

LOUISIANA MONTHLY MORBIDITY LHSASA

DISEASES REPORTED DURING THE MONTH OF

AUGUST, 1973

BY PARISH OF RESIDENCE

A CASE REPORT: TULAREMIA IN WEBSTER PARISH

Reported by:
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In late April a 4 year old boy residing in Shongaloo, Louisiana removed a tick from his pet dog. He smashed the engorged tick between his fingers a short time later and in the process introduced a small amount of blood from the insect into his right eye. Three days later, when this eye became inflamed, he was seen by his pediatrician who elicited a history of fever and sore throat of one day's duration and noted pharyngitis and mild infection of his right conjunctiva. He was given Procaine Penicillin 600,000 units im and oral penicillin, only to return four days later complaining of persistent fever and headaches. Physical examination at this time revealed pharyngitis without additional abnormal findings. The right eye was no longer inflamed. The child's CBC on this day revealed 13,500 WBC's with 80% segs., 13% lymphs, 4 monos, and a hemoglobin of 12.2.

BUREAU OF VITAL STATISTICS

DIVISION OF HEALTH MAINTENANCE AND AMBULATORY PATIENT SERVICES

Prepared by:

**DIVISION
OF TABULATION &
ANALYSIS**

September 11, 1973

	ASEPTIC MENINGITIS	DIPHTHERIA	ENCEPHALITIS	ENCEPHALITIS, POST INFECTION	INFECTIOUS AND SERUM HEPATITIS	TUBERCULOSIS, PULMONARY	MENINGOCOCCAL INFECTIONS	PERTUSSIS	POLIOMYELITIS, PARALYTIC	RABIES IN ANIMALS	RHEUMATIC FEVER	RUBELLA *	SHIGELLOSIS	TYPHOID FEVER	OTHER SALMONELLOSIS	TETANUS	MEASLES	GONORRHEA	SYPHILIS, PRIMARY AND SECONDARY
TOTAL TO DATE 1972	58	4	10	9	502	383	35	34	0	32	8	89	101	6	113	4	83	11540	594
TOTAL TO DATE 1973	80	0	13	4	571	385	36	12	0	36	14	99	178	6	139	3	84	15553	561
TOTAL THIS MONTH	9	0	1	0	72	35	6	2	0	5	0	0	23	0	35	0	0	1921	63
ACADIA						1												3	
ALLEN																		4	
ASCENSION																		6	
ASSUMPTION																		1	
AVOUELLES																		7	
BEAUREGARD						1												5	
BIENVILLE																		22	3
BOSSIER					2	1				2			1					216	2
CADDO					4	2												79	
CALCASIEU						4							1		1				
CALDWELL																			
CAMERON																		1	
CATAHOULA																		3	
CLAIBORNE																		6	
CONCORDIA					3													17	
DESOTO																		59	2
EAST BATON ROUGE					3	1							2		15			12	1
EAST CARROLL																		4	
EAST FELICIANA																		7	
EVANGELINE					1	1		2										1	2
FRANKLIN																		3	
GRANT	1																	11	2
IBERIA						1												2	
IBERVILLE					1														

*Includes Rubella, Congenital Syphilis, and Neonatal Syphilis.

In spite of an additional injection of bicillin, the child's fever continued and he began to have an annoying cough. Ten days after the onset of his initial symptoms, he was placed in a local hospital by his pediatrician who noted an exudate on the child's left tonsil. He had no obvious lymphadenopathy then or at any time during his illness. Laboratory studies obtained shortly after his admission included: normal sinus and chest X rays, a normal urinalysis, and a CBC which revealed 11.6 gms hbg., 14,400 WBC, 1% metamyelocytes, 4% bands, 50% segs., 34% lymphs. and 11% monos. On the 4th hospital day the child developed 4 - 5 herpetic-like ulcers on his gums and buccal mucosa. On the 6th hospital day his tularemia titer had risen from an admission level of 1:160 to 1:320. His temperature was subsiding by this time without additional antibiotics. Nonetheless, he began to receive oral terramycin on the 7th hospital day. The child's fever rapidly defervesced and he was discharged on the 10th hospital day afebrile, free of this oral ulceration and with a tularemia titer of 1:1280+.

