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(REVIEW ARTICLE)

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A review: The study of pathogenic bacteria that cause antibiotic-resistant cervical ulcers in young women

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Abstract

Cervicitis is the medical term for infection of the cervix in females. usually spread sexually. Upper vaginal tract issues can result from the silent infection cervicitis, which is typically asymptomatic. Increasing vaginal discharge, whether or not there is vaginal bleeding, is the most significant. The microorganisms known to cause cervicitis include the genus *Chlamydia trachomatis*, *Neisseria gonorrhea*, and *Mycoplasma genitalium*. molecular methods and cultures are used to determine the diagnosis. the females who are most likely to contract these diseases.

Keywords: Antibiotics; *Neisseria gonorrhoeae; Chlamydia trachomatis; Mycoplasma genitalium*.

1. Introduction

Cervicitis is an infection of the cervix that is linked to upper genital tract infections and problems during pregnancy. It can be carried on by several known pathogens, It is a more condition infected the women in childbearing age and sexual activity this disease it can be acute cervicitis , or chronic characterized by inflammation of the uterine end cervix, when the vaginal discharge continues more than three months then it's called chronic cervicitis, Cervical chronic inflammation may contribute to cervical cancer development, There is no established method for treating patients whose infections are caused by non-infectious sources (1). Mucus, pus, and mucopurulent cervical discharge are the symptoms, and vaginal bleeding is another clinical indicator of inflammation(1, 36). Although cervicitis can be caused by many pathogens *Neisseria gonorrhoeae*, *Chlamydia*, *Herpes simplex* virus, *Trichomonas vaginalis*, *Mycoplasma genitalium*, *Ureaplasma urealiticum*, and *Trichomonas vaginalis* are the most common pathogens that cause cervicitis(2,3). Mechanical irritants like traumatic injury from surgical instruments, foreign bodies, cervical caps, or condoms, and chemical irritants like spermicide, contraceptive creams and vaginal douche also can causes cervicitis.(4). There is a distinct relationship between cervicitis and infertility, pelvic inflammation and bacterial vaginosis (5).

Anatomically the uterus connected with the vagina by adjacent channels and the environment of vagina is acidic that it a suitable to revive more deleterious bacteria such as *Gardnerella* and *Prevotella* in turn, has bacteria that ability to go from the cervix to the uterus (6,7).When the patient infect by invasion to pathogens will be use antibiotics as a result of excessive irresponsible use of antibiotics and without medical advice bacteria that is a jointly resistant to most antibiotics by various mechanisms(8).

This is medically called Multidrug resistance (MDR)(9). this resistance comes in many forms like Primary, Secondary and Clinical Resistance(10).Usually the pathogen which cause the infection have many virulence factors pili, capsule, surface hydrophobicity, adherence, biofilm formation, protease and siderophores (11). Mostly found interaction between the cervicitis and vaginitis that due to both organs return to the reproductive system and this makes the transmission of pathogens between them very possible, chronic inflammation of the vagina with cervicitis and

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endometrium barely lead to infertile(12) . during vaginal infection by bacteria produce same enzymes these enzymes act to deterioration cervical mucus as a result devastate the cervical barrier (13). chlamydia trachomatis , *Mycoplasma genitalium* and infection by *Neisseria gonorrheae* , and genital *Herpes simplex* virus arise from risk factors of cervicitis(14). when the treatment of uterine ulcers is neglected, the infection will be spread to the vaginal woman, it cause bacterial vaginosis and which associated with various gynecological diseases such as pelvic infection, spontaneous abortion, premature birth, amniotic fluid infection, postpartum endometritis, and perinatal complications cervicitis can be caused by several known pathogens, most infection of cervices accrue caused by sexually transmitted diseases(15). this review is a study the bacteria causes cervicitis in woman.

1.1. Etiology

Female during the your live exposure to more diseases special gynecological diseases and This caused by microorganisms like viruses and bacteria which compromise the body's defenses(16)**.** the cervicitis one from the disease infect to woman this disease Probably classified into types infectious and non-infectious, Infectious accrue by germs like *Neisseria gonorrhoeae Chlamydia trachomatis*, herpes simplex least commonly, *Trichomonas vaginalis ,* The infect beginning in the columnar epithelial tissue in endocervix when you are by Neisseria and chlamydia *but* affect the squamous epithelial tissue in ectocervix human immunodeficiency virus (HSV) and Trichomonas(17). Chemical and physical irritants are considered non-infectious causes (18). The cause of more than fifty percent of cases of cervicitis is unknown (19).

