

ROLE OF ORAL TRANEXAMIC ACID IN REDUCING PEROPERATIVE AND POSTOPERATIVE HEMORRHAGE IN EXTERNAL DCR SURGERY

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Abstract:

Background: External dacryocystorhinostomy (DCR) is now a well-established, effective approach to relieve nasolacrimal duct obstruction. Per operative hemorrhage obscure the operative field during surgery. so it is difficult to carry on an uncomplicated surgery. Moreover postoperative hemorrhage has become an added problem. The objective of this study is, to evaluate the effect of oral tranexamic acid in reducing both per operative and postoperative hemorrhage in external DCR surgery.

Methods: This hospital based interventional quasi experiment included 60 patients with chronic dacryocystitis at DMCH between January 2014 to June 2014. Oral formulation of tranexamic acid 500mg two capsule and tablet Vit B complex as placebo started 1 hour prior to DCR surgery and continued up to second postoperative day in intervention and control group respectively. In every case, the rate of hemorrhage was evaluated peroperatively and postoperatively.

Findings: In this study, mean duration of operation was 35.98 (range 30 to 51) min in group-A and 54.13(45-75min) minutes in group-B. Perioperative mean blood loss was of 15.03 ml with a maximum blood loss of 25ml in group A and was 33.57ml with maximum blood loss of 39ml in group B. Mean postoperative bleeding was 2.55ml with maximum blood loss 5ml In group A and was 5.53ml with maximum blood loss 13ml in group B. postoperatively no bleeding was found in 24(73.33%) cases in group A and 10(40%) cases in group B.

Conclusion: This study suggests that oral tranexamic acid significantly reduces peroperative and postoperative hemorrhage and reduces duration of surgery and improves the quality of DCR surgery.

Keywords: Dacryocystitis, Dacryocystorhinostomy, Tranexamic acid.

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Introduction:

Epiphora is an annoying symptom, embarrassing the patient both socially and functionally.¹ It is the main presenting symptom of chronic dacryocystitis and a common ophthalmic problem.² Epiphora result from a disruption in the balance between tear production and drainage.³ Dacryocystitis is an infection of the lacrimal sac and it result from nasolacrimal duct obstruction. It is usually unilateral in nature.⁴ Bilateral acquired nasolacrimal duct obstruction secondary to sarcoidosis and chronic lymphocytic leukemia has been reported.⁵ Tears retain in the lacrimal sac complicated by bacterial infection.

staphylococci, pneumococci and streptococci are the most common causative agents.⁶ The usual causes of stenosis of the nasolacrimal drainage system include chronic or acute inflammation, traumatism, and congenital malformation.⁷⁻⁹

Dacryocystorhinostomy (DCR) involves the creation of an alternative route for the drainage of tears between the lacrimal sac and nasal cavity, bypassing the nasolacrimal duct. This alternative route generated using in external approach (external DCR) or through the nasal cavity using an endoscope (EES-DCR).¹⁰ Research suggests the use of general

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anaesthesia and more recently, the use of local anaesthesia has also been proposed for both techniques.^{11,12} However, external DCR remains the gold standard for the treatment of nasolacrimal duct obstruction.¹³

In external DCR, an external incision was made, the periosteum and the sac were elevated. A bony ostium was created using a punch. A large bony resection of 15-20mm in external DCR is required to ensure a large anastomosis and high success rate^[14]. A corresponding piece of nasal mucosa was removed. Suturing instead of excising of lacrimal sac and nasal mucosa flaps was described as early as 1914. There was no significant difference between DCR using both anterior and posterior flap anastomosis and DCR using only anterior flap anastomosis.¹⁵ The role of antimetabolite for the maintenance of patency in external DCR is currently being studied. Intraoperative mitomycin C (MMC) application is a safe adjuvant for reduction of the closure rate of the osteotomy site after primary external DCR.¹⁶

In recent years, endoscopic endonasal DCR, endo-laser DCR has gained popularity, although it is considered more technically challenging and has a prolonged learning curve^[17, 18]. The success rate of the endoscopic approach in NLDO are similar to those of the external approach and range between 80% and 96%.¹⁹⁻²⁵

One of the most common and serious complications of DCR is haemorrhage. Bleeding during the operation not only hinders the procedure but also delays the operation and unfavourably affects the outcome^[26]. Several authors have defined in detail the procedures to minimize intraoperative haemorrhage.^{27,28}

Tranexamic acid may play a vital role to reduce the peroperative and postoperative bleeding. Tranexamic acid exerts its antifibrinolytic effect by reversibly blocking lysin binding sites on plasminogen, thus preventing plasmin from interacting with lysin residues on the fibrin polymer, causing subsequent fibrin degradation, so the fibrinolytic system of blood is inhibited and bleeding stops.²⁹ Tranexamic acid has no effect on overall blood coagulation parameters (e.g. platelet count, activated partial thromboplastin time and prothrombin time).

