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SPECIAL ARTICLE

The Thai 2022 Sexually Transmitted Infections Treatment Guideline: Abnormal vaginal discharge

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ABSTRACT

Abnormal vaginal discharge is one of the most common presenting symptoms at gynecologic clinics. Sexually transmitted infection (STI) is a subset of all etiologies; but appears to be a major public health concern as it much affects health and economy of the infected people. Improper or delayed management results in greater morbidity and mortality. From the epidemiological surveillance data in Thailand, STI is on the rise; and gonorrhea and chlamydial cervicitis appear to be the main STI causes of abnormal vaginal discharge. In this year, the Division of Autoimmune Deficiency Syndrome (AIDS) and Sexually Transmitted Infections (STIs), Thai Ministry of Public Health, in collaboration with Institute of HIV Research and Innovation (IHRI), Institute of Dermatology, Faculty of Medicine, Chulalongkorn University, and Faculty of Medicine Siriraj Hospital, Mahidol University, has issued the Thai national guideline for diagnosis and treatment of sexually transmitted infections, 2022. As a high proportion of women presenting with abnormal vaginal discharge are non-STI cases, the treatment guideline includes both STI and non-STI causes. And, this article will focus on only the section of the guideline for managing women with abnormal vaginal discharge.

Keywords: guideline, sexually transmitted infections, Thai, treatment, vaginal discharge.

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แนวทางการรักษาโรคติดเชื้อติดต่อทางเพศสัมพันธ์ของไทย พ.ศ.2565: ภาวะระดูขาวผิดปกติ

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บทคัดย่อ

ภาวะระดูขาวผิดปกติเป็นอาการนำที่พบบ่อยที่สุดอาการหนึ่งในคลินิกนรีเวช ถึงแม้ว่าสาเหตุเพียงส่วนหนึ่งเกิดจากโรคติดต่อทางเพศสัมพันธ์ แต่ถือว่าโรคติดต่อทางเพศสัมพันธ์เป็นปัญหาทางสาธารณสุขที่สำคัญ เนื่องจากส่งผลกระทบในวงกว้างทั้งด้านสุขภาพและเศรษฐกิจ การรักษาที่ช้าหรือไม่เหมาะสมจะส่งผลให้เกิดภาวะแทรกซ้อนตามมาจนอาจถึงแก่ชีวิต จากรายงานเชิงระบาดวิทยาในประเทศไทย พบว่าอุบัติการณ์ของโรคติดต่อทางเพศสัมพันธ์มีสูงขึ้น โดยโรคหนองในและโรคหนองในเทียมเป็นโรคติดต่อทางเพศสัมพันธ์ที่เป็นปัญหาสำคัญที่ทำให้ผู้หญิงมีภาวะระดูขาวผิดปกติ ในปี พ.ศ.2565 กองโรคเอดส์และโรคติดต่อทางเพศสัมพันธ์ กระทรวงสาธารณสุขร่วมกับ สถาบันเพื่อการวิจัยและนวัตกรรมด้านเอชไอวี สถาบันโรคผิวหนัง คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย และคณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล ได้จัดทำแนวทางการวินิจฉัยและการรักษาโรคติดต่อทางเพศสัมพันธ์ เนื่องจากภาวะระดูขาวมีสาเหตุจากทั้งโรคติดต่อทางเพศสัมพันธ์และไม่ใช่กลุ่มโรคนี้ แนวทางการรักษาจึงได้ครอบคลุมกลุ่มโรคที่ไม่ใช่โรคติดต่อทางเพศสัมพันธ์ด้วย และบทความนี้จะเน้นเฉพาะกลุ่มที่มีอาการระดูขาวผิดปกติเท่านั้น

