Phototherapy for Psoriasis

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Disclosure

• **Investigator:**
  - Clinuvel
  - Estée Lauder
  - Ferndale
  - Incyte
Learning Objectives

To be able to:

• Review the application of ultraviolet-based therapy for psoriasis
• Know the protocol
• Describe the side effects of UV therapy
Guidelines on Phototherapy

- **Psoriasis** – AAD Psoriasis Guidelines:

- **CTCL** – US Cutaneous Lymphoma Consortium:

- **Vitiligo** – Vitiligo Working Group:
UV-based Therapy for Psoriasis

- NB-UVB
- Targeted phototherapy
- PUVA
UV-based Therapy for Psoriasis

- NB-UVB
NB-UVB for Psoriasis

Before 21 tx

PUVA > NB-UVB > BB-UVB
NB-UVB: Protocol

• Ideally, MED should be done

• Mean MED:
  
  I – III: 200 - 600 mJ/cm²  
  IV – VI: 650 – 1600 mJ/cm²

• Start 70% MED, increase by 10-15% per treatment

• Maximum: 3 J/cm² to body; 1 J/cm² to face
## Protocol: NB-UVB

<table>
<thead>
<tr>
<th>Skin type</th>
<th>Initial UVB Dose (mJ/cm²)</th>
<th>Dose Increase per Treatment</th>
<th>Maximum Dose* (mJ/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>150</td>
<td>10-15%</td>
<td>3000</td>
</tr>
<tr>
<td>II</td>
<td>150</td>
<td>10-15%</td>
<td>3000</td>
</tr>
<tr>
<td>III</td>
<td>250</td>
<td>10-15%</td>
<td>3000</td>
</tr>
<tr>
<td>IV</td>
<td>250</td>
<td>10-15%</td>
<td>3000</td>
</tr>
<tr>
<td>V</td>
<td>400</td>
<td>10-15%</td>
<td>3000</td>
</tr>
<tr>
<td>VI</td>
<td>400</td>
<td>10-15%</td>
<td>3000</td>
</tr>
</tbody>
</table>

*1000 mJ/cm² maximum dose for face*
Protocol: NB-UVB

- Noticeable improvement should occur in 20-30 treatments
- Once optimal improvement has been achieve, taper to twice weekly for 4 wks, and once weekly for 4 wks, then d/c
- Hold dose at once weekly regimen
Combination Therapy

- Topical corticosteroids
- Anthralin
- Calcipotriene ointment/cream
- Tazarotene gel
- Traditional systemics (methotrexate, cyclosporine, acitretin)
- Biologics
Combination Therapy

- Topical corticosteroids
- Anthralin
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Home Phototherapy

- Basic model: $2500; 3-panel: $6000
- Output stated in mW/cm² (measured 9 inches away)
- Conversion table provided
  - Top row: output in mW/cm²
  - Left hand column: dose in mJ/cm²
  - Exposure time (min/sec) can be easily read
- Convenient for pts
Limitations:

- Insurance coverage
- Patient compliance
- Maintenance vs clearing
NB-UVB and Folate (Vit B9)


- In vitro, photodegradation of folic acid occurs following exposure to 260-400 nm radiation
- In vivo:
  - UVA: No evidence of decrease of folate levels
  - Sunlight: Decreased levels only in those taking folate supplement
  - NB-UVB: mixed results (higher doses → lower levels)
• Folic acid deficiency has been associated with neural tube defects in fetus
• Complete closure of neural tube closure occurs 4 weeks after conception, before many women realize they are pregnant
NB-UVB and Folate (Vit B9)

- Women planning or capable of pregnancy and receiving phototherapy: should get 0.8 mg/d of folic acid supplement (*Folic acid = synthetic form of folate*)
- Consistent with the current recommendations of the United States Preventive Services Task Force (*JAMA Jan 2017; 317:183*)
NB-UVB: Long Term Side Effects
(Hearn, RMR... Ferguson, J, Dawe, RS. BJD 10/08; 159:931. Dundee)

