Management of Lacrimal Pathway Obstructions: A Deliberation

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The lacrimal drainage pathway starts from the punctum in the eye, traversing the upper and lower canaliculi, common canaliculus, lacrimal sac and the nasolacrimal duct (bony and cartilaginous parts), finally opening in the inferior meatus of the nose.

Blockage of this pathway manifests as epiphora, with or without muco-purulent discharge. Partial or complete nasolacrimal duct obstruction has been described as the commonest cause of this, among patients referred to oculoplasty setups. NLD obstruction (NLDO) may be congenital or acquired, the latter being mostly idiopathic.

Although treatment protocols for congenital and acquired NLDO are slightly different, dacryocystorhinostomy (DCR) is the only definitive treatment. External DCR with its reported success rates of 90-95% is still considered to be the gold standard.

To achieve these objectives, newer techniques of endonasal and of transcanalicular DCR have been developed, using a variety of instruments as well as different types of lasers. The use of stents and antimetabolites is speculated to increase the success rate. Silicone stent has been hypothesised to prevent postoperative osteotomy site obstruction and improve the success rate of the procedure by facilitating recanalization and epithelialisation of the passage.

Smriti Nagpal - Q. What is the ideal management of congenital NLDO? At what minimum age do you recommend DCR surgery?

Pelin Kaynak: In my practice I prefer to perform probing under inferior nasal endoscopic guidance. I intubate when there is a complex obstruction in the duct. I choose to do a DCR when there is a mucocele at any age (my youngest patient is 9 month old). If symptoms are on and off, I wait until 4th year but I don’t think there is enough evidence to postpone surgery.

Mukesh Sharma: I manage congenital NLDO conservatively with local antibiotics & Criggler’s massage up to the age of 10 months. If the patient does not improve, then we do syringing and probing under general anaesthesia and we try not to delay it beyond 1 year. Early probing is done in cases with acute dacryocystitis and mucocele - even as soon as the age of 1 month . We do it under endoscopic guidance specially in all repeat probing cases, alongwith ‘in-fracture’ of the inferior turbinate wherever there is difficulty in probe retrieval or presence of an enlarged turbinate.

We never do paediatric DCR at less than 4 years of age and as a principle always perform one probing ourselves even in older children (up to 7-8 years) before doing DCR.
Mohammad Javed Ali: I do not think there is anything called "ideal management" for Congenital NLDO (CNLDO). I mostly manage the infants conservatively till their first birthday to give a chance to spontaneous resolution, which is a part of natural history of the disease. Based on the types of CNLDO and their complexities, various options for management include probing, intubation and balloon dacryoplasty. Special surgical techniques are employed in the management of complex CNLDO’s like intranasal cysts and buried probe. All these make DCR surgery in pediatrics quite rare. Age at the time of DCR surgery, (if required), is guided by multiple factors like complications (for example, recurrent acute dacryocystitis) and the need to address urgent ocular co-morbidities (for example, congenital glaucoma or unilateral dense cataracts).

Ruchi Goel: Spontaneous resolution is an accepted outcome in 96% cases by about 9-12 months of age. Criggler’s massage twice-daily with gentle inward pressure applied to the lacrimal sac for 2–3 seconds, is to be performed when discharge is present, along with topical tobramycin sulfate 0.3% four times a day. The massage creates a hydrostatic pressure that opens the nasolacrimal duct. It also empties the sac decreasing the chances of bacterial infection. Moxifloxacin 0.5% is also used by some surgeons. Though delayed probing decreases its success rate, I prefer to intervene between 9-12 months. Endoscopic guided probing is an extremely effective procedure. Repeat probing, if needed, can be performed after 3 months and can be combined with fracture of inferior turbinate if required. Children presenting even at the age of 3 or 4 years can be given a trial of probing. Silicon intubation is performed if probing fails more than twice or thrice, at age > 2yrs and if there is persistent mucosal block. Silicon tubes are kept in place for a minimum of 6 weeks. I perform DCR after 4 years of age.

