Case 10

An Unusual Cause of Dyspnoea in a 2yr old dog

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Interpretation and Diagnosis

The thoracic radiographs show a diffuse nodular, interstitial pattern. The bronchoalveolar lavage sample has good cellularity and cell preservation. There is a clear background with scattered erythrocytes. Along with moderate numbers of ciliated, columnar, respiratory epithelial cells , there is a mixed inflammatory cell population present comprising predominantly neutrophils and macrophages along with significant numbers of eosinophils. There are also scattered small, discoid shaped spore structures about 3-5µm in diameter which stain a green colour under the Wright's stain. Occasionally these are seen to be undergoing phagocytosis by neutrophils and macrophages. The final diagnosis was pneumonitis secondary to inhalation of "puffball" mushroom spores (Lycoperdonosis).

Treatment and Outcome

The dog was placed in an oxygen tent and treated with a combination of dexamethasone, potentiated amoxycillin and metronidazole. After initial improvement the dog was sent home with continued treatment of prednisolone, cimetidine and potentiated amoxycillin. The dog showed gradual improvement over a two week period and at the time of writing is clinically well.

Discussion

Puffball mushrooms are found commonly in Britain as well as other temperate regions of the world, and occur in areas that are frequently used for exercising pets (such as grassland and woodland). This case highlights the potential serious clinical signs that can result from inhalation of puffball mushroom spores and the need for veterinarians to include puffball toxicosis in their list of differential diagnoses of cases presenting with acute respiratory distress. Appropriate questioning of owners may highlight possible

exposure and allow prompt, appropriate treatment that can result in complete resolution of clinical signs as in this case.

The case reported here shares similar presenting signs to those reported in previous human and animal cases. The primary presenting signs in this case were dyspnoea and tachypnoea with harsh lung sounds progressing to pyrexia and inappetence. Other clinical signs reported in animals and humans include cyanosis, vomiting, myalgia and coughing. (Rubensohn, 2009, and Munson et al, 1997). Interestingly this case had no haematological abnormalities whereas the majority of previously reported animal and human cases have had a neutrophilia (Munson et al, 1997, Strand et al, 1967, Hendricksen, 1976) and one of the dogs had a concurrent neutrophilia and eosinophilia (Rubensohn, 2009). The majority of reported cases have had detectable radiographic abnormalities including diffuse interstitial with multifocal alveolar patterns (Alenghat et al, 2009) and nodular infiltrates (Munson et al, 1997) but interestingly a recent case reported had normal chest radiographs (Rubensohn, 2009). This may reflect different stages of the disease progression at the time of radiography. There are only limited previous reports of cytological findings in previous cases of lycoperdonosis. In this case there was moderate to marked pyogranulomatous inflammation with a significant eosinophilic component. Significant numbers of spores were seen some of which had been phagocytosed by neutrophils and macrophages. The spores were 3-5μm in diameter, circular in shape and stain a green colour with Wright's stain. The one previous cytological report in such cases was from a trans-tracheal wash rather than a BAL and revealed "suppurative inflammation with increased mucus" and "round basophilic vacuolated structures" (Rubensohn,2009). There are no cytological reports of BAL samples in human cases but the spores have been identified in sputum samples (Munson et al, 1997). Histopathology performed in the case of a dog which had to be euthanased revealed a "diffuse histiocytic and pyogranulomatous bronchointerstitial pneumonia" along with several structures consistent with lycoperdon spores (Alenghat et al, 2009).

In previous cases there has been much interest as to whether this disease represents a hypersensitivity reaction or a genuine fungal pneumonia. The eosinophilic component noted in this BAL sample is something to be expected in a hypersensitivity reaction but can also be seen in association with fungal infections. Further things to support a hypersensitivity basis for the disease include the fact that this case and another animal case (Rubensohn, 2009) responded to treatment with corticosteroids and antibiotics alone without systemic anti-fungal drugs, and the fact that in no cases has a fungal agent been cultured from samples obtained from the patient. Some have suggested that the body temperature of humans/animals is too warm to allow germination and mycelial formation for saprophytic fungi such as lycoperdon species (Strand et al, 1967). However, in reported human cases, treatment often includes systemic antifungal drugs such as amphotericin B (Munson et al, 1997). In the light of this, systemic antifungal drugs could be considered on a routine basis in treatment of these cases or certainly in any cases not responding well to corticosteroids and antibiotics alone.

