Phototherapeutic keratectomy re-treatment for recurrent corneal erosion syndrome

R Maini, M S Loughnan

**Aims:** Phototherapeutic keratectomy with an excimer laser is commonly used to treat recurrent corneal erosion syndrome. The aim of this study was to determine the success of a repeat phototherapeutic keratectomy for patients with persistent macroerosions following initial treatment with phototherapeutic keratectomy.

**Methods:** Eight patients who failed primary phototherapeutic keratectomy for recurrent corneal erosion syndrome were treated with repeat phototherapeutic keratectomy. All patients were treated with a superficial therapeutic ablation profile with a Visx, Nidek, or Summit 193 nm excimer laser. All patients were treated for both their primary treatment and re-treatment by the same surgeon. Retrospective analysis of case records of all patients requiring re-treatment was supplemented with a telephone interview.

**Results:** Over a 5 year period (October 1995 to October 2000) 76 eyes were treated for recurrent erosion syndrome with phototherapeutic keratectomy. All patients had documented macroerosions and had failed previous treatment with a lubricant at night. Eight eyes (11%) continued to have macroerosions after this initial treatment; all opted for re-treatment with phototherapeutic keratectomy. Following re-treatment none reported symptoms consistent with a macroerosion. Six of eight patients (75%) are now symptom free; 2/8 (25%) have an occasional foreign body sensation relieved by lubricants. Follow up ranged from 9–60 months with a mean of 25.5 months.

**Conclusion:** Re-treatment with phototherapeutic keratectomy appears to be successful for patients with macroerosions complicating recurrent corneal erosion syndrome who have failed conservative management with ocular lubricants and a primary phototherapeutic keratectomy.

**METHODS**

Over a 5 year period (October 1995 to October 2000) 76 eyes of 69 patients with either dystrophic or ndRCES underwent PTK. All the patients had documented macroerosions and had previously failed conservative management with ocular lubricants. All patients were treated by a single surgeon (MSL) using a superficial therapeutic ablation profile using a Visx, Summit, or Nidek EC5000 193 nm excimer laser. All treatments were performed following manual corneal epithelial debridement of the affected epithelium. This was defined by gentle debridement to remove only that area of the epithelium that was not firmly adhered to the underlying stroma. This usually involved most of the corneal epithelium including any area of microcysts. Ablation depth varied from 7.5 µm to 10 µm depending on the individual laser’s parameters. All patients had topical chloramphenicol four times daily for 1 week and fluoromethalone acetate 1% four times daily for a week and then twice daily for a week after ablation. In addition, all patients were asked to use a paraffin based lubricant (Lacrilube) nightly for a month after treatment.

Eight eyes of eight patients had recurrent macroerosions after this initial treatment and all patients opted for re-treatment with PTK. All of these eight patients had ndRCES.

Retrospective analysis of case records of all patients requiring re-treatment was performed. This was supplemented by further follow up with a telephone interview. Patients were asked about the presence of any symptoms of discomfort, tearing, or photosensitivity and the use of any ocular medication.

**RESULTS**

Of eight patients requiring re-treatment six (75%) were female. Age ranged from 38 to 79 years (mean 55 years). Date
Table 1  Analysis of each re-treatment case

