Original Article

Success Rate of Conventional Dacryocystorhinostomy in Post-acute Dacryocystitis Compared to Endonasal Dacryocystorhinostomy in Acute Dacryocystitis

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Abstract

Purpose: To determine the success rate of conventional dacryocystorhinostomy (DCR) and endoscopic DCR performed in patients with acute dacryocystitis.
Methods: Records of patients with acute dacryocystitis and operated during 2007–2008 were reviewed. Patients who completed a follow-up of 60 months were included in our study. Demographic characteristics, surgery types, success rate, and follow-up periods were recorded. Success was defined as the elimination of epiphora, absence of dacryocystitis, and negative syringing test result (i.e., unrestricted flow of irrigated saline to the nose).
Results: A total of 67 patients were operated during the period. Fifty-seven patients completed the follow-up of 60 months. The mean age in the conventional and endoscopic groups was 39.5 ± 8.5 and 39.5 ± 8.4 years, respectively. The participants included 33 female and 24 male patients. Endoscopic DCR was performed in 28 (endoscopic group) and conventional DCR (conventional group) in 29 patients. Conventional DCR was performed after subsidence of the acute attack, which took an average of 10 days (range, 9–19 days). After a period of 60 months, patency on syringing and resolution of epiphora was documented in 26 patients in the conventional group (success rate, 89.7%) and 23 patients in the endonasal group (success rate, 82.1%) ($P = 0.654$).
Conclusion: The success rates of conventional and endonasal DCR during a follow-up period of five years in patients with acute dacryocystitis are almost similar.

Keywords: Acute Dacryocystitis; Conventional Dacryocystorhinostomy; Endonasal Dacryocystorhinostomy

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INTRODUCTION

Acute dacryocystitis is associated with a rapidly evolving pain, redness, and swelling over the medial canthal region. Its treatment includes the use of warm compress, systemic antibiotics, and drainage of abscess. External dacryocystorhinostomy (DCR), which is performed after the resolution of acute infection, was used to treat these cases before endoscopic approach came into existence. However, the disadvantages of this procedure include scarring at the site of incision, hemorrhage during the procedure, disruption of the anatomy of the medial canthus, and it cannot be performed

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in acute dacryocystitis due to inflamed skin area. However, endonasal approach as the primary method to treat acute dacryocystitis was suggested by Lee and Woog.[1] Endoscopic approach offers the advantage of early resolution of acute infection, pain relief, and epiphora. It is also associated with health economics benefits as it avoids further admission at the hospital for DCR.[2] In addition, endonasal endoscopic approach allows the inspection of nasal anatomy and correction of abnormalities of the nasal septum or middle turbinate that may predispose to failure.

The success rate of endonasal DCR in acute dacryocystitis is 83–94.4% in different case series.[1,2] Rabina et al[3] reported a 94.4% success rate of conventional DCR in patients with a previous history of dacryocystitis with mean postoperative follow-up of 20 months. However, their study did not mention the duration between an acute attack and conventional DCR. The comparative evaluation of success rates between endoscopic DCR in acute and conventional DCR in patients after resolution of acute dacryocystitis has not been reported in the literature.

The present study is a retrospective analysis of the success rate of endonasal DCR in patients with acute dacryocystitis and conventional DCR performed in patients after the resolution of acute attack.

METHODS

In this study, we retrospectively evaluated patients with acute dacryocystitis with a history of surgical treatment at a private practice situated in central India from January 2007 to December 2008. Inclusion and exclusion criteria are depicted in Table 1. Patients with abnormal intranasal anatomy (deviated nasal septum, nasal polyps, and tumors) were excluded from the study groups. An ear-nose-throat (ENT) specialist performed examinations to rule out any nasal pathology preoperatively. The examination of nasal cavity was performed using rigid endoscope once the diagnosis of dacryocystitis was completed as an office procedure. The diagnosis of acute dacryocystitis was based on the sudden onset of redness, swelling, and pain near the medial canthal region over the lacrimal sac area. Previous history of epiphora was confirmed from all the patients. At admission, patients were treated with intravenous administration of cefazolin (2 g/kg/day) and anti-inflammatory agents. Ibuprofen (400 mg) and paracetamol (325 mg) was used thrice a day for five days. The decision to perform either conventional or endoscopic DCR was taken depending upon the subsidence of acute attack and matching was performed between the two groups. Endoscopic procedure was performed with the persistence of swelling and signs of inflammation after five days of the treatment. The remaining patients underwent conventional DCR.

