Original Article

Dacryocystorhinostomy: Clinical Practice Patterns among Ophthalmologists

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ABSTRACT

Aim: To determine practice patterns of ophthalmologists regarding indications and operative dacryocystorhinostomy steps.

Study Design: Cross-sectional study (online survey).

Duration and Settings of the Study: October 20, 2024 to October 27, 2024, as an online survey.

Methods: This cross-sectional study was carried out by office bearers of the Pakistan Oculoplastic Association (POA). A survey questionnaire was created at Google Forms, and the link was sent to Pakistani ophthalmologists via WhatsApp groups. It contained demographic data of the surgeons performing DCR surgery and their practice/opinion regarding different operation steps.

Results: A total of 53 participants responded, with the number of responses for individual questions ranging from 48 to 53. The age distribution was <30 years (7.5%), 30-50 years (54.7%), and >50 years (37.7%). The sex distribution comprised 71.7% male and 28.3% female. Regional distribution showed that 50.9% of participants were from Punjab, 30.2% from Khyber Pakhtunkhwa (KPK), and 17.0% from Sindh. Surgical experience in dacryocystorhinostomy (DCR) ranged as follows: <10 years (26.9%), 11 to 20 years (48.1%), and >21 years (25.0%). The number of external DCR procedures performed varied: Among the participants, 37.7% performed less than 100 cases; 13.2% performed 101 to 200 cases; and 49.1% performed more than 200 cases.

Conclusion: There are multiple variations in the external DCR operation steps. Surgeons should be aware of all the possible options to select the best ones.

Keywords: Dacryocystorhinostomy; Practice Preferences; Pakistani Ophthalmologists.

INTRODUCTION

Nasolacrimal duct obstruction (NLDO) results in watering (epiphora) of the eye. NLDO is addressed by creating a functional passage from the lacrimal sac to the nose. This passage or fistula is created by removing the medial wall of the lacrimal sac, the nasal mucosa in front of the middle turbinate and the osteotomy (removal of the bone). The concept was introduced by an oculist from Andalusia, Muhamad Ibn Aslam Al Ghafiqi, in the 12th century AD[1]. He described the technique as a small instrument shaped like a spear that makes a hole in a nasal direction in the lacrimal bone "*until blood flows through the nose and mouth."*[1] Toti, an Italian, described the modern-dayexternal Dacryo Cysto Rhinostomy (DCR) in 1904. Concept of endoscopic endonasal (endo) DCR was given by Caldwell (1893), however, modern-day use of nasal endoscopes was described by McDonogh and Meiring (1989). With the formation of a large bony opening and the formation of mucosal flaps, the results of endo DCR are approaching the external DCR. In spite of new developments in endo DCR, the transcutaneous or external technique is still the most frequent all around the world including in the USA.[1] In 2013, a survey was conducted regarding DCR amongst members of the American Society of Ophthalmic

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Plastic and Reconstructive Surgery (ASOPRS) and found that 94% of respondents were performing external DCR and 63% were offering endonasal.[2] Another survey published in 2024 in the European Journal of Ophthalmology reported that 61 % of oculoplastic surgeons preferred external DCR.[3]

Because external DCR is still the most popular technique, we wanted to analyze demographic details of the external DCR surgeons and which options in different external DCR steps are practiced most.

METHODS

This cross-sectional study was carried out by office bearers of the Pakistan Oculoplastic Association (POA). A survey questionnaire was created at Google Forms and the link was sent to ophthalmologists, including members of POA via WhatsApp groups on October 20, 2024. It contained demographic data of the surgeons performing DCR surgery and their practice patterns regarding different operation steps. Thirty-one questions were included in the survey. A request for participation was sent to different WhatsApp groups including Pakistan Oculoplastic Association (POA) and Regional Ophthalmological Society of Pakistan (OSP) groups. The setting of the Google Forms was adjusted so that only one response could be initiated from one surgeon. No honorarium was paid, and no other incentive was offered to participants for filling out the form. The survey was anonymous and the responses were collected till one week after sharing the link (on October 27, 2024, the link was closed). Permission of the Institutional Review Board of LRBT Hospital, Multan Road, Lahore was taken before conducting the study.

