EPIDEMIOLOGY BULLETIN

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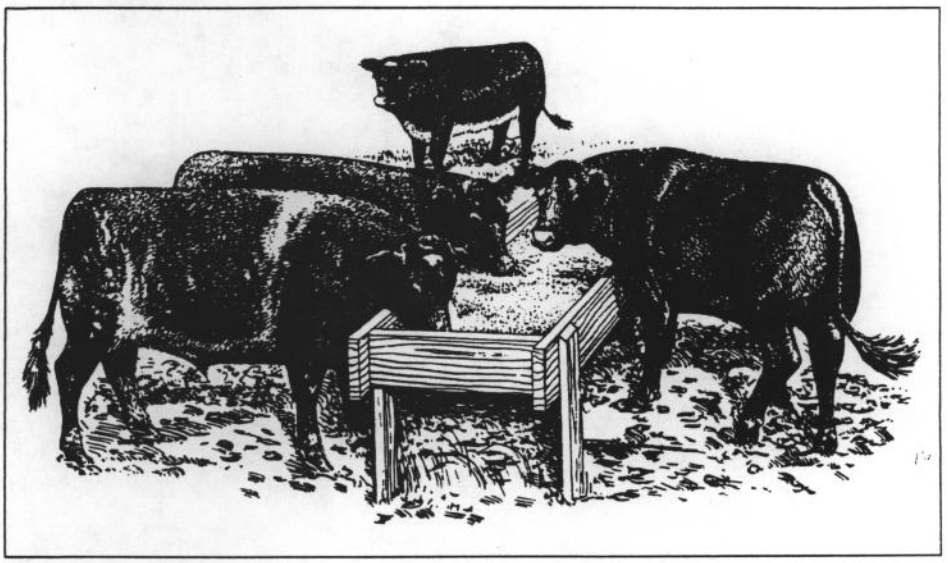
Cattle Rabies in Virginia



Introduction

Virginia has been experiencing a rabies epizootic since 1980, with a peak number of cases in 1983. The outbreak began on the Virginia-West Virginia border and then spread across northern Virginia, Washington, D.C., Maryland, and into Pennsylvania. Each year, more and more Virginia counties are affected. During the first six months of this year, five Virginia counties reported rabies for the first time.

Since the outbreak began, most cases have been reported in raccoons. A variety of other species have been affected, but most of these cases are believed to be due to "spillover" from the raccoon epizootic. Monoclonal antibody studies have been used to document that the viral strain found in rabid raccoons is probably the same strain found in most cases of rabies in other animals in Virginia.[1] A different strain of virus, however, has been responsible for rabies in skunks in southwestern Virginia, where an enzootic has existed for fifteen years. Multiple strains, distinct from the raccoon and skunk strains, have been isolated from rabid bats and may be responsible for sporadic cases of rabies in terrestrial animals in non-enzootic/epizootic areas. Most cases in Virginia cattle, as in other terrestrial animals, are believed to be due to exposures from rabid raccoons. A review of all confirmed cases of cattle rabies occurring in Virginia between January 1980 and June 1986 was conducted to compare Virginia's experience with reports in the scientific literature.

Methods

Cases were identified using the Virginia Department of Health records on animal rabies. Information on clinical signs was supplied by laboratory forms, which accompany all specimens submitted for rabies examination, as well as phone interviews with the examining veterinarians. All cases were diagnosed by examination of brain tissue using the rabies fluorescent antibody test.

Results

Nine cases of rabies were identified in cattle between January 1980 and July 1986. One case occurred in 1981, one in 1982, three in 1983 at the peak of the raccoon outbreak, two in 1984, and one in 1985 and 1986 respectively. The cases occurred in nine different counties: Augusta, Clarke, Fauquier, Floyd, Hanover, Louisa, Prince William, Rockingham, and Shenandoah. Over the study period, two of the nine cases (22%) occurred in the month of February, three of the cases (33%) occurred in the month of March, and four of the cases (44%) occurred in the month of October.

