

## Alopecia due to demodexis

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**Abstract:** Demodex is a common commensal mite of the pilosebaceous unit in human and animal (mammals). Alopecia is a loss of hair from the head or body and there are many type of hair loss with different symptoms and causes. This is a case report of a 30-year-old woman with hairless area in head. She had no families' history of alopecia or autoimmune disease. There was no significant improvement after 1 year routine treatment for her alopecia. She had a domestic pet (Hamster) and she announced that her hamster has slept in her bedroom (her bed). We taken scales from hairless area and examined it under microscope and the hamster skin was also examined. In microscopic direct examination of her scalp observed many demodex in two species *D. folliculorum* and *D. cricetuli* and only *D. cricetuli* in her hamster. She was treated for demodexis and after about 2 months her hair re grown. The some common symptoms of demodicosis are: redness of skin, itch, loss of eyelashes and eyebrows. Demodexis may play a pathogenic role when they are in large numbers, or there is an immune suppression. In present case after a long time treatment by local and systemic corticosteroid therapy immune suppression was acquired and the hairless area developed. Therefore we can conclude the demodex cause to hairless in some condition. In some studies loss of eyelashes and eyebrows were reported due to demodex but there is any report about scalp hair loss. So this patient is a specific case of demodexis.

**Keywords:** Demodex, pilosebaceous, aleopcia.

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### INTRODUCTION

In some study the unusual locations of demodex include scalp, breast, penis and exterior sebaceous glands at cheek were reported. Demodex is a genus of parasitic mites of arthropoda (class Arachnid and order Acarina) that live in or near hair follicles of mammals [1,2]. These parasites are tiny and cigar-shaped. Demodex can multiply opportunistically and cause infection in immune suppression individuals and also found positive correlation duration of treatment with topical steroids [3, 4]. An interesting theory is that the mites produce immunologic suppressants that help them survive in the host [5]. Demodex spp. transmitted by direct contact (direct contact with a person who has infection) and most probably by dust containing eggs, toilet material and else [6]. Considering close relation between human and domestic animals, probably these (animals) hosts are primary source of infection and transmission [3].

Alopecia is a loss of hair from the head or body. Alopecia is one of the most common complaints among all patients consulting a dermatologist. There are many type of hair loss with different symptoms and causes. The most common forms of non scarring alopecia are androgenic alopecia, telogen effluvium,

and alopecia areata. The patho physiology of such disorders may include infectious, nutritional, congenital, autoimmune, or environmental causes. Alopecia areata (AA) is a relatively common patchy non scarring hair loss condition. Of the world population, 1.7% is suffering from alopecia areata at some point in their lives [7, 8, 9].

### CASE REPORT

A woman 30-year-old referred to a mycology lab in Tehran with a large hairless area that suspected fungal infection. She was treated for alopecia areata by sub cutaneous topical corticosteroids injection but she complained the hairless area expanded and there was no significant improvement after one year. Therefore her doctor suspected fungal infection because she had a domestic pet (Hamster) and she announced that her hamster has slept in her bedroom. We taken scales from hairless area in her scalp and examined under a microscope, we saw many demodex (*D. folliculorum*, *D. cricetuli*) so our observation reported to her doctor. Also her hamster was examined and a few demodex were detected that they were *D. cricetuli*. However hamster hadn't clinical signs.

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The patient was treated for demodexis with lindane shampoo ( lindane-gilaranco 1% ) for 2 months, and after that in second microscopic examination the number of demodex decreased and re grown of hairs were seen, hence the doctor continued treatment for her demodexis. The patient was treated for demodexis from 2014 January 23 until 2014 December 7. She referred to medical (mycology) lab 5 times and every time the number of demodexis decreased and new hair growth increased. In last time her specimen were seen and any demodex was seen and her hair growth improve.

## DISCUSSION

Scalp hair loss due to demodex is an unusually (uncommon) case. The extent of Demodex colonization in the human population is high (20–80 %), and reach to 100% in elderly people [10, 11]. Demodicidae mites belong to family Demodicidae. All Demodex spp are parasites of mammals. This ectoparasites are common commensal microorganisms of the pilosebaceous unit in human and animal (mammals) that they like some cutaneous micro organisms, take on different roles depending on host condition change from commensals (or even mutuals) to parasites as the host's defence are altered. This may happen when the immunological conditions of the host change and new environmental conditions on the skin facilitate the development of demodex mites. The demodexis is relation to clinical sign that in this state demodex play a pathogenic role that they are in excessive numbers or penetrating into the dermis [2, 5, 12,11,13,14, 15].

Animals especially pet (dog, cat), farm animals (horse, cattle, sheep, goat, pig, rabbit), wild animals (elk, deer), rodent (hamster, rat, mice) and bat can be a carrier of demodex [11]. Our Patient had a domestic pet (Hamster) and her hamster has slept in her bedroom so it could be as a source. In our case we saw 2 species of demodex in her scalp, one *D. folliculorum* that is the most common species of human beings and is mainly found in facial hair follicles and sebaceous follicles and the other *Demodex criceti*, a mite that is a resident of the epidermis of hamsters [16, 17].

The demodexes use the chelicerae to cut the epithelial cells of the host skin, secrete lytic enzymes for pre-oral digestion; they live inside the sebaceous glands and hair follicles, sucking nutrients from the hair roots. After mating they burrow into the skin, laying eggs and infection to the skin. The irritation and hypersensitivity seen to result from excretions, which the female deposit in the skin as they burrow and oviposit. Secondary bacterial infections may also occur, probably as a result of scratching. Also bacteria were found inside and on the surface of demodex mites. Some of them, such as staphylococcus, produce exotoxins that can be due to a host immune reaction. These processes destroy the epithelial cells.