RESULTS

A total of 53 participants responded to the survey. Responses were analyzed to assess current practices and variations in external DCR among ophthalmic surgeons. More than half (54.7%) of the participants were experienced surgeons aged 3050 years including 71.7% male ophthalmologists. Almost 50.9% surgeons were practicing in Punjab. Surgeons with eleven years of experience in DCR surgery were 48.1% (Table 1).

Table 1: Demographics and surgical experience of respondents (n=53)

Variable	Category	Percentage	n
Age group (years)	<30	7.5	53
	30-50	54.7	
	>50	37.7	
Sex	Male	71.7	53
	Female	28.3	
Geographical location	Punjab	50.9	53
	KPK	30.2	
	Sindh	17.0	
DCR experience (years)	<10	26.9	52
	11-20	48.1	
	>21	25.0	
Number of external DCRs performed	<100	37.7	53
	101-200	13.2	
	>200	49.1	

n=frequency; DCR=dacryocystorhinostomy;KPK=Khyber Pakhtunkhwa,<=less than,>= morethan

The predominant indication for surgery was multiple attacks with chronic swelling, reported by 68.1% of respondents.Probing and syringing was preferred by 83.3% respondents (Table 2).

Table 2: Indications and preoperative work-up

Variable	Category	Percentage	n
Indication for surgery	Multiple attacks only	14.9	48
	Multiple attacks + chronic swelling	68.1	
	Single attack + chronic swelling	12.5	
Nasal examination before surgery	Yes	88.7	53
	No	11.3	
Investigations ordered	Yes	92.6	53
	No	7.4	
Probing and syringing	Yes	83.3	53
	No	16.7	

N=frequency, +=plus

Type of anesthesia and intraoperative technique for DCR surgery are summarized in table 3.

Table 3: Anesthesia and intraoperative surgical technique

Variable	Category	Percentage	n
Type of anesthesia	General anesthesia	43.4	53
	Local anesthesia	50.9	
	MAC	5.7	
Adrenaline injection in GA	Yes	83.3	53
	No	16.7	
Timing of nasal packing	20-30 min before surgery	35.2	53
	Just before surgery	64.8	
Skin incision	Straight	55.6	53
	Curved	44.4	
Exposure method	Lacrimal retractor	37.5	48
	4-0 silk suture	60.4	
Medial canthal tendon cut	Yes	58.3	48
	No	41.7	
Osteotomy tool	Kerrison punch	52.0	53
	Chisel	5.6	
	Bur	13.0	
	Punch	31.5	
Preservation of nasal mucosa	Frequently	72.9	48
	50% of cases	25.0	

n=frequency; GA=general anesthesia; MAC=monitored anesthesia care

Surgical procedures such as flap-closure, skin closure and post-operative management are given in the table 4. Advanced techniques, such as endoscopic and laser-assisted DCR procedures, were also performed by the surgeons.

Table 4: Flap Closure, postoperative management, and advanced techniques

Variable	Category	Percentage	n
Flap suturing	Anterior flap only	73.6	53
	Both flaps	24.5	
Use of mitomycin-C	Yes	8.7	46
	No	91.3	
Systemic antibiotics	Yes	95.8	48
	No	4.2	
Skin closure suture	Vicryl	81.5	53
	Silk	7.4	
	Prolene	9.3	
Intubation without canalicular block	Yes	72.2	53
	No	27.8	
Nasal packing duration	None	13.2	53
	1 day	79.2	
	>1 day	7.5	
Success monitoring method	Epiphora	61.1	53
	Syringing	3.7	
	Both	35.2	
Endoscopic DCRs performed	None	63.0	53
	<5	22.2	
	650	9.3	
	>50	5.6	

n=frequency; DCR=dacryocystorhinostomy

DISCUSSION

Distribution of age reflects that the majority of the survey participants were specialists (30 - 50 years old) and an additional one-third were senior consultants. Male were double to the female. Half were from Punjab, one-third from KPK and the remaining from Sindh, which reflects the normal distribution of the Pakistan population. Most respondents were senior surgeons. This is evident from the fact that half had DCR experience of 11- 20 years and an additional quarter were more experienced (only one-fourth had less than 10 years' experience).

