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EVALUATION OF EXTERNAL DACRYOCYSTORHINOSTOMY- A HOSPITAL BASED PROSPECTIVE STUDY

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Abstract:
Background: Chronic dacryocystitis occurs usually due to obstruction of lacrimal passage at the junction of the lacrimal sac and the nasolacrimal duct or within the bony nasolacrimal duct.
Objectives: This study aimed to evaluate the role of mechanical Dacryocystorhinostomy (DCR) to restore the flow of tears into the nose from the lacrimal sac when the nasolacrimal duct does not function.
Methods: It is a hospital based prospective study performed on 60 patients of age group between 10-50 years in four months. Patients included in the study had nasolacrimal duct obstruction and not undergone previous lacrimal surgery. The technique involved anastomosis of nasal mucosal and lacrimal sac flaps and a large bony ostium. Success was defined as anatomical patency with fluorescein flow on nasoendoscopy and patency to lacrimal syringing.
Results: Sixty patients (36 males and 24 females) with the mean age of 23 years underwent mechanical endonasal Dacryocystorhinostomy (DCR) in a same-day surgery. No complications were detected including hearing loss, otorrhea and wound complication with no retraction pocket or displaced graft during follow-up period. The grafts take rate was 90% (six cases of unilateral incomplete closure). The mean of air-bone gap overall improved from 13.88 dB preoperatively to 9.16 dB postoperatively ($p < 0.05$).
Conclusion: Unilateral external transcanal cartilage tympanoplasty can be considered as a safe minimally invasive procedure that can be performed in a same-day surgery. It reduces the cost and operation time and is practical with a low rate of postoperative complications.
Keywords: Atrophic Rhinitis, External Dacryocystorhinostomy (DCR), Hearing Loss, Lacrimal Sac, Nasolacrimal Canal, Otorrhea.

Introduction

External Dacryocystorhinostomy (DCR) is a surgical procedure to restore the flow of tears into the nose from the lacrimal sac when the nasolacrimal duct does not function.[1] The original intranasal approach was described in 1893 by Caldwell[1] and the external approach in 1904 by Toti.[2] The external approach became very popular and the main stay of treatment with modification in the 1920s [3] with the addition of mucosal flap, and in 1962 with silastic tube intubation by Jones.[4] The intranasal approach was largely abandoned owing to problems with visualization but with modern endoscopes and rhinology instruments there has been renewed interest in the past 10 or so years. McDonogh and Meiring[5] described the first modern endonasal DCR procedure in 1989 with Massaro et al[6] in1990 using an argon laser for the osteotomy. In 1991 Gonnering et al[7] used an endoscope with the argon laser, rather than the operating microscope, for completing the endonasal procedure. External or endoscopic Dacryocystorhinostomy (DCR) is the preferred treatment for managing nasolacrimal duct obstructions and dacryocystitis. They are typically associated with high success rates in the order of 80%–95% depending on the underlying etiology.[1–8] However, surgical failure occurs and can range from 4% to 13%.[1,9–11] Many causes of failure can be attributed to abnormal healing of the ostium, with scarring and cicatricial closure of the osteotomy site being among the most commonly reported.[9–12] The other causes of

ostium-related failures include inadequate sac exposure, small opening of the sac, cicatrization of the sac prior to surgery, inappropriate location of the ostium, unopened agger nasi cells, removal of sac wall with poor approximation of lacrimal sac and nasal mucosa membranes over the internal common opening (ICO), granulomas, and sump syndrome.[10,12,13]

With the advent of nasal endoscopes, endoscopic DCR is becoming popular. In this procedure, a nasal endoscope is used to visualize the lacrimal sac through the nasal cavity. The bone covering the lacrimal sac is nibbled out. The medial wall of the sac is incised or excised, facilitating drainage of tears into the nasal cavity. This procedure avoids scarring.

Atrophic rhinitis is an absolute contraindication. In case of acute dacryocystitis, this operation cannot be done immediately; rather it is done after a period of time. In case of elderly patients (above 70 years of age), Dacryocystectomy is preferred to Dacryocystorhinostomy as old age naturally causes atrophy in nasal mucosa.