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Introduction

Abnormal vaginal discharge is one of the most common presenting symptoms at gynecologic clinics. Sexually transmitted infection (STI) is a subset of all etiologies; but appears to be a major public health concern as it much affects health and economy of the infected people. Improper or delayed management results in greater morbidity and mortality. According to the estimation by the World Health Organization (WHO) in 2020, there are 374 million new infections from all regions around the world: 156 million are trichomoniasis, 129 millions are chlamydial cervicitis and 82 million are gonococcal infection[1]. From the epidemiological surveillance data in Thailand, STI is on the rise, from 28.8 per 100,000 population in 2017 to 33.6 per 100,000 population in 2020[2]. In 2021, the most common STIs that caused abnormal vaginal discharge were gonorrhea and chlamydial infection, at 2.4 per 100,000 population and 1.3 per 100,000 population, respectively. The prevalence was highest in people at the age of 15-24 years.

In this year, the Division of Autoimmune Deficiency Syndrome (AIDS) and Sexually Transmitted Infections (STIs), Thai Ministry of Public Health, in collaboration with Institute of HIV Research and Innovation (IHRI), Institute of Dermatology, Faculty of Medicine, Chulalongkorn University, and Faculty of Medicine Siriraj Hospital, Mahidol University, has issued the Thai national guideline for diagnosis and treatment of sexually transmitted infections, 2022. As a high proportion of women presenting with abnormal vaginal discharge are non-STI cases, the treatment guideline includes both STI and non-STI causes. And, this article will focus on only the section of the guideline for managing women with abnormal vaginal discharge.

Vaginal ecosystem[3]

The vagina is a passageway for natural conception, menstruation and birth canal. Also, it is a channel for pathogens to enter the body. Vaginal epithelium protects the body from infection with mucus protein (sialoglycoprotein) coated as a physical defense; provides an immune defense by producing secretory immunoglobulin A and immunoglobulin G that capture pathogens; and contains immune-related cells[4]. Vaginal discharge is another pivotal protective factor of the infection. The normal vaginal discharge consists of secretions from various parts, including cervical gland, fluid from the vaginal wall, fluid from the fallopian tube and endometrial cavity, secretions from the Bartholin's gland and Skene glands, vaginal flora and their metabolic products.

The main bacteria in the vagina of prepuberty women are *E. coli, Diphtheroids*, and coagulase-negative *Staphylococcus*. During puberty, *Lactobacilli spp*. are the dominant normal flora bacteria. Estrogen produces more mature squamous cells and increases the accumulation of glycogen in the vaginal epithelium cells. Vaginal enzymes include alpha-amylase breaking down glycogen into maltose, maltotriose, and alpha-dextrins. They are then digested by lactase dehydrogenase of *Lactobacilli spp*. to lactic acid which inhibits the growth of other bacteria. This results in mildly acidic vaginal environment (pH 3.5-4.5) during reproductive period.

Vaginal ecosystem can be frequently disturbed by both intrinsic and extrinsic factors. The intrinsic factors relate to hormonal change, including menopausal period, menstruation, pregnancy and lactation. As such, characters of vaginal discharge vary with age, condition and day of menstrual cycle. Therefore, 'abnormal vaginal discharge' is too complicated to be approached using a 'syndromic approach'. The extrinsic factors cover a wider range of causes, including excessive vaginal cleansing, sugar-rich diet, high level of stress, prolonged use of antibiotics, sedentary lifestyle, hormone use and abnormal bleeding as a side effect etc. These factors should be taken into consideration as an important part for managing women with abnormal vaginal discharge.

Approach to women with abnormal vaginal discharge

On top of the approach to gynaecologic patients which includes history-taking, physical examination and

pelvic examination; vaginal pH and wet preparation should also be done. History taking to assess the risk of STIs, including the number of sexual partners, new sex partners within prior three months, condom use, and history of STIs in both the woman and her sexual partner(s). Physical examination aims to detect systemic manifestations of STIs such as skin rash and alopecia. Pelvic examination reveals external genital/ vaginal/ cervical lesions, urethral discharge and characters of vaginal discharge. Some characters of vaginal discharge may be helpful but not specific such as homogeneous whitish discharge indicating bacterial vaginosis, mucopurulent discharge indicating bacterial infection, yellow or green frothy discharge indicating trichomoniasis and lumpy vaginal discharge (curd-like discharge) indicating fungal vaginitis.

