**TABLE 195-1 CLINICAL PRESENTATION OF TULAREMIA**

| | Rate of Occurrence, % | |
|---|---|---|
| Sign or Symptom | Children | Adults |
| Lymphadenopathy | 96 | 65 |
| Fever (≥38.3°C or ≥101°F) | 87 | 21 |
| Ulcer/eschar/papule | 45 | 51 |
| Myalgias/arthralgias | 39 | 2 |
| Headache | 9 | 5 |
| Cough | 9 | 5 |
| Pharyngitis | 43 | — |
| Diarrhea | 43 | — |

***Source:*** Adapted from RF Jacobs, JP Narain: Pediatrics 76:818, 1985; with permission.

In the United States, most patients with tularemia (75–85%) acquire the infection by inoculation of the skin. In adults, the most common localized form is inguinal/femoral lymphadenopathy; in children, it is cervical lymphadenopathy. About 20% of patients develop a generalized maculopapular rash, which occasionally becomes pustular. Erythema nodosum occurs infrequently. The clinical manifestations of tularemia have been divided into various syndromes, which are listed in Table 195-2.

**Ulceroglandular/Glandular Tularemia** These two forms of tularemia account for ~75–85% of cases. The predominant form in children involves cervical or posterior auricular lymphadenopathy and is usually related to tick bites on the head and neck. In adults, the most common form is inguinal/femoral lymphadenopathy resulting from insect and tick exposures on the lower limbs. In cases related to wild game, the usual portal of entry for *F. tularensis* is either an injury sustained while skinning or cleaning an animal carcass or a bite (usually on the hand). Epitrochlear lymphadenopathy/lymphadenitis is common in patients with bite-related injuries.

In ulceroglandular tularemia, the ulcer is erythematous, indurated, and nonhealing, with a punched-out appearance that lasts 1–3 weeks. The papule may begin as an erythematous lesion that is tender or pruritic; it evolves over several days into an ulcer with sharply demarcated edges and a yellow exudate. The ulcer gradually develops a black base, and simultaneously the regional lymph nodes become tender and severely enlarged (Fig. 195-1). The affected lymph nodes may become fluctuant and drain spontaneously, but the condition usually resolves with effective treatment. Late suppuration of lymph nodes has been described in up to 25% of patients with ulceroglandular/glandular tularemia. Examination of material taken from these late fluctuant nodes after successful antimicrobial treatment reveals sterile necrotic tissue. In 5–10% of patients, the skin lesion may be inapparent, with lymphadenopathy plus systemic signs and symptoms the only physical findings (*glandular tularemia*). Conversely, a tick or deerfly bite on the trunk may result in an ulcer without evident lymphadenopathy.

**Oculoglandular Tularemia** In ~1% of patients, the portal of entry for *F. tularensis* is the conjunctiva, which the organism usually reaches through contact with contaminated fingers. The inflamed conjunctiva is painful, with numerous yellowish nodules and pinpoint ulcers.

**TABLE 195-2 CLINICAL SYNDROMES OF TULAREMIA**

| | Rate of Occurrence, % | |
|---|---|---|
| Syndrome | Children | Adults |
| Ulceroglandular | 45 | 51 |
| Glandular | 25 | 12 |
| Pulmonary (pneumonia) | 14 | 18 |
| Oropharyngeal | 4 | — |
| Oculoglandular | 2 | — |
| Typhoidal | 2 | 12 |
| Unclassified | 6 | 11 |

***Source:*** Adapted from RF Jacobs, JP Narain: Pediatrics 76:818, 1985; with permission.

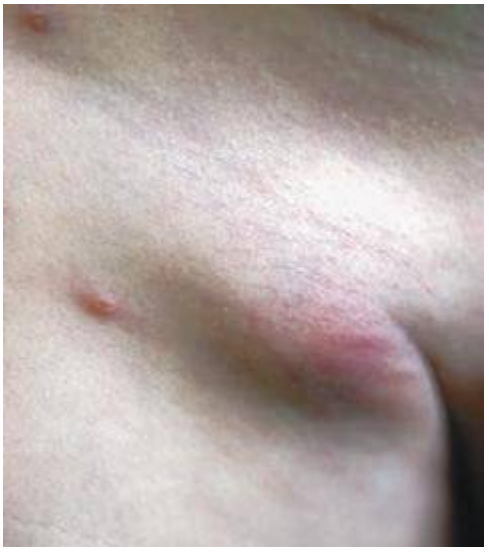

**FIGURE 195-1 An 8-year-old boy with inguinal lymphadenitis** and associated tick-bite site characteristic of ulceroglandular tularemia.

Purulent conjunctivitis with regional lymphadenopathy (preauricular, submandibular, or cervical) is evident. Because of debilitating pain, the patient may seek medical attention before regional lymphadenopathy develops. Painful preauricular lymphadenopathy is unique to tularemia and distinguishes it from tuberculosis, sporotrichosis, and syphilis. Corneal perforation may occur.

**Oropharyngeal and Gastrointestinal Tularemia** Rarely, tularemia follows ingestion of contaminated undercooked meat, oral inoculation of *F. tularensis* from the hands in association with the skinning and cleaning of animal carcasses, or consumption of contaminated food or water. Oral inoculation may result in acute, exudative, or membranous pharyngitis associated with cervical lymphadenopathy or in ulcerative intestinal lesions associated with mesenteric lymphadenopathy, diarrhea, abdominal pain, nausea, vomiting, and gastrointestinal bleeding. Infected tonsils become enlarged and develop a yellowish-white pseudomembrane, which can be confused with that of diphtheria. The clinical severity of gastrointestinal tularemia varies from mild, unexplained, persistent diarrhea with no other symptoms to a fulminant, fatal disease. In fatal cases, the extensive intestinal ulceration found at autopsy suggests an enormous inoculum.

**Pulmonary Tularemia** Pneumonia due to *F. tularensis* presents as variable parenchymal infiltrates that are unresponsive to treatment with β-lactam antibiotics. Tularemia must be considered in the differential diagnosis of atypical pneumonia in a patient with a history of travel to an endemic area. The disease can result from inhalation of an infectious aerosol or can spread to the lungs and pleura via bacteremia. Inhalation-related pneumonia has been described in laboratory workers after exposure to contaminated materials and, if untreated, can be associated with a relatively high mortality rate. Exposure to *F. tularensis* in aerosols from live domestic animals or dead wildlife (including birds) has been reported to cause pneumonia. Hematogenous dissemination to the lungs occurs in 10–15% of cases of ulceroglandular tularemia and in about half of cases of typhoidal tularemia. Previously, tularemia pneumonia was thought to be a disease of older patients, but as many as 10–15% of children with clinical manifestations of tularemia have parenchymal infiltrates detected by chest roentgenography. Patients with pneumonia usually have a nonproductive cough and may have dyspnea or pleuritic chest pain. Roentgenograms of the chest usually reveal bilateral patchy infiltrates (described as ovoid or lobar densities), lobar parenchymal infiltrates, and cavitary lesions. Pleural effusions may have a predominance of mononuclear leukocytes or PMNs and sometimes red blood cells. Empyema may develop. Blood cultures may be positive for *F. tularensis*.