Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL13, ISSUE 08, 2022

Lagophthalmos-Surgical Procedure & Outcome

K. Tejaswi[1], P. Sai Rupa Sree[1], D. Sowramya[2], P. Sudhir Babu[3]

[1]Assistant Professor, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Telangana, India.
[2]P.G. Final Year Student, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Telangana, India.
[3]Professor & HOD, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Telangana, India.

Abstract

Background: Lagophthalmos is an eyelid condition. The common notion that hares sleep with their eyes open inspired the name Lagophthalmos. Good blink reflex and eyelid closure help maintain tear film and corneal health.

Material and Methods:A total of 30 eyes from 30 patients presented to the ophthalmology department at the Kamineni Institute for Medical Sciences in Narketpally with lagophthalmos between November 2020 and September 2022, and the study was designed as a prospective interventional trial.

Results: Idiopathic facial nerve palsy was revealed to be the most common underlying cause of lagophthalmos, according to our research. Those who are diagnosed with idiopathic facial nerve palsy have an 85 percent chance of making a full recovery within 12 weeks without the assistance of surgical treatment.

Conclusion: Ultimately, idiopathic facial nerve palsy is identified as the leading cause of lagophthalmos. When it comes to preventing corneal damage from exposure, LPS disinsertion with a spacer is just as effective as gold weight implantation.

Keywords: Lagophthalmos, surgical procedure, outcome.

Corresponding Author: Dr. K. Tejaswi, Assistant Professor, Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally, Nalgonda, Telangana, India.

Introduction

Lagophthalmos is defined as inability to close eyelids completely.[1,2] Lagophthalmos comes from the Greek word for hare (lagoos),[2-4] and derives from a myth that hare sleeps with its eyes open. Proper eyelid closure and a normal blink reflex are essential for maintaining a stable tear film and a healthy corneal surface. Facial paralysis with resultant paralytic lagophthalmos and ectropion can occur from many causes, including Bell's palsy, tumors, trauma, and the ocular complications of inadequately managed facial paralysis range in severity from corneal irritation and punctuate keratopathy to corneal ulceration, perforation, and blindness.[5-7] Therefore it is important to recognize lagophthalmos early in the patient's course and begin treatment as soon as possible. Traditional medical therapy has included emollient ointments and eye drops, as well as taping and pressure patches.[8-10]However, these are of short-lasting benefit and the frequency of application is such that these measures are often abandoned by the patients. This has led to use of surgical procedures in the management of facial paralysis. An effective surgical procedure is essential to counteract the devastating complications that can occur due to lagophthalmos this study was conducted to evaluate the effectiveness of surgical management in alleviating both functional and cosmetic impairments caused by lagophthalmos.[11-14]

ISSN: 0975-3583,0976-2833 VOL13, ISSUE 08, 2022

Aims

To evaluate the effectiveness of LPS disinsertion with spacer surgical procedures in reducing the amount of lagophthalmos and healing exposure keratopathy.

Objectives

- To assess the following post operatively
- Improvement of ocular symptoms
- Reduction of amount of lagophthalmos.
- Reduction of MRD1.
- Improvement in status of the cornea.

Material and Methods

This prospective interventional study was conducted among patients presenting with lagophthalmos to the department of ophthalmology at Kamineni institute of medical sciences, Narketpally 30 eyes of 30 patients were studied during the period of November 2020 to September 2022.

Inclusion criteria

- All the cases of lagophthalmos due to various etiologies were included.

Exclusion criteria

- Cases of Bell's palsy with a duration of less than 6 months were excluded.

Procedure

All the patients first underwent thorough clinical examination including history, general examination, ocular examination including BCVA, measurement of MRD1, MRD2, palpebral fissure height, amount of lagophthalmos, bells phenomenon, and anterior segment examination including fluorescein staining of cornea. Following surgical procedure was performed in each case depending on amount of lagophthalmos and status of the lower lid.

Surgical Technique

Upper eyelid LPS disinsertion with spacer

After marking superior lid crease, local anesthesia is given. Skin crease incision is taken. Orbicularis muscle is tented up, dissection is carried out till orbital septum with Westcott scissors the septum is opened up, and preaponeurotic fat is identified overlying LPS aponeurosis. Westcott's scissors are used to dissect aponeurosis from anterior superior portion of tarsus. Autogenous fascia late which is used as spacer is trimmed and then sutured to tarsal plate, skin is closed with a running 6-0 vicryl suture.