Techniques of pelvic examination should be of concern as the taken specimen will be further tested. A dry speculum should be used so that the pH of vaginal discharge is accurately measured. Collection of abnormal vaginal discharge from the posterior and lateral fornix (high vaginal swab) should be done before Pap testing in order to avoid blood contamination. This specimen will be examined under microscopy (wet preparation). On the contrary, endocervical swab can be done either before or after Pap testing because this specimen will be sent for Gram staining, culture or molecular STI diagnosis.

A wet preparation is a test of abnormal vaginal discharge mixing with normal saline solution; dripping on a glass slide; and being examined under a 100x microscope. It should be done within one hour after specimen collection. As the first glance, the ratio of numbers between leukocytes and squamous epithelium and the jerky movement of the organisms (*Trichomonas vaginalis*) should be looked for. Detection of *T. vaginalis* can immediately lead to treatment of trichomoniasis. If number of squamous epithelium is more than that of leukocytes, three conditions are considered, including normal vaginal discharge, bacterial vaginosis and acute vaginal candidiasis. A 10% potassium hydroxide (10% KOH) solution should then be used to break down the cell membranes, but not the cell walls of the fungi, making the pseudohyphae more noticeable. Moreover, fishy odor, one of the diagnostic criteria for bacterial vaginosis, can be observed (positive whiff test). To detect clue cells, another drop of high vaginal swab will be examined under 400x microscope (high power field; hpf).

If number of leukocytes is more than that of squamous epithelium, the diagnosis can be bacterial vaginitis (gonorrhea, non-gonococcal cervicitis, trichomoniasis, aerobic vaginitis, cytolytic vaginitis) and chronic candidiasis. A drop of 10% KOH solution should also be added to reveal pseudohyphae. Then, another drop of high vaginal swab will be examined under 400x microscope(hpf) to count number of leukocytes. According to the Center for Disease Control and Prevention, the definition of cervicitis is a leukocyte count greater than 10/hpf[5] although clinical application is not clear. A previous study showed that 21.8% of high vaginal swab with ≥ 30 leukocytes/hpf had *Chlamydia trachomatis*[6].

Apart from wet preparation, vaginal pH and Gram staining are also bed-side diagnostic tools of abnormal vaginal discharge. Vaginal pH ≥ 4.7 favors deficient vaginal ecosystem[7] which both results in and is resulted from abnormal vaginal discharge. Vaginal pH alone and combining with clinical symptoms demonstrated high diagnostic performance[7]. However, contamination of blood, seminal fluid or douching solution deranges the interpretation. Gram staining is useful but appears complicated and time-consuming.

As molecular diagnostic tests of STI pathogens, in an individual test or in a panel form, have currently been widely available, more precise diagnosis and treatment should be the primary goal. Nonetheless, most of the healthcare settings in Thailand where such tests are considered unaffordable, microscopic examination should play the major role. The Thai guideline suggests using ≥ 30 leukocytes/hpf as the triage point to starting treatment of gonorrhea and chlamydial cervicitis. In out-reached settings where microscopic examination is not provided, syndromic approach using sexual risk behaviors and naked-eye diagnosis is also acceptable. (Fig. 1)

