

Vulvovaginitis due to *Enterobius vermicularis* in a girl and epidemic enterobiasis in her family

Lotfollah Davoodi¹, Eissa Soleymani¹, Ziaeddin Oladi¹, Shadi Shayestehazar¹, Fatemeh Parandin², Azadeh Mizani¹, Seyed Reza Mirbadie³, fatemeh Hajizadeh¹, and Mahdi Fakhar¹

¹Mazandaran University of Medical Sciences

²Kermanshah University of Medical Sciences

³Shahrood University of Medical Sciences

April 16, 2024

Introduction

Vulvovaginitis is inflammation of the vulvovaginal mucous membranes (1) that responsible of some of pediatric gynecology consultations (2). Prepubertal girls commonly experience a gynecologic issue, which is often characterized by symptoms such as vulvovaginal itching, discharge, irritation, burning or skin changes. The development of these symptoms is primarily influenced by anatomic, physiological, and behavioral factors specific to this age group (3). *Streptococcus pyogenes*, *Haemophilus influenzae* and *Enterobius vermicularis* emerge as the predominant pathogens, while fungal and viral infections exhibit lower occurrence rates (4). The presence of genital discomfort or a burning sensation during urination is often observed in cases of vulvovaginitis. This condition, which is more prevalent in prepubescent girls, can be caused by a deficiency of estrogen and poor local hygiene leading to infection of the vaginal mucosa. Despite the lack of precise data on its prevalence, these predisposing factors are known to contribute to the development of vulvovaginitis (3).

In addition, favor factors of development of this disease include local alkaline pH, thin labia minora and reactivated estrogen stimulus during the prepubertal period results in thinning of the vulvovaginal epithelium. Among prepubertal girls, the most common clinical presentation is nonspecific vulvovaginitis caused by endogenous vaginal flora (5). One of the most agents of vulvovaginitis is a parasite called *Enterobius vermicularis* (*E. vermicularis*) (4). This worm exhibits the most extensive geographical distribution among helminths (6). Its induced infection is a global phenomenon and is recognized as the most prevalent form of helminth infection (7). This condition is prevalent across all age groups and socioeconomic backgrounds, although it is particularly widespread among children between the ages of five and fourteen (8, 9). It is important to note that parasitic infections even in children may lead to malnutrition and decreased learning abilities (10). Embryonated eggs can be detected on various surfaces such as fingernails, clothing, house dust and other objects. Once these eggs are ingested, they undergo hatching within the stomach, giving rise to larvae.

These larvae then make their way to the cecum, where they undergo further development and eventually reach adulthood as pinworms, measuring approximately 1 cm in length. The gravid adult female worms exhibit a nocturnal migration to the perianal region, where they lay a substantial number of eggs, up to 11,000 in total. These eggs become infective within a relatively short period of time, approximately six hours after being deposited. The lifespan of *E. vermicularis* typically ranges from 11 to 35 days (8). Transmission of the infection takes place via direct transmission from an infected individual through the oral-anal route,

or through the dispersal of airborne eggs from contaminated clothing or bed linen. Upon ingestion, the eggs hatch and release larvae within the intestine (11).

Adult worms in girls may also infiltrate the vagina to release eggs and consequently leading to the development of vulvovaginitis. In 1980, Vaughan reported one of the first enterobiasis in direct observation of vaginal region (9, 12). Moreover, these worms possess the ability to invade the endometrial cavity, thereby inducing endometritis and salpingitis in affected patients (9). For diagnosis collection of eggs from infected area (anus or vagina) can be achieved through the use of the cellophane swab or scotch tape swab method. stool examination not be a reliable means of detecting eggs (13). Cases have been documented wherein this worm have traversed the entire of the reproductive system and penetrated the peritoneal cavity by means of the fallopian tubes (9). In this paper we presented a 4 years Iranian girl that suffered of vulvovaginitis caused by *E. vermicularis* . her family infected by this parasitic helminth too.

Case History/examination

An anxious and very nervous 4-yr-old girl that suffered from severe vaginal itching and burning was referred to Razi Hospital in Qaemshahr City in northern Iran. According to her parents, her older sister, who was 6 years old, refrained from playing with him due to the fear of exposure of infection. The patient's mother and sister did not have any sing and symptoms of enterobiasis, and only her father had a slight itching of the anus.

Methods (Differential diagnosis, investigations and treatment)

We doubted *E. vermicularis* and gave her scotch tape for sampling. We asked her parents to take samples from both her vagina and anus. To our surprise, in addition to the eggs, we observed the female adult worm under the microscope (**Figure 1**). We wanted of mother, father and sister of she to take samples by scotch tape tomorrow morning after waking up and before going to the toilet. Numerous of eggs were observed in the samples of all three of them. The size and shape of the eggs identified as *E. vermicularis* . Interestingly, the mother and older sister had *E. vermicularis* infection without any symptoms. Therapy was done by Mebendazole (100 mg, as single dose, next two week repeated) for all member of family. Our cases followed for 3 weeks that we found that all family was cured. In the 4-year-old girl symptoms related to severe anxiety and nervousness, as well as severe vaginal inflammation and itching and vulvovaginitis caused by *E. vermicularis* , were completely improved.

