

A Comparative Study of Effect of W-Shaped versus Linear Skin incision with respect to various complications for external dacryocystorhinostomy surgery

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Abstract

Background: Dacryocystitis, is the inflammation of the lacrimal sac and Naolacrimal duct 1. It is usually caused due to an obstruction to flow of tears in the bony passages, that leads to stasis in the sac, which gets infected **Aims and Objectives:** to study Effect of W-Shaped versus Linear Skin incision with respect to various complications for external dacryocystorhinostomy surgery **Methodology:** After Institutional Ethical committee approval was taken, this Prospective randomized Interventional comparative study conducted in department of ophthalmology, in a tertiary hospital. Duration of study was 18 months and all patients were subjected to a follow up period of 6 months. All patients attending ophthalmology outpatient department in our institute for the symptom of epiphora and diagnosed as primary acquired nasolacrimal duct obstruction or chronic dacryocystitis, with diagnosed for primary acquired nasolacrimal duct obstruction. Patients in the age group of 10–70 years randomly allotted into Group- 1 and Group-2 and underwent external dacryocystorhinostomy with 'Linear' and 'W' shaped skin incision by a single experienced surgeon between December 2014 and June 2016. The statistical analysis done by Unpaired t test, Chi-square test calculated by SPSS 19 version software. **Result:** There was no significant difference in ages between the two groups ($p=0.304$) In our study, youngest case was 19 year old and oldest case was 62 year old, Average mean age was 39.24 ± 11.26 , Female to Male sex ratio being 2.1 : 1. Intraoperative bleeding was the Most common intraoperative complication in Both Group A (6.4%) and Group B (12.9%), the incidence of bleeding is more in Group B, but the difference is statistically insignificant ($p=0.403$) Wound infection was the most common postoperative complication in both Group A (9.7%) and Group B (6.5%) Incidence rate of intraoperative and postoperative complications in both the Group shows no statistically significant difference ($p > 0.05$). **Conclusion:** It can be concluded from our study that the disease was most common in female sex and complications were bleeding and infection in both the group and both them were similar with respect to complications are concerned.

Key words: W-Shaped /Linear Skin incision, complications for external dacryocystorhinostomy, Nasolacrimal duct.

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INTRODUCTION

Dacryocystitis, is the inflammation of the lacrimal sac and Naolacrimal duct 1. It is usually caused due to an obstruction to flow of tears in the bony passages, that leads to stasis in the sac, which gets infected¹. The clinical spectrum ranges from simple epiphora to acute or chronic dacryocystitis.² Acute dacryocystitis is the acute inflammation of lacrimal sac with localized erythema and tenderness of the skin overlying lacrimal sac area. Chronic dacryocystitis contains purulent or mucoid

material in the lacrimal sac, which regurgitates on irrigation or pressure over sac area.² The peculiar location of the lacrimal sac i.e., at the junction of the orbit and nose makes it to be frequently involved by diseases of both these sites and in turn it can lead to complications in either of the adjoining structures.¹ Dacryocystitis is a problem not only to the patients but also to the ophthalmologist. It not only causes social embarrassment by constant watering and discharge but also a menace to the integrity of the eye. Organisms from both ends of the passage can infect the sac and also infection in paranasal sinuses, oral cavity and anywhere else in the body can spread to the sac. Hence a detailed examination to rule out any infected foci is a must. Dacryocystitis in turn can spread to involve other adjoining structures due to continuity and by haematogenous route to involve distant sites. It causes chronic conjunctivitis, bacterial persistent ulcers, panophthalmitis with loss of the eyeball, facial cellulitis, orbital cellulitis and even cavernous sinus thrombosis can occur, putting the patient's life in danger. Dacryocystitis could be, congenital, acquired or traumatic. Untreated dacryocystitis never undergoes spontaneous resolution. Any decisions as to the lines of treatment should be preceded by a complete investigation of the lacrimal passages without which cases will inevitably occur wherein the wrong treatment is adopted.¹ The reason for different presentation may be related to microbial pathogenesis of dacryocystitis³ and therefore, it is important to know the underlying etiology, typical infectious organisms and the antibacterial treatment of dacryocystitis.³ The purpose of a DCR is to bypass the obstructed nasolacrimal system by creating an anastomosis between the lacrimal sac and the nasal mucosa. There are different methods for performing DCR including endoscopic and cutaneous approaches. One standard technique is known as external DCR(E-DCR)^{4,5}. Since its introduction in 1904 by Toti, external dacryocystorhinostomy (E-DCR) has been the gold standard in the management of acquired nasolacrimal duct obstruction⁶ E-DCR is a cost-effective surgical technique that may be performed under local anesthesia with minimal blood loss⁷⁻¹³ As an alternative to E-DCR, other surgical techniques involving no skin incision but with increased cost, such as endoscopic endonasal laser-assisted dacryostorhinostomy, mechanical endoscopic endonasal dacryocystorhinostomy, and laser endocanalicular dacryocystorhinostomy have been performed, with variable success rates in modern nasolacrimal duct obstruction surgery. These techniques have the potential to enable simultaneous surgery for associated nasal pathology and to decrease the postoperative recovery time¹⁴⁻¹⁶ E-DCR has a high surgical success rate but scar tissue formation at the incision site may be a major

