



Papulopustular demodicosis: a case report

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ABSTRACT

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Primary demodicosis is an infestation of *Demodex* colonization >5 mites/cm² without pre-existing or concomitant inflammatory skin disease. Primary demodicosis is divided into 3 variants i.e. spinulata, papulopustular and nodulocystic. Several topical and systemic agents are used in the *Demodex* facial treatment. A 22 y.o. man complained of acne on his face three months ago. On physical examination, there were pustules, multiple erythematous papules, ice pick atrophic scars, and box and rolling scars. KOH examination found the *Demodex* number > 5 mites/cm². No spores were found. The patient received oral and topical metronidazole therapy. Papulopustular demodicosis is a follicular inflammation caused by *Demodex* mites. The inflammatory stage shows a predilection for the perioral, periorbital, and periauricular regions. According to the pattern of morphology and localization of the centropacial area, some cases of demodicosis are often referred to as Rosacea-like (rosaceiform) demodicosis. The treatment goals are to reduce the overall number of mites and treat the underlying condition. This paper reports a case of papulopustular demodicosis of the face. The diagnosis was made by history taking and physical examination using the diagnostic criteria for demodicosis. Clinical improvement was obtained after oral and topical metronidazole therapy for two weeks.

ABSTRAK

Demodikosis primer adalah infestasi kolonisasi *Demodex* > 5 tungau/cm² tanpa disertai penyakit kulit inflamasi yang sudah ada sebelumnya atau bersamaan. Demodikosis primer dibagi menjadi tiga varian yaitu spinulata, papulopustular dan nodulokistik. Beberapa agen topikal dan sistemik digunakan dalam perawatan *Demodex* wajah. Laki-laki 22 tahun mengeluh jerawat di wajah sejak 3 bulan yang lalu. Pada pemeriksaan fisik, dijumpai tampak pustula, papula eritem multipel dan tampak scar atrofi tipe *ice pick*, *box scar* dan *rolling scar*. Pemeriksaan KOH didapatkan jumlah *Demodex* >5 , tidak didapatkan spora. Pasien mendapat terapi metronidazole oral dan topikal. Demodikosis papulopustular merupakan peradangan folikel akibat tungau *Demodex*. Tahap inflamasi menunjukkan predileksi pada daerah perioral, periorbital dan periauricular. Menurut pola morfologi dan lokalisasi yang mengenai area sentropacial beberapa kasus demodicosis sering disebut juga sebagai *Rosacea-like* (rosaceiform) demodikosis. Tujuan pengobatan adalah untuk mengurangi jumlah tungau secara keseluruhan dan untuk mengobati kondisi yang mendasarinya. Makalah ini melaporkan satu kasus papulopustular demodikosis pada wajah. Diagnosis ditegakkan dengan anamnesis dan pemeriksaan fisik menggunakan kriteria diagnosis untuk demodicosis. Perbaikan klinis didapatkan setelah terapi metronidazole oral dan topical selama 2 minggu.

Keywords:

demodicosis;
Demodex;
rosacea-like;
papulopustular;
metronidazole

INTRODUCTION

Demodicosis is a skin infection caused by *Demodex* sp. colonization around hair follicles or sebaceous glands in the skin. Two species of *Demodex* sp. have been identified in humans, namely *Demodex folliculorum* and *D. brevis*.^{1,2} This mite feeds on epidermal cells and sebum components so that it can be found in every area of human skin rich in sebaceous glands, namely the face, cheeks, forehead, and chin, and Meibomian glands in the eyelids.^{1,3} The mite population increases with age, reaching a peak in the fifth and sixth decades of life.⁴ *Demodex* is a typical skin parasite with a prevalence ranging from 20 to 80% and a density of <5 mites/cm².^{3,4}

The incidence of *Demodex* infestation in healthy persons ranges between 23 to 100%. There were only 5 cases of demodicosis reported during 2013-2014 in Solo, Indonesia.⁵ Demodicosis is frequently misdiagnosed due to its various clinical characteristics, despite the fact that demodicosis is a normal facial flora. There are two clinical variants of demodicosis: primary and secondary.⁶ Primary demodicosis is an infestation of *Demodex* colonization > 5 mites/cm² without preexisting or concomitant inflammatory skin disease.^{6,7} Primary demodicosis is divided into three variants i.e. spinulata, papulopustular and nodulocystic. Secondary demodicosis is associated with an abnormal increase in *Demodex* mites in patients with cutaneous or other systemic disease and immunosuppression.⁷

