IV. HIV INFECTION AND EARLY INTERVENTION [9]

Infection with HIV produces a spectrum that progresses from no apparent illness to AIDS as a late manifestation. The pace of disease progression is variable. The median time between infection with HIV and the development of AIDS among adults is 10 years, with a range from a few months to 12 years. Most adults and adolescents infected with HIV remain symptom-free for long periods, but viral replication can be detected in asymptomatic persons and increases substantially as the immune system deteriorates. Most people who are infected with HIV will eventually have symptoms related to the infection. In cohort studies of adults infected with HIV, data indicated that symptoms developed in 70%-85% of infected adults, and AIDS developed in 55%-62% within 12 years after infection. Additional cases are expected to occur among those who have remained AIDS-free for >12 years.

Greater awareness of risky behaviors by both patients and health-care providers has led to increased testing for HIV and earlier diagnosis of early HIV infection, often before symptoms develop (though emotional or psychological problems may occur). Such early identification of HIV infection is important for several reason. Treatments are available to slow the decline of immune system function. Persons who are infected with HIV and altered immune function also are at increased risk for infections such as tuberculosis (TB), bacterial pneumonia, and *Pneumocystis carinii* pneumonia (PCP), for which preventive measures are available. Because of its effect on the immune system, HIV affects the diagnosis, evaluation, treatment, and follow-up of many other diseases and may affect the efficacy of antimicrobial therapy for some STDs. Close clinical follow-up after treatment for STDs is imperative. During early infection, persons with HIV and their families can be educated about the disease and become linked with a support network that addresses their needs and with care systems effective in maintaining good health and delaying the onset of symptoms. Early diagnosis also offers the opportunity for counseling and for assistance in preventing the transmission of HIV infection to others.

For the purpose of these recommendations, early intervention for HIV is defined as care for persons infected with HIV who are without symptoms. However, recently detected HIV infection may not have been recently acquired. Persons newly diagnosed with HIV may be at many different stages of the infection. Therefore, early intervention also involves assuming the responsibility for coordinating care and for arranging access to resources necessary to meet the medical, psychological, and social needs of persons with more advanced HIV infection.

Diagnostic Testing for HIV-1 AND HIV-2

Testing for HIV should be offered to all persons whose behavior puts them at risk for infection, including persons who seek evaluation and treatment for STD's. Counseling before and after testing (i.e., pretest and posttest counseling) is an integral part of the testing procedure. Informed consent must be obtained before an HIV test is performed. Some states require written consent.

HIV infection is most often diagnosed by using HIV-1 antibody tests. Antibody testing begins with a sensitive screening test such as the enzyme-linked immunosorbent assay (ELISA) or a rapid assay. If confirmed by Western blot or other supplemental test, a positive antibody test means that a person is infected with HIV and is capable of transmitting the virus to others. HIV antibody is detectable in approximately 95% of patients within 6 months of infection. Although a negative antibody test usually means a person is not infected, antibody tests cannot rule out infection that occurred <6 months before the test.

Since there is transplacental passage of maternal HIV antibody, antibody tests for HIV are expected to be positive in the serum of both infected and uninfected infants born to a seropositive mother. Passively acquired HIV antibody falls to undetectable levels among most infants by 15 months of age. A definitive determination of HIV infection for an infant <15 months of age should

be based either on the presence of antibody to HIV in conjunction with a compatible immunologic profile and clinical course or on laboratory evidence of HIV in blood or tissues by culture, nucleic acid, or antigen detection.

Specific recommendations for screening and diagnostic testing for HIV include the following:

- Informed consent must be obtained before an HIV test is performed. Some states require written consent.
- Positive screening tests for HIV antibody must be confirmed by a more specific confirmatory test (either the Western blot assay or indirect immunofluorescence assay [IFA]) before being considered definitive for confirming HIV infection.
- Persons with positive HIV tests must receive medical and psychosocial evaluation and monitoring services, or be referred for these services.

The prevalence of HIV-2 in the United States is extremely low, and CDC does not recommend routine testing for HIV-2 in settings other than blood centers, unless demographic or behavioral information suggests that HIV-2 infection might be present. Those at risk for HIV-2 infection include persons from a country in which HIV-2 is endemic or the sex partners of such persons. Additionally, testing for HIV-2 should be conducted when there is clinical evidence or suspicion of HIV disease in the absence of a positive test for antibodies to HIV-1.

Counseling for Patients With HIV Infection

Behavioral and psychosocial services are an integral part of HIV early intervention. Patients usually experience emotional distress when first being informed of a positive HIV test result, and also later when notified of changes in immunologic markers, when antiviral or prophylactic therapy is initiated, and when symptoms develop. Patients face several major adaptive challenges: a) accepting the possibility of a curtailed life span, b) coping with others' reactions to a stigmatizing illness, c) developing strategies for maintaining physical and emotional health, and d) initiating changes in behavior to prevent HIV transmission. Many patients also require assistance with making reproductive choices, gaining access to health services and health insurance, and confronting employment discrimination.

Interrupting HIV transmission depends upon changes in behavior by those persons at risk for transmitting or acquiring infection. Though some viral culture studies suggest that antiviral treatment reduces viral burden, clinical data are insufficient to determine whether therapy might reduce the probability of transmission. Infected persons, as potential sources of new infections, must receive extra attention and support to help break chains of transmission and to prevent infection of others. Targeting behavior change programs toward HIV-infected persons and their sex partners, or those with whom they share needles, is an important adjunct to current AIDS prevention efforts.

Specific recommendations for counseling patients with HIV infection include:

- Persons who test positive for HIV antibody should be counseled by a person who is able to discuss the medical, psychological, and social implications of HIV infection.
- Appropriate social support and psychological resources should be available, either on site or through referral, to assist patients in coping with emotional distress.
- Persons who continue to be at risk for transmitting HIV should receive assistance in changing or avoiding behaviors that can transmit infection to others.

Initial Evaluation and Planning for Care

Practice settings for offering early HIV care are variable, depending upon local resources and needs. Primary-care providers and outpatient facilities must ensure that appropriate resources are available for each patient and must avoid fragmentation of care; it is preferable for persons

with HIV infection to receive care from a single source that is able to provide comprehensive care for all stages of HIV infection. But the limited availability of such resources often results in the need to coordinate care between outpatient, and specialist providers in different locations. Because of the progressive nature of HIV and the increased risk for bacterial infections, including TB, even before HIV infection becomes advanced it is essential to establish specific provisions for handling the medical, psychological, and social problems likely to arise at any stage of infection. An important component of early intervention is effective linkage with referral settings where off-hours care and specialty services are available. Development of an appropriate plan for care involves the following:

- Identification of patients in need of immediate medical care (e.g., patients with symptomatic HIV infection or emotional crisis) and of those in need of anti-retroviral therapy or prophylaxis for opportunistic infections (e.g., PCP).
- Evaluation for the presence of diseases associated with HIV, such as TB and STDs.
- Administration of recommended vaccinations.
- Case management or referral for case management.
- Counseling.

Because of the complexity of services required for management of patients with HIV infection, particularly regarding medical care, referral to a center experienced in providing care for HIV-infected patients is imperative.

Providers unable to offer therapeutic management of HIV may use the initial evaluation to identify the need for prompt referral to appropriate resources. The initial evaluation of HIV-positive patients should include the following essential components.

- A detailed history, including sexual history, substance abuse history, and a review of systems for specific HIV-related symptoms.
- A physical examination; for females, this examination should include a gynecologic examination.
- For females, testing for *N. gonorrhea*, *C. trachomatis*, a Papanicolaou (Pap) smear, and wet mount examination of vaginal secretions.
- Toxoplasma antibody test, tests for hepatitis B viral markers, and syphilis serology.
- A CD4+ T-lymphocyte analysis and determination of HIV plasma ribonucleic acid (i.e. HIV viral load).
- Complete blood and platelet counts and blood chemistry profile.
- A chest radiograph.
- A purified protein derivative (PPD) tuberculin skin test by the Mantoux method. The test result should be evaluated at 48 – 72 hours; in HIV-infected persons, a 5 mm induration is considered positive. The usefulness of anergy testing is controversial.
- A thorough psychosocial evaluation, including ascertainment of behavioral factors indicating risk for transmitting HIV and elucidation of information about any partners who should be notified about possible exposure to HIV.

* HIV-infected persons should be referred for appropriate medical follow-up to facilities in which health-care personnel are experienced in providing care for HIV-infected patients (including antiretroviral therapy, prophylaxis and management of opportunistic infections).

Management of Sex Partners

When referring to persons who are infected with HIV, the term "partner" includes not only sex partners but also injecting-drug users who share syringes or other injection equipment. The rationale for partner notification is that the early diagnosis and treatment of HIV infection possibly reduces morbidity and offers the opportunity to encourage risk-reducing behaviors. Two complementary notification processes, patient referral and provider referral, can be used to identify partners. With patient referral, patients inform their own partners directly of their exposure to HIV infection. With provider referral, trained health department personnel locate partners on the basis of the names, descriptions, and addresses provided by the patient. During the notification process, the anonymity of patients is protected; their names are not revealed to sex or needle-sharing partners who are notified.

One randomized trial suggested that provider referral is more effective in notifying partners than patient referral. In that trial, 50% of partners in the provider referral group were notified, yet only 7% of partners were notified by subjects in the patient referral group. However, few data demonstrate whether behavioral change takes place as a result of partner notification and many patients are reluctant to disclose the names of partners because of concern about discrimination, disruption of relationships, and loss of confidentiality for the partners.

Specific recommendations for implementing partner notification procedures include:

- Persons who are HIV-positive should be encouraged to notify their partners and to refer them for counseling and testing. Providers should assist in this process, if desired by the patient, either directly or through referral to health department partner notification programs.
- If patients are unwilling to notify their partners or if it cannot be assured that their partners will seek counseling, physicians or health department personnel should use confidential procedures to assure that the partners are notified.

