Update on Management and Prevention of Vaginal Infections

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Vaginal Infections

For a better understanding of the pathophysiology of vaginal infections, the normal microbiological flora of the vagina should be noted. The following groups of organisms can be found in normal vaginas:

1. Lactobacilli
2. Cocci including Staphylococcus aureus, Group B and Group D Streptococci
3. Bacilli: Gardnerella vaginalis, E Coli
4. Mycoplasma hominis, Ureaplasma urealyticum
5. Yeast: Candida albicans
6. Human papillomavirus

The acidic milieu of the vagina (pH of 4.5) is maintained by lactobacilli (Doderlein’s) which account for 95% of the bacteria found in the normal vaginal flora. This inhibits the growth of the other vaginal commensals under normal conditions. The presence of glycogen in the vagina provides substrate for lactic acid production which in turn depends on the patient’s endogenous hormone status. So in young pubertal girls, pregnant women and menopausal ladies, the vaginal pH may be elevated. Other than the vaginal oestrogen concentration, there are other factors which may affect the vaginal ecosystem:

1. Genetics: individual immune response
2. Immune status: immediate postoperation (e.g. hysterectomy)
3. Sexual activities: deposition of semen, saliva and other foreign bodies may affect the vaginal pH and immune functions
4. Oral and vaginal medications
5. Vaginal blood
6. Contraception: oral contraceptive pills, intrauterine contraceptive device increase levels of Bacteroides species and group B streptococci
7. Vaginal products like douche, tampons, pads etc

Approach to Patients with Vaginal Infection

The most common symptoms presented for vaginal infection are vaginal discharge, itchiness, vulval pain or soreness, pain during intercourse, etc. One of the structured approach for acute symptoms is shown in the box below.

(1) Where does it bother you
(2) How does it bother you
(3) When did it begin
(4) Do you have a new sexual partner
(5) Current contraceptive method
(6) What is your most concern

This approach is slightly different from the patient with chronic symptoms or recurrent vulvovaginitis.

There are many causes of vulvovaginal infections including candida infection, bacterial vaginosis, trichomoniasis, desquamative inflammatory vaginitis, genital herpes, human papillomavirus infection, bacterial infections, allergic vulvovaginitis and menopausal vulvovaginitis. The first three conditions are most common and will be discussed in more detail. To distinguish them based on symptoms and examination, the following table may be of use for general practitioners:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Candida Infection</th>
<th>Bacterial Vaginosis</th>
<th>Trichomoniasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itchiness</td>
<td>Intense</td>
<td>Nil</td>
<td>Intense</td>
</tr>
<tr>
<td>Foul smell</td>
<td>+/-</td>
<td>Fishy</td>
<td>+/-</td>
</tr>
<tr>
<td>Colour</td>
<td>White</td>
<td>White/yellow</td>
<td>Green</td>
</tr>
<tr>
<td>Consistency</td>
<td>Curdy cheese</td>
<td>Thin</td>
<td>Thin</td>
</tr>
<tr>
<td>pH</td>
<td>Acidic &lt; 4.5</td>
<td>4.5-7.0</td>
<td>4.5-7.0</td>
</tr>
</tbody>
</table>

Other than the signs and symptoms, a complete physical examination, pelvic and speculum examination are required to confirm the correct diagnosis. In the general practitioner setting, an initial treatment based on signs and symptoms (without pelvic examination) is acceptable but if there is no response, a complete examination should be performed. A wet mount smear and potassium hydroxide test for bacterial vaginosis are ideal for a quick bedside test but these are rarely done in our office setting. Instead the vaginal secretion can be sent to the laboratory for smear and culture.

Candida Infection

This is the commonest cause of vulvovaginal infections and 75% of women have infection once in their life time. Some patients have repeated episodes of infection or recurrent vulvovaginal candidiasis (RVVC, defined as 4 episodes of symptomatic infection per year, at least once proven by culture).