TULAREMIA

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Tularemia is an acute bacteremic disease of wild rodents (especially rabbits) caused by *Francisella tularensis*, a small, extremely pleomorphic, aerobic, non-motile, non-spore forming, gram-negative coccobacillus. It may be secondarily transmitted to man by the bite of an infected blood sucking tick, ingestion of contaminated water or infected animal tissue, contamination of the skin or conjunctival sac with infected material, or inhalation of contaminated aerosols.

Epidemiology:

It is a cosmopolitan disease; human cases have been reported from every state of the United States except Hawaii. In the past 20 years, 25 to 38 percent of human cases have been reported from the West South Central States (Arkansas, Oklahoma, Texas, and Louisiana). In 1972, 68 of 152 cases (45%) were reported from this area with 39 of the 68 cases (57%) reported from Arkansas. The reservoirs of tularemia are almost unlimited. The organism has been isolated from more than 100 different animal and insect vectors and more than 50 different sources of human infection have been described. Prior to 1945, cottontail rabbits were the major natural reservoirs of the disease and most reported human infections followed direct contact with these animals. However in the past 20 years, the rabbit has assumed a decreasingly important role as a source of infection. Today ticks have greater importance as reservoirs of tularemia especially in the West South Central States. Three genera of ticks are most frequently involved. In decreasing order of frequency these are the Lone Star tick, the American dog tick, and the Rocky Mountain spotted fever tick.

In the majority of states east of the Mississippi River (excluding the New England and Middle Atlantic States), the cottontail rabbit is the principal vector and most human infections occur among hunters and trappers in the winter months. West of the Mississippi River, tularemia is transmitted to man primarily by ticks and most infections occur in the summer.

Clinical Manifestations:

Tularemia may be an extremely variable clinical entity; one patient may present with a low grade fever and regional lymphadenopathy, while another patient presents with a severe toxic fulminant infection which may be fatal. The incubation period may range from a few hours to 14 days, with a mean of 4.5 days. In most cases, the disease begins abruptly; very common constitutional symptoms include fever, chills, headache, backache, malaise, and weakness. Non-specific neurological symptoms such as delirium, stupor, and restlessness are not uncommon. Hepatomegaly and jaundice are occasionally seen especially with the typhoidal syndrome. *F. tularensis* produces the most pronounced reaction at the portal of entry. This has led to a classification that includes six clinical types: ulceroglandular, glandular, typhoidal, oculoglandular, oropharyngeal, and pulmonary.

Ulceroglandular Tularemia:

This accounts for 70 to 80% of all cases of tularemia, is usually easy to diagnose, and a vector history can be established in 75%. Occasionally severe constitutional symptoms overshadow the initial lesion, a painful red papule that becomes pustular and then ulcerates (2mm. to 2cm.) In 50% of the cases there is a definite correlation between the vector and the ulcer site; the tick most commonly produces a skin ulceration in warm moist areas (axillary, inguinal, perineal, genital) whereas the ulceration secondary

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																				DIVISION OF TABULATION & ANALYSIS
JACKSON																		8		
JEFFERSON	1				8	1	2						10		9			101	7	
JEFFERSON DAVIS					2													4		
LAFAYETTE			1		2	4	1											13		
LAFOURCHE					1	1									1			17	1	
LASALLE																		1		
LINCOLN																		43		
LIVINGSTON						2									1			4		
MADISON																		12	1	
MOREHOUSE																		7	1	
NATCHITOCHES					1	1									2			34		
ORLEANS	4				23	5	2						7		3			713	26	
OUACHITA					1	2				3								85	5	
PLAQUEMINES					2													2		
POINTE COUPEE																		7		
RAPIDES					5													112	4	
RED RIVER																		1		
RICHLAND																		8		
SABINE																		4		
ST. BERNARD					2													7		
ST. CHARLES						3									1			12		
ST. HELENA															1			1		
ST. JAMES						2												5		
ST. JOHN													1					6		
ST. LANDRY																		25		
ST. MARTIN						1												10		
ST. MARY					1													14	1	
ST. TAMMANY					5								1		1			22		
TANGIPAHOA	1																	21	1	
TENSAS																				
TERREBONNE	2					1	1											9		
UNION					2													6	1	
VERMILION																				
VERNON																		74	1	
WASHINGTON																		21	2	
WEBSTER																		9		
WEST BATON ROUGE																		10		
WEST CARROLL					1													2		
WEST FELICIANA					2													15		
WINN																		7		
OUT OF STATE																				

