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GUIDELINES

FOR THE MANAGEMENT OF

SEXUALLY TRANSMITTED INFECTIONS



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Note 1999

The World Health Organization recommends that the term sexually transmitted disease (STD) be replaced by the term sexually transmitted infections (STI). The term sexually transmitted infections has been adopted as it better incorporates asymptomatic infections. In addition, the term has been adopted by a wide range of scientific societies and publications.

Reproductive tract infections encompass three main groups of infection, particularly in women, and sometimes in men. These groups are endogenous infections in the female genital tract (e.g. candidiasis and bacterial vaginosis), iatrogenic infections that may be acquired through non-sterile medical, personal or cultural practices and classical STI. Currently, research is being conducted to better understand the determinants of endogenous infections. They are not primarily sexually transmitted; thus, clinical and public health actions as recommended for STI may not apply to these infections. Given the current state of knowledge and understanding of these infections treatment of partners is not recommended as routine public health practice. Reassurance and patient education are critical with regard to the nature of these endogenous infections.



PREFACE

Sexually transmitted infections (STI) are among the most common causes of illness in the world and have far-reaching health, social and economic consequences for many countries.

The emergence and spread of HIV infection and AIDS have had a major impact on the management and control of STI. At the same time, resistance of several sexually transmitted pathogens to antimicrobial agents has increased, adding to therapeutic problems.

In 1991, WHO published recommendations for the comprehensive management of patients with STI within the broader context of control, prevention and care programmes for STI and HIV infection. WHO convened an Advisory Group Meeting on Sexually Transmitted Diseases Treatment in May 1999 to review and update treatment recommendations in the light of recent developments (see annex).

This publication presents the revised recommendations, both for a syndromic approach to the management of patients with STI symptoms and for the treatment of specific STI, based on global epidemiological surveillance data. It also provides information on the notification and management of sexual partners and on STI in children and adolescents.



1. INTRODUCTION

1.1. BACKGROUND

Sexually transmitted infections (STI) remain a public health problem of major significance in most parts of the world. The incidence of acute STI is believed to be high in many countries and failure to diagnose and treat STI at an early stage may result in serious complications and sequelae, including infertility, foetal wastage, ectopic pregnancy, anogenital cancer and premature death, as well as neonatal and infant infections. The individual and national expenditure for STI care can be substantial.

The appearance of the human immunodeficiency virus (HIV) and the acquired immunodeficiency syndrome (AIDS) has focused greater attention on the control of STI. There is a strong correlation between the spread of conventional STI and HIV transmission and both ulcerative and non-ulcerative STI have been found to increase the risk of sexual transmission of HIV.

The emergence and spread of HIV infection and AIDS complicated the management and control of some other STI. For example, the treatment of chancroid has become increasingly difficult in areas with a high prevalence of HIV infection, due to the HIV-related immunosuppression.

Antimicrobial resistance of several sexually transmitted pathogens is increasing, rendering some regimens ineffective.

New agents, such as third-generation cephalosporins and fluoroquinolones, capable of treating infections with resistant strains are available but are expensive. However, their initial high cost must be weighed against the cost of inadequate therapy, which may lead to complications, relapse, further spread and selection for antimicrobial resistance.

1.2. RATIONALE FOR STANDARDIZED TREATMENT RECOMMENDATIONS

Effective management of STI is one of the cornerstones of STI control, as it prevents the development of complications and sequelae, decreases the spread of these diseases in the community and offers a unique opportunity for targeted education about HIV



prevention. Appropriate treatment of STI patients at their first encounter with a health care provider is, therefore, an important public health measure. When this involves adolescent¹ patients, there is the potential to influence future sexual behaviour and treatment-seeking practices at a critical stage of development.

The use of appropriate standardized protocols is strongly recommended in order to ensure adequate treatment at all levels of the health service. Such standardized treatment also facilitates the training and supervision of health providers, delays the development of antimicrobial resistance in sexually transmitted agents such as *Neisseria gonorrhoeae* (*N. gonorrhoeae*) and *Haemophilus ducreyi* (*H. ducreyi*), and is an important factor in rational drug procurement.

It is anticipated that the following recommendations will help countries to develop standardized protocols adapted to local epidemiological and antimicrobial sensitivity patterns. It is recommended that national guidelines for the effective management of STI be developed in close consultation with local STI and public health experts.

1.3. CASE MANAGEMENT

STI case management is the care of a person with an STI-related syndrome or with a positive test for one or more STI. The components of case management include: history taking, examination, correct diagnosis, early and effective treatment, advice on sexual behaviour, promotion and/or provision of condoms, partner notification and treatment, case reporting and clinical follow-up as appropriate. Thus, effective case management consists not only of antimicrobial therapy to obtain cure and reduce infectivity, but also comprehensive care of the patient's needs for reproductive health.

1.4. SYNDROMIC MANAGEMENT

Aetiological diagnosis of STI is problematic in many settings. It places constraints on time, resources, costs and access to treatment. In addition, the sensitivity and specificity of commercially available tests can vary significantly, thus, affecting negatively, the reliability of laboratory testing for STI diagnosis. In settings where laboratory facilities are available

¹ WHO has defined adolescents as persons in the 10-19 years age group, while youth has been defined as the 15-24 years age group. "Young people" is a combination of these two overlapping groups covering the range 10-24 years (*A Picture of Health: A review and annotated bibliography of the health of young people in developing countries* (1995), UNICEF, WHO).



there must be suitably qualified personnel with adequate training to perform technically demanding procedures, and the establishment of external quality control is mandatory.

Few developing country health facilities have the laboratory equipment or skills required for aetiological diagnosis of STI. To overcome this, a syndrome-based approach to the management of STI patients was developed and promoted in a large number of countries in the developing world. Syndromic management is based on the identification of consistent groups of symptoms and easily recognized signs (syndromes), and the provision of treatment that will deal with the majority or most serious organisms responsible for producing a syndrome. WHO developed a simplified tool (a flowchart or algorithm) to guide health workers in the implementation of syndromic management.

Syndromic management for urethral discharge in men and genital ulcers in men and women has proved to be both valid and feasible. It has resulted in adequate treatment of large numbers of infected people, and is inexpensive, simple and very cost-effective. WHO also developed syndromic case management algorithms for women with symptoms of vaginal discharge and/or lower abdominal pain. However, it is important to recognize the limitations of the vaginal discharge algorithms, particularly in the management of cervical (gonococcal and chlamydial) infections. In general, but especially in low prevalence settings and in adolescent females, endogenous vaginitis rather than STI is the main cause of vaginal discharge. While attempts have been made to increase the sensitivity and specificity of the vaginal discharge algorithm for the diagnosis of cervical infection, through the introduction of an appropriate, situation-specific risk assessment, both remain low.

Moreover, some of the risk assessment questions based on demographics, such as age and marital status, tend to incorrectly classify too many adolescents as at risk of cervical infection. Therefore, there is a need to identify the main STI risk factors for adolescents in the local population and tailor the risk assessment accordingly. For adolescents in particular it may be preferable to base the risk factors on sexual behaviour patterns.

Recommendations for treatment using a syndrome-based approach are given in section 2.

1.5. RISK FACTORS FOR STI-RELATED CERVICITIS

The algorithms currently available for the management of cervical infection are far from ideal. Initially, it was thought that the finding of vaginal discharge would be indicative of



both vaginal and cervical infection. However, it has become clear that while vaginal discharge is indicative of the presence of vaginal infection, it is poorly predictive of cervical infection (gonococcal and/or chlamydial), particularly in adolescent females.

Some clinical signs seem to be more frequently associated with the presence of cervical infection. In the published literature, clinical observations that have been consistently found to be associated with cervical infection are the presence of cervical muco-pus, cervical erosions, cervical friability and bleeding between menses or during sexual intercourse.

A number of demographic and behavioural risk factors have also been frequently associated with cervical infection. Some of those which, in some settings, have been found to be predictive of cervical infection are age below 21 years (or 25 in some settings), being unmarried, more than one sexual partner in the last 3 months, new partner in the previous 3 months, currently partner has a sexually transmitted infection and recent use of condoms by the partner. Such risk factors are, however, usually specific for the population group for which they have been identified and validated, and cannot easily be extrapolated to other populations or to other countries. Most researchers have suggested that more than 1 demographic risk factor in any particular patient is more valid than just a single one, but that clinical signs can be valid as a single factor.

Adding these signs and a risk assessment to the vaginal discharge algorithm does increase its specificity and, thus, the positive predictive value, although the latter remains low, especially when the algorithm is applied to populations with relatively low rates of infection.

1.6. SELECTION OF DRUGS

Antimicrobial resistance of several sexually transmitted pathogens has been increasing in many parts of the world and this has rendered some low-cost regimens ineffective. Recommendations to use more effective drugs frequently raise concerns about cost and possible misuse.

A two-tier drug policy with the provision of less effective drugs at the peripheral health care level and the most effective and usually more expensive drugs only at a referral level may result in an unacceptable rate of treatment failures, complications and referrals, and may erode confidence in health services. This approach is not recommended. The drugs used for STI in all health care facilities should be at least 95% effective. Criteria for the selection of drugs are listed in the box below.



Criteria for the selection of STI drugs

Drugs selected for treating STI should meet the following criteria:

- high efficacy (at least 95%)
- low cost
- acceptable toxicity and tolerance
- organism resistance unlikely to develop or likely to be delayed
- single dose
- oral administration
- not contraindicated for pregnant or lactating women.

Appropriate drugs should be included in the national Essential Drugs list and in choosing drugs, consideration should be given to the capabilities and experience of health personnel.



2. TREATMENT OF STI-ASSOCIATED SYNDROMES

This section discusses the management of the most common clinical syndromes caused by sexually transmitted agents. Flow charts (algorithms) for the management of each syndrome are provided.

For all these conditions (except vaginitis) the sexual partner(s) of patients should also be examined for STI and promptly treated for the same condition(s) as the index patient.

Successful management of STI requires that staff are respectful of patients and are not judgmental. Examination must be done in appropriate surroundings where privacy can be ensured and confidentiality guaranteed. When dealing with adolescents, the health care provider should be reassuring, experienced and conversant with the changes in anatomy and physiology associated with the different maturation stages e.g. the menarche in young girls or nocturnal emissions in boys. In some situations, health care workers require training to overcome their own sensitivities and be able to address the issue of sexuality and STI in an open and constructive manner.

2.1. URETHRAL DISCHARGE

Male patients complaining of urethral discharge and/or dysuria should be examined for evidence of discharge. If none is seen, the urethra should be gently massaged from the ventral part of the penis towards the meatus.

If microscopy is available, examination of the urethral smear may show an increased number of polymorphonuclear leukocytes and a gram stain may demonstrate the presence of gonococci. In the male, more than 5 polymorphonuclear leukocytes per high power field (x 1000) are indicative of urethritis.

The major pathogens causing urethral discharge are *N. gonorrhoeae* and *Chlamydia trachomatis* (*C. trachomatis*). In the syndromic management, treatment of a patient with urethral discharge should adequately cover these two organisms. Where reliable laboratory facilities are available, a distinction may be made between the two organisms and specific treatment instituted.

**Recommended syndromic treatment**

- therapy for uncomplicated gonorrhoea (for details see section 3.1)

PLUS

- therapy for chlamydia (for details see section 3.2)

- Patients should be advised to return if symptoms persist 7 days after start of therapy.

AT A GLANCE**Urethral Discharge**

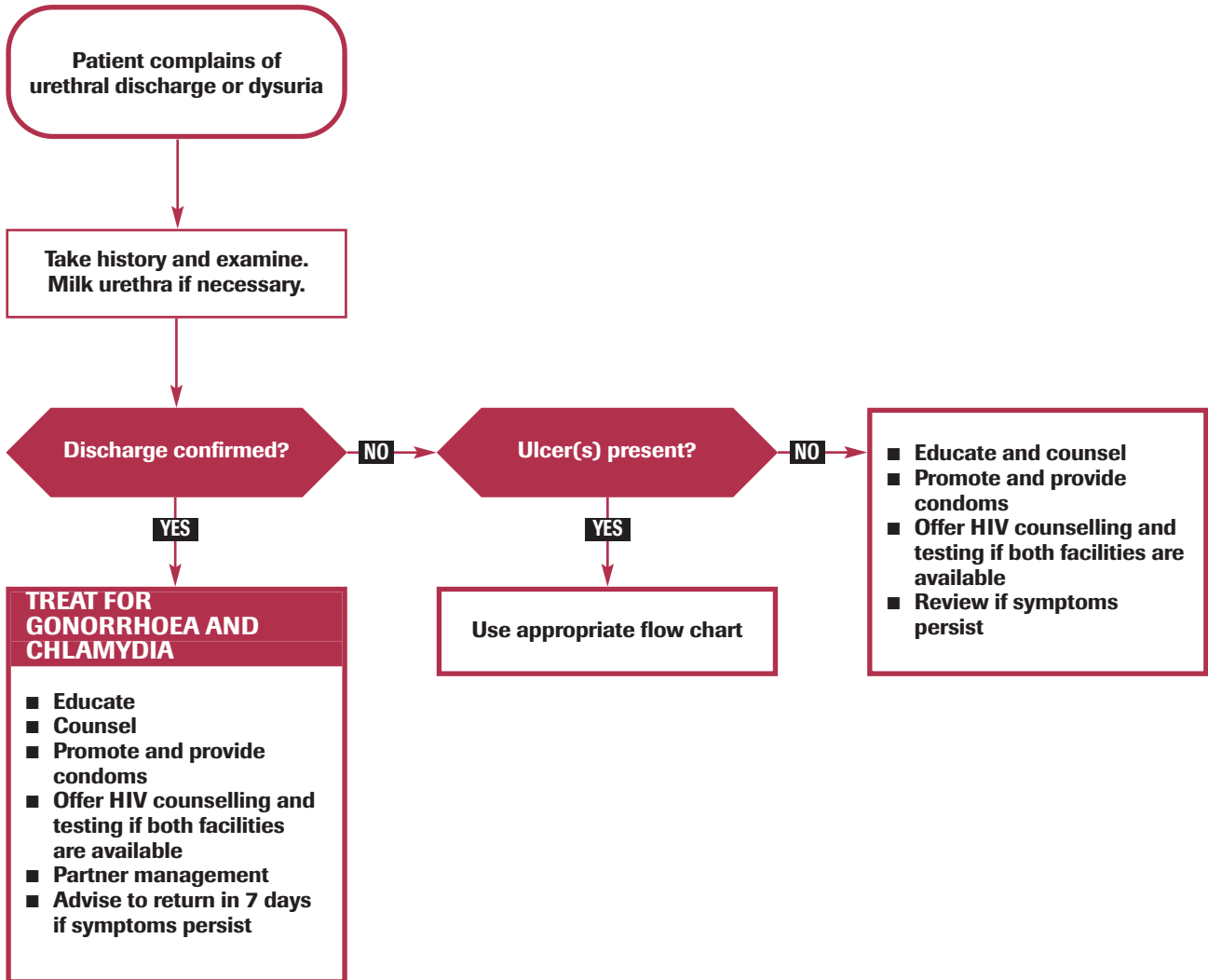
For details, see section 3.1 and 3.2

Treatment options for Gonorrhoea	Treatment options for Chlamydia
Ciprofloxacin	Doxycycline
Azithromycin	Azithromycin
Ceftriaxone	
Cefixime	
Spectinomycin	
Alternatives	Alternatives
Kanamycin	Amoxicillin
Trimethoprim/Sulfamethoxazole	Erythromycin (if Tetracycline contraindicated)
	Ofloxacin
	Tetracycline

WHO recommends that, where possible, single dose therapy be utilized.