Information on clinical signs was available on seven of the nine cases (Table 1). Signs reported most fre-

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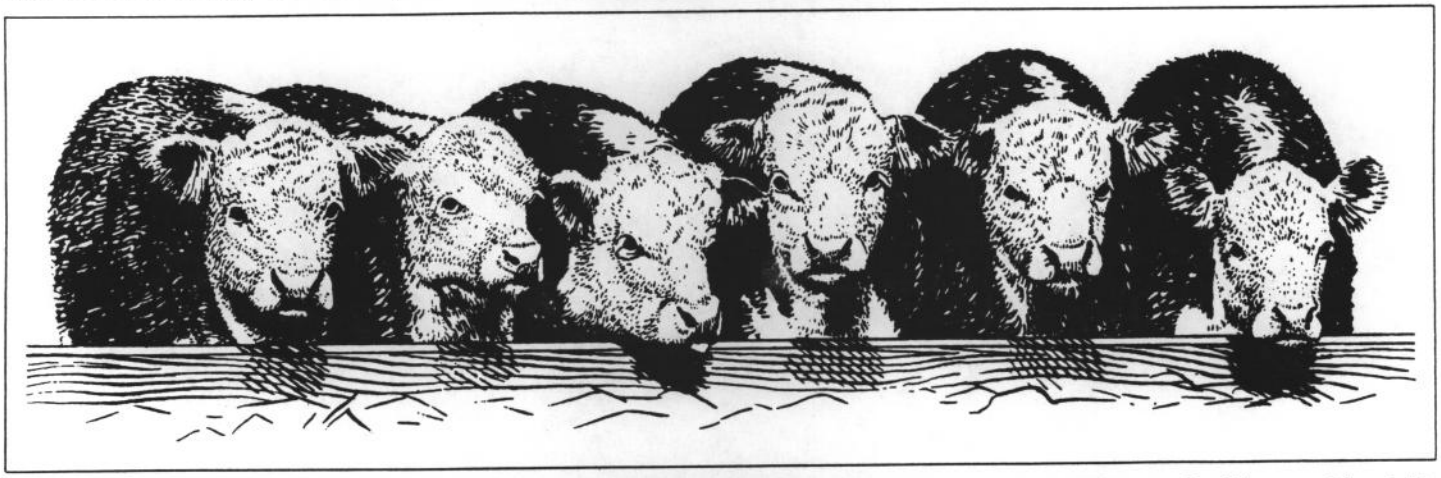
Table 1. Clinical Signs Observed in Seven Confirmed Cases of Rabies in Cattle, Virginia, January 1980 through June 1982.

Clinical Sign	Frequency
Weak or wobbly gait	57%
Drooling	57%
Bellowing	43%
Inability to swallow, drink	43%
Aggression	28%
Constipation	28%
Anorexia	28%
Paralysis	14%
Lack of response to stimuli	14%

Continued from page 1

quently were weak or wobbly gait, drooling, bellowing, inability to drink or swallow, anorexia, constipation, and aggression. Eight of the nine cases had no known exposure to a rabid animal (information on exposure was unavailable for one case). However, eight of the nine cases (88%) occurred in counties where at least one case of rabies was reported in a raccoon during the same year.



Only one case lived in a county with no other confirmed case of rabies in any species during the study period.

Discussion

The literature describes two forms of rabies in cattle, a "dumb" or paralytic form and a "furious" form.[2-4] The paralytic form begins with hindlimb incoordination, due to an ascending paralysis. As paralysis progresses, the affected animal is unable to swallow and profuse drooling of saliva occurs. The animal may repeatedly bellow. Rumination ceases, bloat (excessive accumulation of gas in the first two compartments of the ruminant stomach) may occur, and tenesmus and decreased rectal tone may be observed along with dry, hard feces. Constipation may be followed by diarrhea with rapid weight loss. Eventually, the affected animal becomes recumbent, resting on its sternum. While recumbent, it may exhibit opisthotonus and paddle with the front limbs. Death occurs due to respiratory paralysis. The time course of the disease is variable, lasting from one to six days.

The furious form begins with depression and a rapid decline in milk production in the lactating animal. The affected animal may appear tense and alert. It may grind its teeth, groan, or bellow with a loud, hoarse voice. Some animals, especially bulls, may show sexual excitement. Other animals may kick or charge other animals, people, or objects. Anorexia and pica may also occur. The furious form may evolve into the paralytic form. If not, death usually occurs within twenty-four to forty-eight hours after onset of clinical signs.

The Virginia cattle rabies cases reviewed in this study exhibited clinical signs more typical of the paralytic form than the furious form, although two cases (28%) were reported to be aggressive. The clinical signs of rabies in cattle are variable and may be suggestive of more than one disease. This increases the likelihood that cattle rabies will be misdiagnosed and its incidence underestimated.

