Does complete excision of posterior remnant tissue improves surgical outcome in modified single anterior flap external dacryocystorhinostomy?

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Abstract

Purpose: This study aims to analyze the impact of complete excision of posterior remnant tissue (ExPRT) on outcome of modified single anterior flap external dacryocystorhinostomy (mSAF-EDCR).

Materials and Methods: We analyzed records of all patients who had undergone mSAF-EDCR with complete ExPRT between August 2014 and October 2016. We also noted operative time, complications and surgical outcome of these patients.

Results: Forty-one patients had undergone mSAF-EDCR with complete ExPRT. Average surgical time was 36 minutes (range 28 to 50). The most common complications were intraoperative bleeding in four cases and torn sac flap in two cases, laceration of nasal mucosa in one case and extension of skin incision in one case. Follow-up was done at tenth day and one month post-operatively. There was complete absence of watering in 36 patients and occasional watering in five patients. Tear meniscus height was normal for all patients. Syringing was patent in all 41(100%) patients. Hence both subjective and objective success rates were 100%.

Conclusions: Our series of cases mSAF-EDCR demonstrated 100% success rate which may be attributed to complete ExPRT. Our study also indicates that mSAF-EDCR is technically easier and time saving, and should be preferred over conventional EDCR. The complications related to flap damage are also more easily manageable in mSAF-EDCR than conventional EDCR. These results also prompt future research to assess complete ExPRT during mSAF-EDCR surgery.

Keywords: Dacryocystitis, Epiphora, Lacrimal, Lacrimation, Nasolacrimal duct.

Introduction

Modified single large anterior flap external dacryocystorhinostomy (mSAF-EDCR) is technically easier and less time consuming than conventional EDCR.[1-3] We also prefer to use mSAF-EDCR in our patients but in addition to the usual steps of this procedure we also do complete excision of posterior remnant tissue (ExPRT) of lacrimal sac and nasal mucosa. We believe that this may reduce complications like common canalicular obstruction and sump like syndrome, and improve the success rate of this procedure. Complete ExPRT during mSAF-EDCR has not been studied till now. We studied the impact of complete ExPRT on outcome of mSAF-EDCR. The secondary goals were to measure surgical time and study complications of this procedure.

Materials and Methods

We retrieved and analyzed the records of all patients who had undergone mSAF-EDCR with complete ExPRT between August 2014 and October 2016. Ethics approval was taken from the Institutional Ethics Committee and study was conducted in accordance of the declaration of Helsinki. Patients with incomplete records, age less than 16 years, secondary acquired nasolacrimal duct obstruction, canalicular /common canalicular obstruction, and chronic dacryocystitis with fistula were excluded. We recorded the demographics, pre-operative assessment, operative details, post-operative management and clinical outcomes. We analyzed the clinical outcomes of surgery both subjectively and objectively. Absent or occasional post-operative watering were considered subjective success, whereas patent syringing at the end of 1 month of surgery was considered objective success. We recorded presence of persistent watering, non-patent and partially patent syringing and as surgical failure. Operative time, complications and follow up details were also noted.

Results

We had performed mSAF-EDCR with complete ExPRT in 51 patients. The diagnosis of primary acquired nasolacrimal duct obstruction (PANDO) was made after complete ocular and nasal examination. In all cases syringing and diagnostic probing was done to establish the site of obstruction. Fifty patients had nasolacrimal duct obstruction and one had canalicular obstruction. We excluded cases with incomplete records (4 cases), age < 16 years (2 cases), secondary acquired nasolacrimal duct obstruction (2 cases), canalicular obstruction (1 case), and chronic dacryo-cystitis with fistula (1 case). Finally forty-one patients were analyzed. Their demographics are given in table 1.

All surgeries were done by single oculoplastic surgeon (BW) under local anesthesia. Standard steps and technique of mSAF-EDCR were followed in all cases (figure A and B). In addition to these complete excision of posterior remnant tissue (ExPRT) of lacrimal sac and nasal mucosa was done. Bowman's probe was passed from the lower punctum through the canaliculus and its smooth free passage through the

common canalicular opening was confirmed by passing probe few times (figure C). Any tissue obstructing the free passage at the common canalicular opening was excised. Anterior flaps were trimmed and sutured together, followed by closure of orbicularis muscle and skin. Syringing was done to ensure the patency. Mean surgical time was 36 minutes (range 28 to 50 minutes). Complications consisted of intraoperative bleeding in four cases (9.6%), torn sac flap in two cases (4.8%), laceration of nasal mucosa in one case (2.4%) and extension of skin incision in one case (2.4%). Standard postoperative management was given to all patients.