The causative agent is Candida albicans in the majority of patients and non-albicans account for the others (Candida glabrata, Candida tropicalis, Candida krusei, Candida prapsilosis). The predominant symptoms are
vulval and/or vaginal itchiness, curdy and sometimes thin non-offensive vaginal discharge, pain at intercourse or pain at urination. None of the symptoms is pathognomonic of the vulvovaginal candida (VVC) infection but in a primary care setting, presumptive diagnosis of VVC can be made without laboratory confirmation and initial empirical treatment can be tried first. If the patient does not respond, a proper vaginal examination and laboratory confirmation (vaginal secretion for wet smear and culture) should be arranged or the patient referred to a gynaecologist if such facility is not available in the primary care setting.

Patients may be occasionally found to have candida on culture or pap smear. No treatment is required unless the patient is symptomatic. In pregnancy, the presence of candida will not pose any risk of preterm labour unlike bacterial vaginosis and no treatment is required.

The diagnosis of VVC rests on the symptoms (itchiness, discharge), physical findings (curdy discharge, inflamed vulva and vagina), positive vaginal smear and culture. Some physicians will check the vaginal pH by taking some vaginal secretion and putting on a pH paper (pH < 4.5 in Candida infection and higher pH 4.5 to 7.0 in other infections).

Since all oral or topical antifungal treatments will achieve a 80 to 90% cure rate (symptoms and culture), the choice of treatment will depend very much on the individual practitioner’s preference and the patient’s past treatment history. In general azole therapy has replaced nystatin as azole is more active against candida and resistance to azole has not been reported.

**Box: Therapy for Vaginal Candida Infection**

<table>
<thead>
<tr>
<th>Topical agents</th>
<th>1% cream</th>
<th>5 gram x 7-14 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clotrimazole</td>
<td>100 mg vaginal tablet</td>
<td>1 tablet x 7 days</td>
</tr>
<tr>
<td></td>
<td>100 mg vaginal tablet</td>
<td>2 tablets x 3 days</td>
</tr>
<tr>
<td></td>
<td>500 mg vaginal tablet</td>
<td>single dose</td>
</tr>
<tr>
<td>Miconazole</td>
<td>2% cream</td>
<td>5 gram x 7 days</td>
</tr>
<tr>
<td></td>
<td>100 mg vaginal tablet</td>
<td>1 tablet x 7 days</td>
</tr>
<tr>
<td></td>
<td>200 mg vaginal tablets</td>
<td>1 tablet x 3 days</td>
</tr>
<tr>
<td></td>
<td>1200 mg vaginal tablet</td>
<td>single dose</td>
</tr>
<tr>
<td>Tioconazole</td>
<td>2% cream</td>
<td>5 gram x 3 days</td>
</tr>
<tr>
<td>Nystatin</td>
<td>100000 units vaginal tablets</td>
<td>1 tablet x 14 days</td>
</tr>
<tr>
<td>Dequalinium chloride</td>
<td>10 mg vaginal tablet</td>
<td>1 tablet x 6 days</td>
</tr>
<tr>
<td>Oral agents</td>
<td>200 mg BD</td>
<td>400 mg x 5 days</td>
</tr>
<tr>
<td>Ketoconazole</td>
<td>200 mg BD</td>
<td>400 mg X 1 day</td>
</tr>
<tr>
<td></td>
<td>200 mg QD</td>
<td>200 mg x 3 days</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>150 mg</td>
<td>150 mg single dose</td>
</tr>
<tr>
<td>Fluconazole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For pregnant women, oral treatment should be avoided but local azole or nystatin can be used instead. For recurrent vulvovaginal candidiasis (RVVC), the diagnosis must first be confirmed by smear and culture as some of cases labelled as recurrent infections are in fact not due to candida infection. Also a culture will distinguish between Candida albicans and non-albicans as the treatment regimen will be different.