Special Considerations

Pregnancy

All pregnant women should be OFFERED HIV testing as early in pregnancy as possible. This recommendation is particularly important because of the available treatments for reducing the likelihood of perinatal transmission and maintaining the health of the woman. Women who are HIV-infected should be specifically informed about the risk for perinatal infection. Current evidence indicates that 15%- 25% of infants born to HIV-infected mothers are infected with HIV; the virus also can be transmitted from an infected mother by breast-feeding. Pregnancy among HIV-infected patients does not appear to increase maternal morbidity or mortality.

Women should be counseled about their options regarding pregnancy. The objective of counseling is to provide HIV-infected women with current information for making reproductive decisions, analogous to the model used in genetic counseling. Contraceptive, prenatal, and abortion services should be available on site or by referral.

There is a growing body of evidence that indicates that aggressive antiviral therapy in pregnancy markedly reduces the risk for transmission to the fetus and newborn. Polydrug therapy, HAART (Highly active antiretroviral therapy), for the mother is indicated during pregnancy. Specific recommendations for therapy cannot be made in this text because clinical practice is evolving rapidly. The Centers for Disease Control and Prevention and *The Medical Letter* are good sources that provide regularly updated recommendations for treatment.

To reduce the risk of vertical transmission to the fetus/newborn cesarean delivery is recommended. (ACOG. Scheduled cesarean delivery and the prevention of vertical transmission of HIV infection. Committee Opinion #234, May, 2000) The cesarean delivery ideally should be performed before the onset of labor and before rupture of membranes.

HIV Infection Among Infants and Children

Infants and young children with HIV infection differ from adults and adolescents with respect to the diagnosis, clinical presentation, and management of HIV disease. For example, total lymphocytes and absolute CD4+ cell counts are much higher in infants and children than in healthy adults and are age dependent. Specific indications and dosages for both anti-retroviral and prophylactic therapy have been developed for children (CDC 1995 Revised guidelines for prophylaxis against *Pneumocystis carinii* pneumonia for children infected with or perinatally exposed to human immunodeficiency virus. MMWR 1995;44 No. RR-4). Other modifications must be made in health services that are recommended for infants and children, such as avoiding vaccination with live oral polio vaccine when a child (or close household contact) is infected with HIV.

V. DISEASES CHARACTERIZED BY GENITAL ULCERS OR INGUINAL LYMPHADENOPATHY

In the United States, most patients with genital ulcers have genital herpes, syphilis, or chancroid. Inguinal lymphadenopathy is common in these infections. More than one of these diseases may be present among at least 3%-10% of patients with genital ulcers. Each disease has been associated with an increased risk for HIV infection.

A diagnosis based only on history and physical examination is often inaccurate. Thus, evaluation of all persons with genital ulcers should include a serologic test for syphilis and possibly other tests. Specific tests for the evaluation of genital ulcers include:

- Dark-field examination or direct immunofluorescence test for *T. pallidum*.
- Culture or antigen test for HSV.
- Culture for *Hemophilus ducreyi*.

HIV testing should be considered in the management of patients with genital ulcers, especially for those with syphilis or chancroid.

CHANCROID

Because of recent spread of *H. ducreyi*, chancroid has become an important STD in the United States. Its importance is enhanced by the knowledge that outside the United States chancroid has been associated with increased infection rates for HIV. Chancroid must be considered in the differential diagnosis of any patient with a painful genital ulcer. Painful inguinal lymphadenopathy is present in about half of all chancroid cases.

Recommended Regimen

Azithromycin 1 g orally in a single dose,

OR

Ceftriaxone 250 mg intramuscularly (IM) in a single dose,

OR

Ciprofloxacin 500 mg orally twice a day for 3 days

OR

Erythromycin base 500 mg orally 4 times a day for 7 days.

NOTE: Ciprofloxacin is contraindicated for pregnant and lactating women and for persons aged < 18 years.

All four regimens are effective for the treatment of chancroid among patients without HIV infection. Azithromycin and ceftriaxone offer the advantage of single-dose therapy. Worldwide, several isolates with intermediate resistance to either ciprofloxacin or erythromycin have been reported.

Other Management Considerations

- Sex partners, within the 10 days preceding onset of symptoms in an infected patient, whether symptomatic or not, should be examined and treated with a recommended regimen.
- Patients should be tested for HIV infection at the time of diagnosis. Patients also should be tested 3 months later for both syphilis and HIV, if initial results are negative.

Follow-Up

Patients should be re-examined 3-7 days after initiation of therapy. If treatment is successful, ulcers improve symptomatically within 3 days and objectively improve (evidenced by resolution of lesions and clearing of exudate) within 7 days after institution of therapy. If no clinical improvement is evident, the clinician should consider whether 1) antimicrobials were taken as prescribed, 2) the diagnosis is correct, 3) co-infection with another STD agent exists, 4) the patient is also infected with HIV, or 5) the *H. ducreyi* strain causing infection is resistant to the prescribed antimicrobial. The time required for complete healing is related to the size of the ulcer; large ulcers may require >2 weeks. Clinical resolution of fluctuant lymphadenopathy is slower than that of ulcers and may require needle aspiration through adjacent intact skin—even during successful therapy.

SYPHILIS

Syphilis is a systemic disease caused by *T. pallidum.* Patients with syphilis may seek treatment for signs or symptoms of primary infection (ulcer or chancre at site of infection), secondary infection (manifestations that include rash, mucocutaneous lesions, and adenopathy), or tertiary infection (cardiac, neurologic, ophthalmic, auditory, or gummatous lesions). Infections also may be detected during the latent stage by serologic testing. Latent syphilis acquired within the preceding year is referred to as early latent syphilis; all other cases of latent syphilis are either late latent syphilis or syphilis of unknown duration. Treatment for late latent syphilis, as well as tertiary syphilis, theoretically requires therapy of longer duration because organisms are dividing more slowly; however, the validity of this division and its timing are unproven.

Serologic Tests

Dark-field examinations and direct fluorescent antibody tests on lesions or tissue are the definitive methods for diagnosing early syphilis. Presumptive diagnosis is possible by using two types of

serologic tests for syphilis:

- Treponemal: e.g., fluorescent treponemal antibody absorbed [FTA-ABS], microhemagglutination assay for antibody to T. pallidum [MHATP].
- Nontreponemal: e.g., Venereal Disease Research Laboratory [VDRL], rapid plasma reagin [RPR]. Neither test alone is sufficient for diagnosis.

Treponemal antibody tests, once positive, usually remain so for life, regardless of treatment or disease activity. Treponemal antibody titers do not correlate with disease activity and should not be used to assess response to treatment. Nontreponemal antibody titers do tend to correlate with disease activity, usually rising with new infection and falling after treatment. Nontreponemal antibody test results should be reported quantitatively and titered out to a final end point rather than reported as greater than an arbitrary cutoff (e.g., >1:512). With regard to changes in nontreponemal test results, a fourfold change in titers is equivalent to a two-dilution change, e.g., from 1:16 to 1:4, or from 1:8 to 1:32.

For sequential serologic tests, the same test (e.g., VDRL or RPR) should be used, and it should be run by the same laboratory. The VDRL and RPR are equally valid, but RPR titers are often slightly higher than VDRL titers and therefore are not comparable.

Neurosyphilis cannot be accurately diagnosed from any single test. Cerebrospinal fluid (CSF) tests should include cell count, protein, and VDRL (not RPR). The CSF leukocyte count is usually elevated (>5 WBC/mm3) when neurosyphilis is present and is a sensitive measure of the efficacy of therapy. VDRL is the standard test for CSF; **when positive** it is considered **diagnostic** of neurosyphilis. However, it may be negative when neurosyphilis is present and cannot be used to rule out neurosyphilis. Some experts also order an FTA-ABS; this may be less specific (more false positives) but is highly sensitive. The positive predictive value of the CSF-FTA-ABS is lower, but **when negative**, this test provides evidence **against** neurosyphilis.

Treatment

Parenteral penicillin G is the preferred drug for treatment of all stages of syphilis. The preparation(s) used (i.e., benzathine, aqueous procaine, or aqueous crystalline), the dosage, and length of treatment depend on the stage and clinical manifestations of disease.

Parenteral penicillin G is the only proven therapy with documented efficacy for neurosyphilis, congenital syphilis, or syphilis during pregnancy. For patients with penicillin allergy, skin testing—with desensitization, if necessary—is optimal. Sample guidelines for skin testing and desensitization are included. However, the minor determinant mixture for penicillin is not currently available commercially.

Jarisch-Herxheimer Reaction

The Jarisch-Herxheimer reaction is an acute febrile reaction—accompanied by headache, myalgia, and other symptoms—that may occur within the first 24 hours after any therapy for syphilis; patients should be advised of this possible adverse reaction. Jarisch-Herxheimer reactions are more common among patients with early syphilis. Antipyretics may be recommended, but no proven methods exist for preventing this reaction. The Jarisch-Herxheimer reaction may induce early labor or cause fetal distress among pregnant women. This concern should not prevent or delay therapy.

Persons Exposed to Syphilis (Epidemiological Treatment)

Persons sexually exposed to a patient with early syphilis should be evaluated clinically and serologically. If the exposure occurred within the previous 90 days, the person may be infected yet seronegative and therefore should be presumptively treated. (It may be advisable to presumptively treat persons exposed more than 90 days previously if serologic test results are

not immediately available and follow-up is uncertain.) Patients who have other STD may also have been exposed to syphilis and should have a serologic test for syphilis. The dual therapy regimen currently recommended for gonorrhea (ceftriaxone and doxycycline) is probably effective against incubating syphilis. If a different, nonpenicillin antibiotic regimen is used to treat gonorrhea, the patient should have a repeat serologic test for syphilis in 3 months.

PRIMARY and SECONDARY SYPHILIS

Recommended Regimen

Benzathine penicillin G, 2.4 million units IM, in a single dose.

Alternative Regimen for Penicillin-Allergic Patients (Non-pregnant)

- **Doxycycline,** 100 mg orally 2 times a day for 2 weeks,

  OR

- **Tetracycline,** 500 mg orally 4 times a day for 2 weeks.

