Vaginal discharge

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Abstract

Vaginal discharge is a common presenting complaint in women across all age groups, most commonly in reproductive age. A thorough history, examination and investigations are needed to arrive at a diagnosis and formulate management plan. Sexual history should be taken in a sensitive manner and tests should be tailored to those at high risk. This article focuses on the three main causes of vaginal discharge in reproductive age women namely, bacterial vaginosis, candidiasis and *Trichomonas vaginalis*. An overview of vaginal discharge management in all age groups is described and also the rarer condition of desquamated inflammatory vaginitis.

Keywords bacterial vaginosis; candidiasis; desquamated inflammatory vaginitis; trichomoniasis; vaginal discharge

Introduction

Vaginal discharge is a common presenting complaint among women attending general practitioner (GP), sexual health and gynaecology clinics. Management involves good understanding of normal physiological discharge and the causes for abnormal discharge.

Normal physiological vaginal discharge is a white or clear, non-offensive discharge that can vary over time. It is thick and sticky for most of the menstrual cycle but becomes clearer, wetter, and stretchy for a short period around the time of ovulation. It is heavier and more noticeable during pregnancy, with contraceptive use and with sexual stimulation. It decreases in volume at menopause due to fall in estrogen levels.

Abnormal vaginal discharge is characterized by change in colour, consistency, volume, and/or odour and may be associated with symptoms such as itching, soreness, dysuria, pelvic pain, or intermenstrual or postcoital bleeding.

Causes for abnormal vaginal discharge

Most commonly caused by infections like bacterial vaginosis and candidiasis; however, there can be non-infective causes as well (Box 1). This article provides details of the common infective causes and summarises management in special circumstances like pre-puberty, pregnancy and lactation and post-menopausal women.

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Causes of vaginal discharge

Physiological

Pathological

- Bacterial vaginosis (BV)
- Vulvovaginal candidiasis (VVC)
- STIs: *Trichomonas vaginalis* (TV), chlamydia, gonorrhoea
- Foreign body: retained tampons
- Irritants: perfumes, deodorants
- Atrophic vaginitis
- Fistulae
- Tumours of vulva, vagina, cervix and endometrium
- Trauma (recent perineal repair or vaginal surgery: from granulation tissue)

Box 1

History and examination

History and examination of the patient should be carried out before deciding whether investigations and treatment are required.

Features of vaginal discharge to be elicited include: its onset, duration, timing related to menstrual cycle, odour, colour, consistency and any exacerbating factors. Associated symptoms including itch, discomfort, pain, dysuria, dyspareunia and irregular bleeding should be enquired. A routine gynaecological history should also be obtained including parity, smear history, sexual history and current contraception. Sexual history should dictate the need for discussion regarding full STI screening.

Examination consists of inspection, bimanual examination and obtaining appropriate vaginal swabs. Inspection includes a general external inspection of the vulva and perineal region followed by inspection of the vagina and cervix with the aid of a speculum. Bimanual examination will give the examiner an idea about the position, size and mobility of the uterus as well as the presence of any adnexal masses. Vaginal swab will help in the diagnosis of pathogens that may be responsible for the abnormal discharge.

Look for characteristic signs that may indicate an infective cause of vaginal discharge

- BV is characterized by a thin, white/grey, homogeneous coating of the vaginal walls and vulva that has a fishy odour. There is usually no vaginal or vulval inflammation or soreness, unless there is associated candidiasis.
- Vaginal candidiasis is characterized by an odourless, white, curdy discharge. Examination may reveal erythema, vaginal fissuring and/or oedema, and excoriation of the vulva.
- Trichomoniasis is characterized by a yellow-green, frothy discharge with a fishy odour. Inflammation of the vulva and vagina, or more rarely a strawberry appearance of the cervix may be observed on pelvic examination.
- Cervicitis caused by chlamydia (or less commonly by gonorrhoea) is characterized by an inflamed cervix which

bleeds easily and may be associated with a mucopurulent discharge.
- PID caused by chlamydia (or less commonly by gonorrhoea) is characterized by lower abdominal pain, with or without fever. Cervicitis may be seen and adnexal tenderness and cervical excitation found on bimanual palpation.

Some patients can be given treatment without the need for full investigations. A patient, who presents with first episode of vaginal discharge with clear clinical evidence of either vulvovaginal candidiasis or bacterial vaginosis, and no other risk factors, can be given empirical treatment without further investigations.

