PREVENTION & MANAGEMENT OF LASER SIDE EFFECTS & COMPLICATIONS

Tina S. Alster, MD

Fractional Laser & Light-Based Technologies

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Washington, DC
PREVENTION & MANAGEMENT OF LASER SIDE EFFECTS & COMPLICATIONS
Tina S. Alster, MD

DISCLOSURES

Advisory Board: Cearna, Merz Aesthetics
Consultant: Estee Lauder (La Mer)
Investigator: Revance Therapeutics
Ownership Interests: Hair Sanity, Home Skinovations, The A Method
Non-Ablative Fractional Laser

- 961 successive NAFL treatments at a single center
- 1550nm erbium-doped fiber laser
- 422 total patients (384 females / 38 males)
- SPT I-V
- Lesions treated
  - Photodamage (n=743)
  - Scars (n=175)
  - Other (n=43)
**PREVENTION AND MANAGEMENT OF LASER SIDE EFFECTS & COMPLICATIONS**

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**Non-Ablative Fractional Laser**

**TABLE 2. Incidence of Complications**

<table>
<thead>
<tr>
<th>Complication</th>
<th>SPT I</th>
<th>SPT II</th>
<th>SPT III</th>
<th>SPT IV</th>
<th>SPT V</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acneiform eruption</td>
<td>3</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>HSV</td>
<td>1</td>
<td>13</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Erosions</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Postinflammatory hyperpigmentation</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Prolonged erythema</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Prolonged edema</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Dermatitis</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Impetigo</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Purpura</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5</strong></td>
<td><strong>53</strong></td>
<td><strong>10</strong></td>
<td><strong>4</strong></td>
<td><strong>1</strong></td>
<td><strong>73</strong></td>
</tr>
</tbody>
</table>

SPT, skin phototype; HSV, herpes simplex virus.

Total: 7.6%
Acne: 1.87%
HSV: 1.77%*
*27% +HSV hx, 33% antiviral prophylaxis

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Non-Ablative Fractional Laser

<table>
<thead>
<tr>
<th>Variable</th>
<th>Complications</th>
<th>No Complications</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean skin phototype (SPT)</td>
<td>2.16</td>
<td>2.02</td>
<td>0.0017*</td>
</tr>
<tr>
<td>Mean fluence (J/cm²)</td>
<td>25.50</td>
<td>25.10</td>
<td>0.48</td>
</tr>
<tr>
<td>Mean energy (kJ)</td>
<td>4.19</td>
<td>4.20</td>
<td>0.9739</td>
</tr>
<tr>
<td>Percent females</td>
<td>96.05</td>
<td>90.40</td>
<td>0.101</td>
</tr>
<tr>
<td>Percent males</td>
<td>3.95</td>
<td>9.60</td>
<td>0.101</td>
</tr>
<tr>
<td>Percent photodamage</td>
<td>86.53</td>
<td>86.67</td>
<td>0.7797</td>
</tr>
<tr>
<td>Percent scars</td>
<td>28.95</td>
<td>28.59</td>
<td>0.9469</td>
</tr>
<tr>
<td>Percent other</td>
<td>6.58</td>
<td>4.29</td>
<td>0.3554</td>
</tr>
</tbody>
</table>

*Statistically significant.

Equal distribution across different ages, body locations, laser parameters used & lesions treated (except for PIH - higher incidence in darker SPT)

PIH (0.73%) occurred significantly later post-treatment (mean 11.71 days) and lasted longer (50.57 days) than other side effects.

- NAFL complication rate (7.6%) is significantly lower than pulsed CO₂ or erbium LSR
- All side effects were temporary
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Ablative & Non-Ablative Fractional Laser

- Literature review (MEDLINE search 1998-2009) of treatment complications with fractional lasers
- Results of 42 articles tabulated

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Ablative & Non-Ablative Fractional Laser

<table>
<thead>
<tr>
<th>TABLE 2. Complications of Fractional Laser Skin Resurfacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of Severity</td>
</tr>
<tr>
<td>Mild</td>
</tr>
<tr>
<td>Prolonged erythema</td>
</tr>
<tr>
<td>Acne and milia</td>
</tr>
<tr>
<td>Delayed purpura</td>
</tr>
<tr>
<td>Superficial erosions</td>
</tr>
<tr>
<td>Contact dermatitis</td>
</tr>
<tr>
<td>Recall phenomenon</td>
</tr>
</tbody>
</table>