From January 1 through August 31, the following cases were also reported: 3-Actinomycosis; 6-Brucellosis; 2-Malaria.

to contact with rabbits or squirrels is distal to the wrist. Lymph nodes draining the ulcer site are enlarged, firm, discrete, tender, and may drain spontaneously.

Glandular Tularemia:

Accounting for 10 - 14 percent of all cases this variety is defined as localized lymphadenopathy without a cutaneous ulceration: presumably the organism penetrates the unbroken skin.

Typhoidal Tularemia:

Typhoidal tularemia, accounting for 10 to 15% of all cases, includes patients with no primary skin ulcer, no eye involvement, and no adenopathy except that associated with oropharyngeal involvement. These patients may be extremely ill with fever, chills, headaches, stupor, delirium, malaise, weakness, anorexia, abdominal pain, nausea, vomiting, diarrhea, marked dehydration, pharyngitis, and meningismus. More than one family member may be infected since this syndrome most often results from ingestion of poorly cooked rabbit. Oropharyngeal involvement is present in 35% of these cases and 50% have pneumonia and/or pleural effusion. The mortality may approach 35% because of multiple organ system involvement and frequently a late or missed diagnosis.

Oculoglandular Tularemia:

This syndrome results from the transfer of infected material (usually from the fingers) to the eye and accounts from 1 to 4% of cases. These patients complain of unilateral itching, lacrimation, dimness of vision, redness, and pain. If untreated, ulceration and/or perforation of the cornea and acute dacryocystitis may develop.

Oropharyngeal Tularemia:

E. tularensis, when ingested, may involve the oropharynx. In 102 cases of typhoidal tularemia reviewed by Dienst, 36 (35.3%) had oropharyngeal tularemia, 14 of these patients (36.9%) died. These patients may be quite toxic, febrile, frequently delirious, comatose, and experience abdominal pain, vomiting, and diarrhea. There is an ulcerative pharyngitis with or without a gray necrotic membrane (resembling diphtheria) that covers the posterior oropharyngeal wall or tonsils or both. The cervical lymph nodes may be enlarged (resembling the "bull neck" of diphtheria), tender, and frequently ulcerate. Several members of the same family may be involved as most cases result from poorly cooked rabbit meat.

Pulmonary Tularemia:

Primary pulmonary tularemia resulting from inhalation of the organism is rare in naturally acquired infection. Hematogenous or lymphatic spread from a primary ulceration is probably a much more frequent cause of pneumonia. In cases of tularemia with pulmonary involvement symptoms include a dry cough (or one productive of scanty mucoid and rarely blood-streaked sputum), pleurisy, dyspnea, and rarely, cyanosis. About 1/4 of these patients with pulmonary tularemia have extensive radiographic involvement but few or no symptoms. On physical examination, diffuse generalized moist rales (60%) and localized moist rales, signs of consolidation and a pleural rub (40%) may be noted. Radiographically, the most frequent findings are (in decreasing order of frequency) bronchopneumonia, hilar adenopathy, pleural effusion, consolidation, apical infiltrates, and ovoid densities. Involvement is bilateral (65%) and unilateral or bilateral exudative pleural effusion may occur (50%).

Diagnosis:

The diagnosis can be established by employing a combination of epidemiological, clinical, and serological methods. Tularemia should be considered in the differential diagnosis of any patient who presents with an unexplained fever, especially if he has recently traveled through or lived in an endemic area. The following historical points should suggest the diagnosis: direct contact with wild rodents (especially rabbits), history of tick bites, abrupt onset of a severe illness manifested by skin or conjunctival ulceration with associated regional lymphadenopathy and continuing remittent fever. Failure to elicit a history of contact with vectors of tularemia does not rule out the diagnosis.