Investigations

1) pH test: Collect discharge from the lateral wall of the vagina with a swab, and rub it onto narrow-range pH paper (pH 3.8 −5.5). Normal vaginal pH in a woman of child-bearing age is 3.5−4.5. A pH >4.5 could indicate BV or TV while a pH ≤4.5 could be due to candida.
2) High Vaginal Swab (HVS) or self-taken low vaginal swab for Gram staining and microscopy/culture/sensitivity is taken from the vagina and placed in Amies transport medium with charcoal if bacterial culture testing is needed. Samples should be transported to laboratory immediately as fresh samples or within 48 h of refrigeration at 4 °C. HVS is generally indicated in following circumstances (Box 2):
3) For women at risk of STI, swab is taken for NAAT (Nucleic Acid Amplification Test) to check for chlamydia and gonorrhoea. These include:
   - <25 years old,
   - Change of a partner or those who had more than one sexual partner in last year,
   - Past history of STI, sharing needles and intravenous drug use,
   - Women who request to rule out chlamydia and gonorrhoea.
4) Consider urine pregnancy test to exclude pregnancy and urine dipstick to exclude urinary tract infection if clinically indicated.

Management

For women with suspected bacterial vaginosis or vaginal candidiasis, empirical antibiotic/antifungal treatment should be prescribed. For women with cervicitis, treat for chlamydia while awaiting swab results.

For women with suspected PID, prescribe empirical antibiotic treatment for PID. Note that empirical antibiotics treatment is not required for women at increased risk of a sexually transmitted infection (STI) while awaiting swab results, if they do not have any clinical features suggestive of infection.

Arrange urgent admission for women with suspected PID who are pregnant or have severe symptoms and signs (such as nausea, vomiting, and a fever greater than 38 °C). Arrange referral to a GUM clinic for partner notification for women with microbiologically confirmed gonorrhoea, chlamydia and trichomoniasis.

Management of common infective causes of vaginal discharge is detailed below.

Indications for obtaining a high vaginal swab

- Symptoms suggestive of upper genital tract infection
- Postpartum, post-miscarriage, TOP, recent instrumentation of the uterus, <3 weeks since IUCD insertion
- Recurrent symptoms despite treatment
- Abnormal symptoms of unknown cause (e.g. vaginal bleeding and urinary or bowel symptoms)
- Cervicitis found on examination.
- BV associated with pregnancy
- Vaginitis without discharge.
- Symptoms are not characteristic of BV.

Box 2

A. Bacterial vaginosis

Bacterial vaginosis (BV) is the commonest cause of abnormal discharge in women of childbearing age. Prevalence varies between 5 and 50% with nearly half being asymptomatic.

BV is attributed to imbalance in vaginal ecology with anaerobic and facultative anaerobic bacteria dominating the vaginal flora instead of lactobacilli. These infections raise the normally acidic vaginal fluid pH from <4.5 to 4.5−6.0. Bacteria commonly attributed to BV include *Gardnerella vaginalis*, Prevotella spp., *Mycoplasma hominis*, Mobiluncus spp, *Atopobium vaginalis*, Clostridiales spp, Leptotrichia spp and Sneathia spp.

Risk factors for BV include vaginal douching, receptive oral intercourse, black race, recent change of sex partner, smoking, presence of an STI, e.g. chlamydia or herpes. However, it has been described in virgins as well.

BV is not sexually transmitted but there are associations between BV, STIs and other genital infections. BV has been associated with an increased incidence of vaginal cuff cellulitis and abscess formation following vaginal hysterectomy. BV has been associated with post TOP endometritis and PID. In pregnancy, BV is associated with late miscarriage, preterm birth, preterm premature rupture of membranes and postpartum endometritis.

Clinical features

Women usually present with offensive fishy smelling vaginal discharge, not associated with soreness, itching, or irritation. On examination, thin, white, homogeneous discharge is seen coating the walls of the vagina and vestibule. Usually BV alone is not associated with signs of inflammation.

Diagnosis

The following approaches are available:

Amsel's criteria: at least three of the four following criteria are present for the diagnosis to be confirmed.
- Thin, white, homogeneous discharge
- Clue cells on microscopy of wet mount
- pH of vaginal fluid >4.5
- Release of a fishy odour on adding alkali (10% KOH) − also known as Whiff test

Hay/Ison criteria: a Gram stained vaginal smear is evaluated as follows:

Grade 1 (Normal): Lactobacillus morphotypes predominate

Grade 2 (Intermediate): Mixed flora with some Lactobacilli present, but Gardnerella or Mobiluncus morphotypes also present

Grade 3 (BV): Predominantly Gardnerella and/or Mobiluncus morphotypes. Few or absent Lactobacilli.