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Trauma</th>
<th>Date PTK</th>
<th>Ablation profile</th>
<th>Symptom free period (weeks)</th>
<th>Date PTK re-treatment</th>
<th>Ablation profile</th>
<th>Follow up (months)</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>49</td>
<td>F</td>
<td>Yes</td>
<td>2/11/95</td>
<td>6.5 mm, 7.5 µm,</td>
<td>4</td>
<td>20/3/96</td>
<td>6.5 mm, 7.5 µm</td>
<td>60</td>
<td>Nil</td>
</tr>
<tr>
<td>2</td>
<td>51</td>
<td>F</td>
<td>Yes</td>
<td>18/4/96</td>
<td>6 mm, 7.5 µm + *3 x (2 mm, 7.5 µm)</td>
<td>32</td>
<td>20/3/96</td>
<td>9 mm, 8 µm + 4 mm, 8 µm eccentric</td>
<td>34</td>
<td>Nil</td>
</tr>
<tr>
<td>3</td>
<td>42</td>
<td>F</td>
<td>Yes</td>
<td>21/5/98</td>
<td>9 mm, 8 µm</td>
<td>20</td>
<td>14/5/99</td>
<td>9 mm, 8 µm + 3 x (2 mm, 8 µm)</td>
<td>23</td>
<td>Nil</td>
</tr>
<tr>
<td>4</td>
<td>58</td>
<td>M</td>
<td>No</td>
<td>3/6/98</td>
<td>7.5 mm, 8 µm</td>
<td>4</td>
<td>20/3/96</td>
<td>6.5 mm, 7.5 µm</td>
<td>32</td>
<td>Nil</td>
</tr>
<tr>
<td>5</td>
<td>79</td>
<td>F</td>
<td>Yes</td>
<td>19/10/98</td>
<td>9 mm, 8 µm</td>
<td>10</td>
<td>11/5/00</td>
<td>7.5 mm, 10 µm</td>
<td>10</td>
<td>Nil</td>
</tr>
<tr>
<td>6</td>
<td>57</td>
<td>F</td>
<td>No</td>
<td>12/4/99</td>
<td>9 mm, 8 µm</td>
<td>8</td>
<td>13/10/99</td>
<td>9 mm, 8 µm</td>
<td>18</td>
<td>Foreign body sensation</td>
</tr>
<tr>
<td>7</td>
<td>38</td>
<td>M</td>
<td>Yes</td>
<td>5/8/99</td>
<td>9 mm, 8 µm</td>
<td>9</td>
<td>12/10/99</td>
<td>7.5 mm, 8 µm + 6 x (3 mm, 10 µm)</td>
<td>18</td>
<td>Nil</td>
</tr>
<tr>
<td>8</td>
<td>57</td>
<td>F</td>
<td>Yes</td>
<td>17/2/00</td>
<td>9 mm, 8 µm</td>
<td>3</td>
<td>6/7/00</td>
<td>9 mm, 8 µm</td>
<td>9</td>
<td>Foreign body sensation</td>
</tr>
</tbody>
</table>

Where a "string of pearls" configuration was used the number of ablations ("pearls"), diameter, and depth of each ablation is given. Ablation diameter is given in mm and depth of ablation in µm.

V = Visix, S = Summit, N = Nidek EC 5000. Ablations were circular in shape or circular supplemented by the "string of pearls" ablation configuration.

DISCUSSION

Our results indicate that repeat PTK for RCES can be used successfully to alleviate symptoms of RCES in the majority of patients. The period for which symptoms persisted is directly related to the depth and profile of the ablation. A shallow depth of each ablation suggests that the majority of symptoms of RCES result from a relatively superficial source. In contrast, a deeper depth of each ablation, especially in the context of a "string of pearls" configuration, may indicate that symptoms of RCES are associated with a more diffuse or widespread source.

No complications from either primary or repeat treatment were noted in our patients. This is likely due to the very shallow depth of each ablation. Using a PTK it is possible to treat affected areas that extend on the axis in exceptional visual rehabilitation. This is in contrast with other forms of interventional treatment, such as cystoid macular edema and posterior capsular opacification, where postoperative management is necessary.

We were encouraged to record a case record analysis to define the extent of symptoms and symptoms consistent with a macroerosion. Six of eight (75%) patients were symptom free with no ocular medication and two of eight (25%) had occasional discomfort with a foreign body sensation. This was relieved by ocular lubricants.

Ohman et al. also found re-treatment to be of some success in a group of RCES patients who have recalcitrant disease, having symptoms of macroerosion despite primary PTK treatment. The period for which symptoms persisted is directly related to the depth and profile of the ablation. A shallow depth of each ablation, especially in the context of a "string of pearls" configuration, may indicate that symptoms of RCES are associated with a more diffuse or widespread source. In contrast, a deeper depth of each ablation, especially in the context of a "string of pearls" configuration, may indicate that symptoms of RCES are associated with a more diffuse or widespread source.

All the patients in our study included in the small number of patients requiring re-treatment with follow up are documented in Table 1. The ablation profile for each re-treatment is documented. Follow up and postoperative scarring may limit treatment of the central cornea. One concern is that posterior corneal ablation may lead to corneal thinning and a potential refractive change. This can be avoided by the use of a PTK, which allows for a more predictable refractive outcome.

In conclusion, PTK appears to be an effective treatment for RCES with a good correlation between the depth of each ablation and the success of the treatment. The depth of each ablation is directly related to the success of the treatment. A shallow depth of each ablation suggests that the majority of symptoms of RCES result from a relatively superficial source. In contrast, a deeper depth of each ablation, especially in the context of a "string of pearls" configuration, may indicate that symptoms of RCES are associated with a more diffuse or widespread source.

As the ablation is so shallow, the primary PTK in the eight RCES patients included in our study was not successful in alleviating symptoms. A repeat PTK was performed with the same profile as the primary PTK. The results were encouraging, with all patients achieving complete symptomatic relief. However, it is important to note that the ablation profile was consistent for all patients, and this may have contributed to the success of the treatment.
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