

A REPORT ON INCIDENCE OF CANDIDIASIS IN NATIVE CHICKENS

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ABSTRACT

Incidence of candidiasis and its ability to be a primary infection in a native chicken flock of 500 birds reared in cage system was reported. Grossly, pseudomembranous growth giving turkey-towel appearance was noticed in dead birds. Crops from affected chicken yielded Candida albicans was confirmed by culture and germ tube production in poultry serum from the crop samples collected from affected birds. Administration of copper sulphate was found to be effective in containing illness and the signs associated with candidiasis in the affected flock.

Keywords: Candidiasis, *Candida albicans*, Germ tube, Native chicken

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INTRODUCTION

Candidiasis or crop mycosis or thrush or sour crop is caused by a commonly occurring yeast-like fungi *Candida albicans* that rarely causes various clinical symptoms in different poultry species including chicken, turkey, quail, geese, pigeons *etc.* (Asrani *et al.*, 1993). It is an opportunistic endogenous mycosis (Asfaw and Dawit, 2017) that is initiated by perturbation in

the host rather than exposure to an external source (Kunkle, 2003). The fungus is more likely to be parasitic and causes disease when the host is subjected to predisposing factors (Quinn *et al.*, 2011). Predisposing factors that influence the incidence of the disease include prolonged usage of oral antibiotics, which can suppress the normal microflora of alimentary canal, season and age. This condition usually occurs when the immune system of host is compromised (Wyatt and Hamilton, 1975; McVey *et al.*, 2013). In this paper, a case of crop mycosis in 12 week old native chicken flock reared in cage system was reported. Two dead native chickens (12 weeks old) reared

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for meat purpose in cage system was brought for necropsy to Avian Disease Laboratory, Thalavasal. The crop samples were collected and processed for identification of *Candida albicans*. The isolation and identification of *Candida albicans* was carried out as per Richard and Beneke (1989).

CASE HISTORY AND OBSERVATION

The isolation and identification involved 24 to 48 hours culturing in corn soya agar (Hi Media, Mumbai) at room temperature for Chlamyospore production and in Chloramphenicol Sabouraud dextrose agar (Hi Media, Mumbai) at 37°C for development of yeast-like fungi colonies. For germ tube production, chicken serum derived from a healthy bird was inoculated and incubated for three hours at 37°C.

The symptoms observed in the affected birds included cyanosis of comb, dullness, reduced feed intake (10 to 20%), engorged crop, decreased body weight and 0.1 to 0.2 % daily mortality. Similar findings were reported by Balasubramaniam and Sukumar (2007) and Asfaw and Dawit (2017). On the contrary, Moretti *et al.* (2000) reported a high mortality rate of 40% in turkeys. The gross lesions were gas-engorged crop with severe thickening of mucosa giving turkey-towel like appearance and congestion of vital organs. This finding is congruous to the report of Balasubramaniam and Sukumar (2007) in adult commercial layer chickens. The lesions might be mistaken for Newcastle disease, avian influenza and mycotoxicoses but could be distinguished easily as other key lesions

of these diseases are missing in Candidiasis (Balasubramaniam and Sukumar, 2007).

In postmortem examination, crops which yielded *Candida albicans* were engorged with gas and revealed turkey-towel like appearance (Fig. 1). The fungus, a commensal, could be readily isolated from muco-cutaneous surface of birds. Moreover, onset happened during rainy season which predisposes for the occurrence of the disease (Quinn *et al.*, 2011). The affected flock was maintained hygienically in cages under good management system and was not administered antibiotics orally. Current outbreak necessitates rethinking on Candidiasis as infection was observed only in immuno-compromised host owing to the absence of stressors other than humid weather in this outbreak.

Colonies and oval budding cells revealed typical appearances suggestive of *Candida albicans* (Richard and Beneke, 1989). Formation of germ tube is peculiar for the fungus (Quinn *et al.*, 2011). For the germ tube production, the colonies were inoculated in chicken serum which was kept at 37°C for three hours. Two drops of methylene blue stain was added for clear view (Fig. 2). Serum of other poultry species could also be used for germ tube production of *Candida albicans*.

The treatment regimen suggested by Jungherr (1933) with slight modification was found to be effective for control of the symptoms in five days. The treatment included the administration of magnesium sulphate at the rate of 0.5 gram per kilogram body weight in one-time drinking water followed by copper



Fig. 1. Opened crop showing typical turkey-towel appearance on postmortem of 12 week-old native chicken.