FIGURE 1. URETHRAL DISCHARGE





2.1.1. PERSISTENT/RECURRENT URETHRAL DISCHARGE

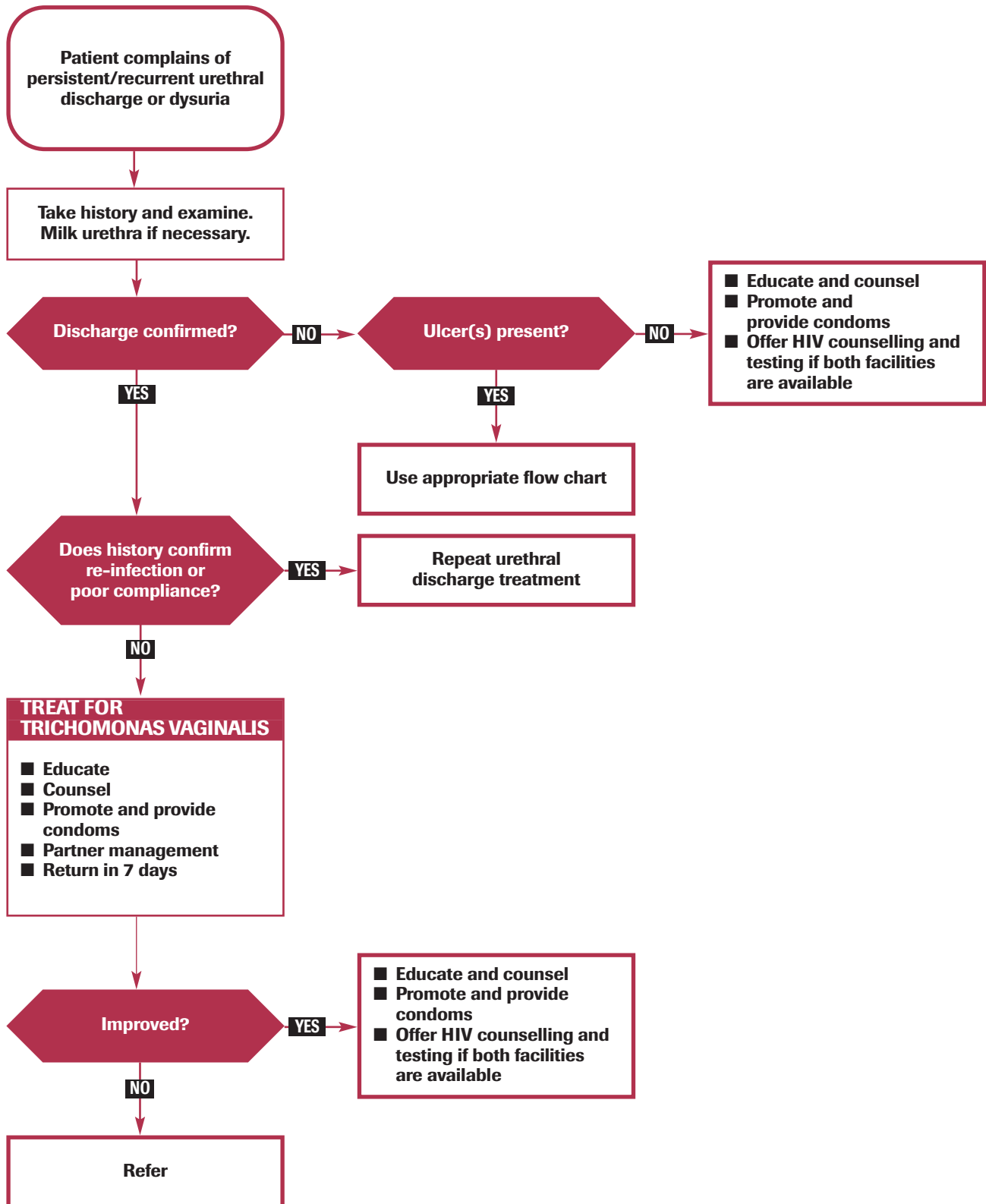
Persistent or recurrent symptoms of urethritis may be due to drug resistance, poor compliance or re-infection. In some cases there may be infection with *Trichomonas vaginalis* (TV).

There is new evidence suggesting high prevalence of TV in men with urethral discharge in some geographical settings. Where symptoms persist or recur after adequate treatment for gonorrhoea and chlamydia in index patient and partner(s), the patient should be treated for TV, if the local demographic pattern so indicates. If the symptoms still persist at follow up the patient must be referred.

For details see section 3.9.



FIGURE 2. PERSISTENT/RECURRENT URETHRAL DISCHARGE IN MEN



N.B. This flowchart assumes effective therapy for Gonorrhoea and Chlamydia to have been received and taken by the patient prior to this consultation.



2.2. GENITAL ULCER

The relative prevalence of causative organisms for genital ulcer disease varies considerably in different parts of the world and may change dramatically over time. Clinical differential diagnosis of genital ulcers is inaccurate, particularly in settings where several aetiologies are common. Clinical manifestations and patterns of genital ulcer disease may be further altered in the presence of HIV infection.

After examination to confirm the presence of genital ulceration, treatment appropriate to local aetiologies and antibiotic sensitivity patterns should be given. For example, in areas where both syphilis and chancroid are prevalent, patients with genital ulcers should be treated for both conditions at the time of their initial presentation to ensure adequate therapy in case of loss to follow-up. In areas where granuloma inguinale is also prevalent, treatment for this condition should be included. In areas where granuloma inguinale or lymphogranuloma venereum (LGV) is prevalent, treatment for these conditions should be included. In many parts of the world, genital herpes is the most frequent cause of genital ulcer disease. Where HIV infection is prevalent, an increasing portion of cases of genital ulcer disease is likely to harbour herpes simplex virus. Herpetic ulcers may be atypical and persist for long periods in HIV-infected patients.

Laboratory-assisted differential diagnosis is rarely helpful at the initial visit, as mixed infections are common. In addition, in areas of high syphilis prevalence, a reactive serological test may reflect a previous infection and give a misleading picture of the patient's present condition.

Recommended syndromic treatment

- therapy for syphilis (for details see section 3.4)
PLUS EITHER
- therapy for chancroid where it is prevalent (for details see section 3.5)
OR
- therapy for granuloma inguinale where it is prevalent (for details see section 3.6)
OR
- therapy for LGV where it is prevalent (for details see section 3.3)



AT A GLANCE

Genital Ulcer

For details, see sections 3.3 – 3.6

Drug options for syphilis	Drug options for chancroid	Drug options for granuloma inguinale	Drug options for LGV
Benzathine	Ciprofloxacin	Azithromycin	Doxycycline
benzylpenicillin	Erythromycin	Doxycycline	Erythromycin
	Azithromycin		
Alternatives	Alternatives	Alternatives	Alternatives
Procaine	Ceftriaxone	Erythromycin	Tetracycline
benzylpenicillin		Tetracycline	
		Trimethoprim/ Sulfamethoxazole	
Penicillin allergy and non-pregnant			
Doxycycline			
Tetracycline			

The decision to treat for chancroid, granuloma inguinale or LGV depends on the local epidemiology of the infections.

Depending upon local availability, management for herpes could include specific antiviral therapy (see section 3.6), but in all settings, appropriate counselling is essential.

Genital Ulcer and HIV Infection

There have been a number of anecdotal reports in the literature suggesting that the natural history of syphilis may be altered as a result of concomitant HIV infection. Some reports have indicated atypical presentations of both primary and secondary syphilis lesions. Some reports have also noted an increase in treatment failure rates among patients with early syphilis who are treated with single-dose therapies of Penicillin.

In chancroid atypical lesions have been reported in HIV-infected individuals. The lesions tend to be more extensive, producing multiple lesions that may be accompanied by systemic manifestations such as fever and chills. Reports of rapidly aggressive lesions have been noted by some clinicians. This emphasizes the need for early treatment, especially in HIV-infected individuals.

There is evidence to suggest that HIV infection may increase rates of treatment failure in chancroid, especially when single-dose therapies are given. More research is needed to confirm these observations.



Herpes simplex lesions may present as persistent multiple ulcers that require medical attention, as opposed to self-limiting vesicular ulcers which occur in immunocompetent individuals. Thus, antiviral treatment may have to be considered therapeutically or prophylactically to offer comfort to the patient. Adequate education needs to be given to the patient to explain the nature and purpose of treatment in order to avoid false expectations of cure.

Genital Ulcer Disease Management

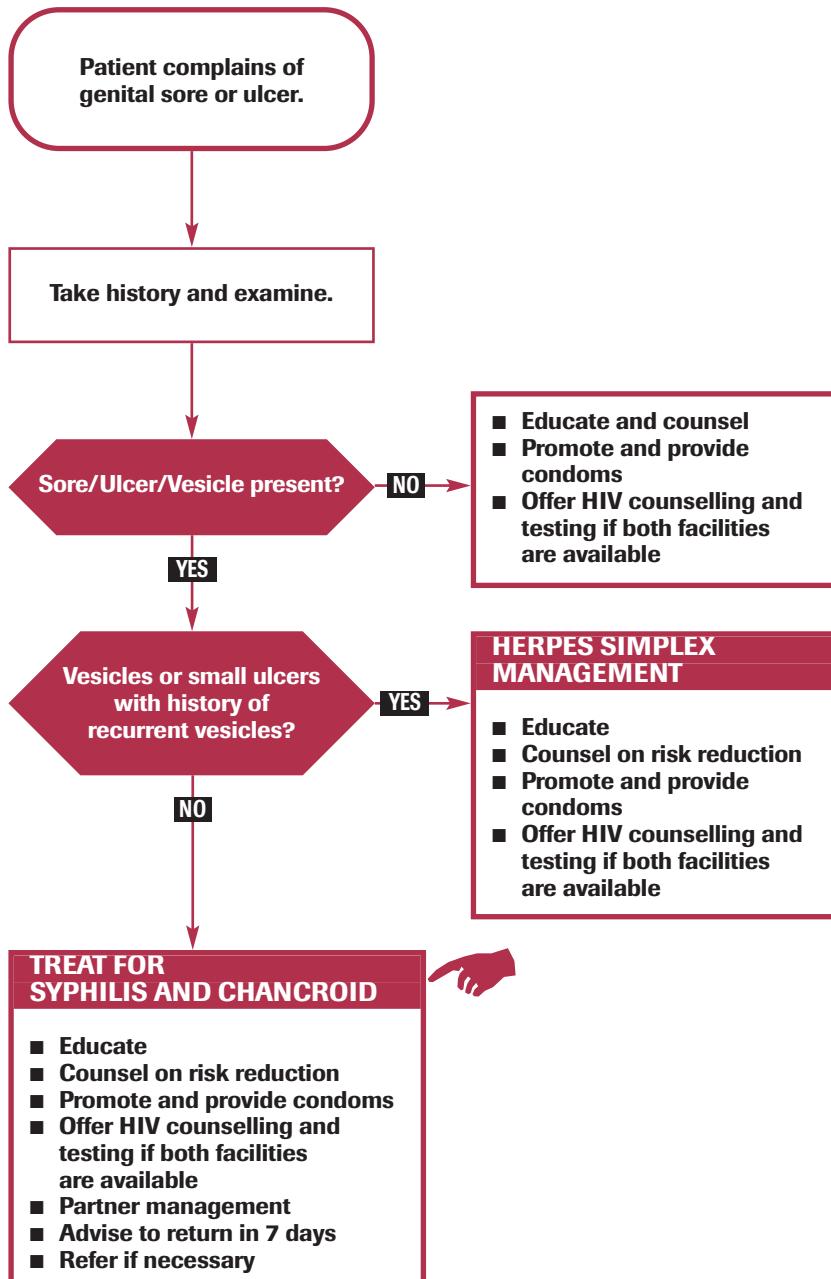
- Treat for syphilis, and, depending upon local epidemiology, either chancroid, granuloma inguinale or lymphogranuloma venereum
- Aspirate any fluctuant glands (surgical incision should be avoided)
- Educate and counsel on risk reduction
- Offer syphilis serologic testing and HIV serologic testing where appropriate facilities and counselling are available
- Review if lesion not fully healed

Herpes Simplex Management

- Advise on basic care of the lesion (keep clean and dry)
- Educate and counsel on compliance and risk reduction
- Offer syphilis and HIV serologic testing where appropriate facilities and counselling are available
- Promote and provide condoms
- Advise to return in 7 days if lesion is not fully healed, and sooner if there is clinical deterioration; if so, treat for other causes of GUD as per guidelines



FIGURE 3. GENITAL ULCERS



Needs adaptation to local epidemiological situation.



INGUINAL BUBO

Inguinal and femoral buboes are localised enlargements of the lymph nodes in the groin area, which are painful and may be fluctuant. They are frequently associated with lymphogranuloma venereum and chancroid. In many cases of chancroid an associated genital ulcer is visible, but occasionally may not be. Non-sexually transmitted local and systemic infections (e.g. infections of the lower limb) can also cause swelling of inguinal lymph nodes.

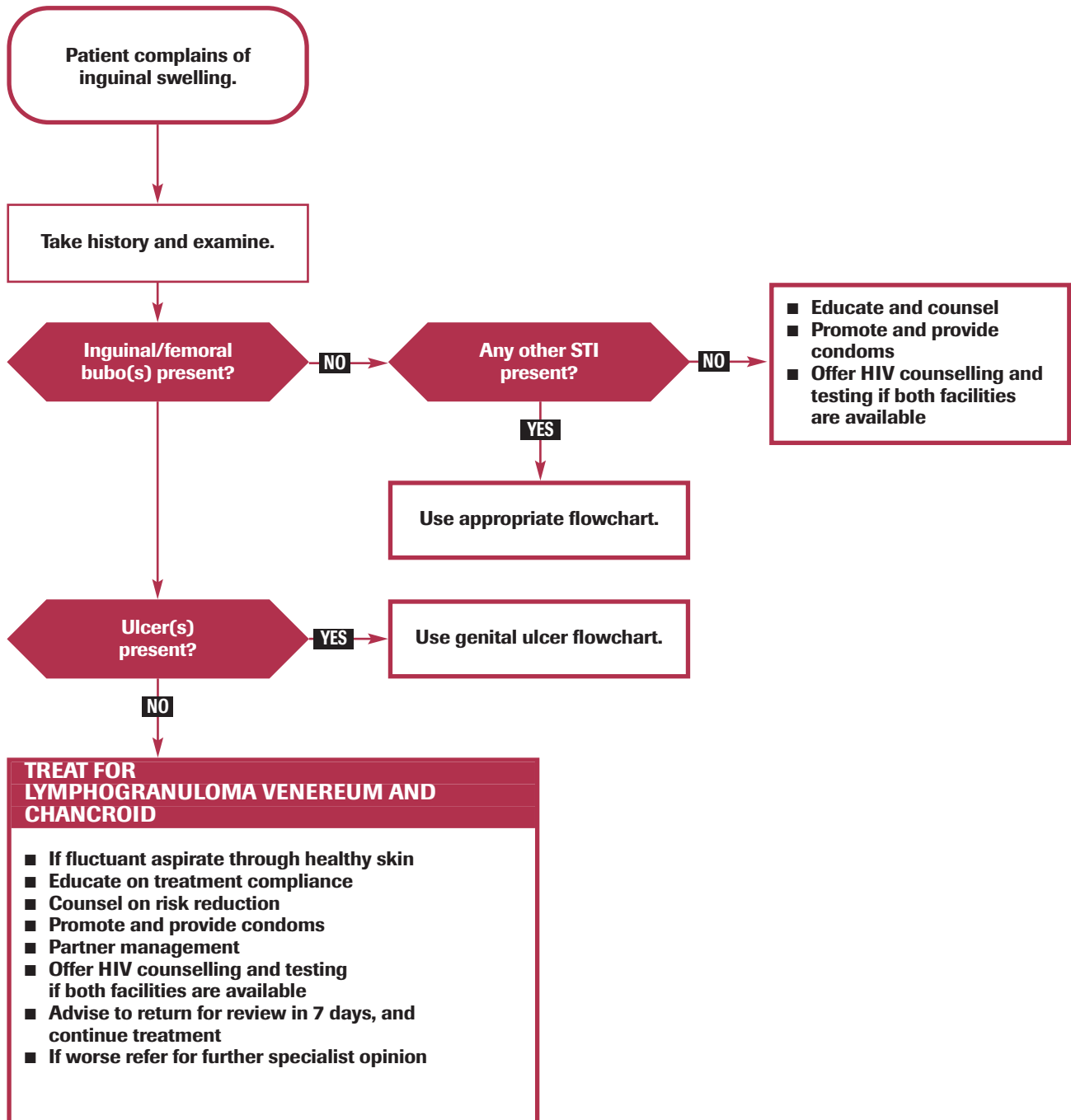
Recommended syndromic treatment

- ciprofloxacin, 500mg orally, twice daily for 3 days
- AND**
- doxycycline, 100mg orally twice daily for 14 days
- OR**
- erythromycin, 500mg orally four times daily for 14 days

Some cases may require longer treatment than the 14 days recommended above. Fluctuant lymph nodes should be aspirated through healthy skin. Incision and drainage or excision of nodes may delay healing and should not be attempted.



FIGURE 4. INGUINAL BUBO





2.3. SCROTAL SWELLING

Inflammation of the epididymis (epididymitis) usually manifests itself by acute onset of unilateral testicular pain and swelling, often with tenderness of the epididymis and vas deferens and occasionally with erythema and oedema of the overlying skin. In men under 35 years of age this is more frequently due to sexually transmitted organisms than in those over 35 years of age. When the epididymitis is accompanied by urethral discharge, it should be presumed to be of sexually transmitted origin, commonly gonococcal and/or chlamydial in nature. The adjacent testis is often also inflamed (orchitis), giving rise to epididymo-orchitis.

In older men, where there may have been no risk of a sexually transmitted infection other general infections may be responsible, for example, *Escherichia coli*, *Klebsiella* spp. or *Pseudomonas aeruginosa*. A tuberculous orchitis, generally accompanied by an epididymitis, is always secondary to lesions elsewhere, especially in the lungs or bones. In brucellosis, usually due to *Brucella melitensis* or *Brucella abortus*, an orchitis is usually clinically more evident than an epididymitis. In pre-pubertal children the usual aetiology is coliform, pseudomonas infection or mumps virus. Mumps epididymo-orchitis is usually noted within a week of parotid enlargement.

It is important to consider other non-infectious causes of scrotal swelling, such as trauma, testicular torsion and tumour. Testicular torsion, which should be suspected when onset of scrotal pain is sudden, is a surgical emergency that needs urgent referral.

If not effectively treated, STI-related epididymitis may lead to infertility.

