Diagnostic Exercise

From The Davis-Thompson Foundation*

Case #: **168** Month: **July** Year: **2021**

Answer sheet

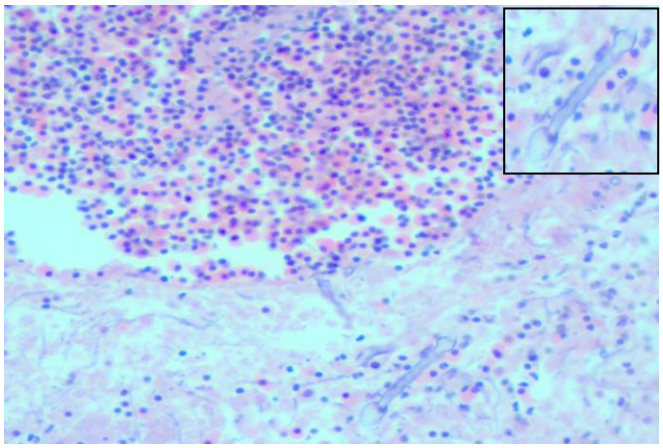
Title: Aspergillus pneumonia in a barn owl

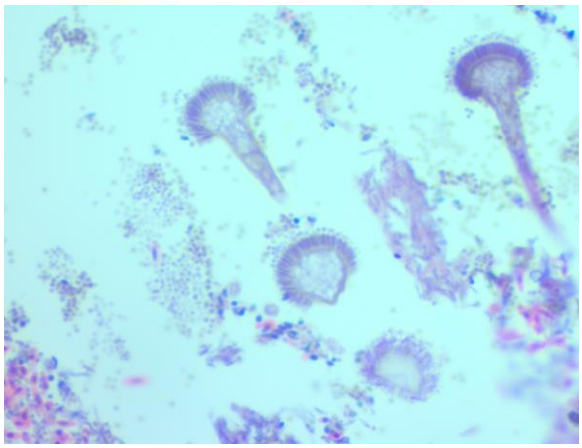
Contributors: Tapan Kumbhani, BVSc, Postgraduate Student and Bhavesh Trangadia[1], MVSc, PhD. Department of Veterinary Pathology, College of Veterinary Science and Animal Husbandry, Junagadh Agricultural University, Junagadh, Gujarat, India. [1]drbjt77@gmail.com

Clinical History: Three barn owls died with the history of respiratory distress. Tissue pieces of lung, liver and kidney were received in 10% buffered formalin at the Department for histopathological diagnosis.

Necropsy Findings: Grossly, liver and kidney were apparently normal. However, nodules and white plaques were observed in lungs.

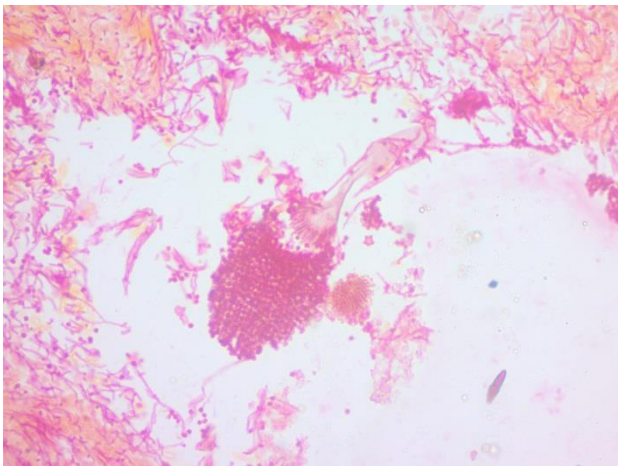
Microscopic Images:

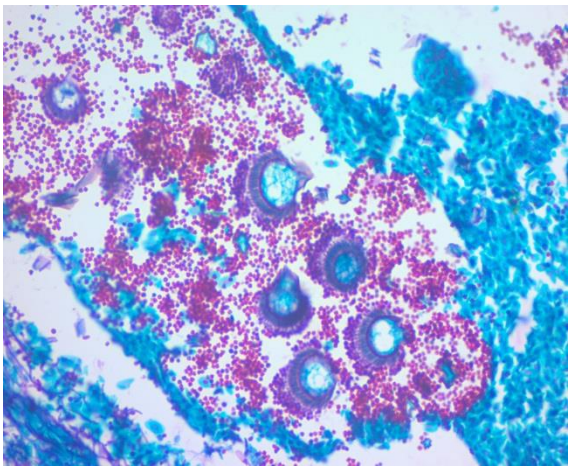




Lung: Infiltration of lymphoplasmacytic cells with fungal hyphae (H&E x 100)

Lung: Fruiting bodies (conidiophores) attached to sterigmata (H&E x 400)





Lung: Hemispherical fruiting bodies with conidiophores (Gridley's x 400)

Lung: Numerous conidia blocking the airways (PAS x 400)

Morphologic diagnosis: Severe, chronic lymphoplasmacytic pneumonia with fungal hyphae and conidiophores, morphology consistent with *Aspergillus* spp.

