

New Method of Microscopic Diagnosis of Scabies Mites

A. T. Togaev^{1,*}, E. Kh. Eshboev²

¹Termez Branch of Tashkent Medical Academy, Termiz, Uzbekistan

²Republican Specialized Scientific and Practical Medical Center of Dermatovenerology and Cosmetology, Tashkent, Uzbekistan

Abstract Scabies is contagious and spreads through skin-to-skin contact. It occurs worldwide but is most common in low-income tropical areas. Children and older people in resource-poor areas are at higher risk. Diagnosis of scabies is based on clinical recognition of the typical features of infestation. The diagnosis of scabies can be supported by visual imaging techniques such as dermatoscopy or microscopy of skin scrapings from burrows, but this is generally not necessary, especially in highly endemic areas. Patients typically present with severe itch, linear burrows and papules around the finger webs, wrists, upper and lower limbs, and belt area. Infants and small children may have a more widespread rash, including involvement of the palms, soles of the feet, ankles, and sometimes the scalp. Inflammatory scabies nodules may be seen, particularly on the penis and scrotum of adult males and around the breasts of females. Because of the delay between initial infection and development of symptoms, scabies lesions may be seen in close contacts that have not yet developed itch.

Keywords Scabies, Epidemiology, Scabies mite, Diagnosis, Immersion oil

1. Introduction

Scabies is a very common parasitic disease among humans. More than 250-300 million people in the world get this disease every year. If the patients are not given timely medical care, scabies is not only infectious for others, but can also cause a number of secondary diseases (pyoderma, allergic dermatitis, urticaria and other dermatoses) [1,2,3,4,5,6,7].

Around 4200-5800 cases of scabies are recorded among the population of our republic every year. In 2010, the intensive index was 15.5 per 100,000 population, and by 2022, this index has increased and will be 16.9. 50.0-55.0% of them are children under 14 years old. According to the statistical data, the distribution and recording of the disease in the regions of our republic do not match each other very well. For example: during 2022, only 116 (6.1) scabies patients were counted from the Khorezm region, 201 (5.0) from Samarkand, and only 107 (4.0) from the population of Tashkent. On the contrary, 850 (26.9) patients were registered in Andijan, 12.52 (43.7) in Namangan, and 410 (47.6) in Syrdarya. The question of why the statistical indicators are so different in these regions, where the way of life, population, customs, climate and the development of medicine are very close to each other, certainly makes us all think. The answer to this question is closely related to the improvement of laboratory diagnostics and the knowledge of personnel in the field of laboratory. In order to know the

laboratory diagnosis, it is necessary to know well the morphobiological characteristics of the scabies mite, which is the causative agent of the disease [6].

Biomaterial for examination of scabies mite was taken in a special laboratory room. The room, used laboratory tools and equipment are frequently wiped with disinfectant solutions. A laboratory worker who wants to microscopically examine a scabies mite should know which areas of the patient have the most mites. For example, mites are found in many folds of the skin, where the stratum corneum is thick: on the edges of the palm, in the folds between the fingers, on the elbow, on the front wall of the armpits, around the edges of the heels and ankles, on the skin of the genitals, and on the skin of the female breasts [14].

Biomaterials from the patients were first scraped from the infected foci determined by the clinician on the basis of the doctor's referral, and then scrapings were taken from the elements of the rash, including blisters, nodules, and tick tracks. Each affected area was first cleaned with a gauze pad soaked in 70% ethyl alcohol. Sputum biopreparations were applied to the surface of the object glass with the same thickness. Then immersion oil, which is always available in the laboratory, was dripped on it. Then it was closed with a shutter. Before placing the drug in the field of view of the microscope, care was taken that its surface was flat. In the process of viewing, in the field of view of the microscope, cells of the epidermal corneal layer (flat cells without a nucleus, artifacts on the corneal layer) were visible. In most cases, they stick to each other and spread over a wide area. Erythrocytes from the cellular elements of the blood form red squares. On the contrary, the elements of pus are yellow and the collection of leukocytes is visible. Hair and loose fibers from underwear can also be seen [7,8,9,10].

* Corresponding author:

togayevaxror1990@gmail.com (A. T. Togaev)

Received: Nov. 5, 2023; Accepted: Dec. 5, 2023; Published: Dec. 8, 2023

Published online at <http://journal.sapub.org/ajmms>

In traditional methods, scabies mites can be found in preparations in 20-30% cases by mature specialists of the clinical laboratory of regional, city and inter-district dispensaries of skin-genital diseases [11,12,13].