The present study adhered to the tenets of Declaration of Helsinki, and informed consent was obtained from all the participants. Details of demographic profiles, duration of symptoms, type of surgical procedures, follow-up and success rates were evaluated.

Table 1. Inclusion and exclusion criteria in the study group

Inclusion criteria	Exclusion criteria
External DCR	(For either external or endoscopic DCR)
Acquired primary acute dacryocystitis after improvement of acute dacryocystitis	Lacrimal sac tumor, deviated nasal septum, nasal polyps
Endonasal DCR	Prolonged bleeding, clotting, and prothrombin time
Acute dacryocystitis	Compromised access to the middle meatus
Lacrimal abscess	Atrophic rhinitis
Good intranasal anatomy (no deviated nasal septum, nasal polyp)	

DCR, dacryocystorhinostomy

Surgical Procedures

Conventional DCR

Anesthesia

The surgery was performed under local infiltration anesthesia, i.e., lignocaine 2% with bupivacaine 0.5% with or without adrenaline. Supraorbital and infratrochlear nerve block was administered. A drop of topical proparacaine hydrochloride 0.5% was placed in the conjunctival cul-de-sac for intraoperative comfort. Nasal packing was performed with lignocaine 4% and xylometazoline 0.5%.

Procedure

The same surgeon (RJ) operated on all the cases. A straight skin incision was made between the root of the nose and medial canthus with a No. 15 blade. The medial palpebral ligament was identified, and the sac was separated from the lateral wall of the nose. The periosteum overlying the lacrimal fossa and the area above it were elevated with a periosteum elevator. The lacrimal bone, lacrimal crest, and the bone above the anterior lacrimal crest were removed with a bone punch to create an opening of 16–18 mm. A lacrimal probe of an appropriate size was passed through the lower canaliculus till it reached the lacrimal sac. The lacrimal sac was opened longitudinally to form the anterior and posterior lacrimal flaps. The posterior lacrimal sac and nasal mucosal flap were severed. The anterior nasal mucosa flap was sutured to the anterior lacrimal sac flap with a 5-0 chromic catgut suture [Figure 1]. Fibers of the orbicularis were sutured with a 5-0 chromic catgut suture, and the skin was sutured with a 6-0 prolene suture in a continuous manner.

After 24 hours, the nasal pack was removed, and syringing was performed from the upper punctum to check the patency of the lacrimal passage. Postoperatively, the patients were administered ibuprofen (400 mg) and ofloxacin (400 mg) orally, twice a day, for five days, and local ofloxacin and dexamethasone eye drops for three weeks. The skin sutures were removed after seven days.

Endonasal DCR

Anesthesia

Surgery was performed under local anesthesia along with sedation.

Procedure

Endonasal DCR was performed by an ENT surgeon (AD). All procedures were performed using 45° rigid endoscopes (Karl Storz, Tuttlingen, Germany). The nasal cavity was packed with gauge soaked in 4% lignocaine hydrochloride with 1:100000 adrenaline 15 minutes before the procedure. The mucosa anterior to the uncinate process was infiltrated with lignocaine 2% with 1:100000 adrenaline.

A nasal mucosa immediately anterior to the superior half of the uncinate process was incised using a sickle knife. A Kerrison punch was used to nibble away the thick bone at the frontal process of the maxilla. The bone removal was then continued nasally to expose the lacrimal sac. A lacrimal probe was passed through the upper punctum to tent the medial wall of the lacrimal sac. The sac was opened with an angled knife [Figure 2]. A tissue punch was used to remove the medial wall. Syringing was performed through the upper punctum with saline to confirm free flow and patency.