The significance, if any, of the observed temporal distribution (colder months) is unclear at this time. One author has suggested that more cases may occur in livestock during months when food is scarce for wildlife.[1] Other factors may also be involved.

Monoclonal antibodies were used in the 1983 Clarke County case to identify the viral strain. The strain was identified as one similar to those known to occur in bats.[1] A bite by a rabid bat may also have been responsible for the case in Floyd County in 1981. This was an isolated case, with no other terrestrial cases reported in Floyd County or in any of the surrounding counties during the study period. The seven other cases were probably due to exposure to rabid raccoons or "spillover" species.

If rabies is suspected in a domestic animal, the head should be submitted for post-mortem examination of the brain. Contact your local health department for specific instructions.

Submitted by Anne Hickson, fourth year veterinary student, during an externship with the Virginia Department of Health.

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Have a Idea for the *Bulletin?*

The editor welcomes any reports of cases, outbreaks, or public health problems of interest to the Bulletin's *readers. Such accounts and any other comments or suggestions regarding the* Bulletin *should be addressed to: Editor,* Epidemiology Bulletin, *Office of Epidemiology, Room 700, 109 Governor Street, Richmond, Virginia 23219.*

Diagnosis and Management of Mycobacterial Infection and Disease in Persons with HTLV-III/LAV Infection

In 1985, the number of new tuberculosis cases reported to CDC was essentially the same as that reported in 1984 (*1*). In contrast, the average annual decline in morbidity during the past 32 years has been 5%. The failure of tuberculosis morbidity to decline as expected in 1985 is probably related to the occurrence of tuberculosis among persons with acquired immunodeficiency syndrome (AIDS) or human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV/LAV)* infection. Several reports have indicated that mycobacterial disease is common among AIDS patients and among persons at risk for AIDS (*2–9*). The most common mycobacterial species isolated from patients with diagnosed AIDS is *Mycobacterium avium* complex (MAC), although in some groups in which tuberculous infection is highly prevalent, disease caused by *M. tuberculosis* is more common (*10–12*). Even among groups in which MAC is the most common mycobacterial pathogen, *M. tuberculosis* accounts for a substantial proportion of the mycobacterial isolates. The association between mycobacterial disease and AIDS raises several important clinical and public health issues that are addressed below.

Diagnosis of Tuberculosis in Patients Likely to Have HTLV-III/LAV Infection

Clinicians should consider the diagnosis of tuberculosis in patients with, or at risk of, HTLV-III/LAV infection, even if the clinical presentation is unusual (*4,13,14*). Available data indicate that extrapulmonary forms of tuberculosis, particularly lymphatic and disseminated (miliary), are seen much more frequently among patients with HTLV-III/LAV infection than among those without such infection. Pulmonary tuberculosis in patients with HTLV-III/LAV infection cannot readily be distinguished from other pulmonary infections, such as *Pneumocystis carinii* pneumonia, on the basis of clinical and radiographic findings. Patients with tuberculosis may have infiltrates in any lung zone, often associated with mediastinal and/or hilar lymphadenopathy. Cavitation is uncommon. Appropriate specimens to establish a culture-confirmed diagnosis of tuberculosis include respiratory secretions, urine, blood, lymph node, bone marrow, liver, or other tissue or body fluid that is indicated clinically. All tissue specimens should be stained for acid-fast bacilli and cultured for mycobacteria. In the presence of undiagnosed pulmonary infiltrates, bronchoscopy with lavage and transbronchial biopsy (if not contraindicated) may be needed to obtain material for both culture and histologic examination. A tuberculin skin test should be administered, but the absence of a reaction does not rule out the diagnosis of tuberculosis because immunosuppression associated with HTLV-III/LAV infection may cause false-negative results.

Treatment of Mycobacterial Disease in a Patient With HTLV-III/LAV Infection

Chemotherapy should be started whenever acid-fast bacilli are found in a specimen from a patient with HTLV-III/LAV infection and clinical evidence of mycobacterial disease. Because it is difficult to distinguish tuberculosis from MAC disease by any criterion other than culture, and because of the individual and public health implications of tuberculosis, it is important to treat patients with a regimen effective against tuberculosis. With some exceptions, patients with tuberculosis and HTLV-III/LAV infection respond relatively well to standard antituberculosis drugs (*15*); however, their treatment should include at least three drugs initially, and treatment may need to be longer than the standard duration of 9 months (*16*). The recommended regimen is isoniazid (INH), 10–15 mg/kg/day up to 300 mg/day; rifampin (RIF), 10–15 mg/kg/day up to 600 mg/day; and either ethambutol (EMB), 25 mg/kg/day, or pyrazinamide (PZA), 20–30 mg/kg/day. The last two drugs are usually given only during the first 2 months of therapy. The addition of a fourth drug may be indicated in certain situations, such as central nervous system or disseminated disease or when INH resistance is suspected. An initial drug-susceptibility test should always be performed and the treatment regimen revised if resistance is found to any of the drugs being used. The appropriate duration of treatment for patients with tuberculo-