Though the most common indication for DCR is epiphora, the vast majority of our respondents thought that another indication was if patient presented with a history of multiple attacks of dacryocystitis and if there was chronic lacrimal sac swelling. The American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS) members, when surveyed, considered the most common preoperative evaluations, tearing history (99%) and probing/irrigation of the lacrimal system (99%).[2] The vast majority of our respondents, almost 88.7% favored nasal examination prior to DCR surgery and investigations before surgery. They also preferred probing and syringing. Pakistani studies such as Matloob et al. highlight the routine of nasal examination and probing syringing.[4] Zaman et al. and Khan et al. studies reported regurgitation test and probing syringing were done preoperatively, while Schirmer`s test, the Jones dye test or dacryocystography were not been considered necessary.[5,6]

In adults, half of the surgeons preferred General Anesthesia (GA) while the rest liked Local Anesthesia (LA). In Pakistani studies, all cases of external DCR were done under LA in the Zaman et al. study[5] however, cases were done under GA in other studies.[4, 6, 7] It reflects that both LA and GA are equally popular in our setup. Though many surgeons are comfortable doing DCR under GA yet LA has some peculiar

advantages e.g. less bleeding, a short recovery period and cost-effectivity. LA avoids systemic complications before, during and after the operation in patients who have high GA risks.[8] Most of our respondents liked to administer local adrenaline injection in GA. Pakistani studies confirmed this trend.[4,7] It certainly improves hemostasis. Two-thirds of our survey participants applied adrenaline-soaked nasal packing just before DCR (Only one third applied 20-30 minutes before). Ideally adrenaline nasal packing should be given time to act, but practically, it is cumbersome to prolong GA or do packing in a conscious patient.

Half of our surgeons made a straight skin incision, though a curved (C-shaped) incision has its own peculiar advantages. In a Khan et al. study, all incisions made were slightly curved[6]. The majority of our ophthalmologists used 4/O black silk retraction sutures for exposure and hemostasis.

More than half cut the medial canthal tendon for better exposure and half use Kerrison rongeur for bone nibbling (one-third prefer Hardysella punch). The Matloob et al. study reported the use of the Kerrison rongeur.[4] A report, however, emphasized the advantages of drill assisted DCR including a decrease in operation time, reduced bleeding during the operation and more regular edges of the bony opening.[9]

Three-fourths of survey participants were able to save the nasal mucosa from removal by elevating it during bone removal, while the remaining were able to preserve the nasal mucosa in 50 % of the cases. Three-fourths of our respondents would stitch only anterior flaps and the rest would stitch both anterior and posterior flaps. In the Matloob et al. study posterior flaps were excised in all the cases and only anterior flaps were stitched with 6/O Vicryl.[4] While in the Khan et al. study, the success rate in DCR (with suturing of the posterior flaps (97.1%) and in DCR with excision of posterior flaps (94.3%)) was comparable, with no statistically significant difference.[6] Removal of the medial wall of the lacrimal sac with suturing of the remaining portion of the anterior sac with the nasal mucosal was compared with incision of the sac (H-shaped) and found to be equally effective.[10] In another study, flapless and single anterior flap DCR, were both effective and had a similar success rate.[11] One Pakistani study mentioned suturing of posterior flaps only.[12]

More than 90 % of survey respondents used pre/peri/post-operative systemic antibiotics. The Matloob et al. mentioned the use of systemic antibiotics.[4] International literature, such as Boal et al. however, supported the fact that routine use of antibiotics (in endo DCR) was not beneficial except when there was recent/current dacryocystitis.[13] More than 90% of our respondents did not use Mitomycin C (MMC). A metanalysis by the American Academy of Ophthalmologists, however, concluded that mitomycin C (MMC) application during the DCR operation resulted in a larger size of the opening due to decreased formation of granulation tissue.[14] External DCR success was 98% with MMC and 86% without MMC, while in Mukhtar et al. used 0.2 mg/ml MMC for 10 minutes.[12] External DCR with 5- fluorouracil (5-FU) has been compared with DCR with silicone intubation and the two groups have been found to be almost equivalent as far as the success rate is concerned.[15] The vast majority of our surgeons used Vicryl to close the skin wound. A small percentage preferred Silk and Prolene. While Prolene use was mentioned by the Mukhtar et al.[12]

