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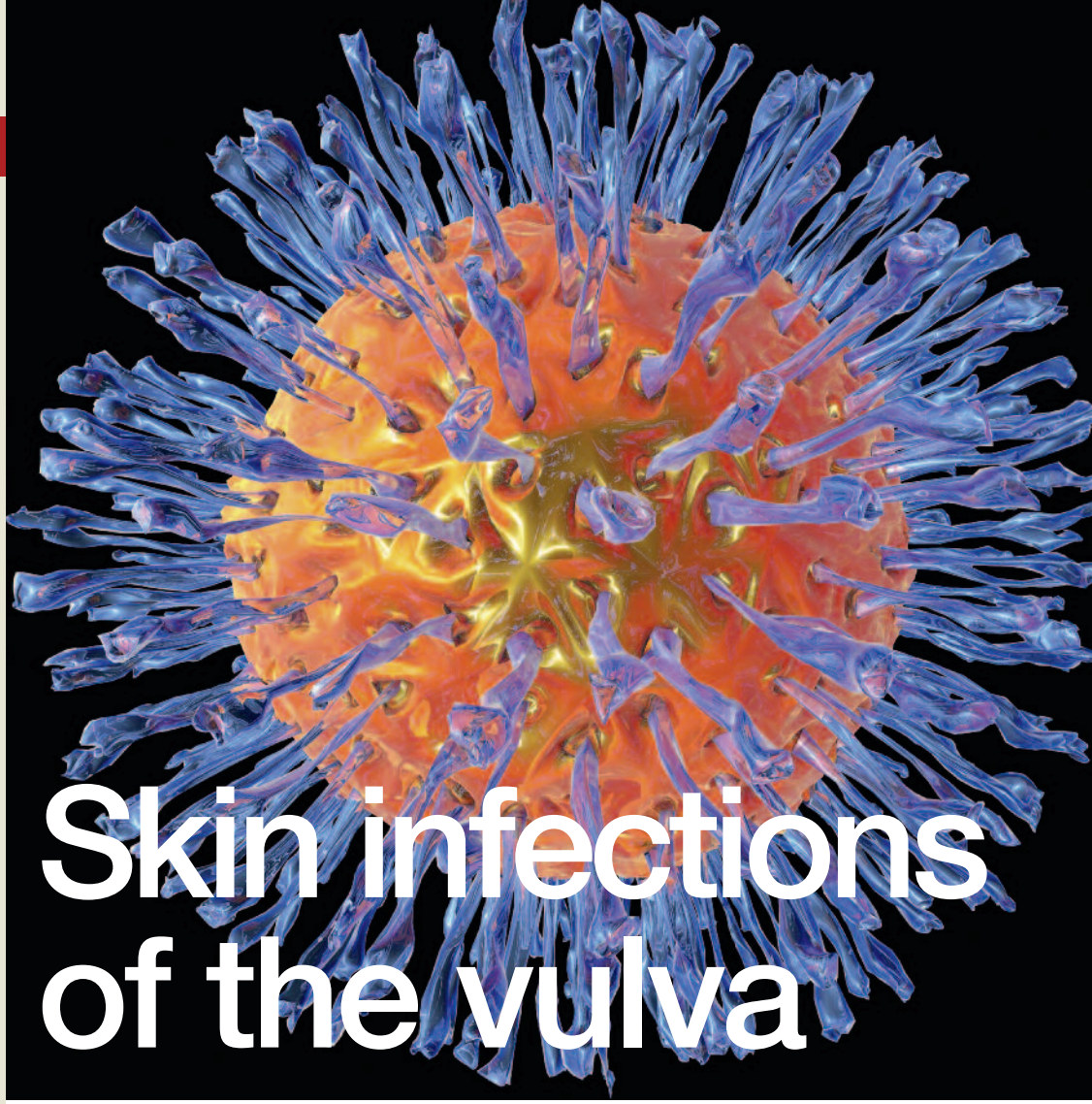