After 24 hours, the nasal pack was removed, and syringing was performed from the upper punctum to check the patency of the lacrimal passage.

None of the patients in either of the groups received either silicon tube intubation or mitomycin-C application. None of the patients required conversion from endoscopic to conventional DCR and vice versa.

Follow-up

The patients in both groups were followed-up after seven days, one month, six months, one year, and yearly for five years. At every visit, syringing was performed. A successful outcome was defined as the elimination of epiphora, absence of dacryocystitis, and negative syringing test result (i.e., unrestricted flow of irrigated saline to the nose).

Statistical Analysis

The data was entered in an Excel® sheet (Software version 14.1.0 [110310]/2011) (Microsoft Corporation, Redmond, WA, USA), and statistical analysis was performed with SPSS version 13.0 (SPSS Inc, Chicago, IL, USA). Fisher's exact test and χ^2 analysis were used for comparing the categorical variables, and a *t*-test was used for comparing continuous variables. A *P* value of 0.001 was considered significant.

RESULTS

During the study period, 67 patients underwent surgical procedure for dacryocystitis. Of them, 57 patients (33 female and 24 male patients), aged 23–55 years, met the inclusion criteria. With the use of anti-inflammatory drugs and antibiotics, pain and inflammatory signs over the sac area were reduced in all patients. However, the symptoms of dacryocystitis persisted. The patients were then divided into two groups: endoscopic and conventional groups. The demographic features of the study groups are illustrated in Table 2. The mean age in the endoscopic and conventional groups was 39.5 ± 8.4 and 39.5 ± 8.5 years, respectively. Endoscopic DCR was performed in 28 (endoscopic

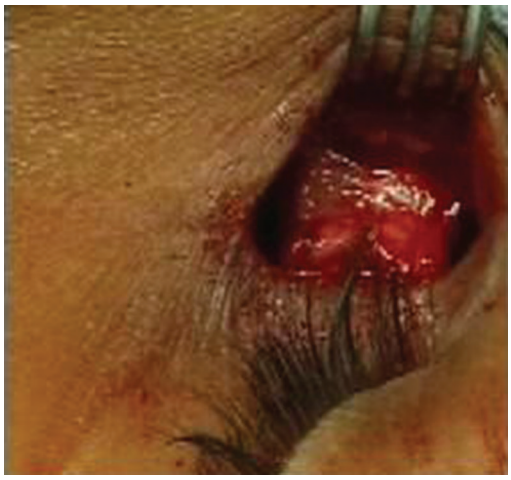

Figure 1. Anterior flaps of the nasal and sac mucosa sutured with a 5-0 chromic catgut suture.

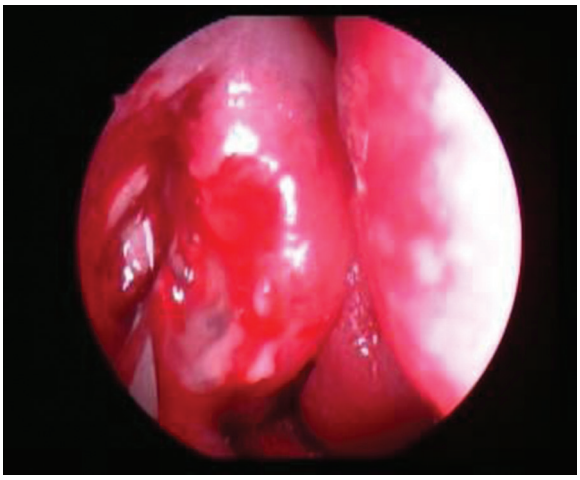

Figure 2. Drainage of pus after opening the medial wall of the sac.

group) and conventional DCR (conventional group) in 29 patients. The mean duration of epiphora prior to the first admission to the hospital was 30 months for patients in the endoscopic group and 26 months for patients in the conventional group (P = 0.241). Twenty-eight patients (49.1%) had right side obstruction, and 29 patients (50.9%) had left side obstruction. Six patients (20.7%) in the conventional group required incision and drainage of lacrimal sac abscess. None of the patients in the endonasal group required incision and drainage. Conventional DCR was performed after subsidence of the acute attack, which took an average of 10 days (range, 9–19 days). The average duration for performing endonasal DCR was 5 days (range 5–10 days). Six patients (20.7%) in the conventional group and four patients (14.3%) in the endonasal group had a previous attack of acute dacryocystitis. The mean postoperative follow-up time for the conventional and endonasal groups were 62.1 (±2.5) and 61.7 (±1.7) months, respectively (P = 0.158).

