

Enterobiasis as a Factor of Chronic Inflammatory Processes of the Urinary System - What's New? Literature Review for 2011-2021

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ABSTRACT

Introduction: Enterobiasis is the most common parasitosis in the world. The literature rarely presents publications on the detection of pinworm eggs in the urine, especially in chronic inflammatory processes of the urinary system.

Materials & Methods: We analyzed publications over the past 10 years of detection of this pathology.

Results&Discussion: The presented results show the feasibility of detecting enterobiasis by urinalysis, which can significantly improve the diagnosis and treatment of enterobiasis.

KEYWORDS: enterobiasis, urine, women, inflammation.

ARTICLE DETAILS

Published On:
11 July 2022

Available on:
<https://ijmscr.org/>

INTRODUCTION

Enterobiasis in equal measure is detected in the USA, European Union, China and in the developing countries of Asia, Latin America and Africa, as well as in Russia and Ukraine, at that the prevalence of pinworm invasions increases from year to year, especially in children [3, 4, 14, 20, 25, 39, 40, 42, 43].

Manifestations of inflammatory pathology of the genitourinary system are often caused by the same etiological factors - pathogenic growth of *Escherichia coli*, *Proteus sp.*, *Klebsiella sp.*, *S. aureus*, *S. agalactiae* [21]. Similarity or combined symptoms on the background of enterobiasis of inflammatory processes of the lower genital system with dysuria phenomena, repeatedly leads the patient for treatment to a gynecologist [24, 30, 38]. And in this aspect, enterobiasis, as a possible etiological factor of recurrent cystitis and vulvovaginitis, is not studied by both general practitioners and laboratory technicians who perform urine analysis. Along with this, enterobiasis detect up to 40% of women who seek medical attention for gynecological disorders: recurrent cervicitis, vaginitis and vulvitis of different etiology [35].

MATERIALS & METHODS

The purpose of this study is to investigate and analyze the epidemiological situation of enterobiasis among girls and women with urine pathology on the basis of a literature database (PubMed, Google Scholar, ResearchGate, PLoS, Hindawi). Studying enterobiasis in recent publications, we found more than 200 papers on the effects of enterobiasis on the development of appendicitis, about 70 papers on the detection of this parasite in the female reproductive system, and about 50 publications on detection in the urinary system.

RESULTS

In Ukraine all cases of worm infestation had to be reported to the health service, which carried out a number of paper and organizational work, and the main discomfort for the individual, or the family, where enterobiasis was found. Therefore, hiding detected invasions, presenting fictitious certificates and survey results to childcare facilities or schools, advocacy for self-medication, over-the-counter selling of medicines, mass advertising of medicines, and promoting the profession of doctor in the media, contributes to the spread of not only parasitic lesions, but also disease and mortality. It is the reason why the statistics of enterobiasis in Ukraine for the last 10 years does not change much in the

Enterobiasis as a Factor of Chronic Inflammatory Processes of the Urinary System - What's New? Literature Review for 2011-2021

official figures on paper and is 1,100 cases per 100,000 population. And with such low detection, 15 companies, both Ukrainian and foreign, sell anthelmintic, not counting the numerous sales of Phyto medicines and supplements [36].

Pinworms mostly parasitize in the distal part of the small intestine, cecum and in the proximal part of the colon. The female pinworms descend into the rectum, actively go out through the anus, lay their eggs on perianal folds and die. One female pinworm can lay up to 17 000 eggs. Eggs, laid by females pinworms, ripen in 4-6 hours and become invasive. They can appear on the undergarments and linen, accumulate under fingernails during scratching and under the conditions of breaking the hygienic rules they contaminate the surrounding objects, toys, utensils, food. Pinworm eggs are relatively stable in the environment and preserve the invasiveness up to 2-4 weeks. Total life duration of the pinworm from the moment of infection to the release of the mature females for egg laying is 1-2 months, but due to frequent reinfestation enterobiasis can last for many years [17].