Skin infections of the vulva

Key points

- Vulval infections may be misdiagnosed by relying on symptomatology rather than history, examination and appropriate testing.
- Vulval infections can be classified as sexually or nonsexually transmissible.
- Infections may be transmitted to the vulva by sexual activity, the hands, fomites and immersion in contaminated water.
- Women with underlying dermatological disease of the vulva may be more prone to microbial infection as a result of skin barrier impairment.
- Many sexually transmissible infections require notification to state health authorities.
- The presence of pregnancy needs to be considered in women of a reproductive age because of possible effects of infections on the fetus.

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Skin infections of the vulva may be primary infections or secondary to vaginal infections. The sexually transmissible infections particularly may have serious consequences if not diagnosed and treated promptly.

Infections of the vulva may be either primary infections, when the causative organism invades and multiplies in the vulval skin as the primary site, or secondary to vaginal infections. The causative organisms can be transmitted by sexual activity, the hands, fomites and immersion in contaminated water. Vulval infections can be classified as common or rare (in an Australian context), and also as sexually transmissible infections or nonsexually transmissible infections. Diagnosis of a vulval infection requires history taking, examination and appropriate testing, and misdiagnosis may occur if symptomatology only is considered.

There is a wide range of vulval infections, and some only occur in certain parts of the world. This article is limited to the more common vulval infections encountered in women in general practice in Australia (see the boxes on page 28). Reference to on-site microscopy as a diagnostic aid has been omitted because most general practices would not have this facility and in practice rely on the use of cell culture, polymerase chain reaction (PCR) techniques and serological testing.

NORMAL LOWER GENITAL TRACT FLORA

In healthy women, there are many different organisms present on the vulval skin surface and in the vagina. The normal bacterial flora

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NONSEXUALLY TRANSMISSIBLE VULVAL INFECTIONS IN AUSTRALIA*

Nematode, tapeworm and fluke infections
- Filariasis
- Hydatid disease
- Schistosomiasis
- Threadworm infection

Fungal infections
- Candidiasis
- Pityriasis versicolor
- Tinea cruris

Bacterial infections

Staphylococcus aureus* and *Streptococcus
- Bartholin's gland abscess
- Cellulitis
- Impetigo
- Infection of hair follicles
- Toxic shock syndrome

Corynebacterium
- Erythrasma

Other bacteria
- Necrotising fasciitis

Viral infections
- Herpes simplex
- Herpes zoster

* Not a comprehensive list.

SEXUALLY TRANSMISSIBLE VULVAL INFECTIONS IN AUSTRALIA*

Protozoal infections
- Trichomoniasis

Bacterial infections
- Bacterial vaginosis
- Chlamydia infection
- Gonorrhoea
- Syphilis

Viral infections
- Genital herpes simplex
- Human papillomavirus infection
- Molluscum contagiosum

* Not a comprehensive list.

of vulval skin includes diphtheroids, micrococci, coagulase-negative staphylococci and lactobacilli. Also, the incidence of *Staphylococcus aureus* is higher at this site compared with other skin areas of the body. The proximity of the anus allows colonisation of the vulva by coliforms and *Candida* (both part of the normal intestinal flora), and also, although rarely, threadworms (also known as pinworms).

During a woman's reproductive life, the predominant vaginal organisms are lactobacilli. Other aerobic and anaerobic bacteria also present include *Gardnerella vaginalis, Mycoplasma hominis, Peptostreptococcus* species and other streptococci, and *Bacteroides* species. After the menopause, lactobacilli are no longer the dominant vaginal organisms and the protective effect afforded by them against colonisation by possibly adverse microbial flora is lost, such that postmenopausal women are more susceptible to urinary tract infections and bacterial vaginosis.

PROTECTION AGAINST INFECTION OF THE VULVA

An intact vulval skin is an important protection against infection. Trauma to the skin may be due to sexual activity, shaving, waxing, plucking, scratching and irritation from clothing.