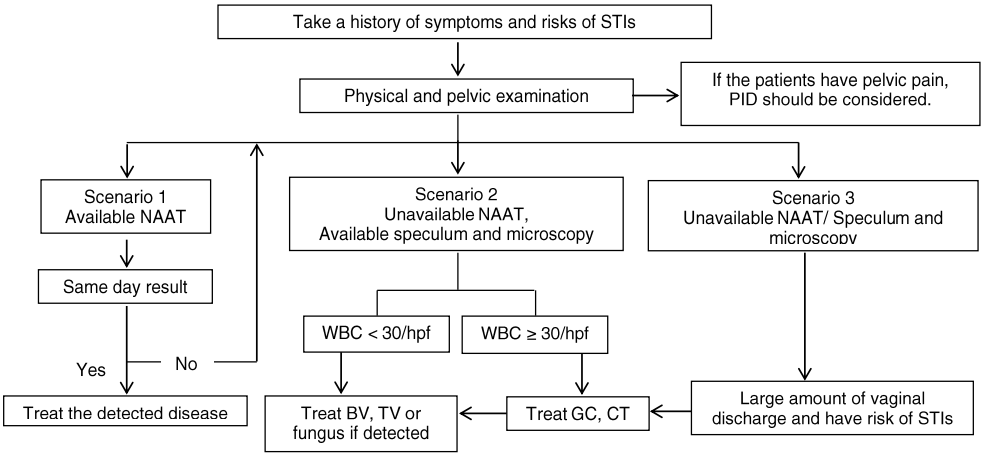

Fig. 1. Algorithm for treating women with abnormal vaginal discharge.

BV: bacterial vaginosis, CT: chlamydial cervicitis, GC: gonorrhea, NAAT: nucleic acid amplification test, PID: pelvic inflammatory disease, STIs: sexually transmitted infections, TV: trichomoniasis, WBC: white blood cell

Remarks: 1. The pH test and wet preparation should be done every time if available.

2. Follow up at 1-2 weeks for assessment of treatment response. If symptoms do not improve, re-evaluation should be done.

Source: Thai 2022 STI treatment guideline

Recommended treatment regimens by diseases

Non-STI causes of abnormal vaginal discharge appear more prevalent than STI ones[8]. Characteristics of vaginal discharge were demonstrated in Table 1.

Table 1. Characteristics of vaginal discharge by various conditions.

	Normal	Candidiasis	Cytolytic vaginitis	Bacterial vaginosis	Aerobic vaginitis	Gonorrhea	Non-gonococcal infection	Trichomoniasis
Signs and symptoms	Change with day of menstrual cycle, clear or mucoid discharge	Itching, stinging, abrasion, thick, curd-like discharge, dyspareunia	Itching, marked inflammation, large amount of discharge, dysuria, dyspareunia	No inflammation, fishy-odored discharge, homogeneous whitish discharge	Itching, marked inflammation, large amount of discharge, dysuria, dyspareunia	Large amount of vaginal and urethral discharge, dysuria	Large amount of vaginal and urethral discharge, dysuria (less severe than gonorrhea)	Itching, large amount of vaginal discharge, yellow or green discharge
pH	≤ 4.5	≤ 4.5	≤ 4.5	> 4.5	> 4.5	> 4.5	> 4.5	> 4.5
wet smear	PMN:EC < 1	PMN:EC < 1	PMN:EC < 1	PMN:EC < 1	PMN:EC > 1	PMN:EC > 1	PMN:EC > 1	PMN:EC > 1
Gram stain	Lactobacilli (gram+ rod)	Pseudohyphae, budding yeast	Lactobacilli (gram+ rod)	Clue cells	Various organisms	Gram negative diplococci	-	Trichomonad

PMN: polymorphonuclear leukocytes, EC: vaginal epithelial cells. Source: Thai 2022 STI treatment guideline

Vaginal candidiasis

Vaginal candidiasis (VC) is the leading cause of abnormal vaginal discharge[8, 9]. The most common pathogen is *Candida albicans*, at about 80-90%, followed by *C. glabrata, C. tropicalis, C. krusei*, etc[10]. As *C. albicans* is a normal flora that can live in the vagina. VC is not classified as an STI.

Signs and symptoms

The symptoms of VC are itching inside or outside the vagina and abnormal vaginal discharge such as increased amount or curd-like appearance. In case of severe symptoms, external genital area is involved causing erythema, swelling, painful skin, abrasions, or dyspareunia.

