PEDIATRIC DERMATOLOGY PHOTOQUIZ

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An Erythematous Ear

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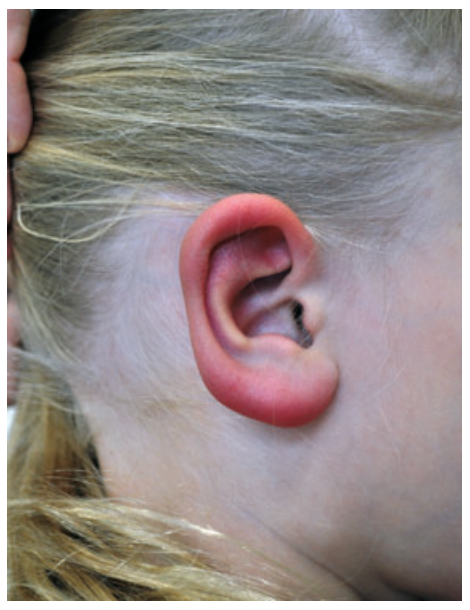
Case Presentation

A 5-year-old girl presented to our dermatology clinic at Oregon Health and Science University for consultation regarding erythema and edema of the right ear. She was otherwise healthy. Her mother had first noted the right superior helix to be "red and swollen" 4 months before. At that point, her primary care provider had treated her with antibiotic eardrops for suspected otitis externa, without improvement. The otolaryngology service next evaluated her and treated her with a 10-day course of prednisone and cephalexin. She had no response to this treatment either. Over the ensuing months, the affected area extended to involve the entire helix and earlobe. The area was initially tender but became asymptomatic after the first month. She had no other symptoms, specifically, no fever, weight loss, arthralgia, myalgia, or other cutaneous lesions.

She did not have a history of trauma, recent illness, or medications before development of the eruption. She had unremarkable past medical and family histories. She patient had lived in the United States her entire life. She had traveled to the Lake Constance region of Germany for a vacation with her mother a few weeks before onset of the current illness.

Physical examination revealed the patient to be afebrile and well appearing. The right ear, from helix to earlobe, was brightly erythematous and warm with firm, nonpitting edema (Fig. 1). There was no overlying epidermal change. The remainder of the cutaneous examination was unremarkable. Incisional biopsy of the helical rim was performed (Figs. 2 and 3).

What is the diagnosis?



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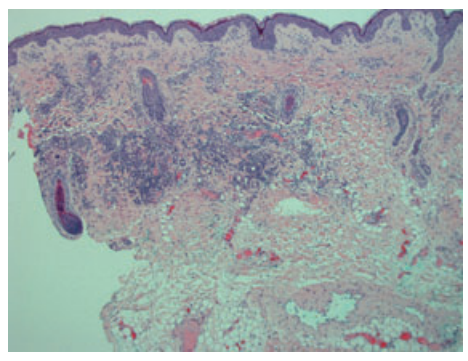

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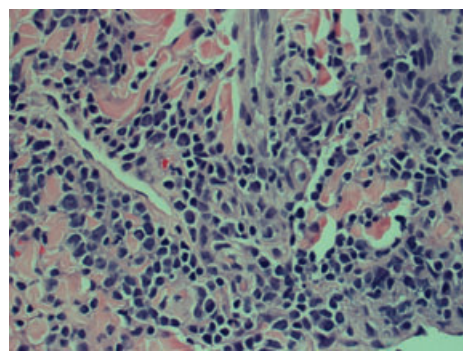

Figure 3.

An Adolescent Boy with Persistent Penile and Scrotal Erythema and Swelling

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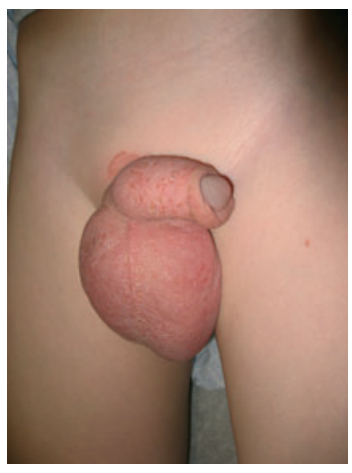
Case Presentation

An 11-year-old Caucasian boy presented to our dermatology clinic with a 1-year history of a mildly pruritic, scaly, erythematous, edematous plaque involving the entire penis and scrotum. Potassium hydroxide preparation was negative for fungi. Clinical impression at that time was psoriasis, and he improved somewhat with topical corticosteroids, but over the next 2 years, he developed more nontender edema and erythema of the scrotum and the penis. He remained otherwise healthy without any fever, chills, or weight loss. Family history was positive for psoriasis and eczema.