Summary (Smriti Nagpal): Most surgeons prefer to manage conservatively till 9-12 months of age, with topical antibiotics and Criggler’s massage. If symptoms persist, a trial of 1 to 3 probings is given before attempting silicon intubation or balloon dacryoplasty. DCR is generally preferred after the age of 4 years.

Smriti Nagpal - Q. What is the role/status of antimetabolites like MMC and of silicone stents in DCR surgery today? (Figures 1,2) In which cases would you use them?

Pelin Kaynak: I use them in re-do cases. Silicone tube is a must in a transcanalicular laser assisted DCR for smooth re-epithelisation of the canaliculi.

Mukesh Sharma: We use silicon stents in all cases with high chances of failure (failed DCR’s, pediatric DCR’s, patients with associated common canalicular blocks, traumatic blocks etc). I am against the use of stents in all cases because of the potentiality of inducing fibrosis even in otherwise well behaving cases. I use MMC extremely rarely, mainly in cases where very significant fibrosis is encountered on the table. I still feel long term safety profile of MMC may not be predictable, especially since we see many cases of scleral necrosis after the use of MMC in pterygium surgery.

Mohammad Javed Ali: Recent meta-analysis on the use of adjuncts have not come out with clear guidelines as to the efficacy of MMC or silicone stents. However, the overall general trend slightly favours the use of adjunctives and the evidence gets stronger in revision cases. There was a controversy also with regards to the concentration and duration of MMC to be used and duration of retention of stents and both these have now been reasonably addressed. Since I almost always use endoscopic approach, MMC (0.2 mg/ml, 3 mins) and intubation (4 weeks only) are used routinely by me as of now. I may change this practice in future if convincing evidence sees the light of the day in literature.

Ruchi Goel: There have been variable reports regarding the concentration, duration and time of application of MMC. The mean concentration of MMC used was 0.3 mg/ml (range 0.02-0.75 mg/ml) and mean duration of application 18 min (range 2-30 min). It has been used both intra as well as postoperatively. Silicone stents also are known to increase the success rates in DCR. However stents themselves have their own set of
complications like damage to the canaliculi and occurrence of infections.
I do not use any of these adjuvants in primary DCR. In failed cases or difficult cases I prefer to intubate for a period of 6 weeks in both external as well as endoscopic DCR. I rarely use MMC.

Summary (Smriti Nagpal): Use of silicone stents is advocated for failed or difficult cases, while MMC is rarely used in external DCR. It still has a role in endoscopic approach. Some surgeons prefer to intubate all patients of endoscopic DCR, however one must remember that silicon stents are also associated with complications like punctal injury, infections etc and should be retained for a limited period of time only.

Smriti Nagpal - Q. Which one do you prefer External or Endoscopic approach? If Endoscopic, endonasal or transcanalicular?

Pelin Kaynak: External DCR is my favourite. If the patient wants scarless DCR, then I perform endonasal or transconjunctival DCR in selected cases.\textsuperscript{18,19}

Mukesh Sharma: I believe that the potential of encountering problems of associated proximal lacrimal drainage system (up to common canaliculus), which is there in up to 20% cases, simply too great to avoid external DCR. Similarly the flexibility of flap design, suturing and hitching, and the option of removing fistulous tracts in the same surgery is not there with endonasal DCR.

Sometimes I combine external DCR with endoscopic nasal examination & augmentation in cases with nasal problems (turbinate hypertrophy etc).
I do not agree that external DCR, if done properly, has major cosmesis and bleeding issues.
I have no experience of doing transcanalicular laser DCR – but have some reservations about inducing common canaliculus block by misfiring laser and about having insufficient bony opening.