Recommended syndromic treatment

- therapy for uncomplicated gonorrhoea (for details see section 3.1)
PLUS
- therapy for chlamydia (for details see section 3.2)



AT A GLANCE

Scrotal Swelling

For details, see section 3.1 and 3.2

Drug options for Gonorrhoea

Ciprofloxacin
Azithromycin
Ceftriaxone
Cefixime
Spectinomycin

Drug options for Chlamydia

Doxycycline
Azithromycin

Alternatives

Kanamycin
Trimethoprim/Sulfamethoxazole

Alternatives

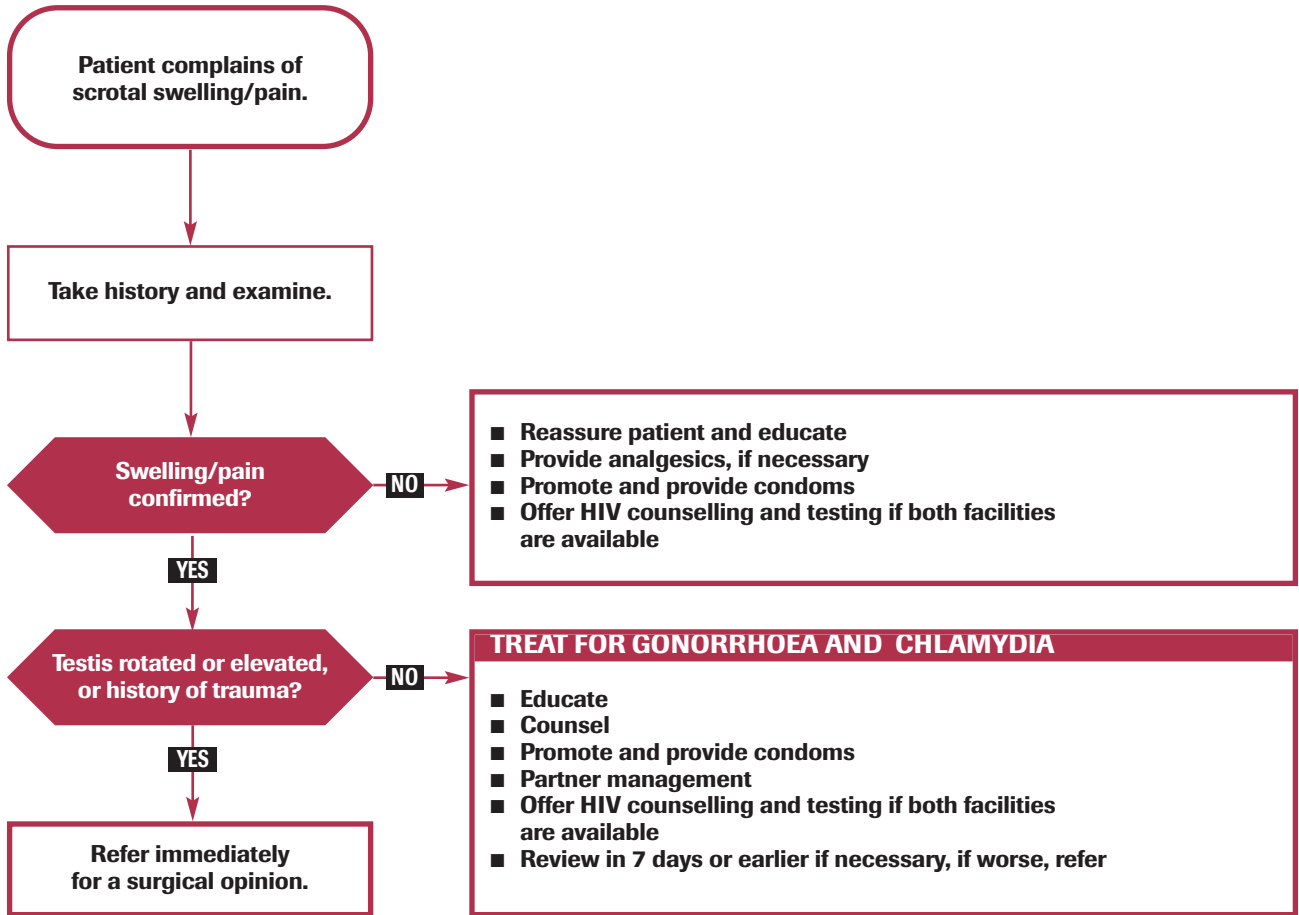
Amoxicillin
Ofloxacin
Erythromycin (if Tetracycline is contraindicated)
Tetracycline

Adjuncts to therapy

Bed rest and scrotal support until local inflammation and fever subside.



FIGURE 5. SCROTAL SWELLING





2.4. VAGINAL DISCHARGE

A spontaneous complaint of abnormal² vaginal discharge is most commonly due to a vaginal infection. Rarely, it may be the result of muco-purulent STI-related cervicitis. *T. vaginalis*, *C. albicans* and bacterial vaginosis are the commonest causes of vaginal infection and *N. gonorrhoeae* and *C. trachomatis* cause cervical infection. The clinical detection of cervical infection is difficult because a large proportion of women with gonococcal or chlamydial cervical infection is asymptomatic. The symptom of abnormal vaginal discharge is highly indicative of vaginal infection, but poorly predictive for cervical infection. Thus, all women presenting with vaginal discharge should receive treatment for trichomoniasis and bacterial vaginosis.

Among women presenting with discharge, one can attempt to identify those with an increased likelihood of being infected with *N. gonorrhoeae* and/or *C. trachomatis*. Microscopy adds little to the diagnosis of cervical infection and is not recommended. To identify women at greater risk of cervical infection, an assessment of a woman's risk status is useful, especially when risk factors are adapted to the local situation.

Knowledge of the prevalence of gonococcal and/or chlamydia in women presenting with vaginal discharge is important for the decision to treat for cervical infection. The higher the prevalence, the stronger the justification for treatment. Risk assessment positive women have a higher likelihood of cervical infection than those who are risk negative. Women with vaginal discharge and a positive risk assessment could therefore, be offered treatment for gonococcal and chlamydia cervicitis.

Available preliminary data seems to indicate that it is cost-effective to treat for cervical infection where the prevalence exceeds 6%. More work on this issue is in progress to provide further guidance to program managers and policy-makers.

Where resources permit, one could consider the use of laboratory tests to screen women with vaginal discharge. Such screening could be applied to all women with discharge or selectively to those with discharge and a positive risk assessment.

In some countries, syndromic management algorithms have been used as a screening tool to detect cervical infection among women not presenting with a genital complaint

² Abnormal in terms of quantity, colour or odour.



(e.g. in family planning settings). While this may assist in detecting some women with cervical infections, it is likely that there will be substantial over-diagnosis.

CERVICAL INFECTION

Recommended syndromic treatment

- therapy for uncomplicated gonorrhoea (for details see section 3.1)

PLUS

- therapy for chlamydia (for details see section 3.2)

AT A GLANCE

Cervical infection

For details, see section 3.1 and 3.2

Drug options for Gonorrhoea

Ciprofloxacin

Azithromycin

Ceftriaxone

Cefixime

Spectinomycin

Alternatives

Kanamycin

Trimethoprim/Sulfamethoxazole

Drug options for Chlamydia

Doxycycline

Azithromycin

Alternatives

Amoxicillin

Ofloxacin

Erythromycin (if Tetracycline is contraindicated)

Tetracycline

Note

- Tetracyclines are contraindicated in pregnancy.
- Trimethoprim/Sulfamethoxazole should only be used in areas where this combination has been shown to be effective against uncomplicated gonorrhoea.

VAGINAL INFECTION

Recommended syndromic treatment

- therapy for bacterial vaginosis (for details see section 3.10)

PLUS

- therapy for *Trichomonas vaginalis* (for details see section 3.9)

AND, WHERE INDICATED,

- therapy for *Candida albicans* (for details see section 3.11)



AT A GLANCE

Vaginal infection

For details, see sections 3.9 – 3.11

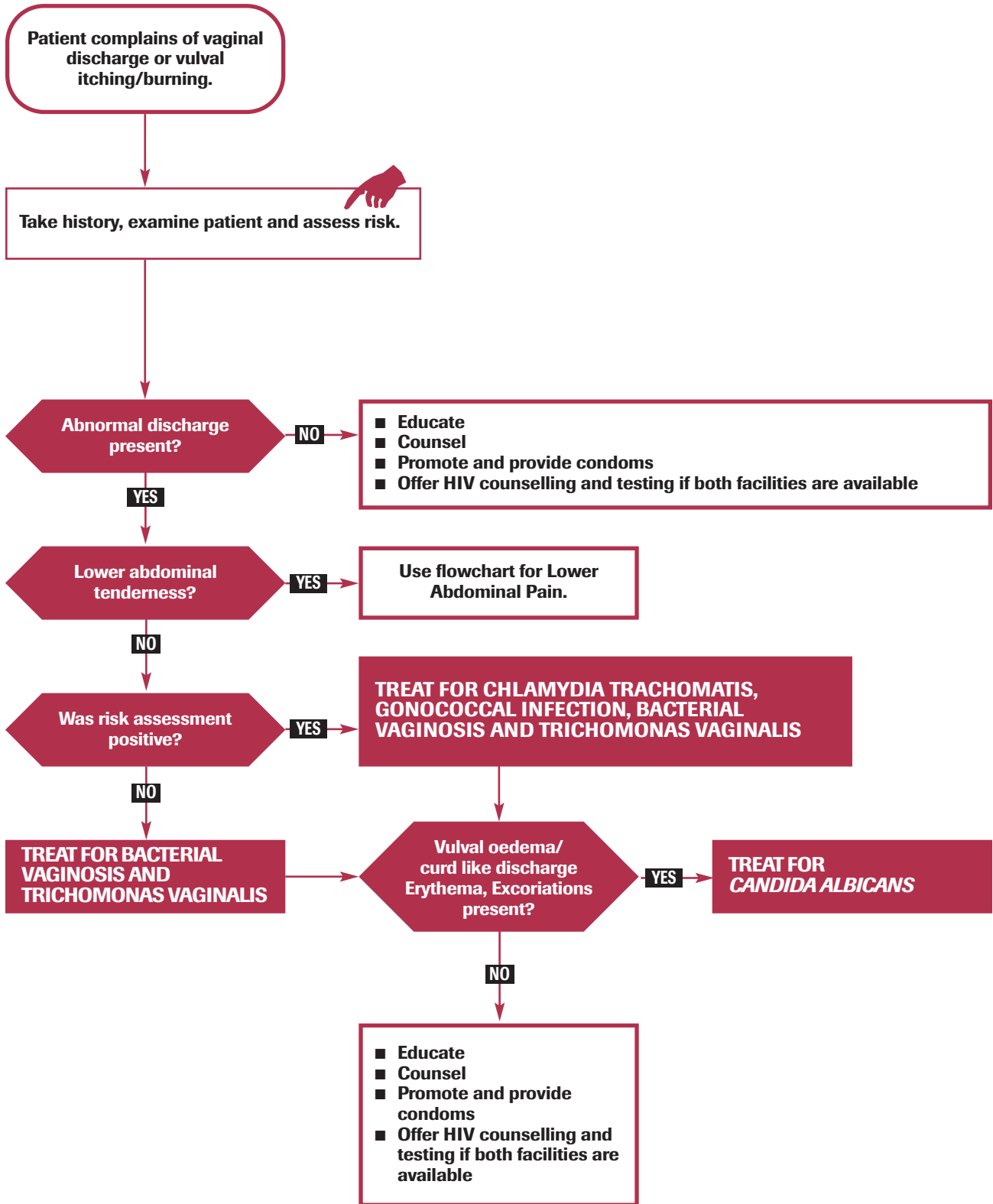
Drug options for BV	Drug options for TV	Drug options for Candida
Metronidazole	Metronidazole	Miconazole
	Tinidazole	Clotrimazole
		Fluconazole
Alternatives	Alternative	
Clindamycin	Nystatin	
Metronidazole gel		
Clindamycin vaginal cream		

Note

- Patients taking metronidazole should be cautioned to avoid alcohol.



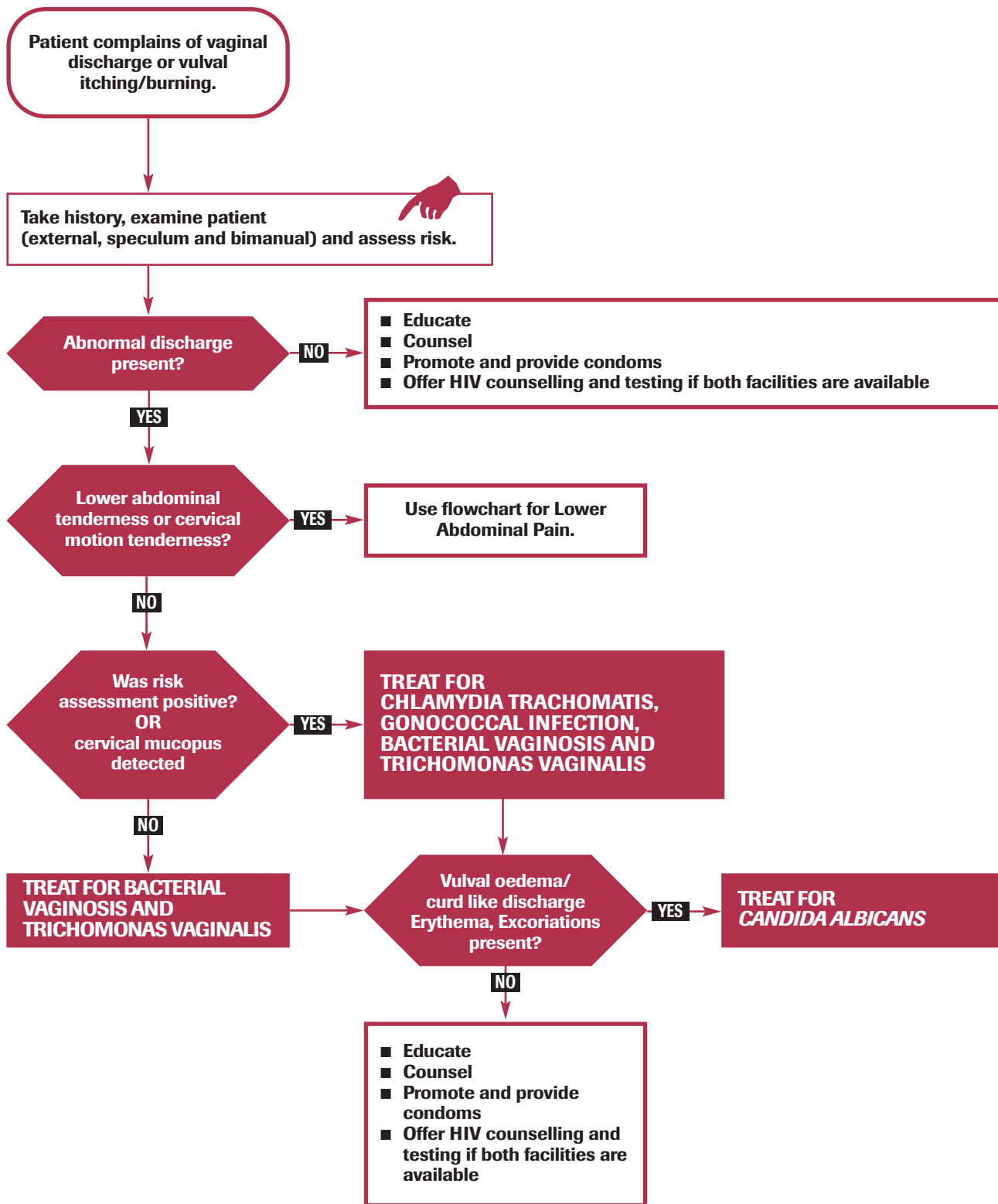
FIGURE 6. VAGINAL DISCHARGE



Risk factors need adaptation to local social and behavioural epidemiological situation.



