

What Is Your Diagnosis?



A 79-year-old man presented with rosacea of 3 years' duration that was refractory to multiple medications. His medical history was notable for type 2 diabetes mellitus. His dermatologic history was otherwise unremarkable. Prior therapies for his rosacea included minocycline hydrochloride, doxycycline monohydrate, and tetracycline hydrochloride, which did not result in improvement. His most recent therapy was hydrocortisone butyrate cream 0.1% applied daily for a year and a half that resulted in only partial response. On physical examination he had multiple inflammatory papules and pustules noted on the neck and bilateral cheeks with extension to his upper chest, especially on his right side.

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The Diagnosis: *Demodex* Folliculitis



The most common ectoparasites in humans are *Demodex* mites.¹ The mite *Demodex folliculorum* was first discovered in cerumen in 1841 by the anatomist Jakob Henle; the mite was named *Acarus folliculorum* and was later changed to *D folliculorum*.^{2,3} These organisms have since been investigated for more than 50 years, yet there is still controversy over their role in skin disease and folliculitis.^{4,5} *Demodex* species are an important cause of skin disease in several animals, but it has been difficult to prove the cause in humans.⁴ The 2 major species that affect humans are *D folliculorum* and *Demodex brevis*. *Demodex folliculorum* mites are longer, have long tubular posterior segments and arrow-shaped eggs, and reside in the follicular infundibulum in groups of 10 to 15.⁶ *Demodex brevis* mites are shorter with a pointed posterior segment, have oval-shaped eggs, and usually are present in sebaceous glands.⁷ When viewed microscopically, mites have 3 segments—head, thorax, and abdomen—and are covered with a cuticle.⁶ The mites all possess needlelike mouthparts that are used for consuming skin cells.

Although these mites can be seen in individuals of all ages, as many as 80% to 90% of patients older than 50 years are infested.⁸ The mites present in higher concentrations and in areas of the body with

an increased number of sebaceous glands, such as the face, scalp, neck, eyelids, and upper chest.⁷ In most cases, the presence of these mites is asymptomatic and causes no clinical findings. *Demodex* folliculitis and other diseases related to *Demodex* mites are more likely to occur in patients older than 50 years as well as immunosuppressed patients, such as patients with human immunodeficiency virus,^{9,10} patients undergoing chemotherapy,¹¹ and organ transplant recipients. Two cases of *Demodex* folliculitis were reported in patients with AIDS-defining illnesses.¹⁰ In patients who are immunocompetent, skin trauma is the likely cause of *Demodex* folliculitis, especially with repetitive trauma such as regular shaving.⁶ Increased numbers of *Demodex* mites are seen in other skin conditions, including rosacea, perioral or periorificial dermatitis, pustular folliculitis, demodectic abscesses, and papulopustular scalp eruptions.^{5,12-15} Many of the potential diagnoses can be ruled out based on clinical appearance. Rosacea and perioral or periorificial dermatitis both have characteristic lesion locations, which were absent in our patient. Rosacea typically involves the central face, which was spared in our patient. Perioral or periorificial dermatitis is associated with papules and erythema located periorally or periorcularly. Our patient had been previously treated with oral tetracycline for rosacea, which resulted in no clinical

improvement. He had no abscesses, papules, or pustules on his scalp.

Another diagnosis to consider is folliculitis caused by bacteria, fungi, or viruses. These potential causes are more common than *Demodex* folliculitis. Bacterial folliculitis most often is caused by *Staphylococcus aureus*, *Streptococcus* species, or other gram-positive cocci.⁶ More infrequent causes include gram-negative bacteria, such as *Pseudomonas*, *Klebsiella*, and *Proteus*.¹⁶⁻¹⁹ Dermatophytes, *Candida*, and *Pityrosporum* fungi are the most common causes of fungal folliculitis.¹⁸ Determining the etiology of the folliculitis is important, as treatment can vary widely based on the causative organism.

Diagnosis of *Demodex* infestation can be easily confirmed with direct microscopic examination of skin scrapings.¹⁵ In our patient, a potassium hydroxide preparation was performed and showed *Demodex* mites in the scrapings. Higher numbers of mites visualized microscopically is more suggestive of disease causation. Although skin biopsy usually is not necessary for diagnosis, classically it shows a perifollicular infiltrate with presence of multiple *Demodex* mites in the dilated ostium of hyperkeratotic follicles.¹

Treatment of *Demodex* folliculitis typically is accomplished with oral ivermectin and permethrin cream 5%.¹ We instructed our patient to stop treatment with hydrocortisone butyrate cream and prescribed a dose of ivermectin 18 mg orally (200 µg/kg), followed by a repeat dose 7 days later. He was given samples of crotamiton lotion 10% to apply topically at night and was instructed to wash it off the next morning. We used the crotamiton lotion instead of permethrin cream, secondary to the availability of the samples. At his follow-up visit 6 weeks later, only the lesions on his left side showed notable clearance. Our patient decided on his own to perform an internal, split-side, controlled study and only applied the crotamiton lotion to his left side. He continued using the hydrocortisone butyrate cream on the right side of his face, neck, and chest, which resulted in persistent inflammatory papules and pustules. At this point, the patient was strongly encouraged to discontinue use of the hydrocortisone butyrate cream and only to use the crotamiton lotion as directed. He also was given 2 more doses of ivermectin 18 mg weekly (200 µg/kg) for 2 weeks. Follow-up was scheduled for 2 months. The patient returned for follow-up and had notable improvement but continued to have background erythema; he was prescribed pimecrolimus cream 1% to apply twice daily and was later treated with intense pulsed light for residual erythema and to decrease follicular inflammation. His skin is now mostly clear.

Other potential treatments of *Demodex* folliculitis include lindane lotion, malathion lotion, and benzyl

benzoate lotion 10%.^{12,14,20,21} Oral metronidazole was shown to be effective in one case refractory to traditional treatments.¹⁴

Infectious folliculitis usually presents as erythematous, pustular, or ulcerated skin lesions.⁶ Common causes of infectious folliculitis are bacteria, fungi, and viruses. Although *Demodex* mites are considered to be an uncommon cause of folliculitis or other skin disease, *Demodex* folliculitis should be considered when a patient who is treated for a condition such as rosacea does not see a clinical response to traditional therapy.

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