

# Shining Light on PDT and Actinic Keratoses

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## INTRODUCTION

**P**hotodynamic therapy (PDT) is a non-invasive treatment modality involving photosensitizers that are activated by absorption of visible light to initially form the excited singlet state, followed by transition to the long-lived excited triplet state. This triplet state can undergo photochemical reactions in the presence of oxygen to form reactive oxygen species (including singlet oxygen) that can destroy cancer cells, pathogenic microbes, and unwanted tissue.<sup>1</sup> PDT targets neoplastic epithelial cells selectively and may lead to an improved cosmetic outcome especially in elderly patients with fragile, photodamaged skin, mainly effective for dermatologic conditions like actinic keratoses, Bowen's disease, in-situ squamous cell carcinoma, and superficial basal cell carcinoma.<sup>2,3,4</sup>

Our observational study with a one-year follow-up examined the effectiveness of photodynamic therapy using only the 308 nm blue light in patients with a history of skin cancer and presence of Acantholytic Actinic Keratoses (AKs). Patients with history of adverse reactions to visible light exposure, the immunocompromised, and those with a history of melanoma were excluded.<sup>6</sup> Once the risks of PDT were discussed and consent was obtained, 100 patients were selected to receive an average of five sessions of 16-minute exposure to DUSA BLU-U5 without the use of any photosensitizers such as 5-aminolaevulinic acid (ALA) or 5-aminolaevulinic acid methylester (MAL). Areas were scrubbed with alcohol pads prior to exposure to 308-nm blue light DUSA-Blue. Hyperkeratotic lesions were curetted prior to application of blue light to make them more amenable to the therapy. Locations of AKs varied from back, chest, stomach, arms, and face. Below is a table of ten randomly selected patients from our trial and their percent of clearance rate at the conclusion of our study.

The mean age of the ten patients selected was 82.6 years old with 5 men and 5 women constituting the study population. The percent clearance rate of AKs from the start of the trial to the one-year follow-up was 67.67% cleared. This percent clearance was consistent with about two-third clearance in the clinically observed number of AKs in all patients enrolled in this pilot study.

**FIGURE 1.** Part 1 before PDT.



**FIGURE 2.** Part 1 after PDT.



**FIGURE 3.** Part 2 before.



**FIGURE 4.** Part 2 after.



TABLE 1.

Rate Of Clearance in Patients before and after PDT				
Patient #	Patient Age	Number of AKs Before	Number of AKs Cleared	Percent Clearance Rate
1	71	20	14	70%
2	91	15	11	73.33%
3	77	40	24	60%
4	75	58	42	72.41%
5	90	57	43	75.44%
6	82	21	7	33.33%
7	87	24	18	75%
8	77	50	33	66%
9	92	25	18	72%
10	84	24	19	79.17%
	82.6	33.4	22.9	67.67%

Photodynamic therapy is an important component in the treatment of AKs. Herein, our pilot study hopes to shed light on the great rate of clearance in the number of AKs with the use of only 308-nm blue light without any photosensitizing agents. We propose that in patients with known contraindications to photosensitizing agents, this could be an effective way to clear AKs while avoiding the harmful side effects of photosensitizing agents. It would be beneficial to conduct a split study comparing the effects of using photosensitizing agent on one side while exposing only to blue light on the other side. This would allow for the observation of the difference in reduction of AKs on both sides.

## DISCLOSURES

The authors have no conflicts of interest to declare.

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