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Observation on the Curative Effect of Deep Fixation Combined with Gray Line Incision on Senile Lower Eyelid Entropion and Trichiasis

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Abstract: *This paper aims to investigate the effect of deep fixation combined with gray line incision on senile lower eyelid entropion and trichiasis. From June 2022 to June 2024, 72 cases (94 eyes) of senile entropion patients were selected as observation group and control group, 36 cases (47 eyes) in each group. The control group was treated with simple deep fixation, while the observation group was treated with deep fixation combined with gray line incision. After the end of surgical treatment, the treatment effect of the two groups of patients was compared. The patients were followed up for 3~72 months, and the recurrence rate was compared. The improvement of ocular symptoms (ODSI) and postoperative complications were analyzed. Palpebral margin was perpendicular to eyeball, irritation symptoms subsided, eyelashes grew downward and forward, avoiding contact with upper eyelid skin and eyeball surface, otherwise it was regarded as recurrence. After targeted treatment, 16 of 47 eyes of elderly patients in the observation group relapsed, while 31 eyes were cured. The recurrence rate was 34.04%, and the cure rate was 65.96%. In the observation group, all patients had recurrence, so 47 eyes of 36 patients were cured, so the recurrence rate was 0.00%, and the cure rate was 100.00%. The recurrence rate of observation group was lower than that of control group, and the cure rate was higher than that of control group (P<0.05); compared with control group, the incision pain caused by traction in observation group was lighter, and the eyelash turnover angle was larger, but the early gray line incision might affect the appearance. Eversion of the eyelids is rare and mild. When the stitches are removed, the eyelid margin will be widened, but it will not affect the appearance. With the passage of time, the gray line incision will gradually merge with the color of eyelid margin, and the original appearance of "double eyelid" will gradually fade within 3 to 6 months after suture removal;the score of eye symptom improvement in observation group is lower than that in control group, and the postoperative complications in observation group are 8.33% lower than that in control group (P<0.05). Deep fixation combined with gray line incision is helpful to improve the recovery speed, relieve discomfort during treatment, improve the quality of daily life and reduce the recurrence rate of senile lower eyelid entropion and trichiasis. The treatment effect is good, the incision pain is light, the eyelashes are turned forward and downward, the early gray line incision affects the appearance, the eyelid ectropion is less and light, the postoperative complications are reduced, and the ocular symptoms are improved. It has clinical application value.*

Keywords: *Gray line incision; Deep fixation; Lower eyelid entropion and trichiasis; Treatment effect; Elderly*

1. Introduction

Senile lower eyelid entropion, as a common eye disease, not only affects the patient's appearance, but also may have adverse effects on vision. Its symptoms include severe eye irritation and, in extreme cases, may even cause corneal damage[1]. In addition, senile entropion, also known as degenerative entropion, is caused by aging of the lower eyelid tissue. In the elderly population, the incidence of this disease is approximately 2.1%[2]. Palpebral entropion is the eyelid edge curved to the inside of the eyeball, when this degree of curvature aggravated, eyelashes will also turn to the eyeball, resulting in trichiasis phenomenon. Lower eyelid entropion and trichiasis may cause a range of eye discomfort, including redness, tearing, sensation of foreign bodies, eyelid twitching, etc. In severe cases, it may also cause infection, corneal ulcers, and even decreased vision. For senile lower eyelid entropion and trichiasis, surgical correction of eyelid position is currently considered the most effective treatment[3]. Despite the variety of surgical techniques available, the risk of postoperative recurrence remains a concern. In clinical practice, orbicularis oculi muscle shortening is widely accepted due to its lower

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long-term recurrence rate, and its advantages are obvious compared with traditional eyelid skin orbicularis muscle resection. However, there are some limitations to this procedure, including the possibility of major trauma during surgery, ectropion, and possible cosmetic effects. To overcome these limitations, deep instrumentation has become a common treatment option. The abnormal position of lower eyelid can be corrected efficiently by grey line incision combined with deep fixation technique. While retaining the natural shape and function of eyelids, this operation also has the advantages of small injury, fast recovery and high aesthetic degree, providing a more ideal treatment option for patients [4]. In this study, deep fixation combined with gray line incision was used for the treatment of senile lower eyelid entropionand trichiasis. The results were as follows.

2. Data and Methods

2.1 General data

From June 2022 to June 2024, 72 cases (94 eyes) of senile entropion were divided into observation group and control group, 36 cases in each group. Thecontrol group was treated with simple deep fixation, while the observation group was treated with deep fixation combined with gray line incision. There were 20 males and 16 females in the observation group (aged 60~88) and 22 males and 14 females in the control group (aged 62~87). Patients sign informed consent forms. There was no statistical difference in general information.

