Trichomonas vaginalis: a review on pathogenicity, diagnosis and treatment

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Abstract

The parasite Trichomonas vaginalis is one of the primary parasites that cause vaginitis and causes Trichomoniasis and is considered a sexually transmitted disease, and it is widespread all over the world. This parasite is an anaerobic flagellar parasite that affects the urinary genital tract in humans and the symptoms associated with it vary between the sexes, and severe infection may cause infertility or delayed childbearing for both sexes. According to WHO reports, there are about 170 million annual cases of this parasite around the world. Due to the risks posed by venereal diseases to society and the lack of studies on such diseases, this study was conducted to increase knowledge and methods of prevention and treatment of this parasite.

Keywords Trichomonas vaginalis, pathogenicity and methods of prevention

Introduction

The parasite Trichomonas vaginalis is one of the primary parasites causing vaginitis in women, and it is classified under the group of sexually transmitted diseases (Soper, 2004). Trichomoniasis is widespread in all parts of the world (Harp et al., 2011) and it was the first observation of the emergence and emergence of this disease at the beginning of the twentieth century by the researcher (Hook, 1999) 1837 in Donn.

Trichomonas vaginalis is a protozoan flagellar parasite that infects the human urogenital tract (Donné, 1936). It invades the vagina, the urinary system, and the cervix, in women, the bladder, the seminal vesicle, and the prostate in men (Johnston and Mabey, 2008). The symptoms caused by this parasite are more pronounced in women than in men. A woman's reproductive system is exposed to several causes of inflammation and microbial infections Lutofism, where a woman's vagina is a dynamic environment that contains two stages, the first stage is the regeneration and growth of the phenotypic cells of the mucus wall lining the vagina, and the second stage the menstrual cycle, and in each of them is controlled by changes in the position of hormones under Controlling the regulation of the estrogen hormone, the phenotypic cells, and the normal internal bacteria, the vagina secretes a normal fluid in all women from puberty to the menopause period, and it is a defensive and protective fluid against microbes, and its acidic pH ranges between 4.2 -3.8, where it is considered the appropriate medium. For bacterial growth, in addition to the presence of large amounts of lactic acid (Ash and Orihel, 2007).

Vaginal infections recur continuously in a woman's life; Because of the hormonal imbalance between the microorganisms present in the vagina and the increase of a certain type of that revival higher than its normal level on the one hand and the reduction of the number of members of the genus Lactobacillus on the other hand, as well as other factors such as the excessive intake of antibiotics, steroidal hormone therapy, and immunosuppressive drugs, as well as Physiological imbalance, such as pregnancy, infertility, abortion, or diabetes and immunodeficiency (Nanda et al., 2007).

Several factors lead to an imbalance in the natural balance of the vagina, the most prominent of which are: Progress Age, tension, and hormonal changes that occur to the body, such as menstruation, pregnancy, menopause, sexual intercourse, antibiotics, and spermicide drugs, in addition to the vaginal "shower", which overuse of it leads to the elimination of the
natural secretions of the reproductive system, in addition to
the resulting causes of living organisms such as bacteria,
viruses and parasites (Swygard et al., 2004).

Estimates of the World Health Organization (WHO) for 2007
indicate that every year there are 448 million new cases of
treatable sexually transmitted infections, such as syphilis,
gonorrhea, and trichomoniasis among the 15-49 age group
throughout the world. This number does not include cases of
HIV and other sexually transmitted infections that continue to
negatively affect the lives of individuals and communities
around the world, and sexually transmitted infections and their
complications in developing countries fall into the most
important disease categories. The five that adults seek health
care services for, and the Trichomonas vaginal parasite that
causes diseases of the human reproductive system was initially
named Trick and then changed to the name and throughout
1936 in the year Ehrenberg, this as mentioned by the scientist
P. Trichomonas vaginali, years ago it was known as social
parasites before it was known to It is a disease, which was
installed in 1940, and this division of vaginal trichomonas is
due to what it is now to the world of Burgass in the year 1998
(Petrin et al., 1998).

Classification

The classification of trichomonas is largely dependent on the
number and arrangement of flagella, as most are parasites
Trichomonas vaginalis belongs to the family of Trichomonas
flagella (Tricomondedae). There are three types among the
human hairs are:

1. Trichomonas vaginalis lives in the vagina.
2. Trichomonas hominis lives in the intestine.
3. Trichomonas tenax is found in the mouth.