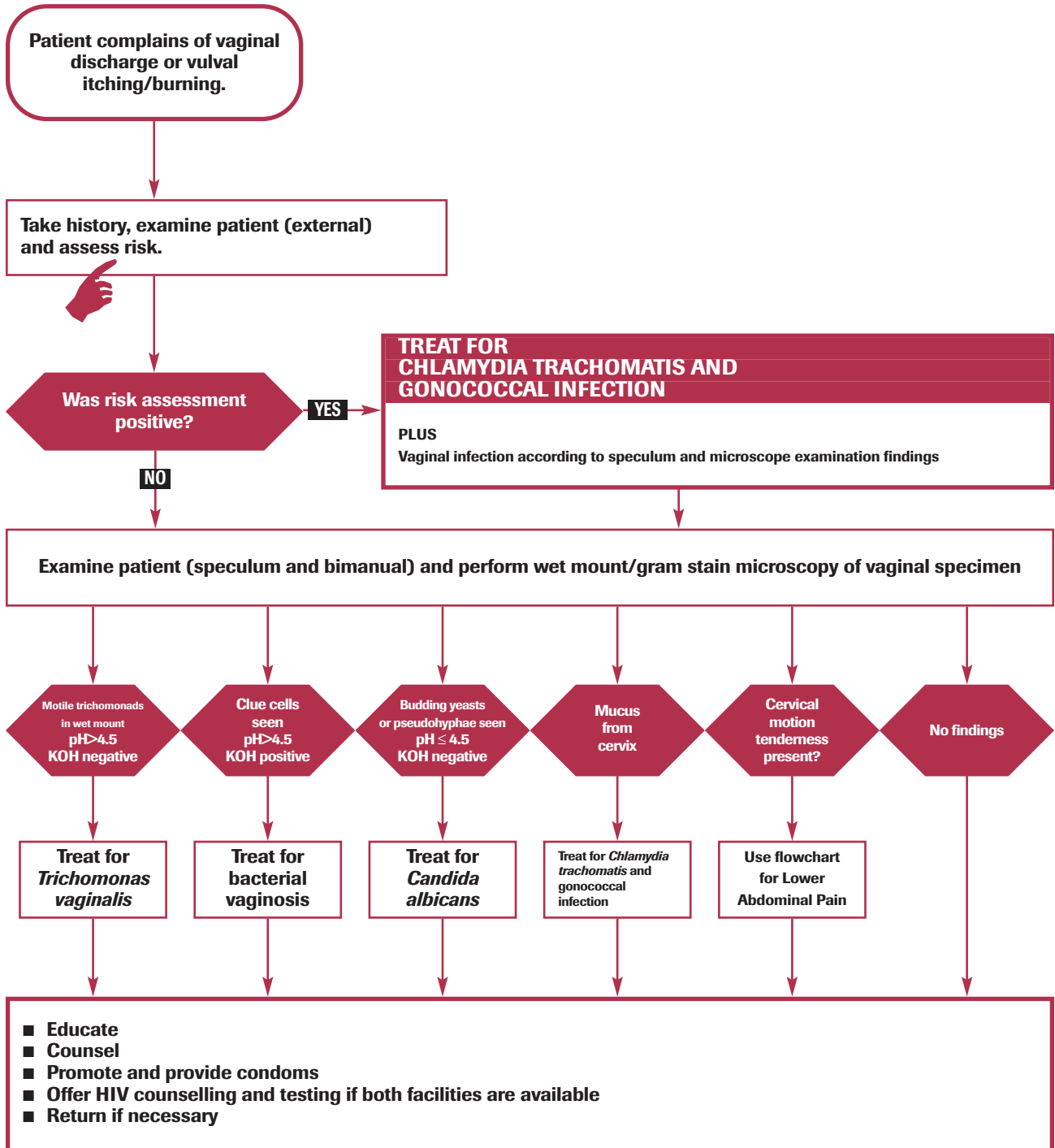
FIGURE 7. VAGINAL DISCHARGE (SPECULUM AND BIMANUAL)



Risk factors need adaptation to local social and behavioural epidemiological situation.



FIGURE 8. VAGINAL DISCHARGE (SPECULUM AND MICROSCOPE)



Notes:

1. KOH Test: 1 drop 10% KOH to reveal the amine odour (fishy)
2. Wet mount: smear on slide with 1 drop of saline and view at 400x



Risk factors need adaptation to local social and behavioural epidemiological situation.



2.5. LOWER ABDOMINAL PAIN

All sexually active women presenting with lower abdominal pain should be carefully evaluated for the presence of salpingitis and/or endometritis – pelvic inflammatory disease (PID). In addition, routine bimanual and abdominal examinations should be carried out on all women with a presumptive STI since some women with PID or endometritis will not complain of lower abdominal pain. Women with endometritis may present with complaints of vaginal discharge and/or bleeding and/or uterine tenderness on pelvic examination. Symptoms suggestive of PID include abdominal pain, dyspareunia, vaginal discharge, menometrorrhagia, dysuria, pain associated with menses, fever, and sometimes nausea and vomiting.

PID is difficult to diagnose because clinical manifestations are varied. PID becomes highly probable when one or more of the above symptoms are seen in a woman with adnexal tenderness, evidence of lower genital tract infection, and cervical motion tenderness. Enlargement or induration of one or both fallopian tubes, a tender pelvic mass, and direct or rebound tenderness may also be present. The patient's temperature may be elevated but is normal in many cases. In general, clinicians should err on the side of over-diagnosing and treating suspected cases.

Hospitalisation of patients with acute pelvic inflammatory disease should be seriously considered when:

- the diagnosis is uncertain;
- surgical emergencies such as appendicitis and ectopic pregnancy can not be excluded;
- a pelvic abscess is suspected;
- severe illness precludes management on an outpatient basis;
- the patient is pregnant;
- the patient is unable to follow or tolerate an outpatient regimen; or
- the patient has failed to respond to outpatient therapy. Many experts recommend that all patients with PID should be admitted to hospital for treatment.

Etiological agents include *N. gonorrhoeae*, *C. trachomatis*, anaerobic bacteria (*Bacteroides* spp. and Gram-positive cocci). Facultative Gram-negative rods and *Mycoplasma hominis* have also been implicated. As it is impossible to differentiate between these clinically, and a precise microbiological diagnosis is difficult, the treatment regimens must be effective against this broad range of pathogens. The regimens recommended below are based on this principle.



OUTPATIENT THERAPY

Recommended syndromic treatment

- single-dose therapy for uncomplicated gonorrhoea
(see section 3.1 - single-dose ceftriaxone has been shown to be effective;
other single dose regimens have not been formally evaluated as treatments for PID)
PLUS
- doxycycline, 100mg orally twice daily, or tetracycline, 500mg orally, 4 times daily for 14 days
PLUS
- metronidazole, 400-500mg orally, twice daily for 14 days.

Note

- Patients taking metronidazole should be cautioned to avoid alcohol.
- Tetracyclines are contraindicated in pregnancy.

Alternative syndromic treatment where single dose therapy for gonorrhoea is not available

- trimethoprim (80mg)/sulfamethoxazole (400mg), 10 tablets orally once daily for 3
days, and then 2 tablets orally, twice daily for 10 days
PLUS
- doxycycline, 100mg orally, twice daily, or tetracycline, 500mg orally, 4 times daily for 14 days
PLUS
- metronidazole, 400-500mg orally, twice daily for 14 days.

Note

This regimen should only be used in areas where trimethoprim/sulfamethoxazole has been shown to be effective in the treatment of uncomplicated gonorrhoea. Patients taking metronidazole should be cautioned to avoid alcohol.

Adjuncts to therapy: removal of intrauterine device (IUD)

The IUD is a risk factor for the development of PID. Although the exact effect of removing an IUD on the response of acute salpingitis to antimicrobial therapy and on the risk of recurrent salpingitis is unknown, removal of the IUD is recommended soon after antimicrobial therapy has been initiated. When an IUD is removed, contraceptive counselling is necessary.



Follow-up

Outpatients with PID should be followed up after 72 hours and admitted if their condition has not improved.

INPATIENT THERAPY

Recommended syndromic treatment

1. ceftriaxone, 250mg by intramuscular injection, once daily

PLUS

■ doxycycline, 100mg orally or by intravenous injection, twice daily, or tetracycline, 500mg orally 4 times daily

PLUS

■ metronidazole, 400-500mg orally or by intravenous injection, twice daily, or chloramphenicol, 500mg orally or by intravenous injection, 4 times daily.

2. clindamycin, 900mg by intravenous injection, every 8 hours

PLUS

■ gentamicin, 1.5 mg/kg by intravenous injection every 8 hours.

3. ciprofloxacin, 500mg orally, twice daily, or spectinomycin 1g by intramuscular injection, 4 times daily

PLUS

■ doxycycline, 100mg orally or by intravenous injection, twice daily, or tetracycline, 500mg orally, 4 times daily

PLUS

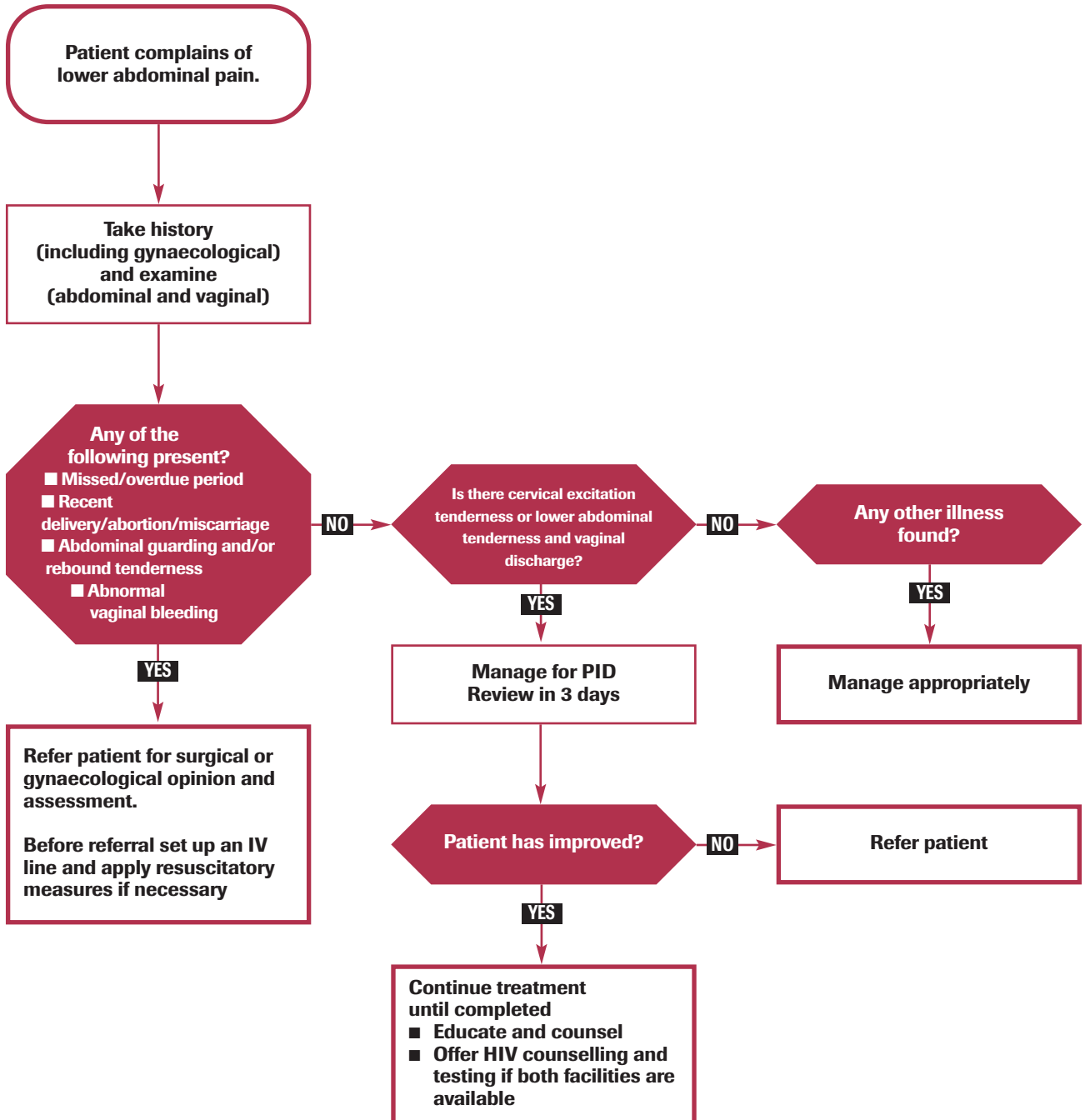
■ metronidazole 400-500mg orally or by intravenous injection, twice daily, or chloramphenicol, 500mg orally or by intravenous injection, 4 times daily.

Note

■ For all three regimens, therapy should be continued until at least 2 days after the patient has improved and should then be followed by either doxycycline, 100mg orally, twice daily for 14 days, or tetracycline, 500mg orally, 4 times daily, for 14 days. Patients taking metronidazole should be cautioned to avoid alcohol. Tetracyclines are contraindicated in pregnancy.



FIGURE 9. LOWER ABDOMINAL PAIN





2.6. NEONATAL CONJUNCTIVITIS

Neonatal conjunctivitis (ophthalmia neonatorum) can lead to blindness when caused by *N. gonorrhoeae*. The most important sexually transmitted pathogens which cause ophthalmia neonatorum are *N. gonorrhoeae* and *C. trachomatis*. In developing countries, *N. gonorrhoeae* accounts for 20-75% and *C. trachomatis* for 15-35% of cases brought to medical attention. Other common causes are *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Haemophilus* spp. and *Pseudomonas* spp. Newborn babies are generally presented because of redness and swelling of the eyelids or “sticky eyes”, or because of discharge from the eye(s).

As the clinical manifestations and possible complications of gonococcal and chlamydial infections are similar, in settings where it is impossible to differentiate the two infections, treatment should be provided to cover both infections. This would include single dose therapy for gonorrhoea and multiple dose therapy for chlamydia.

AT A GLANCE

Neonatal conjunctivitis

For details, see section 3.1 and 3.2.

Drug options for gonorrhoea

Ceftriaxone

Alternatives

Kanamycin

Spectinomycin

Drug options for chlamydia

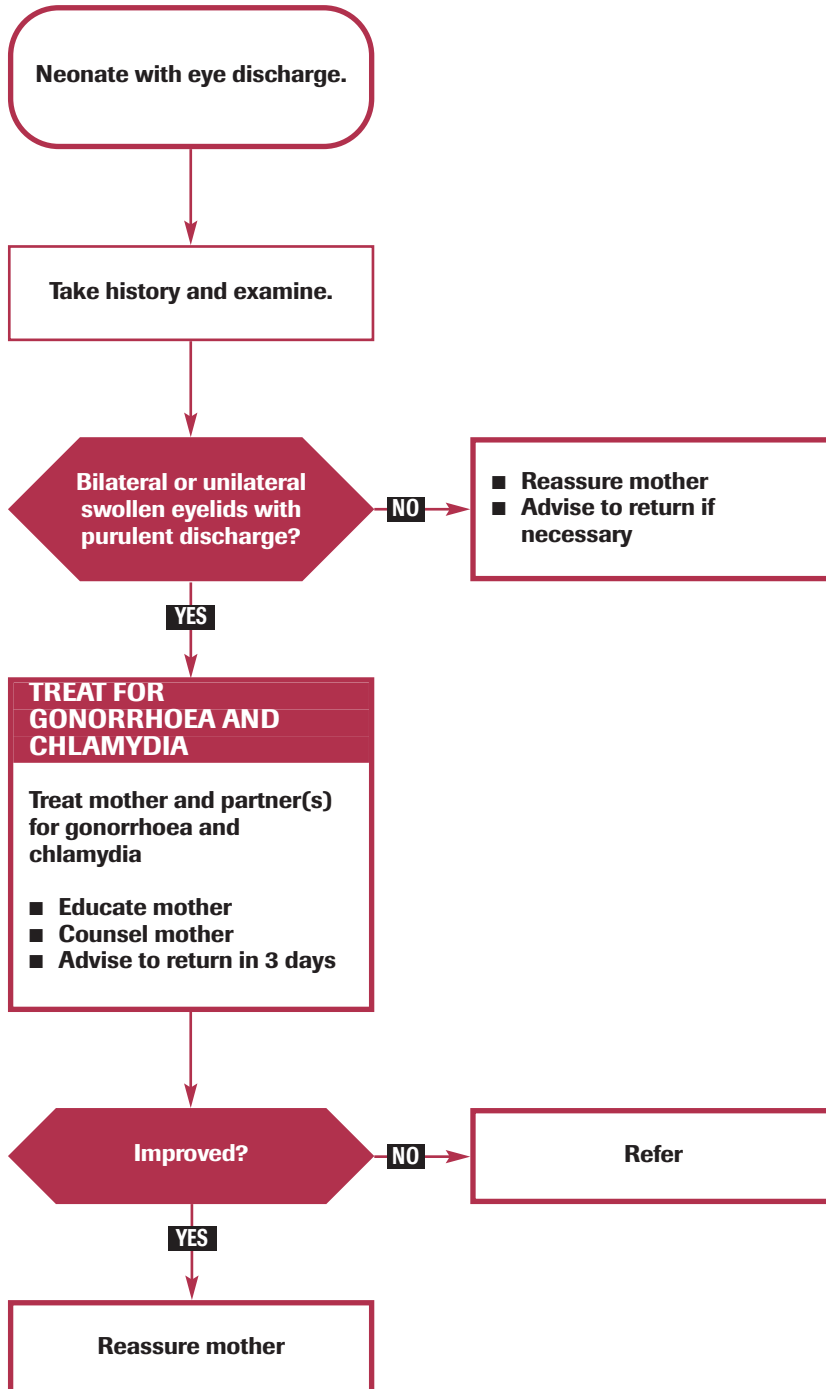
Erythromycin

Alternatives

Trimethoprim/Sulfamethoxazole



FIGURE 10. NEONATAL CONJUNCTIVITIS





3. TREATMENT OF SPECIFIC INFECTIONS

3.1. GONOCOCCAL INFECTIONS

A large proportion of gonococcal isolates worldwide are now resistant to penicillins, tetracyclines, and other older antimicrobial agents, which can therefore no longer be recommended for the treatment of gonorrhoea.

It is important to monitor local *in vitro* susceptibility, as well as the clinical efficacy of recommended regimens.

Note

In general it is recommended that concurrent anti-chlamydia therapy be given to all patients with gonorrhoea, as described in the section on chlamydia infections, since dual infection is common. This does not apply to patients in whom a specific diagnosis of *C. trachomatis* has been excluded by a laboratory test.

UNCOMPLICATED ANOGENITAL INFECTION

Recommended regimens

- ciprofloxacin, 500 mg orally, as a single dose
- OR**
- azithromycin, 2 g orally, as a single dose
- OR**
- ceftriaxone, 125 mg by intramuscular injection, as a single dose
- OR**
- cefixime, 400 mg orally, as a single dose
- OR**
- spectinomycin, 2 g by intramuscular injection, as a single dose.

