

Granuloma Annulare Presenting as Contact Dermatitis

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Granuloma annulare is a benign idiopathic disorder of the dermis that has various clinical presentations and an unknown etiology. We discuss a patient who presented with a contact dermatitis that demonstrated granuloma annulare on biopsy. The most likely etiologic agent was a substance known as FAZ (an exhaust product of Kodak DryView laser imaging film), to which the patient was exposed in his occupation.

Case Report

A 39-YEAR-OLD HEALTHY MAN PRESENTED to the dermatology department with a 1-month history of a pruritic rash on his neck. He also had recently developed pruritus on his forearms and on the dorsal part of his hands. He had not used any topical agents but had tried an oral antihistamine, without benefit. He had no previous history of skin rashes suggestive of a contact dermatitis. Physical examination revealed a well-demarcated area of salmon-colored macules and flat-topped papules coalescing into plaques around his neck and on the exposed area of his chest, sparing the hairline (Figs 1 and 2). There was no facial or eyelid involvement. On his forearms and on the dorsal part of his hands were less-subtle but similar erythematous flat-topped papules coalescing into plaques. Because of the distribution of the rash, a contact allergy or a phototoxic reaction to a contact allergen was considered. A punch biopsy specimen from the neck showed a granulomatous dermatitis with an intradermal inflammatory infiltrate composed of histiocytes and multinucleated giant cells, some in a vague palisading pattern, consistent with granuloma annulare (Figs 3 and 4).

The patient worked in a radiology department and maintained radiology equipment. He consistently came into contact with a product called TroubleShooter (3M, St. Paul, MN) and with FAZ, an exhaust product of Kodak

DryView laser imaging film (Eastman Kodak Company, Rochester, NY).

Methods

Patch tests and photopatch tests were performed with the Mayo Clinic Contact Dermatitis Core Group standard, cosmetic, fragrance, machinist, and printer/photographer series and with the patient's own products, TroubleShooter and FAZ. TroubleShooter, a liquid solution, was applied to a piece of filter paper and then placed in a Finn Chamber (Epitest Ltd Oy, Tuusula, Finland). FAZ, an exhaust product from the DryView laser imaging film, leaves a yellow powdery wax in the machine. Some of this powder (collected by the patient) was placed directly in a Finn Chamber for patch testing. Readings were done at 48, 72, and 96 hours. Minimal erythema doses were determined before patch testing. The patient had an ultraviolet B minimal erythema dose of 14 mJ at 5 seconds. Ultraviolet A (1, 5, and 10 J) was administered, and the patient had no erythema at 24 or 48 hours. Products for photopatch testing were left on for 24 hours and were then irradiated with 10 J/cm² of ultraviolet A and read at 48, 72, and 96 hours.

Results

Results were scored according to the Mayo Clinic Contact Dermatitis Core Group classification. Positive patch-test reactions are listed in Table 1. The patient had reactions to FAZ, TroubleShooter, pyrocatechol, potassium dichromate, balsam of Peru, Disperse Blue 106, ethyleneurea/melamine formaldehyde mix, methyldibromoglutaronitrile/phenoxyethanol, and coconut diethanolamide. He

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Figure 1. A well-demarcated plaque of salmon-colored macules and flat-topped papules on the exposed areas of the anterior neck and chest (A) and posterior neck (B).

also had positive photopatch reactions to FAZ (Fig 5) and TroubleShooter.

Discussion

Granuloma annulare is a benign idiopathic disorder of the dermis with varied clinical presentations. The exact etiology is unknown; however, suspected causes include trauma, medications, and viruses.¹ Little has been published regarding granuloma annulare presenting as a contact dermatitis. There is one published case report of a patient with granuloma annulare contact dermatitis from nickel. A biopsy specimen of the positive patch-

test reaction to 5% nickel sulfate showed histologic features consistent with granuloma annulare.² Another reported case involved a patient presenting with biopsy-proven granuloma annulare attributed to contact with corticosteroid powders; however, the patient was never patch-tested.³

There have been reports of disseminated granuloma annulare on the sun-exposed distribution of the neck, chest, and forearms, with sparing of the face, similar to the granuloma annulare seen in our patient.⁴ In these other patients, the eruption did not follow sun exposure, and in the one patient tested, the eruption could not be reproduced by a monochromator. Patch testing



Figure 2. A closer view of the posterior neck shows granulomatous papules.

