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Human Immuno-deficiency Virus and Sexually Transmitted Infections

Introduction

Sexually transmitted infections (STIs) are a group of viral, bacterial and parasitic infections that are predominantly transferred during sexual intercourse or intimate contact. STIs are the most commonly reported infections worldwide. The World Health Organization (WHO) estimates that worldwide, there are 340 million new cases of curable STIs diagnosed each year in adults aged between 15 and 49 years [1]; the highest rate of new cases occur in sub-Saharan Africa. HIV infection has reached epidemic proportions; 33.2 million people were estimated to be living with HIV/AIDS at the end of 2007 [2].

Infections that may be transmitted sexually:

- [Chancroid \(*Haemophilus ducreyi*\)](#)
- [Chlamydia \(*Chlamydia trachomatis*\)](#)
- [Donovanosis](#) (granuloma inguinale) (*Klebsiella*)
- [Genital herpes](#) (herpes simplex 1 and 2)
- [Genital warts](#) (human papillomavirus)
- [Gonorrhoea \(*Neisseria gonorrhoeae*\)](#)
- [Hepatitis A](#) (hepatitis A virus)
- [Hepatitis B](#) (hepatitis B virus, HBV)
- [Hepatitis C](#) (hepatitis C virus)
- [Human Immunodeficiency Virus](#) (HIV)
- [Lymphogranuloma venereum \(*Chlamydia trachomatis* L1, L2, L3\)](#)
- [Scabies \(*Sarcoptes scabiei*\)](#)
- [Syphilis \(*Treponema pallidum*\)](#)
- [Trichomoniasis \(*Trichomonas vaginalis*\)](#)

Transmission

Transmission occurs during unprotected sexual intercourse (oral, vaginal or anal) or intimate skin-to-skin contact. Some organisms (HIV, hepatitis B and C viruses and syphilis) can also be transmitted via contaminated blood or blood products, contaminated syringes and during procedures in which contaminated medical instruments are used (e.g. dental procedures, tattooing, body piercing). Organisms can also be transmitted from mother to child during pregnancy (HIV, syphilis, and HBV), during childbirth (HIV, gonorrhoea, syphilis, herpes, chlamydia, HBV) or during breast-feeding (HIV).

Risk for travellers

STI risk in travellers is dependent on the risk-taking behaviour (unprotected sexual intercourse or other intimate contact) and the prevalence of STIs in the contact population.

Sexual risk taking may be influenced by many factors, including change in social environment and substance or alcohol use [3]. It has been estimated that 5-60% of individuals will have a sexual encounter with a new partner whilst abroad [4-9], and younger travellers are more likely to have a sexual encounter with a new partner than older travellers [6,9].



Certain groups of travellers are known to be at increased risk of STIs [10-14]. They include seafarers, long distance lorry drivers, business travellers, men who have sex with men (MSM), migrant workers, and expatriate workers [10,14,15]. Prevalence of STIs such as HIV-infection and gonorrhoea is high in commercial sex workers (CSWs) and travellers who seek CSWs (including those who travel as 'sex tourists'), are at high risk of exposure to STIs [15].

Viral infections

Genital herpes (Herpes simplex 1 & 2)

Genital herpes is common and is found worldwide.

Genital herpes is caused by either Herpes simplex virus 1 or 2 (HSV-1, HSV-2). Most genital herpes infections are caused by HSV-2. The virus can infect the mucous membranes and surrounding skin of the genital tract, rectum, mouth, and the oro-pharynx. Transmission occurs during close physical contact with a person who has active infection; symptoms occur about 14 days after exposure. Primary infection may present as a systemic illness, with 'flu-like' symptoms, multiple painful genital ulcers and regional lymphadenopathy. Genital and cutaneous lesions usually begin with a painful papule that progresses to a blister and then ulcerates. On mucous membranes ulceration may appear first. In females the cervix may be involved, and with receptive anal intercourse there may be rectal infection with proctitis. Serious complications include aseptic meningitis and urinary retention.

After primary infection, there can be clinical resolution or intermittent recurrence of lesions and symptoms. Recurrent infection may be asymptomatic, particularly in women.

Infants born to mothers who have active genital HSV infection can be infected during delivery. Infected newborns may develop skin lesions, pneumonia, and/or have neurological complications. Women with active genital herpetic lesions, therefore, usually have their babies delivered by caesarean section.

Primary and recurrent genital HSV infection can be treated with systemic and topical anti-viral drugs. These drugs do not eradicate the virus, which remains latent and therefore symptoms may recur.