The main mechanism of infection is the fecal-oral route of transmission, the leading mode of transmission is contact-household, at that the hands, contaminated with helminth eggs, is the main factor of transmission. This is

facilitated by the urbanization of society, street food, keeping animals at home without proper hygiene and deworming [27].

Another way of pinworm invasion in humans is sexual, which is mediated by the diversity of sex life and number of partners, especially oral and anal sex can lead to transmission of nontraditional helminth infections [34]. Homosexual and heterosexual contacts, as well as the promotion of hair removal of the skin of the genitals and anal parts of the body contribute to the fecal-anal transmission of enterobiasis [1]. Incomprehension of enterobiasis transmission during different kinds of sexual intercourse is one of the factors of recurrent infection [9].

The study of the role of *Enterobius vermicularis* on the state of the urinary system has intensified over the past decade in various parts of the world. In particular, the work of Abdulsada A. and co-authors 2020 showed a link between enterobiasis and urinary tract infection, with aggressive pathogenic growth of *E. coli*, *S. aureus* and *Klebsiella* [2]. This is consistent with the results of our work in previous years, on the growth of pathogenic growth of *Escherichia coli*, *Proteus sp.*, *Klebsiella sp.*, *S. aureus*, *S. agalactiae* also *Ureaplasma urealyticum* and *parvum* and the clinical conditions they cause [34].

Along with this, both pinworm eggs and live individuals were detected microscopically Fig.1. [6].