Risk factors[11]

Vaginal candidiasis was associated with internal factors in each woman more than the severity of pathogen. Those factors are often related to blood sugar levels, including poorly controlled diabetes, pregnancy, steroid use etc. In addition, long-term use of antibiotics and receiving additional hormones (birth control pills containing estrogen, hormone replacement therapy in menopause) have been associated with vaginal candidiasis. Additional factors related to stress or mood swings, iron deficiency anemia and excessive cleaning of the genitals have also been reported.

Diagnosis

Examination of high vaginal swab under a microscope is the most practical method. For fungal culture, it is reserved for recurrent VC as it can be used to detect drug-resistant strains. Only clinical diagnosis by history or naked-eye diagnosis is not accepted. At present, screening for other STIs among women with VC is not recommended.

Treatment

C. albicans responds well to azoles group medication. Oral formulation should be avoided in pregnant and lactating women; and pregnant patients require a longer course of treatment. Vaginal suppositories may reduce the contraceptive effectiveness of condom. Azole cream should be added if there is vulvar involvement but should not be applied deep into the vagina.

Beside medications, advice regarding vaginal hygiene and general healthcare should be underlined. Gentian violet as an adjuvant treatment for women with acute VC significantly helps reduce symptom duration[10]. Sexual intercourse should be avoided until all symptoms are subsided. (Table 2, 3)

Table 2. Recommended treatment of acute vaginal candidiasis.

Medications*	- Fluconazole 150-200 mg orally single dose - Itraconazole 200 mg orally twice daily for 1 day - Clotrimazole 500 mg vaginal suppository single dose - Clotrimazole 200 mg vaginal suppository daily for 3 days - Clotrimazole 100 mg vaginal suppository daily for 6-7 days - Miconazole 200 mg vaginal suppository daily for 3 days
Abstinence from sex	If having symptoms
Sexual partner treatment	No treatment
Follow-up	Repeat examination only if symptoms persist.

* Sertaconazole 300 mg ovule is an azole vaginal suppository which shows an acceptable treatment efficacy (unpublished data)[12].

Table 3. Recommended treatment of recurrent vaginal candidiasis.

Medications	- Fluconazole 150-200 mg orally every 3 days for 3 doses then Fluconazole 150-200mg orally once weekly for 6 months - Fluconazole 150-200 mg orally every 3 days for 3 doses, followed by Fluconazole 150-200mg orally once weekly for 2 months. At the follow-up visit, fungal culture should be done. If negative, fluconazole 150-200mg orally every 2 weeks for another 2 months. At the follow-up visit, fungal culture should be done. If negative, fluconazole 150-200 mg orally every 4 weeks for another 4 months. At the follow-up visit, fungal culture should be done. If negative, the medication can be discontinued.* *If there is a breakthrough symptom, re-evaluation should be done; and fluconazole at the previous dose should be continued.
Abstinence from sex	If having symptoms
Sexual partner treatment	No treatment
Follow-up	Repeat examination only if symptoms persist.

No improvement of symptoms may be caused by azole resistance or non-albicans *Candida* pathogens. Alternative treatments are nystatin 100,000 units vaginal suppositories for 12-14 nights or Amphotericin B vaginal suppositories 50 mg vaginal suppositories for 14 nights[11]. A study in Thailand demonstrates that a course of 6 dequalinium chloride 10 mg vaginal tablets has an acceptable efficacy[13].

Bacterial vaginosis (BV)

BV is not considered as an STI because it is caused by an imbalance of bacterial community in vagina. There is an increase of anaerobic bacteria replacing *Lactobacilli spp*.

Signs and symptoms

BV is mostly asymptomatic. Those who have symptoms often present with whitish or grayish vaginal discharge or with fishy-odor discharge. The smell becomes striking during sexual intercourse and around menstrual period.