After a period of 60 months, patency on syringing and resolution of epiphora was documented in 26 patients in the conventional group (success rate, 89.7%) and 23 patients in the endonasal group (success rate, 82.1%; P = 0.654) [Table 3]. In the conventional group, three patients showed failure. None of the patients in both groups received silicone intubation or mitomycin-C application.

Table 2. Demographic characteristics of patients in both groups

Characteristics	Conventional DCR	Endoscopic DCR
Age (mean±SD) years	39.5±8.5	39.5±8.4
Sex		
Male	14	10
Female	15	18
Laterality		
Right	13	15
Left	16	13
Duration of epiphora (months)	26	30

DCR, dacryocystorhinostomy; SD, standard deviation

Table 3. Clinical outcomes in the two groups

Patency on syringing	External DCR	Endoscopic DCR
Patent (%)	26 (89.7)	23 (82.1)
Blocked (%)	3 (10.3)	5 (17.9)
Result	P=0.654	

DCR, dacryocystorhinostomy

DISCUSSION

Dacryocystorhinostomy, in which an anastomosis is created between the lacrimal sac mucosa and nasal mucosa, is a widely accepted treatment for nasolacrimal duct obstruction (NLDO).[4,5] However, it is not suitable for acute dacryocystitis due to the risk of spreading infection through the tissue planes, septicemia, exacerbating inflammation, and excessive bleeding during the surgery.[6] An endonasal or transcanalicular laser-assisted approach has been reported to minimize these risks.[7-9] Transcanalicular laser-assisted DCR (TCLADCR) has been shown to be effective in relieving signs and symptoms of acute dacryocystitis. Morgan et al[10] have shown a low success rate of 67% after TCLADCR in patients with acute dacryocystitis during a follow-up period of 11 months. Joshi et al[11] have shown the use of small-sized ostium and improper placement of ostium for the failure of TCLADCR. Before the insurgence of these modalities, external DCR was performed after the subsidence of acute dacryocystitis. To the best of our knowledge, the success rate of conventional DCR after the treatment of an acute attack and its comparison to endoscopic DCR in patients with acute dacryocystitis has not been reported in the literature.

In our retrospective case series, 67 patients were operated out of 237 patients of dacryocystitis presented to the outpatient department suggesting an incidence of 28.3%. The subsidence of acute attack with treatment took an average of 10 days (range, 9–19 days). Six patients in the conventional group required incision and drainage of abscess while none of the patients in the endonasal group required incision and drainage. From the medical records, it was apparent that the medical fitness of these six patients for the surgical intervention was delayed due to uncontrolled systemic hypertension in four patients and diabetes mellitus in two patients. The authors reported pain relief within 48 hours and infection control after an incision and drainage through the skin followed by an injection of antibiotics and irrigation in patients with acute dacryocystitis.[12] The acute attack causes erythematous skin, subcutaneous tissue edema, and inflamed lacrimal sac and nasal mucosa that can result in hemorrhage during the incision and dissection of tissues. This may reflect in obliteration of the ostium and reduction in the success rate after the surgical procedure in post-dacryocystitis cases. In our study, the success rate of conventional DCR in post-dacryocystitis cases was 89.7%. Rabina et al[3] reported 94.4% success rate of conventional DCR in post-dacryocystitis cases in a retrospective analysis of data with a mean follow-up period of 20 months. However, the duration between the episodes of dacryocystitis and DCR was not mentioned in the study. On the contrary, Wu et al[13] reported 65.7% success rate of external DCR after silicone intubation in post-acute dacryocystitis cases during a follow-up period of 12 months. In our study, no silicone intubation was performed.

