

Thermoablation treatment for trichiasis in trachoma using the semiconductor diode pumped laser

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ABSTRACT: Purpose. *The aim of this prospective study was to verify the efficacy of laser therapy for trichiasis in trachoma. Trichiasis is one of the most important complications of trachoma which is endemic in Sanliurfa, a city in the southeast of Turkey.*

Methods. *Twenty-eight eyelids of 22 patients – 15 males and 7 females – with trichiasis related to trachoma involving the upper, lower, or both lids, were included in the study and treated with a semiconductor diode-pumped, frequency-doubled, solid-state laser operating true CW at 532 nm.*

Results. *19 (67.9%) of the lids were successfully treated in two sessions or less. Six lids (21.4%) required a third laser session and three (10.7%) a fourth session. Mild notching or dimpling occurred in two eyelids (5.6%). Postoperative swelling was minimal or absent.*

Conclusions. *The results show that laser treatment may be successful for trichiasis caused by trachoma. Laser thermoablation is an effective and safe method, with many advantages over other modalities. (Eur J Ophthalmol 1999; 9: 85-8)*

KEY WORDS: *Laser thermoablation, Trachoma, Trichiasis*

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INTRODUCTION

Trichiasis is one of the most important complications of trachoma and has been endemic for ages in Sanliurfa, a city in the southeast of Turkey. Trachoma mainly affects the upper palpebral conjunctiva, though in severe cases it may cause scarring of the lower palpebral conjunctiva. The severe scarring, especially scars near the lid margin, lead to entropion of the eyelid and trichiasis. The eyelashes rubbing against the corneal surface disrupt the corneal epithelium, leading to epithelial defects, corneal ulceration, and scarring (1).

Treatment of trichiasis in trachoma has always been a problem, and the use of laser thermoablation was first suggested by Berry in 1979 (2). Circumscribed tissue destruction is possible with precisely focused

laser energy. Essentially, laser thermoablation of trichiasis involved focusing the laser energy at the lash and follicle which are then destroyed by photovaporisation and thermocoagulation from the laser-tissue interaction (3).

This study was planned prospectively to investigate the efficacy of laser therapy for trichiasis related to trachoma. To the best of our knowledge this is the first study to be published internationally from a region where trachoma is endemic.

METHODS

Twenty-eight eyelids of 22 patients –15 males and 7 females who had trachoma, involving the upper, lower, or both lids, were included in the study and treat-

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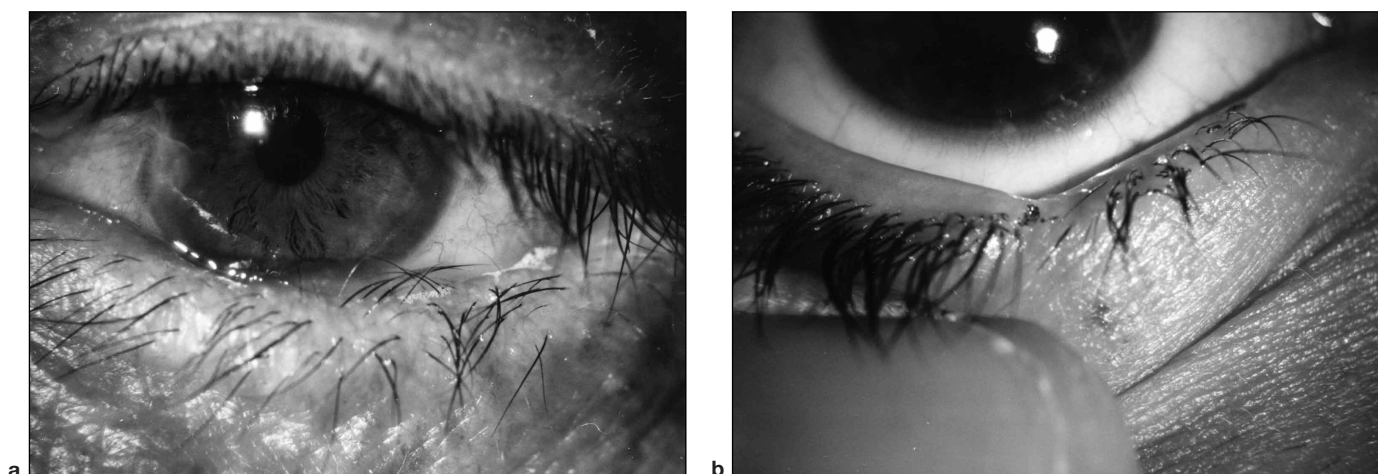


Fig. 1 - a) Trichiasis of the lower eyelid. **b)** Postoperative appearance of the eyelid. The laser burn has selectively destroyed the abnormal cilia and created a crater which has been deepened to reach the eyelash follicle.