Note

- Ciprofloxacin is contraindicated in pregnancy. The manufacturer does not recommend it for use in children and adolescents.



- There is accumulating evidence that the cure rate of Azithromycin for gonococcal infections is best achieved by a 2-gram single dose regime. The 1-gram dose provides protracted sub-therapeutic levels which may precipitate the emergence of resistance.

There are variations in the anti-gonococcal activity of individual quinolones, and it is important to use only the most active.

Alternative regimens which may be useful in some countries, depending on the prevalence of resistant gonococci:

- kanamycin, 2 g by intramuscular injection as a single dose
- OR**
- trimethoprim (80 mg)/sulfamethoxazole (400 mg), 10 tablets orally, as a single dose daily for 3 days.

Note

- Kanamycin and trimethoprim/sulfamethoxazole should only be used in areas where in vitro resistance rates are low and are monitored at regular intervals. In addition, second-line treatment with recommended drugs should be available.

DISSEMINATED INFECTION

Recommended regimens

- ceftriaxone, 1 g by intramuscular or intravenous injection, once daily for 7 days (alternative third-generation cephalosporins may be required where ceftriaxone is not available, but more frequent administrations will be needed)
- OR**
- spectinomycin, 2g by intramuscular injection, twice daily for 7 days. There are some data to suggest that therapy for 3 days is adequate.

For gonococcal meningitis and endocarditis the same dosages apply but the duration of therapy will need to be increased to 4 weeks for endocarditis.

GONOCOCCAL OPHTHALMIA

This is a serious condition that requires systemic therapy as well as local irrigation with saline or other appropriate solutions. Irrigation is particularly important when the recommended therapeutic regimens are not available. Careful hand washing by personnel caring for infected patients is essential.



A. ADULT GONOCOCCAL CONJUNCTIVITIS

Recommended regimen

- ceftriaxone, 125 mg by intramuscular injection as a single dose
- OR**
- spectinomycin, 2 g by intramuscular injection as a single dose
- OR**
- ciprofloxacin, 500 mg orally, as a single dose.

This regimen is likely to be effective although there are no published data on its use in gonococcal ophthalmia.

Alternative regimen where the recommended agents are not available:

- kanamycin, 2 g by intramuscular injection as a single dose.

Follow-up

Careful monitoring of clinical progress is important.

B. NEONATAL GONOCOCCAL CONJUNCTIVITIS

Recommended regimen

- ceftriaxone, 50 mg/kg by intramuscular injection as a single dose, to a maximum of 125mg.

Alternative regimen where ceftriaxone is not available

- kanamycin, 25 mg/kg by intramuscular injection as a single dose to a maximum of 75 mg
- OR**
- spectinomycin, 25 mg/kg by intramuscular injection as a single dose to a maximum of 75 mg.

Single-dose ceftriaxone and kanamycin are of proven efficacy. The addition of tetracycline eye ointment to these regimens is of no documented benefit.

Follow-up

Patients should be reviewed after 48 hours.

Prevention of ophthalmia neonatorum

Using timely eye prophylaxis should prevent gonococcal ophthalmia neonatorum. The infant's eyes should be carefully cleaned immediately after birth and the application of 1% silver nitrate solution or 1% tetracycline ointment to the eyes of all infants at the time



of delivery is strongly recommended as a prophylactic measure. However, ocular prophylaxis provides poor protection against *C. trachomatis* conjunctivitis.

Infants born to mothers with gonococcal infection should receive additional treatment as follows:

Recommended regimen

- ceftriaxone 50 mg/kg by intramuscular injection as a single dose, to a maximum of 125mg.

Alternative regimen where ceftriaxone is not available

- kanamycin, 25 mg/kg by intramuscular injection as a single dose, to a maximum of 75mg
- OR**
- spectinomycin, 25 mg/kg by intramuscular injection as a single dose, to a maximum of 75 mg.

3.2. CHLAMYDIA TRACHOMATIS INFECTIONS (OTHER THAN LYMPHOGRANULOMA VENEREUM)

Uncomplicated urethral, endocervical, or rectal infections

Recommended regimens

- doxycycline, 100 mg orally, twice daily for 7 days
- OR**
- azithromycin, 1 g orally, in a single dose

Alternative regimens

- amoxicillin, 500 mg orally, three times a day for 7 days
- OR**
- erythromycin, 500 mg orally, four times a day for 7 days
- OR**
- ofloxacin, 300 mg orally, twice a day for 7 days
- OR**
- tetracycline, 500 mg orally, four times a day for 7 days.

Note

- Tetracyclines are contraindicated during pregnancy and lactation.
- Current evidence indicates that 1 gram single dose therapy of azithromycin is efficacious for chlamydia infection.



There is evidence that extending the duration of treatment beyond 7 days does not improve the cure rate in uncomplicated chlamydia infection. Erythromycin should not be taken on an empty stomach.

Follow-up

Compliance with the 7-day regimens is critical. Resistance of *C. trachomatis* to recommended treatment regimens has not been observed.

CHLAMYDIAL INFECTION IN PREGNANCY

Recommended regimens

- erythromycin, 500 mg orally four times a day for 7 days
- OR**
- amoxicillin, 500 mg orally three times a day for 7 days.

Note

- Doxycycline (and other tetracyclines) and ofloxacin are contraindicated in pregnant women. The safety and efficacy of azithromycin use in pregnant and lactating women have not been established.
- Erythromycin estolate is contraindicated during pregnancy because of drug-related hepato-toxicity, so only erythromycin base or erythromycin ethylsuccinate should be used.

NEONATAL CHLAMYDIAL CONJUNCTIVITIS

All cases of conjunctivitis in the newborn should be treated for both *N. gonorrhoeae* and *C. trachomatis*, because of the possibility of mixed infection.

Recommended regimen

- erythromycin syrup, 50 mg/kg per day orally, in 4 divided doses for 14 days

Alternative regimen

- trimethoprim 40mg with sulfamethoxazole 200mg orally, twice daily for 14 days.

There is no evidence that additional therapy with a topical agent provides further benefit. If inclusion conjunctivitis recurs after therapy has been completed, erythromycin treatment should be reinstated for 2 weeks.



INFANTILE PNEUMONIA

The recommended therapy is erythromycin syrup, 50 mg/kg per day for 14 days. If this is not available, trimethoprim 40mg with sulfamethoxazole 200mg may be given orally twice daily for 3 weeks. However, the optimal duration of therapy has not been established.

3.3. LYMPHOGRANULOMA VENEREUM

Results of controlled trials on the treatment of lymphogranuloma venereum have not been published, and recommendations are based on expert opinion.

Recommended regimen

- doxycycline, 100 mg orally, twice daily for 14 days
- OR**
- erythromycin, 500 mg orally, 4 times daily for 14 days.

Alternative regimens

- tetracycline, 500 mg orally, 4 times daily for 14 days

Note

- Tetracyclines are contraindicated in pregnancy.
- Fluctuant lymph nodes should be aspirated through healthy skin. Incision and drainage or excision of nodes may delay healing. Some patients with advanced disease may require treatment for longer than 14 days, and sequelae such as strictures and/or fistulae may require surgery.



3.4. SYPHILIS

EARLY SYPHILIS

(i.e. primary, secondary, or latent syphilis of not more than two years' duration)

Recommended regimen

- benzathine benzylpenicillin³, 2.4 million IU, by intramuscular injection, at a single session. (Because of the volume involved, this dose is usually given as two injections at separate sites.)

Alternative regimen

- procaine benzylpenicillin, 1.2 million IU daily, by intramuscular injection, for 10 consecutive days.

Alternative regimen for penicillin-allergic non-pregnant patients

- doxycycline, 100 mg orally, twice daily for 15 days.

OR

- tetracycline, 500 mg orally, 4 times daily for 15 days

LATE LATENT SYPHILIS

Recommended regimen

- benzathine benzylpenicillin, 2.4 million IU by intramuscular injection, once weekly for 3 consecutive weeks.

Alternative regimen

- procaine benzylpenicillin, 1.2 million IU, by intramuscular injection, once daily for 20 consecutive days.

Alternative regimen for penicillin-allergic non-pregnant patients

- doxycycline, 100 mg orally, twice daily for 30 days.

OR

- tetracycline, 500 mg orally, 4 times daily for 30 days

3 Benzathine benzylpenicillin synonyms: benzathine penicillin G; benzylpenicillin benzathine; benzathine penicillin

Procaine benzylpenicillin synonyms: procaine penicillin G

Aqueous benzylpenicillin synonyms: benzylpenicillin potassium; benzylpenicillin sodium; crystalline penicillin, penicillin G potassium; penicillin G sodium



Penicillin is the preferred therapy and should be given whenever possible. It should be emphasized that antibiotic treatment is less well defined for late syphilis than it is for early syphilis. In general, late syphilis requires longer therapy.

Consultation with a cardiologist is recommended when caring for patients with cardiovascular syphilis.

NEUROSYPHILIS

Recommended regimen

- Aqueous benzylpenicillin, 12-24 million IU by intravenous injection, administered daily in doses of 2-4 million IU every 4 hours for 14 days.

Alternative regimen

- procaine benzylpenicillin, 1.2 million IU by intramuscular injection, once daily, and probenecid, 500 mg orally, 4 times daily, both for 10-14 days.

This regimen should be used only for patients whose outpatient compliance can be assured.

Note

Some authorities recommend adding benzathine benzylpenicillin, 2.4 million IU, by intramuscular injection, in 3 consecutive doses once weekly, after completing these regimens, but there are no data to support this approach. Benzathine benzylpenicillin, 2.4 million IU by intramuscular injection does not give therapeutic levels in the cerebrospinal fluid.

Alternative regimens for penicillin-allergic non-pregnant patients

- doxycycline, 200 mg orally, twice daily for 30 days.
- OR**
- tetracycline, 500 mg orally, 4 times daily for 30 days

Note

The above alternatives to penicillin for the treatment of neurosyphilis have not been evaluated in systematic studies. Although their efficacy is not yet well defined, third-generation cephalosporins may be useful in the treatment of neurosyphilis.

The central nervous system may be involved during any stage of syphilis. Clinical evidence of neurological involvement (e.g. optic or auditory symptoms, cranial nerve



palsies) warrants examination of the cerebrospinal fluid. However, this is also highly desirable in all patients with syphilis of more than two years' duration, or of uncertain duration, in order to evaluate the possible presence of asymptomatic neurosyphilis. Some experts recommend consulting a neurologist when caring for a patient with neurosyphilis, and careful follow-up is essential.

SYPHILIS AND HIV INFECTION

All patients with syphilis should be encouraged to undergo testing for HIV because of the high frequency of dual infection and its implications for clinical assessment and management. Neurosyphilis should be considered in the differential diagnosis of neurological disease in HIV-infected individuals. In cases of congenital syphilis, the mother should be encouraged to undergo testing for HIV; if her test is positive, the infant should be referred for follow-up.

Recommended therapy for early syphilis in HIV-infected patients is no different from that in non-HIV-infected patients. However, some authorities advise examination of the cerebrospinal fluid and/or more intensive treatment with a regimen appropriate for all patients with the dual infections of *Treponema pallidum* and HIV, regardless of the clinical stage of syphilis. In all cases, careful follow-up is necessary to ensure adequacy of treatment.

SYPHILIS IN PREGNANCY

Pregnant women should be regarded as a separate group requiring close surveillance, in particular to detect possible reinfection after treatment has been given. It is also important to treat the sexual partner(s).

Recommended regimens

Pregnant patients at all stages of pregnancy, who are not allergic to penicillin, should be treated with penicillin according to the dosage schedules recommended for the treatment of non-pregnant patients at a similar stage of the disease.

Alternative regimens for penicillin-allergic pregnant patients

a. Early syphilis

- erythromycin, 500 mg orally, 4 times daily for 15 days

b. Late syphilis

- erythromycin, 500 mg orally, 4 times daily for 30 days.

**Note**

The effectiveness of erythromycin in all stages of syphilis and its ability to prevent the stigmata of congenital syphilis are highly questionable, and many failures have been reported. Its efficacy in neurosyphilis is probably low. Although data are lacking, consideration should probably be given to using an extended course of a third-generation cephalosporin in pregnant women whose allergy is not manifested by anaphylaxis.

Penicillin desensitisation of pregnant women with syphilis requires that the procedure be performed in a hospital setting. This is not feasible at most primary health care settings and can not be recommended as a routine procedure.

Follow-up

Following treatment, quantitated non-treponemal serological tests should be performed at monthly intervals until delivery, and re-treatment should be undertaken if there is serological evidence of reinfection or relapse.

CONGENITAL SYPHILIS

All infants born to sero-positive mothers should be treated with a single intramuscular dose of benzathine benzylpenicillin, 50 000 IU/kg whether or not the mothers were treated during pregnancy (with or without penicillin). Hospitalisation is recommended for all symptomatic babies born to mothers who were sero-positive. Symptomatic infants and asymptomatic infants with abnormal CSF (up to 2 years of age) should be treated as early congenital syphilis.

Recommended regimens**a. Early congenital syphilis (up to 2 years of age)****AND****Infants with abnormal cerebrospinal fluid:**

- aqueous benzylpenicillin 100 000 – 150 000 IU/kg/day administered as 50 000 IU/kg/dose IV every 12 hours, during the first 7 days of life and every 8 hours thereafter for a total of 10 days.

OR

- procaine benzylpenicillin, 50 000 IU/kg by intramuscular injection, as a single daily dose for 10 days.

**Note**

Some experts treat all infants with congenital syphilis as if the cerebrospinal fluid findings were abnormal. Antibiotics other than penicillin (i.e. erythromycin) are not indicated for congenital syphilis except in cases of severe allergy to penicillin. Tetracyclines should not be used in young children.

b. Congenital syphilis of 2 or more years' duration:

- aqueous benzylpenicillin, 200 000 – 300 000 IU/kg/day by intravenous or intramuscular injection, administered as 50 000 IU/kg every 4-6 hours for 10-14 days.

Alternative regimen for penicillin-allergic patients, after the first month of life:

- erythromycin, 7.5-12.5 mg/kg orally, 4 times daily for 30 days.

Congenital syphilis may occur if the expectant mother has syphilis, but the risk is minimal if she has been given penicillin during pregnancy. All infants of seropositive mothers should be examined at birth and at monthly intervals for 3 months until it is confirmed that serological tests are, and remain, negative. Any antibody carried over from mother to baby usually disappears within 3 months of birth. Where available, IgM-specific serology may aid diagnosis.

Early congenital syphilis generally responds well, both clinically and serologically, to adequate doses of penicillin. Recovery may be slow in seriously ill children with extensive skin, mucous membrane, bone or visceral involvement. Those in poor nutritional condition may succumb to concurrent infections, e.g. pneumonia.

Follow-up of Patients Treated for Syphilis

The follow-up of patients treated for early syphilis should be based on available medical services and resources. The clinical condition of the patients should be assessed and attempts made to detect reinfection during the first year after therapy. Patients with early syphilis who have been treated with appropriate doses and preparations of benzathine benzylpenicillin, should be evaluated clinically and serologically, using a non-treponemal test, after 3 months to assess the results of therapy. A second evaluation should be performed after 6 months and, if indicated by the results at 6 months, again after 12 months, to reassess the condition of the patient and detect possible reinfection.

All patients with cardiovascular syphilis and neurosyphilis should be followed for many years. The follow-up should include clinical, serological, cerebrospinal fluid and, where



necessary, radiological examinations based on the clinician's assessment of the individual patient's condition and evaluation of the illness.

At all stages of the disease, repeat treatment should be considered when:

- clinical signs or symptoms of active syphilis persist or recur;
- there is confirmed increase in the titre of a non-treponemal test;

Examination of the cerebrospinal fluid should be undertaken before repeat treatment, unless reinfection and a diagnosis of early syphilis can be established.

Patients should be retreated with the schedules recommended for syphilis of more than two years' duration. In general, only one re-treatment course is indicated because adequately treated patients may maintain stable, low titres of non-treponemal tests.

3.5. CHANCROID

Owing to widespread resistance in all geographical areas, tetracycline and penicillins have no place in the treatment of chancroid. Single-dose therapy with anti-microbials are the preferred regimen.

Recommended regimen

- ciprofloxacin, 500 mg orally, twice daily for 3 days
OR
- erythromycin base, 500 mg orally, 4 times daily for 7 days
OR
- azithromycin, 1 g orally, as a single dose.

Alternative regimens

- ceftriaxone, 250 mg by intramuscular injection, as a single dose

Management of lesions

No special treatment is required. Ulcerative lesions should be kept clean, and fluctuant lymph nodes should be aspirated as required through the surrounding healthy skin. Incision and drainage or excision of nodes may delay healing and is not recommended.

**Follow-up**

All patients should be followed up until there is clear evidence of improvement or cure. In patients infected with HIV, treatment may appear less effective, but this may be due to co-infection with genital herpes or syphilis. Since chancroid and HIV infection are closely associated and therapeutic failure is likely to be seen with increasing frequency, patients should be followed up weekly until there is clear evidence of improvement.

3.6. GRANULOMA INGUINALE (DONOVANOSIS)

Donovanosis is caused by the intracellular Gram-negative bacterium *Calymmatobacterium granulomatis*. The disease presents clinically as painless, progressive, ulcerative lesions without regional lymphadenopathy. The lesions are highly vascular and can easily bleed on contact. Treatment should be continued until all lesions have completely epithelialized.

