



Review Article

SCABIES: SOURCES OF INFECTION, DIAGNOSIS AND TREATMENT OPTION

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Abstract

One of the major infestations, the human scabies, is distributed all over the world with variable presentation and impact based on clinical situation. Also, being one of the skins ectoparasitic infestations via mite *Sarcoptes scabiei*, the scabies, is a critical issue with high importance in elderly people due to the distinctive vulnerability factors. Those factors involve decreased mobility, complexity with implementations of specific treatments and residency in grouped living facilities. The scabies' diagnosis might be complicated, since many dermatologic diseases might be closely resembled *via* such condition. Complicating such group's diagnosis has many medical properties where such patients are assessed, a few of them might be equipped for following the diagnostic guidelines. By itself, the diagnosis might be complicated due to the mite burden and clinical presentation. Lastly, the scabies' transmissibility, particularly in the grouped living arrangements, provides proper and prompt treatments of such condition paramount. In terms of clinicians providing treatment for patients, all such factors might be challenging. The aim of this study is describing the clinical presentation, susceptibility factors, management and diagnosis considerations. Furthermore, scabies is one of the main dermatological problems handled via family physicians, general physicians and dermatologists. Also, scabies shows in many forms in various individuals. Scabies treatments witnessed development with the emergence of novel treatment plans and anti-ectoparasitic drugs. The drugs advent, like ivermectin and permethrin has revolutionized treatments. Scabies management not just involve the prescription of drugs, yet to properly educate patients regarding the drug's application method. The failures in treatment might be caused by many reasons and should be appropriately managed.

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1. Introduction

Scabies can be defined as a parasitosis resulting from mite *Sarcoptes scabiei* var *hominis*, with the crusted scabies are further contagious compared to conventional scabies due to the large mite burdens. Primarily, scabies is identified in

overcrowded and poor conditions, yet it might be affecting people of all socioeconomic status and ages in terms of the hygiene level (Cheng *et al.*, 2020). In addition, the predominant manifestations of the disease were mediated *via* hypersensitivity and inflammatory reactions to mite products and mites. Also, the hallmark of infestation involves popular rash and intense itching. Efficient control of scabies needs treatments of affected individuals, their closed contacts, along with

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environmental fomites. It has been hard achieving the control due to the missed or delayed diagnosis, inappropriate treatment and application of medication (Bhat *et al.*, 2017).

2. Clinical Presentation

There are 3 major clinical scabies presentations: nodular, crusted and classic. The major form, classic ones, creates symptoms of irritability, fatigue, severe pruritus (more severe throughout the evenings), and, in a few affected individuals, fever from the cellulitis or secondary impetigo. In the classic scabies, there is low parasite burden. In terms of classic scabies, the lesions of skin have a predilection with regard to the inter-digital web spaces that are related to hands, wrists' flexor surfaces, elbows' extensor surfaces, axillae, genitalia, periumbilical skin, whereas crusted scabies happens in the immunocompromised patients, like the ones on the immuno-suppressive therapies of long term (recipients of organ transplant) or the ones with human T-lymphotropic virus type-1 or HIV infections (Jannic *et al.*, 2018). In addition, other groups who have susceptibility were patients with a physical or mental handicap, like the ones with paralyzed limbs, leprosy, or sensory neuropathy, since they might have no ability for feeling a scratch or itch. Even though the crusted scabies resulting from the same mite which results in typical scabies, density of mite in the crusted type of scabies is more and might be ranging from thousands to millions for each one of the patients, in comparison with dozen of mites or so, generally identified in the typical scabies. Furthermore, patients who are affected by the crusted scabies are posing a dilemma of treatment due to the eradication of mite as well as egg burden from the skin areas that are heavily-crusts has been complicated. One of the uncommon variants is nodular scabies, specified *via* the very pruritic reddish brown nodules with size of about 2 cm commonly identified on buttocks, genitalia, axillae and groin. Sometimes, patients are demanding repeat therapies by the scabicides, while extremely aggressive repeat therapies should be tempered by the assurance that nodules will be ultimately

resolved with suitable anti-inflammatory therapies (Engelman *et al.*, 2020).

3. Transmissions and Impacted Contacts

Symptoms and signs of Scabies infestation might develop 4 – 6 weeks following the initial mite exposure. Theoretically, scabies might be contracted through transferring larvae, mature mites or eggs to new host's skin; yet, the mature mites were majorly culprits. The direct contact of the body has been the main route to transmit scabies, also the number of the mites of scabies has been directly proportional to the transmission risks (Bernigaud *et al.*, 2019), as happens when children are sleeping in the same bed or throughout sexual intercourse. Furniture, clothing, bedding, and other environment resources might be acting as fomites, particularly in the crusted type of scabies. It is common to have transmission between family members, verified via evidences from molecular studies showing the mites' genotype from family members was further homogeneous in comparison to the mites' genotypes from separate families in community (Woloski *et al.*, 2018).

