Photodynamic Therapy: Tips to Share and Lessons Learned

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Photodynamic Therapy: Tips to share & lessons learned

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Disclosure Statement

I, Juliet Aylward, MD, do not have any relevant financial interest or other relationships with a commercial entity producing health-care related product and or services.

Objectives

- Explain the mechanism of action of photodynamic therapy
- List the indications for, risks of, benefits of, and alternatives to treatment
- Describe the practical matters of office implementation including resource needs, insurance prior authorization and billing

Do you use photodynamic therapy in your practice?

1. Yes
2. No
3. No, but will in the near future

FDA Approved Rx for Actinic Keratosis

- Topical 5-fluorouracil
- 5% and 3.75% imiquimod cream
- Diclofenac gel
- Ingenol mebutate gel
FDA Approved Rx for Actinic Keratosis

- PDT - delta-aminolevulinic acid
  - Blue light 405-420 nm = Soret band
    - Blu-U and ClearLight
  - "Hypertrophic AKs of face and scalp"
- PDT - methyl-aminolevulinic acid
  - Red light 570-670 nm
    - Aktilite and Curelight
  - "Nonhyperkeratotic AKs of face and scalp in immunocompetent"

PRACTICE GAP

Your treatment choice is...

1. Topical 5-fluorouracil
2. Imiquimod
3. Liquid nitrogen
4. Photodynamic therapy
5. Other
6. Refer

PDT in Clinical Practice

- Cost of equipment
- Reimbursement
- Staff training
- Space utilization
- Patient education
- Complications

Barrier to use or implementation?

1. Cost/insufficient reimbursement
2. Space/staff required
3. Satisfied with current options
4. Question efficacy
5. Patient factors
6. Other

PDT: Mechanism of action

- Light sensitizing compound ALA
- Component of heme biosynthetic pathway
- Accumulates preferentially in hyperproliferative tissues
- Converted to protoporphyrin IX
- Light activation of photosensitizer
  - Appropriate wavelength (optimal source?)
  - Oxygen free radicals
  - Cell death
- Dual selectivity
PDT: Mechanism of action

**What is Photodynamic Therapy?**
- Increased toxic reaction to light due to an added photosensitizer.

PDT: Risks
- Pain and pruritus during exposure
  - Worse with large areas
  - Worse for forehead and scalp in men
- Erythema, edema, crusting, vesiculation, erosion, peeling
- Ocular complications with exposure

PDT: Benefits
- "One shot deal"
- Less down time
- No active role for patient
- Fewer phone calls and visits
- No sabotage of treatment
- Less complicated instructions

PDT: Risks
- Allergic contact dermatitis and urticaria to MAL (peanut and almond oil)
- Systemic absorption potential – liver toxicity
- Contraindications: cutaneous sensitivity to light source, porphyria, porphyrin allergies, sensitivity to solution, photosensitizing drugs

Most costly field treatment...

1. ALA-PDT
2. Diclofenac
3. 5-fluorouracil
4. **Imiquimod**

PDT: Benefits
- Pharmacoeconomic analysis of treatment of multiple Aks
  - 2 treatment courses/sessions followed by cryotherapy to 100% clearance
    - ALA PDT=$725.17
    - Diclofenacin=$845.07
    - 5-FU=$942.13 (phase III data increases cost)
    - Imiquimod=$1,473.39 (phase III data increases cost)
**PDT: Benefits**

- "Clears" the field
- Phase III results
  - 77% with Levulan PDT experienced 75% clearance vs 23% with vehicle
  - 66% experienced 100% clearance vs 13%
- Phase IV results
  - 64% with Levulan PDT maintained complete response at 12 months

**PDT: Benefits**

- Field cancerization
  - Genetic abnormalities in tissue chronically exposed to a carcinogen
  - Increased risk of multiple or recurrent malignant lesions around site of primary tumor
  - Field ALA PDT versus placebo (Apalla et al, BJD, 2010) significant reduction in new NMSCs and AKs

**PDT: Benefits**

- Cyclic PDT for solid organ transplant recipients
  - Wiley et al, Derm Surg, 2009
  - 12 high risk patients
  - PDT at 4-8 week intervals for 2 years
  - SCCs evaluated pre-treatment, at 12 months, at 24 months
  - Median reduction at 12- and 24-months from 1-month pretreatment counts was 79% and 95% respectively

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**PDT: Office implementation**

- Dedicated and trained staff
- Room with access to a sink for patient intake and application and for exposure
- Options for patients during incubation
- Supplies
  - Acetone, soap, towels, chair/table, medication, light source, safety glasses, timer, water, snacks, fan, ice packs, MP3