Genital warts (Human papillomavirus)

Genital warts are common and are found worldwide.

Genital warts are caused by certain strains of the Human Papillomavirus (HPV), particularly HPV-6 and HPV-11. Certain HPV types have been associated with the development of cervical intra-epithelial neoplasia (HPV-16, 18, 31 and 35) which can progress to cervical cancer. HPV-16 has been associated with the development of anal squamous intraepithelial neoplasia, a precursor to invasive anal cancer.

The incubation period ranges from two weeks to eight months after sexual contact with an infected partner. Infection may be asymptomatic. In females, lesions can occur in the perianal area, vaginally and on the cervix. In males the penile shaft and perianal tissues are the most common sites of infection, but warts can occur in the urethral opening and in the rectum.

Infants born to mothers who have genital HPV infection affecting the cervix or vagina, can be infected during delivery and develop anogenital warts or laryngeal papillomas.



Genital warts are treated with topical preparations (either cytotoxic or immunomodulating agents). Cryotherapy, electrocautery or lazer ablation is indicated where there are extensive lesions. There is now a recently developed and approved vaccination against certain strains of HPV that is being integrated into child and adolescent immunisation programmes [16].

Human Immunodeficiency virus (HIV) & Acquired Immune Deficiency Syndrome (AIDS)

HIV infection occurs worldwide. At the end of 2007 it was estimated that 33.2 million (range 30.6-36.1 million) persons were living with HIV infection and 2.1 million (range 1.9-2.4 million) had died from AIDS-related illnesses [2]. Prevalence is highest in sub-Saharan Africa, South and South East Asia, and Latin America and the Caribbean [2]. More than 70% of deaths due to AIDS occur in sub-Saharan Africa. Between 2001 and 2005, there was a cumulative total of 32,167 individuals who were newly diagnosed with HIV infection in England and Wales. Of UK-born heterosexuals (N=1,585), where probable country of acquisition was known (N=1,538), 41% probably acquired their infection abroad, 43% in an African country and 29% in Thailand [13]

HIV is a lentivirus within the retrovirus family. There are at least two variants of HIV (HIV-1 and HIV-2). Both types are genetically different and are divided into subsets or clades with certain subsets endemic to particular geographical areas. HIV-2 is largely confined to west Africa and the Indian sub-continent.

HIV infects lymphocytes and macrophages that are crucial to effective immunity against a wide variety of infections. Progressive damage to the immune system over a period of months to years results in an immune system that is unable to fight certain infections and cancers leading to a diagnosis of AIDS.

Most infections with HIV are asymptomatic. HIV is transmitted during unprotected sexual contact, through exchange of body fluids, during injecting drug use, and from receipt of unscreened blood products. The presence of co-existing STIs, especially those that result in genital ulceration, is an enhancing factor in HIV sexual transmission.

About 6-8 weeks after exposure to the virus, some persons will develop a self-limited acute retroviral syndrome with symptoms of fever, myalgia, lymphadenopathy, mouth ulcers, sore throat, and rash. This illness may go unreported. The infection can then remain latent for months or years and not diagnosed until presentation with symptoms associated with immune dysfunction (symptomatic HIV infection or AIDS). Symptomatic HIV infection presents with a wide range of clinical manifestations and any system in the body can be affected. Typical manifestations of AIDS include gastrointestinal problems (weight loss, wasting, diarrhoea), respiratory disease (*Pneumocystis pneumonia*), skin complaints (pruritus, rash, aphthous ulceration) and central nervous system infection (cryptococcal meningitis and toxoplasmosis). In advanced disease there may be blood disorders (anaemia, neutropenia, and thrombocytopenia) and central nervous system involvement (dementia, neuropathy).

HIV infection can be transmitted from mother to child either *in utero* or perinatally. Breast-feeding increases the risk of infection. HIV can also be transmitted via contaminated blood or blood products, contaminated syringes and during procedures in which contaminated medical instruments are used (e.g. tattooing, body piercing).

HIV infection is a chronic and progressive condition unless treated with anti-viral agents. Highly active anti-retroviral therapy (HAART) suppresses viral replication and has revolutionised HIV/AIDS treatment in high income countries, reducing morbidity from the disease and increasing



life expectancy. There is increasing but still limited access to these retroviral agents in low income countries of the world.

Bacterial infections

Chancroid

Chancroid is a common cause of genital ulceration in tropical countries, particularly Africa, South East Asia, and Papua New Guinea. Chancroid is caused by the bacillus *Haemophilus ducreyi* and is transmitted through unprotected sex. Men are most commonly affected. After an incubation period of 3-7 days, a papule appears at the site of infection. Painful ulceration follows, which may cause extensive destruction of the infected area. There may be suppurative regional lymphadenopathy. Chancroid is infectious as long as sores remain open.