Demodicosis is characterized by pruritic, erythematous, and papulopustular lesions. The inflammation-associated erythema disappears after mite treatment, and the lesions diminish with normalization of skin *Demodex* density.⁸ Several topical and systemic agents are used for treating facial *Demodex* treatment. The most

commonly used topical treatments are crotamiton, ivermectin, permethrin, and sulfur-sodium sulfacetamide, while the preferred systemic agents are ivermectin, metronidazole and doxycycline.⁹

This paper reported a case of papulopustular demodicosis of the face. This case report aimed to increase awareness and enhance the recognition of the clinical manifestations of demodicosis, thus preventing misdiagnosis and subsequent long-term medication errors. The discussion focuses on problems of diagnosis and management.

CASE

A male in his 20s presented with acne on the face. The initial lesion was a pimple on the chin three months ago. The lesions are itchy and sometimes painful. The acne has been getting worse since using a mask with scuba material. Masks are often used repeatedly between a few days to weeks. The patient was consulted by a general practitioner on the diagnosis of acne and was given oral and topical medication, but there was no change.

None of his family had the same lesions. There was no history of allergies and atopy. History of consumption of immunosuppressant drugs was denied. There were pustules, multiple erythematous papules, ice pick atrophic scars, box scars, and rolling scars over the face, especially the malar, glabellar, and mandibular (FIGURE 1).

There were multiple erythematous papules and pustules on both cheeks. Then there was no improvement after being diagnosed and treated with acne vulgaris, so the diagnosis of demodicosis was considered. The differential diagnosis included papulopustular demodicosis, papulopustular acne, rosacea, and *Malassezia folliculitis*. Woods lamp examination revealed a golden yellow fluorescence (FIGURE 2).



FIGURE 1. The patient's face prior to treatment, showed pustules and multiple erythematous papules, ice pick atrophic scars, box scars, and rolling scars in the malar, glabellar and mandibular regions.

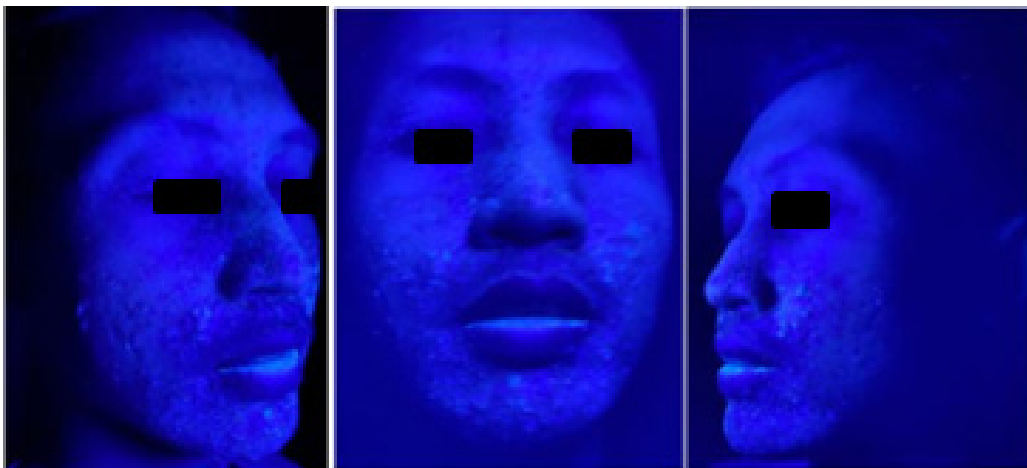


FIGURE 2. Wood's lamp examination revealed a white, partially golden yellow fluorescence.

The results of the KOH examination showed *Demodex* number > 5, and no spores were found (FIGURE 3). The patient was diagnosed with papulopustular demodicosis. The patient was given oral therapy with metronidazole tablets 500 mg b.i.d and a topical cream

consisting of 250 mg metronidazole tab, 5 g clindamycin phosphate 1% gel, and 7.5 g nicotinamide 4% b.i.d. After two weeks of treatment, the patient's skin abnormalities gradually subsided, and 1-2 *Demodex* mites were found on KOH examination.