Mohammad Javed Ali: I perform Powered Endoscopic DCR with a 360\degree mucosa to mucosa approximation, a technique which I believe is the most physiological among the existing approaches.\textsuperscript{20,21} The success of this approach in the hands of trainees and less experienced surgeons is also encouraging.\textsuperscript{22}

Ruchi Goel: In patients unwilling for follow up, those with nasal abnormalities precluding endoscopy, Wegener’s granulomatosis, sarcoidosis, post traumatic cases requiring simultaneous repair of other deformities and suspected malignancies, I would perform external DCR. In others Laser DCR with surgical augmentation is my preferred approach. In acute dacryocystitis, endoscopic route is my first line of treatment as it facilitates the resolution of disease much faster than external approach.

Mukesh Sharma: In all canalicular blocks associated with patent NLD (patent syringing through other punctum), I prefer doing canalicular trephination & passing a monocanalicular stent (leaving it in situ for 3 months) with reasonably good results (75\% in our series of 16 cases). In all canalicular blocks associated with blocked NLD, I go for canaliculo-DCR (block at \( \geq 8\) mm) or conjunctivo-DCR (block \(<8\) mm), depending on the site of canalicular block.

Canalicular endoscopy appears to be quite promising to visualize the system and deal with blocks, but I do not have any personal experience of its use.

Mukesh Sharma: I do not think there is anything called “ideal management” for canalicular blocks. I attempt Sisler’s canalicular trephination under endoscopic guidance, for any canalicular blocks at or beyond 5 mm, followed by intubation. The role of canalicular endoscopy in diagnostic settings is well established, but the same is still not true for therapeutic indications.\textsuperscript{25,26}

Ruchi Goel: To recapitulate, the mean length of the vertical part of the lacrimal canaliculi, both inferior and superior, is about 2 mm (from 1.7 to 2.2 mm), the length of the horizontal portion of the lower lacrimal canaliculus 10 mm (from 7 to 13 mm), and that of the horizontal fragment of the upper lacrimal canaliculus 9 mm (from 6 to 12 mm). The mean length of the common part of the lacrimal canaliculi (after fusion of the two canaliculi in one) is 3 mm (from 1 to 5 mm).\textsuperscript{27}
Canalicular block is one condition which at times is frustrating to treat. Canalicular endoscopy enables the surgeon to directly view and localize the obstructions. It helps in differentiation between inflammatory, partial, and complete stenosis serving as a useful adjunct.\textsuperscript{28} Endoscopic Erbium (Er)-YAG laser treatment combined with silicone intubation in presaccal canalicular obstruction has been effectively used to canalize scar thickness of 2.0 mm.\textsuperscript{29} Partial blocks fare well with probing followed by intubation. Complete canalicular blocks require trephination with intubation. In post-traumatic cases or those with extensive fibrosis, in blocks proximal to 8 mm, I perform conjunctivo-DCR and for blocks 8 mm and beyond, DCR with trephination with silicon intubation.

Summary (Smriti Nagpal): In isolated canalicular blocks, canalicular trephination followed by monocanalicular intubation, if possible, is mostly practiced. Canalicular endoscopy and UBM (ultrasound biomicroscopy) helps to better assess and manage the situation. In patients with associated NLDO or when both canaliculi are blocked, for blocks at or distal to 8 mm, canaliculo-DCR or trephination followed by DCR with bicanalicular intubation is done, while for blocks proximal to 8 mm, conjunctivo-DCR is the preferred surgery.

Smriti Nagpal - Q. What would be your line of treatment in case of punctal stenosis? Role of punctal plugs? or monocanalicular stents?

Pelin Kaynak: Etiology directs us here, as well. In most cases punctal eversion and/or dry eye must be treated as well. I dilate and place a punctal plug in pure punctal obstruction. A monocanalicular stent will also do the work.

Mukesh Sharma: I prefer using plugs, because I avoid trying to negotiate and sometimes damage the otherwise healthy canalicular lining while passing a monocanalicular stent. Although sometimes plugs may be lost, but they can be replaced & reinserted.