Physical examination of the groin and genitalia revealed scrotal and penile edema and erythema without increased warmth or signs of infection. Overlying the erythema were multiple scaly papules extending from the distal shaft of the penis to the scrotum and then under the raphe and up the gluteal cleft (Figs. 1 and 2). The rest of skin examination was unremarkable.

A 4-mm punch biopsy of the scrotum was performed. The histopathologic features are illustrated in Figs. 3 and 4.

What is the diagnosis?



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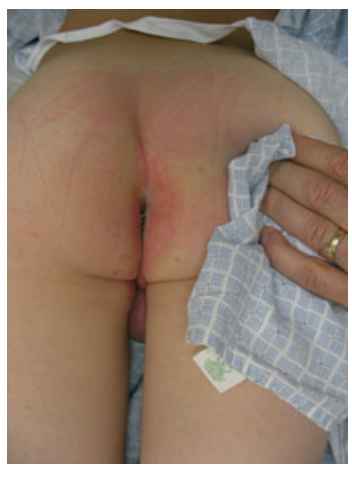

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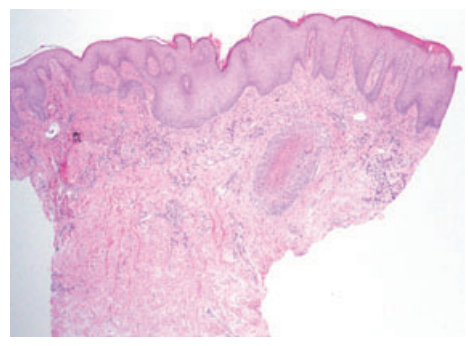

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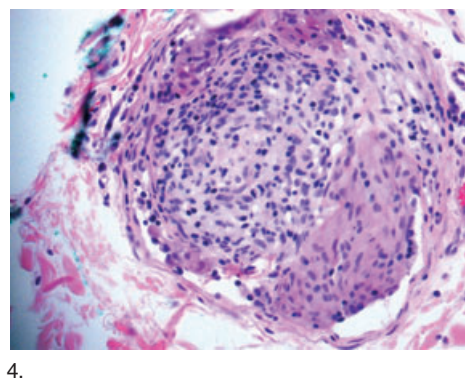

Figure 4.

Febrile Illness with Papular and Vesicular Exanthem and Ulceronecrotic Plaques

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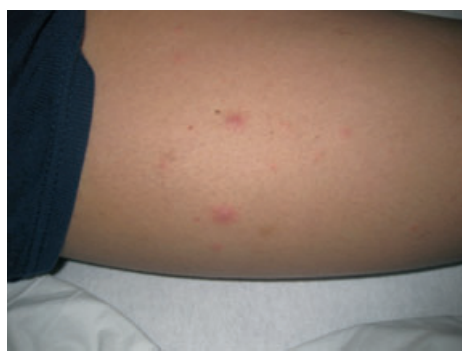
Case Presentation