Recommended regimen

■ azithromycin, 1 g orally on first day, then 500 mg orally once a day

OR

■ doxycycline, 100 mg orally, twice daily

Alternative regimen

■ erythromycin, 500 mg orally, 4 times daily

OR

■ tetracycline, 500 mg orally, 4 times daily

OR

■ trimethoprim (80 mg)/sulfamethoxazole (400 mg), 2 tablets orally, twice daily for a minimum of 14 days,

Note

The addition of a parenteral aminoglycoside such as gentamicin should be strongly considered for HIV-infected patients.

Follow-up

Patients should be followed clinically until signs and symptoms have resolved.



3.7. GENITAL HERPES INFECTIONS

There is no known cure for genital herpes, but the course of symptoms can be modified if systemic therapy with acyclovir, or its analogues, is started as soon as possible following the onset of symptoms. Topical therapy with acyclovir produces only minimal shortening of the duration of symptomatic episodes and is not recommended.

FIRST CLINICAL EPISODE

Recommended regimen

- acyclovir, 200 mg orally, 5 times daily for 7 days.

OR

- acyclovir, 400 mg orally, 3 times daily for 7 days

OR

- famciclovir, 250 mg, 3 times daily for 7 days

OR

- valaciclovir, 1 g, 2 times daily for 7 days

Treatment can be expected to reduce the formation of new lesions, the duration of pain, the time required for healing, and viral shedding. However, it does not appear to influence the natural history of recurrent disease.

RECURRENT INFECTIONS

Most patients with a first-episode of genital HSV-2 infection will have recurrent episodes of genital lesions. Episodic or suppressive antiviral therapy will shorten the duration of genital lesions. Because many patients benefit from antiviral therapy, options for treatment should be discussed with all patients.

When treatment is started during the prodrome or within 1 day after onset of lesions, many patients who have recurrent disease benefit from episodic therapy. If episodic treatment of recurrences is chosen, the patient should be provided with antiviral therapy, or a prescription for the medication, so that treatment can be initiated at first sign of prodrome or genital lesions.

**Recommended regimen**

- acyclovir, 200mg orally, 5 times daily for 5 days

OR

- acyclovir 400mg 3 times daily for 5 days

OR

- acyclovir 800mg orally twice daily for 5 days

OR

- famciclovir 125mg orally twice daily for 5 days

OR

- valaciclovir 500mg orally twice daily for 5 days

OR

- valaciclovir 1000mg orally once daily for 5 days

SUPPRESSIVE THERAPY

Daily suppressive therapy reduces the frequency of genital herpes recurrences by >75% among patients who have frequent recurrences (i.e. six or more recurrences per year). Safety and efficacy have been documented among patients receiving daily therapy with acyclovir for as long as 6 years, and with valaciclovir and famciclovir for 1 year. Suppressive therapy has not been associated with emergence of clinically significant acyclovir resistance among immunocompetent patients.

Suppressive treatment with acyclovir reduces, but does not eliminate, asymptomatic viral shedding. Therefore, the extent to which suppressive therapy may prevent HSV transmission is unknown.

Recommended regimen

- acyclovir, 400 mg orally, 2 times daily, continuously.

OR

- famciclovir 250mg orally twice daily

OR

- valaciclovir 500mg orally once daily

OR

- valaciclovir 1000mg orally once daily

Some experts recommend discontinuing acyclovir after one year of continuous use so that the recurrence rate can be reassessed. The lowest continuous dose that will suppress recurrences in an individual can be determined only empirically.

**Severe Disease**

- acyclovir, 5-10 mg/kg IV every 8 hours, 5-7 days or until clinical resolution is attained.

HERPES IN PREGNANCY

During the first clinical episode of genital herpes, treat with oral acyclovir.

Vaginal delivery in women who develop primary genital herpes shortly before delivery puts babies at risk for neonatal herpes. Babies born to women with recurrent disease are at very low risk. Genital cultures late in pregnancy are poor predictors of shedding during delivery. Careful history and physical examination serve as a guide to the need for caesarean section in mothers with genital herpes lesions.

Treatment for Neonates

- acyclovir, 10 mg/kg intravenously three times a day, for 10-21 days

HERPES AND HIV CO-INFECTION

In people whose immunity is deficient, persistent and/or severe mucocutaneous ulcerations may occur, often involving large areas of perianal, scrotal or penile skin. The lesions may be painful and atypical, making a clinical diagnosis difficult. The natural history of herpes sores may become altered. Most lesions of herpes in HIV infected persons will respond to acyclovir, but the dose may have to be increased and treatment given for longer than the standard recommended period. Subsequently, patients may benefit from chronic suppressive therapy. In some cases the patients may develop thymidine-kinase deficient mutants for which standard antiviral therapy becomes ineffective.

The recommended regimen in severe herpes simplex lesions with co-infection with HIV is acyclovir 400mg orally 3-5 times daily until clinical resolution is attained.

3.8. VENEREAL WARTS

Human papilloma virus (HPV) is a common sexually transmitted pathogen. Genital warts are painless and do not lead to serious complications, except where they may cause obstruction. The removal of the lesion does not mean cure of the infection. No treatment is completely satisfactory. In most clinical situations, podophyllin (or podophyllotoxin) or trichloroacetic acid (TCA) is used to treat external genital and perianal warts. Cryotherapy, with liquid nitrogen, solid carbon dioxide, or cryoprobe is preferred by many physicians when available. Cryotherapy is non-toxic, does not require anaesthesia and, if used properly, does not result in scarring.



Sexual partners should be examined for evidence of warts. Patients with anogenital warts should be made aware that they are contagious to sexual partners. The use of condoms is recommended to help reduce transmission.

Specific types of HPV may give rise to invasive carcinoma of the cervix. It is recommended practice to examine the cervix in all female STI patients, and to perform regular cervical smears in this population for Papanicolaou examination. However, a high percentage of smears in adolescents may appear to be abnormal.

The available treatments for visible anogenital warts are either patient-applied (i.e. podofilox and imiquimod), removing the need for frequent clinic visits, or provider-administered. Podofilox 0.5% solution may be applied with a cotton swab and the gel can be applied with a finger.

Recommended regimens

a. Chemical

Patient-applied

- Podofilox 0.5% solution or gel twice daily for 3 days, followed by 4 days of no treatment, and the cycle repeated up to 4 times.
(Total volume of podofilox should not exceed 0.5ml per day)
- Imiquimod 5% cream applied with a finger at bedtime, left on overnight, 3 times a week for as long as 16 weeks.
(The treatment area should be washed with soap and water 6-10 hours after application)

Note

The safety of both podofilox and imiquimod during pregnancy has not been established.

Provider administered

- Podophyllin 10-25% in compound tincture of benzoin, applied carefully to the warts, avoiding normal tissue. External genital and perianal warts should be washed thoroughly 1-4 hours after the application of podophyllin. Podophyllin applied to warts on vaginal or anal epithelial surfaces should be allowed to dry before removing the speculum or anoscope. Treatment should be repeated at weekly intervals.
- Where available, podophyllotoxin 0.5%, one of the active constituents of podophyllin resin, is recommended. Its efficacy is equal to that of podophyllin, but it is less toxic and appears to cause less erosion.



- Some experts advise against the use of podophyllin for anal warts. Large amounts of podophyllin should not be used because it is toxic and easily absorbed; its use during pregnancy and lactation is contraindicated.

OR

- Trichloroacetic acid (TCA) (80-90%) applied carefully to the warts avoiding normal tissue, followed by powdering of the treated area with talc or sodium bicarbonate (baking soda) to remove unreacted acid. Repeat application at weekly intervals.

b. Physical

- Cryotherapy with liquid nitrogen, solid carbon dioxide, or a cryoprobe. Repeat applications every 1-2 weeks

OR

- Electrosurgery

OR

- Surgical removal.

Vaginal warts

- Cryotherapy (with liquid nitrogen)
- Podophyllin – 10-25% (allow to dry before removing speculum)
- TCA or BCA (80-90%)

Cervical warts

- Management should include consultation with an expert
- Pap smear
- No TCA or podophyllin

Treatment of cervical warts should not be started until the results from a cervical smear test are known.

Most experts advise against the use of podophyllin or trichloroacetic acid for cervical warts. One of the alternative therapies listed above should therefore be used.

Meatal and urethral warts

- Cryotherapy
- Podophyllin 10-25%



Accessible meatal warts may be treated with podophyllin, 10-25%, in compound tincture of benzoin, or podophyllotoxin 0.5% where available. Great care should be taken to ensure that the treated area is dried before contact with normal, opposing epithelial surfaces is allowed. Low success rates with podophyllin are reported.

Urethroscopy is necessary to diagnose intra-urethral warts, but they should be suspected in men with recurrent meatal warts. Some experts prefer electrosurgical removal. Intra-urethral instillation of a 5% cream of fluorouracil or thiotepa may be effective, but neither has been adequately evaluated. Podophyllin should not be used.

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TREATMENT OF SPECIFIC INFECTIONS

3.9. TRICHOMONAS VAGINALIS INFECTIONS

TRICHOMONAS VAGINALIS VAGINAL INFECTION

Recommended regimen

- metronidazole, 2 g orally, in a single dose

OR

- tinidazole, 2 g orally, in a single dose.

The reported cure rate in women ranges from 82% to 88% but may be increased to 95% if sexual partners are treated simultaneously.

Alternative regimen

- metronidazole, 400 or 500 mg orally, twice daily for 7 days⁴

OR

- tinidazole, 500 mg orally, twice daily for 5 days.

Other 5-nitroimidazoles are also effective, both in single and in multiple dose regimens.

Note

Patients taking metronidazole or other imidazoles should be cautioned not to consume alcohol while they are taking the drug and up to 24 hours after taking the last dose.

Asymptomatic women with trichomoniasis should be treated with the same regimen as symptomatic women.

⁴ Metronidazole is available in either 200 mg or 250 mg capsules.



Management of sexual partners

All sexual partners should be notified and treated, and patients should be advised against sexual intercourse until both the index patient and the partner(s) are treated.

Trichomoniasis is frequently asymptomatic in men but is increasingly recognized as a cause of symptomatic non-gonococcal, non-chlamydial urethritis. For treatment of trichomonas vaginalis urethritis, see below.

Follow-up

Patients should be asked to return after 7 days if symptoms persist. Reinfection should be carefully excluded. Patients not cured following initial treatment often respond favourably to repeat treatment with the 7-day regimen. Resistance to the 5-nitroimidazoles has been reported, and may be one cause of treatment failure.

Patients not cured with the repeated course of metronidazole may be treated with a regimen consisting of metronidazole 2 g orally, daily, together with 500 mg applied intravaginally each night for 3-7 days. Vaginal preparations of metronidazole are available in many parts of the world, but are only recommended for the treatment of refractory infections, not for the primary therapy of trichomoniasis. An alternative regimen consists of 400 or 500 mg metronidazole orally, twice daily for 7 days.

TRICHOMONIASIS IN PREGNANCY

There is increasing evidence of an association between infection with *T. vaginalis* and adverse pregnancy outcomes (e.g. premature rupture of the membranes, low birth weight). Metronidazole is not recommended for use in the first trimester of pregnancy, though it can be used during the second and third trimesters⁵. The minimum effective dose (2 g orally, in a single dose) should be used.

⁵Data on the safety of metronidazole in pregnancy are limited and some countries (USA, Canada) recommend use of single dose metronidazole at any time during pregnancy. This is especially relevant in the case of trichomoniasis, where early treatment has the best chances of preventing adverse pregnancy outcomes.

**Neonatal infections**

Infants with symptomatic trichomoniasis or with urogenital colonization persisting past the fourth month of life should be treated with metronidazole.

Recommended regimen

- metronidazole, 5 mg/kg orally, 3 times daily for 5 days.

Trichomonas vaginalis* urethritis*Recommended regimen**

- metronidazole, 400 or 500 mg orally, twice daily for 7 days

OR

- tinidazole, 500 mg, orally twice daily for 5 days.

3.10. BACTERIAL VAGINOSIS

Bacterial vaginosis is a clinical syndrome resulting from replacement of the normal hydrogen peroxide (H₂O₂)-producing *Lactobacillus* sp. in the vagina with high concentrations of anaerobic bacteria, such as *G. vaginalis* and *Mycoplasma hominis*. The cause of the microbial alteration is not fully understood.

Whereas trichomoniasis is a sexually transmitted infection, bacterial vaginosis is an endogenous reproductive tract infection. Treatment of sexual partners has not been demonstrated to be of benefit. It is recommended that predisposing factors such as the use of antiseptic/antibiotic vaginal preparations or vaginal douching be reduced or eliminated.

Additional studies are needed to confirm the relationship between an altered vaginal microflora and the acquisition of HIV.

The current recommendation is to only treat symptomatic women.

Recommended regimen

- metronidazole, 400 or 500 mg orally, twice daily for 7 days

Note

Patients taking metronidazole should be cautioned not to consume alcohol while they are taking the drug and up to 24 hours after taking the last dose.

**Alternative regimens**

- metronidazole, 2 g orally, as a single dose
- OR**
- clindamycin vaginal cream 2%, 5 g at bedtime intravaginally for 7 days
- OR**
- metronidazole gel 0.75%, 5 g twice daily intravaginally for 5 days
- OR**
- clindamycin, 300 mg orally twice daily for 7 days.

Follow-up

Patients should be advised to return if symptoms persist as re-treatment may be needed.

BACTERIAL VAGINOSIS AND SURGICAL PROCEDURES

Women with bacterial vaginosis, scheduled to undergo reproductive tract surgery or a therapeutic abortion, should receive treatment with metronidazole.

BACTERIAL VAGINOSIS IN PREGNANCY

There is evidence that bacterial vaginosis is associated with an increased incidence of adverse pregnancy outcomes (e.g., premature rupture of membranes, pre-term delivery and low birth weight). Symptomatic pregnant women should be treated, and those with a history of previous pre-term delivery should be screened to detect asymptomatic infections. Pregnant women with recurrence of symptoms should be re-treated. Screening of asymptomatic pregnant women without a history of prior pre-term delivery is not recommended.

Metronidazole is not recommended for use in the first trimester of pregnancy, but it may be used during the second and third trimesters. Lower doses of metronidazole are recommended throughout pregnancy, to reduce the risks of any adverse effects.

Recommended regimen

- metronidazole, 200 or 250 mg orally three times daily for 7 days.

**Alternative regimens**

- metronidazole, 2 g orally, as a single dose

OR

- clindamycin, 300 mg orally twice daily for 7 days

OR

- metronidazole gel, 0.75%, 5 g twice daily intravaginally for 7 days.

3.11. CANDIDIASIS

Vulvo-vaginal candidiasis usually is not acquired through sexual intercourse. Although treatment of sexual partners is not recommended it may be considered for women who have recurrent infection. A minority of male sex partners may have balanitis, which is characterised by erythema (redness) of the glans penis.

VULVOVAGINAL CANDIDIASIS

Therapy generally involves topical use of any of a wide variety of imidazoles (e.g. miconazole, clotrimazole, econazole, butoconazole, terconazole) or nystatin. Imidazoles require shorter courses of treatment and appear to be more effective than nystatin. They are generally more expensive, though.

Recommended regimens

- miconazole or clotrimazole, 200 mg intravaginally, daily for 3 days

OR

- clotrimazole, 500 mg intravaginally, as a single dose

OR

- fluconazole, 150 mg orally, as a single dose.

Alternative regimen

- nystatin, 100 000 IU intravaginally, daily for 14 days

VULVOVAGINAL CANDIDIASIS IN PREGNANCY

Although there are now some effective single dose oral treatments, they are not known to be safe or effective. Only topical azoles should be used to treat pregnant women. Of those treatments that have been investigated for use during pregnancy, the most effective are miconazole, clotrimazole, butoconazole and terconazole.



Recurrences

It is recommended that predisposing factors such as antibiotic use, the use of antiseptic/antibiotic vaginal preparations or vaginal douching be reduced or eliminated. Simultaneous treatment of a rectal focus with oral nystatin or fluconazole is not useful in preventing recurrences. Other underlying factors for recurrent vulvovaginal candidiasis include uncontrolled diabetes mellitus, immunosuppression, and corticosteroid use.

VULVOVAGINAL CANDIDIASIS AND HIV INFECTION

Candidiasis at several sites, including the vulva and vagina, is an important correlate of HIV disease. It is often quite severe and frequently relapses. Prolonged treatment is generally required, and chronic suppressive therapy is frequently employed.

BALANOPOSTHITIS

Topical application of a nystatin or clotrimazole lotion or cream twice daily for 7 days.

3.12. SCABIES

Scabies is often sexually transmitted in adults. However, there clearly are situations in which scabies is transmitted through close body contact not related to sexual activities. This is true in circumstances in which people are living in very close quarters such as in schools, poor housing complexes and in institutions such as nursing homes and psychiatric hospitals. The labelling of scabies as a sexually transmitted infection should be avoided when the likely cause is close body contact, in order to prevent stigmatization. In addition, the management recommendations are different for patients presenting with sexually acquired scabies (i.e. young adult living in good housing conditions). Management of such patients should include treatment of all sexual partners. For outbreaks of scabies related to non-sexual close body contact, treatment of all people involved is critical.