Risk factors

Disturbance of vaginal ecosystem includes vaginal douching, excessive genital cleansing, prolonged vaginal bleeding or following any kinds of vaginal infection.

Diagnosis

The most commonly used bedside diagnostic tool of BV is Amsel criteria[14]. Diagnosing BV by Amsel criteria requires the presence of 3 out of 4 criteria; homogeneous creamy grayish-white discharge, vaginal pH is > 4.5, fishy-odor discharge either before or after adding 10% KOH (whiff test), and presence of clue cells. The limited use of Amsel criteria is when there is contamination of blood, seminal fluid or amniotic fluid. Another diagnostic method of BV which has high diagnostic accuracy is the detection of ≥ 20% clue cells in either wet preparation or Gram staining (sensitivity 87.1% and specificity 55.8%)[15].

Treatment

Antibiotic treatment together with risk behavior modification is recommended. As metronidazole is the main antibiotics, patients should be advised to avoid alcohol consumption until ≥24 hours after last metronidazole intake or for ≥72 hours after last tinidazole intake to avoid disulfiram-like reaction. Common side effects of the medications include nausea, vomiting, and metallic taste. (Table 4)

Table 4. Recommended treatment of bacterial vaginosis.

Medications	- Metronidazole 400-500 mg orally twice daily for 7 days
	- Metronidazole 2 g orally single dose
	- Metronidazole 750 mg vaginal suppository daily for 7 days
	- Tinidazole 2 g orally single dose
	- Clindamycin 300 mg orally twice daily for 7 days
Abstinence from sex	If having symptoms
Sexual partner treatment	No treatment
Follow-up	Repeat examination only if symptoms persist.

Vaginal trichomoniasis

Vaginal trichomoniasis is an STI caused by *Trichomonas vaginalis* which has an oval shape and is sized slightly larger than a leukocyte. It has a jerky movement due to having five flagella.

Signs and symptoms

Vaginal trichomoniasis can be asymptomatic. Patients with symptoms often present with yellow or green frothy vaginal discharge and itching in the vagina. Some may have fishy-odor discharge and dysuria. The pelvic

examination may reveal inflamed vaginal mucosa and friable cervix with bleeding beneath the mucosa (strawberry cervix).

Risk factors

Vaginal trichomoniasis is a disease that is transmitted only from person to person through sexual intercourse. Risk factors are therefore related to unprotected sex with people with the disease.

Diagnosis

The simplest bed-side diagnostic tool is wet preparation. However, the sensitivity is only 40-70% and its accuracy is greatly reduced if examination is performed later than an hour of specimen collection[16]. Nucleic acid amplification test (NAAT) is an alternative option[17].

Treatment

Symptoms of TV can be non-specific and mimicks other STIs, especially VC. Moreover, the coinfection is common. Prescribing metronidazole with other medication, a clear advice regarding side effects and how to properly consume is necessary. (Table 5)

Table 5. Recommended treatment of trichomoniasis.

Medications	Recommended regimen
	- Metronidazole 2 g orally single dose
	- Metronidazole 400-500 mg orally twice daily for 5-7 days
	Alternative regimen
	- Tinidazole 2 g orally single dose
	Follow-up at 1-2 weeks:
	If symptoms persist and trichomonad is detected under microscopy.
	- Metronidazole 400 - 500 mg orally twice a day for 7 days if the first regimen is the sigle dose.
	Follow-up at 1-2 weeks:
	If symptoms persist and trichomonad is detected under microscopy.
	- Metronidazole 2 g orally once daily for 5-7 days or
	- Metronidazole 800 mg orally 3 times a day for 7 days
Abstinence from sex	Until sexual partner(s) are treated
Sexual partner treatment	Expedited treatment with the same regimen
Follow-up	1-2 weeks and 3 months after the date of treatment

Aerobic vaginitis (AV)[18, 19]

It is not an STI but a form of vaginal dysbiosis. The decrease of *Lactobacilli spp*. is caused by an overgrowth of aerobic vaginal flora, including *E. coli*, *Enterococci spp.*, *Staphylococcus aureus*, gr. B *Streptococcus*[19]. AV has also been found to be associated with STIs by increasing the STIs, i.e. *C. trachomatis, N. gonorrhoeae, T. vaginalis*, and it was found to be associated with infections of other bacteria in the pelvic cavity, preterm labor, and premature rupture of membranes.