An ill-appearing 12-year-old boy was hospitalized in April with a 4-day history of fever, severe headaches, neck pain, photophobia, and malaise. There were 40 to 50 erythematous papules and vesicles scattered on his face, torso, and extremities (Fig. 1) and two tender 2- by 1-cm inflammatory nodules with necrotic eschars on his back (Fig. 2). No enanthem or regional lymphadenopathy were noted. Routine bacterial and viral cultures of cerebral spinal fluid (CSF), blood, and one of the necrotic skin lesions on the back were negative. Polymerase chain reaction of CSF and skin for herpes simplex virus and varicella-zoster virus were also negative. A biopsy of one of the ulceronecrotic nodules on his back was obtained, which showed a focal epidermal ulceration associated with ballooning degeneration of keratinocytes, necrosis of the epidermis, and a mixed band-like predominantly lymphohistiocytic inflammatory infiltrate adjacent to the epidermis in addition to superficial and deep perivascular lymphohistiocytic inflammation. Prominent papillary dermal edema and focal areas of vascular damage were also noted (Fig. 3). Additional history revealed that a pet gerbil had died from unknown causes 2 days after the onset of the patient's symptoms. There was no known infestation of the patient's home by mice or other rodents. There were no other household pets and no known exposures to fleas, mites, or ticks. The patient had no history of recent travel outside of the Philadelphia area.

What is the diagnosis?



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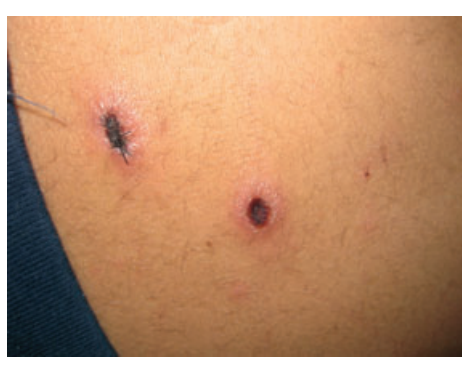

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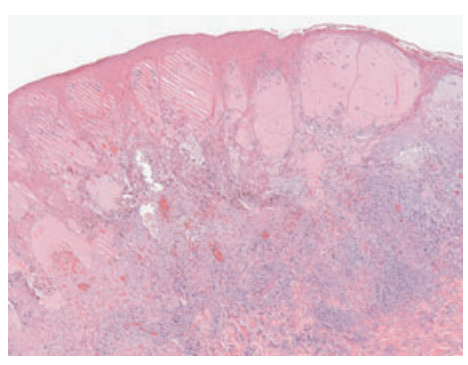

Figure 3.

An Erythematous Ear

Diagnosis: Borrelia lymphocytoma

Histopathology

Histologic examination of the skin biopsy at 4× magnification revealed a patchy, moderately dense interstitial infiltrate consisting of lymphocytes, plasma cells, and histiocytes. At 40× magnification, the lymphocytes were observed to be large, with prominent, irregular nuclei.

Discussion

At follow-up visit, enzyme-linked immunosorbent assay (ELISA) and Western blot were performed for suspected Borrelia lymphocytoma, and she was empirically started on amoxicillin 50 mg/kg per day divided into three doses for 3 weeks. The ELISA was positive for Borrelia antibody (2.07; positive is >1.21), and Western blot IgG was positive with six bands. Immunoglobulin (Ig)M was negative. The erythema and edema of her ear improved dramatically toward the end of her 3-week antibiotic course. At follow-up 2 months later, the ear appeared normal.

Borrelia lymphocytoma occurs predominantly in Europe (1). Cases of Borrelia-associated lymphocytoma may be underreported and underrecognized, especially in children (2). *Borrelia afzelii* and *Borrelia garinii* are the major causes of European lymphocytoma (3,4). These species are not seen in the United States, where the only recognized pathogenic species is *Borrelia burgdorferi sensu stricto*. Lyme borreliosis is rare in Oregon, with only 71 locally acquired cases reported from 1999 to 2004 (5).

In children, Borrelia lymphocytoma occurs most often on the ear. Breast involvement is less common than in adults (2). Many patients do not recall tick bites in these locations. It has been suggested that Borrelia spirochetes may have tropism for cooler body sites (6). Lyme borreliosis may have up to three stages: stage 1 is mainly lymphocutaneous involvement; stage 2 results from systemic spread to the nervous, cardiac, and musculoskeletal systems; and stage 3 refers to late sequelae. Lymphocytoma occurs during the second stage of the disease. In an Austrian study of nine patients, the average interval between tick bite and lymphocytoma was 5.5 weeks (7). Fortunately, despite occurring during the systemic stage, lymphocytoma is rarely associated with extracutaneous symptoms (8).

