Prevalence of *Trichomonas vaginalis* in women attended at a private laboratory

Prevalência de Trichomonas vaginalis em mulheres atendidas em um laboratório privado

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ABSTRACT

Introduction: Sexually Transmitted Infections (STIs) are caused by viruses, fungi, bacteria, or other microorganisms, thus being a serious public health issue. *Trichomonas vaginalis* is the disease causative agent of trichomoniasis, a worldwide protozoan. The prevalence of trichomoniasis depends on some factors, including age, sexual activity, number of sexual partners, hygiene habits, among others. **Objective:** To evaluate the prevalence of *Trichomonas vaginalis* in gynecological cytology in a private laboratory in the city of Fortaleza, state of Ceará, Brazil. **Methods:** This is a retrospective, quantitative, and descriptive study carried out in a private laboratory in Fortaleza, state of Ceará. Data for the research, such as age, marital status, and symptoms, were collected from the patients' medical records as well as the prevalence of cases in liquid-based cytology (LBC) and conventional cytology (CC). **Results:** In 2019, 83 women were positive for trichomoniasis. The most prevalent age group was between 36 and 51 years old (41%), with an average of 39.9 years old. Regarding symptoms, 14 (16.8%) were asymptomatic and 41 (49.3%) had some symptom. **Conclusion:** The data obtained in this study describe the profile of women affected by *Trichomonas vaginalis*.

Keywords: *Trichomonas vaginalis*; clinical laboratory techniques; public health; sexually transmitted diseases.

RESUMO

Introdução: As infecções sexualmente transmissíveis são causadas por vírus, fungos, bactérias ou outros microrganismos, sendo assim um grave problema de saúde pública. O *Trichomonas vaginalis*, um protozoário presente em todo o mundo, é o agente etiológico causador da tricomoníase. A prevalência dessa doença depende de alguns fatores, incluindo idade, atividade sexual, números de parceiros sexuais, hábitos de higiene, entre outros. **Objetivo**: Avaliar a prevalência de *Trichomonas vaginalis,* em citologia ginecológica em um laboratório privado em Fortaleza, Ceará, Brasil. **Métodos**: Trata-se de estudo retrospectivo, quantitativo e descritivo realizado em laboratório privado em Fortaleza. Os dados para a pesquisa, como idade, estado civil, sintomas, foram retirados de prontuários das pacientes, assim como a prevalência de casos em citologia em meio líquido e CO. **Resultados**: No ano de 2019, 83 mulheres apresentaram positividade para tricomoníase. A faixa etária mais prevalente foi a de 36 a 51 anos (41%), ficando com a média de 39,9 anos. Em relação aos sintomas, 14 (16,8%), apresentaram-se assintomáticas e 41 (49,3%) apresentaram algum sintoma. **Conclusão**: Os dados obtidos neste estudo descrevem o perfil das mulheres acometidas pelo *Trichomonas vaginalis*.

Palavras-chaves: *Trichomonas vaginalis*. Medicina privada. Saúde Pública. Infecções Sexualmente Transmissíveis.

INTRODUCTION

Sexually Transmitted Infections (STIs) are caused by viruses, fungi, bacteria, or other microorganisms, thus being a serious public health issue. They are mainly transmitted through sexual contact and intercourse (oral, vaginal, anal) without the use of a condom, with a person who has the infection. STIs can also be transmitted from mother to baby, through breastfeeding, childbirth, or pregnancy[1].

According to the World Health Organization (WHO), there are more than 1 million new cases of STIs per day, in an age group of 15 to 49 years, between men and women. In 2016, regarding the most prevalent infections, there were 6.3 million cases of syphilis, 87 million cases of gonorrhea, 127 million cases of chlamydia, and 156 million of trichomoniasis, which are equivalent to over 376 million new cases of these four infections per year[1,2].

Trichomonas vaginalis is the disease causative agent of trichomoniasis, an STI that is prevalent worldwide. The prevalence of trichomoniasis depends on some factors, including age, sexual activity, number of sexual partners, hygiene habits, sexual habits, phase of the menstrual cycle, access to healthcare services, pregnancy, drug use, socioeconomic factors, among others[3,4].