To define the success of DCR surgery, two main terminologies are used: the anatomical success and the functional success. The anatomical success means creating a patent ostium from lacrimal duct to the nasal cavity and the functional success means draining the tear into the nasal cavity without any obvious complaint of patient.[5] The functional success may not be achieved in all cases with anatomical success and postoperative epiphora complaint may continue in some patients after DCR surgery. Functional success can be evaluated by Dacryoscintigraphy (DSG) and fluorescein dye disappearance test objectively or by epiphora complaints' score (ECS) subjectively.[5] DSG is a radionuclide procedure, showing the passage of the radioactive agent with tear from conjunctival sac to the nasal cavity through ampulla, canaliculi, lacrimal sac, nasolacrimal canal, and the nasal cavity. It makes possible to evaluate the lacrimal pump function and the tear drainage.[6]

This study evaluates the efficacy of external Dacryocystorhinostomy (DCR) as a treatment for managing nasolacrimal duct obstructions and dacryocystitis.

MATERIAL AND METHODS

It is a retrospective, nonrandomized, noncomparative study of case series performed on 60 patients visited in the outpatient Department Of Otolaryngology, Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Thane, Maharashtra, India. The study was performed in one year period from January 2010 to January 2012. The age range of patients was 10-50 years.

Detailed history of the patient including their family history, clinical findings, investigations like haemogram, X-ray reports were obtained. Details of treatment either the medical management (those denied surgery) or the surgical procedures and any associated complications thereafter are also noted. Detailed local examination was done. Any external deformity of nose in the form of depression of bridge was noted. The symptomatic and clinical improvement of the patients at 3 months, 6 months and at 1 year of follow up was noted.

Case selection is very important for beginners attempting to do DCR. Best sac for doing DCR is the one with mucocele because sac is bigger and flaps can be easily made. While the best patient for doing DCR is a thin, frail, elderly patient with roomy nostril due to ease of bone punching and less bleeding, any well-evaluated patient without any ear, nose and throat (ENT) abnormality, may be taken up. Patients with positive regurgitation test are ideal candidates. Patients with common canalicular block usually require complicated procedure, which may require stenting and intubation. Pre-operative workup Blood pressure control is very important to decrease the risk of bleeding. The ENT evaluation should be done to rule out atrophic rhinitis and other nasal abnormalities. Blood thinners and anti-coagulants should be withheld in consultation with the treating physician to further decrease bleeding.

Pre-operative medications: Ethamsylate is a hemostatic drug, which not only promotes platelet adhesion but also inhibits platelet disaggregation. It should be started at a dose of 250 mg twice one day prior to the surgery. Nasal decongestant such as otrivin drops should be given twice a day to reduce nasal congestion. Patient is kept nil by mouth for ease of sedation. There should always be a standby anesthesiologist to provide sedation and to deal with systemic complications.

Intraoperative Tips: Local anesthesia with sedation is preferred as it reduces stress, which in turn decreases bleeding. We prefer a single point block of Local infiltration in DCR surgery.

Identification and exposure of MPL is a very important step in DCR surgery. Once MPL is exposed, the orbicularis fibers are separated along the entire length of the incision. Dis-insertion (not dividing) of MPL is done at the anterior lacrimal crest by cutting on the bone at insertion with 11 number blade. Exposure of bone Dis-insertion of MPL automatically opens up the periosteum, which is now

separated along the entire length of the incision with sharp dissector or periosteum elevator. Lacrimal sac is retracted with periosteum elevator. Baring of periosteum is done to decrease pain and to aid bone punching. Periosteum is elevated posteriorly till the lamina papyracea. Lamina papyracea is a thin bone with consistency and color different from lacrimal bone. Periosteum also elevated anteriorly, inferiorly and superiorly as much as reasonably possible. With a sharp dissector, the lamina is punctured breaking it outwards and removing the pieces with forceps. Bone removal is started with a small punch and then with a big punch. Bone punch should always be perpendicular to the punching surface. Clear the punch of bone pieces with 20G needle. Osteotomy should be as large as possible and should be of size of thumbnail.

