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Original Research Article

Evaluation of effect of absorbable gelatin sponge (gel foam) nasal packing in external dacryocystorhinostomy

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ABSTRACT

Background: The success rate of external DCR has been reported to an exemplary level with variation regard to the surgeon's skill, competence and experience. The relatively high success rates of external DCR does not detract from the limitations of the procedure. Intra operative difficulty and Post-operative morbidity have led to search for modifications in the technique. Gel foam helps to reduce bleeding in the post-operative period and improves the surgical outcome.

Objective: The purpose of this study is to evaluate the effect absorbable gelatin sponge(gel foam) nasal packing in external dacryocystorhinostomy.

Materials and Methods: Study was done at M M Joshi Eye Institute, Hubli and the subjects was divided into two groups. Group A had 21 patients, and they underwent External DCR without gelfoam nasal packing(control group) and Group B (study group) had 20 patients, and they underwent External DCR with gelfoam nasal packing. The postoperative results was compared between the two groups. Statistical analysis was done by SPSS 20.0 version, Chi- square test was done for analysis. P value of less than 0.05 was taken as significant.

Results: The study found out absorbable gelatin sponge (gel foam) nasal packing in external dacryocystorhinostomy would help in reduced postoperative bleeding frequency, bleeding time and increased anatomical success rate.

Conclusion: Postoperative haemostasis was attained successfully by using absorbable packing material such as gelfoam.

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1. Introduction

The traditional surgical approach to distal obstruction of the nasolacrimal duct has been in practice by using an external skin incision. AddedoToti first described the technique of external dacryocystorhinostomy (DCR) in 1904. Technique involves gaining access to the sac via an external approach,

the part adjacent to the canaliculi should be preserved and part of nasal cavity is removed.¹ A mucosal anastomosis with suturing of the mucosal flaps was described later by Dupuy-Dutemps and Bourget.² With the exception of minor alterations, external DCR is still performed in much the same way. The success rate of external DCR has been reported to be 80 to 90%, with moderate variation applying to surgeons experience.³⁻⁵

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Nasal packing after dacryocystorhinostomy (DCR) is an optional procedure to prevent nasal bleeding.⁶ Postoperative nasal bleeding is unpleasant for patients and can be severe in certain cases. Most of the studies on external DCR have reported that it can potentially affect the mucosal healing process and can cause fibrosis and induce scarring at the newly formed ostium site, all of which could result in an impairment of ostial patency. Therefore, the minimization of intra- and postoperative bleeding is important to consider in an attempt to achieve successful surgical results. Postoperative bleeding occurs due to the bleeding from the nasal mucosa, injury while removing nasal pack. More recently, the effects of nasal packing materials after DCR have started to draw attention, but there are no well-established conclusions from the available literature.⁷ Furthermore, the lack of standardization in the measurement of DCR surgical outcomes makes it difficult to compare and interpret the results of previous studies.

Packing materials are broadly divided into non-absorbable and absorbable materials. Non-absorbable materials include Vaseline gauze strips and Merocel, which inhibit bleeding through a compression mechanism. Absorbable materials such as MeroGel.⁸ Absorbable gelatin sponge (gelfoam) and have been reported to be successful as packing materials after DCR. Absorbable gelatin sponge is a substance that has been used by almost every surgical subspecialty for obtaining hemostasis in areas where bleeding is difficult to control.

Nasal packs affects wound healing. Many studies shows its role in re-epithelialization, granulation tissue formation and scarring.^{9–12}

The hypothesis of present study was gelfoam helps to reduce bleeding and inflammation which helps to maintain the ostium an increase success of external dacryocystorhinostomy. The objective of this study was to evaluate the effect of absorbable gelatin sponge nasal packing in external dacryocystorhinostomy. This was assessed by post-operative bleeding frequency, bleeding time, anatomical success rate and patient comfort. Anatomical success rate was measured by lacrimal syringing in the post-operative period. Patient comfort was assessed by subjective score of mild, moderate and severe.