Mohammad Javed Ali: My understanding of punctal stenosis has undergone a paradigm shift since our fundamental studies on it and our past experience with punctoplasties.\textsuperscript{30,31} Since the last one and a half years, I have given up on punctoplasty or any surgical cut on punctum. I dilate all cases of punctal stenosis (severe stenosis may require specialized rapid taper dilators) followed by monocanalicular stents (monokas or Monoka-crawford based on various indications). The stents are retained for 6 weeks only, to prevent them from acting as serious biofilm nidus.

Ruchi Goel: Acquired punctal stenosis is defined as a diameter of less than 0.3 mm or the inability to intubate the punctum with a 26 G cannula (outer diameter 0.47 mm) without dilation.\textsuperscript{32} Stenosis of the external lacrimal punctum may be accompanied by individual or common canalicular stenosis. I have performed snip punctoplasty especially 2 snip procedure, with good outcomes. Lately, the perforated punctal plugs are inserted after dilating the punctum in the office setting. These are kept for about 2 months. Long term results are still awaited.

In patients with combined punctal and canalicular stenosis, dilation followed by implantation of mini-Monoka® stent is preferred. Again, long term results are not known.

Summary (Smriti Nagpal): In patients with punctal stenosis, the punctum is generally dialted with graded punctal dilators, followed by insertion of a punctal plug or a monocanalicular stent. Some surgeons may avoid stents since there is risk of damaging the canalculus while others prefer them to plugs, since the latter get displaced more easily, and also can’t deal with coexisting canalicular narrowing if present. Snip punctoplasty may be done in cases where dilatation is not possible or fails. The cause of punctal stenosis must also be evaluated and managed alongside.

Smriti Nagpal - Q. What are your views on the newer approaches to external DCR surgery: subciliary and transconjunctival?

Pelin Kaynak: Subciliary incision hides the scar on the lid beneath the lash line. Transconjunctival DCR\textsuperscript{16,19} really hides the scar in the medial fornix. The latter is harder to do and takes longer time. In my hands, an external DCR with a 7-8 mm incision in the nazojugal fold heals perfectly well with negligible scarring with 98% success. My dear colleague, Mohsen Kashkouli has published a 5 mm incision DCR with high success. I have not come down to that size, yet.

Mukesh Sharma: I prefer doing it with a standard hockey stick incision. I do not see any cosmetic disfigurement with proper suturing technique, with standard incision.

Mohammad Javed Ali: The subciliary approach was published by our group in 2014 and the transconjunctival approach by Pelin Kaynak from Turkey. I think these options can be seen as a bridge between an external and endoscopic approach. Both these techniques require high level of skill and excellent anatomical orientation. A word of caution is to be careful about the lacrimal pump in the subciliary approach and fat prolapse into the ostium in the transconjunctival approach.

Ruchi Goel: Both these approaches aim to avoid a visible scar. In patients, seeking scarless surgery I perform surgically augmented Laser DCR. I have not tried these incisions.

Summary (Smriti Nagpal): While both subciliary and transconjunctival approaches hide the scar better than external DCR, they require high level of surgical skill, have a longer surgical time and are associated with their own set of complications like fat prolapse. Most surgeons prefer doing endoscopic DCR in patients where scar of external DCR is to be avoided.

Smriti Nagpal - Q. What would be your management protocol in a case of failed DCR? What are the common causes of failure you have encountered in your practice? Do you do DCG in all failed cases? (Figures 3,4)

Pelin Kaynak: I prefer a re-DCR in failed cases, if the patient is operated elsewhere. Ocular surface disease related canalicular strictures, and narrowing of the ostium, are the
most common cause of DCR failure in my practice. I order a DCG if I plan to perform endoscopic DCR and there is suspicion of sac tumor or foreign body.

Mukesh Sharma: For failed DCR’s, it is very important to properly analyze the causes of failure, which may include:

- Improper diagnosis - associated canalicular blocks
- Incorrect technique
  - Sac flaps not correctly made/improperly sutured
  - Creating canalicular block due to incorrect surgical maneuvering
  - Inappropriate size/location of bony opening
  - Sump syndrome
- Post operative complications - hematoma/infections
- Most common cause of failure is soft tissue block (common canaliculus and sac level) rather than inadequate bony opening

We reserve DCG only for rare cases with uncertain location of block, otherwise syringing & probing alone is sufficient in most cases. We do a nasal endoscopic exam in all failed DCR’s.