Adjustment of the nasal pack during bone punching was required to reduce bleeding. Suction with infant feeding tube or Ryle's tube should be used to aid exposure in case of bleeding. Sac flaps Dilate the upper punctum with punctum dilator. Inflate the sac with viscoelastic or chloro ointment in a 2-cc syringe with a 26 number cannula. Long vertical top to bottom incision is taken with 11 number blade and spring scissors on the medial sac wall to create larger anterior and smaller posterior flaps. Vertical long top to bottom incision with an 11 number blade should be made on nasal mucosa such that posterior flaps can appose well and anterior flap is large. Small horizontal cuts may be required on the posterior nasal mucosal flap to help it revert and appose well with posterior lacrimal sac flap. Anterior horizontal cuts are made later, after suturing the posterior flaps. Closure Posterior flaps are sutured so that the posterior sac flap does not block common canalicular ostium in sac. Anterior nasal flap is now opened with 11 number blades and sutured to the anterior sac flap with minimum two 6-0 vicryls sutures (sometimes three). Additional 3-4 orbicularis closure stitches have to be taken. Skin closure can be achieved with either interrupted or continuous subcuticular sutures. Before closures, conjunctival sac should be irrigated to remove any bone pieces.

Post-operative care: complete bed rest in propped up position and extended chin. Patients should be told to avoid blowing of nose. Oral antibiotics, Non-Steroidal Anti inflammatory Drug (NSAID), Serratiopeptidase combination and ethamsylate should be given routinely for five days.

RESULTS

It is a retrospective, nonrandomized, noncomparative study of case series performed on 60 patients. There were 60 patients (36 male/24 female) who underwent 102 external DCRs. The average age of the patients was 32.39 years old (range, 10–50 years old; SD, 19.1 years) and the main presentation was with epiphora (93%) and/or mucocoele (33%). In 13 operations (30%) a septoplasty was required at the time of surgery, and in 10 operations (23%) further endoscopic sinus surgery was performed in conjunction with the DCR. Anatomic success with a patent nasolacrimal system was achieved in 40 of 44 operations (91%). Symptomatic and anatomic success was seen in 102 of 60 patients (95%). Five of the DCRs were classified as failures. In one DCR the patient was symptomatic despite a patent nasolacrimal system and well-healed ostium. In two DCRs preoperative medial canalicular problems were noted. In two DCRs scarring and fibrosis of ostium were noted.

Total 102 external DCR surgeries were performed on 60 patients, in which 36 male and 24 females. Primary DCR were performed on 24 males and 14 females, Primary DCR with septoplasty was performed on 20 males and 12 females, Primary DCR with ancillary nasal procedures were performed on 22 male and 10 females. Primary DCR was performed 10 on left side, 12 on right side and bilaterally on 8 patients. Highest prevalence of DCR surgeries were seems to be performed on right side and least was performed bilaterally. Table 1 denoted the details of demographics like gender and side distribution.

Table 1: Demographics of study group.

Characteristics	Primary DCR	Primary DCR with septoplasty	Primary DCR+ ancillary nasal procedures	Total
Operations/patients	21/24	18/18	13/14	102/60
Male	24	20	22	66/36
Female	14	12	10	36/24
Side of surgery				
Left	10	10	6	26
Right	12	13	7	32
Bilateral	8	8	6	22

54 out of 60 patients and 102 nasolacrimal canals were treated by external DCR surgery, there was 90% anatomical patency and 95% anatomical patency also seen in excluding canalicular pathology. Anatomical patency and symptom relief was observed in 48 out of 60 (80%) patients, also seen in 50 out of 54 (95%) patients excluding canalicular pathology. Table 2 described all the findings.

Table 2: Surgical results.

Success		
	Total	Excluding canalicular pathology
Anatomical patency	102/60 (90%)	39/42 (95%)
Anatomical patency and symptom relief	48/60 (80%)	50/54 (95%)

In the current study a well healed marsupialised ostium was seen in all 60 cases (100%). There was free flow to the nose when one drop of 2% fluorescein was put in the conjunctival sac. The nasolacrimal system was also patent to syringing via the lacrimal puncta. In five of the 60 cases there was scarring of the ostium at the sac-nasal mucosal anastomosis visible on endoscopy. Neither fluorescein drainage nor lacrimal syringing was possible. These ten patients had epiphora similar to their preoperative complaint. Ten patients were symptomatic with a patent system and a well healed ostium. Five of these patients complained of epiphora preoperatively but were patent to syringing and on dacryocystography and one patient had anatomical nasolacrimal duct obstruction preoperatively. The overall success rate was then 90% (54 of 60 DCRs). All these six patients showed a well healed ostium on endoscopy but complained of occasional epiphora especially on windy days. In these patients fluorescein was seen to drain into the nose on endoscopy and lacrimal syringing was achieved without undue pressure generation (Table 2).