NOTE: Doxycycline and tetracycline are equivalent therapies. There is less clinical experience with doxycycline, but compliance is better. In patients who cannot tolerate doxycycline or tetracycline, three options exist:

- If follow-up or compliance cannot be ensured, the patient should have skin testing for penicillin allergy and be desensitized if necessary.
- If compliance and follow-up are ensured, erythromycin, 500 mg orally 4 times a day for 2 weeks, can be used.
- Patients who are allergic to penicillin may also be allergic to cephalosporins; therefore, caution must be used in treating a penicillin-allergic patient with a cephalosporin. However, preliminary data suggest that ceftriaxone, 250 mg IM once a day for 10 days, is curative, but careful follow-up is mandatory.

Follow-Up

Treatment failures can occur with any regimen. Patients should be reexamined clinically and serologically at 3 months and 6 months. If nontreponemal antibody titers have not declined fourfold by 3 months with primary or secondary syphilis, or by 6 months in early latent syphilis, or if signs or symptoms persist and reinfection has been ruled out, patients should have a CSF examination and be retreated appropriately.

HIV-infected patients should have more frequent follow-up, including serologic testing at 1, 2, 3, 6, 9, and 12 months. In addition to the above guidelines for 3 and 6 months, any patient with a fourfold increase in titer at any time should have a CSF examination and be treated with the neurosyphilis regimen unless reinfection can be established as the cause of the increased titer.

HIV Testing

All syphilis patients should be counseled concerning the risks of HIV and should be tested for HIV.

LATENT SYPHILIS

Latent syphilis is defined as those periods after infection with *T. pallidum* when patients are seroreactive, but demonstrate no other evidence of disease. Patients who have latent syphilis and who acquired syphilis within the preceding year are classified as having early latent syphilis.

Patients can be demonstrated as having early latent syphilis if, within the year preceding the evaluation, they had:

a) a documented seroconversion

b) unequivocal symptoms of primary or secondary syphilis, or

c) a sex partner who had primary, secondary, or early latent syphilis

Almost all other patients have latent syphilis of unknown duration and should be managed as if they had late latent syphilis.

Recommended Regimens for Adults

Early Latent Syphilis:

Benzathine penicillin G 2.4 million units IM in a single dose.

Late Latent Syphilis or Latent Syphilis of Unknown Duration:

Benzathine penicillin G 7.2 million units total, administered as three doses of 2.4 million units IM each at 1-week intervals.

TERTIARY SYPHILIS

Tertiary syphilis refers to gumma and cardiovascular syphilis, but not to Neurosyphilis.

Recommended Regimen

Benzathine penicillin G 7.2 million units total, administered as three doses of 2.4 million units IM each at 1-week intervals.

NEUROSYPHILIS

Central nervous system disease can occur during any stage of syphilis. A patient who has clinical evidence of neurologic involvement with syphilis (e.g., ophthalmic or auditory symptoms, cranial nerve palsies, and symptoms or signs of meningitis) should have a CSF examination.

Recommended Regimen

Aqueous crystalline penicillin G 18-24 million units a day, administered as 3-4 million units IV every 4 hours for 10-14 days.

EVALUATION AND TREATMENT OF INFANTS DURING THE FIRST MONTH OF LIFE

An infant should not be released from the hospital until the serologic status of its mother is known.

Infants should be treated for presumed congenital syphilis if they were born to mothers who met the following criteria;

- Had untreated syphilis at delivery;

- Had serologic evidence of relapse or reinfection after treatment (i.e., a fourfold or greater increase in nontreponemal antibody titer);
- Was treated with erythromycin or other nonpenicillin regimen for syphilis during pregnancy;
- Was treated for syphilis <4 weeks before delivery;
- Did not have a well-documented history of treatment for syphilis;
- Was treated for early syphilis during pregnancy with the appropriate penicillin regimen, but nontreponemal antibody titers did not decrease at least fourfold: or
- Was treated appropriately before pregnancy but had insufficient serologic follow-up to ensure an adequate treatment response and lack of current infection.

Evaluation of the Infant

The clinical and laboratory evaluation of infants born to women described above should include:

- A thorough physical examination for evidence of congenital syphilis
- Nontreponemal antibody titer
- CSF analysis for cells, protein, and VDRL
- Long bone x-rays
- Other tests as clinically indicated (e.g., chest x-ray)
- If possible, FTA-ABS on the purified l9S-lgM fraction of serum (e.g., separation by Isolab columns)

Therapy Decisions

Infants should be treated if they have:

- Any evidence of active disease (physical examination or x-ray); or
- A reactive CSF-VDRL; or
- An abnormal CSF finding (white blood cell count >5/mm or protein >50 mg/dl)* regardless of CSF serology; or
- Quantitative nontreponemal serologic titers that are fourfold (or greater) higher than their mother's; or
- Positive FTA-ABS-19S-lgM antibody, if performed.

Even if the evaluation is normal, infants should be treated if their mothers have untreated syphilis or evidence of relapse or reinfection after treatment. Infants who meet the criteria listed in "Who Should be Evaluated" but are not fully evaluated, should be assumed to be infected, and treated.

Treatment

Treatment should consist of 100,000-150,000 units/kg of **aqueous crystalline penicillin G** daily (administered as 50,000 units/kg IV every 8-12 hours) or 50,000 units/kg of **procaine penicillin** daily (administered once IM) for 10-14 days. If more than 1 day of therapy is missed, the entire course should be restarted. All symptomatic neonates should also have an ophthalmologic examination.

Infants who meet the criteria listed in "Who Should be Evaluated" but who after evaluation do not meet the criteria listed in "Therapy Decisions," are at low risk for congenital syphilis. If their mothers were treated with erythromycin during pregnancy, or if close follow-up cannot be assured, they should be treated with benzathine penicillin G, 50,000 units/kg IM as a one-time dose.

Follow-Up

Seropositive untreated infants must be closely followed at 1, 2, 3, 6, and 12 months of age. In the absence of infection, nontreponemal antibody titers should be decreasing by 3 months of age and should have disappeared by 6 months of age. If these titers are found to be stable or increasing, the child should be reevaluated and fully treated. Additionally, in the absence of infection, treponemal antibodies may be present up to 1 year. If they are present beyond 1 year, the infant should be treated for congenital syphilis.

Treated infants should also be observed to ensure decreasing nontreponemal antibody titers; these should have disappeared by 6 months of age. Treponemal tests should not be used, since they may remain positive despite effective therapy if the child was infected. Infants with documented CSF pleocytosis should be reexamined every 6 months or until the cell count is normal. If the cell count is still abnormal after 2 years, or if a downward trend is not present at each examination, the infant should be retreated. The CSF-VDRL should also be checked at 6 months; if it is still reactive, the infant should be retreated.

Therapy of Older Infants and Children

After the newborn period, children discovered to have syphilis should have a CSF examination to rule out congenital syphilis. Any child who is thought to have congenital syphilis or who has neurologic involvement should be treated with 200,000-300,000 units/kg/day of **aqueous crystalline penicillin G** (administered as 50,000 units/kg every 4-6 hours) for 10-14 days. Older children with definite acquired syphilis and a normal neurologic examination may be treated with **benzathine penicillin G** 50,000 units/kg IM, up to the adult dose of 2.4 million units. Children with a history of penicillin allergy should be skin tested and, if necessary, desensitized. Follow-up should be performed as described previously.

HIV Testing

In cases of congenital syphilis, the mother should be counseled concerning the risks of HIV and be encouraged to be tested for HIV; if her test is positive, the infant should be referred for follow-up.

Management of Patients with Histories of Penicillin Allergy

Currently, no proven alternative therapies to penicillin are available for treating patients with neurosyphilis, congenital syphilis, or syphilis in pregnancy. Therefore, skin testing with desensitization, if indicated is recommended for these patients.

Skin Testing

- Skin testing is a rapid, safe, and accurate procedure (see below). It is also productive; 90% of patients with histories of “penicillin allergy” have negative skin tests and can be given penicillin safely. The other 10% with positive skin tests have an increased risk of being truly penicillin-allergic and should undergo desensitization.
- Four determinants, along with positive and negative controls, can be placed and read in an hour.
- Patients who have had a severe, life-threatening reaction in the past year should be tested in a controlled environment, such as a hospital setting, and the determinant antigens diluted 100-fold.
- Other patients can be skin-tested safely in a physician-staffed clinic.
- Patients with a history of penicillin allergy but with no reaction to penicillin skin tests, who are not on antihistamines and who had a positive histamine control on skin testing should be given **penicillin**, 250 mg orally, and observed for one hour. Patients who tolerate this dose well may be treated with penicillin as needed.

Desensitization

Patients who have a positive skin test to one of the penicillin determinants can be desensitized. This is a straightforward, relatively safe procedure. Although the procedure can be done orally or intravenously, oral desensitization is thought to be safer, simpler, and easier. Desensitization should be done in a hospital setting because serious IgE-mediated allergic reaction, although unlikely, can occur. Desensitization can be completed in 4 hours, after which the first dose of penicillin is given (Table 15). STD programs should have a referral center where patients with positive skin tests can be desensitized. After desensitization, patients must be maintained on penicillin for the duration of therapy (for details of Penicillin desensitization, consult any standard Textbook of Medicine).

Testing Procedure

- *Epicutaneous (scratch or prick) test:* apply one drop of material to volar forearm and pierce epidermis without drawing blood; observe for 20 minutes. If there is no wheal >4 mm, proceed to intradermal test.
- *Intradermal test:* inject 0.02 ml intradermally with a 27-gauge short-beveled needle; observe for 20 minutes.

Interpretation
For the test to be interpretable, the negative (saline) control must elicit no reaction and the positive (histamine) control must elicit a positive reaction.

- Positive test: a wheal >4 mm in mean diameter to any penicillin reagent; erythema must be present.
- Negative test: the wheals at the site of the penicillin reagents are equivalent to the negative control.
- Indeterminate: all other results.