The demonstration of serum agglutinins for *E. tularensis* is a simple and reliable method for confirming a presumptive diagnosis of tularemia. Serum agglutinins are absent during the first week of illness, appear in low titer during the second week with an increase to a maximum titer of 1:1280 to 1:2560 by the end of the third or fourth week when a decline in titer occurs. Rarely agglutinins may not appear until the third or fourth week of illness. Although some sera from patients with brucellosis and tularemia may show cross agglutination, the titer is usually higher with the homologous antigen. About 50% of patients with tularemia present with a serum agglutinin titer of 1:160 or greater which is considered diagnostic. The other 50% demonstrate a rising titer during the course of illness which is also diagnostic.

Although *E. tularensis* may be isolated from clinical specimens this should be attempted only by

Map of the United States showing the number of people in each state (in millions):

State	Population (Millions)
Ala.	427
Alas.	3
Ariz.	56
Ark.	3198
Calif.	467
Conn.	11
Del.	11
D.C.	157
Fla.	248
Ga.	1799
H.I.	0
Idaho	108
Ill.	3799
Ind.	1113
Iowa	527
Kans.	949
Ky.	1617
La.	1127
Me.	1
Mass.	49
Mich.	373
Miss.	907
Mo.	2030
Md.	554
Mont.	565
N.H.	2
N.J.	62
N.Y.	143
N.C.	690
N.D.	60
Nev.	198
Ohio	1561
Okl.	1205
Ore.	161
Penn.	360
R.I.	7
S.C.	471
S.D.	59
Tenn.	1823
Texas	1349
Utah	1025
Va.	1934
Vt.	64
Wash.	52
W.Va.	143
Wis.	520
Wyo.	832

[illegible]

laboratory workers who have been vaccinated with the live attenuated vaccine strain of F. tularensis. Death has resulted from laboratory acquired tularemia.

An intradermal skin test, using killed F. tularensis organisms, when positive, gives a tuberculin type reaction within 48 hrs. in approximately 92% of patients with tularemia. This test has the advantage of being highly sensitive and specific and becomes positive during the first week of illness when the agglutination test is still negative.

Treatment:

Before streptomycin was introduced in 1946 the overall case fatality rate for tularemia was 7%. Today with appropriate antimicrobial therapy tularemia is rarely a fatal disease. Streptomycin is the antibiotic of choice. For adults 0.5 grams intramuscularly every 12 hours for 10 days is usually sufficient treatment. For children, treatment for 10 days with streptomycin, 40mgs. per kilogram of body weight, daily in two divided doses is adequate. With streptomycin therapy there is usually marked clinical improvement in 48 to 72 hours with lysis of fever, decreased headaches, and myalgias. Although none of the naturally acquired strains of F. tularensis are streptomycin-resistant, approximately 75% of laboratory acquired strains are. These latter strains are usually sensitive to other antibiotics. Tetracycline is as effective as streptomycin in controlling the acute systemic manifestations of tularemia. However, this bacteriostatic drug is less effective than streptomycin in eradicating the organism from the tissues and relapses occur if the dose or duration of therapy is insufficient. Relapses do not occur at an oral dose for an adult of 2 grams of tetracycline every day for 15 days. For children, a tetracycline, 20 to 40 mgm. per kilogram per day, orally, in 4 divided doses for 10 days is adequate.

Kanamycin, 15mgm. per kilogram intramuscularly per day in two divided doses for 10 days is adequate therapy but no more effective than streptomycin. Gentamicin has proved to be an effective drug for experimental simian tularemia and at least one human case has been treated successfully with gentamicin.

The local ulceration requires no specific therapy. Enlarged lymph nodes should not be aspirated until fluctuant. Since man-to-man transmission has never been demonstrated, it is not necessary to isolate patients with tularemia.

Prophylaxis:

To prevent tularemia direct contact with rabbits and ticks, the most important sources of infection, as well as other potentially infected rodents and arthropods must be avoided.

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