DISCUSSION

It is a retrospective, nonrandomized, noncomparative study of case series performed on 60 patients. There were 60 patients (36 male/24 female) who underwent 102 external DCRs. The average age of the patients was 32.39 years old (range, 10–50 years old; SD, 19.1 years) and the main presentation was with epiphora (93%) and/or mucocoele (33%). These findings were in co-ordination with the study conducted by Tarbet KJ et al[5] and Welhan RA et al.[6] different findings were observed in the study conducted by Olver J et al[9] and Baldeschi L et al.[10] In 13 operations (30%) a septoplasty was required at the time of surgery, and in 10 operations (23%) further endoscopic sinus surgery was performed in conjunction with the DCR. Anatomic success with a patent nasolacrimal system was achieved in 48 of 60 operations (80%). These findings were also suggested by the results conducted in the study by Turkco FM et al[11] and Dresuer SC et al.[13] Symptomatic and anatomic success was seen in 102 of 60 patients (95%). Five of the DCRs were classified as failures. In one DCR the patient was symptomatic despite a patent nasolacrimal system and well-healed ostium. In two DCRs preoperative medial canalicular problems were noted. In two DCRs scarring and fibrosis of ostium were noted.

54 out of 60 patients and 102 nasolacrimal canals were treated by external DCR surgery, there was 90% anatomical patency and 95% anatomical patency also seen in excluding canalicular pathology. These findings were also suggested by the results conducted in the study by Sadia SA et al[20] and Sprekelsen MB et al.[21] Anatomical patency and symptom relief was observed in 48 out of 60 (85%) patients, also seen in 50 out of 54 (95%) patients excluding canalicular pathology. Table 2 described all the findings. These findings were not in accordance with the study suggested by the results conducted in the study by Tsirbas A et al[22] and Ibrahim HA et al.[23]

Approximately 80% of cases i.e. 48 of 60 patients required a septoplasty at the time of surgery which is higher than other studies of endonasal DCR, but the creation of a large ostium necessitates better access than is often required with other procedures.[18] 24 out of 60 i.e. 40% of cases required endoscopic sinus surgery in conjunction with DCR, a rate seen in other studies These findings were also suggested by the results conducted in the study by Rosen N et al[26] and Caversaccio M et al[28] also in Cokkeser Y et al.[29] There were three cases of post operative haemorrhage. These resolved with nasal packing and did not need transfusion. This gives a rate of less than 3% which compares well with both previous endonasal studies[21] and external DCR studies.[22] There were no cases of orbital fat exposure or frontal sinusitis which can occur if the dissection is taken too posteriorly into the uncinate.[21] Damage to the orbital plate of the ethmoid (lamina papyracea) and frontonasal duct can occur if the dissection is taken too posterior. In 56 of 102 cases O'Donohue tubes were used for lacrimal intubation. The average follow up was 9 months (range 3 months

to 15 month). These patients were followed up till asymptomatic report came out.

CONCLUSION

Proper case selection, pre-operative workup and adequate exposure go a long way in making DCR stress-free and successful. Excessive bleeding, a common hindrance in DCR surgery can be successfully tackled by proper positioning of patient, use of adrenaline, suction, and adjustment of nasal pack.

This new technique of endonasal DCR involves creation of a large ostium and construction of nasal and lacrimal sac mucosal flaps. Its anatomic success rate (91% or 40 of 44 DCRs) compares favorably with the success rate of other techniques for endonasal DCR and is also similar to the success of external DCR. Experience in endoscopic nasal surgery is important in endonasal DCR surgery, as other ancillary procedures may be required within the nose at the time of surgery.

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