These types can be differentiated by the difference in the
injury site and the morphological and structural variation. The
Trichomonas vaginal parasite is one of the largest of these
types and the only one that causes the disease. This parasite is
classified:

Kingdom: Animalia
Phylum: Protozoa
Subphylum: Sarcomastigophora
Superclass: Mastigophora
Class: Zoomastigophora
Order: Trichomonadida
Family: Trichomonadae
Genus: Trichomonas
Species: T. vaginalis

Morphology and structure

The parasite has a pear or oval shape (Fig.1), a length of 15-5
microns, and a width of 10-7 microns. The front part of the
parasite’s body has a nuclear particle located in its center. The
parasite also has multiple digestive vacuoles (Garber, 2005).
The parasite moves in the middle in which it lives using five
flagella, four of which are of equal length. It is located in the
anterior part of the parasite’s body, and the fifth flagellum is
lateral, attached from its anterior and posterior ends to the
Costa rib, forming the outer boundary of the (undulating)
membrane in which there are fine particles that help adhesion
and exchange of nutrients between the host cells. The
membrane is except when the traverse movement, which is
characterized by its active, progressive, vibrational movement,
is reduced thanks to the front flaps and the rotational
movement around itself, thanks to the undulating membrane.
There is also a pair of Axostyle needles that extend from front
to back and protrude at the posterior end of the parasite's body.
The parasite also has fine, parallel, longitudinally arranged
microscopic tubes that accentuate the end of the parasite and
end with a thin spine that originates outside the body of the
parasite, and appears outside from the backside clearly and it
is not moving, as they noticed there are two forms of the
parasite, a rounded shape and another similar to the amoebic
phase, where they found that The amoebic form usually
appears in acute infection with the parasite, and its effect
changes according to the special conditions surrounding the
vagina, the cause may be a hormonal allergy or other causes,
and through other studies, it has been found that the
Trichomonas vaginal parasite is not much different from the
rest of the other types that are found in the mouth, the large
intestine. And the bladder, and in a comparison between two of
these types, it was found that the backward flagellum
forming the corrugated membrane ends before the end of the
parasite in the vaginal trichomoniasis, while in the middle of
the end of the parasite in the human trichomonas located in the
intestine, and is distinguished from the Trichomonas parasite
present in the mouth, but some differ something in size as
well as in the wavy membrane is relatively short. (Schwebke
and Burgess, 2004) In prepared prepared samples, the
Trichomonas vaginal parasite appears spherical with a size of
18-15 microns, but it is smaller when it is attached to the slide.
Pathogenicity and clinical symptoms

The incubation period for this disease ranges from 4 days to 3 weeks, and the symptoms differ between women and men, in men the infection is in most cases without any symptoms and often unclear and less dangerous, which is observed in women and in cases of severe infection the symptoms are as follows:

- Itching and disturbance of the urethra, in addition to dysuria and sexual intercourse, due to inflammation of the urethra, bladder and epididymis.
- Permanent inflammation of the bladder, which includes inflammation of the seminal vesicles and the upper regions of the genitourinary system, with urinary secretions (Cami et al., 2014). This inflammation is accompanied by an enlarged prostate and may cause infertility (Cudomre et al., 2004) In women, the infection is rarely asymptomatic, with a rate ranging between 10-15%. These symptoms are as follows:
  - Abundant vaginal secretions with a foul odor (fishy odor, foamy and creamy-colored in both moderate and severe cases.
  - Inflammation of the vagina with burning and itching accompanied by yellow or greenish secretions, and the labia and the area surrounding them become red and inflamed (Powers and Celeste, 1998).
  - Common symptoms are frequent urination, which is accompanied by pain and dysuria, as well as urethritis and cystitis (Ohlemeyer et al., 1998).
  - Local itching and burning in the vulvar region, the urethra, cervix, and bartolin gland may become inflamed, and this inflammation may move to the ureter and the vesicle, sometimes causing dyspareunia, and the vagina appears red due to the hemorrhage that it is exposed to (Sood et al., 2007).
  - Itching in the inner upper part of the thigh, the labia may become slightly swollen, and the vaginal secretions come out continuously, especially during or after menstruation, forming what is known as hematuria.
  - Some experiments have shown that the symptoms of vaginal Trichomonas infection affect the concentration of a hormone. Estrogen in the vagina, so that the higher the concentration of this hormone, the fewer symptoms associated with the disease.