The low success rate in our study could be because six patients had repeated attacks of acute dacryocystitis,

which predisposed to the failure due to fibrosis of the ostium. Another reason could be the age of the patients at surgery. Erdol et al[14] reported lower success rate in external DCR in younger patients than in older patients. The mean age in the external DCR group of our study was 39.5 ± 8.5 years. In a study, Rabina et al[3] reported that the mean age at surgery was 66 ± 14 years in the post-dacryocystitis group. Acute dacryocystitis usually present in the 5th-6th decade of life. However, the mean age of patients in both groups in our study was 39.5 years. This reveals that acquired nasolacrimal duct obstruction is more common in the middle age group. There is a declining trend towards both the extremes of age. Similar data was found by Saha et al.[15] However, other groups found that the mean age group is slightly more than our findings.[16-18] We could not ascertain the reasons for early presentation in our case series.

The duration of symptoms has also been suggested to affect the success rate. The shorter the duration of epiphora and earlier the surgery, the higher the success rate.[14,19] Since this was a retrospective study, we had to depend on the patients' medical records for the duration of epiphora, which was 26 months in the conventional group. Seider et al[19] reported 84% success rate of external DCR in patients with early signs of epiphora and lacrimal sac inflammation than patients with a history of acute inflammation in the lacrimal sac for more than six months (reported success rate in such cases was 77%). Rabina et al[3] also found a success rate of DCR by external and endoscopic route with a short duration of symptoms of lacrimal sac obstruction.

In our case series, the success rate of endoscopic endonasal DCR performed in the acute stage of dacryocystitis was 82.1%. In acute cases, average duration of endoscopic DCR was five days. All patients reported relief from pain and swelling starting from the third postoperative day.

In our study, the success rate of endonasal DCR was lower than that of conventional DCR in the present study. The apposition of nasal and sac mucosa is essential for long-term success. Sonkhya et al[20] suggested marsupialization of mucosal flaps and concluded that the success rate of endonasal DCR was comparable to external DCR. In the present study, mucosal flaps were severed, and marsupialization was not performed. As endoscopic DCR was performed in the acute stage, it may promote re-stenosis of the ostium due to the presence of acute inflammation.[21]

However, the success rate in our study correlates with that reported by Lee et al[1] for endonasal DCR as a primary treatment for acute dacryocystitis. Wu et al[13] reported a success rate of 90% in acute purulent dacryocystitis via endoscopic route during a follow-up period of 12–24 months. They performed circular bi-canalicular intubation with silicone tubes after the creation of the ostium. Madge et al[2] reported a success rate of 94.4% in endonasal endoscopic DCR in a multicenter retrospective analysis of 18 patients. The excellent outcome was attributed to the use of silicone intubation and mitomycin-C. None of the patients in our study received either silicone intubation or mitomycin-C application.

Silicone intubation of the nasolacrimal system is controversial. It keeps the newly formed ostium open and ensures patency in the long run. However, studies have shown excellent results of endoscopic DCR without stenting.[21-23] Stenting has been shown to add the risk of granulation tissue formation at the ostium, which has been suggested as a cause of failure.[24,25]

The main drawback of this study was its retrospective design and selection of cases in the two groups. Endoscopic procedure was performed with the persistence of swelling and signs of inflammation after five days of the treatment. Accordingly, patients who had lengthy or severe inflammation could affect the surgical outcome. However, the success rate was almost equal in both the groups. In addition, the information on the patients' diseases was obtained from their medical charts. Another limitation was two surgeons were involved in conducting two different types of the procedures. Ophthalmologists may not be aware of nasal anatomy to perform endoscopic procedure and vice versa, which may influence the success rate. However, the baseline data for both types of procedures were obtained judiciously. We did not include patients with intranasal lesions including nasal polyps, tumors, and deviated nasal septum in any of the study groups.

In conclusion, the success rate of conventional DCR and endonasal DCR is almost identical in post-dacryocystitis cases during a follow-up period of five years. A repeated attack of acute dacryocystitis affects the outcome in both routes.

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Nil.

Conflicts of Interest

There are no conflicts of interest.

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