Table 15 Oral desensitization protocol (from Wendel)

Dose*	Penicillen V Suspension (Units/MI)	Amount** MI	Units	**Cumulative Dose(units)**
1	1,000	0.1	100	**100**
2	1,000	0.2	200	**300**
3	1,000	0.4	400	**700**
4	1,000	0.8	800	**1,500**
5	1,000	1.6	1,600	**3,100**
6	1,000	3.2	3,200	**6,300**
7	1,000	6.4	6,400	**12,700**
8	10,000	1.2	12,000	**24,700**
9	10,000	2.4	24,000	**48,700**
10	10,000	4.8	48,000	**96,700**
11	80,000	1.0	80,000	**176,700**
12	80,000	2.0	160,000	**336,700**
13	80,000	4.0	320,000	**656,700**
14	80,000	8.0	640,000	**1,296,700**

Observation period: 30 minutes before parental administration of penicillin.

*Interval between doses, 15 minutes; elapsed time, 3 hours and 45 minutes; cumulative dose, 1.3 million units.

**The specific amount of drug was diluted in approximately 30 ml of water and then given orally.

Adapted with permission from the Journal of Medicine: Wendel GD Jr, Stark BJ, Jumison RB, Molina RD, Sullivan TJ. Penicillin allergy and desensitization in serious infections during pregnancy. New England J Med1985;312:1229-32. (Level III)

LYMPHOGRANULOMA VENEREUM

Lymphogranuloma venereum (LGV), a rare disease in the United States, is caused by serovars L1, L2, or L3 of *C. trachomatis*. The most common clinical manifestation of LGV among heterosexuals is tender inguinal lymphadenopathy that is most commonly unilateral. Women and homosexually active men may have proctocolitis or inflammatory involvement of perirectal or perianal lymphatic tissues resulting in fistulas and strictures. When patients seek care, most no longer have the self-limited genital ulcer that sometimes occurs at the site of inoculation. The diagnosis is usually made serologically and by exclusion of other causes of inguinal lymphadenopathy or genital ulcers.

Treatment

Treatment cures infection and prevents ongoing tissue damage, although tissue reaction can result in scarring. Buboes may require aspiration or incision and drainage through intact skin. Doxycycline is the preferred treatment.

Recommended Regimen

Doxycycline 100 mg orally 2 times a day for 21 days.

Alternative Regimen

Erythromycin base 500 mg orally 4 times a day for 21 days .

NOTE: Pregnant and lactating women should be treated with the erythromycin regimen.

Management of Sex Partners

Sex partners of patients who have LGV should be examined, tested for urethral or cervical chlamydial infection, and treated if they had sexual contact with the patient during the 30 days preceding onset of symptoms in the patient.

GENITAL HERPES SIMPLEX VIRUS (HSV) INFECTIONS

Genital herpes (HSV) is a viral disease that may be recurrent and has no cure. Two serotypes of HSV have been identified; HSV-1 and HSV-2: most cases of genital herpes are caused by HSV-2. On the basis of serologic studies, approximately 30 million persons in the United States may have genital HSV infection.

Most infected persons never recognize signs suggestive of genital herpes: some will have symptoms shortly after infection and then never again. A minority of the total infected U.S. population will have recurrent episodes of genital lesions. Some cases of first clinical episode genital herpes are manifested by extensive disease that requires hospitalization. Many cases of genital herpes are acquired from persons who do not know that they have a genital infection with HSV or who were asymptomatic at the time of the sexual contact.

Randomized trials show that systemic acyclovir provides partial control of the symptoms and signs of herpes episodes when used to treat first clinical episodes, or when used as suppressive therapy. However, acyclovir neither eradicates latent virus nor affects subsequent risk, frequency, or severity of recurrences after administration of the drug is discontinued. Topical therapy with acyclovir is substantially less effective than the oral drug and its use is discouraged. Episodes of HSV infection among HIV-

infected patients may require more aggressive therapy. Immunocompromised persons may have prolonged episodes with extensive disease. For these persons, infections caused by acyclovir-resistant strains require selection of alternate antiviral agents.

Clinical Manifestations

- Vesicular lesions may occur on the cervix, vagina, and vulva. The lesions will eventually break down and become ulcerated.
- Primary infection: A wide range of symptoms may occur, including fever, malaise, anorexia, local lymphadenopathy, viremia and meningitis.
- Recurrent infection: Symptoms are generally less severe, manifesting with only local genital involvement.
- Acute urinary retention may occur with urethral involvement.

Obstetric Management Principles

Although no single management protocol will prove satisfactory for all pregnant women with genital HSV infections or a history of such infections, current recommendations for pregnant women with HSV infections include the following:

- Cultures should be done when a woman has active HSV lesions during pregnancy to confirm the diagnosis. If there are **NO** visible genital lesions at the onset of labor, vaginal delivery is acceptable.
- Weekly surveillance genital cultures of pregnant women with a history of HSV infection, but **NO** visible lesions, are **NOT** necessary and vaginal delivery is acceptable.
- Amniocentesis in an attempt to rule out intrauterine infection is NOT recommended for mothers with HSV infection at any stage of gestation.
- Abdominal delivery of women with active infection, especially primary infection, will significantly reduce the risk and incidence of neonatal HSV infection. Cesarean delivery, however, will **NOT** prevent all cases of neonatal infection.
- Breast-feeding may be allowed with careful hand-washing and appropriate precautions to avoid contact with active lesions.

Therapy

Recommended Regimen for the First Clinical Episode of Genital Herpes

Acyclovir 400 mg orally 3 times a day for 7-10 days

OR

Acyclovir 200 mg orally 5 times a day for 7-10 days,

OR

Famciclovir 250 mg orally 3 times a day for 7-10 days,

OR

Valacyclovir 1 g orally 2 times a day for 7-10 days

When treatment is instituted during the prodrome or within 1 day after onset of lesions, many patients with recurrent disease experience benefit from episodic therapy.

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 Regimens for Episodic Recurrent Infection

Acyclovir 400 mg orally 3 times a day for 5 days, or

Acyclovir 200 mg orally 5 times a day for 5 days, or

Acyclovir 800 mg orally 2 times a day for 5 days, or

Famciclovir 125 mg orally 2 times a day for 5 days, or

Valacyclovir 500 mg orally 2 times a day for 5 days

Daily Suppressive Therapy

Daily suppressive therapy reduces frequency of recurrences by at least 75% among patients with frequent recurrences (i.e., six or more recurrences per year). Suppressive treatment with oral acyclovir does not totally eliminate symptomatic viral shedding or the potential for transmission. After 1 year of continuous suppressive therapy, acyclovir should be discontinued to allow assessment of the patient's rate of recurrent episodes

Recommended Regimens for Daily Suppressive Therapy

Acyclovir 400 mg orally 2 times a day

OR

Famciclovir 250 mg 2 times a day

OR

Valacyclovir 500 mg orally once a day

OR

Valacyclovir 1,000 mg orally once a day

Severe Disease

Intravenous (IV) therapy should be provided for patients with severe disease or complications necessitating hospitalization (e.g., disseminated infection that includes encephalitis, pneumonitis, or hepatitis).

Recommended Regimen

Acyclovir 5-10 mg/kg body weight IV every 8 hours for 5-7 days or until clinical resolution is attained.

Other Management Considerations

- Patients should be advised to abstain from sexual activity while lesions are present.
- Patients with genital herpes should be told about the natural history of the disease, with

emphasis on the potential for recurrent episodes, asymptomatic viral shedding, and sexual transmission. Sexual transmission of HSV has been documented to occur during periods without evidence of lesions. Many cases are transmitted during such asymptomatic periods.

- The use of condoms should be encouraged during all sexual exposures. The risk for neonatal infection should be explained to all patients—male and female—with genital herpes. Women of childbearing age who have genital herpes should be advised to inform health-care providers who care for them during pregnancy about their HSV infection.

Counseling and Management of Sex Partners

Sex partners of patients who have genital herpes are likely to benefit from evaluation and counseling. Symptomatic sex partners should be managed in the same manner as any patient with genital lesions. However, the majority of persons with genital HSV infection do not have a history of typical genital lesions. These asymptomatic persons may benefit from evaluation and counseling; thus, even asymptomatic partners should be queried about histories of typical and atypical lesions and encouraged to examine themselves for lesions in the future.

Special Considerations

HIV-Infected Patients

- Lesions caused by HSV are relatively common among patients infected with HIV. Intermittent or suppressive therapy with oral acyclovir may be needed.
- The acyclovir dosage for HIV-infected persons is controversial, but experience strongly suggests that immunocompromised patients benefit from increased dosage. Regimens such as 400 mg orally 3-5 times a day have been found useful. Therapy should be continued until clinical resolution is attained.
- For severe disease, IV acyclovir therapy may be required. If lesions persist among patients undergoing acyclovir treatment, resistance to acyclovir should be suspected. These patients should be managed in consultation with an expert. For severe disease because of proven or suspected acyclovir-resistant strains, hospitalization should be considered. Foscarnet, 40 mg/kg body weight IV q 8 hours until clinical resolution is attained, appears to be the best available treatment.

Acyclovir in Pregnancy

The safety of systemic acyclovir and valacyclovir therapy in pregnant women has not been established. Glaxo-Wellcome, Inc., in cooperation with CDC, maintains a registry to assess the effects of the use of acyclovir during pregnancy. Women who receive acyclovir during pregnancy should be reported to this registry (888-825-5249 X39441).

Current registry findings do not indicate an increase in the number of birth defects identified among prospective reports when compared with those expected in the general population. Moreover, no consistent pattern of abnormalities emerges among retrospective reports. These findings provide some assurance in counseling women who have had inadvertent prenatal exposure to acyclovir.

In the presence of life-threatening maternal HSV infection (e.g., disseminated infection that includes encephalitis, pneumonitis, or hepatitis), acyclovir administered IV is indicated. Among pregnant women without life-threatening disease, systemic acyclovir should not be used to treat recurrences nor should it be used as suppressive therapy near term (or at other times during pregnancy) to prevent reactivation.