Women with underlying dermatological disease of the vulva may be more prone to bacterial and fungal infection as a result of skin barrier impairment.

NONSEXUALLY TRANSMISSIBLE INFECTIONS OF THE VULVA

Threadworm infection

Threadworm (*Enterobius vermicularis*) infection is a common infection of the bowel in children, and if general hygiene is not ideal then others in the family may become infected. The female worms migrate to the anus and lay their eggs on the perineal and perianal skin at night; the threadworms (white, 3 to 12 mm long, thin roundworms) can be seen in these areas and they and the eggs can cause itchiness. In infected women, the worms may move onto the vulva and into the vagina, causing inflammation.

Treatment of threadworm infection is with mebendazole 100 mg as a single dose (adults and children aged 2 years and older).

Folliculitis and furuncles

Shaving and waxing the vulval area, especially on the mons pubis and outer labia majora, are the most common forms of trauma that cause folliculitis and furunculitis. The causative organism is *S. aureus*. Women with persisting lesions may require long courses of oral antibiotics or even surgical drainage of large lesions. Although diabetes mellitus, poor hygiene, immunodeficiency and obesity can all make the condition worse, most affected women are healthy staphylococcus carriers who have none of these conditions.

Folliculitis and furunculitis are treated with flucloxacillin 250 mg tablets four times a day for seven to 10 days.

Candidiasis

Candida species are part of the normal flora of the lower genital tract in women of reproductive age, being found in up to 50% of women. *Candida albicans* is identified on microscopy as the causative organism in up to 90% of women with symptoms of vulval candidiasis. Other species that cause candidiasis include *C. glabrata, C. tropicalis, C. parapsilosis* and *C. krusei*; these species can be resistant to the usual treatments for *C. albicans*.

Pruritus is the main symptom and examination shows a beefy red appearance with satellite lesions and a thick curd-like white discharge (Figure 1). Predisposing conditions include diabetes

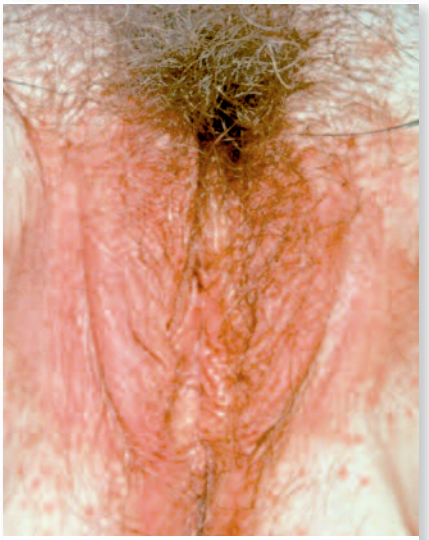

Figure 1. Vulval candidiasis showing the beefy red appearance and the satellite lesions.

mellitus, antibiotic use, high-dose oestrogen hormone contraceptive and replacement use, pregnancy and immunosuppressed states.

Treatment of symptomatic women is with local antifungal creams or oral antifungal medication. In uncomplicated cases of *C. albicans* infection, oral or topical treatments have similar cure rates but oral treatment is more convenient. Oral treatment is with fluconazole 150 mg stat, and topical treatment is with mycostatin or nystatin cream used twice daily. Infection with *Candida* species resistant to these treatments is treated with miconazole vaginal cream for seven days or fluconazole 50 mg three times in 72 hours, and repeated weekly for six months in resistant cases.

Tinea cruris

Tinea cruris is a fungal infection of the groin that may spread to the vulva. *Trichophyton rubrum* and *Epidermophyton floccosum* are the most common causes.