Antibiotic treatment is required.

Chlamydia (*Chlamydia trachomatis*)

See also Lymphogranuloma venereum (LGV)

Chlamydia is the most prevalent sexually transmitted infection and occurs worldwide.

It is caused by the bacteria *Chlamydia trachomatis* (CT) and is transmitted heterosexually or homosexually. Symptoms occur 6-19 days after infection. Urethritis is the usual presenting symptom in males. CT pharyngitis and proctitis are not uncommon in men who have sex with men. In females, the only symptom may be increased vaginal discharge. Often infection is asymptomatic, but the organism can ascend the female genital tract, causing pelvic inflammatory disease and irreversible damage to the fallopian tubes. This may result in an increased risk of ectopic pregnancy or infertility.

Infants born to mothers who have active chlamydial infection can be infected during delivery. Perinatal infection may result in a mild self-limiting conjunctivitis (ophthalmia neonatorum). Chlamydial pneumonitis is a more serious sequela to perinatal infection, manifesting between the ages of 6 weeks and 3 months.

Chlamydial infections are sensitive to tetracyclines.

Donovanosis (granuloma inguinale)

Donovanosis is a tropical disease endemic to Papua New Guinea, India, Vietnam, Japan, southern Africa, Brazil and among the Aboriginal people of Australia. The condition also occurs in commercial sex workers in poor socio-economic conditions. Donovanosis is rare in high income countries.

Caused by the bacillus *Klebsiella granulomatis* (previously classified as *Calymmatobacterium*), after a 3-40 day incubation, the disease starts with a small papule at the site of infection which progresses to a painless genital ulcer. Without treatment, the ulcer spreads into skin folds in the anogenital regions. Complications include secondary infection and elephantiasis.

Donovanosis is treated with antibiotics.



Gonorrhoea (*Neisseria gonorrhoeae*)

Gonorrhoea is one of the most prevalent sexually transmitted disease in the tropics [17] but is also common worldwide. It is commonly found in commercial sex workers. In England and Wales, 965 patients diagnosed with gonorrhoea were reported through the gonococcal resistance to antimicrobials surveillance programme in 2005. Where information on travel history was available, 12% (N=104) reported having a sexual contact abroad in the previous three months before diagnosis. Western Europe and the Caribbean were the most reported regions of travel for those reporting a sexual contact abroad [13].

Gonorrhoea is caused by *Neisseria gonorrhoeae*, which infect the epithelium of the male and female urogenital tract, the rectum, the pharynx and the conjunctivae. The infection is asymptomatic in up to 50% of women and 10% of men. Symptomatic gonorrhoea presents after a 2-7 day incubation period. Men develop a purulent penile discharge. Untreated gonococcal infection in men may lead to epididymitis and urethral stricture. In women symptoms include vaginal discharge, dysuria and post-coital bleeding. Untreated infection in women may result in ascending infection of the female genital tract with increased risk of fallopian tube damage, ectopic pregnancy or infertility. Disseminated gonococcal infection manifesting as gonococcal arthritis, meningitis or endocarditis, occurs in a small number of cases.

Infants may be infected during delivery. Perinatal infection may result in an acute conjunctivitis occurring in the first month of life (ophthalmia neonatorum).

Treatment depends on the epidemiology of gonococcal resistance. There is widespread resistance to tetracyclines and penicillins and these agents are no longer reliable. Resistance to fluoroquinolones is common in the Far East. In the United Kingdom, cephalosporins or quinolones are the treatment of choice for uncomplicated gonorrhoea.

Lymphogranuloma venereum (LGV) (Durand-Nicholas-Favre disease, Tropical bubo)

LGV is endemic to Africa, India, parts of South East Asia, parts of South America and the Caribbean. Cases occur sporadically in Australia, North America and Europe [18,19]

LGV is caused by the invasive L1, L2 and L3 serovars of *Chlamydia trachomatis*. It is transmitted during sexual contact. The disease has two distinct phases. Initially, a small genital papule or ulcer may occur at the site of inoculation 3-30 days after exposure. Infection may then progress to the inguinal nodes causing lymphadenitis and the patient is generally unwell. Rectal exposure in men or women can lead to a proctocolitis with pain and rectal discharge. Complications of the untreated condition include elephantiasis and rectal stricture (which may predispose to the development of genital or rectal carcinomas [17].

LGV is usually treated with tetracyclines.