Life cycle

Flagellates, including Trichomonas vaginalis, reproduce by simple binary division with a direct life cycle, you do not need any mediator. The natural pH of the vagina from 4.5 (pH 4) When the acidity of the vagina changes or abnormal occurs, the environment becomes ready to proliferate in the reproduction of Trichomonas vaginalis. The path of direct infection with the larvae, where there is no cystic phase or any other phases in the parasite's life cycle, and the larvae are divided directly longitudinally without passing through transitional stages (Huppert et al., 2007).

Mode of infection

The active phase (Trophozoite) is the infectious phase in humans, and the infection is transmitted from one person to another in several ways:

- Direct sexual contact
- Multiple sexual partners.
- Low levels of personal hygiene

Scientists have shown that personal hygiene has a role in the transmission of infection, as they concluded from their studies that the rates of infection are almost equal between the two sexes, so that this percentage among women is between 10-25% and that the rates of this percentage vary according to personal hygiene (Schirm et al., 2007), while this percentage in men was from 10-20%. (Kengne et al., 2004).

- The use of underwear for injured persons (Cudmore et al., 2004).
- Childbirth

In rare cases, the Trichomonas vaginalis parasite can be isolated from the respiratory system of infants, in cases of respiratory tract infection and conjunctivitis, which gave evidence that infection of newborns may be during the birth stage in the vaginal region of the infected mother (Ryan et al., 2004).

- Use of public toilets.

Fig. 2 Life cycle of T. Vaginalis
Diagnosis

Diagnosis is made in women in several ways, including:

- Clinical diagnosis

Women infected with *T. vaginalis* develop infections characterized by small red spots on the wall of the vagina, and the cervix resembling strawberries, and this is examined using the vaginal speculum.

- Laboratory diagnosis includes:

Direct microscopy

The urinary sediment is examined to detect the presence of the parasite and the vaginal secretions are examined (Mielczarek and Blaszkowska, 2015).

Culture. Implantation

*Trichomonas vaginalis* implantation is currently considered the most sensitive method for diagnosis, and it is recommended to perform it when there is a suspicion of vaginal infection with *Trichomonas* even if the direct examination is negative. These parasites reproduce 2-4 days after cultivation (Hussein and Atwa, 2008).

- Immunological methods

These methods depend on detecting Trichomoniasis vaginal antigens in the serum and are represented by: agglutination of latex, agglutination of the latex molecules Immunofluorescence and exceed the sensitivity of ELISA (Enzyme Immunosorbent) and particles of these immune methods (Verges, 1979).

  - Taking a swab from the cervix.
  - PCR examination to detect vaginal *trichomonas* DNA (Upcroft and Upcroft, 2001)

Treatment

One of the most commonly used drugs is metronidazole (Flagyl) Metronidazol. Trichonomiasis, in which a person with *Trichomonas vaginalis* parasite is treated with the use of metronidazol compounds by mouth, in an adult person one tablet at a concentration of 250-200 mg three times a day for one week or for ten days and in children 100 mg three times a day from 12 years and over 50 mg three times a day from 12 years and over 100 mg / 3 times a day (AL-Naeyl et al., 2021) taking into account not to give it to pregnant women, especially during the first months of pregnancy (Gowhari et al., 2021). It is important to examine the partner and give him the same treatment even in the absence of Micro-organisms, in order to avoid the risk of recurring infection, and when the infection recurs, a distinction must be made between this recurrence and the failure of treatment, in the case of recurrence the aforementioned treatment is used for both partners together, while in the failure of treatment resort to increasing the dose, or increasing the length of the treatment period, or changing the drug This, and we must emphasize the treatment of both spouses together, not just the patient, with abstinence from sexual intercourse for the duration of the treatment (Mousa and Qasim, 2015; Qasim and Al-Mayali, 2019; Tahmasebi et al., 2021).

12 of other treatments are the use of an acid vaginal wash such as a solution of lactic acid or dilute vinegar to preserve the acidic environment of the vagina, which does not help *trichomonas* life (Mohammed and Qasim, 2021), while in newborns after the fourth week who have symptoms of inflammation and Infection with *T. vaginalis* can be treated with metronidazole 30-10 mg / kg daily for five to eight days.

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

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