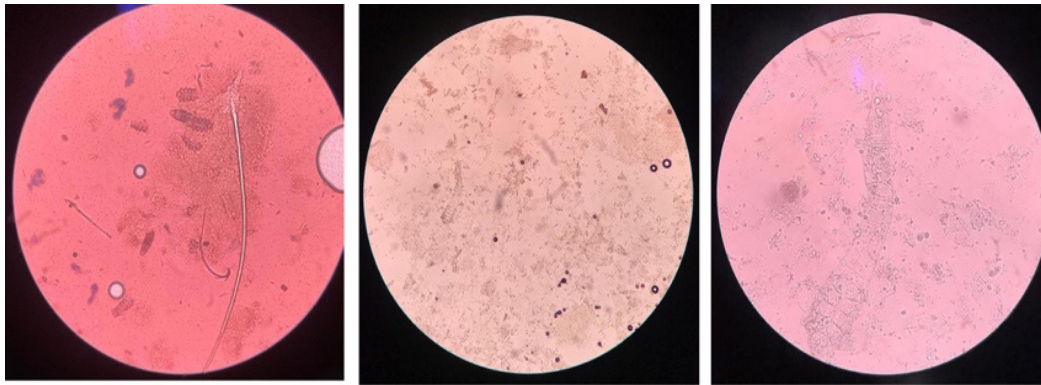


FIGURE 3. KOH examination showed *Demodex* count >5, no spores were found



FIGURE 4. Patient's face after therapy, showing atrophic erythematous scar of the ice pick type, box scar, and rolling scar in the malar, glabellar and mandibular regions,

DISCUSSION

Jakup Henle first reported *Demodex* mites in 1871. *Demodex* mites belong to the family Demodicidae. *Demodex folliculorum* and *D. brevis* are two types of *Demodex* mites in human skin and follicles.³ Both parasites can be found in every area of human skin, with a predilection for the facial area, especially the forehead, cheeks, nasolabial folds, and nose, due to the high density of the sebaceous glands in this area.⁴ *Demodex* mites can be found on normal skin with a density of <5 mites/cm². Males were usually more infested than females.^{3,4,6} It is caused by male's androgen-induced increase in sebum production. It's important to highlight the impact of

exogenous lipids applied in cosmetics on the growth of *Demodex* mites.⁴

The diagnosis of demodicosis or *Demodex* infestation is considered when clinical signs or symptoms are present and if there are more than 5 mites/cm² or when the mites penetrate the dermis.^{3,10} There are two clinical variants of demodicosis: primary and secondary.⁶ Primary demodicosis can be defined when it fulfills the following diagnostic criteria: (i) absence of pre-existing or concomitant inflammatory skin disease, such as acne, rosacea, or perioral dermatitis; (ii) abnormally increased mite colonization, which should be identified from active lesions at the time of examination; and (iii) remission of disease only after adequate treatment

with topical or systemic acaricides/arachnicides,¹¹⁻¹³ but not with antibiotics that have an anti-inflammatory effect, such as tetracycline or doxycycline, or macrolides.⁶ Secondary causes of demodicosis are associated with an abnormal increase in *Demodex* mites in patients with cutaneous or another systemic disease, often with immunosuppression, and most commonly present as papulopustular lesions.⁷

Primary demodicosis is clinically characterized by a late-onset, usually occurring after the fourth decade, and particularly among the elderly population. The predilection is mainly on the face, typically involving the periorificial area (perioral, periorbital, or periauricular). The distribution of the lesions is asymmetrical, grouped in an irregular shape with satellite lesions in the affected area and involving the follicles. Symptoms can range from asymptomatic to slightly itchy. Affected patients usually do not exhibit the classic manifestations of rosacea, such as erythema, transient flushing, or telangiectasia. In contrast, secondary demodicosis may occur early and show a more diffuse facial distribution or truncal involvement with more extensive inflammation. There is a past medical history of perioral dermatitis or rosacea.⁶