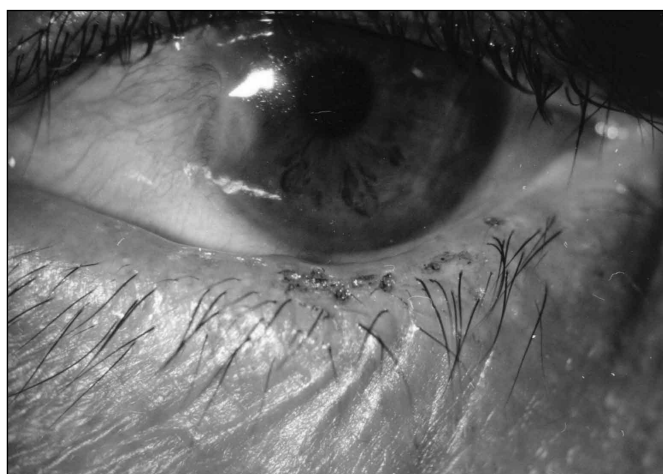


Fig. 2 - Eyelid immediately after the laser treatment.

ed with the semiconductor diode pumped, frequency-doubled, solid state laser operating true CW at 532 nm in the Department of Ophthalmology at Harran University School of Medicine between September 1997 and June 1998. The patients' age ranged from 45 to 76 years, mean 66.3 years. Patients who had more than ten rubbing lashes per eyelid and also had entropion were excluded from the study.

A detailed ophthalmic examination was conducted in each patient, including visual acuity, and detailed examination of the eyelid to document the exact site of aberrant lashes, and establish the presence of any lid scarring, neovascularisation, and entropion. After the ophthalmic examination, photographs were taken of all eyes.

The surgical procedure was explained to the patient and informed consent was obtained. All surgical procedures were performed under topical anesthesia. The technique was as follows. The patient was placed at the slitlamp of the laser unit (OcuLight GL Semiconductor-based Green Photocoagulator, Iris Medical Instruments Inc., CA, USA) and was asked to look in the opposite direction from the planned area of treatment. The eyelid was rotated slightly outwards with a cotton-tipped applicator to align the radical of the misdirected lash with the laser beam. The laser variables were set to a spot size of 75 μ m, exposure time 0.1 s and power 800-1000 mW. The laser aiming beam was focused at the base of the abnormal eyelash. The initial application vaporized the lash, and the shaft left a small black spot on the lid margin which absorbed the energy of the next burns. After 4-5 applications, a crater was created in the lid margin at the base of the lash. In order to destroy the whole lash follicle, this crater was deepened by changing the laser settings (spot size 200 μ m, exposure time 0.2 s) (Fig. 1).

Lashes were treated individually and no more than five were destroyed at each session. As far as possible, intervening tissue was preserved and destruction of the tarsal plate was avoided (Fig. 2). At the conclusion of the laser treatment the patient was discharged and topical antibiotic ointment was applied twice daily for one week.

The patients were initially examined postoperatively and the end of one week, after one month and after three months. After that, patients were scheduled for

every month during the follow up period but were advised to report back earlier if they experienced any recurrence of symptoms. Recurrences were treated by exactly the same method.

RESULTS

The upper lid was involved in 22 eyes and the lower lid in six eyes. The numbers of rubbing lashes per lid ranged from one to ten, average four. The mean follow-up interval was nine months, ranging from 6-10 months. The results were considered satisfactory if no recurrence of trichiasis occurred for at least six months after the last laser session or if there were no more misdirected-lashes and no symptoms. The patients with a fifth recurrence during the follow-up were considered failures and underwent some other therapy.

Treatment was successful in two sessions or less for 19 (67.9 %). Six lids (21.4 %) required a third laser session; three (10.7 %) needed a fourth session. One of these was an elderly patient had difficulty remaining still at the slit lamp. So it was hard to follow the intradermal path of the lash to the follicle. In the other cases who required a fourth laser session, two lashes were successfully ablated but the remaining one grew after the third session. On epilation, this lash was found to have a long intradermal course and the follicle was more deeply embedded in lid tissue than normal.

