DRUG-INDUCED PHOTOSENSITIVITY

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Disclosure

Dr. Lindsey Walker has no relevant financial relationships with ineligible companies to disclose.

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Overview

- Define drug-induced photosensitivity
- Recognize the difference between photoallergic and phototoxic reactions
- Describe the epidemiological burden including long-term consequences
- Discuss diagnosis
- Identify common culprits
- Explain prevention and management

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What is drug-induced photosensitivity?

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Drug-Induced Photosensitivity

- Cutaneous adverse event after drug exposure + either UV light or visible radiation
- Two classifications: **photoallergic** and **phototoxic**

Criteria:
- Occurs only post radiation
- Drug and/or metabolite:
  - Is present in the skin at time of radiation exposure
  - Can absorb either UV or visible radiation

Blakely, et al. Drug-Induced Photosensitivity- An Update: Culprit Drugs, Prevention and Management. *Drug Safety*. 2019.

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Photoallergic Reaction

- Medication interacts with UV rays and structure is changed
- Body's immune system recognizes changed structure as a foreign threat and produces antibodies
- Rash, blisters, raised/red bumps, oozing lesions
- Can occur in areas that were not exposed to UV
- More common with topical agents, rather than systemic

Ketoprofen reaction

Credit: Wiley Online Library

Hofmann, et al. Drug-Induced Photosensitivity: Culprit Drugs, Potential Mechanisms and Clinical Consequences. JDDG. 2020.

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Phototoxic Reaction

Doxycycline reaction

Credit: flickr.com

- Medication is activated by exposure to UV light
  - "Photoactivation"
- Drug is transformed into a product that is cytotoxic to skin cells
- No immunologic mechanisms involved
- Can occur in everyone exposed to high does of medication and UV light
- Causes pain, redness, irritation, edema

Hofmann, et al. Drug-Induced Photosensitivity: Culprit Drugs, Potential Mechanisms and Clinical Consequences. JDDG. 2020.

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Comparison

	Photoallergic	Phototoxic
Description	Rare, immune-modulated	More common, direct cellular damage
Dose-dependent	**No**	**Yes, for both drug and light**
Incidence	Low	High
Occurrence	**After repeated exposure to drug**	**After initial exposure to drug**
Onset	> 24 hours	< 24 hours (min. to hr.)
Appearance	Eczematous, pruritic	Exaggerated sun burn or rash on exposed skin
Localization	**May spread outside exposed areas**	**Only exposed areas**

Blakely, et al. Drug-Induced Photosensitivity- An Update: Culprit Drugs, Prevention and Management. *Drug Safety*. 2019.

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Epidemiological Burden

- Drug-induced photosensitivity is under-reported
  - Difficult clinical recognition
  - Lack of documentation
  - Often attributed to other causes
- Lasting skin damage
  - Chronic subclinical reactions are potentially carcinogenic
  - Higher doses and more sun exposure = greater risk
  - Prevention is key

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Diagnosis

Clinical history:

- History of medication use
- Onset of event
- Screen for photosensitivity associated diseases (e.g. lupus erythematosus)
- Specialized testing

Hofmann, et al. Drug-Induced Photosensitivity: Culprit Drugs, Potential Mechanisms and Clinical Consequences. JDDG. 2020.

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Diagnosis: Specialized Testing

Phototesting:

- Exposed to artificial radiation on two occasions
  - Once while taking medication
  - Once while not taking medication

Photopatch testing:

- Two topical applications of medication placed on patients back
- After 24 hours, one patch is radiated at a low dose
  - If one site has erythema = photosensitivity
  - If both sites are affected = photoallergic reaction

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Common Medications That Cause Drug-Induced Photosensitivity

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NSAIDs

- Celecoxib
- Diclofenac
- Etodolac
- Ibuprofen
- Indomethacin
- Ketoprofen
- Nabumetone
- Naproxen
- Piroxicam
- Sulindac

- Cause varying degrees of reaction
- Reactions reported include blistering and erythema
- Naproxen has the highest photosensitizing potential
- Only rare cases with ibuprofen

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Antibiotics/Antifungal

Drug	Reaction	Tips
Tetracyclines	Sunburn like reaction, photodermatitis, nail dystrophy with photo-induced onycholysis	Doxycycline: dose-dependent Minocycline: not a significant risk
Fluoroquinolones	Sunburn like reaction, can last 1 week after discontinuation	Ciprofloxacin most photosensitizing potential
Sulfamethoxazole		Photosensitivity reactions in ~5 to 10% of patients
Voriconazole	Reactions typically from long-term use	Can increase skin cancer risk; one of the most commonly reported

Blakely, et al. Drug-Induced Photosensitivity- An Update: Culprit Drugs, Prevention and Management. *Drug Safety*. 2019.

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Other Common Photosensitizers

- Amiodarone – reported in up to 15% of patients; long time to resolve
- Amitriptyline
- Carbamazepine
- Chlorpromazine – one of the most frequently reported photosensitizers
- Furosemide – most commonly presents as sun blisters
- Hydrochlorothiazide – exaggerated sunburn reaction
- Glipizide
- Glyburide
- Lamotrigine
- Nifedipine – reported to cause photodermatitis

Nearly 400 medications have been linked to photosensitivity.

Drug-Induced Photosensitivity. Pharmacist's Letter/Prescriber's Letter. August 2019.
Blakely, et al. Drug-Induced Photosensitivity- An Update: Culprit Drugs, Prevention and Management. *Drug Safety*. 2019

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Prevention and Management

- Avoid direct sunlight and artificial tanning
  - Seek shade between 10 am and 4 pm
  - Sun's rays may be stronger when reflected off water or snow
- Limit exposure via the use of:
  - Long-sleeved shirts, pants, sunglasses, broad-rimmed hats
  - Broad spectrum sunscreen (protects against both UVA and UVB)
    - SPF 30 or higher

- When appropriate, can take medication at nighttime instead of morning
- Discontinue the offending agent if possible
- Use cool compresses and topical or oral steroids if needed

Blakely, et al. Drug-Induced Photosensitivity, An Update: Culprit Drugs, Prevention and Management. *Drug Safety*. 2019

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Resources

- Blakely K, Drucker A, Rosen C. Drug-Induced Photosensitivity—An Update: Culprit Drugs, Prevention and Management. *Drug Saf.* 2019;42(7):827-847. doi:10.1007/s40264-019-00806-5
- Drug-Induced Photosensitivity. Pharmacist's Letter/Prescriber's Letter. August 2019.
- Hofmann, et al. Drug-Induced Photosensitivity: Culprit Drugs, Potential Mechanisms and Clinical Consequences. JDDG. 2020

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Questions?

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What part of the skin are photoallergic and phototoxic reactions localized to?

A. Photoallergic reaction spreads outside of exposed areas and phototoxic reaction is only in exposed areas
B. Photoallergic reaction is only in exposed areas and phototoxic reaction spreads outside of exposed areas
C. Both reactions can spread outside of exposed areas
D. Both reactions are in exposed areas only

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What is the most important fact to remember about lasting skin damage from photosensitivity reactions?

A. Chronic subclinical reactions are potentially carcinogenic
B. Higher doses and more sun exposure lead to greater risk
C. Prevention is key
D. All of the above

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