The protozoan can infect both men and women, with women being the most frequently infected, accounting for 92% of cases according to the WHO[5]. Infection with *Trichomonas vaginalis* in men is usually asymptomatic. The protozoan can survive for over a week in a man's foreskin, in such a way that it can infect his sexual partners[6]. When symptomatic, men can present inflammation in the prostate, epididymis, foamy urethral discharge, dysuria and, in rarer cases, infertility[7,8].

Conversely, in women, infections can be asymptomatic or symptomatic. Clinical characteristics include an increase in the variety of symptoms, such as pelvic pain, dysuria, pruritus, yellowish, frothy discharge with a creamy aspect and foul odor, vulva irritation, pain during sexual intercourse, among others[7,9].

The parasite, when established, has an incubation period of 3 to 20 days and usually persists for a long time in women and for a short period in men. A woman's normal pH ranges from 3.5 to 4.5; pH greater than 5 is already considered a risk factor for an STI[7].

Epidemiologically, the parasite is associated with other STIs, such as infections by the human immunodeficiency virus, human papillomavirus, chlamydia, and mainly gonorrhea, being a sign of high-risk sexual behavior. There is also a relation to pelvic inflammatory disease because it infects the upper urinary tract, causing an inflammatory response that affects the uterus, fallopian tubes, and ovaries[3,5,10].

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Laboratory investigation is essential in the diagnosis of this pathogen, as it leads to appropriate treatment and facilitates controlling the spread of the infection. Different methods are used in the laboratory analysis of trichomoniasis, such as direct fresh examination, urinalysis, staining methods — such as pap smears —, culture methods (gold standard), latex agglutination, immunological methods (enzyme immunoassay), and molecular techniques such as polymerase chain reaction (PCR)[11,12].

Currently, the treatment of trichomoniasis has limited therapeutic options, considering that only nitroimidazole derivatives are indicated, and metronidazole is the drug of first choice. The lack of other methods means that there are limitations, such as patients with intolerance to nitroimidazoles; therefore, it is important to have other treatment options[8].

For the prevention of trichomoniasis, condom use remains the best and most reliable protection against this STI. Nevertheless, basic sanitation, hygiene habits[4], public education, and prevention programs will also help to reduce the extent and spread of the disease[12,13].

OBJECTIVE

To evaluate the prevalence of *Trichomonas vaginalis*, to analyze the correlation between trichomoniasis and other infections, and to observe diagnostic methods in a private laboratory located in the city of Fortaleza, state of Ceará, Brazil.

METHODS

This is a cross-sectional, descriptive study with a quantitative and retrospective approach.

Research data were collected from a private laboratory specialized in pathological anatomy, cytopathology, molecular biology, and genetics in the city of Fortaleza, in the northeast region of Brazil.

The study group consisted of all women attended in the laboratory, in the year 2019, whose tests performed with liquid-based cytology (LBC) and conventional cytology (CO) methods suggested structures of *Trichomonas vaginalis*. All data generated in the research were kept confidential and only the research team had access to them.

Inclusion criteria: all women attended in 2019 who aged between 22 and 75 years old. Exclusion criteria: presence of malignant lesions not reported in the medical record.

Endocervical curettage was the biological material used, and the collection methods of the cytopathological tests were LBC and CC.

Data were collected from the medical records of patients attended by the study laboratory, which comprised the following information: demographic profile, inflammatory pattern, symptoms, age, pathogenic microorganisms, and diagnostic methods, which were analyzed using a form for data collection.

Tables were drawn to distribute the data concerning the research with the aid of the Microsoft Excel 2010 program, and the statistical analysis was carried out using the SPSS program.

This study was approved by the Research Ethics Committee under No. 2.934.072 The principles of Resolution No. 466/2012 of the National Health Council (Brazilian Ministry of Health) were followed.