There are additional grades which have not been correlated with clinical features:

Grade 0 No bacteria present

Grade 4 Gram-positive cocci predominate.

Nugent score: a score of 0–10 is derived from estimating the relative proportions of bacterial morphotypes on a Gram stained vaginal smear.

A score of <4 is normal, 4–6 is intermediate, >6 is BV.

The Bacterial Special Interest group of BASHH recommends using the Hay/Ison criteria in genitourinary medicine clinics.

Management

Patients should be advised to avoid vaginal douching, use of shower gel, and use of antiseptic agents or shampoo in the bath. Treatment is indicated for symptomatic women and women undergoing some surgical procedures like termination of pregnancy.

1) Recommended regimens:

Metronidazole 400 mg oral tablets twice daily for 5–7 days

Metronidazole 2 g single oral dose is an alternative if adherence to treatment is an issue.

Topical treatment is available for women who prefer this mode or who cannot tolerate oral metronidazole:

Intravaginal metronidazole gel (0.75%) one applicator full (5 g) once daily for 5 days

Intravaginal clindamycin cream (2%) one applicator full (5 g) once daily for 7 days

2) Alternative regimens:

Tinidazole 2 g single dose

Clindamycin 300 mg twice daily for 7 days

Alcohol should be avoided during and up to 24 h after oral and topical metronidazole treatment because of the possibility of a disulfiram-like action. Clindamycin cream can weaken condoms and diaphragms, which should not be used during and up to 5 days after such treatment. Pseudomembranous colitis has been reported with both oral and vaginal Clindamycin cream treatment. Non-antibiotic based treatment with probiotic lactobacilli or lactic acid preparations are not currently recommended for treatment.

A test of cure is not required if symptoms resolve. Partners do not need to be screened routinely.

Persistent and recurrent BV

Women with persistent symptoms need re-evaluation including enquiry on continued vaginal douching, use of antiseptics, bubble baths or shampoos in bath and encouraged to avoid them. A speculum examination needs to be performed and swabs taken for culture. Alternation of above antibiotic regimens can be considered, from topical to oral or single dose to full course of oral metronidazole treatment. For persistent bacterial vaginosis (BV) in women with an intrauterine contraceptive device, consider removing the device and advising the use of an alternative form of contraception. Also consider testing and treating female partners in same sex relationship.

In recurrent BV (at least four times a year) with symptoms adversely affecting the woman, consider prescribing metronidazole vaginal gel as suppressive treatment (off-label use). WHO recommends prolonged treatment with 0.75% vaginal metronidazole gel twice weekly for 16 weeks.

B. Vulvovaginal candidiasis

Vulvovaginal candidiasis (VVC or genital thrush) is symptomatic inflammation of the vagina and/or vulva caused by a superficial fungal infection. It is the second most common cause of vaginitis in women of reproductive age after BV.

Majority of VVC is caused by *Candida albicans* (80–89%) with the remaining caused by non-albicans species like *C. glabrata, C. tropicalis, C. krusei, C. parapsilosis* and *Saccharomyces cerevisiae*.

10–20% of women during reproductive years may be colonized with Candida but do not have any clinical symptoms or signs. These women do not require any treatment.

Risk factors for VVC include hyper-estrogenic state (pregnancy, hormone replacement therapy (HRT) and possibly the combined oral contraceptive pill use), immunocompromized state (e.g. HIV), poorly controlled diabetes, treatment with broad spectrum antibiotics and local irritants (like soaps, shower gel, feminine hygiene products, tight fitting or synthetic clothing).

Contraceptive methods may play a part in the development and recurrences of VVC. Use of spermicidal gels and creams increases susceptibility to infection by altering the vaginal flora and increasing the adhesion of Candida organisms. It is believed that women who take oral contraceptive pills, especially combined oral contraceptives (COCs), have a higher rate of VVC but the evidence for this is contradictory. One theory is that Candida cells have estrogen and progesterone receptors that, when stimulated, increase fungal proliferation. There is some evidence that postmenopausal women taking HRT are significantly more prone to develop VVC than women who are not, and those who develop VVC are likely to have been susceptible to it before menopause.

Clinical features

Most women present with vulval itching, soreness and irritation, vaginal discharge, superficial dyspareunia and dysuria. Enquiry should be made on risk factors for VVC and STI risk. Examination may be indicated to assess severity of symptoms, and/or to exclude alternate diagnoses. This may reveal erythema (usually localized to vagina and vulva, but may extend to perineum), excoriation, vaginal edema or fissures and satellite lesions. Vaginal discharge is typically thick, curdy, cottage-cheese like in appearance and non-odorous (Table 1).