Full spectrum of complications reported

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Ablative & Non-Ablative Fractional Laser

- Low rate of complications (compared to non-fractionated lasers)
- Sensitive cutaneous areas and darker SPT predisposed to complications

TIP #1: Provide Proper Preoperative Assessment

- Type and location of lesions
- Patient skin phototype
- Prior treatments
- Existing medical conditions (e.g., HSV, autoimmune dz)
- History of scarring (keloids) or delayed wound healing
- Patient expectations / compliance
- Risk of sun exposure
TIP #2: Prepare for Most Common Side Effects

- Prolonged erythema
  - > 4 days (NAFL)
  - > 1 month (AFL)
- Dermatitis
- Acne / Milia
- Infection
- Pigmentary alteration
TIP #3: Use Proper Technique & Provide Close Follow-Up

- Do not “pulse stack”
- Avoid treatment of tanned skin (recent UVL)
- Individualize treatment
  - additional passes @ most severe areas (cheek scars, perioral rhytides)
  - fewer passes/lower density @ scar-prone areas (infraorbit, mandible, neck, chest)
- Provide prophylactic antibiotics as necessary
TIP #4: Be Able to Recognize & Handle Complications

- Full spectrum of complications
  - Mild (erythema, acne, dermatitis)
  - Moderate (local infection, dyspigmentation, eruptive KAs)
  - Severe (hypertrophic scars, ectropion, disseminated infection)

- Greater risk profile
  - Sensitive cutaneous areas
  - Darker skin phototypes
  - Predisposing medical conditions

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Prolonged Erythema

**Prevention**
- Avoid contact allergens postop
- Avoid LSR in rosacea patients
- Topical L-ascorbic acid *

**Management**
- Postoperative cooling techniques
- Mild topical corticosteroid / NSAID
- LED treatment **

* Alster TS, West TB. Effect of topical vitamin C on CO₂ laser resurfacing erythema. Derm Surg 1998; 24: 331-4
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Dermatitis

- Prevention
  - Avoid postop use of products with common irritants/allergens (eg, fragrances, preservatives, chemical sunscreens)

- Treatment
  - Discontinue offending agent
  - Topical corticosteroid cream
  - Oral antihistamine
Acne Exacerbation

• **Prevention**
  • Prophylactic oral Abx (Doxy, TCN) for acne-prone patients x 7-10 days
  • Avoid LSR in patients w/ active acne

• **Treatment**
  • Discontinue occlusive topicals
  • Initiate/change oral antibiotics
  • Clay masque + LED
  • Acne-specific laser/IPL rx
Infection

- **Antibiotic prophylaxis**
  - HSV coverage (perioral / full-face tx)
  - Bacterial prophylaxis (acne-prone / full-face tx)
- **Early diagnosis/treatment**
  - Schedule frequent F/U appts (POD #3,5,7,10)
  - Obtain appropriate cultures
  - Initiate/change antibiotics
- **Is antibiotic prophylaxis necessary?**

Hyperpigmentation

- **Prevention**
  - Avoid treatment of tanned skin
  - Strict post-tx UVL protection

- **Treatment**
  - Topical Rx (HQ, AHA, kojic acid, retinoic acid, lignin peroxidase)
  - IPL or chemical peel

- *Is preop skin rx necessary?*
  
  NO *

Hypertrophic Scarring

- **Prevention**
  - Avoid use of excessive fluences +/- aggressive techniques
  - Strict wound care
  - Early tx of suspected infection

- **Treatment**
  - 585nm pulsed dye laser*
  - Topical silicone gel
  - Corticosteroids
  - Fractionated laser tx

Ectropion

**Prevention**
- Avoid aggressive treatment of lower eyelid skin (particularly in patients with H/O prior external lower blepharoplasty)
- Close intraoperative assessment of collagen contraction during treatment

**Treatment**
- 585nm pulsed dye laser*
- Manual massage
- Topical corticosteroids
- Surgical repair
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TAKE-HOME MESSAGES

- Proper patient and laser selection is crucial
- Apply proper laser parameters/technique
- Provide appropriate prophylaxis
- Close follow-up is essential
- Identify and treat complications early