For RVVC, treatment will consist of acute treatment and prevention of recurrent attacks. A longer course or trying a different topical and/or oral antifungal treatment may be required. The male partner should be examined and treated if needed as the partner may be the source of infection. Other underlying diseases like diabetes mellitus, immunodeficiency, chronic steroid use should be excluded and/or optimised to decrease the frequency of attacks. A low carbohydrate diet, avoidance of sugar, avoidance of tight undergarment, avoidance of vaginal douching have been suggested but no randomised trials have been performed. The maintenance therapy for the prevention of attacks will include (1) weekly use of vaginal clotrimazole 500 mg (2) ketoconazole oral 100 mg daily for six months (3) fluconazole 150 mg oral weekly. Regular checking of liver function test is required for the last two treatment regimens.

For non-albicans candida infections, a longer course (2 week) treatment can be tried as most of them are resistant to the common drugs used. Boric acid 600 mg in a gelatin capsule vaginally for two weeks may be tried in resistant cases (contraindicated in pregnancy).

**Bacterial Vaginosis**

The aetiology of bacterial vaginosis (BV) is unknown but the pathophysiology is due to the marked reduction of H2O2 producing lactobacilli in the vagina and an overgrowth of three groups of bacteria: Mycoplasma hominis, Gardnerella vaginalis and anaerobes of which the last group account for the foul odour.

The patient will complain of an offensive, fishy smell discharge, white or yellow in colour. Some of the patients having BV can be asymptomatic. Unlike candida infection, most BV patients do not complain of vulval itchiness or soreness. The strict diagnosis will be by the Amsel criteria (thin white homogenous discharge, clue cells on smear, pH of vaginal fluid > 4.5 and release of a fishy odour on adding alkali of 10% potassium hydroxide) or the laboratory Nugent criteria (ratio of lactobacilli and Gardnerella). Both of the above criteria are not commonly used in clinical practice locally and instead the vaginal fluid can be sent to the laboratory for wet mount/Gram stain and microscopy (note: these organisms cannot be cultured).

The recommended oral treatment is standard:

(1) metronidazole 500 mg BD for 7 days
(2) metronidazole 2 gram single dose
(3) clindamycin 300 mg BD for 7 days

The alternatives are vaginal metronidazole or clindamycin cream.

There was an association of BV with increased incidence of preterm labour. In some overseas centres regular screenings for BV are performed during the course of pregnancy, but this is not a common practice in Hong Kong.
For patients with recurrent BV, prophylactic long term use of the above treatment can be considered for the prevention of BV plus treatment of the male partners and advice on the use of condom. Lactobacilli containing vaginal pessary e.g. Gynoflor or lactobacilli containing gel e.g. Lactacyd VG have been tried to restore the normal ecosystem with variable results. Oral probiotics and yogurt have also been tried.

**Trichomoniasis Infestation**

Unlike Candida, trichomoniasis infestation is a sexually transmitted disease and once noted, the patient should best be screened for other sexually transmitted diseases including syphilis and HIV infection.

The protozoa Trichomonas vaginalis can be found in the vagina, urethra and paraurethral glands. Ten to fifty percent of the patients can be asymptomatic and found on routine pap smear or routine culture for other purposes. The typical symptoms are thin, yellow to greenish offensive discharge and marked signs of inflammation on the vagina and cervix (strawberry appearance). The diagnosis is by wet mount, culture and currently PCR method.

Other than the patient, the partner(s) should be treated. The recommend regimens are

1. metronidazole 2 gram orally in a single dose
2. metronidazole 400 to 500 mg twice daily for 5-7 days

Patients should best be rechecked for cure after treatment as incomplete treatment either by the patient and/or her partner(s) can occur. The use of condom can prevent the transmission of trichomonas.

**Summary**

Though vulvovaginal infections are not causing much severe morbidity, the symptoms like vaginal discharge, itchiness, dyspareunia can affect the patient’s social life and sexual life. Prompt investigation and treatment should be provided by the general practitioner and by specialist if needed.