Diagnosis

Usually made from history and examination. Investigations are not routinely recommended if history suggests acute uncomplicated VVC. Investigations may be considered based on clinical

Classification of VVC

Uncomplicated VVC	Complicated VVC
Sporadic or infrequent	Recurrent infection — defined as ≥4 documented episodes in 1 year, with at least partial resolution of symptoms between episodes.
Mild to moderate	Severe infection
Likely due to *C. albicans*	Yeasts other than *C. albicans*
Is not associated with risk factors, such as pregnancy or poorly controlled diabetes	Infection in pregnant women, women with uncontrolled diabetes or immunosuppressive conditions (like HIV) and taking immunosuppressive drugs (like systemic steroids)

Table 1

features and judgment to confirm diagnosis and/or to exclude alternate diagnoses.

1. Vaginal secretions should be collected from the lateral sides of the vaginal wall using a swab for vaginal pH testing (if possible) - to assess the likelihood of symptoms being due to Candida (pH less than or equal to 4.5), bacterial vaginosis (pH above 4.5), or *Trichomonas vaginalis* (pH above 4.5).
2. High vaginal swab for Gram stain and/or phase contrast wet film microscopy - for supporting the diagnosis when this is uncertain (such as when symptoms, signs, and/or vaginal pH are inconsistent with a diagnosis), in women with severe or recurrent symptoms, or if there is treatment failure. This may identify a moderate/heavy growth of *Candida albicans*, non-albicans Candida species, or a mixed infection. Self-taken swab is an alternative.
3. Culture: not indicated in acute VVC but Speciated fungal culture and antifungal sensitivity testing is indicated in recurrent VVC and with poor response to treatment. Interpretation of antifungal susceptibility testing should take into account the acid pH of the vagina compared with the neutral pH at which testing is usually performed; the activity of azole antifungals is reduced in acidic environment and clinical resistance may occur despite the isolate being microbiologically susceptible.
4. Mid-stream sample of urine (MSU) - if a UTI is suspected.
5. HbA1c test - to exclude diabetes mellitus in severe or recurrent infection, especially in pre-pubertal girls and postmenopausal women, who rarely have vulvovaginal candidiasis without underlying risk factors.
6. STI screening - if the woman is concerned or at risk, or if there are clinical features suggestive of an STI.

Management

General advice must be given to avoid tight fitting synthetic clothing and local irritants such as daily panty liners, or, perfumed products. Vulval emollients may be used as soap substiute, moisturiser or barrier cream.

Treatment of uncomplicated VVC

All topical and oral azole therapies give clinical and mycological cure rates of 80% in uncomplicated acute VVC, so choice is a matter of personal preference, availability and affordability. Topical azole therapies can cause vulvovaginal irritation and this should be considered if symptoms persist or worsen (Tables 2 and 3).

Oral therapies

Drug	Formulation	Dosage regimen
Fluconazole	Capsule	150 mg stat
Itraconazole	Capsule	200 mg BD x 1 day

Table 2

Avoid co- administration of medicinal products known to prolong QT interval and metabolised via cytochrome P450 such as erythromycin, quinidine, astemizole, cisapride, pimozide and fluconazole. Next paragraph: If there are vulval symptoms, consider prescribing a topical imidazole in addition to an oral or intravaginal antifungal. Options include:

- Clotrimazole 1% or 2% cream applied 2–3 times a day.
- Ketoconazole 2% cream applied 1–2 times a day

Follow-up and test of cure are not necessary if symptoms resolve and asymptomatic sexual partners do not need treatment. For **persistent** symptoms after 7–14 days of initial treatment, check for compliance with treatment, assess risk factors, consider alternate diagnoses and recommend extended course of oral or topical antifungal preparation;

- Miconazole 2% vaginal cream – 5 g once daily for 10–14 days, *or* 5 g twice daily for 7 days.
- Clotrimazole 100 mg pessary – 1 pessary once at night for 12 nights.
- For oral fluconazole the recommended extended course is 100 mg once a day for 7 days.