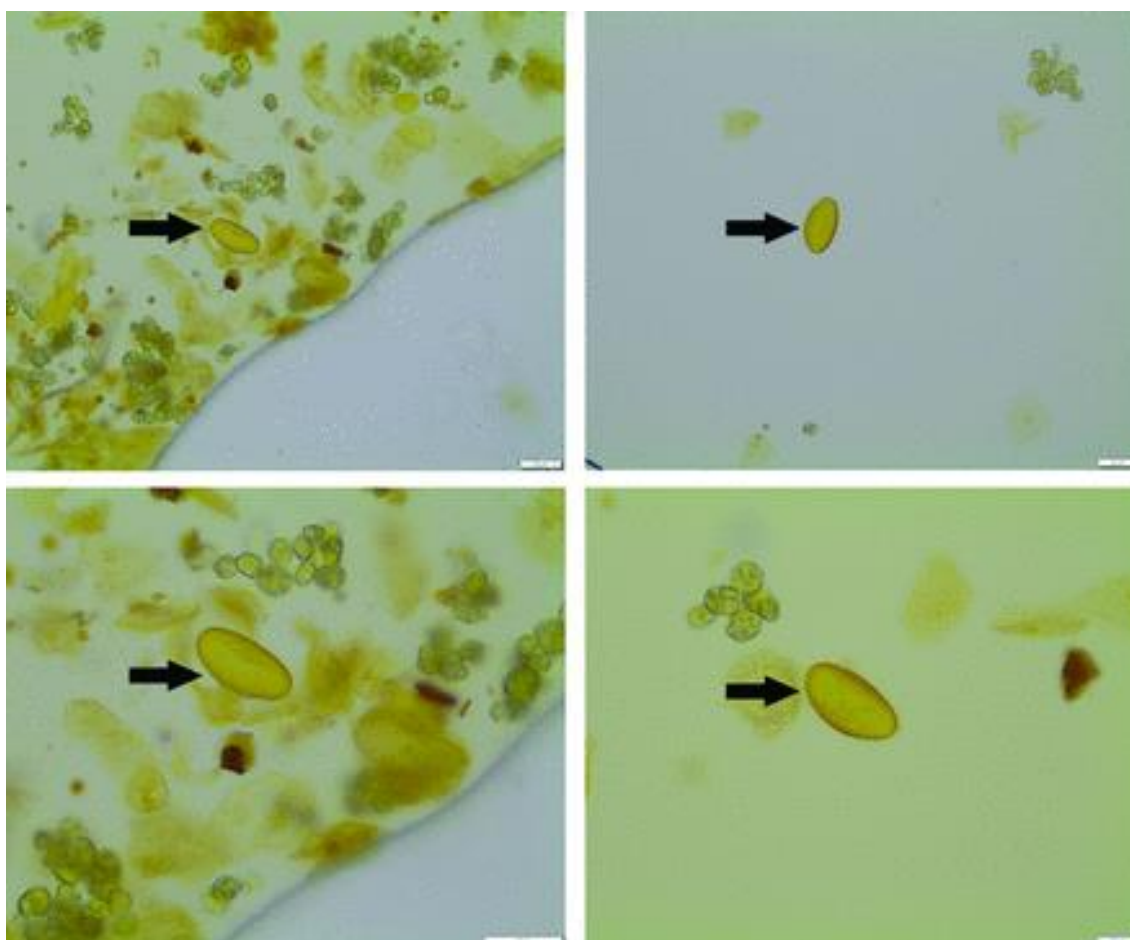


Figure 1. Composite of microphotographs of the patient's urine sample.

Enterobiasis as a Factor of Chronic Inflammatory Processes of the Urinary System - What's New? Literature Review for 2011-2021

The items in question are the yellow oval objects in the middle of each image. The upper photos are 20× magnification and the lower ones are at 40× magnification. Each scale bar represents 20 μm. [6].

In addition, there are also publications on the detection of enterobiasis in pregnant women with bacteriuria and chronic inflammatory diseases of the bladder and kidneys Fig.2 [23, 37].



Figure 2. *E. vermicularis* larvae from urine specimen of 19 old female student [37].

The complexity of the diagnosis of enterobiasis is due to a combination of factors: • low awareness of urologists and gynecologists about the aggressive effects of *Enterobius vermicularis*; • reluctance and lack of mandatory protocols for

the description of worm eggs in the urine centrifuge by laboratory physicians, especially if the urine analysis is performed on automatic analyzers [8, 19].

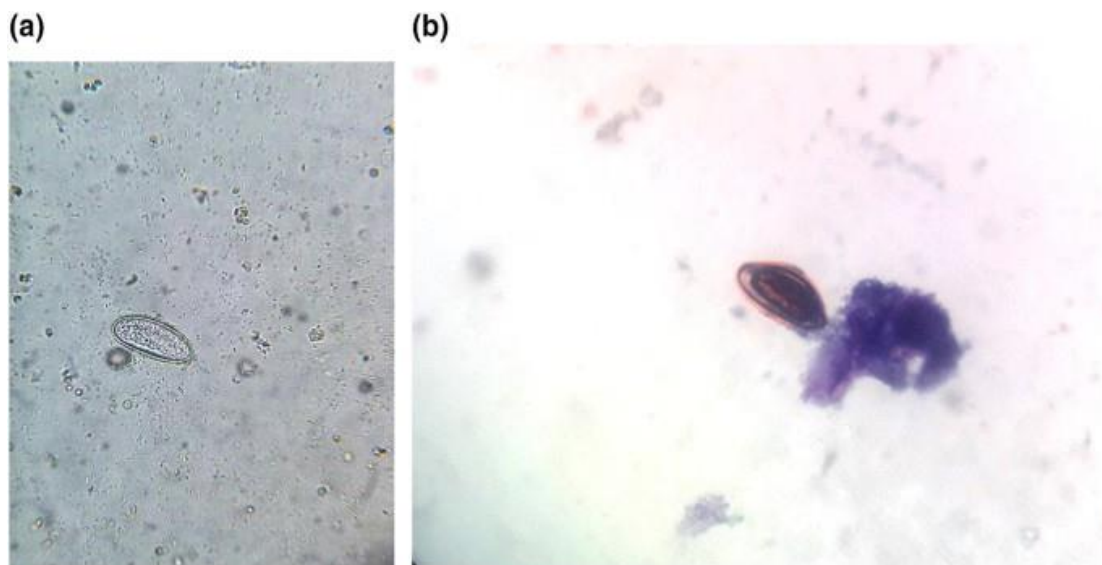


Figure 3. Spectrum of parasitic infections in centrifuged urine sediments from a newly developed tertiary care center in Central India

Urine sediment showing a planconvex egg of *E. vermicularis* with a coiled up larva, and few RBCs in the background (wet mount; 10 ×). b PAP stained sediment of the same case (PAP; 10 ×) [19].