2. Materials and Methods

The study design adopted was randomized control trial. The study setting was M.M Joshi Eye Institute, Hubli. Forty-one patients were studied with primary acquired nasolacrimal duct obstruction with chronic dacryocystitis who underwent external dacryocystorhinostomy (Ex-DCR) by a single surgeon at M M Joshi Eye Institute, Hubli and was divided into two groups. Group A underwent Ex-DCR without gelfoam nasal packing (control group) and Group B(study group)underwent Ex-DCR with gelfoam nasal packing and the postoperative results was compared between the two

groups. The inclusion criteria comprises of patients above the age of 17 years with acquired primary nasolacrimal duct obstruction with chronic dacryocystitis undergoing external DCR surgery. The exclusion criteria comprises of patients with secondary nasolacrimal duct obstruction, such as that caused by trauma, tumor, dacroliths and facial anomalies. Patients with nasal cavity diseases such as, nasal polyps, atrophic rhinitis, and other causes like carcinoma maxillary sinus, patients with less than 3 months of follow-up, patients with histories of uncontrolled hypertension, bleeding disorders, collagen vascular disorders are also excluded. A thorough clinical history was taken in all patients. Clinical examination including regurgitation on pressure over lacrimal sac test, sac syringing and pre- post-op endoscopic nasal examination by an ENT surgeon were done in all patients. The surgery was performed under local anaesthesia, using 2% xylocaine with 1:1,00,000 concentration adrenaline. Preoperatively xylometazoline nasal spray and packing of xylocaine and adrenaline - soaked gauze into the nasal cavity was performed. During surgery, nasal mucosa was identified, 'U' shaped flap was made in the lateral wall of nasal mucosa, medial wall of lacrimal sac was excised, Gelfoam sponge were cut into three pieces and packed one by one at the anastomosis site as deep as the common canaliculi opening to maximize the pressure and tenting effect on the lacrimal sac. Anterior 'U' shaped flap was sutured to the lacrimal sac using vicryl 6-0 and haemostasis was achieved. Muscle and skin sutured with 6-0 vicryl interrupted sutures in layers were used, following wound dressing was done. The follow-up visits were planned at 1, 4,12 weeks and 3 months postoperatively. At every visit, nasal wounds were examined and lacrimal syringing was done. An informed written consent was obtained in all patients.

The participation in the study was explained as voluntary. Patients were given choice to withdraw from the study at anytime for any reason by advising the study staff of this decision.

Statistical analysis was done by SPSS version 20.0(SPSS Inc., Chicago, IL, USA), and a p-value of less than 0.05 was considered statistically significant. To compare the primary data between the two groups, we used the Pearson's chi-square test.

3. Results

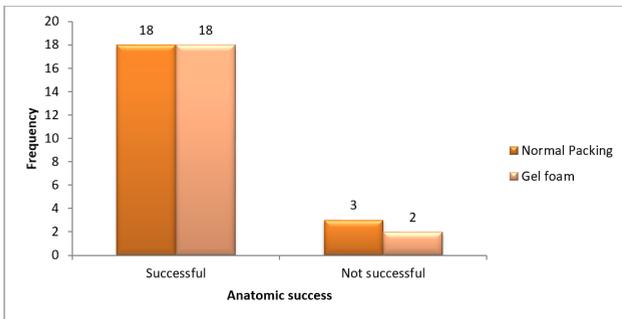
Total forty-one patients included in the study. Study population had 17 male patients and 24 female patients. 21 patients used normal nasal packing and 20 patients used gel foam nasal packing.

Anatomical success was present in 86% of normal nasal packing and 90% of gelfoam nasal packing (Table 1), (Graph 1). This difference was not statistically significant as P value was 0.675. There was no statistical difference in the pain and discomfort in two group (Graph 2). Bleeding

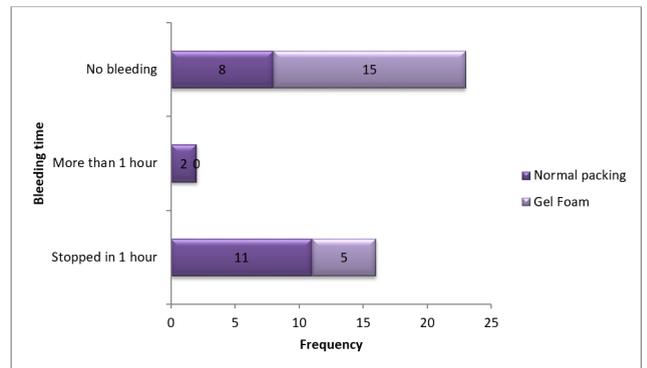
Table 1:

Factors	Level	Normal packing n (%)	Gel form n (%)	Chi-square value	P value
Age group	<=40	1 (50.0)	1 (50.0)	1.283	0.733
	41-50	5 (62.5)	3 (37.5)		
	51-60	8 (42.1)	11 (57.9)		
	61-70	7 (58.3)	5 (41.7)		
Anatomic success	Success	18 (86)	18 (90)	0.176	0.675
	Non Success	3 (14)	2 (10)		
Pain	Mild	10 (55.6)	8 (44.4)	2.002	0.572
	Moderate	5 (55.6)	4 (44.4)		
	Severe	1 (100.0)	0 (0.0)		
	Nil	5 (38.5)	8 (61.5)		
Bleeding time	Stopped in 1 hour	11 (68.8)	5 (31.2)	6.360	0.042
	More than 1 hour	2 (100.0)	0 (0.0)		
	No bleeding	8 (34.8)	15 (62.2)		
Bleeding frequency	1-2	10 (66.7)	5 (33.3)	5.145	0.161
	2-4	1 (100.0)	0 (0.0)		
	> 4	1 (100.0)	0 (0.0)		
	Nil	9 (37.5)	15 (62.5)		