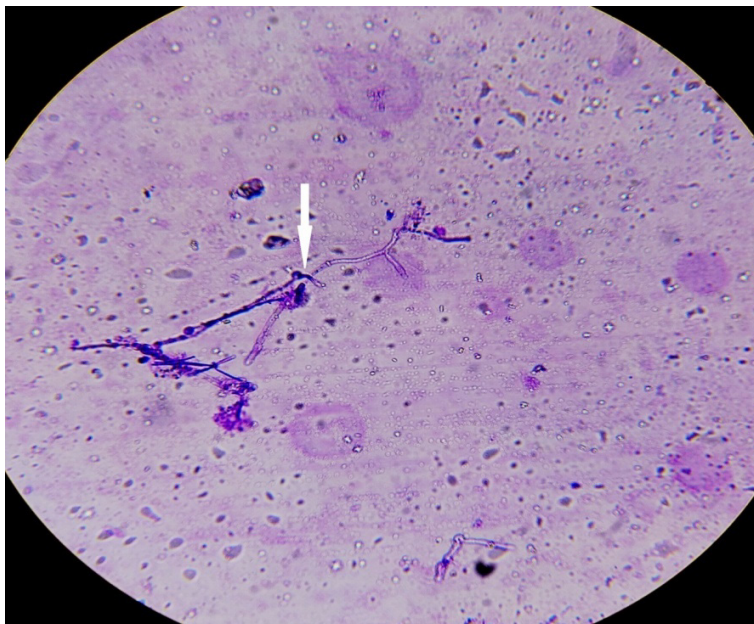


Fig. 2. Germ tube (arrow) production in chicken serum (which was mixed with few drops of methylene blue stain) - inoculated (three hours earlier) with *Candida albicans* (1000 x).

sulphate at the rate of 3 grams per deciliter of drinking water continuously for four days as suggested by Balasubramaniam and Sukumar (2007) was found to be effective. Administration of copper sulphate was also suggested by Asfaw and Dawit (2017) for treating candidiasis in poultry. However, Underwood *et al.* (1956) found that the copper sulphate was ineffective for treating or preventing crop mycosis. Lin *et al.* (1989) suggested nystatin (100 g/ton) for the treatment of thrush. Oral administration of magnesium sulphate might help in flushing out metabolites arising out of fungal multiplication, thus helping for quick recovery from the illness.

From the above findings, it might be concluded that candidiasis could also occur as a primary disease in non-descriptive chickens during humid weather. No literature could be traced on incidence of candidiasis in native chickens in south India. For production of germ tube which is confirmatory for *Candida albicans*, serum from chicken was found to be useful. It is recommended to include copper sulphate at the rate of 500 g per metric ton in poultry feed during rainy season on two days a week basis in order to prevent candidiasis and consequent economic loss. It was also opined that most of the veterinarians performing necropsy of birds fail to take a note of lesions in crop, thus leading to misdiagnosis.

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REFERENCES

- Asfaw, M. and Dawit, D. (2017). Review on major fungal disease of poultry. *British Journal of Poultry Sciences*, **6**: 16-25.
- Asrani, R.K., Paul Gupta, P.K., Sadana, J.R. and Panita, A. (1993). Experimental candidiasis in Japanese quail: Pathological changes. *Mycopathologia*, **121**: 83-89.
- Balasubramaniam, A. and Sukumar, S. (2007). An overview on outbreaks of candidiasis in poultry. *Tamil Nadu Journal of Veterinary and Animal Sciences*, **3**: 121-123.
- Jungherr, E.L. (1933). Observations on severe outbreak of mycosis in chicks. *Journal of Agri Search*, **2**:169-178
- Kunkle, A.A. (2003). Fungal infections. In: Diseases of Poultry. 11th edn, Eds, Saif, Y. M., Barnes, H.J., Glisson, J.R., Fadly, A.M., Mac Dougald, L.R. and Swayne, D.E. Iowa State Press, Ames, Iowa.
- Lin, M.Y., Huang, K.J. and Kleven, S.H. (1989). *In vitro* comparison of the activity of various antifungal drugs against new yeast isolates causing thrush in poultry. *Avian Diseases*, **33**: 416-421.
- McVey, D.S., Kennedy, M. and Chengappa, M.M. (2013). Veterinary Microbiology

- 3rd ed. Wiley – Blackwell, UK, pp. 313-320.
- Moretti, A., Fioretti, D.P., Boncia, L., Pasquali, P. and Del Rossi, E. (2000). Isolation of *Candida rugosa* from turkeys. *Journal of Veterinary Medicine Series*, **47**: 433 – 439.
- pp. 1148-1175.
- Quinn, P.J., Markey, B.K., Leonard, F.C., Fitzpatrick, E.S., Fanning, S. and Hartigan, P. (2011). *Veterinary Microbiology and microbial diseases*. 2nd ed. Wiley – Blackwell, UK.
- Richard, J. L. and Beneke, E.S. (1989). *Mycoses and Mycotoxicoses*. In: A laboratory manual for the isolation and identification of avian pathogens. 3rd edn. American Association of Avian Pathologists, USA. pp. 70 – 76
- Underwood, P.C., Collins, J.H., Durgin, C.G., Hodges, F.A. and Zimmerman. Jr., H.E. (1956). Critical tests with copper sulphate for experimental moniliasis (crop mycosis) of chicken and turkeys. *Poultry Science*, **3**: 599 – 605.
- Wyatt, R.D. and Hamilton, P.B. (1975). *Candida* species and cop mycosis in broiler chickens. *Poultry Science*, **54**: 1663-1666.