Repeated publications on the infestation of *Enterobius vermicularis* in recurrent urinary tract infection in

both adults and children [6, 7, 11, 12, 16]. Enterobiasis has also been described in inflammatory processes of the urinary system in both a 9-month-old child [15] and a 7-year-old girl [28].



Figure 4. Urine sample showing egg of *E. vermicularis*. [28].

DISCUSSION

The negative impact of enterobiasis on the reproductive and reproductive system in women is actively discussed in the world literature. This enterobiasis of tubes, ovaries, detection of parasites in the endometrium and cytological smears [18, 22, 24, 26, 29, 31, 32, 41].

In the Ukrainian protocols we found recommendations for the detection of worms in ulcers and abscesses of the external genitalia, with recurrent vulvitis. And we did not find protocols in recurrent inflammatory processes of the urinary tract recommendations for the definition of enterobiasis. In the practical work of the doctor in inflammatory chronic processes of the genital system in addition to the general analysis of urine, it is recommended to make a bacteriological culture of urine with sensitivity to antibiotics [5, 10].

The problem of enterobiasis is directly related to the debatable issues of antibiotic resistance in pathology of the genitourinary system, especially against the background of the use of reserve drugs during treatment with COVID 19 (Meropenem, Tienam). And what's next?

Missing diagnosis of enterobiasis is not only the irrationality of the use of antibiotics, followed by antibiotic resistance, recurrence of infectious manifestations of the urinary system with chronicity of the process, but also deaths. They cannot be avoided without timely diagnosis, even in European countries with highly professional medicine [33].

CONCLUSIONS

Over the past 10 years, various parts of the world have covered work to detect enterobiasis in the urinary system in girls under one year, adolescents, women of childbearing age, women in menopause.

At recurrent diseases of urinary system it is necessary to recommend inspection on an enterobiasis.

Since automatic laboratory tests are not able to detect enterobiasis in the urine, it is necessary to recommend manual examination of urine in problem patients, to emphasize the attention of laboratory doctors on parasites [13].

Author Contributions: All authors confirmed they have contributed to the intellectual content of this paper and have met the following 3 requirements: (a) significant contributions to the conception and design, acquisition of data, or analysis and interpretation of data; (b) drafting or revising the article for intellectual content; and (c) final approval of the published article.

Authors' Disclosures or Potential Conflicts of Interest: No authors declared any potential conflicts of interest.

REFERENCES

- I. Abdolrasouli A, Roushan A, Hart J. Enterobius vermicularis infection of female genital tract. *Sex Transm Infect.* 2013; 89(1): 37.
- II. Abdulsada A. Rahi, Nibras K. Khlaif. Pinworm infection and urogenital tract infection in girls of Wasit province. *Journal Of Critical Reviews* 2020; 7: 2196-2201.
- III. Babat SO, Sirekbasan S, Macin S, et al. Diagnostics of intestinal parasites by light microscopy among the population of children between the ages of 4-12 in eastern Turkey. *Trop Biomed.* 2018; 35(4): 1087-1091.
- IV. Bouchaud, O. Circumstances for diagnosis and treatment of intestinal parasitosis in France. *La Presse Medicale* 2013; 42(1): 84-92.
- V. Chambliss AB, Mason HM, Van TT. Correlation of chemical urinalysis to microscopic urinalysis

Enterobiasis as a Factor of Chronic Inflammatory Processes of the Urinary System - What's New? Literature Review for 2011-2021

