4. Takada K, Kishi J, Miyasaka N. Step-up versus primary intensive approach to the treatment of interstitial pneumonia associated with dermatomyositis/polymyositis: a retrospective study. *Mod Rheumatol*. 2007;17:123-130.
5. Pozharashka J, Miteva L, Dourmishev L. Cutaneous manifestations and their corresponding dermoscopic features in patients with dermatomyositis. *Dermatol Pract Concept*. 2022;12:e2022142.

https://doi.org/10.1016/j.jaad.2024.03.052

Benzoyl peroxide use in acne therapy: Evaluating the association with acute myeloid leukemia risk

To the Editor: Benzoyl peroxide (BPO) has been used since the early 20th century and is considered a staple in treating acne. Several over-the-counter (OTC) BPO products have recently been reported to degrade into benzene at elevated temperatures, exceeding concentrations of 2 ppm, which is the Food and Drug Administration limit for drugs. Some products were also found to emit significant amounts of benzene into the environment from unopened packaging.[1] These findings have sparked serious questions regarding the safety and associated risks of BPO-containing products. Benzene is a well-recognized carcinogen and chronic, low-dose exposure is leukemogenic, with acute myeloid leukemia (AML) being the most frequently observed type.[2,3] It remains unclear if BPO use among acne patients is associated with increased odds of developing AML.

Using Cosmos,[4] a community collaboration of health systems representing over 243 million patients from over 1400 hospitals and 32,500 clinics in the United States, we estimated the prevalence of AML in over 2.3 million acne patients with and without BPO. Patients aged 12 years and older were identified using the International Statistical Classification of Diseases, 10th Revision diagnoses (clinical, admitting, billed, or problem list) for acne vulgaris (L70.0) diagnosed between ages 12 and 45 years and AML (C92.00) diagnosed after a diagnosis of acne for data recorded between March 8th, 2010, and March 7th, 2024. Any BPO-containing prescription or reported use linked to a diagnosis of acne was included. Odds ratios (ORs), confidence intervals (95%CIs), and significance were calculated in GraphPad Prism using the Woolf logit interval and chi-square test.

AML was diagnosed in 0.012% of acne patients with a BPO prescription compared to 0.017% without recorded BPO use (OR, 0.70; 95%CI, 0.55-0.90) (Table I). Because many acne patients use OTC BPO products that are not captured in the electronic medical record, we also assessed the diagnosis of acne as a surrogate for BPO exposure. AML was diagnosed in 0.015% of acne patients compared with 0.052% of those without acne (OR, 0.29; 95%CI, 0.26-0.32) (Table II). Data was disaggregated and stratified by age groups to avoid potential age-related bias with AML diagnosis. Neither a diagnosis of acne nor exposure to prescription BPO for treating acne was associated with significantly elevated odds of developing AML in any group.

With over 2.3 million acne patients assessed, we did not observe increased odds of AML associated with (1) BPO prescriptions or reported BPO use among acne patients or (2) a diagnosis of acne in the general population. While these results are restricted by the inability to determine the duration or extent of BPO use individually, utilizing a substantial national database of 243 million patients helps reduce the impact of these limitations. Additionally, it remains unknown if prescription BPO products differ in stability from OTC products, which could affect potential benzene exposure. This study helps reassure dermatologists and patients that based on analyses of a large national database; there is no clear associated risk of AML with BPO use. However, further research and validation are urgently needed to assess benzene concentrations in OTC and prescription BPO products in both controlled environments and real-world conditions to inform patients on appropriate use.

Jesse Veenstra, MD, PhD,[a,b] and David Ozog, MD[a,b]

From the Department of Dermatology, Henry Ford Health, Detroit, Michigan[a]; and Department of Medicine, Michigan State University, East Lansing, Michigan.[b]

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Key words: acne; acute myeloid leukemia; benzene; benzoyl peroxide; malignancy; risk.

Correspondence to: Jesse Veenstra, MD, PhD, Department of Dermatology, Henry Ford Health, 3031 W. Grand Blvd, Detroit, MI 48202

E-mail: jveenst1@hfhs.org

Conflicts of interest

None disclosed.