Treatment of complicated VVC

Severe VVC: Fluconazole 150 mg oral on day 1 and 4. This improves symptomatic relief though not subsequent recurrence. Alternate vaginal therapy if oral treatment is contraindicated: Clotrimazole 500mg pessary on day 1 and 4 or Miconazole vaginal capsule 1200 mg on day 1 and 4 Some experts also use

Topical therapies (Vaginal route)

Drug	Formulation	Dosage regimen
Clotrimazole	Pessary	500 mg stat
Clotrimazole	Pessary	200 mg x 3 consecutive nights
Clotrimazole	Pessary	100 mg x 6 consecutive nights
Clotrimazole	Vaginal cream (10%)	5 g stat
Econazole	Pessary	150 mg stat
Econazole	Pessary	150 mg x 3 consecutive nights
Fenticonazole	Capsule	600 mg stat
Fenticonazole	Capsule	200 mg x 3 consecutive nights
Miconazole	Capsule	1.2 g stat
Miconazole	Capsule	400 mg X 3 consecutive nights

Econazle, Fenticoncazole and Miconazole damage latex condoms and diaphragms.

Table 3

Summary of medication for VVC

Treatment Stage	Drug	Formulation	Dosage regimen
Induction	Fluconazole	Capsule	150 mg every 72 h X 3 doses
Maintenance	Fluconazole	Capsule	150 mg once a week for 6 months

Table 4

low potency corticosteroids in conjunction with antifungals to improve symptomatic relief.

Recurrent VVC

Defined as at least four documented episodes of symptomatic VVC annually with at least partial resolution of symptoms between episodes. Positive microscopy or a moderate/heavy growth of C. albicans should be documented on at least two occasions when symptomatic.

Approximately 5% of women of reproductive age with a primary episode of VVC will develop recurrent disease. This is thought to be caused by host factors rather than a more virulent strain or reintroduction of the organism to genital tract. It is usually due to *C. albicans*. Host factors include persistence of Candida (as detected by PCR although culture negative between attacks), uncontrolled diabetes mellitus, hyper-estrogenaemia (including HRT and COC pill), disturbance of vaginal flora (e.g. through use of broad spectrum antibiotics) and a link to allergy (in particular allergic rhinitis) and proinflammatory genetic markers.

Further investigations are advised including fungal culture, FBC, and HbA1C if other indications are present.

Management

General advice is as per uncomplicated disease. Review contraceptive practice, and advise avoiding high dose estrogen containing COC (uncommon in current UK practice). Low dose COC does not predispose to VVC but may contribute to recurrence. Depot Provera or desogestrel-only-pills may be used alternatively.

Treatment: The principal therapy involves an induction regimen to ensure clinical remission followed by a maintenance regimen (Tables 4 and 5).

These regimens are unlicensed for routine use. There are anecdotal reports of oral COC failure with prolonged oral azole therapy. Oral ketoconazole should no longer be prescribed for the treatment of fungal infections due to increased risk of liver damage.

If relapse occurs between treatment doses, consider twice weekly fluconazole 150 mg or 50 mg fluconazole daily. Alternately, consider Cetirizine 10 mg once daily. There are no trials addressing the optimal duration of suppressive therapy. If recurrences after maintenance regimen are infrequent, each episode should be treated independently. If recurrent disease is re-established, induction and maintenance regimens should be repeated.

Non-albicans species of VVC

Majority are *C. glabrata* and are still susceptible to available azoles though may need longer treatment course (usually 2 weeks is suggested). *C. Krusei* is resistant to fluconazole. Nystatin pessaries are the usual first line treatment for non albicans species. Nystatin pessary 100,000 units intravaginally at night for 12-14 consecutive nights. Alternatives treatment options include:

- Amphotericin B vaginal suppositories 50 mg daily for 14 days.
- Boric acid vaginal suppositories 600 mg daily for 2 weeks (dose reduced to 300 mg daily if mucosal irritation occurs). Limited evidence for boric acid and may be teratogenic.
- Flucytosine 5 g vaginal cream or 1 g vaginal pessary daily for 2 weeks together with amphotericin or nystatin. (Flucytosine may not be readily available and a discussion with pharmacist before prescribing is recommended).

Alternative treatment

Evidence does not support use of probiotics, tea tree oil or dietary modification (carbohydrate or yeast intake) for prevention of recurrence. Zafirlukast 20 mg BD for 6 months may induce remission and may be considered as maintenance prophylaxis to prevent recurrence, particularly in women with history of atopy.

Diabetes Mellitus: Symptomatic VVC is more prevalent in diabetics and most problematic in those with poor control. There is increased prevalence of non-albicans species, particularly *C. glabrata*. When *C. albicans* is isolated, single dose fluconazole (150 mg) gives a similar response to non-diabetics. For *C. glabrata* boric acid 600 mg vaginal suppository daily for 14 days is as effective as single dose fluconazole. Glycaemic control should be optimized.