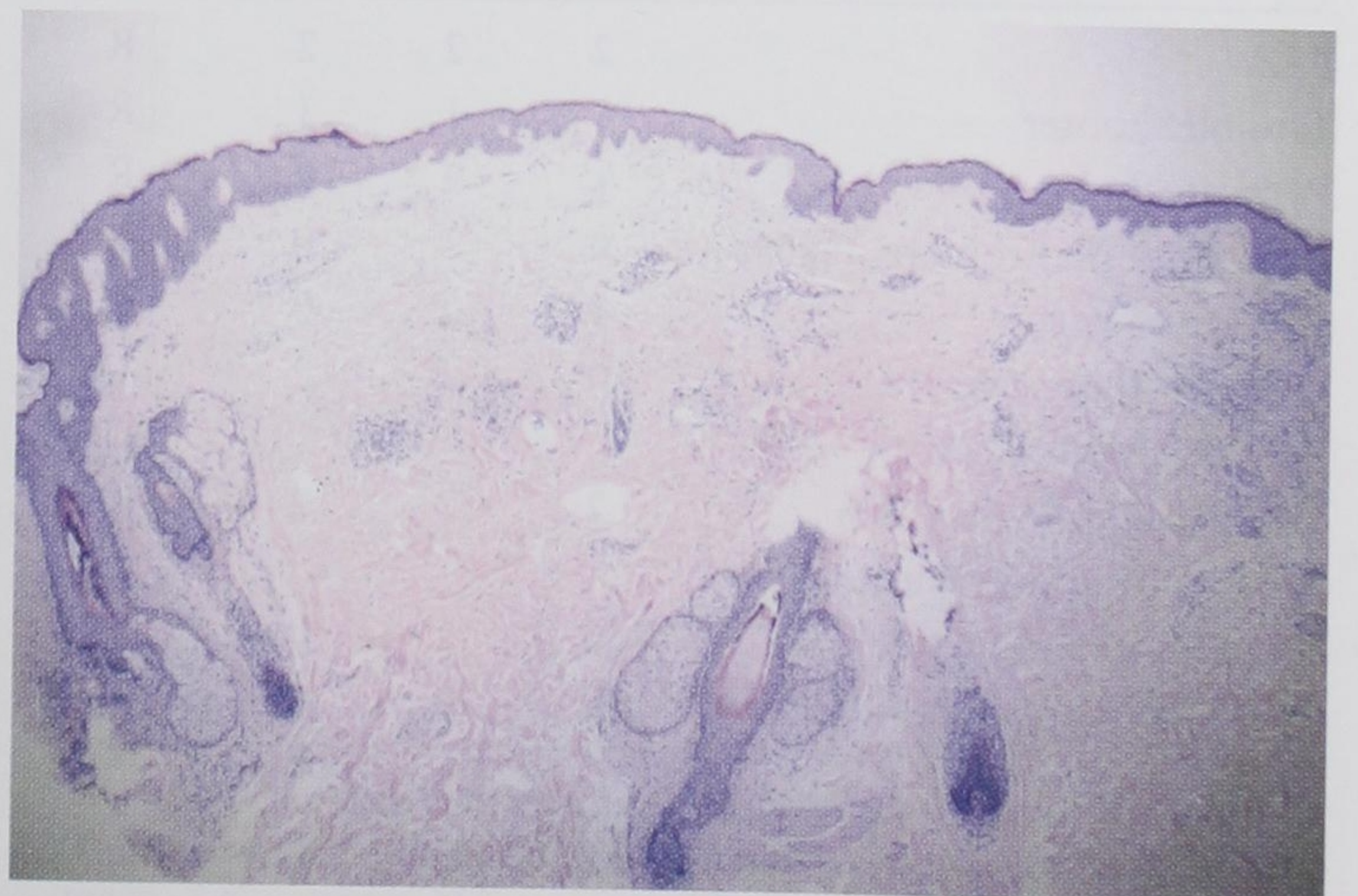


Figure 3. Biopsy specimen from an affected area on the neck. (Hematoxylin and eosin, $\times 40$ original magnification)

