Canine juvenile cellulitis is a rare disorder primarily seen in puppies. It presents as an edematous vesiculopustular dermatitis that mainly affects the face, pinnae, and submandibular lymph nodes. The cause of this disorder is unknown but is suspected to have a hereditary component. Infectious agents, including bacterial agents and viral agents such as distemper virus and herpesvirus, have been considered as causes. However, the lesions are usually sterile, and, often, resolution of disease is much slower with antibiotics alone than with antibiotics and glucocorticoids. Also, special stains and electron microscopy have failed to demonstrate microorganisms. Inoculation of tissue from infected dogs into neonatal pups has not produced disease.

Another theory is that juvenile cellulitis is a hypersensitivity reaction, but this, too, is doubtful as treatment of most hypersensitivity disorders requires allergen elimination or lifelong antiinflammatory or immunosuppressive drug therapy. However, the proposed hypersensitivity reaction may be only temporary in nature in young, growing puppies, which may explain why most cases need only a transient course of immunosuppressive treatment. Other potential causes that have been suggested include poor hygiene, inadequate nutrition, endoparasites, stress, and a reaction to vaccination. As this disease is characterized by a significant positive response to glucocorticoids, there is likely an underlying immune dysfunction.

**Age Predisposition**
- Occurs most commonly in puppies between the ages of 3 weeks and 4 months.
- Has been documented in a dog 8 months of age and suspected in two adult dogs (one was 2 years of age and the other was 4 years of age).

**Breed Predisposition**
- Any breed can be affected, but dachshunds, golden retrievers, Labrador retrievers, Gordon setters, beagles, and pointers may be predisposed.
- A high incidence of this disease process has been shown to occur in Gordon setters. It has been reported that approximately 25% of puppies from affected litters had juvenile cellulitis.

**Owner Observations**
- The owners first notice facial swelling, mainly around the eyelids, lips, muzzle, and pinnae.
- This progresses quickly within 24 to 48 hours to the development of papules and pustules all over the face. The face may become painful.
- An owner may also notice that the puppy is anorectic, lethargic, febrile, and has joint pain.

**Other Historical Considerations/Predispositions**
- As heredity is implicated in the etiology, it is important to ask if other puppies in the litter have been affected.

**Physical Examination Findings**
- Edematous muzzle, lips, and eyelids. The swelling is bilaterally symmetric.
- Prominent submandibular lymphadenopathy.
- Within 24 to 48 hours, bilaterally symmetric erythema, papules, vesicles, and pustules develop on the lips, muzzle, chin, bridge of the nose, pinnae, and periorbital regions.
- Frequently, alopecia and crusting develop in swollen areas.
Lesions may worsen and drain a serous to purulent exudate.
The swollen areas are not pruritic but are often painful.
A pustular otitis may occur, and the pinnae may swell.
Firm to fluctuant subcutaneous nodules that may be painful or fistulate may occur around the anus, on the prepuce, and on the trunk.
A regional to diffuse lymphadenopathy may be present.
Puppies that are severely affected may be lethargic, anorectic, and febrile and may have joint pain.
Swollen paws rarely occur. If treatment is delayed, cicatricial (symmetrical scarring) alopecia may result.
In some atypical cases, only the pinnae and ear canals are affected.

Laboratory Findings
- Cytology of skin or ear exudate: purulent to pyogranulomatous inflammation. A secondary infection with bacteria or yeast may be identified.
- Cytology of lymph node aspirate: suppurative, pyogranulomatous, or granulomatous inflammation. No microorganisms are seen.
- Dermatohistopathology: Ideally, biopsy samples should be obtained from early, intact pustules, vesicles, or nodules. A punch biopsy of 4 to 6 mm is usually sufficient. Larger punches and wedge biopsies can result in larger lesions that are more difficult to close as the tissue may be friable.
  — Epidermis: May be normal, hyperplastic, ulcerated, or contain pustules.
  — Dermis: Usually multiple discrete or confluent granulomas and pyogranulomas. These granulomas and pyogranulomas have clusters of epithelioid macrophages with cores of neutrophils. They may also be pustular and suppurative. Several neutrophils may be seen in the superficial dermis and extend into and around follicles.
  — Pyogranulomas may extend to the panniculus and to the subcutis. Suppurative inflammation may also extend to the subcutis.
  — Chronic lesions may show scarring, especially within the subcutis.
  — Infectious agents are not seen.
- Bacterial cultures are normally sterile but can be positive if secondary infections are present; coagulase-positive staphylococci are most commonly isolated.

Other Diagnostic Findings
- Chemistries and complete blood counts are not routinely conducted. However, some abnormalities have been noted:
  — Chemistry: Total serum globulin levels are normal. Hypoalbuminemia, elevated bile acid levels, and elevated alkaline phosphatase levels have been reported.
  — Complete blood count: A normocytic, normochromic anemia, leukocytosis with neutrophilia, and monocytosis have been reported.

Summary of Diagnostic Criteria
- If the dog is between 3 weeks and 4 months of age and presents with the facial signs listed in the physical examination section, juvenile cellulitis will be a top differential.
- Once the basic cytology has been completed, it is very important to obtain biopsy samples to confirm the diagnosis of juvenile cellulitis.