Extended courses of antifungals are recommended for managing vulvovaginal candidiasis in women with uncontrolled diabetes or HIV and those taking immunosuppressive drugs. Examples include:

Alternative regimens for VVC

Treatment Stage	Drug	Formulation	Dosage regimen
Induction	Clotrimazole	Vaginal pessary	100 mg once a night for 10–14 days
Maintenance	Clotrimazole	Vaginal pessary	500 mg once a week for 6 months
	Itraconazole	Capsules	50–100 mg daily for 6 months

Table 5

- Miconazole 2% vaginal cream – 5 g once daily for 10–14 days, or 5 g twice daily for 7 days.
- Clotrimazole 200 mg vaginal pessaries- 1 pessary once at night for 6 nights.
- Oral fluconazole, the recommended extended course is 100 mg once a day for 7 days.

C. Trichomonas vaginalis

Trichomoniasis is an STI caused by a flagellated protozoan called *Trichomonas vaginalis*. In women, the organism is found in vagina, urethra and paraurethral glands. In adults, transmission is almost exclusively through sexual intercourse. Vertical transmission can occur from an infected mother to baby during vaginal delivery. TV infection in pregnancy may be associated with increased incidence of preterm births and low birth weight infants and postpartum endometritis if present at delivery. TV may enhance transmission of HIV.

Clinical features

Most individuals with TV (10–50%) are asymptomatic. Common symptoms include vaginal discharge, vulval itching, dysuria, or offensive odour, but these are not specific for TV. Occasionally the presenting complaint is of low abdominal discomfort, dyspareunia or vulval ulceration. On examination, the classical frothy yellow discharge occurs in 10–30% of women. Up to 70% have discharge varying in consistency from thin and scanty to profuse and thick. Vulvitis and vaginitis are associated with trichomoniasis. Approximately 2% of patients will have strawberry cervix appearance to the naked eye. Higher rates are seen on colposcopic examination. 5–15% of women will have no abnormalities on examination.

Diagnosis

Testing for TV should be undertaken in women complaining of vaginal discharge or vulvitis, or found to have evidence of vulvitis, and/or vaginitis on examination. A swab is taken from the posterior fornix at the time of speculum examination. Self-administered vaginal swabs are likely to give equivalent results.

Microscopy. Detection of motile trichomonads by light field microscopy can be achieved by collection of vaginal discharge using a swab or loop, which is then mixed with a small drop of saline on a glass slide and a coverslip placed on top. The wet preparation should be read within 10 min of collection, as the trichomonads will quickly loose motility and be more difficult to identify. The slide should be scanned, firstly at low magnification (100X), and then at a higher magnification (400X) to confirm the morphology of any trichomonads and to visualize the flagella. Microscopy as a diagnostic aid for TV has the advantage as it can be performed near to the patient and in a clinic setting. The sensitivity is highest in women presenting with vaginal discharge and a visualization of motile trichomonads in these women indicates the presence of infection.

If the swab needs to be sent to laboratory, it should be sent immediately and marked as 'suspected trichomonas infection', so wet microscopy will be performed.

Culture: Culture has a higher sensitivity to microscopy in identifying TV, but his has now been superseded by NAAT.

Molecular detection: NAATs offer the highest sensitivity for the detection of TV. They should be the test of choice where resources allow and are becoming the current ''gold standard''.

Management

General advice: Sexual partner(s) should be treated simultaneously. Patients should be advised to avoid sexual intercourse for at least one week and until they and their partner(s) have completed treatment and follow-up. Screening for coexistent sexually transmitted infections should be undertaken.

Treatment: Systemic antibiotic therapy is required to effect a permanent cure due to the high frequency of infection of the urethra and paraurethral glands in females.

Recommended regimens include metronidazole 2 g orally in a single dose or metronidazole 400–500 mg twice daily for 5–7 days.

An alternative regimen is tinidazole 2 g orally in a single dose. Tinidazole has similar activity to metronidazole but is more expensive. These treatments result in parasitological cure in >90% of patients. Intravaginal treatment offers parasitological cure rates around 50%, which is unacceptably low and therefore not recommended.

Arrange follow-up to check for persistent symptoms, ensure contact tracing and discuss results of any STI screening tests. Do not routinely offer test to confirm cure.

Treatment Failure: These women should be managed in a specialist sexual health service.

Persistent or recurrent TV is due to inadequate therapy, re-infection, or resistance. Therefore check compliance and exclude vomiting of metronidazole. Revisit sexual history for possibility of re-infection and ask if partner(s) have been treated.

The following treatment protocols are recommended for non-response to standard TV therapy.