Conclusion

This infection is significant because it can easily spread to other family members (14), The transmission of infection through the fecal-oral route is the predominant mode of transfer among humans. Meanwhile, the eggs can persist viable on clothing and bedding for a period of two to three weeks, thereby enabling a convenient means of transmission within families and children's groups (8, 15). Physicians and society should not ignore this issue. To prevent *E. vermicularis* contamination, it is essential to consider disinfecting underwear and bed sheets. In kindergartens, the spread of this parasite should not be overlooked, and asymptomatic individuals who have been exposed to infected persons should be treated. In order to prevent and avoid the spread of enterobiasis, a periodic examination by Scotch test should be done in kindergartens A negative scotch test to check for *E. vermicularis* eggs does not rule out infection (16). The members of a family should be aware about transmission routes of it. It is necessary to treatment of all members of the family, such as the infected individual, concurrently. Additionally, it is crucial to educate both the patient and their family members on preventative measures to curb the spread of infection. Also, maintaining cleanliness and hygiene after toileting, particularly in girls who are more susceptible to *E. vermicularis* infection and subsequently vulvovaginitis, should be taken seriously (14).

Discussion

Infection caused by *E. vermicularis* outside of the intestines is infrequent, with the female genital tract being the primary site of involvement. Ectopic enterobiasis has been reported in various regions of the female genital tract, including the uterus, ovary, vagina, fallopian tubes, and pelvic peritoneum (17). Cytological

examinations have occasionally identified intestinal parasites that are responsible for vaginal enterobiasis. While enterobiasis is commonly believed to be asymptomatic or to only cause minor symptoms such as perianal itching, it is important to note that this parasite has the potential to cause severe and potentially life-threatening illnesses, and in some cases, even death (6). Non gastrointestinal manifestations of *Enterobius vermicularis* are such as pruritus vulvae, urinary tract infections, postmenopausal bleeding, epididymitis, pelvic mass, tubo-ovarian abscess, and generalized peritonitis (6, 11). The invasion of the endometrial cavity by *E. vermicularis* can result in the development of endometritis and salpingitis (9). It is crucial to avoid mistaking them for other types of parasitic ova, pollen grains, or tainted plant cells (9, 18). The dimensions of *Enterobiusvermicularis* eggs are 55 μ in length and 25 μ in width, with the width being half of the length (9). The presence of these characteristics aids in differentiating from other possible impurities that may be present in vaginal specimens, such as fibers, plant matter, fungi, and so on (19). Studies has shown that *E. vermicularis* has the ability to invade the urinary and vaginal tracts in female children, resulting in the development of vulvovaginitis (20). Our case was a 4-year-old girl who had severe vaginal itching caused by *E. vermicularis* and was highly anxious and nervous. The entire family was also infected with this parasite. enterobiasis is a widely recognized form of parasitic infection that affects children (21) with a prevalence about 17.2 % in Iran (22, 23).

Acknowledgements

We extend our sincere appreciation to the Razi Hospital affiliated with Mazandaran University of Medical Science for their valuable support in supplying us with the necessary data.

Data Availability

The data is accessible through the corresponding author and can be obtained upon request. **Declarations**
Informed consent was acquired from the patient and her family.

Conflict of interest

The authors declare that they have no conflicts of interest.

Funding:

None

Author's participation

L Davoodi and E Soleymani made significant contributions to the conception and design of the study. L Davoodi and E Soleymani wrote the first draft of the manuscript. Z Oladi, S Shayesteh Azar, F Parandin, A Mizani, S R Mirbadie and F Hajizadeh edited and commented the manuscript. L Davoodi and E Soleymani extracted data from the patient's sheets. M Fakhar was responsible for collecting data and submitting the manuscript. All authors have made significant contributions to the critical revision of the manuscript, thoroughly reviewing and endorsing the final submitted version.

References

1. Ocampo D, Rahman G, Giugno S, Risso P, Rubinstein AV. Vulvovaginitis in a pediatric population: relationship among etiologic agents, age and Tanner staging of breast development. Arch Argent Pediatr. 2014;112(1):65-70.
2. Cassinelli R. Recomendaciones para el diagnóstico y tratamiento de vulvovaginitis (VV) en niñas prepúberes. Arch argent pediatr. 2000;98(6):412.
3. Romano ME. Prepubertal Vulvovaginitis. Clin Obstet Gynecol. 2020;63(3):479-85.
4. Dei M, Di Maggio F, Di Paolo G, Bruni V. Vulvovaginitis in childhood. Best Pract Res Clin Obstet Gynaecol. 2010;24(2):129-37.