Outcome measures: During follow up following aspects were evaluated.

- Improvement of preoperative symptoms of eye irritation
- Reduction of amount of lagophthalmos,
- corneal status

All groups' data are expressed as average plus or minus standard deviation. Statistical significance of differences between preoperative and postoperative groups of measurements was determined by 2-tailed t test. Differences between groups were considered to be statistically significant at $P<0.05$.

ISSN: 0975-3583,0976-2833 VOL13, ISSUE 08, 2022

RESULTS

30 cases were included in the study 5 patients lost for follow up. 25 eyes of 25 patients were followed for an average period of 5.6 months.

Table 1: Sex distribution

Females	10
Males	15

Age distribution
Mean age of presentation was 52 years (31 yrs. - 72 yrs.)

Table 2: Age distribution

Age group in years	**No. of patients(n=25)**
30-40	1
40-50	10
50-60	7
60-70	4
70-80	3

Etiology of Lagophthalmos
Patients with permanent facial nerve palsy were included in the study. Etiological Causes of facial nerve palsy in these patients were:

Table 3: Etiology

Cause	**No. of patients(n=25)**
Idiopathic	11
Trauma	4
Post tumor excision	1
Ear infections(CSOM)	2
Leprosy	2
Vascular(CVA)	5

Mean time duration from onset of symptoms to surgery was 2.2years (1 year to 3 years). Most common preoperative symptoms in these patients were inability to close eyes, epiphora, discomfort, redness, irritation. 25 patients who were included in the study underwent following surgical procedure

Table 4: Surgical procedure

Surgical technique	**No. of patients operated**
Upper eyelid LPS disinsertion with spacer	25

Upper eyelid LPS disinsertion with spacer
The mean preoperative palpebral fissure height was 12.31 ± 0.53, this measure was improved postoperatively to 9.5 ± 0.76($p<0.0001$) the mean preoperative amount of lagophthalmos was 4.06 ± 0.79 which was significantly improved postoperatively to 0.93 ± 0.75 ($p<0.0001$).
Among 25 patients lagophthalmos completely resolved in 15 cases (60%). Asymptomatic lagopthalmos of 1mm to 2 mm persisted in 7 cases. In 3 patients >2mm of lagophthalmos was persistent during follow up.

ISSN: 0975-3583,0976-2833 VOL13, ISSUE 08, 2022

Mean preoperative MRD1 was 7.8mm which was reduced to 4.8mm postoperatively Exposure keratopathy was completely resolved in 16 cases (64%) improved in 8 cases. Symptoms improved in 90% of the cases. No complications were noted during follow up.

Table 5: Palpebral fissure height

Upper eyelid spacer Surgery	Mean preop (mm)	Mean postop (mm)
PFH	12.31	9.5
lagophthalmos	4.06	0.93
MRD 1	7.2	4.8

DISCUSSION

In our study the most common cause of lagophthalmos was idiopathic facial nerve palsy (50%). 85% 0f the cases with idiopathic facial nerve palsy will recover with in a period of 8 to 12 weeks in rest 15% of the cases paralysis is permanent and they need surgical intervention. In a study conducted by Stephen.C,Dresner,[15-17] he stated that Secondary facial nerve palsy is due to various causes and is generally less prevalent than Bell's palsy (25% vs.75%). According to Rahman (2007) most common causes include Bell's palsy (51%), trauma (22%). Maintaining a comfortable eye in which cornea is protected is the main goal for the patients with lagophthalmos. A large number of techniques have been advocated from time to time for the treatment of lagophthalmos and so far none has proved to be ideal. The criteria for a good technique are.[18-20]

(i) It should support the lower lid against the globe.
(ii) It should prevent ectropion of lower punctum and thus should keep the epiphora in check.
(iii) It should permit movement of the upper lid so that ex¬posure keratitis and lag-ophthalmos do not recur.
(iv) Cosmetic appearance should be good.