1) Repeat course of 7-day standard therapy: metronidazole 400–500 mg twice daily for 7 days. Consider next regimen for those who fail to respond;
2) Higher-dose course of nitroimidazole: metronidazole or tinidazole 2 g daily for 5–7 days, or metronidazole 800 mg three times daily for 7 days.

For patients failing this third regimen, resistance testing is recommended. If not available, following can be tried:

3) Very high-dose course of tinidazole: tinidazole 1 g twice or three times daily, or 2 g twice daily for 14 days ± intravaginal tinidazole 500 mg twice daily for 14 days.
4) If very high-dose tinidazole has been unsuccessful it is difficult to recommend one specific further treatment. Treatment of such cases can be a therapeutic challenge as treatment options are limited with little evidence to support them. Other treatments with some reported success include:

Paromomycin intravaginally 250 mg once or twice daily for 14 days.

Furazolidone intravaginally 100 mg twice daily for 12–14 days

Acetarsol pessaries 500 mg nocte for 2 weeks
6% Nonoxynol - 9 pessaries nightly for 2 weeks
These are unlicensed products and not readily available.

Tests of cure are only recommended if the patient remains symptomatic following treatment, or if symptoms recur. Current partners and any partner(s) within the 4 weeks prior to presentation should be screened for the full range of STIs and treated for TV irrespective of the results of investigations.

Special categories

Pre pubertal vaginal discharge

Vaginal discharge is the most common reason for referral of a prepubertal girl to a gynaecologist. The most frequent age of referral is 3–10 years. Vulvovaginitis is the most frequent cause (infective or chemical with non-specific bacterial infection being most common); less common causes include foreign bodies and rare vulval and vaginal tumours. The anatomical proximity of anus to vulva, undeveloped labia devoid of fat pads and hypoestrogenic thin skin with neutral vaginal pH, all predispose vulvovaginal area to infection. Discharge may be associated with soreness and itching which can be chronic and distressing. Bleeding is an uncommon symptom and should prompt investigations for precocious puberty, sexual abuse and tumours. Examination must be carried out gently and sensitively, with the child on the mother's lap or lying down on a couch in frog leg position. Inspection with gentle retraction and use of smaller cotton tip swabs is advised and general anesthesia is recommended for any instrumentation. Vulval hygiene and use of emollients is the cornerstone of management. Antibiotics should be used when a pure growth of a specific pathogenic organism has been identified.

Vaginal discharge in pregnancy and lactation

In the UK, a BV prevalence of 12% was found in women attending antenatal care. Symptomatic women should be treated in the usual way. Women with additional risk factors for preterm birth may benefit from treatment before 20 weeks' gestation. Both oral and topical regimens are equally effective and safe to be prescribed in pregnancy. Metronidazole enters breast milk and may affect its taste. Manufacturers recommend avoiding high doses of metronidazole if breast feeding. Small amounts of clindamycin enter breast milk. It is prudent therefore to use an intravaginal treatment for lactating women.

Asymptomatic vaginal colonization with Candida (30–40%), acute vulvovaginal candidiasis, recurrent infection, and treatment failure are all more common in pregnancy. Colonization with Candida species is not associated with low birth weight or premature delivery and asymptomatic women do not need treatment. Topical imidazoles should be used for symptomatic VVC in pregnancy. There is no evidence that any one topical preparation is more effective than the other. Longer courses are recommended, for e.g., intravaginal clotrimazole 200 mg or miconazole 400 mg for 7 consecutive nights. Manufacturers state that during pregnancy clotrimazole can be used, only under the supervision of a doctor or midwife and miconazole can be used, provided the potential benefits outweigh the risks. It is advised that care should be taken when using an applicator to avoid physical damage to the cervix. Some women prefer to insert pessaries by hand when pregnant. If there are vulval symptoms, consider prescribing a topical imidazole in addition. Oral therapy is contraindicated. However, it is impotant to note that exposure to standard dose fluconazole at any stage in pregnancy would not usually be regarded as medical grounds for termination of pregnancy or any additional foetal monitoring.

For breastfeeding women, topical imidazoles are safeand equally effective alternatives to oral azoles for the management of VVC and therefore the treatment of choice. For recurrent disease, intravaginal clotrimazole is recommended for induction and maintenance regimens. Breastfeeding can be maintained after a single dose of 150mg Fluconazole but should be avoided after repeated or high doses of fluconazole.

TV in pregnancy and lactation should be treated as outside pregnancy with metronidazole. Recommended regimen is 400–500 mg BD for 7 days. The safety of tinidazole is not well evaluated. Women should be offered repeat screening of STIs and blood borne viruses and partner notification undertaken as routine.