In conclusion, lycoperdonosis is a rare condition in humans and dogs but should be included in the differential diagnosis list for animals presenting with acute onset

dyspnoea. Common clinical signs include dyspnoea, tachypnoea, pyrexia and inappetence. Haematological abnormalities may include a neutrophilia with or without a left shift and an eosinophilia. Radiographs often display nodular or interstitial/alveolar patterns but may be normal. Cytological examination of BAL fluid in this case revealed moderate to marked pyogranulomatous inflammation with a significant eosinophilic component. Treatment can be effective and includes oxygen therapy, corticosteroids and antibiotics. It is still uncertain whether systemic antifungal drug treatment is advisable in these cases. The prognosis is guarded but complete clinical recovery is possible with appropriate treatment and nursing care.

References

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Figures

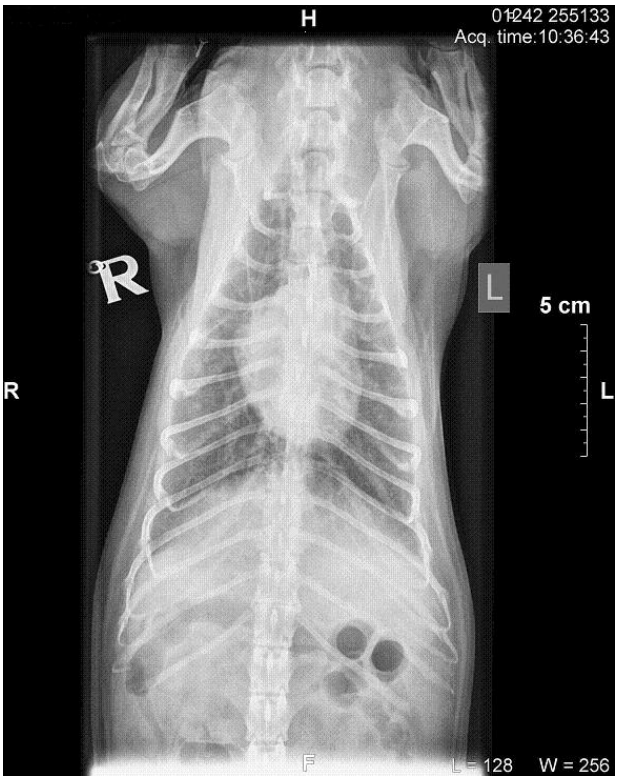

Figure 1: Dorsoventral chest radiograph

Figure 2: Lateral chest radiograph

The radiographs show a diffuse, nodular, interstitial pattern.

Figure 3: The "puffball" mushroom the dog in this case was seen playing with
(NB – when in season [late summer/autumn] they are white in colour before turning this olive brown colour as they degenerate)