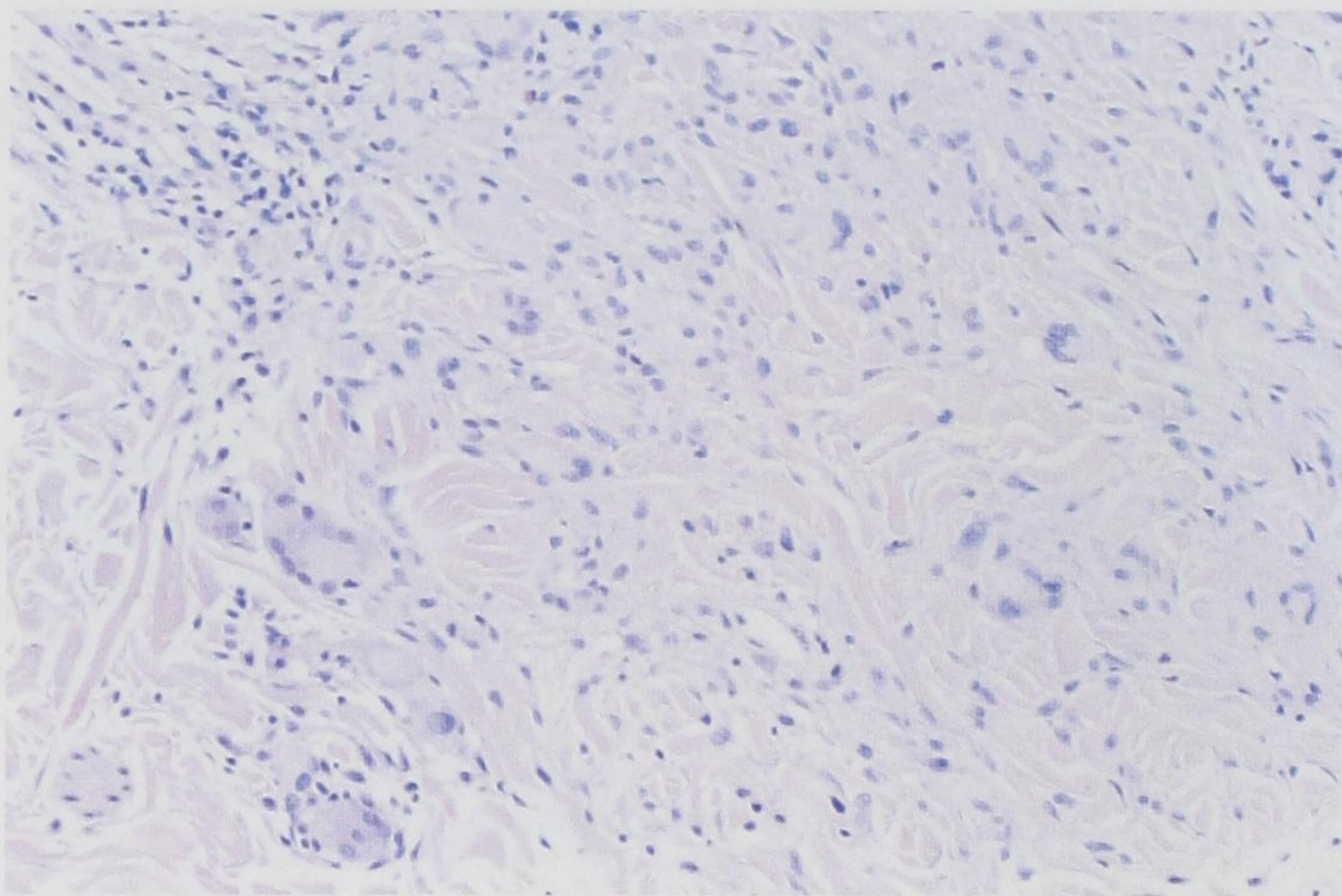


Figure 4. Biopsy specimen from an affected area on the neck. Higher magnification demonstrates an intradermal inflammatory infiltrate of histiocytes and multinucleated giant cells in a subtle palisading pattern. (Hematoxylin and eosin, × 200 original magnification)



Figure 5. Positive patch-test reaction to FAZ (arrow) at the 96-hour reading.

was not reported and presumably was not done on these patients.

Our patient presented with contact dermatitis demonstrating granuloma annulare on biopsy specimen analysis. The most likely etiologic agent was a product known as FAZ, an exhaust product of Kodak DryView laser imaging

film, to which the patient was exposed when he opened and repaired radiology equipment that had not cooled down completely. The laser imaging film is composed of polyethylene terephthalate (80–90% by weight), polyvinyl butyral–polyvinyl alcohol–polyvinyl acetate terpolymer, and silver behenate; however, the exact components of the exhaust product (ie, FAZ) are not known. Given the stronger reaction in the unlit series, the patient’s eruption was less likely photoinduced or photoexacerbated. The distribution, although suggestive of a photo contact dermatitis, may be more related to areas of skin exposed when the patient was working with an aerosolized or airborne antigen. In fact, the diminished reaction to the photopatch series tends to support a suppressive, not inductive, role of ultraviolet light in this case.

The reaction to TroubleShooter (composed of water, ethanolamine, oleamine oxide, benzyl alcohol, and ethyl alcohol) was most likely an irritant reaction. Pyrocatechol and potassium dichromate are found in photographic developers (and possibly also radiology equipment) and may be relevant. The persistent reaction (scored as 2) to Disperse Blue 106 may also be relevant because some Kodak films do contain a blue dye. Relevance is unclear for reactions to balsam of Peru, ethyleneurea/melamine formaldehyde mix, methyldibromoglutaronitrile/phenoxyethanol, and coconut diethanolamide.