In the laboratories of district medical associations, the detection of mites does not exceed 10-12%. Unfortunately, in most such laboratories, this indicator is equal to "zero". The reason is that they do not know how to find a tick. There is no question of identifying their eggs, larvae and excrement. That is why the main diagnosis by dermatovenerologists is determined based on the clinical picture of the disease. As a result, there are various misunderstandings with the employees of the Sanitary Epidemiological Peace and Public Health Service. They say that it is impossible to make a "diagnosis of scabies" if the tick is not found. As a result of these disagreements, epidemiological control of the disease remains difficult. Practicing doctors know that the incidence of scabies is several times higher than the statistics show. Defects in laboratory service play a special role in the occurrence of these problems.

We all know that bacteriological, serological, immunological and PCR analyzes are useless in determining the causative agent of scabies. One method is native microscopic examination of mites. However, it is worth noting that the detection rate of traditional methods used so far is very low [15,16,17]. Only highly experienced laboratory workers working in regional, city and inter-district dermatology clinical laboratories can find ticks in numbers. That is why disputes between clinical experts and laboratory workers in this regard have been going on for a long time.

Purpose of work. To develop of a new microscopic method for the detection of mites, the causative agent of scabies, by analyzing a series of methods.

2. Research Materials and Methods

In the process of implementation of the goal, biomaterials were taken from affected skin foci with the help of scarifications from 224 patients of different ages who were clinically suspected to have scabies in order to identify scabies.

3. Research Results

Microscopic studies of biopreparations obtained from skin foci infected with scabies mite were carried out in 224 patients of different ages (from 1 to 60 years) with clinical suspicion of scabies. The main group (using immersion oil) consisted of 112 patients, 89 of whom (79.5%) had scabies mites, larvae, eggs and excrement detected. Scabies mites were found in 34 (30.3%) of 112 patients examined in the control group (generally accepted methods). Thus, the detection rate of scabies mites, larvae, eggs and excrement increased by 2.5-2.6 times.

4. Conclusions

With the help of immersion oil, which is available in all laboratories, the excreta exposed to scabies mites, their larvae and eggs can be easily identified under the microscope, while they appear very clear and bright. Also, due to the use of immersion oil, other cell elements, for example, squamous epithelial cells, erythrocytes, leukocytes, are clearly visible in the field of view of the microscope.

The method is easy to perform, safe, painless, highly effective, convenient for all laboratories, quick and easy detection of the scabies pathogen, allows to increase the rate of detection of scabies mite in patients by 2-3 times compared to traditional methods. Diagnosis of scabies mites can also save biological disease. In order to train young doctors and laboratory assistants, scabies mite, larvae, eggs and excrement allow to store biopreparations for a long time. The method can be put into practice in a short period of time in all clinical diagnostic laboratories in the Health Care system.

REFERENCES

- [1] WHO informal consultation on a framework for scabies control, meeting report, WHO Regional Office for the Western Pacific, Manila, Philippines, 19–21 February 2019. <https://www.who.int/publications/i/item/9789240008069>.
- [2] Abdieva D. H. The prevalence of scabies in family irradiating foci: Abstracts of scientific papers of the International scientific and practical conference "Actual problems of dermatovenerology and aesthetic medicine (Tashkent, November 20-21, 2015) / D. H. Abdieva, M. S. Valieva, N. I. Dyrda // Dermatovenerology and aesthetic medicine. - Tashkent, 2015. - N3. - C. 199 (Volume 27).
- [3] Zhuchkov M.V., Bolshakova E.E., Sonin D.B., Masiyanskaya T.D. The use of dermatoscopy in the diagnosis of scabies: description of a clinical case//Dermatology. Appendix to the journal Consilium Medicum. - 2018. - No. 1. - pp. 49-50.
- [4] Kikineva Ya.V., Protasovitskaya R.N. Awareness of the population about scabies//: Chemistry, ecology and rational nature management. Materials of the International Scientific and Practical Conference. Ingush State University. - 2021. - pp. 125-129.
- [5] Malyarchuk A. P. The choice of tactics for the treatment of patients with complicated scabies: scientific edition / A. P. Malyarchuk, T. V. Sokolova // Clinical dermatology and venereology. - M., 2016. - Volume 15 N6. - C. 74-84.
- [6] Maslova A.V., Sapuntsova S.G. Clinical features of the course of scabies in children: Topical issues of modern medicine. Materials of the II Far Eastern Medical Youth Forum. Edited by E.N. Sazonova. - 2018. - pp. 115-117.
- [7] Rakhmatov A. B. Dermatoscopy in the diagnosis of scabies [Electronic resource] / A. B. Rakhmatov, M. K. Khaldarbekov, T. P. Rakhmatov. - Electron. text data.: [B. I.] //// Thesis collection of the National Congress on infectious diseases (Tashkent, March 24-25, 2022). - Tashkent, 2022. - pp. 58-59.

