



## DISSEMINATED PROTOTHECOSIS IN A GERMAN SHEPHERD DOG (GSD) – A CASE REPORT

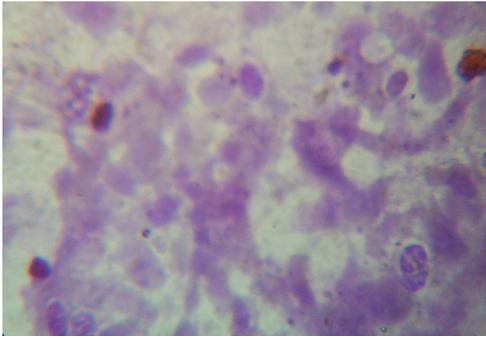
Protothecosis is an uncommon disease of man and animals caused by unicellular colourless algae of genus *Prototheca*. It is considered as an emerging threat to the AIDS patients (Woolrich *et al.*, 1994). Infection occurs in the colon following ingestion of the organisms with subsequent dissemination via blood and lymph (Migaki *et al.*, 1982). However prognosis for the canine disseminated form of protothecosis is grave. In this article a case of disseminated protothecosis in a German Shepherd dog which was presented with unresponsive chronic haemorrhagic colitis is discussed. As per the available literature this is the first case of disseminated canine protothecosis reported in India.

A two year old female GSD was referred to College of Veterinary and Animal Sciences, Mannuthy with a history of intermittent watery brownish diarrhoea since eight weeks. The condition had shown some initial response to antidiarrhoeal medications but recurred each time when treatment was stopped. At the time of presentation to the University Veterinary Hospital, Mannuthy the animal had haemorrhagic diarrhoea with mucus, tenesmus, weight loss, occasional vomiting, polyuria, ataxia, circling, head tilt, nystagmus, apparent blindness and deafness. Body condition was very poor and the coat was dry and harsh. Faeces was extremely watery, bright orange-yellow in colour with blood and with a putrid odour. Ophthalmic examination showed exudative retinal detachment, chorioretinitis, hyphema and vitreous opacities of both eyes. All the clinical data were within normal range.

Blood picture showed severe leucocytosis (24000/cc) with neutrophilia (90%) and other blood values were within normal range. Serum biochemical analysis revealed normal plasma protein, albumin, albumin globulin ratio and ALT level with elevated creatinine (4.0 mg %) and blood urea (118 mg %). Contrast

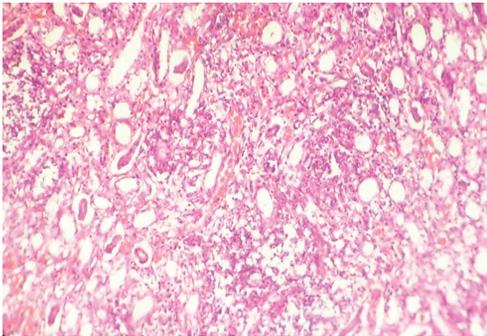
radiography of abdomen with barium revealed only some thickening of the wall of the intestine. Ultrasonographic examination showed dilated intestinal loops with anechoic content and renomegaly with lack of corticomedullary distinction. Faecal flotation technique was negative for ova of endoparasites and *Giardia* spp. Microscopic examination of faecal sample revealed a large number of unidentified pleomorphic unicellular organisms with several endospores within them. Culture of bowel swab produced a light growth of gram negative bacilli sensitive to ciprofloxacin. Faecal smears stained with Wrights stain revealed large number of organisms with thick cell wall and metachromatic cytoplasmic granules and small centrally placed nucleus, which were tentatively identified as *Prototheca* sp. (Fig. 1). Cultural examination of faecal sample in blood agar and SDA free of cyclohexamide yielded white to tan colonies on third day and characteristic organism in all stages of development were identified by staining the smear from colony with gram's stain. The morphologic features were compatible with those reported for *Prototheca* sp. The dog's condition was deteriorated rapidly over the next 5 days and died on 7<sup>th</sup> day of admission inspite of the treatment with antibiotics, fluids, styptics etc. Cultural examination of CSF, vitreous humour and pericardial fluid on SDA yielded same type of organism. The organisms were seen in large numbers in faeces but were not identified until cultural examination was performed, so specific therapy was not attempted in this case.

Post mortem examination revealed thickened caecal and colonic mucosa with petechiations and pinpoint foci of necrosis. The contents were haemorrhagic, mucoid and foul smelling. White to gray nodules of 1 to 3 mm diameter were diffusely scattered throughout various organs like kidney, heart and liver which corresponded to the dense accumulation of organisms (Fig.2). Histopathological examination of these tissues revealed large



**Fig.1.** Wright stained faecal smear. Notice the variable size of the organism (1000x)

number of organisms varying in their morphology *i.e.*, varying in size (5-15  $\mu$ m), shape, slightly refractile capsules with endospores forming several sporangiospores (Fig.3).



**Fig.3:** Photomicrograph of myocardial tissue with protothecal organism – Several of which have typical endosporulation (H&E x 1000x)

Prototheca are ubiquitous in the environment. Three species are currently recognized as *P. stagnors*, *P. wickerhami* and *P. zopfii* of which the last two have been incriminated as pathogens (Migaki *et al.*, 1982). The signs of colitis with which this dog presented may have been related to invasion of the colon by prototheca organisms since the colonic mucosa appears to be the main site of prototheca replication (Rallis *et al.*, 2002). Similar to what has been reported in other dogs, this dog had bloody diarrhoea and prominent ocular, cochlear and neurologic abnormalities (Thomas and Preston, 1990). In a retrospective study, 20 of 26 dogs with systemic protothecosis were presented with ophthalmic signs (Amanda *et al.*, 2006) and two of 13 dogs with acute renal failure (Pressier *et*



**Fig.2:** Numerous small granulomas of the myocardium with disseminated protothecosis.

*al.*, 2005). To our knowledge, this may be the first case reported having all the clinical signs of systemic protothecosis *viz.*, gastro intestinal, ocular, cochlear, neurological and renal failure. The white firm nodules seen grossly in many tissues were identified as granulomas composed mostly of aggregations of prototheca (Imes *et al.*, 1977).

The diagnosis of the case was based only on cultural examination of faecal swab, CSF, pericardial fluid and fluid from vitreous humor and also by histopathological examination of heart, kidney and colon. Successful treatment will depend on early diagnosis and aggressive chemotherapy. Canine cases reported in the literature were unresponsive to all antibiotics, corticosteroid and Amphotericin B (Moore *et al.*, 1985). The failure of animals to respond to therapy is probably attributed to the advanced stage of the disease by the time the dog was brought for treatment. So any animal brought to the hospital with history of protracted bloody diarrhoea coupled with ocular lesions should be suspected for protothecosis.

### Summary

A four year old German Shepherd dog was presented to the University Veterinary College hospital with history of chronic haemorrhagic diarrhoea, tenesmus and blindness. Cultural/stained faecal smear examination revealed the presence of organism with morphologic features compatible to those reported for *Prototheca* spp. Dog's clinical condition deteriorated and died on 7<sup>th</sup> day of hospitalization. Histopathological evaluation revealed large number of organisms of varying morphology with slightly refractile capsules.

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