- and urine culture: implications for reflex urinalysis workflows. *J Appl Lab Med.* 2020; 5(4): 724-731.
- VI. Chin Tan G, Stalling M, Boue D, et al. That's not supposed to be there: an unusual finding on urinalysis. *Clin Chem.* 2017; 63(10): 1660-1661.
- VII. Choudhury S, Kumar B, Pal DK. Enterobius vermicularis infestation of urinary tract leading to recurrent urinary tract infection. *Trop Parasitol.* 2017; 7(2): 119-121
- VIII. Cociancic P, Rinaldi L, Zonta ML, Navone GT. Formalin-ethyl acetate concentration, FLOTAC Pellet and anal swab techniques for the diagnosis of intestinal parasites. *Parasitol Res.* 2018; 117(11): 3567-3573.
- IX. Cymerman RM, Kaplan Hoffmann R, Rouhani Schaffer P, Pomeranz MK. Vulvar infections: beyond sexually transmitted infections. *Int J Dermatol.* 2017; 56(4): 361-369.
- X. de Toro-Peinado I, Concepción Mediavilla-Gradolph M, Tormo-Palop N, Palop-Borrás B. Diagnóstico microbiológico de las infecciones urinarias [Microbiological diagnosis of urinary tract infections]. *Enferm Infecc Microbiol Clin.* 2015; 33 Suppl 2: 34-9.
- XI. Dos Santos VM. Enterobius vermicularis: uncommon clinical presentations. *Arch Iran Med.* 2019; 22(2): 104-105.
- XII. Eder TIB, B A SW, Lipek T. Extraintestinal Oxyuriasis. *Dtsch Arztebl Int.* 2018; 115(18): 326.
- XIII. Egli A, Schrenzel J, Greub G. Digital microbiology. *Clin Microbiol Infect.* 2020; 26(10): 1324-1331.
- XIV. Ermolenko A, Rumiantseva E, Bartkova A, Voronok V, Poliakova L. Nematodes of humans in the Primorye Territory. *Medical Parasitology* 2013; 1: 31-4.
- XV. Intra J, Sarto C, Manuli E, et al. Multiple Parasitic Infestation in a Nine-month-old Patient: A Case Report. *Helminthologia.* 2019; 56(1): 53-56.
- XVI. Gunaratna GP, Dempsey S, Ho C, Britton PN. Diagnosis of enterobius vermicularis infestations. *J Paediatr Child Health.* 2020; 56(12): 1994.
- XVII. Kang WH, Jee SC. Enterobius vermicularis (Pinworm) Infection. *N Engl J Med.* 2019; 381(1): e1.
- XVIII. Khalbuss W.E., Michelow P., Benedict C. [et al.]. Cytomorphology of unusual infectious entities in the Pap test. *Cytojournal.* 2012; 9: 15.
- XIX. Khurana U, Majumdar K, Kapoor N, et al. Spectrum of parasitic infections in centrifuged urine sediments from a newly developed tertiary care centre in Central India. *J Parasit Dis.* 2018; 42(4): 608-615.
- XX. Kim, D., Cho, M., Park, et al. Environmental factors related to enterobiasis in a southeast region of Korea. *Korean Journal of Parasitology* 2014; 51(1): 139-42.
- XXI. Kolman KB. Cystitis and Pyelonephritis: Diagnosis, Treatment, and Prevention. *Prim Care.* 2019; 46(2): 191-202.
- XXII. Kyu Choi S., Kyung Kim E., Hong Y.O. et al. Enterobius vermicularis ova in a vaginal smear *Korean J. Pathol.* 2010; 44: 341-42.
- XXIII. Lau R, Chris RB, Phuong MS, et al. Treatment of soil-transmitted helminth infections in pregnancy: a systematic review and meta-analysis of maternal outcomes. *J Travel Med.* 2020; 14: 41-2.
- XXIV. Mentessidou A, Theocharides C, Patoulas I, Panteli C. Enterobius Vermicularis-Associated Pelvic Inflammatory Disease in a Child. *J Pediatr Adolesc Gynecol.* 2016; 29(2): e25-27.
- XXV. Neghina R, Dumitrascu V, Neghina A, et al. Epidemiology of ascariasis, enterobiasis and giardiasis in a Romanian western county (Timis), 1993-2006. *Acta Tropica;* 125 (1): 98-101.
- XXVI. Ng Y, Ng S, Low J. Enterobius vermicularis infestation of the endometrium - a cause of menstrual irregularity and review of literature. *Annals of the Academy of Medicine Singapore.* 2011; 40 (11): 514-5.
- XXVII. Özdil K, Karataş N, Zincir H. Low socioeconomic level and enterobius vermicularis: A interventional study to children and their mothers in home. *Zoonoses Public Health.* 2020; 67(8): 882-891.
- XXVIII. Patel B, Sharma T, Bhatt GC, Dhingra Bhan B. Enterobius vermicularis: an unusual cause of recurrent urinary tract infestation in a 7-year-old girl: case report and review of the literature. *Trop Doct.* 2015; 45(2): 132-134.
- XXIX. Powell G, Sarmah P, Sethi B, Ganesan R. Enterobius vermicularis infection of the ovary *BMJ Case Rep.* 2013.
- XXX. Reddy YPS, Senthil Kumaran S, Vanka V, et al. Abdominal pain - a common presentation with unusual diagnosis: a case report. *J Community Hosp Intern Med Perspect.* 2020; 10(6): 604-608.
- XXXI. Reipen J, Becker C, William M, et al. Peritoneal enterobiasis causing endometriosis-like symptoms. *Clinical and Experimental Obstetrics and Gynecology* 2012; 39(3): 379-81.
- XXXII. Rizvi G, Rawat V, Pandey HS, Kumar M. Acute abdomen: An uncommon presentation of a common intestinal nematode. *Trop. Parasitol.* 2015; 5(2): 123-26.
- XXXIII. Serpytis, M. & Seinini, D. Fatal case of ectopic enterobiasis: Enterobius vermicularis in the