Plastic surgery may be required to correct damage caused by tissue destruction.

Syphilis

Syphilis occurs worldwide.

Syphilis is caused by the bacterium *Treponema pallidum*. Untreated, syphilis has primary, secondary and tertiary phases. It is transmitted both sexually and transplacentally. The primary



lesion, a painless, highly infectious ulcer (chancere), occurs at the site of infection 10-70 days after exposure. The lesion occurs on the external genitalia or may be hidden internally in the vagina, rectum or mouth. Primary lesions gradually heal without treatment. Three to six weeks after the primary infection a secondary phase begins. Symptoms include a classic maculo-papular rash involving the palms of the hands and soles of the feet, generalised lymphadenopathy and meningitis. Untreated, the illness may become latent, recurring weeks, months or even years after the primary infection (tertiary syphilis).

Congenitally infected infants may be stillborn or develop manifestations of congenital syphilis during the neonatal period or during the first three months of life. Early syphilis in infancy may manifest as a failure to thrive, snuffles, rash, bone abnormalities, hepatosplenomegaly and anaemia. Pre-natal screening and treatment of sero-positive mothers is effective in preventing congenital syphilis [17,20].

The usual treatment of the various stages of syphilis is penicillin.

Protozoan infections

Trichomoniasis

Trichomoniasis is prevalent worldwide.

Trichomoniasis is caused by a flagellated protozoa *Trichomonas vaginalis* (TV). It is transmitted during sexual contact and attaches to the squamous epithelium of the male and female genital tracts (vagina, urethra). In females symptoms include vaginal itch with a frothy vaginal discharge. On examination, the cervix may look friable with a typical 'strawberry red' appearance. Infected men are usually asymptomatic, although they may complain of urethral discharge and urinary discomfort.

Infants born to mothers who have active TV infection may be infected during delivery.

TV is treated with metronidazole or tinidazole.

Arthropod infections

Scabies (*Sarcoptes scabiei*)

Scabies occurs worldwide, and is common in poor socio-economic conditions.

Scabies is caused by a parasitic mite (*Sarcoptes scabiei*) that thrives in conditions where people live in close proximity. It can also be transmitted from person to person during sexual contact. Mite infestation manifests as intensely itchy, nodular lesions, commonly between the fingers and toes, abdomen, axillae and groin. Secondary infection is common.

Hyperkeratotic (Norwegian) scabies, is a particularly contagious and fulminant form of the disease, characterised by thick plaques or crusts and found on the face, scalp, back, buttocks, nails and feet.

Scabies is treated either with topical anti-parasitics or orally with ivermectin. Hyperkeratotic scabies usually requires a combination of topical preparations and ivermectin.



Prevention of sexually transmitted infection

Travellers should be counselled about the risk of acquiring STIs during international travel. Abstinence from sexual intercourse with a new or known to be infected partner is the most effective strategy for preventing HIV infection and other STIs. Studies have demonstrated that male and female condoms offer effective protection against STIs, including HIV, but only when used consistently and correctly [21, 22, 23]. The risk of condom failure is dependent on the experience of the user and the frequency of condom use [24].

[Hepatitis B](#) vaccination will protect against transmission of hepatitis B.

Condoms

Condoms are available worldwide.

In the United Kingdom (UK), condoms should carry the BSI or CE kite-mark. Travellers from the UK should carry an adequate supply of condoms of this standard. They should ensure that condoms bought overseas carry a recognised mark of quality e.g. European kite-mark BSEN 600, International Standards Organisation (ISO) mark or approval by the Food and Drug Administration (FDA). Condoms should not be used beyond the marked expiry date.

Condoms manufactured in South and South East Asia are made slightly narrower than those available in the UK.

Female condoms are available in many countries (www.femalehealth.com).

Information on condom use is available at: <http://www.condomessentialwear.co.uk/>

High-risk sexual exposure

Emergency contraception overseas

Emergency contraception may sometimes be required.

Emergency contraception using hormones is usually effective if given within 72 hours of unprotected intercourse. This method may be available in many countries (<http://www.maristopes.org.uk/uk/publications.htm> and <http://ec.princeton.edu/>). Insertion of an intrauterine contraceptive device (IUCD) within 5 days of unprotected intercourse may prevent a pregnancy. This method is inadvisable in some countries because of the risks associated with invasive procedures.

Post exposure screening

Individuals who have been at high risk of exposure to an STI during travel should seek medical advice and post exposure screening at the earliest opportunity. Further sexual contact should be avoided until screening tests for STIs have been performed and are negative.

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