A biopsy specimen of the positive patch-test reaction to FAZ at 96 hours indicated chronic dermatitis and did not show evidence of granuloma annulare. However, more

Table 1. Positive Results of Patch Testing*

Chemical	48 h	72 h	96 h	Relevance
FAZ	2	2	2	R
TroubleShooter	1	1	1	R
Pyrocatechol	1	2	0	R
Potassium dichromate, 0.25%	0	2	0	R
Balsam of Peru	0	2	0	Q
Disperse Blue 106, 1%	0	2	2	Q
Ethyleneurea/melamine formaldehyde mix, 5%	2	2	2	Q
Methyldibromoglutaronitrile/phenoxyethanol, 1.5%	0	2	0	N
Coconut diethanolamide, 0.5%	0	2	0	N

N = not relevant; Q = questionable relevance; R = relevant.
*Results were scored according to the Mayo Clinic Contact Dermatitis Core Group classification: 0 = no reaction; 1 = macular reaction; 2 = papular reaction; 3 = reaction spreading beyond the margin; 4 = bullous or ulcerative reaction.

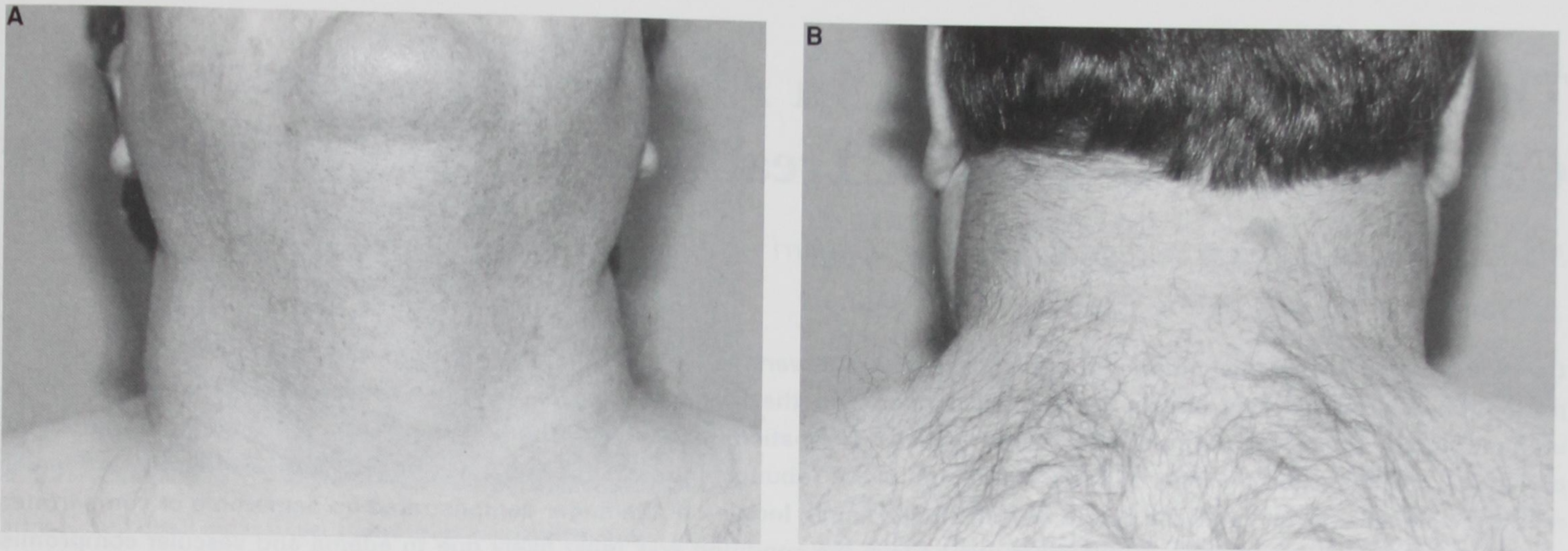


Figure 6. A and B, Resolution of the rash 6 months after the patient changed work duties and avoided exposure to FAZ.

chronic exposure to the compound may be required before those histopathologic changes develop.

At the last follow-up visit, after the removal and absence of FAZ from his work environment for 6 months, the patient was asymptomatic, his neck lesions had completely resolved (Fig 6), and the lesions on his arms had significantly improved. This case illustrates contact dermatitis as another possible cause of granuloma annulare. The most likely agent in this case was FAZ, the exhaust product of Kodak DryView laser imaging film.

References

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