Borrelia culture is difficult, and polymerase chain reaction for direct detection of Borrelia organisms is not sensitive or economical, but serologic testing can help detect cases of Borrelia lymphocytoma. The two-tier test protocol, starting with ELISA and then immunoblotting, is recommended for investigation of suspected Lyme borreliosis (9). Western blot is the most specific study.

The Centers for Disease Control and Prevention and U.S. and German associations for pediatric infectious disease recommend treatment for Borrelia lymphocytoma with oral amoxicillin 50 mg/kg per day for children younger than 9 or oral doxycycline 100 mg twice a day for older children for 14 to 21 days.

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An Adolescent Boy with Persistent Penile and Scrotal Erythema and Swelling

Diagnosis: Granulomatous lymphangitis (a variant of cutaneous Crohn disease)

Microscopic Findings, Additional Studies, and Clinical Follow-Up

Histopathologic evaluation revealed psoriasiform acanthosis of the epidermis and a diminished granular cell layer. A collection of epithelioid histiocytes and giant cells with central fibrinoid necrosis was present within the upper dermis. Granulomas were also noted in the deep lymphatics. Periodic acid Schiff and acid-fast bacilli stains were negative.

The boy was referred to a gastroenterologist, and esophagogastroduodenoscopy and colonoscopy with biopsies revealed no evidence of active ileitis or colitis. Rectal biopsies revealed isolated microgranulomas. Laboratory studies showed high anti-*Saccharomyces cerevisiae* antibodies (ASCA) immunoglobulin (Ig)G and IgA titers. Tuberculin test and chest radiograph were normal. The gastroenterologist's conclusion was metastatic (cutaneous) Crohn disease (CD). Twice monthly adalimumab injections were started, and the penile and scrotal swelling improved dramatically within 9 months. The boy continued to feel well, without any gastrointestinal symptoms related to CD. Further review of the case and slides with the identification of granulomas in the lymphatics led us to the diagnosis of granulomatous lymphangitis (GL).

Discussion

Genital edema is a rare condition that is most commonly benign and self-limited. In children, it is usually idiopathic and thought to be a localized variant of angioedema (1), but the persistence of scrotal and penile swelling and the presence of granulomatous inflammation points to GL, a rare cause of genital swelling in children. GL is associated with concurrent or subsequent development of CD and is histopathologically indistinguishable from CD (1,2). Hence, it is often referred to as a variant of cutaneous Crohn disease (GL-CCD) (1).

Granulomas of CD can occur at sites distant from the gastrointestinal tract, particularly the skin (3). Skin lesions appear more commonly when CD involves the colon than the ileum alone (4). When involving the anogenital area, this can present as nontender erythema and swelling of the penis or the vulva (2). The swelling is thought to be secondary to lymphedema as a result of inflammation involving the lymph vessels and subsequent lymphatic obstruction (1).

Histologically, GL-CCD is characterized by discrete, noncaseating granulomas with numerous Langerhans-type multinucleated giant cells present in the superficial and deep dermis and the adipose tissues. Perivascular or perifollicular accentuation and extravascular neutrophilia are often present as well (4). The presence of granulomas within lymphatics is the essential feature of granulomatous lymphangitis (1).

Granulomatous lymphangitis-cutaneous Crohn disease affects boys and girls equally, with a reported age of onset of 10 to 14 years (4). The most common presentation of GL-CCD in children is genital involvement, with swelling and induration of the genitals with or without erythema in 85% of reported cases (4). Only 47.5% of children diagnosed with GL-CCD have a concurrent diagnosis of CD, but 42.5% subsequently develop CD within 9 months to 14 years (4). Therefore, clinical and laboratory examinations should be performed to look for evidence of CD at the time of presentation, as well as during follow-up for future development, although 7.5% of cases do not develop any signs of CD and may represent a forme fruste of CD (1).