Table I. Association between benzoyl peroxide treatment for acne and acute myeloid leukemia risk

Age	Exposure	Total (*n*)	AML+	AML−	OR (95% CI)	*P*
All	Acne + BPO	668,756	79	668,677	0.70 (0.55-0.90)	.0057
	Acne − BPO	1,583,316	266	1,583,050		
12-30	Acne + BPO	514,432	52	514,380	0.83 (0.60-1.15)	.2649
	Acne − BPO	1,020,618	124	1,020,494		
30-40	Acne + BPO	105,490	16	105,474	0.72 (0.42-1.23)	.2282
	Acne − BPO	355,394	75	355,319		
40-50	Acne + BPO	43,733	<10 cases	43,714	0.70*	--
	Acne − BPO	183,421	60	183,361		
50-65	Acne + BPO	51,010	<10 cases	5099	--	--
	Acne − BPO	23,839	<10 cases	23,829		
65+	Acne + BPO	<10 cases	<10 cases	<10 cases	--	--
	Acne − BPO	44	<10 cases	44		

AML, Acute myeloid leukemia; *BPO*, benzoyl peroxide; *CI*, confidence interval; *OR*, odds ratio.
*For exposures with <10 cases identified, OR was conservatively estimated using 10 cases.

Table II. Association between acne and acute myeloid leukemia risk

Age	Exposure	Total (*n*)	AML+	AML−	OR (95% CI)	*P*
All	Acne+	2,336,498	355	2,336,143	0.29 (0.26-0.32)	<.0001
	No Acne	214,571,505	112,356	214,459,149		
12-30	Acne+	1,588,661	179	1,588,482	0.89 (0.77-1.03)	.1240
	No Acne	50,507,086	6,394	50,500,692		
30-40	Acne+	478,627	95	478,532	1.15 (0.94-1.41)	.1700
	No Acne	33,840,920	5,829	33,835,091		
40-50	Acne+	236,741	72	236,669	1.14 (0.90-1.44)	.2759
	No Acne	29,230,893	7,815	29,223,078		
50-65	Acne+	32,393	<10 cases	32,380	0.55*	--
	No Acne	43,836,935	24,617	43,812,318		
65+	Acne+	76	0	76	0	.7640
	No Acne	57,155,671	67,701	57,087,970		

AML, Acute myeloid leukemia; *CI*, confidence interval; *OR*, odds ratio.
*For exposures with <10 cases identified, OR was conservatively estimated using 10 cases.

REFERENCES

1. Kucera K, Zenzola N, Hudspeth A, et al. Benzoyl peroxide drug products form benzene. *Environ Health Perspect*. 2024;132:37702.
2. Shallis RM, Weiss JJ, Deziel NC, Gore SD. A clandestine culprit with critical consequences: benzene and acute myeloid leukemia. *Blood Rev*. 2021;47:100736.
3. Glass DC, Gray CN, Jolley DJ, et al. Leukemia risk associated with low-level benzene exposure. *Epidemiology*. 2003;14:569-577.
4. Cosmos. Accessed March 22, 2024. https://cosmos.epic.com/

https://doi.org/10.1016/j.jaad.2024.04.064

Simulation-based exercises to improve the performance of cosmetic consultations

To the Editor: Structured educational approaches, including simulated patient encounters, are relatively underexplored in the training of dermatology residents for cosmetic consultations.[1-5] We conducted a study to investigate whether simulation exercises could enhance dermatology residents' and cosmetic fellows' skills during cosmetic consultations.

At the Annual Meeting of the American Society for Dermatologic Surgery in 2019, a cohort of 25 participants comprising 15 residents and 10 fellows (cosmetic dermatology and Mohs fellows) underwent 2 simulated patient encounters before and after, respectively, a dedicated didactic session. The 6 standardized patients (SPs) were professional actors affiliated with the Northwestern Simulation Laboratory who were specifically trained for this simulation exercise. SPs attended a mandatory 4-hour training session regarding the case scenarios (Table I). Each simulated SP interaction lasted 15 minutes. Expert cosmetic dermatologists (with an average 11 years of experience) assessed these encounters for interaction quality, including competency areas such as eliciting concerns in an open-ended manner and managing dissatisfied patients. The expert cosmetic dermatologists provided feedback on interaction quality in a group discussion