Etiologic diagnosis: Fungal pneumonia

Etiology: *Aspergillus* spp.

Histopathology: Lung sections revealed the presence of multiple fungal hyphae characterized by dumb bell shaped, thin parallel walls, acute angle dichotomous, branching and distinct infrequent separations. Airways filled with lymphoplasmacytic exudates and numerous central flask shaped, hemispherical to globose vesicles with one or two rows of peg-like sterigmata which formed unbranched chains of conidia on distal end. Special stains viz; modified PAS (Malachite green as counter stain) and Gridley's stains used to confirm the etiology as *Aspergillus* spp.

Discussion:

Aspergillosis is an infectious, non-contagious fungal disease caused by saprophytic fungus of Aspergillus genus. Among the genus, *Aspergillus fumigatus* is the predominant species causing airborne infection in birds, due to comparatively smaller size of spores which can escape nasal cavity and trachea to reach lungs and air sacs (Fedde 1998). The disease mainly transmitted through inhalation of spores. It affects young broilers, poults, quails and a variety of wild birds causing high morbidity and mortality. Clinical manifestations of disease depend on the infective dose, distribution of spores, pre-existing disease and importantly the immune status of the host (Dahlhausen et al. 2004). Avian aspergillosis can be classified as acute or chronic. Acute cases are thought to be due to inhalation of large numbers of spores, whereas immunosuppression may leads to chronic disease (Vanderheyden 1993). Grossly air sacs become progressively thicker and opaque with focal granuloma along with extensive white discoloration of lungs and granulomatous pneumonia are evident as lesion progresses in turkeys (Kunkle and Rimler 1996). Conidia production can be seen in tissue sections of well-oxygenated bronchi, bronchioles and air sacs. Hyphae containing fruiting bodies can fill the lumen and may penetrate the air sacs causing serositis and superficial necrosis in adjacent organs (Tsai et al. 1992). Histopathological lesions can be suggestive of diagnosis but morphology of the fungal hyphae must be differentiated from in-vivo hyphae of hyaline filamentous fungi, zygomycetes and fusarium spp. Etiological diagnosis can be confirmed by using PCR and immunohistochemistry (Beernaert et al. 2010).

References:

Beernaert L. A., Pasmans F., Van Waeyenberghe L., Haesebrouck F., Martel A. 2010. *Aspergillus* infections in birds: a review. Avian pathol, 39(5): 325-331.

Dahlhausen B., Abbott R., Van Overloop P. 2004. Rapid detection of pathogenic *Aspergillus* species in avian samples by real-time PCR assay: a preliminary report, p. 37. In E. Bergman (Ed.). Proceedings of the 25th Annual Conference & Expo of the Association of Avian Veterinarians, New Orleans, LA, USA.

Fedde M. R. 1998. Relationship of structure and function of the avian respiratory system to disease susceptibility. Poul Sci, 77: 1130-1138.

Kunkle R. A. and Rimler R. B. 1996. Pathology of acute aspergillosis in turkeys. Avian Dis, 40: 875–886.

Tsai S. S., Park J.H., Hirai K., Itakura C. 1992. Aspergillosis and candidiasis in psittacine and passeriforme birds with particular reference to nasal lesions. Avian Pathol, 21: 699-709.

Vanderheyden N. 1993. Aspergillosis in psittacine chicks. p. 207. In G. Jackson (Ed.). Proceedings of the Annual Conference of the Association of Avian Veterinarians, Nashville, TN, USA.

*The Diagnostic Exercises are an initiative of the Latin Comparative Pathology Group (LCPG), the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. - Consider submitting an exercise! - A final document containing this material with answers and a brief discussion will be posted on the CL Davis website (http://www.cldavis.org/diagnostic_exercises.html).

Associate Editor for this Diagnostic Exercise: Ingeborg Langohr

Editor-in-chief: Claudio Barros