- 4665 pts; 55% w/ psoriasis
- 97% of pts: SPT I-III
- NB-UVB 1985-2002
- No increase in BCC, SCC, or melanoma
- Pts w/ NB-UVB + PUVA: slight increase in BCC
UV-based Therapy

- NB-UVB
- Targeted phototherapy
308-nm Xenon-Chloride Excimer Laser
308-nm Excimer Laser: Psoriasis
(Feldman, SR, JAAD 6/2002; 46:900)

- MED. Starting dose: MED & physical characteristics of lesion (usually 3 MED)
- Twice weekly for 10 tx
- 72% (66/92): >75% clearing, 6.2 tx
- 50%: >90% clearing in 10 or less tx
Excimer Laser: Psoriasis

After 1 tx
Targeted Phototherapy

- Noticeable improvement should occur by 6-10 treatments
- Discontinue after 15-20 treatments, without tapering.
Targeted Phototherapy: Psoriasis

• Ideal for those with <10% BSA
• Residual resistant lesions following other forms of tx
• Hyperkeratotic lesions on palms and soles
• Scalp lesions
Targeted Phototherapy: Limitations

• Perilesional hyperpigmentation
  – Problematic for face
• Travel time to phototherapy unit
• Insurance coverage/expense
UV-based Therapy for Psoriasis

- NB-UVB
- Targeted phototherapy
- PUVA
PUVA = 8 Methoxypsoralen + UVA
Pyrimidine-Psoralen Monoadducts
Pyrimidine-Psoralen Bifunctional Adducts
PUVA Protocol

• Oxsoralen Ultra (liquid formulation of 8-MOP) 0.4-0.6 mg/kg; 1 hour prior to UVA (5-MOP: 1.2 mg/kg)
• Maximum: 70 mg
• Three times or twice per week
# Protocol

<table>
<thead>
<tr>
<th>Skin Type</th>
<th>Initial Dose (J/cm²)</th>
<th>Increments (J/cm²)</th>
<th>Max (J/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0.5</td>
<td>0.5</td>
<td>8</td>
</tr>
<tr>
<td>II</td>
<td>1.0</td>
<td>0.5</td>
<td>8</td>
</tr>
<tr>
<td>III</td>
<td>1.5</td>
<td>1.0</td>
<td>12</td>
</tr>
<tr>
<td>IV</td>
<td>2.0</td>
<td>1.0</td>
<td>12</td>
</tr>
<tr>
<td>V</td>
<td>2.5</td>
<td>1.5</td>
<td>20</td>
</tr>
<tr>
<td>VI</td>
<td>3.0</td>
<td>1.5</td>
<td>20</td>
</tr>
</tbody>
</table>
Side Effects

Acute:

- Nausea (psoralen)
- Phototoxicity (48 – 72 hrs)
UVA, UVB, PUVA-induced Skin Changes

W. Gange (courtesy of N. Kollias)
Side Effects

**Acute:**

- **Nausea** (psoralen)
- **Phototoxicity** (48 – 72 hrs)
- Pruritus
- Nail changes
Melanonychia

Photoonycholysis

Melanonychia

Photoonycholysis
Side Effects

Chronic:

• Lentigines
PUVA Lentigines
Side Effects

**Chronic:**

- Lentigines
- Photoaging
- Photocarcinogenesis
**PUVA and NMSC**

*(Nijsten TEC, JID 8/03; 121:252. Boston)*

- Prospective study: incidence of skin cancer in 1380 pts tx w/ PUVA
- First 15 yrs: no increase
- After 25 yrs:
  - $\leq 200$ tx: 7% of pts had SCC
  - $\geq 400$ tx: 50% had SCC
  - $\geq 200$ tx: 33% had BCC
PUVA and Melanoma

- 1380 Pts. 1975 – 1999
- 23 Pts developed 26 melanomas
- Melanoma pts:
  - SPT I and II
  - > 250 treatments
  - Longest follow up (>15 yrs)
PUVA and Melanoma


• European follow up study: NO increase in melanoma
PUVA and Pregnancy


• Mutagenic, but not teratogenic in human
• PUVA should be avoided during pregnancy
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