RESULTS

In 2019, 37,544 exams were performed. After analyzing the patients' medical records, 83 (0.2%) women were positive for trichomoniasis. The collection methods of cytopathological tests were LBC, accounting for 52 (66%) patients; and CC, accounting for 31 (34%) patients.

Cases of trichomoniasis associated with other microorganisms were also quantified. The verified pathogens were: *Gardnerella vaginalis*, with 13 cases (15%); *Leptothrix sp.*, with two cases (5%); and *Candida sp.*, with one case (1%). In the vaginal microbiota, in association with *Trichomonas vaginalis*, 50 (62%) cases with cocci and bacilli and one case (20%) with only cocci were found.

Another data collected from the medical records was the patients' age. Of the total, 71 (85.5%) had the information and 12 (14.5%) were incomplete. The most prevalent age group was 33 to 39 years (28%), followed by 40 to 45 years (19%); 22 to 27 years (13%); 46 to 51 years (13%); 28 to 33 years (11%); 52 to 57 years (11%); 58 to 63 years (6%); 70 to 75 years (3%); and 64 to 69 years (1%). The mean was 39.9 years.

Regarding marital status, 24 (30.1%) were married, nine (10.8%) were single, two (2.4%) were divorced, and one (1.2%) was widowed. Of the 83 medical records, 46 (55.4%) did not inform the patient's marital status.

Regarding symptoms, 14 (16.8%) were asymptomatic and 42 (49.3%) presented with some symptom. Of the symptomatic women, two had a friable cervix; four had yellowish discharge; two had yellowish discharge and pruritus; two had reddish discharge; seven had frothy discharge; four had frothy discharge and pelvic pain; six had white discharge; five had discharge and pruritus; and three had only pruritus. Of the 83 medical records, 44 (53.0%) did not report symptoms.

Concerning the intensity of inflammation, the obtained data were as follows: 71 (85.5%) severe; 4 (4.8%) moderate; and 8 (9.6%) not informed.

DISCUSSION

The results were obtained by collecting and analyzing 37,544 medical records for the year 2019, of which 83 women had positive tests for trichomoniasis, corresponding to 0.2% of cases. Dan *et al*., in 2013[6], carried out a study on 26,699 preventive exams in women from Alta Sorocabana (microregion of health located in the state of São Paulo, Brazil). Of these, 143 women (0.5%) had infection with *Trichomonas vaginalis*. In the state of São Paulo, 2,611,876 tests were performed, and 16,536 women (0.6%) had the infection. In the city of Porto Velho (state of Rondônia, Brazil), Souza conducted a research in 20,701 exams over a period of 14 months (2014 to 2015), in which 118 (0.5%) women were contaminated by *Trichomonas* vaginalis[14].

The clinical presentation of trichomoniasis in women can include a wide range of symptoms. The parasite can persist for long periods in the female urogenital tract. However, in most cases, women are still asymptomatic[15]. In the present study, 49.3% of women with the parasitosis had symptoms, which corroborated an analysis carried out with 288 women in the city of Chaves, in Portugal, which detected the incidence of the protozoan in 3.8% of the women under

study, and only 54.5% were symptomatic — the others did not report any symptoms[16].

Protozoan infection can affect women in different age groups; hence, there are ages in which the prevalence is increased. The obtained pieces of information contain the ages of the patients, showing that more cases of infection were quantified between the ages of 33 and 39 years old, with a percentage of 28%. This result is similar to that of Lima and Sampaio[17], which showed a higher incidence between 20 and 49 years old. According to Sutcliffe *et al*., this age group corresponds to the woman's reproductive phase, when there are changes in the menstrual cycle, pregnancy, and a more active sexual life[18].

The pap smear is widely used in diagnosis, considering that, in addition to being cost-effective, it is used in gynecological exams to screen for cytological abnormalities, being important in the prevention and early diagnosis of cervical cancer[16,19]. PCR is another test for identifying the parasitosis; although it is not considered the gold standard, the test started showing high sensitivity (76–100%) and specificity of 96-100% in the detection of *Trichomonas vaginalis*[20]. LBC is a method for preparing samples for cytopathological tests and was developed aiming to reduce CC failures by presenting better cell disposition, thus facilitating interpretation. However, Silva *et al*. compared the diagnosis of *Trichomonas vaginalis* by the LBC and CC methods; in CC, positivity was observed in 38.7% samples, and in LBC, in 13.4% samples[21].