Materials and methods:

This was a randomized interventional study. This study was carried out in DMCH eye department from January 2014 to June 2014. Total 60 patient with chronic dacryocystitis were selected for external DCR under local anaesthesia. Thirty patients in each group. Group A belongs to study group and group B belongs to control group. Oral tranexamic acid (500mg)/placebo, two cap/tab given orally one hour prior to operation to study group/control group respectively. Peroperative blood loss was measured by attaching a collection pot to the suction vacuum tubing in milliliter in both study and control group. Duration of operation was also measured in both study and control group; the time was calculated by using a watch from the skin incision to skin closure in minutes. Postoperative blood loss was measured by weight difference between nasal gauze that was removed 24 hours after operation. Postoperatively systemic antibiotic, systemic analgesic and oral tranexamic acid (500mg) was prescribed. Oral tranexamic acid (500mg) was given one cap 12 hourly for 2 postoperative days in group A and placebo was given one tab 12 hourly for 2 postoperative days in group B.

Results:

In this study, the mean age was 31.63 years in group A and 35.76 years in group B, ranging from 18 years to 50 years. Among 60 patients of both groups, 26(43.33%) were male and 34(56.67%) were female. Maximum population came from housewife which is about 12(40%) and 10(33%) respectively in group A and group B. Among 60 patients, only 7(11.66%) patients come from middle socioeconomic class and rest 53(88.33%) patients belong to poor socioeconomic class. The mean duration of operation was 35.98 minutes for group A and 54.13 minutes for group B. Peroperative mean blood loss was 15.03ml in group A and was 33.57ml in group B. Postoperative mean blood loss was 2.55ml in group A and was 5.53ml in group B. Postoperatively there was no bleeding was found in 24(80%) cases in group A and 10(34%) cases in group B.

Table-I
Demographic characteristics of the study population

Trait	Group A (Study group) n=30	Group B (control group) n=30	p-value
Age , mean (SD)	31.6(9.1)	35.7(9.5)	>0.99 ^a
Age groups			
< 20 years	4(13.3%)	2(6.67%)	0.26 ^b
20-29 years	8(26.67%)	6(20%)	
30-39 years	12(40%)	9(30%)	
>40 years	6(20%)	13(43.33%)	
Sex male n (%)	14(46.7)	16(43.3)	0.6 ^b
Occupation			
Housewife	12(40%)	10(33.33%)	0.52 ^b
Service	9(30%)	6(20%)	
Student	2(6.67%)	4(13.3%)	
Business	3(10%)	7(23.33%)	
Others	4(13.33%)	3(10%)	

a-Unpaired t-test b-Chi-square test

Table-II
Difference of different outcomes between the case and the controls

Outcomes	Group A	Group B	P value
Duration of operation			
30-40 min	23 (76.67%)	0 (0%)	<0.001 ^a
41-50 min	6 (20%)	1 (3%)	
>50 min.	1 (3%)	29 (96.67%)	
Mean (SD)	35.9(5.40)	54.1(2.5)	<0.001 ^b
Preoperative bleeding			
10-20	28 (93.33%)	0 (0%)	<0.001 ^a
20- 30	2 (6%)	3 (10%)	
>30	0 (0%)	27 (90%)	
Mean(SD)	15.03(3.35)	33.57(3.63)	<0.001 ^b
Post-operative bleeding			
No bleeding	24 (80%)	10 (33.33%)	<0.001 ^a
1-5	6 (20%)	0 (0%)	
>5	0 (0%)	20(66.67%)	
Mean (SD)	2.55(1.68)	5.53(4.3)	<0.001 ^b

a- Chi square testb-

Unpaired t-test

Discussion

Bleeding is the most common and serious complication of DCR surgery. Bleeding during the operation not only hinders the procedure but also delays the operation and unfavourably affects the outcome.²⁶ Several authors have defined in detail the procedures to minimize intraoperative haemorrhage, method of minimizing intraoperative bleeding during DCR includes meticulous infiltration of topical anesthesia combined with adrenaline at the surgical site, nose spraying with lidocaine hydrochloride and weak phenylephrine hydrochloride, and packing with cocaine hydrochloride-soaked ribbon gauze at least 10 minutes prior to surgery.^{27,28} oral tranexamic acid may also play role in reducing both peroperative and post-operative haemorrhage.