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**The Human Retrovirus Subcommittee of the International Committee on the Taxonomy of Viruses has proposed the name human immunodeficiency virus (HIV) for this virus (Science 1986;232:697).*

Continued from page 3

sis and HTLV-III/LAV infection is unknown; however, it is recommended that treatment continue for a minimum of 9 months and for at least 6 months after documented culture conversion. If INH or RIF is not included in the treatment regimen, therapy should continue for a minimum of 18 months and for at least 12 months following culture conversion. After therapy is completed, patients should be followed closely, and mycobacteriologic examinations should be repeated if clinically indicated.

Some clinicians would take a different approach to treatment than that outlined above, to cover the possibility of MAC disease. Although the clinical significance and optimal therapy of MAC disease in these patients is not well defined, and there are no definitive data on the efficacy of treatment, one regimen commonly used to treat MAC disease substitutes rifabutin (ansamycin LM 427) for rifampin, combined with INH, EMB, and clofazimine. Rifabutin and clofazimine are experimental drugs available to qualified investigators only under investigational new drug protocols. Rifabutin is distributed by the CDC Drug Service (telephone: [404] 329-3670), and clofazimine, by Ciba-Geigy: (telephone: [201] 277-5787). If *M. tuberculosis* is isolated from a patient receiving this four-drug regimen, treatment should be switched to one of the three-drug regimens outlined above (INH, RIF, and EMB or PZA). If MAC is isolated from a patient who has been started on a three-drug regimen, the clinician may continue the three-drug regimen or switch to the four-drug regimen of INH, EMB, rifabutin, and clofazimine.

Although experience is very limited, patients with disease due to *M. kansasii* should respond to INH, RIF, and EMB. Some clinicians advocate the addition of streptomycin (SM), 1 gram twice weekly, for the first 3 months. Therapy should continue for a minimum of 15 months following culture conversion.

Monitoring for toxicity of antimycobacterial drugs may be difficult for patients who may be receiving a variety of other drugs and may have other concomitant conditions. Because hepatic and hematologic abnormalities may be caused by the mycobacterial disease, AIDS, or other drugs and conditions, the presence of such abnormalities is not an absolute contraindication to the use of the treatment regimens outlined above.

Infection Control

Recommendations for preventing transmission of HTLV-III/LAV infection to health-care workers have been published (*17*). In addition, infection-control procedures applied to patients with HTLV-III/LAV infection who have undiagnosed pulmonary disease should always take the possibility of tuberculosis into account. This is especially true when diagnostic procedures, such as sputum induction or bronchoscopy, are being performed. Previously published guidelines for preventing tuberculosis transmission in hospitals should be followed (*18*).