**PDT: Office implementation**

- See the patient in advance (E&M)
  - Consent
  - Written materials and instructions
  - Note specifies site and times for PDT
- Treatment on a different day
  - October-March
  - Completed by staff
  - Supervised by MD who must be in the building
  - Staff reiterate instructions & expectations

**Medicare covers PDT after initial trial of topical.**

1. True
2. False
3. I don't know
**PDT: Office implementation**

- **Insurance**
  - No prior authorization: Medicare, Aetna, Blue Cross/Blue Shield, WPS*, Cigna*
  - Prior authorization: Unity, Physicians Plus
- **Industry support**

**PDT: Office implementation**

- **Costs**
  - Light source $9,000-50,000 (IPL & PDL too)
  - Supplies
  - Medication
  - Staff
  - Facilities
- **Triage**
  - Experienced staff
  - Access to MD if needed

**PDT: Office implementation**

- **Costs – J code**
  - Medication
    - 2 gm tube Metvixia J7309
      - 2 applications at one week interval
      - $141.30-$127.54
    - Kerastick J7308
      - $165.31-$144.65
  - My practice
    - Kerastick average $155
    - Patient charged $289 (first stick)
    - Medicare = $161.83
    - Reimbursement
      - CPT 96567 procedure code
        - Medicare - $130.89
          - Range $92.39 (PR) to $185.34 (San Francisco)

**PDT: Administration**

- **Patient selection**
  - Failed other topicals
  - “Allergic” to 5-fluorouracil
  - Want to decrease length of morbidity
  - Word of mouth
- **Shave legs, arms, and scalp pre-PDT**
- **Retinoid for 1 week-1 month prior**
- **Hyperkeratotic lesions: curette, LN2, follow**

**PDT: Administration**

- **Pretreat with rigorous cleaning or acetone to degrease and reduce surface keratin**
  - Skip acetone in those with respiratory problem and in Type I or sensitive skin
  - Patient should be sitting to optimize breathing with acetone use
PDT: Administration

- Prepare Kerastick
  - Crush bottom ampule then top ampule
  - Shake gently for 30 seconds to 3 minutes
- Apply to lesions/field
  - Treat area broadly
  - Go back to spot treat
  - Manufacturer recommends second application
  - Patients ask “Did you get this one? Did you get this one?” etc

PDT: Administration

- Patient should be lying down to avoid dripping
- Avoid UV exposure, cold, bright artificial light during incubation

Push firmly due to “stopper” with old sticks
New sticks eliminate stopper
Less repetitive motion strain

PDT: Administration

- Incubation and exposure
  - ALA monograph recommends 14-18 hours and 16 minutes 40 seconds (10 J/cm² at 2-4 inches from device)
  - Statistically higher accumulation than background in 92% of lesions at 1 hour and 100% at 2 hours (Warren et al., Journal of Biomedical Optics, 2010.)

- Face/scalp = 1.5-2 hours at 12-15 minutes
- Extremities/trunk = 4-5 hours at 20 minutes

PDT: Administration

- Rinse with water and pat dry before exposure
- Fan helps with cooling during exposure
- About 50% with burning/stinging
PDT: Administration

- Worsens then reaches plateau until complete
- 5-10% discontinue treatment early
- Check on patients every 2-3 minutes during initial treatment

Don’t forget the BluBlockers!

PDT: Administration

- Patient instructions
  - Physical sunscreen agent for 2 days post-PDT
  - Sunglasses when outdoors

PDT: Pitfalls

- Depth of treatment
  - Failure of drug penetration, rather than light penetration
- Consider biopsy/treatment for possible NMSCs or melanoma before treatment
  - Treatment of superficial portion of malignancy can lead to deep recurrences and poor margin control

PDT: Pitfalls

- Overlap of treatment zones (scalp and face)
- 2-4 inches away from light source
- Long sessions to do extremities
- Occlusion is challenging
- Air cooling for analgesia can diminish efficacy by decreasing protoporphyrin IX photobleaching

PDT: Pitfalls

- Blue light irradiation can contribute to age-related macular degeneration and other ocular problems
- Blu-U cannot accommodate some obese patients
- Other light sources with limited “spot size”
### PDT: The future

- Intrallesional ALA PDT
- Immediate field treatment versus selective treatment and monitoring
- Iontophoresis and electroporation to increase penetration
- Safety and efficacy of short contact (1-3 hours) PDT and broad versus spot treatment

### PDT is effective & economical field treatment.

1. True
2. False

### Barrier to use or implementation?

1. Cost/insufficient reimbursement
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### THANK YOU!

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