Regarding management of failed DCR cases, we approach the patient on a case to case basis – deal with canalicular blocks if present, try enlarging the previous bony opening (to about 15-18 mm) or change the location of ostium if required, try to retrieve residual nasal and sac tissue for flaps or suture with surrounding soft tissue. We use stent in all previously failed cases and rarely we use MMC, only in cases with lot of fibrosis.

Mohammad Javed Ali: Failed DCR from my perspective is a surgical challenge. The core focus should be directed to identify all the possible causes of failure and endoscopic examination is vital for this. The common causes I noticed while revising DCR’s include cicatricial closure of ostium, inadequate past osteotomy and inadequate sac marsupialization in the primary surgery. Additional intranasal factors (DNS, Concha, Sac in sinus) that were not addressed in the primary surgery also contribute to failures. I do not perform DCG in routine failed cases since it does not add much to the clinical and endoscopic examination.

Ruchi Goel: I will divide the failed DCR cases into primary failure and those with repeated failures. In the former group, many a times a half-hearted effort to create the osteotomy is the culprit! A small or too high an osteotomy, scar tissue covering the passage, common canalicular blocks and redundant sac remnants are some of the common causes. In patients with recurrent failures it is imperative to rule out chronic inflammation like tuberculosis.

No I do not do DCG in all cases as most of the patients can be assessed clinically.

Summary (Smriti Nagpal): After carefully assessing the cause of failure, most prefer to do a re-DCR, either external or endoscopic, with silicon stents if needed. DCG is not routinely used except in cases where there is suspicion of sac tumour or foreign body or when location of block is uncertain.

Smriti Nagpal - Q. What are the definitive indications for conjunctivo-DCR (CDCR), which technique do you prefer? Do you use laser for the same? (Figure 5)

Pelin Kaynak: Bicanalicular, untreatable obstructions that failed recanalization, are the candidates for CDCR. These are
mostly post-traumatic obstructions. When there is history of trauma Ho:YAG laser is a perfect tool. Diode laser also facilitates the surgery, however has a higher thermal spread. Conventional surgery works very well, too. I prefer to inject Botulinum toxin-A into the lacrimal gland in most of these cases.

Mukesh Sharma: We do conjunctivo-DCR for cases with proximal canalicular block along with NLD block (<8 mm) and in cases with complete fibrosis of lacrimal drainage system including punctum. We do it the traditional way – by making a stab incision through caruncular area, via sac, anastomosis into the nose and threading the tract with glass tube.

Mohammad Javed Ali: Indications for conjunctivoDCR for me include punctal agenesis, complete proximal canalicular blocks and post-traumatic loss of proximal lacrimal system (provided medial canthal anatomy is not grossly disturbed). I prefer doing endoscopic CDCR with placement of frosted Jones tubes or the dual flanged Gladstone-Putterman tubes. I do not prefer using lasers since I would require a good and healthy mucosa in the vicinity of the pyrex tube.

Ruchi Goel: In patients with complete proximal blocks involving both upper and lower canaliculi, 8mm from punctum, I prefer to do conjunctivo-DCR. In post-traumatic cases requiring additional procedures like correction of telecanthus, ectropion etc I prefer external approach. In others, if there is no contraindication to nasal endoscopy I do Laser conjunctivo-DCR. Our method of ‘Mirror tuck technique for tube fixation’ with 6-0 prolene has solved the problem of tube extrusion. I use straight glass by pass tube without holes that is easily available at a minimal cost.