In our study 25 patients underwent upper eyelid LPS disinsertion with spacer. Complete eye lid closure was achieved in 15 cases (60%).Mean amount of reduction of PFH is 3mm. Mean difference of preoperative and postoperative MRD1 is 2.8mm. Mean reduction of lagophthalmos is 3.5mm. Symptoms were relieved in 90% of the patients. J C Flanagan and C B Campbell stated that they preferred use of fascia lata as upper eyelid spacer.[21-24]

Following are the studies in which auricular cartilage was used as spacer. In a study conducted by Iñigo F et al,[25-27] an ear cartilage graft is interposed between the tarsal plate and the levator palpebrae superioris muscle. 12 patients with paralysis of the orbicularis oculi muscle, as assessed by electromyography, were treated with this technique. The palpebral fissure was decreased by 2-3 mm in all cases. Patients showed significant improvement of their eye symptoms. One patient, in whom the palpebral fissure could not be closed sufficiently to protect the eye, required additional lengthening by 4 mm of the cartilage graft and a lateral tarsorrhaphy.[28,29]

Friedhofer H, Coltro PS, conducted a retrospective study including case series of 30 patients with paralytic lagophthalmos from 1997 to 2010.[30] For mild cases, cartilage from the auricular scapha was placed in pretarsal space of the upper eyelid and cartilage from the concha was inserted in preaponeurotic space and then sutured to the levator aponeurosis after treatment, they presented with evident clinical improvement, reduction of eye symptoms, and resolution of keratopathy.[31] Complete eye closure was achieved in 24 (80%) patients, whereas the remaining 6 (20%) patients had residual asymptomatic lagophthalmos. From our

ISSN: 0975-3583,0976-2833 VOL13, ISSUE 08, 2022

study following were observed. LPS disinsertion at tarsal plate weakens levator and partly induces ptosis when this is combined with spacer which lowers the upper lid by gravity it is more effective. It was observed that LPS disinsertion with spacer is equally effective in reducing lagophthalmos and providing symptomatic relief as compared to gold weight implantation.[32,33]

CONCLUSION

It is concluded that idiopathic facial nerve palsy is the most common cause of lagophthalmos. LPS disinsertion with spacer is equally effective as compared to gold weight implantation in correcting lagophthalmos and protecting cornea from exposure keratopathy. However it has to be combined with LTS to correct lower lid laxity and ectropion. We conclude that being cost effective LPS disinsertion with spacer can be considered as one of the treatment options for correcting lagophthalmos.

References

1. Cline D; Hofstetter HW; Griffin JR. Dictionary of Visual Science. Butterworth-Heinemann, Boston 1997; 4:21.
2. Lyons, C. J. and McNab, A. A. Symptomatic nocturnal lagophthalmos. Australian and New Zealand Journal of Ophthalmology, 1990: 18: 393–396.
3. Valeria Sansone,James Boynton and Cynthia Palenski .Use of gold weights to correct lagophthalmos in neuromuscular diseases. Neurology 1997; 48;1500
4. May M. Gold weight and wire springs implants as alternatives to tarsorraphy. Arch otolaryngol Head Neck Surg 1987; 113: 656-660.
5. Stephen.C.Dresner. ophthalmic management of facial nerve palsy Arch opthalmol 2000:23: 43-46.
6. Rahman,SA Sadiq –Survey of ophthalmology, 2007-Elsevier.
7. Iñigo F, Chapa P, Jimenez Y, Arroyo O.Surgical treatment of lagophthalmos in facial palsy: ear cartilage graft for elongating the levator palpebrae muscle. Br J Plast Surg. 1996 Oct; 49(7):452-6.
8. Friedhofer H, Coltro PS, Vassiliadis AH, et al. Alternative surgical treatment of paralytic Lagophthalmos using autogenic cartilage grafts and canthopexy. AnnPlastSurg.2013; 71(2):15-139.
9. Tan, Swee T. et al. Gold weight implantation and lateral tarsorrhaphy for upper eyelid paralysis Journal of Craniomaxillofacial Surgery , Volume 41 , Issue 3 , e49 - e53
10. Anthony J.Bron, Ramesh C.Tripathi & Brenda J.Tripathi. Wolff's anatomy of Eye and Orbit, 8th edition, 2001; 2:30-49,4: 143-7
11. Ramanjit Sihota & Radhika Tandon. Parsons' Diseases of the Eye, 21st Ed. Elsevier India; 2008; 423-44
12. Putterman AM, Urist MJ. Surgical anatomy of the orbital septum. Ann Ophthalmol; 6:290–4, 1974.
13. Clinton D. McCord, Myron Tanenbaum. Oculoplastic surgery. 3rd Ed. Newyork; Raven Press; 2001.
14. The Facial Nerve, STEVEN L.GALETTA and MARK MAY, Duane's ophthalmology, 2006:8.
15. Carpenter M: Core Text of Neuro-Anatomy, Baltimore: Williams & Wilkins, 1985: 151
16. 16. Martin RG, Grant JL, Peace D: Microsurgical relationship of the anterior inferior cerebellar artery and the facial vestibulocochlear nerve complex. Neurosurgery 1980; 6:483
17. Latkany RL, Lock B, Speaker M : Nocturnal lagophthalmos: an overview and classification. Ocul Surf. 2006 Jan;4(1):44-53.