1.2. Risk Factors for Cervicitis

Numerous variables contribute significantly to the development of cervical cancer. The hypo estrogenic state brought on by menopause, whether it's natural or surgical, can resemble cervicitis.

This results from the uterine and vaginal lining atrophy (1). Since sexual activity is the primary infectious cause risk factor (39,40). Additionally, there are dangers if a pregnant lady has an infection , Progesterone may result in the thinning of this epithelium in pregnant women and women who use estrogen-containing contraception, among other impacts hormones have on the cervicovaginal mucosa (42).

1.2.1. Causes of cervicitis

Cervicitis can accrue from many causes:

Chlamydia trachomatis

Chlamydia Trachomatis is an anaerobic pathogen with a distinct two phasic developmental growth cycle that produces blinding trachoma and transmitted sexually (STI). Trachoma is prevalent in underdeveloped that causes blindness or vision impairment in millions of people*.* (46,47).

Chlamydia trachomatis the first a sexually transmitted infectious disease . is gram- negative pathogens, intracellular obligates that division within eukaryotic cells(24) Under anatomic position, the most usually infected, this can be seen in cervicitis, urethritis, and pelvic inflammatory disorders, which, if left untreated in women, increase the risk of infertility and ectopic pregnancy, resulting in expensive medical costs. Infection can cause urethritis, epididymitis, and prostates in males (23). *chlamydia trachomatis* can infected both men and women in pregnancy the many issues have occurred, such as loss of the fetus, premature rupture, preterm labor and delivery, low birth weight (43,44,45). Numerous methods used in the diagnosis of chlamydial infections that rely on detective virulence factors, such as bioinformatics analysis, microscopic localization and substitute secretion systems. These techniques have enabled the identification of a large number of putative effectors. (48,49).

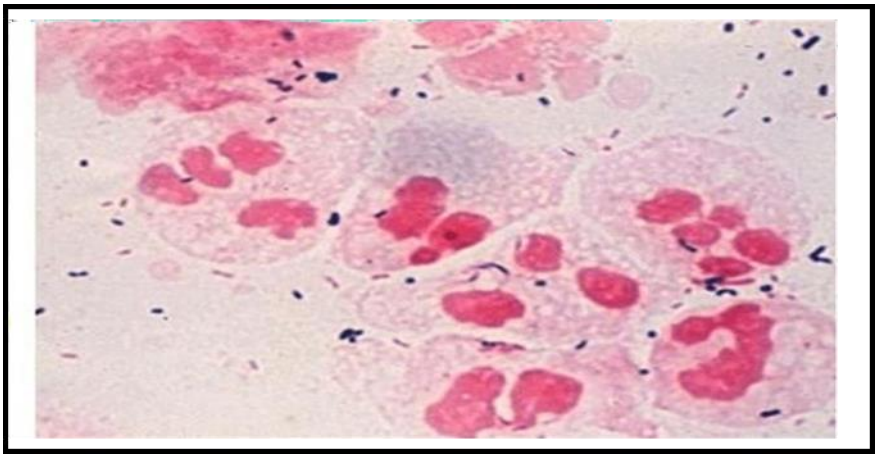

Figure 1 Chlamydia trachomatis smear

Neisseria gonorrheae

is a Gram-negative bacteria and The cervix is the most typical location of *N. gonorrhoeae* infection. Which sexually transmitted infection is most prevalent in women this disease usually infected individuals of both sexes in case limited culture and education (53,54,55).generally the mean cause of mucosal infections in urogenital tract by *N. gonorrhoeae* bacterium and the transitional and columnar epithelial tissue it the first damage (25).

urethritis in men and cervicitis in women considerably a result of infection with this bacteria (26). *Neisseria gonorrhea* is not part of the normal Flore, it indicative of infection [27].The effect of *Neisseria gonorrhea*e mainly prevent harm brought on by innate immune responses being triggered at colonization sites (31).

When Neisseria gonorrhea is not treated, it can lead to genital tract problems such as infertility and ectopic pregnancy (28). Because N. gonorrhea cannot survive outside of the body, sexual transmission is the major mode of infection between hosts. (32).