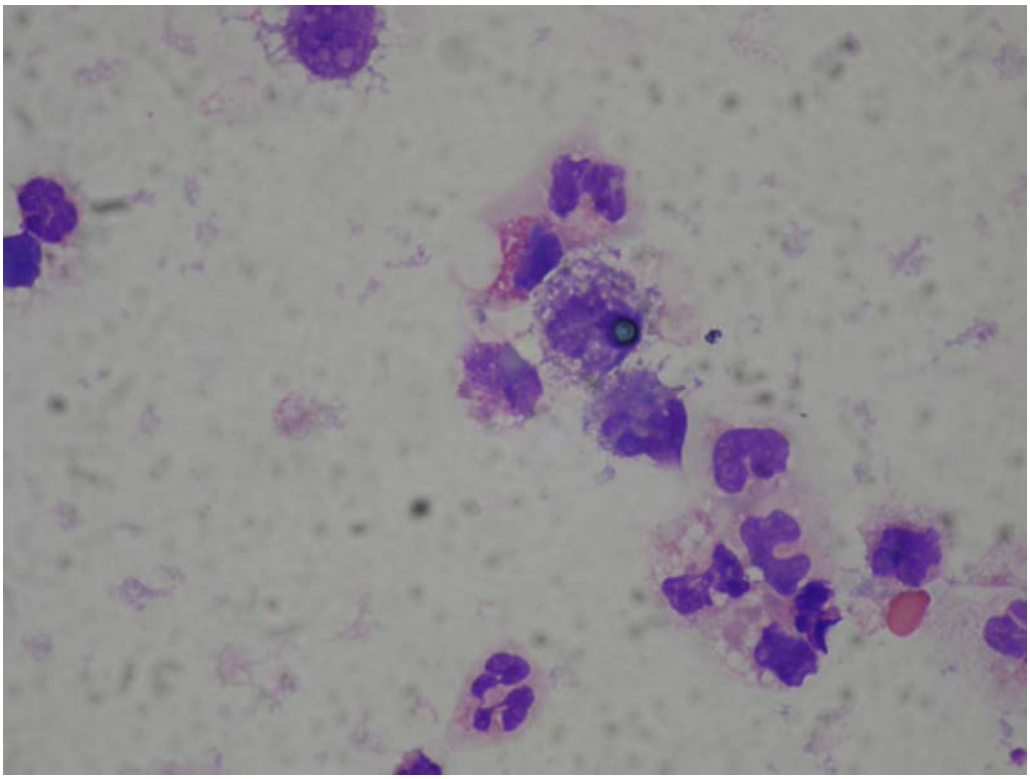

Figure 4A: High power (x50 objective) view of BAL [Wright's stain]