The scaly rash, which may blister, has a red border that spreads down the inner thighs from the groin and can be very itchy, especially in hot weather and with the wearing of tight fitting clothing. The infection often comes from the feet or nails, being spread by scratching or the use of an infected towel. Tinea cruris can be confused with other skin conditions, including candidiasis and psoriasis. Microscopy and culture of skin scrapings confirm the diagnosis.

Treatment consists of keeping the skin clean and dry, wearing loose fitting clothing and the application of antifungal cream or the use of oral therapy. Effective drugs include miconazole, clotrimazole and tolnaftate.

Herpes zoster

Herpes zoster (shingles) occurs when varicella–zoster virus is reactivated after lying dormant in the spinal dorsal root ganglia following the initial infection with the virus (chickenpox). It is characterised by pain, followed by papules and blisters, and will occur on the vulva if the S3 dermatome is affected. Aciclovir can be used to treat this condition.

SEXUALLY TRANSMISSIBLE INFECTIONS OF THE VULVA

It is important to recognise that patients with sexually transmitted infections (STIs) may have more than one such infection and that many STIs require notification to state health authorities. The presence of pregnancy needs to be considered in women in the reproductive age group because the fetus may be susceptible to these infections.

With all cases, follow up after treatment is required. Counselling of patients and their partners is important to help them cope with the diagnosis, to identify any misconceptions and to prevent transmission.

Sexually transmissible vulval infections include genital herpes, primary and secondary syphilis, genital human papillomavirus infection and molluscum contagiosum. The vaginal infections trichomoniasis, bacterial vaginosis, chlamydia infection and gonorrhoea can cause vulval irritation if they have a profuse discharge. Infection with the human immunodeficiency virus (HIV) can affect the vulva but it is not a specific vulvitis.

Figure 2. Multiple ulcers of genital herpes infection.

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Genital herpes

Genital herpes is caused by herpes simplex viruses 1 and 2 (HSV1, HSV2), the usual cause being HSV2. HSV infection is an important cofactor in the transmission of HIV. Most people with HSV infection are asymptomatic or have had symptoms that they did not recognise as being due to the virus. Genital herpes is spread by direct contact with an infected person. The virus penetrates damaged skin, spreads along lymphatics to regional lymph nodes and then via local sensory neurones to sensory or autonomic nerve root ganglia where it lies dormant. The primary infection is usually symptomatic but symptoms may be mild and so not recognised.

Clinical features vary depending on whether the episode is the initial primary

Figure 3. Syphilitic chancre of primary syphilis.

episode or a subsequent nonprimary episode. A true primary episode occurs in an individual who has not been previously exposed to the virus. After an incubation period of fewer than seven days, a localised area of tingling or pain occurs and is followed two to 24 hours later by multiple papule formation, then blister formation and finally ulceration (Figure 2). In women, the lesions occur on the vulva and are very painful, the vaginal mucosa is inflamed and the cervix is also involved in most cases. Crusting of the lesions is followed by healing, which occurs without scarring. Viral shedding can last up to 16 days from the onset of symptoms.

With HSV2 infection, recurrent episodes can occur monthly; with HSV1 infection, recurrent episodes occur much less frequently. Recurrences tend to be milder than the primary episode and healing is also quicker. In women, recurrences are often unilateral (as compared with bilateral in the primary episode), affect smaller areas of skin/mucous membranes than the primary episode and are less painful.

Diagnosis is usually made clinically but should be confirmed by viral culture or PCR techniques (the latter are more sensitive than culture).

Treatment options for a primary infection include valaciclovir (the first-line treatment, as it has a better oral bioavailability than aciclovir and also requires less frequent dosing – 1000 mg orally twice a day) or aciclovir (200 mg five times daily orally for 10 days with a primary infection). Famciclovir is not licensed in Australia for use in first episode genital herpes. Treatment should start within five days of the onset of symptoms and continue for as long as new lesions are forming.