Follow-up was done on tenth day and at one month post-operatively. Syringing and fluorescein dye disappearance test were done. Follow up findings and outcomes are given in table 2. All patients had normal tear meniscus height at the end of one month. Both subjective and objective success rates were 100%.

Discussion

All of our patients underwent mSAF-EDCR with complete ExPRT. We could achieve subjective and objective success rate of 100%. The average surgical time taken for our procedure was 36 minutes. Nine of our patients developed complications.

EDCR can be done by many teqniques (Table 3). Recent studies recommend mSAF-EDCR technique for all EDCR surgeries.[1-3] We also followed this technique in all our patients with two modifications. Firstly, instead of suturing flaps to overlying orbicularis we trimmed both the flaps to make them taught. Secondly, we performed complete ExPRT. We have observed that even after making a large single anterior flap of sac and nasal mucosa, some remnant tissue of sac flap and posterior nasal mucosa is invariably left behind. Going by general surgical principles, any remnant tissue has potential for granuloma formation and scarring. Posterior remnant sac tissue may cause common canalicular obstruction especially if it is left behind common canalicular opening. Remnant posterior nasal mucosa may cause sump syndrome like symptoms. Additional removal of every bit of remnant of posterior nasal flap may prevent sump syndrome.[4] In study by Khan et al common canalicular duct obstruction occurred in two cases in spite of posterior flaps excision. It might have been due to incomplete ExPRT.[5] Study by Tetikoglu M et al is the only other study that mentions excision of posterior lacrimal sac flap (PLSF) and posterior nasal mucosal flap (PNMF) in mSAF-EDCR but they did not mention complete ExPRT.[3] There is no study that has discussed complete ExPRT during mSAF-EDCR.

Previous studies have reported success rate of 73% to 97.6% in conventional EDCR, 79% to 96.7% in modified EDCR and 94.9% to 100% in mSAF-EDCR.[5-11] We achieved 100% subjective and objective success rate in our patients. The only other mSAF-EDCR study to have achieved 100% success rate till date was done by Baldeschi L et al but they studied only twenty-nine patients.[12] A previous mSAF-EDCR study by same author, had higher failure rate of 16%.[1] Many studies have compared outcomes of conventional EDCR and modified EDCR (table 4) but there is only one study that has compared outcomes of conventional EDCR and mSAF-EDCR.[12] The success rates of conventional, modified EDCR and mSAF-EDCR are similar but later two have benefits of ease of procedure and reduced surgical time. Meta-analyses of seven studies by Bukhari et al analyzing 765 eyes also reached the same conclusion.[13]

The mean surgical time in our study was 36 min (range, 28 to 50). Mean operative times reported in literature for conventional EDCR varies from 45-90 minutes,[14-16] 34-36 min for modified EDCR[11,17] and 28-34 min for m-SAF-EDCR.[1,3] Most studies, including ours demonstrate that modified EDCR is much less time consuming than conventional EDCR. We expected complete ExPRT would add to our surgical timing but our mean surgical time was similar to previous modified EDCR studies. Apart from lesser mean surgical time taken by Baldeschi et al (28 min) our mean surgical time was similar to that of others. Hence complete ExPRT did increased the procedure time. Surgical time and outcomes of mSAF-EDCR have been summarized in Table 5.

Most common intraoperative complication in our cases was bleeding which occurred in four cases (9.75%) which is similar to previously reported incidence of 5.3 to 12%.[7,10] In additional we feel that, in cases of torn anterior lacrimal sac flap (ALSF) and anterior nasal mucosa flap (ANMF) it was easier to approximate torn flaps because of large size of remaining intact flap.

All patients had patent syringing but five patients had occasional watering. These five patients were more than 70 years and had lacrimal pump failure.

We acknowledge that there were few limitations in our study. Our study had retrospective design. However, this factor is partially mitigated by the fact that this is a single centre study and all the surgeries were done by single surgeon (BW) who also maintained the records. Since we perform complete ExPRT in all our cases, comparative analysis could not be done. Due to lack of controls and comparative analysis we cannot comment on risk association or cause effect relation between complete ExPRT and outcome. Other factors like surgical technique and skill might have also contributed to good outcome.

We recommend that prospective case control study should be performed to analyze complete ExPRT during mSAF-EDCR surgery to establish higher level of evidence.