Contact Investigation for Tuberculosis

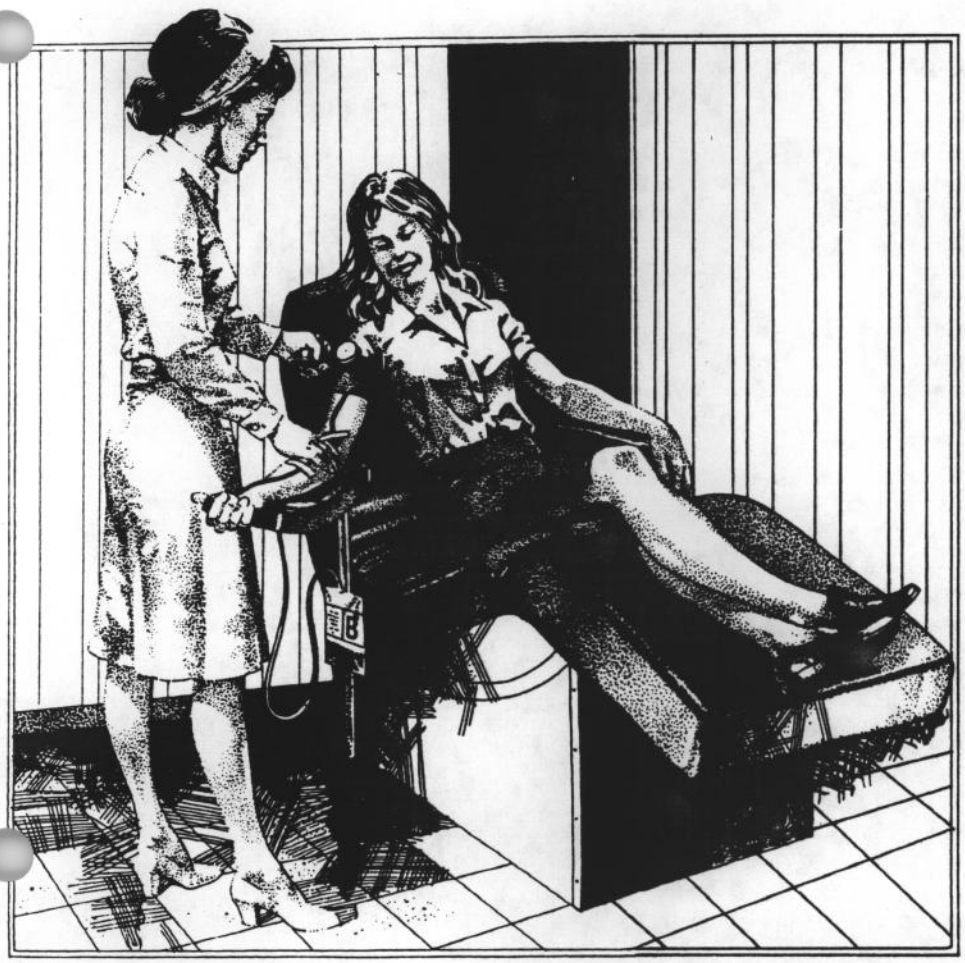
Patients with pulmonary tuberculosis and HTLV-III/LAV infection should be considered potentially infectious for tuberculosis, and standard procedures for tuberculosis contact investigation should be followed (*19*). Specific data on the infectiousness of tuberculosis in patients with HTLV-III/LAV infection are not yet available.

Examining HTLV-III/LAV-Infected Persons for Tuberculosis and Tuberculous Infection

Individuals who are known to be HTLV-III/LAV seropositive should be given a Mantoux skin test with 5 tuberculin units of purified protein derivative as part of their clinical evaluation. Although some false-negative skin test results may be encountered in this setting as a result of immunosuppression induced by HTLV-III/LAV infection, significant reactions are still meaningful (*20*). If the skin test reaction is significant, a chest radiograph should be obtained, and if abnormalities are detected, additional diagnostic procedures for tuberculosis should be undertaken. Patients with clinical AIDS or other Class IV HTLV-III/LAV infections (*21*) should receive *both* a tuberculin skin test and a chest radiograph because of the higher probability of false-negative tuberculin reactions in immunosuppressed patients.

Examining Patients with Clinically Active Tuberculosis or Latent Tuberculous Infection for HTLV-III/LAV Infection

As part of the evaluation of patients with tuberculosis and tuberculous infection, risk factors for HTLV-III/



LAV should be identified. Voluntary testing of all persons with these risk factors is recommended (*22*). In addition, testing for HTLV-III/LAV antibody should be considered for patients of all ages who have severe or unusual manifestations of tuberculosis. The presence of HTLV-III/LAV infection has implications regarding treatment (see above), alerts the physician to the possibility of other opportunistic infections, and allows for counselling about transmission of HTLV-III/LAV infection (*23*). Testing for HTLV-III/LAV antibody is especially important for persons over age 35 with *asymptomatic* tuberculous infection, because INH would not usually be indicated for persons in this age group unless they are also HTLV-III/LAV seropositive.

Preventive Therapy

HTLV-III/LAV seropositivity in a person of any age with a significant tuberculin reaction is an indication for INH preventive therapy (*16*). Although it is not known whether INH therapy is as efficacious in preventing tuberculosis in HTLV-III/LAV-infected persons as in other groups, the usually good response of HTLV-III/LAV-infected persons with tuberculosis to standard therapy suggests that INH preventive therapy would also be effective. Before instituting preventive therapy, clinically active tuberculosis should be excluded.