Diagnostic Differentials
- Bacterial pyoderma (can resemble chin pyoderma or deep pyoderma):
  — Cytology should be conducted on samples from intact pustules or from under crusts to look for bacterial infection. Bacteria may be found with secondary infection in cases of juvenile cellulitis.
  — Culture of tissue samples collected by surgical prep can also rule out infection.
- Demodicosis: Deep skin scrapings should be performed on lesional skin.
- Dermatophytosis:
  — Hair and crust should be tested on dermatophyte test medium.
  — A trichogram (examination of hair under a microscope) may be conducted looking for evidence of arthroconidia (including ectothrix and endothrix spores and hyphal invasion of hairs). If arthroconidia are not found along the hair shaft, this does not rule out dermatophytosis.
- Angioedema: Dermatohistopathology of biopsy samples should help to rule this out.
- Adverse cutaneous drug reaction: The owner should be questioned about recent administration of medications (including routine vaccinations). Dermatohistopathology of biopsy samples should help to rule this out.
- Distemper: Although distemper is a diagnostic differential and has been considered in the etiology of juvenile cellulitis, it is not currently thought to be the main cause of this disease. Distemper is much
Alternative/Optional Treatments/Therapy

- Griseofulvin 14–34 mg/kg PO q24h. No required length of treatment has been reported. Recently studied cases in which this drug was administered showed resolution within 3 weeks. We are not aware of any confirmed juvenile cellulitis cases that did not respond to appropriate glucocorticoid treatment. However, griseofulvin is thought to work via its immunomodulatory properties.

Supportive Treatment

- It is very important to ensure that the puppy is obtaining adequate nutrition during this period of growth. This may be more of a concern in patients presenting with inappetence. $

- Often, these patients are very painful. In these cases, a short-term (1 to 3 days) course of a pain medication such as tramadol may be appropriate. The suggested dosage is 1–4 mg/kg PO q8–12h. $

Patient Monitoring

- Normally, the patient improves rapidly. The veterinarian or a technician should talk with the owners every 2 to 3 days for an update. If the patient worsens, reassessment is necessary. If treatment is going well, it is appropriate to recheck 2 to 3 weeks from the initial visit so that medications may be adjusted. Also, because the patient may be growing quickly during this time period, dosages may need to be increased accordingly.

Home Management

- It is crucial for owners to follow the medication regimens indicated by their veterinarians.

- If signs worsen, the owner should notify the veterinarian in case another problem is occurring.

Milestones/Recovery Time Frames

- Generally, facial lesions should begin to resolve within 1 to 3 days of beginning corticosteroid treatment. Lameness, fever, and appetite should greatly improve or resolve by this time.

- All lesions should resolve within 1 to 4 weeks of treatment. Treatment may take longer if the panniculus is affected. Scarring alopecia may remain if treatment was started later in the course of the disease.

Treatment Contraindications

- NSAIDs should not be used for pain management as they are contraindicated with concurrent glucocorticoid therapy.

- Tramadol is contraindicated in severely debilitated patients.
• Other immunosuppressive agents, such as cyclosporine, are not indicated for this disease process.

PROGNOSIS

Favorable Criteria
• Prognosis is good if treatment is instituted within 4 to 5 days. However, treatment started later can often have favorable results.
• Relapses are very uncommon.
• Rarely, this disease spontaneously resolves.

Unfavorable Criteria
• If any secondary infection is present, it must be addressed because immunosuppressive dosages of glucocorticoids can lead to worsening of infectious diseases.
• If treatment is delayed, permanent scarring can occur.
• With no treatment, death can occur or euthanasia may be recommended because of pain, a poor quality of life, or the presence of secondary infections.

RECOMMENDED READING


ARTICLE #2 CE TEST

The Auburn University College of Veterinary Medicine approves this article for 1 contact hour of continuing education credit. Those who wish to apply this credit to fulfill state relicensure requirements should consult their respective state authorities regarding applicability. Subscribers may take individual CE tests online and get real-time scores free of charge at SOCNNewsletter.com.

1. What are common physical examination findings of juvenile cellulitis?
   a. crusting of the face and interdigital spaces
   b. bilateral edematous swelling of the muzzle, lips, and eyelids
   c. alopecia of the pinnae and trunk
   d. swollen conjunctiva and tearing

2. Cytologic evaluation of exudate from the skin often reveals
   a. acantholytic cells.
   b. abundant cocci and rods with no inflammatory cells.
   c. purulent to pyogranulomatous inflammation.
   d. eosinophils and mast cells.

3. The most common differentials of this disease include
   a. demodicosis, bacterial pyoderma, and dermatophytosis.
   b. demodicosis, pemphigus foliaceus, and discoid lupus erythematosus.
   c. bacterial pyoderma, yeast dermatitis, and cheyletiella.
   d. pemphigus foliaceus, adverse drug reaction, and vasculitis.

4. What is the main treatment choice for this disease?
   a. Corticosteroids at 0.5 mg/kg PO q24h until clinical resolution, then 0.5 mg every other day.
   b. Corticosteroids at 2 mg/kg PO q24h until clinical resolution, then taper over approximately 2 weeks.
   c. Azathioprine at 2.2 mg/kg PO q24h until clinical resolution, then taper over 2 to 4 weeks.
   d. Cephalexin at 30 mg/kg PO q12h until clinical resolution.

5. Which of the following is currently thought to be a likely underlying cause of juvenile cellulitis?
   a. staphylococcal pyoderma
   b. mycobacterial infection
   c. parvoviral infection
   d. immune dysfunction