2.2 Methods

2.2.1 Control group

Simple deep fixation was used. Local infiltration anesthesia of eyelid was performed, and 2% lidocaine + elcaine was used for ocular surface anesthesia. The patient's eyes were routinely disinfected. The skin and subcutaneous tissue were cut to reach the eyelid plate. The operation was performed with a small sharp knife special for ophthalmology at a position 2 mm away from the eyelid edge and parallel to the eyelid edge. At the same time, secure the lower eyelid with an eyelid clamp, ensuring that the incision length slightly exceeds the length of the entropion so that the tarsus is fully exposed. During surgery, excess lower orbicular muscle, lower eyelid skin, and subcutaneous tissue are removed. After the resection is complete, the skin is aligned and sutured, interrupted with tarsus using 5-0 silk thread until the procedure is complete. After the operation, antibiotics were given orally for 3 days, and tetracycline eye ointment was applied routinely to cover the eyes.

2.2.2 Observation group

Deep fixation combined with gray line incision was used. That is, on the basis of treatment in the control group, plus gray line incision. After the operation, antibiotics were given orally for 3 days, and tetracycline eye ointment was applied routinely to cover the eyes.

2.3 Observation indicators

After the end of surgical treatment, compare the treatment effect of two groups of patients, follow-up of patients for 3~72 months, and its recurrence rate for comparative observation. (1) Improvement of ocular symptoms: The improvement of ocular symptoms was closely monitored and carefully assessed using the OSDI scale over a three-month period before and after surgery. The scale includes four assessment dimensions: foreign body sensation, tearing, photophobia and irritation sensation. Each symptom is assigned a score of 0, 1, 2, 3 and 4 according to its severity. Scores were proportional to the severity of symptoms. (2) Postoperative complications: improper eyelid position, eyelid separation, subconjunctival hemorrhage.

2.4 Statistical treatment

The statistical tool used was SPSS 21.0; 0.05 was the test standard; the comparison between groups was t; when $P<0.05$, the difference was statistically significant.

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3. Results

3.1 Treatment effect

Eyelid margin and eyeball vertical, irritation symptoms subside, eyelashes downward and forward growth, avoid contact with upper eyelid skin and eyeball surface, otherwise regarded as recurrence. After targeted treatment, 16 of 47 eyes of elderly patients in the observation group relapsed, while 31 eyes were cured. The recurrence rate was 34.04%, and the cure rate was 65.96%. In the observation group, all patients had recurrence, so 47 eyes of 36 patients were cured, so the recurrence rate was 0.00%, and the cure rate was 100.00%. The recurrence rate of observation group was lower than that of control group, and the cure rate was higher (P<0.05), as shown in Table 1.

Table 1: Treatment effect [n(%)]

Group	Number	Recurrence (%)	Recovered (%)
Observation group	36 (47 eyes)	0 (0.00)	47 (100.00)
Control group	36 (47 eyes)	16 (34.04)	31 (65.96)
X^2		19.282	19.282
P		0.000	0.000

3.2 Comparison of early performance between the two groups

Compared with the control group, the incision in the observation group caused less pain and the eyelashes turned more, but the early gray line incision may affect the appearance. Eversion of the eyelids is rare and mild. When the stitches are removed, the eyelid margin will be widened, but it will not affect the appearance. Over time, the gray line incision will gradually merge with the color of the eyelid margin, and within about 3 to 6 months after the suture is removed, the original appearance of the "double eyelid" will gradually fade.

3.3 Comparison of OSDI scores between two groups

The OSDI score in the observation group was lower than that in the control group (P<0.05). See Table 2.

Table 2: Comparison of OSDI scores between the two groups ($\bar{x}$ ±s, points)

Group	Number	Photophobia	Excitement	Lacrimation	Foreign body sensation
Observation group	36	1.85±0.39	1.77±0.20	1.86±0.32	1.75±0.27
Control group	36	2.14±0.46	2.20±0.22	2.28±0.39	2.58±0.47
t		2.885	8.678	4.995	9.188
P		0.005	0.000	0.000	0.000

3.4 Comparison of postoperative complications between the two groups

The incidence of postoperative complications in the observation group (8.33%) was lower than that in the control group (27.78%)(P<0.05). See Table 3.