Three-fourths of our surgeons passed silicon tubes even when there was no common canalicular obstruction and the same number did not regularly perform syringing at the end of the operation. The majority of ASOPRS members preferred bicanalicular Crawford stents (76%).[2] The Nair et al. found that 58% of surgeons did not place silicon stents routinely.[16] In another study, bicanalicular silicon tube intubation was not found to improve the success of the endo DCR.[17, 18] A few Pakistani studies such as the Matloob et al. did not mention silicon intubation.[4] The

vast majority of our DCR surgeons did post-operative nasal packing for one day. In Pakistani literature the nasal pack was mostly removed after one day.[4, 6] Half of the surgeons removed the sutures 7-8 days after the operation. While Matloob et al. mentioned the removal of sutures after six days.[4]

In bilateral external DCR cases, the vast majority of our respondents would operate with >2 weeks interval. More than half (52%) of ASOPRS members preferred simultaneous bilateral external DCR.[2] In literature, however, simultaneous bilateral DCR was found to be equally effective as sequential surgery.[19] In the Matloob et al. study, most females, 25 (68%) preferred =1 year duration for second eye DCR surgery as compared to males, 6 (16%).[4]

More than half of our surgeons considered DCR successful if epiphora improved but one-third reported that additional syringing was also required. The Giordano et al. [20] and the Khan et al.[6] also labeled DCR as successful if both epiphora improvement and patency (confirmation by syringing) were present. Additional nasal endoscopy was considered in one Pakistani study, such as Matloob et al.[4] Another survey sent via email (containing a link to the Google forms) found that irrigation of lacrimal passages (91%) and endoscopy of the nose (67%) were used for evaluation of a failed DCR.[21] Half of our surgeons thought that the earliest age for external DCR was 67 years, while the rest believed it was >8 years.

Half of the surveyed surgeons preferred to remove silicon tubes >46 months after the operation while one-third surgeons were of the opinion to remove at >2 - 4 months. ASOPRS members prefer to remove tubes during the 2nd month (35%) and the 3rd month (36%) after the operation.[2] In another study, tubes were removed at 6 months.[20] In Mukhtar et al.[12] and Khan et al.[6] studies, silicon tubes were removed at 6 weeks and 3 months respectively.

One fifth of our respondents had little experience (<5) of endonasal endoscopic DCRs and a similar number have performed (<5) transcanalicular Laser-assisted DCRs. The advantages of endoscopic DCR were choice of the patients, no scar, and previous failed DCR, while selection of the external DCR was due to a higher success rate and the choice of the physicians.[2] In the the Tariq et al. study, the functional success rate for external DCR (73%) was comparable with that of endonasal DCR (77%).[7] A few advantages of endo DCR (when compared with external DCR) include no external (skin) scar, higher success rate, reduced operation time, less bleeding during the operation, shorter duration of hospitalization and fewer complications.[22] But even scar after external DCR was found to be invisible in 92 % of the cases.[20] The success rate of transcanalicular laser DCR has been found to be less than the success rate of external DCR. The former being a less invasive surgery with a reduced operation time, may be preferred in elderly patients who are unfit/have a high risk for GA.[23] One study found the endo DCR success rate to be 84%, [24] while another study found it to be 94% equivalent to external DCR (92%) in 600 cases with 6 months of follow-up.[25]

Conclusion: There are multiple options and variations in the external DCR operation steps. A surgeon should be aware of all the possible options to select the best ones.

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Authors' Contributions:

KKS: Conceptualization and design of the study, drafting, review and final approval of the final manuscript and agrees to be accountable for all aspects of the work.

SI: Data acquisition, review and approval of the final manuscript and agrees to be accountable for all aspects of the work.

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