Summary (Smriti Nagpal): Proximal bicanalicular blocks or punctal agenesis cases where past attempts at recanalization have been unsuccessful, or patients with post-traumatic loss of proximal lacrimal system, are candidates for conjunctivo-DCR. Endoscopic CDCR is coming up in a big way nowadays. Some may avoid use of lasers, to preserve a healthy mucosa in the vicinity of the tube. Post CDCR, a frosted Jones tube is mostly inserted to maintain patency of the tract. Another interesting suggestion is the injection of Botox into the lacrimal gland, to help control the epiphora.

Smriti Nagpal - Q. What in your opinion would be the ideal ostium post a DCR surgery?(Figure 6) How to avoid sump syndrome?

Pelin Kaynak: I prefer an inferiorly situated ostium (below the medial canthal ligament and which engages the upper part of the duct), of about 6 to 10 mm in diameter

Mukesh Sharma: We believe an ostium size of 12-15 mm is enough for an ideal case. We try to respect the anatomical landmarks around it –

- Anteriorly we include the anterior lacrimal crest into the ostium but stay at least 2-3 mm inferior from its suture with the nasal bone

Ruchi Goel: The ostium size decreases over the time. Till date the perfect size is yet to be found. However, a larger and inferiorly placed osteotomy is likely to remain patent. I create about 15X15mm osteotomy in external DCR and 8X8mm in Laser DCR. In laser DCR, after creating an initial osteotomy of about 4X4mm I like to enlarge it to about 8mmX8mm surgically using a Blakesley’s forceps. This also avoids unnecessary use of laser energy that can result in inadvertent burns. I would like to reiterate that the position of osteotomy should not be too high as this is likely to result in sump syndrome, more so in laser DCR.

Summary (Smriti Nagpal): One must aim to create a large osteotomy, of about 10 to 15mm in size in external DCR and about 8 to 10mm in endoscopic procedures. The osteotomy must extend
from the fundus of the sac till the beginning of the NLD, extending inferiorly enough to avoid sump syndrome. The full length of the lacrimal sac should ideally be marsupialised and free movement of the probe should be ensured on table. Some surgeons prefer to stay below the medial canthal tendon, while others prefer to disinsert the anterior limb of the tendon for better surgical exposure.

Smriti Nagpal - Q. How do you deal with a case of acute dacryocystitis? (Figure 7)

Pelin Kaynak: I usually manage acute dacryocystitis with systemic and topical antibiotic therapy, along with drainage in case an abscess has formed. If I suspect infection by an unusual organism, I send samples for culture-sensitivity before I start the antibiotic therapy and tailor my treatment as per the reports.

Mukesh Sharma: We always try to manage it conservatively with antibiotics and NSAIDs, to tide over the acute process before going in for DCR surgery, which is the definitive management. Rarely if an abscess forms, then incision and drainage is done. We do not do endonasal DCR in acute dacryocystitis since we wish to avoid handling of an inflamed sac.

Mohammad Javed Ali: There has been a paradigm shift in the management of acute dacryocystitis. The traditional dogma of conservative management followed by surgery has now been challenged in the light of newer evidence. We have shown the short-term and long-term benefits of performing a powered endoscopic DCR in the setting of acute dacryocystitis and even in a lacrimal abscess.43,44

Ruchi Goel: In acute dacryocystitis, the earlier the laser DCR is done, the faster is the recovery. The traditional approach of giving systemic antibiotics with drainage of pus prolongs the morbidity. Even if the patient does not cooperate, just a small osteotomy along with a combination of oral antibiotic therapy (amoxicillin-clavulanic acid combination) hastens the recovery. The osteotomy can then be enlarged after a week, once acute inflammation subsides.

Summary (Smriti Nagpal): Conventional management of acute dacryocystitis comprised of culture-sensitivity of the discharge, followed by appropriate antibiotic therapy. DCR surgery was usually done after acute inflammation subsided. However, with the growing popularity of endoscopic procedures, more and more surgeons are now preferring to intervene early in such cases. This allows for internal drainage of the pus with more rapid resolution of symptoms. Also by using the endoscopic approach, a skin incision is avoided and minimum collateral tissue is damaged, thereby eliminating the risk of spread of infection to the skin and rest of the orbit. The osteotomy may further be enlarged at a later stage if so needed.

