup>rd</sup> month after treatment (P≤0.000).

**Conclusion:** Crawford tube stenting is an effective procedure after medical and probing has failed in patients with congenital nasolacrimal duct obstruction.

**Key Words:** Crawford Tube Stenting, Failed Medical Treatment, Failed Probing, Patients.

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## INTRODUCTION

Nasolacrimal duct obstruction (NLDO) is an obstruction found in the lacrimal system that most commonly produces the symptom of Epiphora<sup>1</sup>. NLD can be either an acquired condition, or it may be congenital in nature. Congenital Nasolacrimal Duct Obstruction (CNLDO) is a highly prevalent disorder found in the pediatric population. Studies of epidemiology have reported the incidence of CNLDO to be from 5-20%<sup>2</sup>.

<sup>1</sup>. Department of Ophthalmology, Isra School of Optometry, Karachi.

<sup>2</sup>. Department of Ophthalmology, Khairpur Medical College Khairpur Mir's.

Correspondence: Dr. Anum Fatima, Senior Registrar of Ophthalmology, Isra School of Optometry, Karachi.

Contact No: 0335-7485133

Email: dr.anumlaghari@gmail.com

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The reason for the development of CNLDO is a mechanical obstruction in the nasolacrimal duct (NLD) located near the valve of Hasner. Fortunately, the rate of spontaneous resolution of CNLDO is said to be 90% within the first year<sup>3</sup>. The clinical signs and symptoms of the disease include excessive tearing, mucopurulent or mucous discharge, along with a positive regurgitation test<sup>4-5</sup>. If CNLDO doesn't resolve spontaneously then medical management is necessary. Management of CNLDO includes conservative medical management that can include the administering of antibiotics, massaging of the lacrimal duct, and even probing<sup>6-7</sup>. If the above mentioned management techniques fail to resolve the obstruction and symptoms surgical procedures can then be carried out, with Dacryocystorhinostomy (DCR) being the most common procedure<sup>8-9</sup>. DCR can be carried out either externally or through an endoscopic approach. External DCR in children is reported to have an excellent success rate<sup>10</sup>. However, the success rate of Endoscopic DCR is also said to be approaching that of External DCR<sup>11</sup>. The method that surgeons adapt, either being Endoscopic or External DCR still remains controversial, with some being in favor of the external DCR approach, while

some advocate for using endoscopic DCR which is a less invasive method with various different stent materials especially silicon<sup>12-14</sup>. Since CNLDO is a very common issue in across the world, and with data in the Pakistan being very anecdotal concerning silicon Crawford tube, a longitudinal study was conducted to assess Crawford tube stenting after failed medical treatment and failed probing in patients with congenital nasolacrimal duct obstruction.

## MATERIALS AND METHODS

This experimental / longitudinal study was conducted after being granted approval from the Institutional review board at Isra postgraduate institute of Ophthalmology, Al-Ibrahim eye hospital Karachi for six months from January-2020 to December-2020. The study took place for a period of 6 months in which 103 patients aged 1-5 years with CNLDO was included through Non-probability sampling technique. The children were included in the study after taking consent from their parents or guardian regarding their inclusion in the study. Once adequate consent was taken and the patients were eligible for the study, other factors of trauma to eye, use of any eye drops, and history of active infection of the eye were taken into account. Before Crawford tube was commence, a probing range from 0.70 to 1.10mm in diameter was conducted through the upper and lower punctum. After probing the Crawford tube stent consisting of two probes was passed through first the upper punctum and then through the lower punctum, the probes then are removed and the free ends tied to the nose. All of these procedures will be performed under strict supervision with experienced consultants working in the facility. After the completing of intubation, the patients will be called for follow up on the 1<sup>st</sup> week, 1<sup>st</sup> month, and the 3<sup>rd</sup> month. At every follow up visit, patient will be evaluated for mucopurulent discharge, Epiphora, and regurgitation test. A successful treatment will be considered once there is an absence of Epiphora and discharge. At the end of 3<sup>rd</sup> month, the Crawford tube will be removed. Data was analyzed using SPSS 21.0, Mean  $\pm$  SD will be computed for age. Frequency and percentage will be computed for gender, epiphora, mucous discharge and regurgitation. Post stratification, Chi-square/Fisher exact test will be applied as appropriate to assess significant association between age, gender and success of the treatment. P-value<0.05 will be considered significant.