Patients with suspected GL-CCD require a careful diagnostic evaluation (5). Biopsies of the affected area should be obtained for histologic examination and special staining for acid-fast bacilli and fungi (5). Additional investigations include complete blood count, erythrocyte sedimentation rate, ASCA Ig, chest radiograph, and a tuberculin test (5). Esophagogastroduodenoscopy and colonoscopy with biopsies should be performed to look for evidence of CD. Treatment options include topical and oral corticosteroids; chemotherapeutic agents such as azathioprine, cyclosporin, and sulfasalazine; and biological agents such as infliximab and adalimumab (4).

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Febrile Illness with Papular and Vesicular Exanthem and Ulceronecrotic Plaques

Diagnosis: Rickettsialpox

Further Investigations and Course

Empiric doxycycline was started with rapid clinical improvement. The skin biopsy specimen was sent to the Centers for Disease Control and Prevention (CDC), where an immunohistochemical stain to spotted fever group rickettsia (SFGR) was positive (Fig. 4). A convalescent serum specimen demonstrated seroconversion with immunoglobulin (Ig)G antibodies reactive to SFGR antigens (1:256).

Discussion

The obligate intracellular bacteria *Rickettsia akari* causes rickettsialpox, which is transmitted to humans through the bite of the house mouse mite (*Liponyssoides sanguineus*). The house mouse, *Mus musculus*, is considered to be the natural vertebrate reservoir for *R. akari*. The house mouse mite has also been isolated from other rodent species, including gerbils (1). Serologic evidence of infection with *R. akari* has been noted in other rodent species but to our knowledge not in gerbils.

After an incubation period of 9 to 14 days, an indurated, ulcerated papule or nodule with eschar forms at the site of the bite; two primary lesions with eschar may be seen (2,3). A generalized papulovesicular eruption that typically spares the palms and soles then occurs. Fever, headache, malaise, and leukopenia are common, and neck pain, photophobia, and a vesicular enanthem involving the oral mucosa are described occasionally.

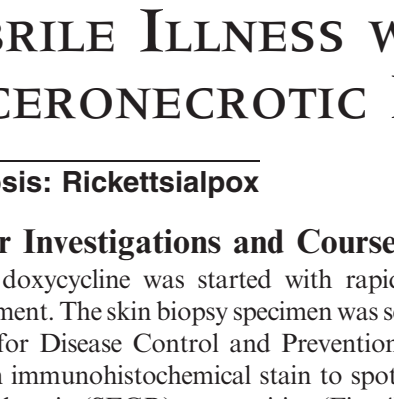

Figure 4.

Diagnosis may be made by demonstrating the development of convalescent antibodies to the SFGR. Specialized reference laboratories, including the CDC, can perform immunohistochemical SFGR staining on skin biopsy specimens (4). Of the spotted fever group rickettsioses, only rickettsialpox is considered endemic to urban centers of the northeastern United States. Other eschar-associated spotted fever group rickettsioses endemic to the United States include *Rickettsia parkeri* rickettsiosis in the southeast and *Rickettsia* 364D rickettsiosis in California (5).

The differential diagnosis of rickettsialpox includes varicella, coxsackievirus A16 and other enteroviral infections, infectious mononucleosis, disseminated herpes simplex, and gonococcemia. When only the primary inoculation lesion is clinically apparent, the differential diagnosis includes other infectious causes of eschars, including cutaneous anthrax, bacterial ecthyma, and cutaneous mucormycosis or aspergillosis, and noninfectious conditions such as spider bites.

The treatment of choice for rickettsialpox is doxycycline for 5 to 10 days; rapid and complete recovery is expected, although symptoms in untreated patients also resolve within 10 to 14 days.

Although the majority of cases of rickettsialpox in the United States have been reported in New York City, some have come from other cities, predominantly larger urban areas (6). During 2001, an increase in the number of reported cases in New York City was seen after the identification of several cases of bioterrorism-associated cutaneous anthrax (7). To our knowledge, this is the first case of rickettsialpox reported from Philadelphia since 1952 (8).

Rickettsialpox is probably underrecognized because most cases present with mild, self-limited symptoms, but patients may also present with clinical findings suggestive of a more serious infection. Recognition of the cutaneous eschar and papulovesicular rash and a high index of suspicion in metropolitan areas with large rodent populations is paramount to making the diagnosis.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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