Primary demodicosis is categorized into three variants: spinulate, papulopustular, and nodulocystic.⁷ Spinulate demodicosis, now known as *pityriasis folliculorum*, displays an indistinct, smooth, whitish, slightly yellowish, pointed appearance primarily on facial sebaceous hair follicles, which are isolated but clustered, with or without slight erythema and mild inflammation. This is probably caused by the tail of the mite (opisthosoma of *Demodex*). *Demodex folliculitis*, which means inflammation of the follicles due to *Demodex* mites, can be morphologically

divided into the following patterns: papulopustular, nodulocystic, and conglobate, which describe abscess-like lesions. The inflammatory stage shows a predilection for the perioral, periorbital, and periauricular areas.⁷ According to the morphological pattern and localization of the centropalpebral area, some cases of demodicosis are often referred to as Rosacea-like (rosaceiform) demodicosis.¹⁴

The differential diagnosis primarily includes papulopustular demodicosis, papulopustular acne, rosacea, and *M. folliculitis*. This case met the criteria for the diagnosis of primary demodicosis. Papulopustular lesions with satellite lesions in one affected area and involving the follicles in the perioral, malar, and forehead areas without a history of previous inflammatory skin disease and demonstrating an excellent response to treatment, present a profile consistent with papulopustular demodicosis. In addition, the KOH examination on lesion scrapings showed the number of *Demodex* mites $> 5/\text{cm}^2$, confirming the diagnosis of papulopustular demodicosis.

Scuba masks that are used repeatedly without being washed aggravate acne in patients. Masks can cause friction, create a stifling feeling, and increase temperature, hydration, and humidity. Humidity can accumulate when wearing a face mask, affecting the skin barrier and potentially leading to superinfection.¹⁵⁻¹⁷ Excessive hydration tends to cause skin dysbacteriosis and breakdown of the skin barrier. Sebum secretion rises in response to an increase in temperature.^{15,18}

Treatment of demodicosis has so far been based on single case reports and is only weakly supported by evidence. The treatment goals are to reduce the overall number of mites and treat the underlying condition, such as periorificial dermatitis if present.^{6,8,10} Many treatments and regimens have been reported to be effective. Ivermectin

is acaricidal and is the treatment of choice for demodicosis in dogs and humans. The recommended oral dose of ivermectin for the treatment of demodicosis in humans is 0.2 mg/kg single dose. However, other topical acaricides, such as permethrin 5%, benzyl benzoate 10-25%, crotamiton 10%, lindane 1%, or malathion 0.5%, while approved for the treatment of scabies, their efficacy for the treatment of demodicosis is very limited based on current evidence. The superiority of topical benzyl benzoate 10% in killing *Demodex* mites has only been demonstrated in a small number of patients. Treatment of rosacea with low-dose systemic tetracycline or macrolide antibiotics, topical azelaic acid 15-20%, or topical metronidazole 0.75-2% is supposed to have anti-inflammatory or acaricidal effects. The hypothesis that tetracycline drugs may affect the proliferation of *Demodex* mites by targeting the endosymbiotic *B. oleronius* remains to be confirmed.⁶ Such treatment failure is not uncommon in native primary demodicosis. The optimal dose of systemic metronidazole in treating demodicosis remains to be determined and should be compared with ivermectin.^{6,8}

Jacob *et al.*⁸ reported that the most effective treatment was permethrin 5% once a week for 2-4 weeks, followed by metronidazole cream for maintenance. Metronidazole cream was added in cases where periorificial dermatitis was present. Compliance is essential for complete resolution. Relapse is common, and retreatment may be necessary. In this case, the patient was treated with oral metronidazole and a metronidazole compound, and clinical improvement was noted after two weeks of treatment. The administration of a topical metronidazole compound made from metronidazole tablets was because its preparation was not available in Indonesia. This metronidazole treatment meets the diagnostic criteria for

demodicosis of disease remission only after adequate treatment with topical or systemic acaricides/arachnicides,^{11,13,14} but not with antibiotics that have an anti-inflammatory effect, such as tetracycline or doxycycline, or macrolides.

CONCLUSION

Demodicosis is a common skin disorder that dermatologists commonly misdiagnose or underdiagnose. This is a case report of papulopustular demodicosis presenting erythematous papules and pustules on the centropacial face. The diagnosis was misdiagnosed as papulopustular acne, rosacea, and *M. folliculitis*. Multiple *Demodex* mites were detected in pustules and rashes on both cheeks. Oral and topical metronidazole therapy is the preferred course of action in this situation. There was clinical improvement after two weeks of therapy.

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