

Understanding Photodynamic Therapy (PDT): A Guide for Patients and Caregivers

Zaim Haq

What is Photodynamic therapy?

Photodynamic Therapy (PDT) is a medical treatment that uses a special drug called a photosensitizing agent, light, and oxygen to destroy cells of interest within your body, such as cancer cells. It is mainly used on the skin to treat conditions like skin cancer and acne. One of the benefits of PDT is that it selectively targets the bad cells while primarily leaving the healthy ones alone. This helps not only with quicker recovery but also reduces the chance of scarring. Additionally, PDT is less invasive than many traditional treatments, which may result in less pain and shorter recovery times, making it a more comfortable option for many patients¹.

How It Works

1. **Photosensitizing Agent:** This is a special drug applied on the skin, taken as an injection or by mouth. This drug prefers to stay within cancer cells as these cells are very active which allows the agent to concentrate within them².
2. **Light Exposure:** After the drug has had time to build up in the cells, your dermatologist will shine a specialized light on the area. This light activates the drug, which then produces a form of oxygen that kills the cells².

Uses of PDT

PDT is particularly effective for treating non-melanoma skin cancers like basal and squamous cell carcinoma. It may be favored for lesions on visible areas of the body such as the face as it may lead to better cosmetic outcomes than traditional surgery. PDT is also used to manage acne and enhance the appearance of the skin by reducing oil production and refining pore size. PDT also has applications for non-dermatologic conditions such as treating lung, esophageal, and bladder cancers³.

PDT Process

The photosensitizer drug can be applied topically, injected, or taken orally, depending on the location and type of condition being treated. Following a waiting period that allows the drug to concentrate in the cells of interest, the area is exposed to a specific light wavelength. The length of exposure varies depending on the specific drug and condition. Post-treatment following PDT involves shielding the treated area from light to avoid activating the photosensitizer accidentally. Temporary side effects such as redness, swelling, or discomfort may also occur following surgery⁴.

Advantages of PDT

PDT is precise, targeting only the diseased cells and sparing healthy tissue, which minimizes scarring and other side effects. It is also minimally invasive, leading to quicker recovery times and fewer

complications than surgical methods. PDT can be performed multiple times on the same area if needed, which may be useful for recurrent conditions⁵.

Disadvantages of PDT

It is important to avoid direct sunlight and intense indoor light after treatment with PDT to prevent unwanted reactions from the photosensitizer. The effectiveness of PDT is also limited by how deeply the light can penetrate, making it less effective for cells deep within the skin⁵.

Discussing PDT with your physician

When considering PDT, it's important to understand both the process and the commitment involved. Discuss with your healthcare provider what to expect during and after the treatment and the potential need for multiple sessions. Being well-informed can help you manage expectations and help with understanding post-treatment guidelines, ensuring the best outcome for your health

1. Kwiatkowski S, Knap B, Przystupski D, et al. Photodynamic therapy - mechanisms, photosensitizers, and combinations. *Biomed Pharmacother*. 2018;106:1098-1107. doi:10.1016/j.biopha.2018.07.049
2. Donohoe C, Senge MO, Arnaut LG, Gomes-da-Silva LC. Cell death in photodynamic therapy: From oxidative stress to anti-tumor immunity. *Biochim Biophys Acta Rev Cancer*. 2019;1872(2):188308. doi:10.1016/j.bbcan.2019.07.003
3. Moy LS, Frost D, Moy S. Photodynamic Therapy for Photodamage, Actinic Keratosis, and Acne in the Cosmetic Practice. *Facial Plast Surg Clin North Am*. 2020;28(1):135-148. doi:10.1016/j.fsc.2019.09.012
4. Hou YJ, Yang XX, Liu RQ, et al. Pathological Mechanism of Photodynamic Therapy and Photothermal Therapy Based on Nanoparticles. *Int J Nanomedicine*. 2020;15:6827-6838. Published 2020 Sep 15. doi:10.2147/IJN.S269321
5. Dobson J, de Queiroz GF, Golding JP. Photodynamic therapy and diagnosis: Principles and comparative aspects. *Vet J*. 2018;233:8-18. doi:10.1016/j.tvjl.2017.11.012

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