Signs and symptoms

Severe inflammation and large amount of yellow vaginal discharge are common. The most common history is that symptoms persist for a long time despite multiple medical visits.

Diagnosis[20]

Diagnosis is usually based on Gram staining and microscopic examination by using the proportion of *Lactobacilli spp.*, high white blood cell count, and normal flora organisms to aggregate the scores into AV scores which include *Lactobacillus* grade, white blood cell count, toxic leucocyte ratio, and background flora. Interpretation: Normal score = 0-4, Moderate

AV score = 5-6, Severe AV score = 6-10.

Treatment

The goal of treatment is to correct three conditions: atrophy, inflammation and abnormal flora. Based on the authors' experience, a course of treatment is usually longer than 7 days. (Table 6)

Table 6. Recommended treatment of aerobic vaginitis.

Medications	Topical estrogen is to resolve atrophy. Topical corticosteroid is to relieve inflammation. For antibiotics, including the use of lactobacilli suppository, there is no consensus on which medication and in what form to use. Amoxicillin/Clavulanic acid 1 g orally twice a day or Moxifloxacin 400 mg orally once a day for 7 days has been proposed.
Abstinence from sex	If having symptoms
Sexual partner treatment	No treatment
Follow-up	Repeat examination only if symptoms persist.

Cytolytic vaginitis[21]

Cytolytic vaginitis is usually caused by an increase in the number of *Lactobacilli spp*. causing irritation; and excessive production of lactic acid and hydrogen peroxide that damages the vaginal epithelium.

Signs and symptoms

Severe inflammation and large amount of yellow vaginal discharge are common. The most common history is that symptoms persist for a long time despite multiple medical visits.

Diagnosis

Wet preparation or Gram staining reveals many gram-positive rod bacteria compatible with *Lactobacilli spp*. together with a large number of epithelial cells. If the patients have cytolytic vaginitis for a long time, there will be an increase in leukocytes.

Treatment

The goal of treatment is to alkalinise intravaginal condition. Douching with sodium bicarbonate solution as being recommended seems impractical in Thai women. And, some women need a longer course of treatment. (Table 7)

Table 7. Recommended treatment of cytolytic vaginitis.

Medications	Vaginal douching with 1 to 2 tablespoons of sodium bicarbonate (NaHCO3) or baking soda mixed with 1 -1.5 litre of warm water. Vaginal douching with a slightly longer douching time is effective without the use of antibiotics. It has been suggested to do douching twice a week, every 2 weeks. Symptoms should improve in about 2-3 weeks after treatment has started. * Based on the authors' experience, sodium bicarbonate 300 mg tablet (Sodamint®) being applied intravaginally 2-3 times a day for two weeks shows good clinical and microscopic outcomes.
Abstinence from sex	If having symptoms
Sexual partner treatment	No treatment
Follow-up	Repeat examination only if symptoms persist.

Gonococcal infection

The pathogen is *Neisseria gonorrhoeae* and the trophic cell is columnar cell which is the lining of urethra, endocervix, fallopian tubes, and conjunctiva. This

organism can enter bloodstream to other organs such as joints, meninges, heart etc.

Signs and symptoms

The symptoms are abnormal vaginal and/or urethral discharge and dysuria.

Diagnosis

The wet preparation test revealed a large number of white blood cells. Gram staining revealed intracellular gram-negative diplococci. More sensitive diagnostic method is nucleic acid amplification test (NAAT). Culture should be done to determine drug resistance.