Perinatal Infection

Most mothers of infants who acquire neonatal herpes lack histories of clinically evident genital herpes. The risk of transmission to the neonate from an infected mother appears highest among women with first episode genital herpes near the time of delivery (30-50%) and is low (<3%) among women with recurrent herpes. The results of viral cultures during pregnancy do not predict viral shedding at the time of delivery, and such cultures are **not** routinely indicated.

At the onset of labor, all women should be carefully questioned about symptoms of genital herpes and should be examined. Women without symptoms or signs of genital herpes infection (or prodrome) may deliver their babies vaginally. Among women who have a history of genital herpes, or who have a sex partner with genital herpes, cultures of the birth canal at delivery may be helpful in decisions relating to neonatal management.

Infants delivered through an infected birth canal (proven by virus isolation or presumed by observation of lesions) should be followed carefully, including virus cultures obtained 24-48 hours after birth. Available data do not support the routine use of acyclovir as anticipatory treatment for asymptomatic infants delivered through an infected birth canal. Treatment should be reserved for infants who develop evidence of clinical disease and for those with positive postpartum cultures.

All infants with evidence of neonatal herpes should be treated with systemic acyclovir. Acyclovir (30-60 mg/kg/day for 10-21 days) is the regimen of choice. The care of these infants should be managed in consultation with an infectious disease expert.

VI. INFECTIONS OF EPITHELIAL SURFACES

GENITAL WARTS (Human Papillomavirus, HPV)

Exophytic genital and anal warts are benign growths most commonly caused by HPV types 6 or 11. Other types that may be present in the anogenital region (e.g., types 16, 18, 31 33, and 35) have been strongly associated with genital dysplasia and carcinoma. These types are usually associated with subclinical infection, but occasionally are found in exophytic warts.
Some subclinical HPV infections may be detected by Pap smear and colposcopy. Application of acetic acid may also indicate otherwise subclinical lesions, but false-positive tests occur. Tests for the detection of HPV-DNA are now widely available. The clinical use of these tests in managing individual patients is not known. Therefore, therapeutic decisions should not be made on the basis of these HPV-DNA tests.

No therapy has been shown to eradicate HPV. HPV has been demonstrated in adjacent tissue after laser treatment of HPV-associated cervical intraepithelial neoplasia and after attempts to eliminate subclinical HPV by extensive laser vaporization of the anogenital area. The benefit of treating patients with subclinical HPV infection has not been demonstrated, and recurrence is common. The effect of genital wart treatment on HPV transmission and the natural history of HPV is unknown. **Therefore, the goal of treatment is removal of exophytic warts and the amelioration of signs and symptoms, not the eradication of HPV.**

Expensive therapies, toxic therapies, and procedures that result in scarring should be avoided. Sex partners should be examined for evidence of warts. Patients with anogenital warts should be made aware that they are contagious to uninfected sex partners. The use of condoms is recommended to help reduce transmission.

In most clinical situations, cryotherapy with liquid nitrogen or cryoprobe is the treatment of choice for external genital and perianal warts. Cryotherapy is nontoxic, does not require anesthesia, and if used properly does not result in scarring. Podophyllin, trichloroacetic acid (TCA), and

electrodesiccation/electrocautery are alternative therapies. Treatment with interferon is not recommended because of its relatively low efficacy, high incidence of toxicity, and high cost.

The carbon dioxide laser and conventional surgery are useful in the management of extensive warts, particularly for patients who have not responded to cryotherapy; these alternatives are not appropriate for limited lesions. Like more cost-effective treatments, these therapies do not eliminate HPV, and often are associated with the recurrence of clinical cases.

Pregnant Patients and Perinatal Infections

- The use of podophyllin and podofilox are **CONTRAINDICATED** during pregnancy.
- Genital papillary lesions have a tendency to proliferate and to become friable during pregnancy. Many experts advocate removal of visible warts during pregnancy, although data on this subject are limited.
- Cesarean delivery for prevention of transmission of HPV infection to the newborn is **not** indicated. In rare instances, however, cesarean delivery may be indicated for women with genital warts if the pelvic outlet is obstructed or if vaginal delivery would result in excessive bleeding.
- HPV types 6 and 11 can cause laryngeal papillomatosis in infants. The route of transmission (transplacental, birth canal, or postnatal) is unknown, and laryngeal papillomatosis has occurred among infants delivered by cesarean section. Hence, the preventive value of cesarean delivery is unknown. The perinatal transmission rate is also unknown although it must be very low, given the relatively high prevalence of genital warts
  and the rarity of laryngeal papillomas. Neither routine HPV screening tests nor cesarean delivery is indicated to prevent transmission of HPV infection to the newborn.

Treatment Recommendations

External Genital/Perianal Warts: Recommended Regimen

Patient-Applied:

Podofilox 0.5% solution or gel. Patients may apply podofilox solution with a cotton swab, or podofilox gel with a finger, to visible genital warts twice a day for 3 days, followed by 4 days of no therapy. This cycle may be repeated as necessary for a total of four cycles. The total wart area should not exceed 10 cm2, and a total volume of podofilox should not exceed 0.5 mL per day. The safety of podofilox in pregnancy has NOT been established.

OR

Imiquimod 5% cream. Patients should apply imiquimod cream with a finger at bedtime, three times a week for as long as 16 weeks. The treatment area should be washed with mild soap and water 6-10 hours after the application. The safety of imiquimod during pregnancy has NOT been established.

Provider-Administered:

Cryotherapy with liquid nitrogen or cryoprobe. Repeat applications every 1-2 weeks.

OR

Podophyllin resin 10-25% in compound tincture of benzoin. A small amount should be applied to each wart and allowed to air dry. Application should be limited to <0.5 mL of podophyllin or < 10 cm2 of warts per session. Some experts suggest that the preparation should be thoroughly washed off 1-4 hours after application to reduce local irritation.

Repeat weekly if necessary. The safety of podophyllin in pregnancy has NOT been established.

OR

TCA or BCA 80%-90%. Apply a small amount only to warts and allow to dry, at which time a white "frosting" develops; powder with talc or sodium bicarbonate (i.e. baking soda) to remove unreacted acid if an excess amount is applied. Repeat weekly if necessary.

OR

Surgical removal either by tangential scissor excision, tangential shave excision, curettage, or electrosurgery.

Alternative Regimens

Intralesional interferon,

OR

Laser surgery.

Cervical Warts:

For women who have exophytic cervical warts, high-grade squamous intraepithelial lesions (SIL) must be excluded before treatment is begun. Management of exophytic cervical warts should include consultation with an expert.

Vaginal Warts: Recommended Regimen

Cryotherapy with liquid nitrogen. Note, the use of a cryoprobe in the vagina is **not** recommended because of the risk of vaginal perforation and fistula formation.

OR

Trichloroacetic acid (80%-90%). Apply only to warts; powder with talc or sodium bicarbonate (baking soda) to remove unreacted acid. Repeat application at weekly intervals.

OR

Podophyllin 10%-25% in compound tincture of benzoin. Treatment area must be dry before speculum is removed. Treat <2 cm2 per session. Repeat application at weekly intervals. **Contraindicated in pregnancy**. Extensive or refractory disease should be referred to an expert.

Urethral Meatus Warts: Recommended Regimen

Cryotherapy with liquid nitrogen.

OR

Podophyllin 10%-25% in compound tincture of benzoin. Treatment area must be dry before contact with normal mucosa, and podophyllin must be washed off in 1-2 hours. **Contraindicated in pregnancy.** Extensive or refractory disease should be referred to an expert.

Anal Warts: Recommended Regimen

Cryotherapy with liquid nitrogen. Extensive or refractory disease should be referred to an expert.

OR

Trichloroacetic acid (180%-90%).

OR

Surgical removal.

Oral Warts: Recommended Regimen

Cryotherapy with liquid nitrogen.

OR

Surgical removal. Extensive or refractory disease should be referred to an expert.

Follow-Up

After warts have responded to therapy, follow-up is not necessary. Annual cytologic screening is recommended for women with or without genital warts. The presence of genital warts is not an indication for colposcopy.

Management of Sex Partners

Examination of sex partners is not necessary for management of genital warts because the role of reinfection is probably minimal. The use of condoms may reduce transmission to partners likely to be uninfected, such as new partners; however, the period of communicability is unknown. Experts speculate that HPV infection may persist throughout a patient's lifetime in a dormant state and become infectious intermittently. Whether patients with subclinical HPV infection are as contagious as patients with exophytic warts is unknown.

VII. GONOCOCCAL AND CHLAMYDIAL INFECTIONS

Treatment of **gonococcal** infections in the United States is influenced by the following trends:

- The spread of infections due to antibiotic-resistant *N. gonorrhea*, including penicillinase-producing *N. gonorrhea* (PPNG), tetracycline resistant *N. gonorrhea* (TRNG), and strains with chromosomally mediated resistance to multiple antibiotics.
- The high frequency of chlamydial infections in persons with gonorrhea.
- Recognition of the serious complications of chlamydial and gonococcal infections.
- The absence of a fast, inexpensive, and highly accurate test for chlamydial infection.

All gonorrhea cases should be diagnosed or confirmed by culture to facilitate antimicrobial

susceptibility testing. The susceptibility of *N. gonorrhea* to antibiotics is likely to change over time in any locality. Therefore, gonorrhea control programs should include a system of regular antibiotic sensitivity testing of a surveillance sample of *N. gonorrhea* isolates as well as all isolates associated with treatment failure.

Treatment of Gonorrhea in Adults

Uncomplicated Urethral, Endocervical, or Rectal Infections

Single-dose efficacy is a major consideration in choosing an antibiotic regimen to treat persons infected with *N. gonorrhea*. Another important concern is coexisting chlamydial infection, documented in up to 45% of gonorrhea cases in some populations. Until universal testing for chlamydia with quick, inexpensive, and highly accurate tests becomes available, persons with gonorrhea should also be treated for presumptive chlamydial infections. Generally, patients with gonorrhea infections should be treated simultaneously with antibiotics effective against both *C. trachomatis* and *N. gonorrhea*.