4. Diagnosis

Largely, the scabies diagnosis has been carried out upon clinical grounds. Also, the indication of very itchy rashes, sometimes being worse in the evening, has been supportive, while a contact history with recognized cases sometimes exists. The examination might report lesions of skin in common distribution. There might be many approaches for diagnosing scabies: dermoscopy, burrow KOH scraping, digital photography magnifications, clinical presentation and biopsy of the skin, which generally involves itchy red papules as well as contacts with a comparable rash (Chandler and Fuller, 2019). Close examinations with hand-held dermatoscope are allowing excellent visualization regarding curvi-linear scaly burrow, while the actual mite might be indicated at burrow's end as triangular dark structure, conforming with the anterior legs and pigmented head of scabies mite. Furthermore, the emerging larvae is escaping through the burrow's roof and

move close to skin surface, in which they burrow out small pockets as well as moult to following phase of the development.

Other non-invasive methods of imaging were utilized, such as video dermatoscopy as well as reflectance confocal microscopy, which is providing more thorough study of mite. In addition, the parasitological confirmations might be acquired through gently scraping of skin for removing the mite which might be after that put on glass slide and observed within microscopy of low power (Chandler and Fuller, 2019). The reliability and sensitivity of such approach is limited and needs expertise. Skin scraping might be tolerated poorly, especially *via* young patients. Furthermore, the diagnoses of “suspected” and “clinical” scabies depends upon detections that are related to common lesions of the skin in the characteristic distributions, which are supported through the main features in the history. There were no standardised laboratory tests provided to diagnose scabies (Chng *et al.*, 2021). Many possible antibody and antigen immunoassays were assessed, yet such tests’ performance was sub-optimal, and no one was adopted widely, up-to-date molecular approaches might be offering solutions. Traditional targeting of the PCR to mitochondrial cytochrome c oxidase sub-unit 1 (cox-1) gene that is related to *S. scabiei* was formerly utilized for diagnosing the infestation with scabies; yet, the positive rate of diagnosis has been extremely low to offer good outputs (Wong *et al.*, 2014).

5. Treatment Principles

Choosing the treatment of scabies depends on efficiency, possible toxicity, disease type and age of patient. Generally, there are no randomized controlled tests, checking the effectiveness of topical treatment of scabies with regard to crusted scabies, the crusts might be harboring thousands of mites (Diepgen *et al.*, 2015). Keratolytics must be added to the routine of the treatment till resolving hyperkeratosis. Crusted scabies cases are requiring more re-treatment cycles compared to traditional scabies. Even though judgments regarding therapy depends on scale burden and

clinical assessment of mite (Yari *et al.*, 2017). There are no symptoms when an individual gets scabies for the first time. Typically, symptoms might develop in 4 - 6 weeks following being infested; yet, they might be still spreading scabies throughout such time. Along with the infested individual, treatments are suggested for sexual contacts and family members, especially the ones with direct prolonged skin on skin contacts with an infested individual (Sunderkötter *et al.*, 2016). Close personal and sexual contact with prolonged direct skin to skin contacts with infected individual throughout the previous month must be observed and treated. All individuals must be treated simultaneously for the purpose of preventing any re-infestation. Sometimes, scabies in adults might be acquired sexually. Towels, clothing and bedding that are utilized *via* infested individuals or their family, close and sexual contacts at any time throughout the 3 days prior to treatments must be de-contaminated when washing in the hot water as well as drying by a hot dryer, through dry cleaning, or through sealing in plastic bags for minimum of 72 hrs (Boyd *et al.*, 2012). Generally, mites of scabies won’t be capable of surviving for over 2 - 3 days away from the human skin. In addition, scabicide cream or lotion must be utilized to all body parts from the toes and feet up to the neck. In the case when treating young children and infants, scabicide cream or lotion should be utilized to their whole neck and head since scabies might be affecting their neck, scalp and the rest of their body. The scabies symptoms are because of the hypersensitivity reaction (i.e. allergy) to mites as well as their feces (i.e. the scybala), itching remains for many weeks following treatments, even in a case when the eggs and mites are killed. In the case when itching remains for over 2 to 4 weeks following treatment or in the case when new burrows or pimple-like rash lesions keep appearing, retreatments might be needed (Collins, 2019). The treatment of scabies involves scabicial agent’ administration (lindane, permethrin or ivermectin), and suitable antimicrobial agent in the case when secondary infection was developed. Many modalities of treatment were utilized for a long time, yet the

search for optimum scabicide is continuing. An optimum scabicide must be efficient against egg and adult, applicable with ease, non-sensitising, nontoxic, non-irritating, and economical; it has to be applicable to all ages as well (Mila-Kierzenkowska *et al.*, 2017).

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