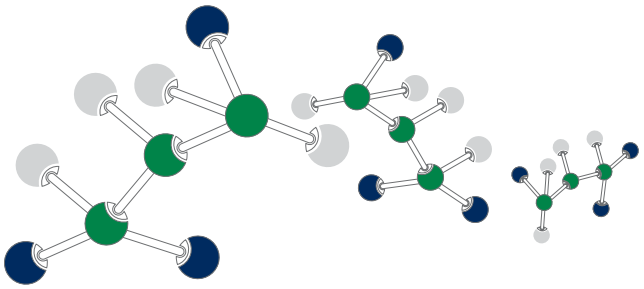

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DIAGNOSIS OF CAUSES OF VAGINAL INFECTIONS

Compiled by Dr Vicky Howell **February 2015**

INTRODUCTION

Vaginal discharge in women is the commonest gynaecological complaint and one of the most common reasons for women seeking medical care. Vaginal discharge may be caused by infections, chemical irritants, foreign bodies or malignancies. Genital ulcers are most commonly caused by sexually transmitted pathogens, but may be caused by malignancies or may be due to excoriations (scratching) from an itchy vaginal discharge.

A thorough clinical examination should be undertaken to exclude any non-infectious cause for the discharge or genital ulcers including the use of a speculum to examine the cervix. Infectious causes of vaginal discharges and genital ulcers may have slightly different clinical presentations, but in general the clinical symptoms are considered to be relatively non-specific. Current South African guidelines advocate the use of syndromic management for vaginal discharge and genital ulcers. In settings where diagnostic testing is available laboratory evaluation can be undertaken to determine the cause of the infection in order to direct treatment, which ultimately improves patient compliance with therapy and partner notification. There are many different types of specimens that can be sent to the laboratory depending on the clinical picture and the likely pathogen, including a low vaginal swab, high vaginal swab or cervical swab (collected while visualising the cervix with the aid of a specumlum), or a vulval swab from the external genital area if an ulcer is seen.

INFECTIOUS CAUSES OF VAGINAL DISCHARGE

- Bacterial vaginosis
- *Trichomonas vaginalis*
- *Candida albicans* and other *Candida species*
- *Neisseria gonorrhoea*
- *Chlamydia trachomatis* serovars D-K
- Human papilloma virus (cause of genital warts and cervical cancer)

INFECTIOUS CAUSES OF GENITAL ULCERS

- Herpes simplex virus 1&2
- *Treponema pallidum* (syphilis)
- *Chlamydia trachomatis* serovars L1-3 which causes the disease lymphogranuloma venereum (LGV)
- *Klebsiella granulomatis*, which causes the uncommon disease donovanosis

A mixed infection with two or more organisms is not uncommon, and a patient may present with both a vaginal discharge and a genital ulcer at the same time.

LABORATORY DIAGNOSIS

1. Microscopy

The abundance of normal commensal organisms in the vagina and on the vulva means that a stain of a genital swab will inevitably show a whole variety of different bacterial species. The gram stain may be useful in the diagnosis of Bacterial Vaginosis (BV), a condition characterised by an alteration in the composition of the vaginal flora. The normal vaginal flora consists of predominantly lactobacilli (gram positive rods) with fewer anaerobic organisms e.g. Mobiluncus species, Prevotella species, *Gardenerella vaginalis* and numerous other fastidious or uncultivable anaerobic organisms. With BV, that balance is shifted, resulting in a decrease in the number of lactobacilli with a concomitant increase in the number of anaerobic organisms. In the laboratory a scoring system is used, called the Nugents score, which grades the decrease in the number of lactobacilli versus the increase in the other anaerobic organisms based on their gram stain morphology (shape and colour). The results are interpreted as follows:
0-3: no BV
4-6: altered flora
7-8: suggestive of BV
9-10: diagnostic of BV

Neisserian organisms may be seen on the gram stain, which may indicate *Neisseria gonorrhoea* or the Neisseria species that form part of the saprophytic flora in the vagina and cervix. Direct gram stain may correlate with culture in only 50-70% of cases. Care must be taken when interpreting this result.

Fungal hyphae and yeasts may be seen on the gram stain, indicating vaginal candidiasis.

A plain saline wet preparation of a vaginal swab or fluid may show the trophozoites of the parasite *Trichomonas vaginalis,* a sexually transmitted pathogen. This specimen should be sent to the lab as quickly as possible or else the trophozoites will lose their characteristic “pear” shape as the organism is very fragile and does not survive long periods outside the human body.

Dark field microscopy may be done on a scraping from a genital ulcer when syphilis is suspected, but this specimen should be sent to the laboratory without any delay or else the "corkscrew"-shaped Treponema pallidum spirochaetes will lose their characteristic “twisting” motility and will be indistinguishable from the other commensal spirochaetes that form part of the normal flora.

2. Culture:

The following organisms are likely to be pathogens if isolated from a genital swab:

- *Neisseria gonorrhoea*
- Beta-haemolytic streptococci e.g. *Streptococcus pyogenes* (Group “A” strep) and *Streptococcus agalactiae* (Group “B” strep)
- *Staphylococcus aureus* or gram negative bacilli if a heavy growth of a pure culture of the organism is isolated
- *Gardnerella vaginalis*
- *Listeria monocytogenes*
- *Candida albicans* or yeasts
- *Ureaplasma urealyticum* and *Mycoplasma hominis* are organisms that have been implicated in genital infections but may not necessarily be pathogenic

Organisms that are usually of doubtful clinical significance are:

- Non-haemolytic streptococci and Enterococcus spp.
- Viridans streptococci
- Coagulase negative staphylococci
- Lactobacilli
- Corynebacterium species
- Gram negative bacilli unless isolated in a pure, heavy growth

3. Molecular testing:

Many of the organisms causing genital infections are not easily cultured in the laboratory e.g. the organisms causing Bacterial Vaginosis, the organisms causing genital ulcer disease and the viruses.
Molecular testing (PCR) is available for the following organisms:

- *Chlamydia trachomatis* – vaginal swab or urine
- *Neisseria gonorrhoea* – vaginal swab or urine
- *Herpes simplex virus 1&2* – swab of a lesion is preferable; urine if no lesions, but depends on viral shedding at the time of testing
- *Human papilloma virus* – liquid-based cytology specimen or cervical swab

Dry swabs are used for molecular testing as the swabs used for routine microscopy and culture are unsuitable for PCR due to numerous inhibitory substances in the transport medium (gel-like substance in the tube) of these swabs.

SPECIMEN COLLECTION AND TRANSPORT CONSIDERATIONS

Care must be taken to minimise the contamination of the specimen by the normal flora of the genital tract in order to optimise the interpretation and determination of the clinical relevance of the cultured organisms. Specimens should reach the lab as quickly as possible because certain organisms e.g. *Neisseria gonorrhoea* die quickly when exposed to room temperature and ideally should be sub-cultured onto suitable media in the laboratory as soon as possible.

FOLLOW-UP SWABS

Routine follow-up swabs on non-pregnant women diagnosed with Trichomoniasis, BV or candidiasis are usually not necessary unless there is a recurrence of symptoms after appropriate antimicrobial therapy. Repeat testing of all women who have been diagnosed with chlamydia or gonorrhoea is recommended 3–6 months after treatment, regardless of whether their sexual partners were treated. For symptomatic pregnant women who have been diagnosed with BV, it is recommended that a follow-up swab be submitted after one month followed by repeat treatment if necessary.

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