Recommended Regimen

Ceftriaxone 125 mg IM in a single dose,

OR

Cefixime 400 mg orally in a single dose,

OR

Ciprofloxacin 500 mg orally in a single dose,

OR

Ofloxacin 400 mg orally in a single dose,

PLUS

Azithromycin 1 g orally in a single dose,

OR

Doxycycline 100 mg orally 2 times a day for 7 days.

Alternative Regimens

- **Spectinomycin** 2 g IM in a single dose. Spectinomycin has the disadvantages of being injectable, expensive, inactive against *T. pallidum*, and relatively ineffective against pharyngeal gonorrhea. In addition, resistant strains have been reported in the United States. However, spectinomycin remains useful for the treatment of patients who can tolerate neither cephalosporins nor quinolones.
- **Injectable cephalosporin** regimens other than ceftriaxone 125 mg that have demonstrated efficacy against uncomplicated anal or genital gonococcal infections include these injectable cephalosporins: ceftizoxime 500mg IM in a single dose; cefotetan 1 g IM in a single dose; and cefoxitin 2 g IM in a single dose. None of these injectable cephalosporins offers any advantage compared with ceftriaxone, and there is less clinical experience with them for the treatment of uncomplicated gonorrhea.
- **Oral cephalosporin regimens** other than cefixime 400 mg include cefuroxime axetil 1 g orally in a single dose and cefpodoxime proxetil 200 mg orally in a single dose. These two regimens have anti-gonococcal activity and pharmacokinetics less favorable than the 400 mg cefixime regimen,

and there is less clinical experience with them in the treatment of gonorrhea. They have not been very effective against pharyngeal infections among the few patients studied.

- Single-dose **quinolone** regimens include enoxacin 400 mg orally; lomefloxacin 400 mg orally ; and norfloxacin 800 mg orally. These regimens appear to be safe and effective for the treatment of uncomplicated gonorrhea, but none appears to offer any advantage over ciprofloxacin at a dose of 500 mg or ofloxacin at 400 mg.

  Note that quinolones, such as ciprofloxacin and norfloxacin, are contraindicated during pregnancy and in children 16 years of age or younger.

Follow-Up

Persons who have uncomplicated gonorrhea and who are treated with any of the regimens in these guidelines need not return for a test-of-cure. Those persons with symptoms persisting after treatment should be evaluated by culture for *N. gonorrhea*, and any gonococci isolated should be tested for antimicrobial susceptibility. Infections detected after treatment with one of the recommended regimens more commonly occur because of reinfection rather than treatment failure, indicating a need for improved sex partner referral and patient education. Persistent urethritis, cervicitis, or proctitis also may be caused by *C. trachomatis* and other organisms.

Management of Sex Partners

- Patients should be instructed to refer sex partners for evaluation and treatment. Sex partners of symptomatic patients who have *N. gonorrhea* infection should be treated for *N. gonorrhea* and *C. trachomatis* infections if their last sexual contact with the patient was within 30 days of onset of the patient's symptoms. If the index patient is asymptomatic, sex partners whose last sexual contact with the patient was within 60 days of diagnosis should be evaluated and treated.
- Patients should be instructed to avoid sexual intercourse until patient and partner(s) are cured (i.e., until therapy is completed and patient and partner(s) are without symptoms).

Special Considerations in the Treatment of Gonorrhea

- All patients with gonorrhea should have a serologic test for syphilis and should be offered confidential counseling and testing for HIV infection. Most patients with incubating syphilis (those who are seronegative and have no clinical signs of syphilis) may be cured by any of the regimens containing beta-lactams (e.g., ceftriaxone) or tetracyclines.
- Spectinomycin and the quinolones (ciprofloxacin, norfloxacin) have not been shown to be active against incubating syphilis. Patients treated with these drugs should have a serologic test for syphilis in 1 month.
- Patients with gonorrhea and documented syphilis and gonorrhea patients who are sex partners of syphilis patients should be treated for syphilis (see "Syphilis") as well as for gonorrhea.
- Some practitioners report that mixing 1% lidocaine (without epinephrine) with ceftriaxone reduces the discomfort associated with the injection (see package insert).

Recommended Regimen for Treatment of Gonococcal Infections in Pregnancy

Pregnant women should be cultured for *N. gonorrhea* and tested for syphilis and possible chlamydia at the first prenatal-care visit. For women at high risk of STD, a second culture for gonorrhea (as well as tests for chlamydia and syphilis) should be obtained late in the third trimester.

Ceftriaxone 250 mg IM once,

PLUS

Erythromycin base 500 mg orally 4 times a day for 7 days.

Pregnant women allergic to beta-lactams should be treated with Spectinomycin 2 g IM once, followed by erythromycin. Follow-up cervical and rectal cultures for N. gonorrhea should be obtained 4-7 days after treatment is completed. Ideally, pregnant women with gonorrhea should be treated for chlamydia on the basis of chlamydial diagnostic studies. If chlamydial diagnostic testing is not available, treatment for chlamydia should be given. Tetracyclines (including doxycycline) and the quinolones are contraindicated in pregnancy because of possibly adverse effects on the fetus.

Recommended Initial Inpatient Regimens for Disseminated Gonococcal Infection (DGI)

Hospitalization is recommended, especially for patients who cannot reliably comply with treatment, have uncertain diagnoses, or have purulent synovial effusions or other complications. Patients should be evaluated for clinical evidence of endocarditis or meningitis.

Ceftriaxone 1g, IM or IV, every 24 hours.

Alternative Initial Regimens

- **Ceftizoxime** 1g, IV, every 8 hours, or **cefotaxime** 1g, IV, every 8 hours.
- Patients who are allergic to beta-lactam drugs should be treated with **Spectinomycin** 2g IM every 12 hours.

All regimens should be continued for 24-48 hours after improvement begins; then therapy may be switched to one of the following regimens to complete a full week of antimicrobial therapy:

- **Cefixime** 400 mg orally 2 times a day.
- **Ciprofloxacin** 500 mg orally 2 times a day.

Ciprofloxacin is contraindicated for children, adolescents <18 years of age, and pregnant and lactating women.

Pharyngeal Gonococcal Infection

Patients with uncomplicated pharyngeal gonococcal infection should be treated with **ceftriaxone** 250 mg IM once. Patients who cannot be treated with ceftriaxone should be treated with **ciprofloxacin** 500 mg orally as a single dose. Since experience with this regimen is limited, such patients should be evaluated with repeat culture 4-7 days after treatment.

Meningitis and Endocarditis

Meningitis and endocarditis caused by *N. gonorrhea* require high-dose IV therapy with an agent effective against the strain causing the disease, such as **ceftriaxone** 1-2 g IV every 12 hours. Optimal duration of therapy is unknown, but most authorities treat patients with gonococcal meningitis for 10-14 days and with

gonococcal endocarditis for at least 4 weeks. Patients with gonococcal nephritis, endocarditis or meningitis, or recurrent DGI should be evaluated for complement deficiencies. Treatment of complicated DGI should be undertaken in consultation with an expert.

Adult Gonococcal Ophthalmia

Adults and children over 20 kg with non-septicemic gonococcal ophthalmia should be treated with **ceftriaxone** 1g IM once. Irrigation of the eyes with saline or buffered ophthalmic solutions may be useful adjunctive therapy to eliminate discharge. All patients must have careful ophthalmologic assessment, including slit-lamp examination for ocular complications.

Gonococcal Infections of Infants and Children

Child abuse should be carefully considered and evaluated (see "Sexual Assault and Abuse of Children") for any child with documented gonorrhea.

Prophylactic Treatment of Infants Born to Mothers with Gonococcal Infection

- Infants born to mothers with untreated gonorrhea are at high risk of infection (e.g., ophthalmia and DGI) and should be treated with a single injection of **ceftriaxone** (25-50 mg/kg IV or IM, not to exceed 125 mg). Ceftriaxone should be given cautiously to hyperbilirubinemic infants, especially premature infants. Topical prophylaxis for neonatal ophthalmia is **not** adequate treatment for *documented* infections of the eye or other sites.
- If simultaneous infection with *C. trachomatis* has been reported, mother and infant should be tested for chlamydial infection.
- For infants receiving *prophylactic* treatment, follow-up examination is not required.

Recommended Regimen for Treatment of Infants with Disseminated Gonococcal Infection (DGI)

Infants with documented gonococcal infections at any site (e.g., eye) should be evaluated for DGI. This evaluation should include a careful physical examination, especially of the joints, as well as blood and CSF cultures. Infants with gonococcal ophthalmia or DGI should be treated for 7 days (10 to 14 days if meningitis is present) with one of the following regimens.

Ceftriaxone 25-50 mg/kg/day IV or IM in a single daily dose for 7 days, 10-14 days if meningitis is documented,

OR

Cefotaxime 25 mg/kg IV or IM every 12 hours for 7 days, 10-14 days if meningitis is documented.

Recommended Regimen for Prevention of Ophthalmia Neonatorum

Instillation of a prophylactic agent into the eyes of all newborn infants is recommended to prevent gonococcal ophthalmia neonatorum and is required by law in most states. Although all regimens listed below effectively prevent gonococcal eye disease, their efficacy in preventing chlamydial eye disease is not clear. Furthermore, they do not eliminate nasopharyngeal colonization with *C. trachomatis*. Treatment of gonococcal and chlamydial infections in pregnant women is the best method for preventing neonatal gonococcal and chlamydial disease.

Erythromycin (0.5%) ophthalmic ointment, once

OR

Tetracycline (1%) ophthalmic ointment, once

OR

Silver nitrate (1%) aqueous solution, once.

One of these should be instilled into the eyes of every neonate as soon as possible after delivery, and definitely within 1 hour after birth. Single-use tubes or ampoules are preferable to multiple-use tubes. Bacitracin is **NOT** recommended.

CHLAMYDIAL INFECTIONS

Chlamydial genital infection occurs frequently among adolescents and young adults in the United States. Common clinical presentations include Mucopurulent Cervicitis, Urethritis, Nongonoccal Urethritis, and Neonatal Conjunctivitis and Pneumonitis. Asymptomatic infection is common among both men and women. Screening of young adult women 20-24 years of age is suggested, particularly for those who do not consistently use barrier contraceptives and who have new or multiple sexual partners.