Adults, adolescents and older children: recommended regimen

- lindane 1% lotion or cream applied thinly to all areas of the body from the neck down and washed off thoroughly after 8 hours.

OR

- permethrin cream (5%)

OR

- benzyl benzoate 25%, lotion, applied to the entire body from the neck down, nightly for 2 nights; patients may bathe before reapplying the drug and should bathe 24 hours after the final application

OR



- crotamiton 10%, lotion, applied to the entire body from the neck down, nightly for 2 nights and washed off thoroughly 24 hours after the second application; an extension to 5 nights is found necessary in some geographical areas (crotamiton has the advantage of an antipruritic action).

OR

- sulphur 6%, in petrolatum applied to the entire body from the neck down, nightly for 3 nights; patients may bathe before reapplying the product and should bathe 24 hours after the final application.

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Note

- Lindane is not recommended for pregnant or lactating women.
- Resistance to Lindane has been reported in some areas.

Infants, children under 10 years of age, pregnant or lactating women

Recommended regimen

- crotamiton 10%, as above

OR

- sulphur 6%, as above

OR

- permethrin 5%, cream, applied in the same way as the sulphur regimen described above.

Contacts

Sexual contacts and close household contacts should be treated as above.

Special considerations

Pruritus may persist for several weeks after adequate therapy. A single treatment after 1 week may be appropriate if there is no clinical improvement. Additional weekly treatments are warranted only if live mites can be demonstrated. If reinfection can be excluded and compliance assured, topical anti-inflammatory therapy may be considered as an allergic reaction may be the reason for clinical manifestation.

Clothing or bed linen that may have been contaminated by the patient in the 2 days prior to the start of treatment should be washed and well dried, or dry-cleaned.



3.13. PHTHIRIASIS (PEDICULOSIS PUBIS)

Recommended regimens

- lindane, 1% lotion or cream, rubbed gently but thoroughly into the infested area and adjacent hairy areas and washed off after 8 hours; as an alternative, lindane (1%) shampoo, applied for 4 minutes and then thoroughly washed off,

OR

- pyrethrins plus piperonyl butoxide: applied to the infested and adjacent hairy areas and washed off after 10 minutes; retreatment is indicated after 7 days if lice are found or eggs are observed at the hair-skin junction. Clothing or bed linen that may have been contaminated by the patient in the two days prior to the start of the treatment should be washed and well dried, or dry cleaned.

OR

- permethrin 1% as above.

Note

Lindane is not recommended for pregnant or lactating women.

Special considerations

Pediculosis of the eyelashes should be treated by the application of an occlusive ophthalmic ointment to the eyelid margins daily for 10 days to smother lice and nits. The ointment should not be applied to the eyes.



4. KEY CONSIDERATIONS UNDERLYING TREATMENTS

4.1. THE CHOICE OF ANTIMICROBIAL REGIMENS

EFFICACY

Efficacy is the most important criterion in choosing among available regimens. STI therapy regimens should, ideally, cure at least 95% of those infected with a bacterial STI. Regimens yielding lower cure rates should be used only with great caution since in a setting of unstable susceptibility patterns, they may select for resistant strains and rapidly limit their own usefulness. Such caution should be applied to regimens yielding cure rates between 85% and 95%. Regimens with still lower cure rates are unacceptable.

In order to reduce the risk of development and transmission of resistant strains of sexually transmitted pathogens to the general population, special programmes for effective case management should be designed for groups at high risk, such as sex workers and their clients. *Treatment regimens for these groups should be nearly 100% effective*, and efforts should be made to promote health-seeking behaviour in these populations, preferably through the use of a participatory approach with peer educators and peer health care providers.

Efficacy data cannot be transferred reliably from one location (or in some situations, from one sub-population) to another. Thus, ideally, assessments should be based on well-designed studies conducted in the populations where the treatment will be applied. As a consequence of changes in the local epidemiology of resistant *N. gonorrhoeae* and *H. ducreyi*, therapeutic efficacy against these infections changes over time. Periodic surveillance of clinical efficacy, and/or *in vitro* sensitivity is recommended. If resistance levels and cure rates are not known in an area, the regimens used should be those which can reasonably be expected to produce acceptable cure rates under the most adverse ecological conditions. It is recognized that few comparative clinical trials are large enough to define small differences in efficacy between highly effective antimicrobial regimens.

Note

In order to ensure efficacy, practitioners are cautioned not to use less than the recommended dosages.



SAFETY

Toxicity is a second major concern in STI treatments because of the frequency with which patients become reinfected and their consequent exposure to repeated courses of antimicrobials. In addition, treatment of resistant STI agents often requires achievement of relatively high serum levels of antimicrobials, in some cases for periods of 7 days or more. Combination regimens further increase the risk of adverse drug reactions. Pregnancy, relatively common in sexually active groups with a high incidence of STI, represents a special situation in which additional considerations of foetal safety become important. The safety of the fluoroquinolones in pregnancy and adolescence is uncertain and limits their use in groups with a high level of sexual activity. In some areas, doxycycline is not used because of the danger of photosensitization. Tetracyclines are contraindicated in pregnancy and children under 8 years of age.

The prominence of third-generation cephalosporins in the recommended regimens results from their combination of high efficacy, even against relatively resistant organisms and low toxicity.

COST

Cost is a major limiting factor in all areas. Kanamycin is chosen in preference to spectinomycin for the treatment of gonorrhoea in many parts of the world because of its lower cost. It is assumed that local programmes will use the best regimens that each can afford. In calculating the total cost of various regimens, however, it is important to consider the costs associated with less effective therapies: repeat treatment, further spread, complications and selection for increased microbial resistance. Choosing the most appropriate regimen may be facilitated by the use of a formal decision analysis and sensitivity analyses can sometimes compensate for uncertainties in primary data.

COMPLIANCE AND ACCEPTABILITY

Patient compliance with STI treatment regimens is a continuing problem seriously limiting the effectiveness of multidose regimens such as those involving erythromycin and tetracyclines. Single-dose or very short course regimens should therefore be given preference. Appropriate counselling and health education have been shown to increase compliance and should be a part of clinical management.

Extra effort is required to achieve compliance amongst adolescents as they are often less tolerant of side-effects. They may also not want others to know that they are taking



medication. Health workers must ensure that instructions are fully understood, especially if several regimens are involved, as well as the implications of failure to complete treatment.

In some societies, oral regimens are strongly preferred to injections, whereas among other groups injection may be seen as the only acceptable form of treatment. In view of the emergence and spread of HIV infection, preference should be given to oral regimens, in order to reduce risks associated with the reuse of non-sterilized injection equipment. Patient education on the efficacy of oral preparations must be part of STI management.

60 AVAILABILITY

The geographical distribution and availability of drugs vary considerably. The regional availability of some excellent drugs could be improved by their inclusion on national essential drugs lists.

COEXISTENT INFECTIONS

When several STI are prevalent in a population, co-infection may be a common occurrence. Unfortunately, the ability to treat common co-infections with single drugs has been reduced by the development of resistance to the tetracyclines among *N. gonorrhoeae*. In most cases, dual therapy is now required for simultaneous gonococcal and chlamydial infections. Coincident chancroid and syphilis require a multi-drug regimen. The severity of disease caused by several sexually transmitted pathogens (e.g. herpes simplex virus, *H. ducreyi*, *T. pallidum*) may be increased in HIV infection and AIDS, and treatment must be intensified and prolonged.

RISK OF REDUCING DRUG EFFICACY FOR OTHER INDICATIONS

More effective but expensive drugs should not be reserved for referral centres. Use of less effective regimens at the primary care level would quickly discourage patients from seeking the most readily and rapidly available care and would foster disease spread and selection of resistant organisms.

Simultaneous treatment with several agents has been used to prevent the emergence of resistance in individuals during therapy for tuberculosis. The efficacy of this technique in preventing emergence of resistance in STI populations is unknown. Unfortunately resistance to a number of antimicrobials is sometimes acquired simultaneously by *N. gonorrhoeae*. The use of multiple drugs to treat polymicrobial processes (e.g. pelvic



inflammatory disease) or presumed simultaneous infection (e.g. tetracycline for chlamydial co-infection in cases of gonorrhoea), is widely practised and recommended.

4.2. COMMENTS ON INDIVIDUAL DRUGS

CEPHALOSPORINS

Several third-generation cephalosporins have been shown to be effective in the treatment of gonorrhoea. Cefixime has the advantage of being an oral preparation. It is also likely to be effective against chancroid, but it has not yet been evaluated in this condition. The efficacy of ceftriaxone in the treatment of gonorrhoea and chancroid has been well documented. There is a strong positive correlation between the minimum inhibiting concentrations of penicillins and cephalosporins.

In addition to treating uncomplicated anogenital gonorrhoea, single-dose ceftriaxone is effective in gonococcal ophthalmia neonatorum and conjunctivitis, and pharyngeal infection. Because of its cost it is tempting to use doses of ceftriaxone below 125mg. However, this is likely to accelerate the development of resistance and such regimens are not recommended.

MACROLIDES

Of the newer macrolides azithromycin is currently considered the drug of choice for treating chlamydial infection. The drug has a prolonged bioavailability that permits single-dose administration and it accumulates within cells. Azithromycin 1 gm single-dose therapy has been shown to be as effective as a week-long course of doxycycline 100mg twice daily in the treatment of chlamydia. However, azithromycin is a proprietary drug making its cost significantly higher than a combination of single-dose gonorrhoea therapies combined with a week-long course of doxycycline.

SULPHONAMIDES

The addition of trimethoprim to sulphonamides does not increase their antichlamydial activity. A three-day regimen of sulfamethoxazole and trimethoprim is inadequate for chlamydial infection.

Different sulphonamides are available in various parts of the world. These drugs differ somewhat in their pharmacology. Equivalent doses may be used in the treatment of STI.



QUINOLONES

Earlier agents such as rosoxacin are no longer recommended. In contrast, some of the new fluoroquinolones show considerable promise as oral agents for the treatment of gonorrhoea. Their use is contraindicated in pregnancy. The manufacturers advise against their use in children and adolescents, but ciprofloxacin has been licensed in Denmark for the single-dose prophylaxis of meningococcal disease in children.

The *in vitro* activity of individual fluoroquinolones against *N. gonorrhoeae* varies considerably. There is some evidence of increased minimum inhibiting concentrations in strains isolated after treatment with less active agents. Ciprofloxacin is considered to be the agent with the greatest activity against *N. gonorrhoeae*.

Gonococcal resistance to the fluoroquinolones has become increasingly common since 1992, especially in the Asia-Pacific region. In 1996 the proportions of quinolone resistant gonococci reported from some of the centres of the region ranged from less than 1% in New Zealand to 15% in the Republic of Korea, 24% in Hong Kong, 53% in Cambodia and 66% in the Philippines. Diligent monitoring for quinolone resistance is paramount as this group of affordable drugs remains effective in most parts of the world.

Experience with treating chlamydial infection with fluoroquinolones is limited. Of the currently studied agents, ofloxacin has the greatest potential when given as 300mg twice daily for 7 days. This combination would be effective against both gonorrhoea and chlamydial infection, but the usefulness of this regimen is limited by the drug's high cost and the duration of therapy that may affect compliance.

TETRACYCLINES

A number of tetracyclines of equal efficacy are available. These can be substituted for doxycycline and tetracycline hydrochloride as appropriate.

4.3. ANTIMICROBIAL RESISTANCE IN *N. GONORRHOEAE*

There are two main types of antibiotic resistance in *N. gonorrhoeae*: chromosomal resistance involves penicillins and a wide range of other therapeutic agents such as tetracyclines, spectinomycin, erythromycin, quinolones, thiamphenicol, and cephalosporins; plasmid-mediated resistance affects penicillins and tetracyclines. Chromosomally resistant *N. gonorrhoeae*, penicillinase-producing gonococci, and plasmid-mediated, tetracycline-



resistant strains are all increasing and have had a major impact on the efficacy of traditional regimens for treating gonorrhoea.

Chromosomal resistance in *N. gonorrhoeae* has been observed since the introduction of sulphonamides in the 1930s. Its significance today is that chromosomal resistant strains are often resistant to a number of antimicrobial agents that have been used to treat gonorrhoea. There is also cross-resistance between penicillin and the second- and third-generation cephalosporins. Although not yet of any clinical relevance in relation to the use of ceftriaxone, this trend is disturbing. The high level spectinomycin resistance reported sporadically in gonococci is also chromosomally mediated.

The effectiveness and usefulness of current surveillance of gonococcal resistance are limited, and a simple instrument for assessing and monitoring gonococcal antimicrobial resistance needs to be developed. Lack of standardization of sensitivity testing methodology continues to be a problem. Standard methods should be used and should include a set of reference strains. Disc-diffusion sensitivity testing remains poorly standardized, one problem being the limited availability of antibiotic discs of the correct content.

4.4. ANTIMICROBIAL RESISTANCE IN *H. DUCREYI*

The surveillance of antimicrobial susceptibility in *H. ducreyi* is complicated by the technical difficulties of performing sensitivity testing. Data are available from very few centres.

H. ducreyi has developed resistance to a number of different antibiotics but with the exception of two strains isolated in Singapore in the early 1980s, resistance to erythromycin has not been reported, and it therefore remains the recommended treatment. Ceftriaxone and ciprofloxacin are suitable alternatives, since *in vitro* resistance has not been reported to either, although frequent treatment failures were observed with ceftriaxone among both HIV-positive and HIV-negative patients in a study conducted in Nairobi in 1991. Single-dose azithromycin therapy appears to be another promising alternative, but further data are required.

Plasmid-mediated resistance has been found against ampicillin, sulphonamides, tetracycline, chloramphenicol, and streptomycin. All *H. ducreyi* strains now contain beta-



lactamase coding plasmids, several of which have been described. Neither penicillin nor ampicillin is now effective against chancroid. Tetracycline resistance too is widespread. As with *N. gonorrhoeae*, *H. ducreyi* can also carry a large plasmid capable of mobilizing smaller, non-conjugative resistance plasmids. Trimethoprim and tetracycline resistance can occur in the absence of plasmids.

Resistance to sulphonamides is now widespread, and strains with reduced sensitivity to trimethoprim are becoming increasingly prevalent in South-East Asia, in parts of Africa and in North America. Where strains remain sensitive to trimethoprim, treatment with this agent alone or combined with a sulphonamide remains effective.

Plasmid-controlled aminoglycoside-inactivating enzymes have reduced the usefulness of these antibiotics in treating chancroid in South-East Asia. At present this is not the case in Africa or elsewhere.

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5. PRACTICAL CONSIDERATIONS IN STI CASE MANAGEMENT

5.1. THE PUBLIC HEALTH PACKAGE FOR STI PREVENTION AND CARE

Effective prevention and care of STI can be achieved using a combination of responses constituting the “public health package”. The essential components of this package are shown in the box.

The public health package for STI prevention and care: the essential components

- promotion of safer sex behaviour
- condom programming – encompassing a full range of activities from condom promotion to the planning and management of supplies and distribution
- promotion of health-care-seeking behaviour
- integration of STI prevention and care into primary health care, reproductive health care facilities, private clinics and others
- specific services for populations at risk – such as female and male sex workers, adolescents, long-distance truck drivers, military personnel, and prisoners
- comprehensive case management of STI
- prevention and care of congenital syphilis and neonatal conjunctivitis
- early detection of symptomatic and asymptomatic infections.

COMPREHENSIVE CASE MANAGEMENT OF STI

One of the essential components of the public health package is comprehensive case management of STI, which comprises:

Identification of the syndrome: This can be done through syndromic diagnosis or laboratory tests.

Educating the patient: Patients should be informed about the nature of the infection, the importance of taking the full course of medication, among other things.

Antibiotic treatment for the syndrome: Whichever means is used for diagnosis — flow charts or laboratory tests — the availability and use of effective antibiotics is an absolute



requirement. The drugs must be available at the first point of contact with a patient with an STI. Effective treatment must also be available and used in the private sector.

Condom supply: With people being encouraged to use condoms, health authorities should ensure that there is an adequate supply of good-quality, affordable condoms at health facilities and at various other distribution points in the community. Social marketing of condoms is another way of increasing access to condoms.

Counselling: Counselling should be made available for cases where it is needed — for example, in chronic cases of genital herpes or warts — either for individuals or for couples in a sexual relationship.

Information on partner notification and treatment: Contacting sex partners of clients with STI, persuading them to present themselves to a site offering STI services, and treating them — promptly and effectively — are essential elements of any STI control programme. These actions, however, should be carried out with sensitivity, with social and cultural factors taken into account. This will avoid ethical problems, as well as practical problems such as rejection and violence, particularly against women.

5.2. CLINICAL CONSIDERATIONS

The feasibility of providing STI case management must be assured within any health care setting, whether within the public or private sector. An essential component will be privacy for consultation. Depending on source of care there may also be need to provide facilities such as an examination table or couch with adequate lighting, gloves, syringes, specula, sterilization equipment and laboratory supplies. Thus, for individuals seeking evaluation for an STI appropriate care consists of the following components:

- History taking, including behavioural, demographic and medical risk assessment
- Physical examination is essential, particularly of the genital area, which in some cultures may be sensitive
- Establishment of a diagnosis, syndromic or laboratory based
- Curative or palliative therapy, using the most effective antimicrobial for the pathogen, at the first port of call of the patient
- Patient education and counselling (where counselling services are available), including information on:



- compliance
- nature of infection
- importance of partner notification and treatment therefore
- risk reduction and prevention of further STI transmission
- HIV risk perception and assessment
- Case reporting
- Clinical follow up when appropriate and feasible
- Screening for asymptomatic infection (where feasible)

There are four major components in STI control:

- education of individuals at risk on modes of disease transmission and means of reducing the risk of transmission
- detection of infection in asymptomatic subjects and in subjects who are symptomatic but unlikely to seek diagnostic and therapeutic services
- effective management of infected individuals
- treatment and education of the sexual partners of infected individuals.