The procedure was well tolerated by the patients, who nearly all reported a mild smarting sensation and lacrimation during treatment. When lacrimation was excessive the lid margin was dried repeatedly before continuing therapy. Mild notching or dimpling occurred in two eyelids (5.6 %). Postoperative swelling was minimal or absent. Three patients required non-steroid anti-inflammatory drugs postoperatively.

DISCUSSION

Trichiasis, an acquired posterior orientation of previously normal eyelashes, is a relatively common disorder. If left untreated it can lead to corneal ulceration, vascularisation, hypesthesia and predisposition to infectious keratitis. Worldwide, trachoma is second only to cataract as a major cause of blindness. One important measure for preventing blindness re-

lated to trachoma is to treat the trichiasis which can lead to corneal scarring.

The encouraging results of this trial demonstrate that the semiconductor diode-pumped, frequency-doubled, solid-state laser operating true CW at 532 nm may be successful in the treatment of selected cases of trichiasis caused by trachoma. The other treatment modalities are not satisfactory, and can lead to various complications (3). Electrolysis has a high recurrence rate, and is associated with excessive scarring (trachoma already leads to scarring in eyelids) (3). Cryotherapy is an effective technique, widely used to treat large numbers of trichiatic lashes, but it has a number of disadvantages compared with the laser for treating small numbers of lashes. These include a high incidence of complications (including skin depigmentation, the formation of a notch in the tissue of the lid margin, thinning of the lid, inducing an autoimmune reaction) (4), lack of selectivity (5) especially when treating a few trichiatic cilia scattered among many normal ones, and the requirement for infiltrative or general anesthesia.

Laser therapy seems to be a convenient alternative for small numbers of trichiatic lashes which may be isolated, clustered or recurrent after other treatments. The major advantages of laser therapy are precision and selectivity of application (the follicles are replaced by a dermal scar but the adjacent pilosebaceous units usually remain normal), less inflammation and scarring, no need for infiltrative anesthesia, and the relative ease of application.

Nineteen of the 28 patients (67.9 %), showed no evidence of recurrence of the ingrowing lashes during a mean follow-up nine months, after one or more laser sessions. However, that lids with ten or more ingrowing lashes were not included as other modalities of treatment were considered to be more suitable. Six (21.4%) required a third laser session, a three (10.7 %) a fourth.

Awan reported a 90.3 % cure rate among 31 patients followed up from three months to two years (3). Sharif et al reported that over 67 % of lids were successfully treated with two sessions or less, while four sessions were necessary in only 11 % (6). Campbell et al reported that out of a total of 15 eyelids, treatment was successful in 12 (80 %) after a single, or up to three laser applications (7). All these authors treated trichiasis with laser therapy, but none of the cases were related to trachoma. Regrowth of cilia was thought

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to be due to inadequate destruction of the follicles because of difficulties while performing the procedure. One elderly patient in our study had difficulty sitting still at the slit lamp for focusing the laser. Another case had lashes with a long intradermal course where the follicle might be embedded in lid tissue more deeply than normal.

Complications in the study were limited to mild dimpling of two eyelids (5.6%), but neither was noticed by the patients themselves. Gossman et al treated non-trachomatous-trichiasis by laser and reported 8.3% of dimpling (8). The incidence and severity of complications in our study compare favorably with those associated with cryosurgery, reported by Wood and Anderson (18%) (4), and Johnson and Collin (10%) (9).

The major disadvantage of laser is that additional sessions may be required to ensure a successful result. Also, if lashes come out from the lid margin at awkward angles, difficulties may arise while performing the technique. Regrowth of cilia was thought to be due to complete destruction of the follicles or difficulties in performing the procedure adequately. Laser ablation does not seem suitable in patients with large numbers of trichiatic lashes (more than ten), in those

who are unable to remain still at the slit lamp (children and the mentally handicapped), in patients with head tremors or where follicles are deeply embedded in lid tissues. The follicles of cilia are normally 1.5 to 2.5 mm below the surface (10). In conclusion, our study shows that laser thermoablation is an effective and safe method for the treatment of trichiasis related to trachoma, with many advantages over other recognised treatment modalities. The main advantages are the convenience of treating trichiasis as an outpatient procedure; less time for the treatment session than with other methods; precise and selective treatment with no destruction of surrounding healthy tissue and less scarring and depigmentation of the skin; and the very low incidence of recurrence which can be minimized by repeated laser sessions.

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