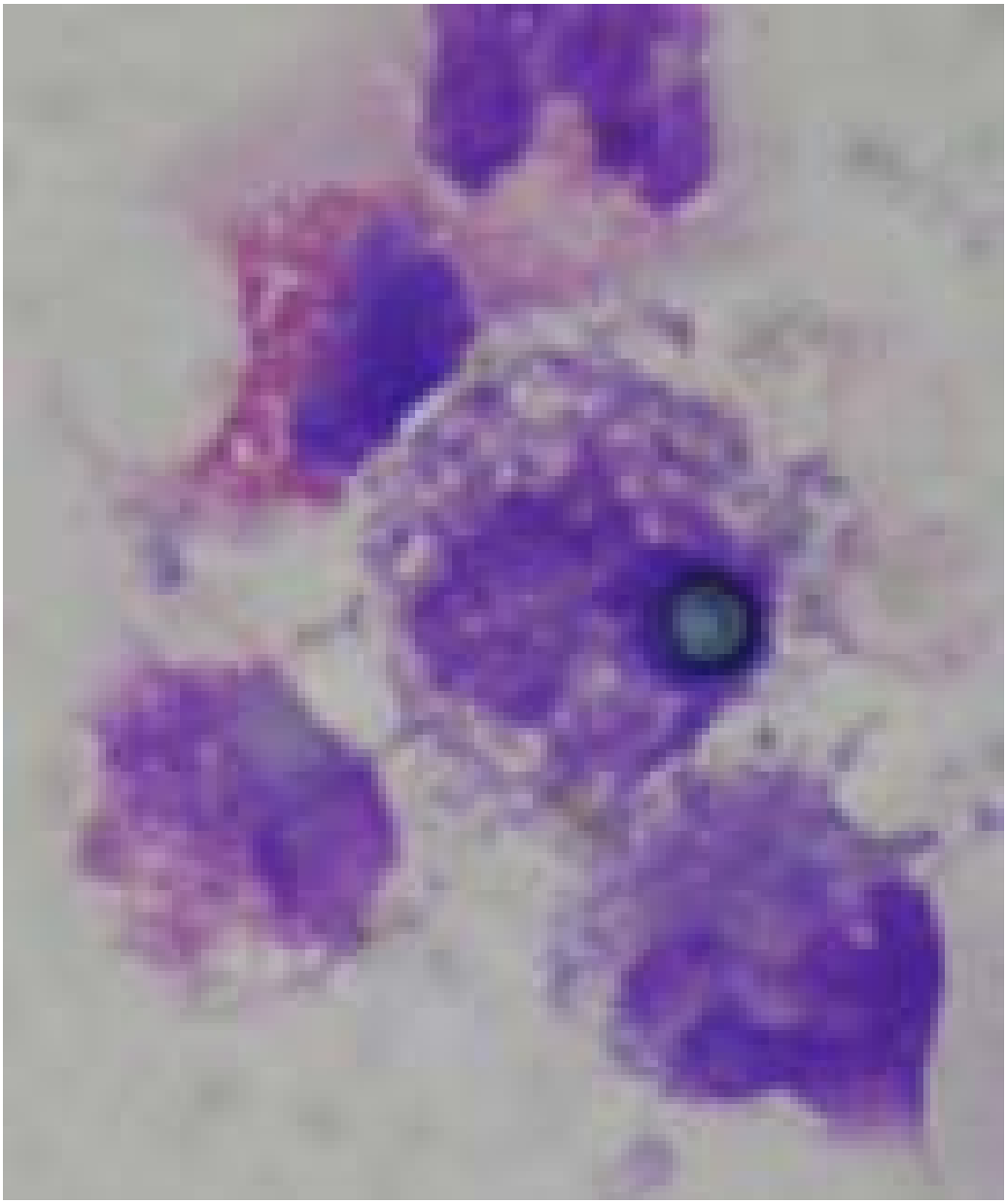

Figure 4B Enlargement of macrophage with green spore.

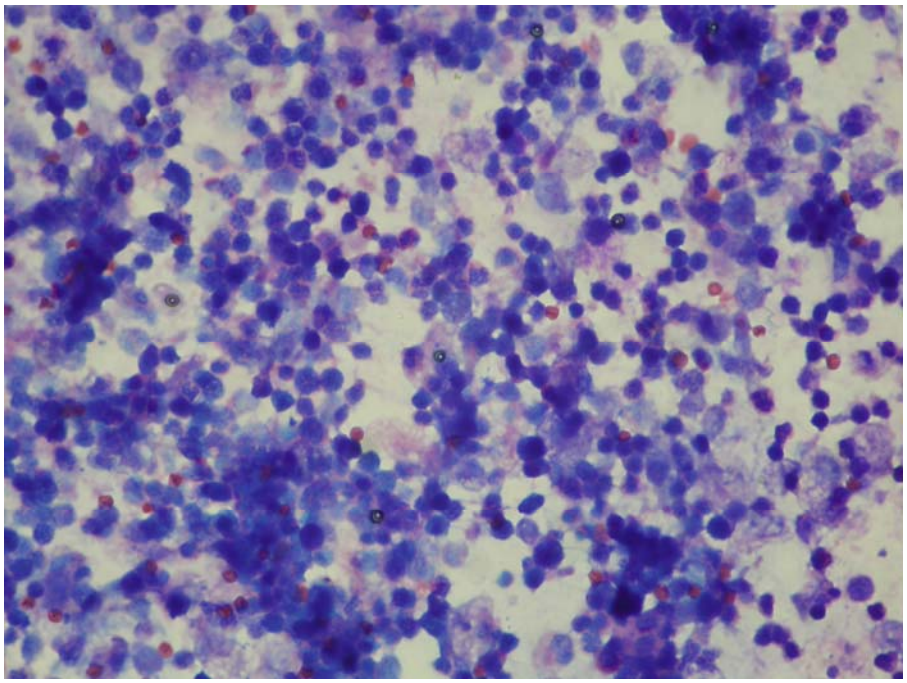

Figure 5: Low power (x10 objective) view of BAL [Wright's stain]