drawback for patients.¹⁴⁻¹⁹ A linear skin (LS) incision medial to the angular vessels or a curvilinear incision are techniques used in E-DCR. There have been few studies comparing the visibility of EDCR scars. Devoto *et al* reported that 9% of their patients who had undergone E-DCR graded the incision scar as very visible and 26% graded it as moderately visible.¹⁸ While we wait for endonasal procedures to evolve and achieve comparable success rates, an external approach DCR that can successfully hide the scar is highly desirable.²⁰ An incision shape that takes into account cutaneous stress lines may be effective in reducing formation of scar tissue. Therefore, in this study, we aimed to compare the effect of W-shaped (WS) and LS incisions on cutaneous scar tissue formation in patients who have undergone E-DCR with respect to various complications.

METHODOLOGY

After Institutional Ethical committee approval was taken, this Prospective randomized Interventional comparative study conducted in department of ophthalmology, in a tertiary hospital. Duration of study was 18 months and all patients were subjected to a follow up period of 6 months. All patients attending ophthalmology outpatient department in our institute for the symptom of epiphora and diagnosed as primary acquired nasolacrimal duct obstruction or chronic dacryocystitis, with diagnosed for primary acquired nasolacrimal duct obstruction or chronic dacryocystitis based on clinical backgrounds, Both male and female patients in the age group of 10-70 years, Patient giving consent for surgery were included into study while, Epiphora with no sign of nasolacrimal duct obstruction on sac Syringing, Patients having age <10yrs and > 70 years, Cases with lacrimal fistulae and acute dacryocystitis, Ectropion/Entropion/Lower lid laxity, Canalicular and punctual obstruction, Post traumatic bone deformity, All recurrent cases due to failed dacryocystorhinostomy surgery, Patients with bleeding disorders, uncontrolled hypertension. Encysted mucocoele, Patient having intranasal pathology, History of radiation therapy, Cases of congenital malformations of lacrimal apparatus and, craniofacial anomalies, Cases of tumors of the lacrimal apparatus and nasal cavity, Patient not giving consent were excluded from the study. Patients in the age group of 10–70 years randomly allotted into Group- 1 and Group-2 and underwent external dacryocystorhinostomy with 'Linear' and 'W' shaped skin incision by a single experienced surgeon between December 2014 and June 2016. The study included 62 cases (31 cases in each group) that were diagnosed as nasolacrimal duct obstruction or chronic dacryocystitis and those who fulfill inclusion criteria during the study period. The complications like

intraoperative and postoperative complication noted. Sample size was calculated by using reference from previous study, D W Lee *et al*²¹
 $N (\text{Sample size}) = Z^2 P(1-P) / d^2$
 (P= prevalence 3 % = 0.03
 Z= 1.96 for 95% C. I.

D= Allowable error for 6%)
 $N = 1.962 * 0.03 * 0.97 / 0.062$
 N=31.05
 The statistical analysis done by Unpaired t test, Chi-square test calculated by SPSS 19 version software.

RESULT

Table 1: Distribution of patients according to Age-Group in Groups

Age-Group	Group A		Group B		Total	
	No. Of Patients	%	No. Of Patients	%	No. Of Patients	%
≤20 years	00	00	02	6.4%	02	3.22%
21-30	10	32.2%	07	22.58%	17	27.41%
31-40	09	29.03%	08	25.81%	17	27.41%
41-50	09	29.03%	07	22.58%	16	25.81%
51-60	03	9.7%	06	19.35%	09	14.52%
>60	00	00	01	3.2%	01	1.61%
Total	31	100%	31	100%	62	100%

In our study of total 62 cases, Maximum No. of patients of 17 cases (27.41%) were found each in age group of (21-30) and (31-40), Followed by 16 cases (25.81%) in age group of (41-50). In Group A , maximum Number of patients of 10 cases (32.2%) found in the age group of (21-30) , followed by 9 cases (29.03%) each in age group of (31-40) and (41-50%), with the mean age of (37.74±9.99) years. In Group B, maximum Number of patients of 8 cases (25.81%) found in the age group of (31-40) followed by 7 cases (22.58%) each in age group of (21-30) and (41-50%).With the mean age of (40.74±12.63) years. There is no significant difference in ages between the two groups (p=0.304). In our study, youngest case was 19 year old and oldest case was 62 year old, Average mean age was 39.24±11.26