For recurrent episodes there are two strategies of treatment. One is for episodic treatment and the other is for suppressive treatment. Episodic treatment needs to be started within two days of lesions appearing or it will have no impact on the clinical course; aciclovir, famciclovir and valaciclovir are used (for dosages, see *Therapeutic guidelines: antibiotic. Version 14, 2010*).[1] For suppressive therapy, lower dosages of these drugs are used on a continuous basis.

The regular use of condoms can help prevent HSV infection, as can preemptive suppressive therapy. The use of suppressive therapy reduces the risk of recurrences. Where there is uncertainty about treatment, consultation with an infectious diseases physician or sexual health physician is recommended.

Syphilis

Syphilitic lesions on the vulva include the primary lesion, which usually starts as a solitary papule that ulcerates to a painless, firm chancre, and the multiple warty broad-based condylomata lata of the secondary phase of the disease (Figures 3 and 4). The gummas of tertiary syphilis rarely occur on the vulva.

The incubation period of syphilis ranges from 10 to 90 days, with an average of 21 days, and a larger inoculum of

Figure 4. Condylomata lata of secondary syphilis and condyloma acuminata of human papillomavirus infection.

the causative organism *Treponema pallidum* subspecies *pallidum* results in a shorter incubation period. Transmission of the spirochaete requires exposure to open lesions containing the organism, such as abraded skin, although it can pass across intact mucous membranes.

Serological testing uses the syphilis enzyme immunoassay test as a screening test and the *Treponema pallidum* haemagglutination assay and fluorescent treponemal antibody absorption tests as confirmatory tests. A nontreponemal test, either rapid plasma reagin or venereal disease research laboratory titres, is used to assist staging of the disease, checking for reinfections in those patients previously treated (treponema-specific tests stay positive for life) and response following treatment.

Treatment is with the penicillin regimen most appropriate to the stage of the disease. The antibiotic treatment must be prolonged because the organism divides

slowly. Thus long-acting penicillin preparations are used to treat the disease. A single dose of benzathine penicillin 1.8 g intramuscularly is the standard treatment for primary, secondary and early latent syphilis, defined as asymptomatic infection of less than two years' duration. Late latent phase syphilis and tertiary syphilis without cardiovascular or neurological involvement require once weekly intramuscular injections of 1.8 g benzathine penicillin for three doses. Procaine penicillin is also used (1 g a day intramuscularly for 10 to 14 days).

Human papillomavirus infections

Human papillomavirus (HPV) is a DNA virus that infects basal epithelial cells and mucous membranes. More than 100 different subtypes are responsible for benign and malignant lesions. The incubation period for HPV ranges from several weeks to many months.

Clinical features on the vulva of HPV infection include the development of visible warts that can vary considerably in size and shape (Figure 4). Diagnosis is made on clinical grounds but if the lesions are pigmented or atypical they should be biopsied.

Some HPV lesions resolve spontaneously whereas others require treatment. Therapy ranges from the use of creams or solutions (podophyllotoxin, imiquimod, trichloroacetic acid), to cryotherapy and to ablative therapies such as surgery or electrocautery.

Prevention of HPV-related disease by the use of HPV vaccines is effective according to short-term studies but longer follow up is required to be certain of these results.

Molluscum contagiosum

Molluscum contagiosum is caused by a member of the poxvirus family, molluscum contagiosum virus, and is spread by direct contact with another lesion or fomites. The virus causes a raised, pearl-like papule or nodule 2 to 5 mm in diameter with a central punctum. Early lesions on the genitalia may be mistaken for herpes or warts but, unlike herpes, these lesions are painless. The skin lesion commonly has a central core or plug containing a white cheesy or waxy material. In adults, the lesions are often seen on the genitals, abdomen and inner thigh.

Diagnosis is based on the appearance of the lesion and can be confirmed by biopsy. In people with normal immune systems, the lesions usually disappear over a period of months to years, without scarring unless there is excessive scratching. Individual lesions may be removed surgically by scraping, decoring, freezing or needle electrosurgery, but this removal may result in scarring. Medications used to remove warts (imiquimod and podophyllotoxin; off-label use) may be helpful in removal of lesions but can cause blistering that leads to temporary skin discolouration.