- Among women several important sequelae may result from *C. trachomatis* infection, the most serious being PID, ectopic pregnancy, and infertility. Some women with apparently uncomplicated cervical infection already have subclinical upper reproductive tract infection. Treatment of cervical infection is believed to reduce the likelihood of sequelae, although few studies have demonstrated that antimicrobial therapy reduces the risk of subsequent ascending infections or decreases the incidence of long-term complications of tubal infertility and ectopic pregnancy.
- Treatment of infected patients prevents transmission to sex partners, and for infected pregnant women may prevent transmission of *C. trachomatis* to infants during birth. Treatment of sex partners will help to prevent re-infection of the index patient and infection of other partners.
- Because of the high prevalence of co-infection with *C. trachomatis* among patients with gonococcal infection, presumptive treatment for chlamydia of patients being treated for gonorrhea is appropriate, particularly if no diagnostic test for *C. trachomatis* infection will be performed.

Recommended Regimen for Treatment of Uncomplicated Urethral, Endocervical, or Rectal *C. trachomatis* Infections

Doxycycline 100 mg orally 2 times a day for 7 days,

OR

Azithromycin 1 g orally in a single dose.

Alternative Regimens

Ofloxacin 300 mg orally 2 times a day for 7 days. (Contraindicated in Pregnancy)

OR

Erythromycin base 500 mg orally 4 times a day for 7 days.

OR

Erythromycin ethylsuccinate 800 mg orally 4 times a day for 7 days.

Follow-Up

Patients do not need to be retested for chlamydia after completing treatment with doxycycline or azithromycin unless symptoms persist or re-infection is suspected.

Management of Sex Partners

- Sex partners of patients who have *C. trachomatis* infection should be tested and treated for *C. trachomatis* if their last sexual contact with the index patient was within 30 days of onset of the index patient's symptoms. If the index patient is asymptomatic, sex partners whose last sexual contact with the index patient was within 60 days of diagnosis should be evaluated and treated.
- Patients should be instructed to avoid sex until they and their partners are cured as documented by test-of-cure or until therapy is completed and patient and partner(s) are without symptoms.

Recommended Regimen for Treatment of C. trachomatis in Pregnancy

Pregnant women should undergo diagnostic testing for *C. trachomatis*, *N. gonorrhea*, and syphilis, if possible, at their first prenatal visit and, for women at high risk, during the third trimester. Risk factors for chlamydial disease during pregnancy include young age (<25 years), past history or presence of other STD, a new sex partner within the preceding 3 months, and multiple sex partners. Ideally, pregnant women with gonorrhea should be treated for chlamydia on the basis of diagnostic studies, but if chlamydial testing is not available, treatment should be given because of the high likelihood of co-infection.

Erythromycin base 500 mg orally 4 times a day for 7 days.

OR

Amoxacillin 500 mg orally 3 times a day for 7 days

Alternative Regimens

Erythromycin base 250 mg orally 4 times a day for 14 days,

OR

Erythromycin ethylsuccinate 800 mg orally 4 times a day for 7 days,

OR

Erythromycin ethylsuccinate 400 mg orally 4 times a day for 14 days,

OR

Azithromycin 1 g orally in a single dose.

NOTE: Erythromycin estolate is contraindicated during pregnancy because of drug-related hepatoxicity. Few data exist concerning the efficacy of amoxacillin.

MUCOPURULENT CERVICITIS

Mucopurulent cervicitis (MPC) is characterized by a yellow endocervical exudate and increased polymorphonuclear leukocytes on cervical Gram stain. The condition is asymptomatic among many women, but some may experience an abnormal vaginal discharge and abnormal vaginal bleeding (e.g., following intercourse). The condition can be caused by *C. trachomatis* or *N. gonorrhea*, although in most cases neither organism can be isolated.

Recommended Regimen for Treatment of Mucopurulent Cervicitis:

- If *N. gonorrhea* is found on Gram stain or culture of endocervical or urethral discharge, treatment should be the same as that recommended for uncomplicated gonorrhea in adults, including co-treatment for chlamydial infection.
- If *N. gonorrhea* is not found, treatment should be the same as that recommended for chlamydial infection in adults.

Management of Sex Partners of women with MPC should be appropriate for the STD (*C. trachomatis* or *N. gonorrhea*) identified. Partners should be notified, examined, and treated on the basis of test results.

PELVIC INFLAMMATORY DISEASE

Pelvic inflammatory disease (PID) comprises a spectrum of inflammatory disorders of the upper genital tract among women and may include any combination of endometritis, salpingitis, tubo-ovarian abscess, and pelvic peritonitis. Sexually transmitted organisms, especially *N. gonorrhea* and *C. trachomatis*, are implicated in the majority of cases; however, endogenous organisms that can be part of the vaginal flora, such as anaerobes, *G. vaginalis*, *H. influenzae*, enteric Gram-negative rods, and *Streptococcus agalactiae* also can cause PID. Some experts believe that *M. hominis* and *U. urealyticum* are also potential etiologic agents.

Diagnostic Considerations

Because of the wide variation in many symptoms and signs among women with this condition, a clinical diagnosis of acute PID is difficult. The following recommendations for diagnosing PID are intended to help health-care providers recognize when PID should be suspected and when they need to obtain additional information to increase diagnostic certainty. These recommendations are based in part on the fact that diagnosis and management of other common causes of lower abdominal pain (e.g., ectopic pregnancy, acute appendicitis, and functional pain) are unlikely to be impaired by initiating empiric antimicrobial therapy for PID.

Minimum Criteria

Empiric treatment of PID should be instituted on the basis of the presence of *all of the following three minimum clinical criteria* for pelvic inflammation and in the absence of an established cause other than PID:

- Lower abdominal tenderness
- Adnexal tenderness
- Cervical motion tenderness

Additional Criteria

For women with severe clinical signs, more elaborate diagnostic evaluation is warranted because incorrect diagnosis and management may cause unnecessary morbidity. These additional criteria may be used to increase the specificity of the diagnosis.

- Oral temperature >38.3 C (>101 F)
- Abnormal cervical or vaginal discharge
- Elevated erythrocyte sedimentation rate
- Elevated C-reactive protein
- Laboratory documentation of cervical infection with *N. gonorrhea* or *C. trachomatis*

- Histopathologic evidence of endometritis on endometrial biopsy
- Tubo-ovarian abscess on sonography or other imaging techniques
- Laparoscopic abnormalities consistent with PID

Treatment

Selection of a treatment regimen must consider institutional availability, cost-control efforts, patient acceptance, and regional differences in antimicrobial susceptibility. PID therapy regimens must provide empiric, broad-spectrum coverage of likely pathogens. No single treatment regimen has been established for persons with PID.

Many experts recommend that all patients with PID be hospitalized so that supervised treatment with parenteral antibiotic can be initiated. **HOSPITALIZATION** is especially recommended when the following criteria are met:

- The diagnosis is uncertain, and surgical emergencies such as appendicitis and ectopic pregnancy cannot be excluded.
- Pelvic abscess is suspected.
- The patient is pregnant.
- The patient is immunodeficient (i.e. has HIV infection with low CD4 counts, is taking immunosuppressive therapy; or has another disease).
- The patient has a severe illness, nausea and vomiting, or a high fever.
- The patient is unable to follow or tolerate an outpatient regimen.
- The patient has failed to respond clinically to outpatient therapy.
- Clinical follow-up within 72 hours of starting antibiotic treatment cannot be arranged.

Parenteral Regimen A

Cefoxitin 2 g IV every 6 hours,

OR

Cefotetan 2 g IV every 12 hours,

PLUS

Doxycycline 100 mg IV or orally every 12 hours.

NOTE: This regimen should be continued for at least 48 hours after the patient demonstrates substantial clinical improvement, after which doxycycline 100 mg orally 2 times a day should continue for a total of 14 days.

Parenteral Regimen B

Clindamycin 900 mg IV every 8 hours,

PLUS

Gentamicin loading dose IV or IM (2 mg/kg) **followed by** a maintenance dose (1.5 mg/kg) every 8 hours. Single daily dosing may be substituted.

NOTE: This regimen should be continued for at least 24 hours after the patient demonstrates substantial clinical improvement, then followed with **doxycycline** 100 mg orally 2 times a day or **clindamycin**, 450 mg orally 4 times a day to complete a total of 14 days of therapy.

When tubo-ovarian abscess is present, many health-care providers use clindamycin for continued therapy rather than doxycycline, because it provides more effective anaerobic coverage.

Alternative Parenteral Regimens

Ofloxacin 400 mg IV every 12 hours,

PLUS

Metronidazole 500 mg IV every 8 hours.

OR

Ampicillin/Sulbactam 3 g IV every 6 hours,

PLUS

Doxycycline 100 mg IV or orally every 12 hours.

OR

Ciprofloxacin 200 mg IV every 12 hours,

PLUS

Doxycycline 100 mg IV or orally every 12 hours,

PLUS

Metronidazole 500 mg IV every 8 hours.

Oral Treatment

Clinical trials of outpatient regimens have provided little information regarding intermediate and long-term outcomes. Patients who do not respond to outpatient therapy within 72 hours should be hospitalized to confirm the diagnosis and to receive parenteral therapy.

Regimen A

Ofloxacin 400 mg orally 2 times a day for 14 days,

PLUS

Metronidazole 500 mg orally 2 times a day for 14 days

Regimen B

Ceftriaxone 250 mg IM once,

OR

Cefoxitin 2 g IM plus **Probenecid** 1 g orally in a single dose concurrently once,

OR

Other parenteral third-generation **cephalosporin** (e.g. **ceftizoxime** or **cefotaxime**),

PLUS

Doxycycline 100 mg orally 2 times a day for 14 days. (Include this regimen with one of the above regimens.)