Table 2: Distribution of patients according to Gender in Groups

Gender	Group A		Group B		Total	
	No. of Patients	%	No. of Patients	%	No. Of Patients	%
Male	09	29.0%	11	35.5%	20	32.26%
Female	22	71.0%	20	64.5%	42	67.74%
Total	31	100%	31	100%	62	100%

In our study of total 62 cases, 42 cases (67.74%)were females , and 20 cases (32.26%) were males. In Group A, 22 cases (71%) were Females and 09 cases were Males (29%). In Group B, 20 cases (64.5%) were Females and 11 cases were Males (35.5%). Female to Male sex ratio being 2.1 : 1

Table 3: Distribution of patients according to Intra-operative and Post-Operative complications

	Group A		Group B		Total		Chi-square value	(p-value)
	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage		
Intraoperative Complications								
Bleeding	02	6.4%	04	12.9%	06	9.7%	0.701	P=0.403 NS
Damage to sac damage to nasal mucosa	01	3.2%	02	6.4%	03	4.8%	0.432	P=0.559 NS
	01	3.2%	01	3.2%	02	3.2%	0.00	P=1.00NS
Post-Operative complications :								
Wound infection	03	9.7%	02	6.5%	05	8.1%	0.208	P=0.645 NS
Delayed wound healing	02	6.4%	01	3.2%	03	4.8%	0.432	P=0.559 NS
Hypertrophic Scar	02	6.4%	01	3.2%	03	4.8%	0.432	P=0.559 NS
Mean±SD	37.74±9.99		40.74±12.63		39.24±11.26		t-value 1.04	P=0.304 NS

Intraoperative bleeding is the Most common intraoperative complication in Both Group A (6.4%) and Group B (12.9%), the incidence of bleeding is more in Group B, but the difference is statistically insignificant ($p=0.403$) Wound infection is the most common postoperative complication in both Group A (9.7%) and Group B (6.5%) Incidence rate of intraoperative and postoperative complications in both the Group shows no statistically significant difference ($p> 0.0.5$)

DISCUSSION

Scar tissue formation at the incision site is the major drawback for patients in E-DCR. An incision shape that takes into account cutaneous stress lines may be effective in reducing formation of scar tissue. For this purpose we have intervened by taking 2 types of skin incision (Linear and W shaped) and compared the results. Maximum No. of patients of 17 cases (27.41%) were found each in age group of (21-30) and (31-40). The average mean age of our study was 39 .24 years. The averagemean age of Group A cases is 37.74 ± 9.99 years and Group B is 40.74 ± 12.63 years

Study	Mean Age
Ekinci <i>et al</i> ²²	40.8 ± 14.3
Mostafa A Waly ²⁴	30.7 ± 18.7
Our study	39.24±11.26

When compared with other studies, mean age in our study correlates with other studies. In our study there was a Female preponderance with 42 cases (67.74%) and 20 (32.26 %) cases were males.

Study	Female	Male
Ekinci <i>et al</i> ²²	14 (87.5%)	02 (12.5%)
BurcuDirim <i>et al</i> ²³	57 (64.8%)	31(35.2%)
Mostafa A Waly ²⁴	25 (62.5%)	15 (37.5%)
Our study	42 (67.74%)	20 (32.25%)

Our study correlates well with the other studies in gender distribution, female preponderance can be attributed to the presence of narrow lumen of bony canal and a high nasal index.²⁵ Intraoperative bleeding is the Most common intraoperative complication in Both Group A (6.4%) and Group B (12.9%), the incidence of bleeding is more in Group B, but the difference is statistically insignificant ($p=0.403$) Slight increase in incidence of bleeding may be related to the edge redundancy in WS incisions make subcutaneous dissection more difficult in comparison with LS incisions 128 In EDCR though majority of operative intervention go well, most of them are complicated by bleeding, creating difficulty in visualization. 139 Cases with minimal bleeding were dealt with ribbon gauze piece soaked in 2% Xylocaine with adrenaline, profuse bleeding, was dealt with the suction. Wound infection is the most common postoperative complication in both Group A (9.7%) and

Group B (6.5%) ,In these cases we also noticed delayed wound healing and Hypertrophic scar formation Incidence rate of of intraoperative and postoperative complications in both the Group shows no statistically significant difference ($p> 0.0.5$)

CONCLUSION

It can be concluded from our study that the disease was most common in female sex and complications were bleeding and infection in both the group and both them were similar with respect to complications are concerned .

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