The prevention of STI is based primarily on changing the sexual behaviours that put people at risk and on promoting the use of condoms.

5.3. EDUCATION FOR PRIMARY PREVENTION

A consultation for STI is a unique opportunity for education about the prevention of HIV and STI in people who, by definition, are at risk for these diseases. Adolescents are an especially important target group for primary prevention because much of their active sexual and reproductive life lies ahead. Furthermore, adolescents may be less inclined to appreciate their risk of acquiring an STI.

Clinics and practitioners who treat patients with STI should have resources available for promoting safer sexual behaviour. Behavioural assessment is an integral part of the STI history and patients should be educated on methods to lower their risk of acquiring STI and HIV, including abstinence, careful selection of partners and use of condoms.

Condoms should be available in any health care facility providing STI services. Instruction in their proper use should also be provided. Although condoms do not provide absolute



protection from any infection, if properly used they greatly reduce the risk of infection. The question of pregnancy prevention should also be addressed and dual protection emphasized. Adolescents should be instructed where to get contraception and future supplies of condoms.

5.4. EDUCATION AND COUNSELLING DURING AN STI CONSULTATION

A consultation for an STI provides an opportunity for the health worker to discuss and explore with the patient, on a one-to-one basis, his or her risk factors for HIV/STI and other issues related to prevention and treatment. Frequently this consists of the provision of information about STI and their prevention, condom use and partner notification. This is education for prevention and is an essential part of an STI consultation.

However, just providing information is usually not sufficient to allow patients to accurately assess their own risk of infection or to deal with the challenges of informing a partner/partners, of preventing future infections or dealing with complications of STI. Some issues, which arise during an STI consultation, may provoke emotional reactions in the patient. Therefore, to deliver more than just education counselling is needed.

Counselling is defined here as an interactive confidential process where a care provider assists a patient in reflecting on these issues and in exploring possible lines of action. There often is a need for skills building and practising different behaviours and all this may require multiple visits. Counselling is much more time-consuming than more traditional means of information provision and requires from health care workers more empathy and understanding of the social and economic situation of a patient, as well as an ability to overcome their own judgmental attitudes.

Issues that should be addressed in a counselling session include:

- informing the partner(s) or spouse about the STI diagnosis (options: either the patient or the health care provider informs the partner(s) or spouse);
- assessing the patient's own risk for HIV and deciding whether or not to undergo testing for HIV;
- learning about, and coming to terms with, worrisome complications of STI, such as infertility, congenital syphilis, etc;
- dealing with an incurable STI such as herpes genitalis which may be transmitted to the partner(s) or spouse;
- symptoms suggesting HIV-related disease



- prevention of future infections, including strategies to discuss and introduce condom use with a partner
- confidentiality, disclosure and the risk of violence or stigmatizing reactions from spouse, partner, family or friends

Before offering counselling to STI patients, the care provider needs to:

- identify the need of the client which may relate to stress or anxiety about a particular aspect of the STI, or may be a special need for confidential risk assessment and planning for risk reduction;
- have the counselling skills, the privacy, and the time (usually 15-20 minutes), including the availability for follow-up discussions, as appropriate.

These resources are usually not available at a busy STI or general outpatient clinic. It is, therefore, suggested that when a counselling need is identified, the patient should be referred to a nearby counselling service, if this is available. If it is not, then a health or social worker may be designated to provide the counselling. This person should receive the relevant training and be accorded the necessary space and time off from other duties to provide the counselling. While not all adolescents will need to be referred for counselling, they have a well-recognized need to be able to talk to someone they can trust and who is well-informed. Having links to local support groups involved with young people can reinforce the clinical advice given at the clinic and encourage them to return to the clinic for future needs.

In many developing countries where health resources are scarce, counselling services are not always generally available. However, it is recognized that some of the ingredients of counselling – compassion, sensitivity and communication skills – are qualities that many health workers already possess and apply on a daily basis during all interactions with patients. Even in the absence of formal training in counselling, health workers should be encouraged to engage their patients in a dialogue about STI to explore risk assessment, personal behavioural options and to identify those requiring further emotional support, if such support is available.

5.5. NOTIFICATION AND MANAGEMENT OF SEXUAL PARTNERS

The sexual partners of STI patients are likely to be infected themselves and should be offered treatment. Further transmission of STI and re-infection are prevented by referral of sexual partners for diagnosis and treatment. Female partners of male STI patients may



well be asymptomatic; thus, partner notification and management offers an opportunity to identify and treat people who otherwise would not receive treatment. Partner notification should be considered whenever an STI is diagnosed, irrespective of where care is provided.

Notification can be by patient referral or by provider referral. In *patient referral* an infected patient is encouraged to notify partner(s) of their possible infection without the direct involvement of health-care providers, while in *provider referral* health-care providers or other health-care workers notify a patient's partner(s).

Partner notification should be conducted in such a way that all information remains confidential. The process should be voluntary and non-coercive. The aim is to ensure that the sexual partner(s) of STI patients, including those without symptoms, are referred for evaluation.

Management of sexual partners is based on knowledge of the index patient's diagnosis (syndromic or specific). The following three strategies can be adopted for the treatment of partners:

- offer immediate epidemiological treatment (treatment based solely on the diagnosis of the index patient) without any laboratory investigation;
- offer immediate epidemiological treatment, but obtain specimens for subsequent laboratory confirmation;
- delay treatment until the results of definitive laboratory tests are available.

The strategy selected will depend on:

- the risk of infection
- the seriousness of the disease
- the availability of effective diagnostic tests
- the likelihood of a person returning for follow-up
- the availability of effective treatment
- the likelihood of spread if epidemiological treatment is not given
- the available infrastructure for follow-up of patients.

WHO recommends that epidemiological treatment (with the same treatment regimen used for the index patient) should be given to all sexual partners.



5.6. ACCESS TO SERVICES

The provision of accessible, acceptable and effective services is important for the control of STIs. In most developing and industrialized countries, patients will have a choice of services from which to seek STI care. Possible sources are within the public sector, the private sector and the informal sector. In ensuring universal access to appropriate STI programmes, it should be recognized that patients seek care from a mixture of these. In many countries most STI care is obtained outside the public sector. Planning of a balanced and comprehensive programme will need to consider strengthening all health care providers that are able to provide STI services.

It is generally argued that high-quality STI care can be delivered by specialist clinical staff in categorical STI clinics, but inaccessibility, unacceptability and the many human and economic resources required make this an impractical method of service provision for the general public.

Although it is recommended that routine STI services be integrated into primary health care, clinics specializing in STIs (sometimes called categorical clinics) may be useful in providing primary care in urban settings for specific groups such as sex workers and their clients, migrant workers, truckers, and any other group with poor access to health care. Additionally, because of a concentration of STI expertise, these clinics can offer referral services for primary care services, hospital outpatient departments, private practitioners etc. In a few selected cases the specialized clinics should also be strengthened as reference centres to provide health care provider training in STIs, epidemiological information (e.g. prevalence of etiological agents within the syndromes and antimicrobial susceptibility), and operational research (e.g. studies on the feasibility and validity of algorithmic approaches).

Adolescents often lack information about existing services (where they are, what times they operate, how much they cost etc). Even if they know of these services they are often reluctant to seek help for diagnosis and treatment. This is due to embarrassment and possible stigma. They also fear negative reactions from health workers and lack of confidentiality. There are initiatives under way in many countries to make health services more adolescent friendly and more responsive to their special needs.



6. CHILDREN⁶, ADOLESCENTS AND SEXUALLY TRANSMITTED INFECTIONS

During the past decade, sexual abuse of children and adolescents has come to be recognized as a serious social problem requiring the attention of policy-makers, educators, and the variety of professionals who deliver social and health services. As researchers begin to document the serious effects of sexual abuse on the mental, emotional and physical health of this group, the management of the victims is emerging as an important aspect of child and adolescent health care in both the industrialized and the developing world.

A standardized approach to the management of sexually transmitted infections in children and adolescents who are suspected of having been sexually abused is important because the infection may be asymptomatic. An STI which remains undiagnosed and untreated may result in an unanticipated complication at a later stage and may be transmitted to others.

Health-care providers have not always been aware of the link between sexual abuse and STI in children. Previously, children suspected of having been sexually abused were not screened routinely for STI. Conversely, children diagnosed with an STI were not investigated for the source of infection, but were assumed to have acquired the infection by non-sexual means, such as a contaminated towel or overcrowded sleeping arrangements bringing them into contact with an infected person.

The identification of a sexually transmissible agent in a child beyond the neonatal period, in the vast majority of cases, is suggestive of sexual abuse. However, exceptions do exist, e.g. rectal or genital infection with *C. trachomatis* in young children may be due to perinatally acquired infection, which may persist for up to 3 years. In addition, bacterial vaginosis and genital mycoplasma have been identified in both abused and non-abused children. Genital warts, although suggestive of assault, are not specific for sexual abuse without other evidence. When the only evidence of sexual abuse is the isolation of an organism or the detection of antibodies to a sexually transmissible agent, findings should be carefully confirmed and considered.

⁶ WHO defines children as persons between the ages of 0 – 9 years.



In adolescents, cases of sexual abuse of both sexes are probably far more widespread than commonly recognized. Most cases of sexual abuse involve relatives, friends and other adults in close and legitimate contact with the child or adolescent. The perpetrator may be difficult to identify. Health workers who suspect abuse must consider the options available for specialized counselling, social support and redress.

It must be stressed that the psychological and social support services should be included for complete management of these patients.

6.1. EVALUATION FOR SEXUALLY TRANSMITTED INFECTIONS

Examination of children and adolescents for sexual assault or abuse should be arranged so as to minimize further trauma. The decision to evaluate the individual for sexually transmitted infections must be taken on a case-by-case basis.

Health care workers dealing with children and adolescents must respect and maintain confidentiality. They should be trained to elicit a good medical and sexual history and know how to overcome the patient's fear of pelvic examination.

Situations involving a high risk of STI and a strong indication for testing include:

- alleged offender known to have an STI or to be at high risk for STI
- symptoms and signs of STI on physical examination

Special care must be taken in collecting the required specimens in order to avoid undue psychological and physical trauma to the patient. The clinical manifestations of some sexually transmitted infections are different in children and adolescents as compared with adults. Some infections are asymptomatic or unrecognised. A paediatric speculum is rarely, if ever, needed in examination of prepubescent sexual assault victims. Indeed, in these situations, skill, sensitivity and experience are more essential than any specially developed technology. Practitioners undertaking examinations and specimen collection should be specially trained in child and adolescent abuse/assault evaluation.

The scheduling of examinations should depend upon the history of assault or abuse. If initial exposure is recent, infectious agents acquired through the exposure may not have produced sufficient concentrations of organisms to result in positive tests at an initial examination. A follow-up visit, approximately 1 week after the last sexual exposure to



repeat the physical examination and to collect additional specimens, is important in such cases to allow sufficient time for infections to incubate.

Similarly, to allow sufficient time for antibody to develop, an additional follow-up visit at approximately 12 weeks following the last sexual exposure is also necessary to collect sera. A single examination may be sufficient if the child or adolescent has been abused over an extended period of time and/or the last alleged episode of abuse occurred some time before the patient presents for medical evaluation. The following recommendation for scheduling examinations is a general guide. The exact timing and nature of follow-up contacts should be determined on an individual basis, however, and take psychological and social needs into consideration.

INITIAL EXAMINATION

An initial examination and any follow-up examinations should include:

- Cultures for *N. gonorrhoeae* and *C. trachomatis* from specimens collected from the pharynx and anus in both sexes, the vagina in girls, and the urethra in boys. Cervical specimens should not be collected from prepubertal girls. In boys, a meatal specimen of urethral discharge is an adequate substitute for an intraurethral swab specimen when a discharge is present. Only standard culture systems for the isolation of *N. gonorrhoeae* should be used.
- Wet-mount microscopic examination of a vaginal swab specimen for *T. vaginalis* infection. The presence of clue cells suggests bacterial vaginosis in a child with vaginal discharge. The significance of clue cells or other indicators of bacterial vaginosis as an indicator of sexual exposure in the presence or absence of vaginal discharge is unclear.
- Tissue culture for herpes simplex virus (where available) and dark-field microscopy or direct fluorescent antibody testing for *T. pallidum* from a specimen collected from vesicles or ulcers in children of all ages and in adolescents.
- Collection of a serum sample to be preserved for subsequent analysis if follow-up serological tests are positive. If the last sexual exposure occurred more than 12 weeks before the initial examination, serum should be tested immediately for antibody to sexually transmitted agents. Agents for which suitable tests are available include *T. pallidum*, HIV and hepatitis B virus. The choice of agents for serological tests should be made on a case-by-case basis.



EXAMINATION AT 12 WEEKS FOLLOWING ASSAULT

An examination at approximately 12 weeks following the last sexual exposure is recommended to allow time for antibody to infectious agents to develop. Serological tests for the following agents should be considered: *T. pallidum*, HIV, hepatitis B virus.

The prevalence of infections with the above agents varies greatly among communities. It will be important to know whether risk factors are present in the abuser/assailant. Also, results of hepatitis B virus tests must be interpreted carefully, since hepatitis B virus may be transmitted by non-sexual modes as well as sexually. Again, the choice of tests must be made on a case-by-case basis.

PRESUMPTIVE TREATMENT

There are few data upon which to establish the risk of a child acquiring a sexually transmitted infection as a result of sexual abuse. The risk is believed to be low in most circumstances, though documentation to support this position is inadequate.

Presumptive treatment for children who have been sexually assaulted or abused is not widely recommended since girls appear to be at lower risk of ascending infection than adolescent or adult women and regular follow-up can usually be assured. However, some children or their parents/guardians may be very concerned about the possibility of contracting an STI, even if the risk is perceived to be low by the health care practitioner. Addressing patient concerns may be an appropriate indication for presumptive treatment in some settings.

SUSCEPTIBILITY AND CLINICAL PRESENTATION OF STI IN CHILDREN AND ADOLESCENTS

There are differences in the epidemiology of STI in adolescents and adults, and though clinical presentations are similar, adolescents are regarded as being more biologically susceptible to infection and at increased risk of morbidity. Some of these differences have been obscured through the common practice of reporting adolescents (10-19 years) in the same category as “youth” (15-24 years) and through general inattention to young females who are married and pregnant.

In the majority of cases, the presentation of a STI is similar to that seen in adults. At the time of puberty and adolescence the female genital tract undergoes changes in response



to increasing levels of ovarian hormones. Along with the anatomical and physiological changes the vaginal epithelium begins to secrete mucus. The mucus secretion causes the adolescent girl to develop a white vaginal discharge, which is physiological. Generally, therefore, vaginal discharge is a poor predictor of the presence of either gonococcal or chlamydial infection.

SUSCEPTIBILITY

In pre-pubescent girls the columnar epithelium extends from the endo-cervical canal to the porto-vaginalis of the cervix. This cervical ectropion, normally present in 60-80% of sexually active adolescents, is associated with an increased risk of *C. trachomatis* infection. Also *N. gonorrhoea*, which infects columnar epithelium, readily colonises this exposed surface. Exposure to oncogenic pathogens such as human papilloma virus enhances the risk of dyskaryosis and carcinoma at an early age. Additionally, because cervical mucus production and humoral immunity are absent until ovulation begins, the risk of complications are higher in the immature adolescent exposed to infection as opposed to the physically mature woman. Ascending infection and subsequent pelvic inflammatory disease (PID) are consequently more frequent in the sexually active pre-pubescent adolescents and those in early puberty.

CERVICAL INFECTIONS

Approximately 85% of gonococcal infection in the female will be asymptomatic. However, there may be vulval itching, a minor discharge, urethritis or proctitis. In pre-pubescent girls, a purulent vulvo-vaginitis may occur.

Similarly *C. trachomatis* infection is asymptomatic in the majority of cases. Symptoms which may occur in the adolescent are inter-menstrual bleeding, post-coital bleeding and an increase in vaginal secretions.

GENITAL ULCER DISEASE

Presentation of syphilis is the same in the adolescents and adults. The stages of primary chancre, secondary syphilis manifestations, latent syphilis and serological responses are the same in both groups.

ANO-GENITAL WARTS

Warts present as condylomatous, papular or flat lesions.

**VAGINAL INFECTION**

Trichomonas vaginalis, candidiasis and bacterial vaginosis are the three usual pathological causes of vaginal discharge. *T. vaginalis* is sexually transmitted and causes an offensive malodorous discharge with vulval soreness and irritation. It may also present no symptoms at all.

Candida albicans is uncommon in adolescents prior to puberty. If present, the adolescent may have a discharge, vulval itching, dyspareunia, a peri-anal soreness or a fissuring at the introitus. Attacks of candida vulvitis may be cyclical in nature and correspond to menstruation.

Bacterial vaginosis does not produce a vulvitis and the adolescent will not complain of itching or soreness.



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