Follow-Up

- Hospitalized patients receiving IV therapy should show substantial clinical improvement (e.g., defervescence, reduction in direct or rebound abdominal tenderness, and reduction in uterine, adnexal, and cervical motion tenderness) within 3 days of initiation of therapy. Patients who do not demonstrate improvement within this time period usually require further diagnostic workup or surgical intervention, or both.
- If the provider elects to prescribe outpatient therapy, follow-up examination should be performed within 72 hours, using the criteria for clinical improvement described above.
- Some experts recommend screening for *C. trachomatis* and *N. gonorrhea* 4-6 weeks after therapy is completed.

Management of Sex Partners

- Evaluation and treatment of sex partners of women with PID is imperative because of the risk for re-infection and the likelihood of urethral gonococcal or chlamydial infection of the partner.
- Sex partners should be treated empirically with regimens effective against both of these infections—regardless of the apparent etiology of PID or pathogens isolated from the infected woman.

Pregnancy

Pregnant women with suspected PID should be hospitalized and treated with parenteral antibiotics.

Intrauterine Device (IUD)

The intrauterine device, particularly within several months of insertion / reinsertion, is a risk factor for the development of pelvic inflammatory disease. 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 counseling is necessary.

VIII. ECTOPARASITIC INFECTIONS

PEDICULOSIS PUBIS (PUBIC LICE)

Patients who have pediculosis pubis usually seek medical attention because of pruritus. Such patients also usually notice lice or nits on their pubic hair.

Recommended Regimens

Lindane 1% shampoo applied for 4 minutes and then thoroughly washed off. (Not recommended for pregnant or lactating women or for children <2 years of age.),

OR

Permethrin 1% cream rinse applied to affected areas and washed off after 10 minutes,

OR

Pyrethrins with **piperonyl butoxide** applied to the affected areas and washed off after 10 minutes.

Follow-Up

Patients should be reevaluated after 1 week if symptoms persist. Retreatment may be necessary if lice are found or if eggs are observed at the hair-skin junction.

Sex Partners within the last month should be treated.

Other Management Considerations

- The recommended regimens should NOT be applied to the eyes. Pediculosis of the eyelashes should be treated by the application of occlusive ophthalmic ointment to the eyelid margins, 2 times a day for 10 days.
- Clothing or bed linen should be decontaminated (machine washed or machine dried using heat cycle or dry-cleaned) or removed from body contact for at least 72 hours. Fumigation of living areas is not necessary.
- Pregnant and lactating women should be treated with permethrin or pyrethrins with piperonyl butoxide.

SCABIES

The prominent symptom of scabies is pruritis. Sensitization to *Sarcoptes scabiei* must occur before pruritis begins. The first time a person is infected with *S. scabiei*, sensitization takes several weeks to develop. Pruritis might occur within 24 hours after a subsequent infestation. Scabies in adults may be sexually transmitted, although scabies in children usually is not.

Recommended Regimen

Permethrin cream (5%0 applied to all areas of the body from the neck down and washed off after 8-14 hours.

Alternative Regimens

Lindane (1%) 1 oz. of lotion or 30 g of cream applied thinly to all areas of the body from the neck down and washed off thoroughly after 8 hours.

OR

Sulfur (6%) precipitated in ointment applied thinly to all areas nightly for 3 nights. Previous applications should be washed off before new applications are applied. Thoroughly wash off 24 hours after the last application.

Note that lindane should not be used following a bath, and it should not be used by persons with extensive dermatitis, pregnant or lactating women, and children <2 years of age.

Other Management Considerations

- Sexual and close personal or household contacts within the last month should be examined and treated.
- Bedding and clothing should be decontaminated (machine washed or machine dried using hot cycle or dry-cleaned) or removed from body contact for at least 72 hours. Fumigation of living areas is not necessary.
- Pruritus may persist for several weeks after adequate therapy. Some experts recommend retreatment after 1 week for patients who are still symptomatic; other experts recommend retreatment only if live mites can be observed.

IX. SEXUAL ASSAULT AND STDS

Recommendations are limited to the identification and treatment of sexually transmitted infections. Matters concerning the sensitive management of potential pregnancy and of physical and psychological trauma are important and they should be addressed, but are beyond the scope of these guidelines. Victims of sexual assault are evaluated both to provide necessary medical services and to identify and collect forensic evidence. Although some information may be useful for the medical management of a victim, this information may not be admissible in court.

- Any sexually transmissible agent, including HIV, may be transmitted during an assault. Few data exist on which to establish the risk of an assaulted person's acquiring an STD. The risk of acquiring gonococcal and/or chlamydial infections appears to be highest. Inferences about STD risk may be based on the known prevalence of these diseases in the community. If the suspected assailant is identified, that individual should be evaluated for STD to the extent possible under the law.
- The presence of STD within 24 hours of the assault may represent prior infection and not assault-acquired disease. Furthermore, some syndromes, such as BV, may be non-sexually transmitted.

Evaluation for Sexually Transmitted Infections

Initial Examination

The victim should be initially evaluated for STD within 24 hours of the assault, if possible, and medical evaluation should include the following:

- Cultures for *N. gonorrhea* and *C. trachomatis* from specimens collected from any sites of penetration or attempted penetration.
- Collection of a blood sample for a serologic test for syphilis and for storage of a serum sample for possible future testing.
- Serologic testing for HIV and hepatitis B infection should be considered.
- Wet mount and culture for *T. vaginalis* and for evidence of BV and yeast infection.
- Pregnancy test.

Evidence collection should follow local protocols. Care must be taken to maintain proper chain of evidence procedures.

Counseling and psychological support should be provided to the victim.

Follow-up Examination 2 Weeks After Assault

Examination for sexually transmitted infections should be repeated 2 weeks after the assault. Culture and wet mount tests should be repeated at this visit unless prophylactic treatment has already been provided.

Follow-Up Examination 12 Weeks After Assault

Serologic tests for syphilis and HIV infection should be performed 12 weeks after the assault. If positive, testing of the sera collected at the initial examination will assist in determining whether the infection antedated the assault.

Prophylaxis

Although not all experts agree, most patients probably benefit from prophylaxis. The following measures

address the more common microorganisms:

- Hepatitis B vaccination
- Antimicrobial therapy including empiric regimen for chlamydial, gonococcal, and trichomonal infections and for BV:

Ceftriaxone 125 mg IM in a single dose,

PLUS

Metronidazole 2 g orally in a single dose,

PLUS

Azithromycin 1 g orally in a single dose

OR

Doxycycline 100 mg orally 2 times a day for 7 days.

Sexual Assault and Abuse of Children

The identification of a sexually transmissible agent from a child beyond the neonatal period suggests sexual abuse. However, exceptions do exist, e.g., rectal and genital infection with *C. trachomatis* in young children may be due to persistent perinatally acquired infection, which may persist for up to 3 years.

In addition, BV and genital mycoplasmas have been identified in both abused and nonabused children. A finding of genital warts, although suggestive of assault, is nonspecific without other evidence of sexual abuse. When the only evidence of sexual abuse is the isolation of an organism or the detection of antibodies, findings should be carefully confirmed.

Evaluation for Sexually Transmitted Infections in Children

- Examinations of children for sexual assault or abuse should be conducted so as to minimize trauma to the child. The decision to evaluate the child for STDs must be made on an individual basis.
- Obtaining the indicated specimens requires skill to avoid psychological and physical trauma to the child.

Presumptive Treatment

There are few data upon which to establish the risk of a child's acquiring a sexually transmitted infection as a result of sexual abuse. The risk is believed to be low in most circumstances, although documentation to support this position is inadequate. Presumptive treatment for children who have been sexually assaulted or abused is not widely recommended. Presumptive treatment after assault may be given if the victim or victim's family requests it or if follow-up examination of the victim cannot be ensured.

REFERENCES

1. Taeusch HW, Ballard RA, editors. Avery's diseases of the newborn, 7th ed. Philadelphia(PA): WB Saunders;1998. (Level III)
2. Boyer KM, Gotoff SP. Prevention of early-onset neonatal group B streptococcal disease with selective intrapartum chemoprophylaxis. N Engl J Med 1986;314:1665-9. (Level I)
3. Mandell GL, Bennett JE, Dolin R, editors. Principles and practice of infectious diseases. Vol 1-2 5th ed. Philadephia(PA): Churchill Livingstone; 2000. (Level III)
4. Monif GR, Baker DA, editors. Infectious diseases in obstetrics and gynecology. 4th ed. Omaha (NE): IDI Publications; 1999.
5. Remington JS, Klein JO, editors. Infectious diseases of the fetus and newborn infant. 5th ed. Philadelphia(PA): WB Saunders; 2001. (Level III)
6. Sever JL, Larsen JW, Grossman JH. Handbook of perinatal infections. 2nd ed. Boston(MA): Little Brown; 1989. (Level III)
7. Amstey MS, editor. Virus infection in pregnancy. Orlando (FL): Grune & Startton; 1984. (Level III)
8. Sweet RL, Gibbs RS. Infectious diseases of the female genital tract. 4th ed. Philadelphia(PA): Lippincott, Williams and Wilkins; 2002. (Level III)
9. Sexually transmitted diseases treatment guidelines 2002. Centers for Disease Control and Prevention. MMWR Recomm Rep 2002; 51(RR-6):1-78. (Level III)
10. Mead PB, Duff P, Crombleholme W, Gibbs RS. Group B strep in pregnancy: can screening mothers safeguard babies? Contemp ObGyn 1991; 36(5):100-17. (Level III)
11. Dajani AS, Taubert KA, Wilson W, Bolger AF, Bayer A, Ferrieri P, et al. Prevention of bacterial endocarditis. Recommendations by the American Heart Association. JAMA 1997;277;1794-801. (Level III)
12. Mead PB. Prevention of bacterial endocarditis. Contemp Ob Gyn. 1999;44(7)13-22. (Level III)
13. Mead PB, Hager WD, Faro S, editors. Protocols for infectious diseases in obstetrics and gynecology. 2nd ed. Malden(MA): Blackwell Science; 2000. (Level III)
14. Prevention of early-onset group B streptococcal disease in newborns. ACOG Committee Opinion No. 279. American College of Obstetricians and Gynecologists. Obstet Gynecol 2002;100:1405-12. (Level III)