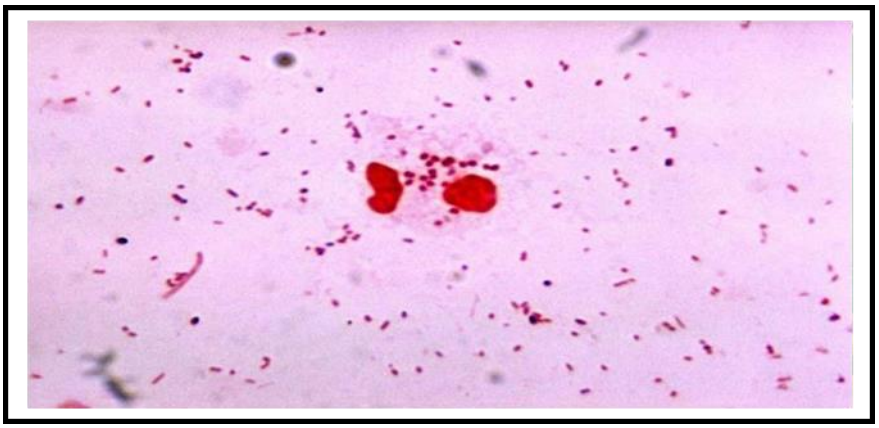

Figure 2 Neisseria gonorrheae smear

Mycoplasma genitalium

Mycoplasma genitalium a tiny bacteria, the cell wall is absent which has provided the organism many functions such as resistance to antibiotics that target cell wall synthesis *(34,35*). *M. genitalium* was discovered at the beginning of the 1980s in men suffering from non-gonococcal urethritis(33). *M. genitalium's* pathogenicity is related to the ability of host epithelial cells to use the terminal tip organelle, the production of substances known as enzymes, and the ability to avoid the human body's immune response by antigenic variety (53). *Infection with M. genitalium* is linked to reproductive health outcomes in women (30). it has been associated with cervicitis, urethritis and pelvic inflammatory disease (29). In sexually active women, ages 15 and up, infection is more likely, and (HIV) is the most commonly implicated agent in this demographic (37,38). The primary route of transmission is direct genital-genital mucosal contact. *M. genitalium* It has been determined that penile-anal sexual contact can transmit some diseases. Due to the limited prevalence of *M.*

genitalium in the oropharynx and the lack of evidence of mother-to-child transmission after birth, oral-genital contact is less likely to significantly contribute to the spread of the infection.

M. genitalium has not been thoroughly investigated, but it has been found in the respiratory tract of newborn infants(50).

hormonal imbalance

The elevated SIL rate observed in premenopausal women may be due to the hormonal imbalance brought on by the steady drop in estrogen levels. However, when cytological results from premenopausal and postmenopausal women were compared (51).

Complications

The infection begins in the upper genital tract and can progress to a pelvic inflammatory illness if left untreated. This is the most dreaded side effect associated with this cervicitis. The fallopian tubes may become inflamed and scarred as a result of pelvic inflammatory disease, and both acute and chronic consequences, such as abscess formation, persistent discomfort and infection, ectopic pregnancy, and infertility, may also occur(52)

1.2.2. Diagnosis

Diagnosis is made through visual cervix inspection and cervical ovaries swabbing, women, the diagnosis of cervicitis is predominatingly inexact and unconfirmed as well as that women during the disorder and appearance the signal disease may not receive effective treatment(56). The first step in diagnosing cervicitis is to establish whether the cause is infectious or non-infectious(57). in women the Diagnosis by testing urine and endocervix or vagina discharge swab specimens(58). Additionally, Gram stain microscopy can be used to confirm the presence of cervical inflammation. (59).

1.2.3. Prevention of cervicitis

It's important to know which organism is causing the cervicitis because the prevention and treatment of case depend on type of pathogens, Since cervicitis is typically brought on by an STD, it is crucial to stress the use of condoms throughout all sexual encounters. positive test results must be encouraged to sexual contact for seven days after receiving treatment and resolving any potential symptoms. Condoms are particularly successful at preventing the spread of STIs like chlamydia and gonorrhea, which can cause cervicitis. Your risk of contracting an STI can be reduced if you're in a long-term relationship with a partner who devotes himself to having sex with you only(60).

Compliance with ethical standards

Disclosure of conflict of interest

Authors have declared that no conflict of interests exists.

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