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Comparing Photodynamic Therapy Approaches in Basal Cell Carcinoma

Ryan Quigley:

Welcome to *AudioAbstracts* on ReachMD. I'm Ryan Quigley and today, I'll be sharing findings from a recent study comparing methods of photodynamic therapy, or PDT, in basal cell carcinoma care.

PDT holds a distinct place in the treatment landscape for superficial basal cell carcinoma. While surgical excision remains the gold standard for many lesions, PDT offers an appealing alternative for patients who want to avoid surgery or prioritize cosmetic outcomes. But there's a trade-off here; while conventional PDT can be effective, it's also time-consuming and often painful.

A randomized controlled trial published in the *Journal of the European Academy of Dermatology and Venereology* in 2025 explored whether simulated daylight PDT could offer a more comfortable experience without compromising efficacy.

Let's take a closer look.

Conventional PDT involves applying a photosensitizing pro-drug—typically aminolevulinic acid or methyl aminolevulinate—followed by an incubation period of about three hours before the lesion is exposed to red light. This activation produces reactive oxygen species that destroy tumor cells.

Simulated daylight PDT takes a different approach. Instead of a high-intensity red light source, it involves a broad white light system designed to mimic natural daylight. Illumination begins much sooner after application of the photosensitizer and continues at lower intensity over a longer period. In theory, this more gradual activation could reduce the discomfort associated with conventional PDT.

But a key question remains: does this gentler approach deliver the same therapeutic efficacy?

To investigate this, researchers in Sweden conducted a single-center trial enrolled 78 patients with a total of 193 superficial basal cell carcinoma lesions. Each lesion was randomized to treatment with either conventional or simulated daylight PDT. Both groups received two treatment sessions separated by one to two weeks.

Patients were evaluated at three months to detect early treatment failure and again at one year to determine overall clearance rates. Pain during illumination was measured using a zero-to-ten numeric rating scale, and patient preferences were assessed through self-report questionnaires.

At one year, the difference in tumor clearance between the two approaches was significantly different. Lesions treated with conventional PDT achieved a 91.8 percent clearance rate, while simulated daylight PDT achieved 62.4 percent clearance. The study had been designed to test whether simulated daylight PDT could be considered non-inferior to conventional PDT, but the results showed that it fell short of that threshold.

Early treatment failures were also more common in the simulated daylight group, and some recurrent lesions were later found to represent non-superficial basal cell carcinoma subtypes on histopathology.

Despite the difference in clearance rates, however, the study revealed an advantage for simulated daylight PDT when it came to patient comfort.

Pain scores during illumination averaged 3.5 to 3.7 with conventional PDT, compared to 0.1 with simulated daylight PDT. Many patients undergoing conventional PDT required cooling measures like water spray to tolerate the treatment, while this was rarely necessary with simulated daylight illumination.

These differences strongly influenced patient perception. Among individuals who experienced both treatment modalities, 87.5 percent preferred simulated daylight PDT immediately after treatment but before knowing the therapy's clearance rates.

Interestingly, cosmetic outcomes after successful treatment were similar between the two groups, and most patients expressed satisfaction with the appearance of the treated areas.

The study highlights a broader reality in dermatologic oncology: treatment decisions may not always depend on efficacy alone. Simpler procedures such as curettage or cryosurgery can achieve very high clearance rates for superficial basal cell carcinoma, yet PDT remains attractive for patients seeking better cosmetic outcomes or wishing to avoid surgical interventions.

Simulated daylight PDT highlights another dimension of that conversation. While its current clearance rates don't support its use as a first-line treatment, its near-painless delivery suggests that future refinements in PDT technology could eventually strike a better balance between comfort and effectiveness. Although, future studies will hopefully provide more insight on which treatment patients prefer after considering the therapies clearance rates.

Long-term follow-up from this study—planned at two and five years—may provide additional insight into the durability of these treatments and whether modifications to simulated daylight PDT protocols could improve outcomes.

Until then, the takeaway is clear: simulated daylight PDT improves comfort, but conventional PDT remains more effective in patients with superficial basal cell carcinoma.

This has been an *AudioAbstract*, and I'm Ryan Quigley. To access this and other episodes in our series, visit ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!

Reference:

Sjöholm A, Backman E, Modin M, Fougelberg J, Claeson M, Paoli J. Simulated daylight vs conventional PDT for clinical superficial BCC: A randomized controlled trial. *J Eur Acad Dermatol Venereol*. 2025;39(11):1997-2004. doi:10.1111/jdv.20602.