Table 1: Demographic profile of study population

Characteristic	Number of patients(N)	Percentage (%)
Total number of patients	41	100
Age group in years		
20-40	9	21.95
41-60	17	41.46
>60	15	36.58
Sex		
Male	21	51.21
Female	20	48.78
Eye Affected		
Right	19	46.34
Left	22	53.65

Table 2: Postoperative follow-up and outcomes at 1 month

Characteristics	Number of Patients	Percentage of total (N=41)
Symptoms		
No Watering	36	87.8
Occasional Watering	5	12.2
Watering	0	0
Results of Syringing		
Patent	41	100
Partially Patent	0	0
Non patent	0	0
Fluorescein Dye Disappearance test (FDDT)		
< 2 minutes	36	87.5
2 to 5 minutes	5	12.2
>5 minutes	0	0
Success Rate		
Objective(Patent Syringing)	41	100
Subjective(Symptom free)	41	100

Table 3: Modifications of EDCR

	EDCR types	Incision shape	Flaps made				Structures sutured		Flaps and Structures Excised
			ANMF	ALSF	PNMF	PLSF	ANMF to ALSF	PNMF to PLSF	
1	Conventional	H	Yes	Yes	Yes	Yes	Yes	Yes	None
2	Modified	H	Yes	Yes	Yes	Yes	Yes	No	None (Posterior flaps left behind not excised)
3	Modified	H	Yes	Yes	Yes	Yes	Yes	No	Posterior flaps
4	Modified	U	Single large	Single large	Not made	Not made	Yes	No	No excision
5	Present study	U	Single large	Single large	Not made	Not made	Yes	No	Every bit of posterior remnant sac and nasal mucosa tissue

EDCR: External dacryocystorhinostomy, ANMF: Anterior nasal mucosa flap, ALSF: Anterior lacrimal sac flap, PNMF: Posterior nasal mucosa flap, PLSF: Posterior lacrimal sac flap

Table 4: Comparision of success rates: Conventional EDCR VS modified EDCR

	Success rate (%)	
	Conventional EDCR	**Modified EDCR**
Dareshani et al, 1996	97.6	94.2
Elwan S et al 2003	85	90
Serin D et al 2007	93.75	96.67
Pandya V et al, 2010	73	79
Khan FA et al2010	97.1	94.3
Turkcu FM et al. 2011	89.8	89.4
Katuwal S et al. 2013	90.7	87.5
Kacaniku G. et al. 2014	95.3	96.2

EDCR (external dacryocystorhinostomy)

Table 5: Modified single large anterior flap only EDCR (mSAF-EDCR): Outcomes and mean surgical time

Study	Number of eyes (n)	Success rate (%)	Mean Surgical time in minutes
Baldeschi et al 2004	29	100	28.6
Tetikoglu M et al 2015	50	96	34
Caglar C et al 2016	118	94.9	NA
Our Study	41	100	36

NA: not available

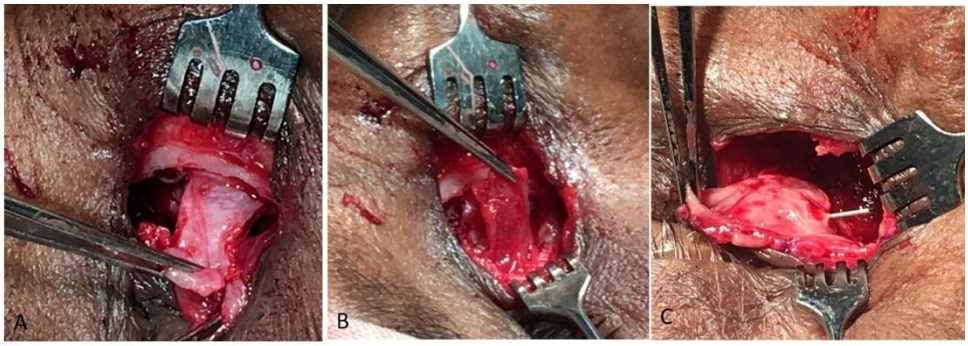

Fig. A: Large nasal mucosal flap,
Fig. B: Large lacrimal sac flap
Fig. C: Confirming free pass of Bowman's probe

Conclusion

Our series of cases mSAF-EDCR demonstrated 100% success rate which may be attributed to complete ExPRT. Our study also indicates that mSAF-EDCR is technically easier and time saving, and should be preferred over conventional EDCR. The complications related to flap damage are also more easily manageable in mSAF-EDCR than conventional EDCR. These results also prompt future research to assess complete ExPRT during mSAF-EDCR surgery.

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