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Reprinted from MMWR 1986;35:448–52

Sexually Transmitted Diseases Treatment Guidelines

Genital Herpes Simplex Virus Infection

Genital herpes infection is a viral disease which may be chronic and recurring and for which no known cure exists. The acyclovir regimens listed provide partial control of the signs and symptoms of herpetic eruptions, but do not affect the subsequent risk, frequency, or severity of recurrences after the drug is discontinued.

First Clinical Episode

A careful history should be obtained to establish that this is the patient's first episode of genital herpes.

To reduce the signs and symptoms:

Acyclovir 200 mg by mouth 5 times daily for 7 to 10 days, initiated within 6 days of onset of lesions.

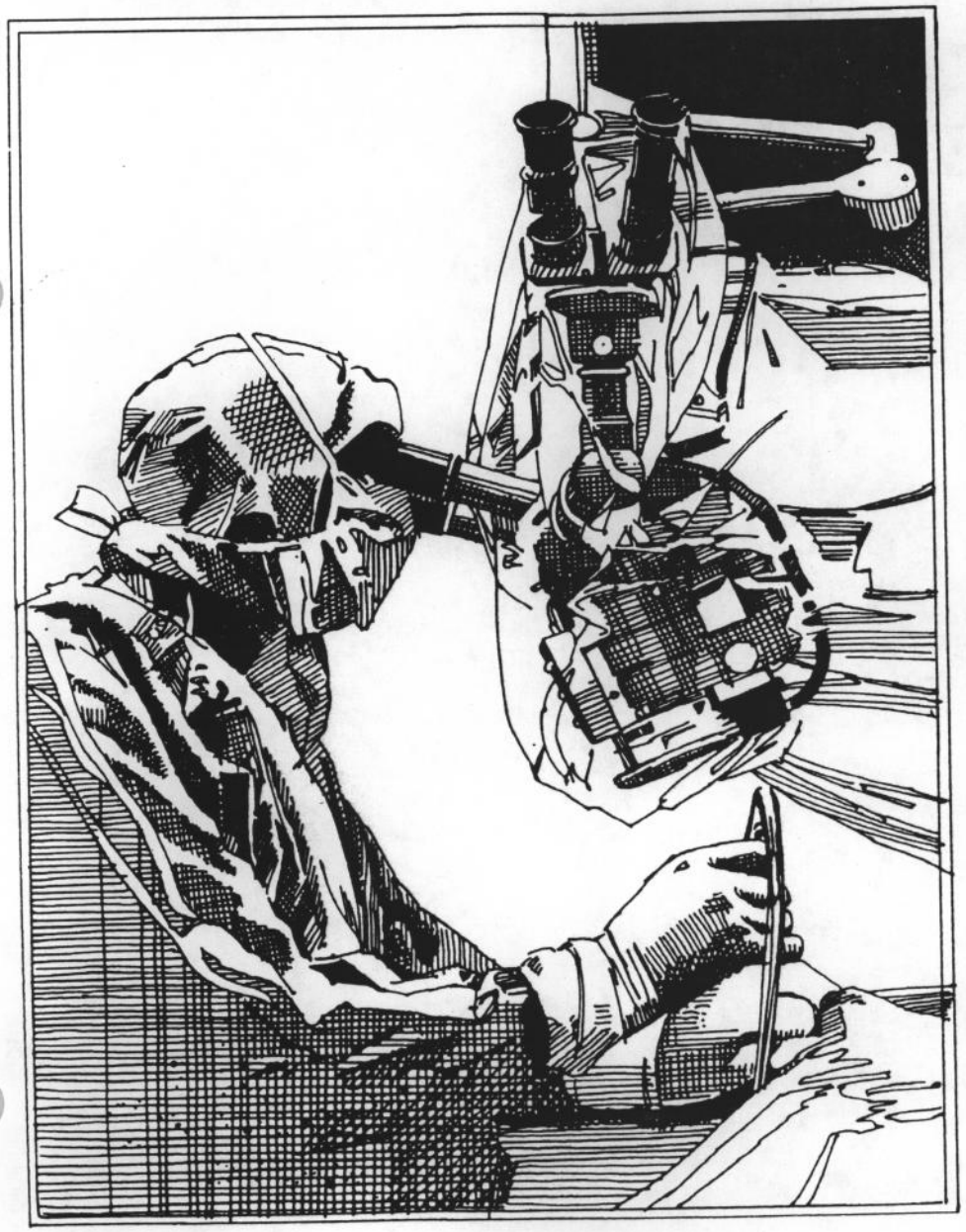
This treatment shortens the median duration of first episode eruptions by between 3 and 5 days and may reduce systemic symptoms in primary episodes.