Enterobiasis as a Factor of Chronic Inflammatory Processes of the Urinary System - What's New? Literature Review for 2011-2021

- kidneys. *Scandinavian Journal of Urology and Nephrology*. 2011; 46(1): 70-2.
- XXXIV. Sklyarova V.O. Epidemiological features of parasitary invasis in women of reproductive age with disorders of reproductive health. *Wiad Lek*. 2018; 71(3 pt 2): 674–677.
- XXXV. Sklyarova V. O. Vaginal Microbiocinosis in Women with Infertility and Parasite Invasion. *International STD Research & Reviews*. 2015; 3: 123–130.
- XXXVI. Sklyarova V, Shatylovich K, Sklyarov P, Filipyuk A. Should ascariasis be considered as a reproductology problem. *Wiad Lek*. 2021; 74(9 p.I)
- XXXVII. Sumanto D, Sayono S, Mudawamah PL. Enterobius vermicularis larvae in urine sample of female student: The first case report in Indonesia. *J Microbiol Exp*. 2021; 9(1): 1–2.
- XXXVIII. Taghipour A, Olfatifar M, Javanmard E, et al. The neglected role of Enterobius vermicularis in appendicitis: A systematic review and meta-analysis. *PLoS One*. 2020; 15(4): e0232143
- XXXIX. Yang CA, Liang C, Lin CL, et al. Impact of Enterobius vermicularis infection and mebendazole treatment on intestinal microbiota and host immune response. *PLoS Negl Trop Dis*. 2017; 11(9).
- XL. Yang S, Wang J, Shi D, et al. 2018 Polyparasitism of Rhabditis Axei and Enterobius Vermicularis in a Child from Beijing, China. *Clin Lab*. 2018; 64(10): 1773-76.
- XLI. Young C., I. Tataryn, K.T. Kowalewska-Grochowska, B. Balachandra. 2010. Enterobius vermicularis infection of the fallopian tube in an infertile female *Pathol Res Pract*. 2010; 15(6): 405-7.
- XLII. Wendt S, Trawinski H, Schubert S, et al. The Diagnosis and Treatment of Pinworm Infection. *Dtsch Arztebl Int*. 2019; 116(13): 213-219.
- XLIII. Zouari M, Mhiri R. Enterobius Vermicularis: Uncommon Clinical Presentations". *Arch Iran Med*. 2019; 22(2): 106.