

Blastomycosis in the Dog

by R. W. Bledsoe, DVM*
C. B. Chastain, DVM†

ETIOLOGY AND OCCURANCE

Blastomycosis is a fungal disease caused by the dimorphic fungal organism, *Blastomyces dermatitidis*. In the tissue or yeast form, the organisms appear as highly refractive, double walled yeast cells which vary from approximately 8-15 microns in diameter. The budding yeast cells show a very characteristic broad attachment. The mold phase is rapid growing and the hyphae branch at right angles.⁴

The disease has been reported throughout the U.S., but is especially prevalent along the Ohio, Missouri, and Mississippi river valleys. There are also reports of the disease in Europe and Africa.⁷

Dogs are the most affected of the domestic animals. It is most often seen in the age range of 2 to 5 years.³ In humans, males are more often affected, but the ratio of sexes affected in dogs is nearly equal. The disease is also reported in horses and cats, and in one case, a captive sea lion. Synonyms for the disease in man are: Gilchrist's Disease, Chicago Disease or North American Blastomycosis.⁷

TRANSMISSION AND PATHOGENESIS

The organism is found in the soil in endemic areas. The most common port of entry is inhalation, but ingestion and entry via skin lesions have been reported. The organism may remain sequestered in the lungs or may spread hematogenously to involve other body structures. The most commonly involved areas are the lungs, eyes, skin, and tracheal lymph nodes. In man, it is common to have a

chronic localized cutaneous involvement of the skin without involvement of other systems. This is not common in the dog. The infection causes a typical granulomatous reaction.⁴

CLINICAL SIGNS

A wide variety of clinical signs are possible. Early in the disease, one may only see emaciation plus a mild non-productive cough. Lung involvement is the most common form; however, some cases are first presented with only ocular lesions. The ocular form is seen in 20 to 25% of all cases.⁶ When there is skin involvement, there may be papules, nodules or draining abscesses. Dissemination to other organ systems such as skeletal, gastrointestinal, reproductive and nervous have been reported. When the skeletal system is involved, it is most often seen in the metaphyses of the long bones. The testes and prostate gland are most often affected when seen in the reproductive system; this may be due, in part, to the common practice of oophorectomy.¹ The urinary bladder is occasionally affected. Diarrhea is occasionally seen. An intermittent fever is often reported.

DIAGNOSIS

The diagnosis is largely based on history and clinical signs but is confirmed by demonstrating the presence of the organism in the tissues. Draining skin lesions are a good place to do impression smears for an ante-mortem diagnosis. Giemsa, Wright's or new methylene blue are all suitable stains for demonstrating the organism.

Post mortem examination usually reveals granulomatous lesions in any or all of the tissues of the systems mentioned above. The organism can usually be found in these

* Dr. Bledsoe is engaged in practice in Keosauqua, Ia.

† Dr. Chastain is an Associate Professor of Veterinary Clinical Science, College of Veterinary Medicine, ISU.

lesions. The lungs and respiratory lymph nodes are especially good tissues to examine.

Serology and skin testing are of limited value in diagnosing blastomycosis. The results are not always definitive and cross reactions do occur. Complement fixation testing will indicate a previous exposure to *Blastomyces dermatitidis*, but there are some cross reactions with *Histoplasma* and *Coccidioides*. Paired serum samples should be used to demonstrate a rising titer. The microimmunodiffusion test is more indicative of present infection, but may also have cross reactions.⁵ Skin testing using .1 cc. blastomycin intradermally can give false negatives and may cross react with histoplasmin activity. In man, skin testing with a heat killed yeast phase vaccine has been slightly more satisfactory.³ When doing skin testing, one should use histoplasmin, coccidioidin, blastomycin and a control of normal saline. It must be emphasized that negative serology or a negative skin test may be seen in anergic individuals which are infected with the disease.

TREATMENT

The treatment of blastomycosis is neither a simple nor inexpensive endeavor. The most likely cases to respond are those which are not disseminated. The minimal cost of the treatment involved range from \$250 to \$400. Amphotericin B is the drug of choice. Two problems with amphotericin B are resistant strains of fungi and toxic side effects. The most common side effects in the dog are nephrotoxicity, hypokalemia, anemia, and phlebitis. The drug must be given slowly, otherwise hyperkalemia may result and lead to cardiac arrest. Following is a suggested treatment regimen:²

- (1) Mix 50 mg. Fungizone^a in 250 cc. 5% dextrose.
- (2) Give intravenously .5 cc. per pound, rest one day then give .75 cc. per pound, rest one day and check BUN to test tolerance.
- (3) Then give 1 cc. per pound three times per week for 12 doses.
- (4) Check BUN one or two times per week.
- (5) Mannitol may be indicated to keep BUN down (.05 gm. per kg. each treatment).
- (6) Post treatment pyrexia may require dipyrone to keep temperature below 106° F.