For patients who have severe symptoms or complications which necessitate hospitalization an alternative regimen is:

Acyclovir 5 mg/kg of body weight IV every 8 hours for 5 to 7 days.

This treatment shortens the median course of first episodes by approximately 7 days.

Topical acyclovir ointment has marginal benefit in decreasing virus shedding but has no significant effect on symptoms or healing time.



The above regimens are also useful for herpes simplex proctitis.

Effect on Recurrences of Acyclovir Treatment of First Clinical Episodes

Treatment for first episode genital herpes with intravenous, oral, or topical acyclovir does not affect the subsequent risk, rate, or severity of recurrences.

Recurrent Genital Herpes

Since benefit to the patient may be minimal, treatment for recurrent episodes should be limited to those patients who typically have severe symptoms and who are able to begin therapy at the beginning of the prodrome or within 2 days of onset of lesions.

Acyclovir 200 mg by mouth 5 times daily for 5 days initiated within 2 days of onset.

This shortens the main clinical course by about 1 day.

Intravenous and topical acyclovir are not indicated for recurrences.

Suppression of Recurrent Genital Herpes Infection

Continuous treatment with **acyclovir** 200 mg by mouth 2 to 5 times daily reduces the frequency of acti disease by at least 75 percent amon patients with frequent (at least 6 per year) recurrences. The dose of acyclovir should be individualized for each patient. After cessation of acyclovir, clinical episodes recur at the same frequency. Although short-term safety has been demonstrated in persons receiving the drug for 6 months, the long-term effects of acyclovir are not yet known. Acyclovir-resistant strains of herpes simplex virus have been isolated from some persons receiving acyclovir for suppression of recurrences, but their clinical significance is unknown. The suppressive regimen is contraindicated in women who may become pregnant during treatment. The decision to initiate this form of therapy should be made after careful consideration of the cost, risks, and benefits involved.

Counseling

Patients should be told about the natural history of genital herpes infection and to abstain from sexual contact while lesions are present even if using acyclovir. Transmission of herpes simplex virus occurs during asymptomatic periods, but the relative risk is undefined. It is unknown

whether patients maintained on oral acyclovir are less likely to shed virus asymptomatically than those not taking the drug. Some consultants recommend that asymptomatic patients use condoms. Women with genital herpes infection should be advised to have yearly Papanicolau smears. Early in pregnancy, women should inform their clinician of a history of genital herpes infection in themselves or their sex partners.

Management of Sex Partners

Routine treatment of sex partners is not indicated.

Pregnant Patients

The safety of systemic acyclovir for the treatment of pregnant women has not been established.

Genital and Anal Warts (Condylomata Acuminata)

The treatment of genital and anal warts has not been well studied. No treatment is completely satisfactory. Genital and anal warts are caused by human papilloma virus (HPV) and have recently been linked to the development of squamous cell genital cancers. For these reasons, atypical or persistent warts should be biopsied. A Pap smear is recommended for all women with genital warts. Cervical warts should not be treated until the result of the Pap smear is available to guide therapy. While podophyllin is widely used in treatment of genital and anal warts, some consultants feel that cryotherapy, when available, is preferable to podophyllin.

External Genital/Perianal

Recommended Regimens

Cryotherapy, e.g., liquid nitrogen or carbon dioxide (dry ice)

OR

Podophyllin 10% in compound tincture of benzoin. Apply carefully to each wart avoiding normal tissue. Wash off thoroughly in 1–4 hours. Some consultants use a longer period, but this must be individualized after patient tolerance and compliance have been established. Repeat once or twice weekly. If warts do not regress after 4 applications of podophyllin, alternative treatments are indicated. Podophyllin should not be used during pregnancy.

Alternative Regimens

Electrosurgery

Surgical Removal

Women with external genital warts often have coexistent vaginal or cervical warts. At a minimum, a Pap smear is indicated for detection of cervical warts or other cytologic abnormalities. Colposcopy in consultation with an expert should be considered.

Vaginal/Cervical

Vaginal/cervical warts are often found only by Pap smear or colposcopy.

Women with vaginal/cervical warts should be examined by an experienced colposcopist. Treatment of vaginal/cervical warts is complicated and should be carried out in consultation with an expert. Current therapies include:

Cryotherapy 5

Flurouracil

Podophyllin 10% in compound tincture of benzoin may be used for vaginal warts only if great care is taken to ensure that the treated area is dried before removing the speculum. Because podophyllin is absorbed and toxic, use of large amounts should be avoided. Podophyllin is NOT RECOMMENDED for cervical warts.