Smriti Nagpal - Q. What is your approach to traumatic cases? Is imaging a must? (Figure 8)

Pelin Kaynak: Laser assisted surgery is a good option in trauma cases. Yes, imaging in the form of a CT scan including the paranasal sinuses, is mostly needed.

Mukesh Sharma: Yes we generally ask for a CT wherever bony injury is suspected. Only in superficial injuries we settle for X-ray PNS; which we believe is a must.

Mohammad Javed Ali: Well, that depends on case to case basis. However, I prefer CT-DCG in all cases of nasoethmoid fractures, and Le-fort fracture types II and III. The focus of imaging should be to assess the skull base, its alterations if any, status of frontal process of maxilla and the frontomaxillary suture junction, bony lacrimal fossa and the lacrimal sac- bony fossa congruity. We have discussed how these influence the outcomes in the references.45,46

Ruchi Goel: In traumatic cases, the nasolacrimal blockage may be only a part of the multiple deformities. Also, the orbital fractures may result in misalignment of bones resulting in difficulty in identifying the anatomical landmarks as well as crowding of the nasal cavity. For a complete assessment, digital X-ray or CT scan of both orbit and PNS would be
required. It may also require a multidisciplinary approach. At times if the bone does not break in the usual manner in the external approach, I create an osteotomy with the drill machine. I usually intubate these patients.

Summary (Smriti Nagpal): CT scan of both orbits and paranasal sinuses is usually recommended in post-traumatic NLDO patients. One must pay special attention to any alterations of skull base, all associated fractures or bony misalignment, position of certain surgically relevant anatomical landmarks including the lacrimal crest and the fronto-maxillary suture and any associated crowding of the nasal cavity. Creating an ideal osteotomy is often difficult in such cases, and a multi-disciplinary approach maybe needed to deal with other associated injuries in the same sitting. Traumatic NLDO is usually more difficult to manage, and bicanalicular silicon intubation maybe preferred by some surgeons. 47

Smriti Nagpal - Q. What are the future trends in this field?
Pelin Kaynak: My opinion is, we will be stenting the untreatable upper canalicular obstructions with heparinized microstents in the near future. DCR has quite evolved, both endonasal and external. Lasers with minimal thermal spread may improve the outcome of endocanalicular DCRs and decrease surgical time and morbidity.

Mukesh Sharma: Flexible canalicular endoscopy to examine whole of the lacrimal drainage system and negotiate blocks physiologically, will become more popular. Also there will be evolution of femtosecond-like precise lasers to avoid collateral damage while making precise sac & bony opening.

Mohammad Javed Ali: This question with regards to Dacryology reminds me of the famous poet Ghalib, who once said:

Poochhte hain wo ke ghalib kaun hai
Koi batlao ke hum batlayein kya!

This specific question can be answered in terms of future trends in clinical and basic sciences.

CLINICAL SCIENCES: There has been a major trend towards in minimally invasive and endoscopic approaches in the last 2 years and these are only going to get refined further. Stereotactic lacrimal surgeries are coming up in a big way, with newer very wide angle endoscopic instruments and techniques and Indians are in the forefront of this advancement! 48-50

BASIC SCIENCES: The future of any science lies in molecular biology and serious efforts to study all the potential basic science aspects of lacrimal drainage system are being pursued. A more detailed study of literature would give the readers a glimpse into what the future possibly holds! 51-53

Ruchi Goel: Interventional dacryology to avoid bypass procedures is likely to change the scenario in future. In traumatic cases, the image guided approach is already in the market.

Summary (Smriti Nagpal): Future trends is towards further advancements in endoscopic techniques and the use of better, more precise Lasers. Studies are being done on all potential basic science aspects of the lacrimal drainage system, to help understand and treat the disorders better.

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