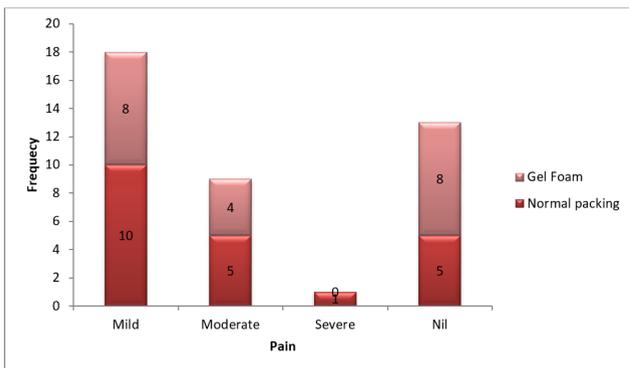
frequency was also less in gel foam nasal packing group, but it was not statistically significant P value 0.161(Graph 4).



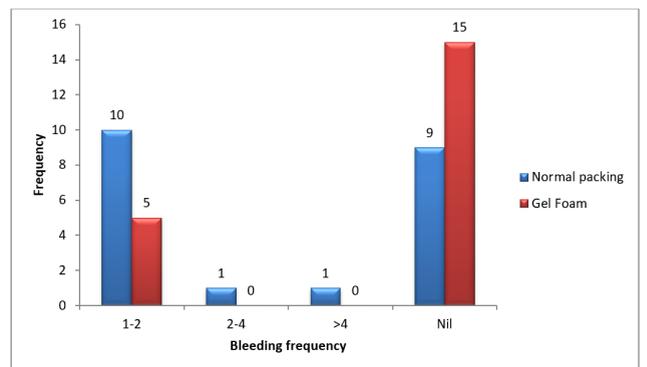
Graph 1:



Graph 3:



Graph 2:



Graph 4:

Our study results showed a statistically significant decrease post-operative bleeding time in gelfoam nasal packing group, P value 0.042 (Graph 3).

4. Discussion

Dacryocystorhinostomy usually have anatomical success rate of 90%.

The most common cause of DCR failure is having a small bony ostium. Bleeding can potentially affect the mucosal healing process. It can cause fibrosis and induce scarring at the newly formed ostium site. It results in an impairment of ostial patency. Gelfoam provide gentle compression and offer sufficient wound support during the critical healing period through the absorption of nasal fluids and blood. This property of gelfoam helps in Berlucchi et al. reported that absorbable packing material showed a decreased nasal adhesion and better endoscopic findings such as re-epithelialization after endoscopic sinus surgery, compared to non-absorbable packing material.¹³

Gelfoam has a haemostatic action which is dependent on its protein and physical properties, when left in situ it controls the recurrent haemorrhage without causing the foreign body reactions. It favours the process of tissue repair and when implanted in tissue. Gel foam completely absorbed in three to six weeks depending upon the type of tissue in which it is placed. This eliminates the removal of nasal pack. If non absorbable packing material is used there is tendency to have bleeding when the packing is removed, gel foam leaves only a slight amount of scar tissue can be used comfortably.

This study shows statistically significant reduction of postoperative bleeding in gelfoam nasal packing compared to normal nasal packing. Frequency of bleeding, Postoperative discomfort are also less compared to normal nasal packing. But these results were statistically not significant. Gelfoam and normal nasal packing did not prove statistical significance in anatomical success rate in the present study. We believe that this is probably due to the high functional success rates of external DCR, which is greater than 85% in both groups.

5. Conclusion

The anatomic success rate of DCR was not affected by the packing material itself. Absorbable packing material such as gelfoam would be very helpful in postoperative haemostasis, endonasal wound care and reducing discomfort associated with nasal packing.

6. Recommendations

The study recommends ophthalmologist to use gel foam in DCR procedure to have reduced postoperative bleeding frequency and bleeding time. Usage of absorbable gel foam materials abort the requirement of nasal pack removal which is the common cause of post-operative bleeding.

7. Source of Funding

None.

8. Conflict of Interest

None.

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