ESTIMATED COSTS FOR TREATING A CASE OF BLASTOMYCOSIS IN A 50 LB. DOG

Office Call	10.00
Diagnostic Tests	30.00
Hospitalization 7 days @ \$3/day	21.00
Professional Services (Tolerance tests and 12 treatments)	140.00
Supplies	
3—50mg vials fungizone @ 14.10	42.30
3—500ml bottles 5% Dextrose @ 5.00	15.00
3—Venasets @ 2.25	6.75
14—Longdwell catheters @ 2.40	33.60
Laboratory (Monitoring BUN's) 4—@5.00	20.00
	\$318.65

CASE REPORT: #578971

A 14 month old male intact doberman was presented to the referring veterinarian on 5/29/79. The presenting signs were corneal edema, anterior uveitis in the left eye, and chronic weight loss. The dog was treated with Lasix^b, Azimycin^c, and Gentocin^d ophthalmic drops. By 6/4/79, the extreme ties had become edematous. Chloromycetin^e and Lasix^b were dispensed to the owner. During the next 2 weeks, several draining skin lesions developed and the mandibular and prescapular lymph nodes became enlarged. Various antibiotic treatments were tried with no improvements. On 6/19/79, the dog was admitted to the ISU Small Animal Clinic. Physical examination revealed five major skin lesions which were red and ulcerated, varying in size from ½ to 2½ cm. in diameter. The mandibular and prescapular lymph nodes were notably enlarged. Ophthalmologic examination revealed a glaucomatous left eye which was grossly enlarged and a right eye which appeared to be of normal size but inflamed. Retinal detachments and infiltrates were present.

Since blastomycosis was suspected, impression smears of the skin lesions were made and thoracic radiographs were taken. The impression smears contained numerous *Blastomyces* organisms. Radiographs revealed fine miliary nodular densities throughout the lung, creating an interstitial pattern. Serology was positive for *Blastomyces*

^a Fungizone—Amphotericin B, ER Squibb and Sons, Inc, Princeton, N.J.

^b Lasix—furosemide, American Hoechst Corp, Animal Health Div, Somerville, N.J.

^c Azimycin—Procaine Pen G in Dihydrostreptomycin Sulfate with Dexamethasone and Chlorpheniramine maleate, Schering Corp, Kenilworth, N.J.

^d Gentocin—Gentamicin/sulfate, Schering Corp, Kenilworth, N.J.

^e Chloromycetin—chloramphenicol, Parke—Davis and Co., Detroit, MI.

and negative for *Histoplasma*. A blastomycin skin test was negative. Given a poor prognosis, the owner elected euthanasia which was performed on 6/21/79.

Necropsy results revealed the bronchial lymph nodes to be 2 to 3 times their normal size. They contained numerous *Blastomyces* organisms. The lungs were scattered with miliary granulomas which also contained numerous organisms. One testicle contained a 1 cm. spherical nodule which histologically revealed a pyogranuloma which was positive for *Blastomyces* organisms. In the medulla of the brain, two 1 mm. granulomas were found which also contained the *Blastomyces* organism.

SUMMARY

Although not a common disease, blastomycosis is occasionally seen in small animal practice. The diagnosis is often made after a lack of response to antibiotic therapy and the disease is usually disseminated at this

time. This usually offers a very poor prognosis. Even when the disease is diagnosed early and the treatment is given, a guarded prognosis is given because relapses often occur. Although animal to man transmission is disputed, caution should be used when handling affected animals.

REFERENCES

1. Carlton WW, Austin W L: Ocular blastomycosis in a dog with lymph node and testicular lesions. *JAVMA* 12:502-506, 1978.
2. Chastain CB: Outlined review of small animal infectious diseases, 1978.
3. Gell PGH, Coombs RRA: *Clinical aspects of immunology*, Alden and Mowbray Ltd., Oxford, p 72, 89-91, 210, 1968.
4. Jungerman PF, Schwartzman RM: *Veterinary medical mycology*, Lea and Febiger, Philadelphia, p. 124-138, 1972.
5. Palmer DF: Kaufman L, Kaplan, Cavalaro JJ: *Serodiagnosis of Mycotic Diseases*, Charles C. Thomas, Springfield, Ill., p. 7-11, 168, 1977.
6. Peiffer RL, Gelatt KN, Mehlhoff T: Ocular Blastomycosis in a dog. *Canine Practice*, 1: 26-30, 1978.
7. Utz JP: *Blastomycosis: infectious diseases*, Hoepflich, PD, ed., Harper and Row, New York, N.Y., p. 399-404, 1977.



Our Motto: "Sudden Service"

**Serving the Veterinary Profession
For Over Fifty Years**

Cedar Rapids, Ia. 319/365-5465

Springfield, Ill. 217/529-6776
Elk Grove Village, Ill. 312/595-1060

No. Kansas City, Mo. 816/842-2384
Indianapolis, Ind. 317/247-7333

DISTRIBUTORS OF

Veterinary Supplies - Instruments - Biological and Pharmaceutical Products

Abbott	Carlton	Hart-Delta	Pfizer
Affiliated Labs	Carson	Hill Dog Food	Pfrimmer
Albion	Chemagro	Dr. S. Jackson	Propper
Alcon	Commercial Solvents	Kasco	Rachelle
Alpar	Cooper	Knoll	Robins
Ames	Curtis	Look	Roche
Anthony	Cutter	Lutens	Schering
Armour	Cyanamid	3 M Company	Shell
Ayerst	Dellen	Maurry	Sherwood
Bard-Parker	Eaton	Merck	Shor-Line
Bauer & Black	Elanco	Monoject	Smith, Miller, Patch
Becton-Dickinson	Evsco	National Labs	Squibb
Biotec	Fraser Sweatman	North Amer. Drager	Vet-A-Mix
Borden	Fromm	Oster	Vet Kem
Brady	Hamilton	Parlam	Westport
Bristol	Harilian	Parke-Davis	Winthrop
Burns			Wyeth