Table 3: The incidence of postoperative complications [n(%)]

Group	Number	Misposition of eyelids	Blepharodesis	Subconjunctival hemorrhage	Overall incidence
Observation group	36	1 (2.78)	1 (2.78)	1 (2.78)	3 (8.33)
Control group	36	3 (8.33)	4 (11.11)	3 (8.33)	10 (27.78)
X^2					4.599
P					0.032

4. Discussion

The pathogenesis of senile lower eyelid entropion and trichiasis is mainly that with the growth of age, the relaxation of skin and muscle leads to the change of eyelid support structure. Specifically, the

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elasticity of the eyelid skin decreases, and the tension of the orbicularis oculi muscle and tarsus decreases, causing the lower eyelid to gradually lose its normal tension and support. This change causes the lower eyelid to turn inward gradually, and the eyelashes that originally grew outward turn inward and directly contact the surface of the eye. In addition, the loss of orbital fat in older adults also causes changes in orbital support structures, which further exacerbates lower eyelid entropion. The inverted lower eyelid causes the eyelashes to rub against the cornea and conjunctiva, triggering irritation and inflammation, resulting in pain, foreign body sensation, tears and other symptoms. Long-term friction may also cause corneal epithelial damage, even corneal ulcer, seriously affecting vision and quality of life. Therefore, the treatment of senile lower eyelid entropion and trichiasis requires comprehensive consideration of eyelid support structure and skin muscle relaxation, correction by surgery or other medical means to restore the normal position and function of the eyelid and alleviate the patient's discomfort symptoms[5].

Senile entropion is a common disease that affects not only appearance, but also vision, accompanied by intense eye discomfort. In extreme cases, this can lead to corneal damage. There are a variety of surgical methods that can be used to treat this problem, and deep internal fixation correction surgery is more common. Through deep fixation technique, the abnormal position of lower eyelid can be corrected efficiently, and it can be returned to its natural state, thus effectively alleviating the symptoms of entropion. Furthermore, the fine steps of gray line incision not only significantly enhance the overall effect of the operation, but also optimize the tension balance of the lower eyelid through precise incision and suture techniques, while retaining the natural shape and function of the eyelid +. In addition, this surgery, with its delicate manipulation, minimal trauma and rapid recovery process, greatly reduces the pain of elderly patients and reduces the risk of postoperative complications. The durability and stability of the surgical effect provide a solid guarantee for preventing the recurrence of lower eyelid entropion and significantly improve the quality of life of patients. The careful protection of eyelid tissue during surgery effectively avoided unnecessary damage and ensured the complete preservation of normal physiological functions of eyelids.

Deep fixation combined with gray line incision achieves excellent therapeutic effect through the following key steps. First, deep fixation redistributes the abnormal tension of the lower eyelid to restore it to a healthy state. Second, gray line incision adjusts the tension distribution of the eyelid through precise operation to ensure that the lower eyelid can be firmly maintained in place, thus effectively preventing the occurrence of entropion. Finally, the meticulous care of eyelid tissue during the whole operation ensures that the normal physiological function of eyelids can be perfectly continued after operation, and finally realizes the radical cure of senile lower eyelid entropion and trichiasis[6]. In conclusion, deep fixation combined with gray line incision in the treatment of senile entropion trichiasis shows significant advantages and unique treatment mechanism, which is an ideal choice to improve the quality of life of patients and restore normal eyelid function.

After targeted treatment, 16 of the 47 eyes of the elderly patients in the observation group relapsed, while 31 eyes were cured. The recurrence rate was 34.04%, and the cure rate was 65.96%. In the observation group, all patients had recurrence, so 47 eyes of 36 patients were cured, so the recurrence rate was 0.00%, and the cure rate was 100.00%. Compared with the control group, the incision in the observation group caused less pulling pain and the eyelashes turned more, but the early gray line incision may affect the appearance. Eversion of the eyelids is rare and mild. When the stitches are removed, the eyelid margin will be widened, but it will not affect the appearance. Over time, the gray line incision will gradually merge with the color of the eyelid margin, and within about 3 to 6 months after the suture is removed, the original appearance of the "double eyelid" will gradually fade. The score of eye symptom improvement in observation group was lower than that in control group, and postoperative complications in observation group was 8.33% lower than that in control group (27.78%). For elderly patients with entropion, deep fixation combined with gray line incision can effectively improve their eye discomfort. Specifically, this surgical technique significantly reduced postoperative complications such as eyelid malposition, eyelid separation, and subconjunctival hemorrhage. The reason for this is that deep fixation and gray line incision can more accurately adjust and stabilize the position of the eyelid, thereby reducing the irritation and friction of the eyeball and reducing the possibility of complications.

5. Conclusion

To sum up, for elderly patients with lower eyelid entropion and trichiasis, deep fixation combined with gray line incision surgery can accelerate the rehabilitation process of patients, relieve clinical

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symptoms, and improve the quality of life of patients. At the same time, the recurrence rate is low, the treatment effect is good, the incision pain is light, the eyelashes are turned forward and downward, the early gray line incision affects the appearance, and the eyelid ectropion is less and light, which has clinical application value.

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