Interestingly, Demodex hasn't an anus so the mite is unable to eliminate their feces, their abdomens expand, and the feces are expelled in the follicle when the mite dies and decays. The great number of mites, the great eventual number of dead mites with decaying bodies and the large volume of feces can trigger inflammation and subsequent immune response and damage [2,18,19, 20].

In other hand Demodex can produce the lipase enzyme which is necessary for Demodex to digest the sebum it feeds on. Induction of inflammation was acquired by the presence of an immune-active lipase in demodex [21]. Sebaceous glands that active under the influence of dihydrotestosterone, in demodexosis producing oils at a faster rate and, hence, become a more suitable environment for live and high colonization of demodex. So in high infection and Sebaceous glands of hair follicles become larger and more active for producing oils at a faster rate that it caused to weaken the hair root and, finally hair less.

Dolence said that the high mite density found in the people group can be attributed to the immunosuppressive action of topical steroids [4]. In our case after treatment by corticosteroid the hairless area developed. In this case decrease falling hair was followed with decrease number of demodex and regrown of hair were seen in scalp.

Our aim in this case report is pay attention to hairless due to demodex. Demodex can be one of second factor (co factor) in falling hair and one of main factor in resistant to cure alopecia and the other disorder that lead to hairless, if experts want to acquire better result.

## REFERENCE

1. Yong, Ed (August 31, 2012). "Everything you never wanted to know about the mites that eat, crawl, and have sex on your face". Not Exactly Rocket Science. Discover. Retrieved April 24, 2013.
2. Lu Gang ; Human Parasitology , 4th Edition, July 20, 2012.
3. Youssefi MR, Tabari Pour R, Rahimi MT; Prevalence of Demodex Mites (Acari: Demodicidae) Parasitizing Human in Babol, North of Iran, Academic Journal of Entomology 2012; 5 (1): 62-64.
4. Dolenc-Voljc M, Pohar M, Lunder T; Density of Demodex folliculorum in perioral dermatitis. Acta Derm Venereol 2005; 85: 211-5.
5. Lacey N, Raghallaigh SN, Powell FC; Demodex mites – commensals, parasites or mutualistic organisms? Dermatology. 2011; 222(2):128-130.

6. Czepita D, Kuzna-Grygiel W, Czepita M, Grobelny A; Demodex Folliculorum and demodex Brevis as a cause of chronic marginal blepharitis, *Annales academiae medicae stetinensis roczniki pomorskiej, akademii medycznej W SZCZECINIE*, 2007; 53(1): 63–67.
7. França K, Rodrigues TS, Ledon J, Savas J, Chacon A; Comprehensive Overview and Treatment Update on Hair Loss, *Journal of Cosmetics, Dermatological Sciences and Applications*, 2013; 3: 1-8.
8. Puri N; Recalcitrant widespread alopecia areata in a child treated successfully with oral methyl prednisolone plus therapy, *nasza dermatologia online our dermatology online*, 2013; 4(3): 316-318.
9. Otberg N; Systemic treatment for alopecia areata, *Dermatologic Therapy*, 2011; 24: 320–325.
10. Elston DM; Demodex mites: Facts and controversies. *Clin Dermatol* 2010; 28: 502-504.
11. Jarmuda S, Reilly NO, aba RZ, Jakubowicz O, Szkaradkiewicz A, Kavanagh K; Potential role of Demodex mites and bacteria in the induction of rosacea, *Journal of Medical Microbiology*, 2012; 61: 1504–1510.
12. Bielenin I, Białczyk E; Infestations of demodicids (Demodicidae, Acarina) and their economic, sanitary and epidemiological significance. *Przegląd Zoologiczny*, 1993; 37: 187–197.
13. Dahl MV, RossAJ, Schlievert PM; Temperature regulates bacterial protein production: possible role in rosaceous. *JAM Acad Dermatol*, 2004.
14. Whitfield M, Gunasingam N, Leow LJ, Shirato K, preda V; Staphylococcus epidermidis : a possible role in the pustules of rosacea, *JAM Acad Dermatol* 2011; 64: 49-52.
15. Kojima T, Ishida R, Adan Sato E, Kawakita T, Ibrahim OMA, Matsumoto Y, Kaido M, Dogru M; In Vivo Evaluation of Ocular Demodicosis Using Laser Scanning Confocal Microscopy, *Investigative Ophthalmology & Visual Science*, 2011, 52(1).
16. Jahns AC, Alexeyev OA; Direct visualization of a gravid Demodex mite in human skin biopsy, 2012, *JDDG*.
17. Karaer Z, Kurtdele A, Ural K, Sari B, Cingi CC, Karakurum MC, Haydardedeoglu AE; Demodicosis in a Golden (Syrian) hamster (*Mesocricetus auratus*), *Ankara Üniv Vet Fak Derg*, 2009; 56: 227-229.
18. Wesolowska M, Knysz B, Rich A, Blazejewska D, Czarnecki, pozowski A, Mosouk-Hojlo M; Prevalence of demodex spp. In eyelash follicles in different populations, 2012, *Arch Med Sci* 2014; 10(2): 319-324.
19. Freitas Yamashita LSD, Cariello AJ, Ali Geha NM, Zorat Yu MC, Hofling-Lima AL; Demodex folliculorum on the eyelash follicle of diabetic patients, 2011, *Arq. Bras. Oftalmol.* vol.74 no.6 SãoPaulo Nov/Dec.2011
20. O'Reilly N, Bergin D, Reeves EP; Demodex-associated bacterial proteins induce neutrophil activation. *Br J Dermatol.* 2012; 166(4): 753-760.
21. Jimenez-Acosta F, Planas L, Penneys N; Demodex mites contain immuno reactive lipase. *Arch Dermatol.* 1989; 125: 1436–7.