SPIROCHETOSIS

DEFINITION

Spirochetosis or nonrelapsing borreliosis is a septicemic disease of most poultry and many other birds. Acute cases are characterized by depression, cyanosis, diarrhea, and leg weakness progressing to paralysis and death.

OCCURRENCE

Spirochetosis occurs naturally in chickens, turkeys, geese, ducks, pheasants, grouse, and canaries. Many other birds can be infected experimentally. In the United States the disease usually has occurred in turkeys, chickens, and pheasants. All age groups are susceptible if not previously exposed. The disease is widely distributed in tropical and temperate regions. In the United States it has been recognized in California, New Mexico, Texas, and Arizona.

HISTORICAL INFORMATION

1. Spirochetosis, one of the major scourges of poultry, was first reported in 1891. Spirochetosis has occurred only a few times in the Southwestern United States. It has been reported in California in 1946 and 1993 as well as in Arizona in 1961. The disease is of major importance in those countries where it is enzootic.

2. There is potential for spread of spirochetosis in the southwestern states because the presence of the tick vector, *Argas persicus*.

ETIOLOGY

1. The etiologic agent is *Borrelia anserina*, a spirochete with 5-8 spirals that is up to 30 microns long.

2. The organism is not very resistant outside the host and must be maintained in some vector between hosts.

EPIDEMIOLOGY

1. *B. anserina* can be transmitted through infectious droppings but usually is transmitted by blood sucking arthropods. *Argas persicus* is the usual vector and mosquitoes of the genus Culex may serve as vectors. Mites may serve as mechanical carriers.

2. *A. persicus* remains infective for up to 430 days after feeding on an infected host. Further, the tick passes the spirochete to its progeny.

3. Infectious vectors and mites transmit the spirochetes to susceptible birds when they feed upon them. Recovered birds clear the infection completely and do not become carriers.

4. Transmission can also occur through ingestion of infected ticks, cannibalism of moribund birds, or scavenging of infected carcasses.

CLINICAL SIGNS

Infected birds are depressed, cyanotic, thirsty, and often have a diarrhea that includes excessive white urates. The birds are weak, squat on the ground, and later may become paralyzed. Morbidity and mortality vary greatly depending on the virulence of the *B. anserina* strain. Morbidity and mortality may approach 100% in highly susceptible flocks.
LESIONS

1. There usually is marked enlargement of the spleen, which is mottled by ecchymotic hemorrhages.

2. The liver frequently is enlarged and may contain small hemorrhages, infarcts, or foci of necrosis. The kidneys and heart may be enlarged and pale. There usually is bile-stained mucoid enteritis. The histopathology has been well described but microscopic lesions are not diagnostic for the disease.

DIAGNOSIS

1. Spirochetosis should be suspected if the tick *A. persicus* is found on typical sick birds. However, nymphs and adult ticks live in the house and feed mostly at night.

2. The spirochetes can be identified in Giemsa-stained blood smears [Fig. 1; Spirochetosis; Cornell U] or by dark-field or phase-contrast microscopy of blood and other fluids. Spirochetes can be concentrated in the buffy coat of centrifuged blood. This may facilitate identifying birds with low spirochetemia. Spirochetes may not be observed during late stages of the disease.

3. In doubtful cases, the spirochete can be demonstrated by isolating it in six chick embryos inoculated with defibrinated blood from a typical early case. Alternatively, young chicks or poults can be inoculated with serum or tissue suspensions and their blood can be examined daily for spirochetes, which usually appear in 3-5 days.

4. The spirochete can be identified in specially stained tissue sections. Also, the fluorescent antibody test can be used to identify it in tissues or blood. Agar-gel precipitin tests have been used to detect spirochete antibodies and antigens.

CONTROL

1. Spirochetosis can be prevented by controlling or eradicating all the vectors and transmitters of *B. anserina*. It may be difficult to eradicate the fowl tick without destroying infested wooden buildings and all the birds in infected flocks. Isolating the roost by suspending it from wires or placing the supports of the roost in pans filled with oil is helpful in reducing tick feeding.

2. A wide variety of bacterins and vaccines has been prepared abroad but are not available in the United States. They appear to be reasonably effective although they produce a shorter, weaker immunity than is desirable unless revaccination is practiced.

TREATMENT

In countries where spirochetosis is enzootic, numerous drugs and antibiotics, including penicillin, streptomycin, tylosin and tetracyclines have been used successfully for treatment.