ISSN: 0975-3583,0976-2833 VOL13, ISSUE 08, 2022

18. Rowlands S, Hooper R, Hughes R, Burney P. The epidemiology and treatment of Bell's palsy in the UK. Eur J Neurol. 2002; 9:63–7.
19. Morris AM, Deeks SL, Hill MD, Midroni G, Goldstein WC, Mazzulli T, et al. Annualized incidence and spectrum of illness from an outbreak investigation of Bell's palsy. Neuroepidemiology. 2002;21:255–61.
20. Holland NJ, Weiner GM. Recent developments in Bell's palsy. BMJ. 2004;329:553–7.
21. May M, Klein SR. Differential diagnosis of facial nerve palsy. Otolaryngol Clin North Am. 1991;24:613–45.
22. Vrabec JT, Coker NJ. Acute paralysis of the facial nerve. In: Bailey B, Johnson J, editors. Head and Neck Surgery: Otolaryngology. Philadelphia, PA: Lippincott; 2006. pp. 2139–54.
23. Joseph EM, Sperling NM. Facial nerve paralysis in acute otitis media: Cause and management revisited. Otolaryngol Head Neck Surg. 1998;118:694–6.
24. Sampath P, Holliday MJ, Brem H, Niparko JK, Long DM. Facial nerve injury in acoustic neuroma (vestibular schwannoma) surgery: Etiology and prevention. J Neurosurg. 1997;87:60–6.
25. Evans AK, Licameli G, Brietzke S, Whittemore K, Kenna M. Pediatric facial nerve paralysis: Patients, management and outcomes. Int J Pediatr Otorhinolaryngol. 2005; 69:1521–8.
26. Pereira MV, Glória AL. Lagophthalmos. Semin Ophthalmol. 2010 May;25(3):72-8.
27. Mancini R, Taban M, Lowinger A, Nakra T, Tsirbas A, Douglas RS, et al. Use of hyaluronic Acid gel in the management of paralytic lagophthalmos: The hyaluronic Acid gel “gold weight” Ophthal Plast Reconstr Surg. 2009;25:23–6.
28. Donnenfeld ED, Perry HD, Nelson DB. Cyanoacrylate temporary tarsorrhaphy in the management of corneal epithelial defects. Ophthalmic Surg. 1991; 22:591–3.
29. Ellis MF, Daniell M. An evaluation of the safety and efficacy of botulinum toxin type A (BOTOX) when used to produce a protective ptosis. Clin Experiment Ophthalmol. 2001; 29:394–9.
30. Chapman P, Lamberty BG. Results of upper lid loading in the treatment of lagophthalmos caused by facial palsy. Br J Plast Surg. 1988; 41:369–72.
31. Snyder MC, Johnson PJ, Moore GF, Ogren FP. Early versus late gold weight implantation for rehabilitation of the paralyzed eyelid. Laryngoscope. 2001; 111:2109–13.
32. Levine RE, Shapiro JP. Reanimation of the paralysed eyelid with the enhanced palpebral spring or gold weight: Modern replacements for tarsorrhaphy. Facial Plast Surg. 2000;16:325–36.
33. Arion HG. Dynamic closure of the lids in paralysis of the orbicularis muscle. Int Surg. 1972;57:48–50.
34. Caesar RH, Friebel J, McNab AA. Upper lid loading with gold weights in paralytic lagophthalmos: A modified technique to maximize the long-term functional and cosmetic success. Orbit. 2004;23:27–32.
35. Pickford MA, Scamp T, Harrison DH. Morbidity after gold weight insertion into the upper eyelid in facial palsy. Br J Plast Surg. 1992;45:460–4.
36. Mavrikakis I, Beckingsale P, Lee E, Riaz Y, Brittain P. Changes in corneal topography with upper eyelid gold weight implants. Ophthal Plast Reconstr Surg. 2006;22:331–4.