In the present article, LBC was the most used method to observe the parasite, accounting for 52 (62.6%) positive cases, whereas CC had 31 cases (37.3%). The disagreement may have occurred because, during the exam, only one type of cytology was performed.

Trichomonas vaginalis MAY be associated with other infections, such as those caused by *Gardnerella*, *Leptothrix,* human papillomavirus, genital herpes, and also gonorrhea, indicating high-risk sexual behavior. Most women infected by the parasite also have bacterial vaginosis[3,5,10]. According to the research carried out by Lima *et al.* in the state of Pernambuco, Brazil, the results of cytopathological tests showed that 34.8% of the patients were positive for trichomoniasis associated with cocci, and 26.1% with *Gardnerella*[22], with results similar to those of the present study, which presented 20% of infected patients in association with cocci and 15% with *Gardnerella*.

In this study, based on CC and LBC, positivity of 0.2% of the analyzed records was observed. Conversely, in a study conducted by Morris *et al*.[23], PCR had a sensitivity of 99.2% (95.5–99.9) and specificity of 96.9% (95.8–97.7) for *Trichomonas vaginalis* (n=1,449). This difference can be explained by the sensitivity and specificity of molecular tests compared with cytology, as the visualization of the *Trichomonas vaginalis* protozoan can be compromised by interferences such as fixation and desiccation.

The study performed in Ghana by Asmah *et al*.[24] detected positivity for *Trichomonas vaginalis* in 42.6% women by the PCR technique. In cervical washes, low sensitivity (31.6%), high specificity (100%), moderate positive predictive value (75.0%), moderate positive likelihood ratio (3.0), and poor agreement (Cohen's kappa coefficient; 0.283) were observed according to the PCR assay. The antigen test (JD's Trichomonas V® rapid antigen test) exhibited lower sensitivity (25.0%), lower specificity (83.3%), and poor agreement (Cohen's kappa coefficient; 0.233) with PCR, demonstrating the importance of using methods to improve the sensitivity and detection of *Trichomonas vaginalis*. There are PCR tests that can also be performed with urine samples, both in men and women[25].

According to Teixeira *et al*.[26], 341 women attended at healthcare units in the city of Ouro Preto (state of Minas Gerais, Brazil) were analyzed, and 13 (16.2%) cases of trichomoniasis were observed. Another study carried out on Quilombola women[27] identified 22 (6.3%) positive cases for *Trichomonas vaginalis*. The present study was carried out in a private laboratory and 83 (0.2%) cases were observed. One of the possible reasons for this contrast is the different populations at each collection site.

Strengths

The use of a well-known method both in public and private institutions provides the possibility of detecting the specific treatment for *Trichomonas vaginalis*.

Limitation

Although the cytology method is not the most sensitive for *Trichomonas vaginalis*, it is also the most used in the Brazilian Unified Health System and takes into account the need for training and refinement in the visualization of the structure, which can be a factor that further reduces sensitivity.

CONCLUSION

The data obtained in this study describe the profile of women affected by *Trichomonas vaginalis*. The infection is verified in all age, ethnic, and socioeconomic groups. Frequency depends on several factors such as sexual activity and number of sexual partners. This article contributes to the development of studies that allow evaluating, through scientific evidence, a better approach to encourage cytopathological test and stimulate the interest in the knowledge and treatment of trichomoniasis.

Participation of each author

Fernanda Nívian Brito da Silva collected and analyzed the data and wrote the article.

Lorena Alcântara de Farias assisted in data collection.

Renata Mirian Nunes Eleutério and Nayara Santos de Oliveira contributed to the writing, collection and analysis of the manuscript data.

Cristina Tonin Beneli Fontanezi was the research advisor and monitored the steps from data collection to the final writing.

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Conflict of interests

The authors declare no conflicts of interest.

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