Desquamated inflammatory Vaginitis (DIV)

This is an uncommon cause of vaginal discharge seen mainly in Caucasians, in perimenoausal period (50%). The symptoms and signs are non-specific and DIV is a diagnosis of exclusion after commoner causes of purulent vaginitis are ruled out. The etiology of DIV is not conclusively known. Several theories propose estrogen deficiency, bacterial infection, role of Kallikrein-related peptides and autoimmune etiology but the latter is most widely accepted.

Clinical Features: Women usually present with purulent discharge lasting several months to years, severe dyspareunia, vulval pain and itching. On examination, vaginal inflammation may range from focal petechiae, to generalized erythema with mild to profuse purulent discharge. Occasionally, annular lesions described as erythematous papules with a pale center resembling donuts are seen. This could involve the cervix with the appearance of colpitis macularis in up to 27% of patients. The vestibule frequently shows signs of focal or diffuse erythema. Severe cases may have a symmetrical erythematous macular vulvar rash. In contrast to erosive lichen planus, vaginal adhesions, synechiae, and stenosis are extremely rare and might suggest incorrect diagnosis. DIV is a devastating condition with a profound effect on sexual relationship.

Diagnosis

Diagnosis of DIV is based on symptoms and signs described above along with wet mount and pH examination of vaginal discharge. There is a marked increase in inflammatory cells (a ratio of inflammatory cells to epithelial cells >1:1), predominantly polymorphonuclear leukocytes (PMNs), together with a mandatory increase in parabasal epithelial cells (immature squamous cells). Vaginal flora is abnormal with the loss of dominant lactobacillus morphotype and pH is always elevated above 4.5.

It is important to exclude other causes of purulent vaginitis like TV, Group A Streptococcus, erosive lichen planus, atrophic vaginitis, contact dermatitis, trauma, foreign body and fistula. A vaginal swab should be sent for culture and NAAT for TV.

The response to treatment with local clindamycin or topical corticosteroids is useful and supports the diagnosis of DIV. By contrast, a good response to estrogen or antibiotics other than clindamycin likely excludes the diagnosis of DIV.

Treatment

Both vaginal clindamycin and vaginal corticosteroids are useful, and sometimes curative, in the treatment of DIV. Both have anti-inflammatory affect. The initial treatment, with either clindamycin or steroid, is administered daily for 2–4 weeks followed by maintenance therapy as needed. Recommended regimens include:

Clindamycin 2% vaginal cream, 5 g every night for 3 weeks followed by twice weekly for 2 months.

Clindamycin 200 mg vaginal pessary, one every night for 2 weeks followed by twice weekly for 2 months.

Hydrocortisone 300–500 mg vaginal pessary, once a night for 3 weeks followed by twice weekly for 2 months.

Most women (86%) will achieve positive response to above regimen while some women will need longer term treatment. Clobetasone propionate is an ultra-potent steroid that can be used in refractory cases for a few weeks to achieve remission before switching to mid potency steroids. Menopausal women with combined estrogen deficiency and DIV can use topical estrogen along with above treatment. Women at risk of developing candidiasis (25%) with prolonged clindamycin can be given fluconazole 150 mg weekly suppressive therapy. ◆

Practice Points

- Vaginal discharge is a common presenting complaint in women across all age groups, most commonly in reproductive age.
- Bacterial vaginosis and candidiasis are the common causes in reproductive age group and can be treated symptomatically in the first instance.
- Liaison with sexual health services is advised for partner notification if an STI is identified and with microbiology for management of complicated and treatment resistant infections.

RECOMMENDED READING

British Association for Sexual Health and HIV. UK national guideline for the management of bacterial vaginosis. Vulvovaginal candidiasis 2007 and Trichomonas Vaginalis 2014, 2012.

Centers for Disease Control and Prevention CDC. Sexually transmitted diseases treatment guidelines, 2015.

Hayes L, Creighton SM. Prepubertal vaginal discharge. *The Obstetrician & Gynaecologist* 2007; **9:** 159–63.

NICE Clinical Knowledge Summaries. Vaginal Discharge, Bacterial Vaginosis, Vulvovaginal Candidiasis and Trichomoniasis.

Reichman O, Sobel J. Desquamated inflammatory vaginitis. *Best Pract Res Clin Obstet Gynaecol* 2014 Oct; **28:** 1042–50.

SherrardJ J, DondersG G, WhiteD. European (IUSTI/WHO) guideline on the management of vaginal discharge. *Int J Std AIDS 2011* 2011; **22:** 421–9.