5. Zeiguer N, Gryngarten M, Herbst M, Galvano A. Patología del tracto genital. Infecciones en la recién nacida y en la infancia. Sociedad Argentina de Ginecología Infanto Juvenil Manual de Ginecología Infanto Juvenil Buenos Aires: Ascune. 2003:305-16.
 6. Petro M, Iavu K, Minocha A. Unusual endoscopic and microscopic view of *Enterobius vermicularis*: a case report with a review of the literature. *South Med J*. 2005;98(9):927-9.
 7. Gatti S, Lopes R, Cevini C, Ijaoba B, Bruno A, Bernuzzi AM, et al. Intestinal parasitic infections in an institution for the mentally retarded. *Annals of tropical medicine and parasitology*. 2000;94(5):453-60.
 8. Panidis S, Paramythiotis D, Panagiotou D, Batsis G, Salonikidis S, Kaloutsi V, et al. Acute appendicitis secondary to *Enterobius vermicularis* infection in a middle-aged man: a case report. *Journal of medical case reports*. 2011;5:559.
 9. Shetty JB, Kulkarni DV, Prabhu V. Eggs containing larvae of *Enterobius vermicularis* in vaginal smear. *J Cytol*. 2012;29(1):94-6.
 10. Soleymani E, Davoodi L, Azami D. The Prevalence of Intestinal Parasitic Infections among the Mentally Retarded Patients in Lamook Rehabilitation Center of Qaemshahr, Mazandaran Province, 2015. *Tabari Biomedical Student Research Journal*. 2016;2(1):1-5.
 11. Craggs B, De Waele E, De Vogelaere K, Wybo I, Laubach M, Hoorens A, et al. *Enterobius vermicularis* infection with tuboovarian abscess and peritonitis occurring during pregnancy. *Surg Infect (Larchmt)*. 2009;10(6):545-7.
 12. Motevalli Haghi SM, Najm M, Fakhar M, Gholami S, MotevalliHaghi S. Prevalence of *Enterobius vermicularis* infection among kindergartens of Sari and Babol cities during 2011. *Journal of Mazandaran University of Medical Sciences*. 2012;21(1):240-2.
 13. Babady NE, Awender E, Geller R, Miller T, Scheetz G, Arguello H, et al. *Enterobius vermicularis* in a 14-year-old girl's eye. *Journal of clinical microbiology*. 2011;49(12):4369-70.
 14. Sočan M, Štromajer E, Ravnik M, Mrzel M, Grilc E, Grmek Košnik I. *Enterobius Vermicularis* Infection: A Cross-sectional Study in Preschool and School Children in the North-Western Part of Slovenia. *Helminthologia*. 2022;59(4):357-63.
 15. Rawla P, Sharma S. *Enterobius Vermicularis*. StatPearls. Treasure Island (FL) ineligible companies. Disclosure: Sandeep Sharma declares no relevant financial relationships with ineligible companies.: StatPearls Publishing
- Copyright © 2023, StatPearls Publishing LLC.; 2023.
16. Joishy M, Ashtekar CS, Jain A, Gonsalves R. Do we need to treat vulvovaginitis in prepubertal girls? *Bmj*. 2005;330(7484):186-8.
 17. Smolyakov R, Talalay B, Yanai-Inbar I, Pak I, Alkan M. *Enterobius vermicularis* infection of female genital tract: a report of three cases and review of literature. *European journal of obstetrics, gynecology, and reproductive biology*. 2003;107(2):220-2.
 18. Martínez-Girón R, Ribas-Barceló A, García-Miralles MT, López-Cabanilles D, Tamargo-Peláez ML, Torre-Bayón C, et al. Airborne fungal spores, pollen grains, and vegetable cells in routine Papanicolaou smears. *Diagn Cytopathol*. 2004;30(6):381-5.
 19. Mehrotra S, Young SL, Wojcik EM. Brown oval structures in vaginal Thin Prep smear: What could they be? *Diagn Cytopathol*. 2007;35(10):651-2.
 20. Dehghani R, Hooshyar H, Ghasemi FS, Mohammadzadeh N, Bakhtiyari Z, Sepehri M, et al. Knowledge of girl students about oxyuriasis in middle schools of Kashan, Central Iran. *International Archives of Health Sciences*. 2017;4(4):89-92.

21. Moussavi E, Houssaini M, Salari N, Hemmati M, Abdullahi A, Khaleghi AA, et al. Prevalence of Enterobius vermicularis among children in Iran: A comprehensive systematic review and meta-analysis. *Parasite epidemiology and control*. 2023;22:e00315.
22. Afrakhteh N, Marhaba Z, Mahdavi SA, Garoosian S, Mirnezhad R, Vakili ME, et al. Prevalence of Enterobius vermicularis amongst kindergartens and preschool children in Mazandaran Province, North of Iran. *Journal of parasitic diseases : official organ of the Indian Society for Parasitology*. 2016;40(4):1332-6.
23. Fallah M, Parsaei M, Soleymani E, Jamshidizad A, Azimi A. Investigation of the Prevalence of Enterobius Vermicularis Infection and Risk Factors among Kindergartens in Hamadan, West of Iran, in 2019. *Avicenna Journal of Clinical Medicine*. 2022;28(4):253-9.

Hosted file

Figure.docx available at <https://authorea.com/users/324788/articles/842674-vulvovaginitis-due-to-enterobius-vermicularis-in-a-girl-and-epidemic-enterobiasis-in-her-family>