Trichomoniasis

The protozoan *Trichomonas vaginalis* colonises the vulva and vagina and is spread by sexual intercourse. Trichomoniasis has an incubation period of four to 28 days, with up to 50% of women being asymptomatic. The characteristic discharge is frothy and malodorous, and can be profuse, possibly causing vulval irritation.

Treatment of trichomoniasis with oral metronidazole 2 g stat or as a divided dose over seven days, or with tinidazole 2 g stat. Topical clindamycin cream is another treatment alternative (off-label use). It is important to treat partners, otherwise the infection will return.

Figure 5. Bartholin's gland abscess caused by a *Neisseria gonorrhoeae* infection.

Bacterial vaginosis

Bacterial vaginosis is a common cause of abnormal vaginal discharge in women in the reproductive age group. The characteristic feature on the vulva is that of a fishy malodorous discharge seen as a fine film at the introitus and on the inner labia and accompanied by soreness rather than an itch. If the discharge is profuse, it can cause vulval irritation.

Treatment of symptomatic women is the same as for trichomoniasis, with which it can occur – that is, oral metronidazole or tinidazole (off-label use), or topical clindamycin or metronidazole.

Genital chlamydia infection

Genital chlamydia infection will only involve the vulva if it involves the glandular cells of Bartholin's gland.

Chlamydia trachomatis is an obligate intracellular Gram-negative bacterium with three distinct human biovars that share the same serological similarities but cause different clinical diseases. Serotypes Ab, B, Ba and C cause trachoma; serotypes D to K cause genital tract infections; and serotypes L1 to L3 cause lymphogranuloma venereum (LGV).

Non-LGV serovars of *C. trachomatis* infect transitional and columnar epithelial cells and so may be associated with infection of Bartholin's gland. Most genital cases, however, infect the endocervix, urethra and rectum.

Chlamydia infection is usually asymptomatic but may present with an abnormal vaginal discharge that can cause vulval irritation. Diagnosis can be made from PCR testing of first pass urine, endocervical swabs or the contents of Bartholin's gland collection.

Treatment for uncomplicated genital chlamydia infection is azithromycin 1 g orally as a single dose. An alternative is doxycycline 100 mg twice daily for seven days. Erythromycin 500 mg twice a day for 14 days is less effective than azithromycin or doxycycline.

Gonorrhoea

Gonorrhoea is caused by *Neisseria gonorrhoeae*, a Gram-negative diplococcus that infects the urethra, cervix, anorectum and pharynx. Involvement of the vulva and vagina is unusual because stratified squamous epithelium is relatively resistant to infection. However, Bartholin's gland and the paraurethral glands may become infected with *N. gonorrhoeae* and present as a Bartholin's gland or paraurethral gland abscess or urethral oedema (Figure 5). In some cases, a profuse vaginal discharge (due to cervicitis) may cause vulval irritation.

Diagnosis of gonorrhoea is made on microscopic examination or culture of the discharge. Treatment is ceftriaxone 500 mg intramuscularly as a single dose.

CONCLUSION

The vulva can be the primary site of infections of various types and be involved in secondary infections from the vagina, both sexually transmissible and non-sexually transmissible. Obtaining a detailed history from patients (including sexual history), performing a thorough examination and undertaking appropriate investigations followed by the correct treatment, follow up and, where necessary, notifying state authorities, is essential.

Patient and partner counselling is important to help them cope with their diagnosis, identify any misconceptions and to prevent transmission. Contact tracing and partner notification are of the utmost importance in limiting the spread of STIs. MT

REFERENCE

1. Antibiotic Expert Group. Therapeutic guidelines: antibiotic. Version 14. Melbourne: Therapeutic Guidelines Limited; 2010.

COMPETING INTERESTS: None.