- [8] Rodin A.Yu. Modern clinical and epidemiological, diagnostic and therapeutic aspects of scabies // Bulletin of the Volgograd State Medical University. - 2021. - № 4 (80). - Pp. 180-184.
- [9] Belovol A.N., Tkachenko S.G. Entomodermoscopy as a modern method of diagnosis of scabies//Dermatology and venereology. - 2013. - № 4 (62). - Pp. 12-17.
- [10] Criteria of epidemiological significance of family foci in rare cases of scabies: scientific edition / T. V. Sokolova, Yu. V. Lopatina, A. P. Malyarchuk, K. M. Novolotskaya // Clinical Dermatology and Venereology. - M., 2021. - Volume 20 N3 (part 2). - C. 157-175.
- [11] Malyarchuk A. P. Scotch test in the diagnosis of scabies: international scientific and practical conference "The state and problems of dermatovenerology and cosmetology in the Republic of Uzbekistan", dedicated to the 90th anniversary of the skin and venereological service of the Bukhara region. Abstracts of scientific papers. (Bukhara, May 2-3, 2014) / A. P. Malyarchuk, T. V. Sokolova // Dermatovenerology and aesthetic medicine. - Tashkent, 2014. - Volume 21 N1. - C. 188-189.
- [12] Malyarchuk A. P. Factors determining the topic of scabies: scientific publication / A. P. Malyarchuk, T. V. Sokolova // Bulletin of Postgraduate medical education. - M., 2009. - N3-4. - C. 21-22.
- [13] Sokolova T.V., Malyarchuk A.P. Dermatoscopy is a non-invasive method of diagnosis and evaluation of the effectiveness of treatment of scabies // Clinical dermatology and venereology. - 2017. - Vol. 16. No. 2. - pp. 90-101.
- [14] Sokolova T.V., Malyarchuk A.P., Lopatina Yu.V., Lamotkin I.A., Ovsyannikova M.R. Metamorphosis of clinical manifestations of scabies // Problems of medical mycology. - 2020. - Vol. 22. No. 3. - p. 130.
- [15] Eshboev E. Kh. Analysis of the degree of detection of scabies in the Tashkent region: Collection of abstracts of the International scientific and practical Conference "Actual problems of dermatovenerology and aesthetic medicine" (Tashkent, September 10-11, 2021) / E. H. Eshboev, O. S. Imamov, A. A. Tastanov // Dermatovenerology and aesthetic medicine: scientific and practical journal / Republican Specialized Scientific and Practical Medical Center of Dermatology and Venereology of the Ministry of Health of the Republic of Uzbekistan, Association of Dermatovenerologists of Uzbekistan. - Tashkent: Niso Poligraf LLC. - 2021. - N 3. - C. 101-
- [16] Arora P, Rudnicka L, Sar-Pomian M, Wollina U, Jafferany M, Lotti T, Sadoughifar R, Sitkowska Z, Goldust M. Scabies: A comprehensive review and current perspectives. *Dermatol Ther.* 2020 Jul; 33(4): e13746. doi: 10.1111/dth.13746. Epub 2020 Jul 6. PMID: 32484302.
- [17] Scabies in the 21st Century: Past, Advances and Potentials. *Acta Derm Venereol.* 2020 Apr 20; 100(9): adv00112. doi: 10.2340/00015555-3468. PMID: 32207535.
- [18] El-Moamly AA. Scabies as a part of the World Health Organization roadmap for neglected tropical diseases 2021-2030: what we know and what we need to do for global control. *Trop Med Health.* 2021 Aug 16; 49(1): 64. doi: 10.1186/s41182-021-00348-6. PMID: 34399850; PMCID: PMC8366162.