Treatment

The drug resistance of *N. gonorrhea* has been a global concern resulting in an increasing dose of antibiotic regimens. (Table 8)

Table 8. Recommended treatment of gonococcal infection.

Medications	Recommended regimen
	- Ceftriaxone 500 mg intramuscular injection single dose[5]*
	Alternative regimen
	- Cefixime 800 mg orally single dose*
	- Gentamicin 240 mg intramuscular injection single dose PLUS
	Azithromycin 2 g orally single dose
	* Treatment of *C. trachomatis* infection should be added if only it cannot be excluded.
Abstinence from sex	Until 7 days after treatment and until sexual partner has completed treatment.
Sexual partner treatment	Sexual partners who have had sex within 60 days before the patient had symptoms are recommended to receive evaluation and treatment as the index patient. However, if being unable to come for evaluation, expedited partner therapy should be done.
Follow-up	7 days after the day of treatment

Test of cure (TOC)[22]

The patients who require TOC are those who still have symptoms or extragenital infection; or have been treated with non-ceftriaxone medication. TOC will help to detect treatment failure, drug resistance, drug compliance and side effects. Moreover, education regarding risky sexual behaviors that cause re-infection, monitoring of sexual partners, and promoting health can also be done.

Non-gonococcal infection

Most cases are caused by *C. trachomatis*, followed by *Mycoplasma genitalium*. Other organisms being reported include *Mycoplasma hominis*, *Ureaplasma urealyticum*, *Ureaplasma parvum*, and others[23]. Owing to the minimal symptoms, the infections can continually spread and re-infection appears common.

Signs and symptoms

Signs and symptoms are similar to gonorrhea but are less severe.

Diagnosis

The wet preparation test reveals a large number of white blood cells. Gram staining and bacterial culture are negative. NAAT is the main diagnostic tool to identify non-gonococcal pathogens.

Treatment

Data are limited for the treatment of some pathogens. This guideline includes the recommended treatment of *C. trachomatis* and *M. genitalium.* (Table 9)

Table 9. Recommended treatment of non-gonococcal infection.

Chlamydia trachomatis treatment[24]

Medications	- Doxycycline 100 mg orally twice a day after meal for 7 days - Azithromycin 1 g orally single dose - Erythromycin stearate 500 mg orally 4 times a day after meal for 14 days - Amoxycillin 500 mg orally 3 times a day after meal for 7 days
Abstinence from sex	Until 7 days after treatment and until the sexual partner has completed treatment.
Sexual partner treatment	Sexual partners who have had sex within 60 days before the patient had symptoms are recommended to receive evaluation and treatment as the index patient. However, if being unable to come for evaluation, expedited partner therapy should be done.
Follow-up	2 weeks after the date of treatment

Mycoplasma genitalium treatment[25]

Medications	- Doxycycline 100 mg orally twice a day for 7 days, followed by Azithromycin 1 g orally initial dose, followed by 500 mg orally once daily for 3 additional days If symptoms persist, - Moxifloxacin 400 mg orally once a day for 10 days
Abstinence from sex	Until 7 days after treatment and until the sexual partner has completed treatment.
Sexual partner treatment	Treat only the current sex partner
Follow-up	2 weeks after the date of treatment

Test of Cure (TOC)[24]

It is not recommended for all patients as dead organisms can be detected for up to 5 weeks after treatment. TOC should be done for those with incomplete treatment or persistence of symptoms. TOC at 3-6 months after complete treatment is suggested, especially those being in the age group of < 25 years.

Conclusion

Abnormal vaginal discharge is a common presenting symptom at all gynaecologic clinics. The etiologies can be STIs or non-STIs. According to the Thai 2022 STI treatment guideline, clinical-based and basic laboratory-based approach is designed to fit all healthcare settings. However, if treatment response does not meet care-givers' expectation, consultation to specialists is recommended.

Potential conflicts of interest

The authors declare no conflicts of interest.

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