60 patients with chronic dacryocystitis admitted in eye department of Dhaka Medical College Hospital were included in this study. Written informed consent was taken from each patient and a thorough ocular and systemic examination was done. Each of the patients was randomly included in either of the following two groups by simple lottery method. In Group-A, 30 patients were given Cap tranexamic acid prior to DCR operation and following two days postoperatively whereas in Group-B, 30 patients were given Placebo (Vit. B complex). Patients were masked to the medications. Blood loss during operation was measured in milliliters.

In this study, the male patients were 43.33 % and 46.67% respectively in both study groups whereas the female patients were 56.67% and 53.33% in both study groups. The disease has female preponderance. So, in both the study groups females were more preponderance with chronic dacryocystitis. Karim et al²⁴ found the total 205 patients of which 128 females and 77 males that is 48.6% is male and 62.4% is female.

Caesar RH et al²⁸ found the mean blood loss was 4.5 ml (range 1 to 14 ml) and the mean operative duration was 36 minutes (range 25 to 65 minutes) in external DCR surgery. Malhotra et al³⁰ reported mean operative duration of external DCR is 41 minutes. In this study, the mean duration of operation was

35.98 (range 30.5 to 49 minutes) minutes in group-A and 54.13 (range 45 to 75 minutes) minutes in group-B. The duration of operation was much higher in Placebo group which is statistically significant.

Peroperative haemorrhage during external DCR has been reported in various studies to range between 4.5ml and 250ml.^{28,31} In this study, peroperative mean blood loss was 15.03ml (ranges from 11ml to 25.5 ml) in group-A and was 33.57 ml (ranges from 24.5 ml to 57ml) in group-B. The blood loss was more in Placebo group. p value reached from student's 't' test which was statistically strongly significant ($p < 0.001$).

Mean postoperative bleeding was 2.55 (ranges from 0 ml to 5 ml) ml in group-A and was 5.53 (ranges from 0 ml to 12 ml) ml in group-B. Postoperatively no bleeding was found in 24 (80%) cases in group-A and 10 (34%) cases in group-B. Wellington K et al^[29] found that women with idiopathic menorrhagia, tranexamic acid 2-4.5 gm/day for 4-7 days reduced menstrual bleeding by 34-59% over 2-3 cycles, significantly more so than Placebo.

Vishal Pundir et al.³² found role of tranexamic acid in intraoperative blood loss in endoscopic sinus surgery. Five randomized controlled trails with 192 patient receiving tranexamic acid and 196 controls were included. Meta-analysis demonstrated that mean estimated blood loss was significantly lower and surgical field quality was significantly better in tranexamic acid group.

A Study was done on "Rate of delayed epistaxis and current and past use of antiplatelet medications".³³ The result was, 374 patients who underwent 437 external DCR, 15 (3.4%) had an episode of delayed epistaxis. They were generally older and more likely to have a history of active dacryocystitis compared with those who did not develop delayed epistaxis. Preoperative use of aspirin, nonsteroidal anti-inflammatory drugs, or warfarin sodium was not associated with delayed epistaxis or poorer surgical outcome if these anticoagulants were discontinued preoperatively as instructed. None of the 15 patients with delayed epistaxis had continued ingesting anticoagulants before

undergoing DCR. Patients who developed epistaxis (80%) had a significantly lower rate of satisfactory surgical outcome than those who did not (90%). In my study postoperative hemorrhage was observed 06 patients (20%) in group-A and in 20 patients (66%) in group-B in the first postoperative day. The difference is statistically significant ($p = 0.000195$). So, the result of functional outcome in our study corresponds that oral tranexamic acid works better in reducing the hemorrhage during external DCR operation.

Conclusion:

All studies show similar results in regards to use of oral tranexamic acid in reducing hemorrhage during external DCR surgery. The usual dosages of the drug are 500mg 2tab one hour prior to DCR surgery and one tab 12 hourly for 2 postoperative days. This usual dosage significantly reduces peroperative and postoperative hemorrhage and thus reduce the duration of surgery and improves the quality of external DCR surgery. Further study in different centers with more patient and more precaution will help to conclude the comment.

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