Urethral/Meatal

Accessible meatal warts may be treated with podophyllin 10% in compound tincture of benzoin (see above). Great care should be taken to ensure that the treated area is dried before contact with normal mucosa is allowed. Podophyllin must be thoroughly washed off after 1–4 hours. Treatment should be undertaken in consultation with an expert. Access to urethroscopy is important for management.

Alternative Regimen

Cryotherapy

Intraurethral warts should be suspected in men with recurrent meatal warts. Urethroscopy is necessary to diagnose this condition. Intraurethral 5% 5-fluorouracil or thiotepa may be effective in this condition but have not been adequately evaluated. Podophyllin should not be used.

Anal Warts

Anal warts accessible by anoscope may be treated with cryotherapy or podophyllin 10% in compound tincture of benzoin (see above). However, extreme care must be taken to avoid exposure of normal mucosa to podophyllin. Allow the treated area to dry before removal of the anoscope. Podophyllin must be washed off after 1–4 hours. Many consultants avoid the use of podophyllin for anal warts.

Alternative Regimen

Electrocautery

Patients with extensive anal warts should be referred for proctological evaluation.

Oral Warts

Oral warts should be treated with: *Cryotherapy* (e.g., liquid nitrogen, solid carbon dioxide) or electrosurgery or surgical removal.

Podophyllin is contraindicated for oral warts.

Reprinted from MMWR 1985;34(4S)

Cases of selected notifiable diseases, Virginia, for the period September 1 through September 30, 1986

Disease	State				Regions					
	This Month	Last Month	Total to Date 1986	Total to Date 1985	Mean 5 Year To Date	This Month N.W.	This Month N.	This Month S.W.	This Month C.	This Month E.
Measles	0	3	60	28	16	0	0	0	0	0
Mumps	1	7	35	42	49	0	0	1	0	0
Pertussis	4	10	34	14	22	0	1	1	1	1
Rubella	0	0	0	2	4	0	0	0	0	0
Meningitis—Aseptic	45	43	196	237	193	8	11	7	6	13
*Bacterial	17	15	188	190	173	3	4	3	2	5
Hepatitis A (Infectious)	12	8	89	124	121	1	6	3	0	2
B (Serum)	60	51	367	431	396	6	15	5	12	22
Non-A, Non-B	5	8	52	65	59	2	3	0	0	0
Salmonellosis	176	221	1057	1238	1127	24	50	18	39	45
Shigellosis	17	8	65	65	316	5	6	3	1	2
Campylobacter Infections	64	72	444	562	369	11	19	9	7	18
Tuberculosis	42	23	271	287	384	5	4	5	5	23
Syphilis (Primary & Secondary)	22	38	279	225	389	7	3	4	6	2
Gonorrhea	1698	1981	14039	14376	15222	—	—	—	—	—
Rocky Mountain Spotted Fever	5	15	44	17	58	3	0	1	1	0
Rabies in Animals	26	12	148	139	274	13	11	1	1	0
Meningococcal Infections	4	4	59	43	55	0	0	0	0	4
Influenza	5	18	3950	950	1637	0	0	0	0	5
Toxic Shock Syndrome	0	2	10	6	6	0	0	0	0	0
Reyes Syndrome	0	0	2	2	5	0	0	0	0	0
Legionellosis	3	3	14	15	17	0	1	1	0	1
Kawasaki's Disease	4	1	22	27	20	0	0	1	0	3
Other: Acquired Immunodeficiency Syndrome	15	16	133	72	—	0	7	1	4	3

Counties Reporting Animal Rabies: Augusta 1 skunk; Clarke 1 skunk; Fauquier 1 cat, 1 raccoon; Frederick 2 raccoons; Highland 1 raccoon; King George 1 raccoon; Rockingham 2 skunks; Shenandoah 2 skunks; Warren 1 raccoon; Arlington 1 raccoon; Fairfax 3 raccoons; Loudoun 5 raccoons, Prince William 3 raccoons; Alleghany 1 raccoon; Goochland 1 raccoon.

Occupational Illnesses: Pneumoconioses 45; Carpal tunnel syndrome 15; Hearing loss 6; Asbestosis 4; Dermatitis 1; Poisoning-metal 1; Silicosis 1.

*other than meningococcal

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