## RESULTS

A total of 103 patients were included in the study. 70 of these were male and 33 females. Mean age of the patients was  $3.1 \pm 1.7$  years. On presentation 90 patients had discharged, 70 had epiphora and regurgitation was present in 88 patients.

**Table No.1: Demographic data presented as frequency and percentage**

Factors	Frequency (%)
<b>Gender</b>	
Male	70 (68.6%)
Female	33 (31.4%)
<b>Mean Age</b>	3.1 $\pm$ 1.7 years
<b>Eye</b>	
Right	73 (70.6%)
Left	30 (29.4%)

**Table No.2: Symptoms after 1<sup>st</sup> week of Surgery**

Symptoms	Frequency		
	Yes	No	P-Value
• Discharge	71	32	p=0.310
• Epiphora	33	70	
• Regurgitation	69	34	

**Table No.3: Symptoms after 1<sup>st</sup> month of Surgery**

Symptoms	Frequency		
	Yes	No	P-Value
• Discharge	61	42	p=0.555
• Epiphora	26	77	
• Regurgitation	71	32	

**Table No.4: Symptoms after 3<sup>rd</sup> month of Surgery**

Symptoms	Frequency	
	Yes	No
• Discharge	50	53
• Epiphora	13	90
• Regurgitation	53	50

## DISCUSSION

Patients are not immediately subjected to surgical intervention when dealing with CNLDO, instead observation is first considered. Later on, medical management and probing is initiated. Once we have exhausted all the options, only then surgical treatment might be considered necessary. In our study, a Crawford tube was used to treat CNLDO. Our study showed that in the 3<sup>rd</sup> month of post-operative follow up, a significant reduction in symptoms and obstruction was seen. This finding is a similar finding to another study, in which all patients showed a reduction in symptoms after undergoing double silicon intubation, stating that it is an alternative to DCR in children who had undergone conventional treatment for nasolacrimal obstruction<sup>15</sup>. The procedure that we performed was simple and very effective as it was able to relieve the symptoms of CNLDO. Another study conducted by Memon et al (2012), in which olive tip silicon intubation was used to resolve CNLDO showed that an overall success rate of 89% was seen in children aged 12-48 months of age. 92% success rate in children under the age of 2 years (P<0.0001), and 90% in children aged 2-3 years (P<0.0001). The study

concluded that silicon intubation with an olive tip is highly successful as primary treatment<sup>16</sup>. We removed the Crawford tube at the end of the 3<sup>rd</sup> month, another study has shown that a greater treatment outcome can occur if the silicon tube was placed in situ for more than 6 months<sup>17</sup>. Using silicon tube is also beneficial because of the fact that it prevents the formation of granulation tissue which could have created obstruction around the newly created patent tract<sup>18</sup>. Crawford tube can be used to only treat symptomatic Epiphora in patients in which there isn't any nasolacrimal duct obstruction, as demonstrated by Tong et al (2016) who showed that Crawford tube is simple, safe, and effective in relieving functional Epiphora<sup>19</sup>.

## CONCLUSION

Crawford tube stenting in patients with failed medical treatment and failed attempts of probing in patients with congenital nasolacrimal duct obstruction is an effect means of treatment. It is relatively simple and can be done with minimal complications. We recommend that this should be used more often. Larger and multicentric studies are needed for assessing results better.

### Author's Contribution:

Concept & Design of Study:	Anum Fatima
Drafting:	Muhammad Faaz Malik, Attaullah Shah Bukhari
Data Analysis:	FAiza Rameez, Saira Bano, Kaleemullah
Revisiting Critically:	Anum Fatima, Muhammad Faaz Malik
Final Approval of version:	Anum Fatima

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

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