Incidence of Mycobacterium avium Subsp. paratuberculosis (MAP) Infection in slaughtered buffaloes (Bubalus bubalis) of Malwa Region of Madhya Pradesh


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Abstract
The study was undertaken to assess the incidence of subclinical and clinical paratuberculosis in slaughtered buffaloes of Malwa region of Madhya Pradesh. They were unproductive buffaloes (1-10 years old) slaughtered in Mhow and Indore examined for subclinical and clinical Mycobacterium avium subsp. paratuberculosis (MAP) infection. Study of gross lesions of intestine and respective mesenteric lymph nodes (MLNs) showed overall 87.33% (131/150) incidence of paratuberculosis. Out of these 131 cases of paratuberculosis, 18.21% (24/131) buffaloes suffered from subclinical and 81.68% (107/131) from clinical paratuberculosis, whereas impression smear examination revealed clinical and subclinical paratuberculosis up to 25.77 and 74.33% in intestine and 13.51 and 86.49% in MLNs, respectively.

Key Words: Buffaloes, Clinical/Subclinical paratuberculosis, Impression smear, MAP.

Introduction
Paratuberculosis or Johne's disease (JD) is a chronic granulomatous gastroenteritis caused by Mycobacterium avium subsp. paratuberculosis. This worldwide disease is primarily a disease of domesticated ruminants, including cattle (both beef and dairy), sheep, goats and farmed deer, which results into weight loss, diarrhoea (intermittent or continuous), emaciation and has significant impact on the global economy (Sweeney, 1996). The macroscopic and histologic lesions remain confined to the intestine, mesenteric and ileo-caecal lymph nodes (Jubb et al., 2007). Due to reduced sensitivity and specificity of the ante-mortem tests (Hietala, 1992), the culling policy is not considered successful for control of Johne's disease (Singh et al., 2007). According to Kurade et al. (2004), diagnosis of subclinical cases of paratuberculosis is a difficult task. Diagnosis of Mycobacterium avium subsp. paratuberculosis (MAP) is challenging due to long incubation period, complex pathogenesis, intracellular and complex biology of MAP, non-availability of sensitive and specific test for detection of subclinical infection. Therefore, the present work was undertaken to study the patho-morphology of the lesions in sub-clinical versus clinical Johne's disease in buffaloes.
Materials and Methods

The study was conducted in Department of Veterinary Pathology of the College in Mhow, Indore (MP). Apparently healthy but unproductive 150 (120 male and 30 female) buffaloes aged between 1-10 years from slaughter houses of Cantonement Board, Mhow and Nagar Nigam, Indore were included in the present study during September 2015 to April 2016. Complete information about the animals regarding age, sex, breed, source of animal, clinical signs and health status were recorded before the slaughter. After slaughter, samples from small and large intestine and respective lymphnodes of buffaloes were collected in the sterile polythene bags and then transported to the Department of Veterinary Pathology, Mhow. These target organs were thoroughly examined for apparent gross lesions followed by identification of MAP by preparing the impression smear and stained with acid fast staining method (Coles and Gebhard, 1986). Significant gross lesions such as highly transverse corrugated intestinal mucosae, corrugations with congestion and haemorrhages in the mucosa of the intestine, transverse corrugations with growth in the intestinal mucosae, slightly transverse corrugated mucosae and absence of transverse corrugation in the intestinal mucosae were recorded by giving longitudinal incision in the intestine to see the changes in the mucosal surface of the intestine.

The findings were recorded according to the appearance of bacteria, bacteria in clumps were taken as positive (+ve), in dispersed form as suspected (+, -) and negative (-ve) when neither of the two forms were observed.

Results and Discussion

The study on MAP was carried out in buffaloes by observing gross lesions of intestine and respective mesenteric lymph nodes (MLNs). The overall incidence of paratuberculosis was found to be 87.33% (131/150) and 64.66% by gross lesion and acid fast staining method, respectively. Further gross lesions studied showed 81.68% (107/131) cases of clinical, viz., highly transverse corrugated intestinal mucosae (21.33%), corrugations with congestion and haemorrhages (43.33%) in the mucosa of the intestine, transverse corrugations with growth (6.66%) in the intestinal mucosae, and 18.32% (24/131) cases of subclinical paratuberculosis, and absence of transverse corrugation (12.66%) in the intestinal mucosae (Plate 01). Similar findings such as intestinal mucosal thickening.
and enlarged mesenteric lymph nodes were recorded by Buergelt et al. (2000) in 70 North American bison; thickening of the intestinal wall as the most common finding by Gonzalez et al. (2005); buffaloes having transverse mucosal folds and intestinal thickening with enlargement of lymph nodes by Sivakumar et al. (2006), Sikander et al. (2012), Reddy et al. (2012), Mohammed and Mohammed (2012), Meena et al. (2013) and Waqas et al. (2015) in cattle and buffalo. Granulomatous inflammation and corrugations of intestinal mucosa recorded in the present study were due to MAP organisms, which were confirmed by detection of acid fast bacilli in smears prepared from gut mucosa and mesenteric lymph nodes.

Out of 150 intestinal smears, 64.66% (97/150) were positive for MAP infection in intestine, whereas in case of mesenteric lymph node impression smears 49.33% (74/150) animals were positive for MAP organisms. Out of 97 positive impression smears for MAP, 25.77% (25/97) showed MAP bacteria in the form of clumps that indicated clinical form of JD, whereas 74.33% (72/97) smears of the intestine showed MAP bacteria in the scattered form indicative of subclinical form of JD (Plate 02). In case of mesenteric lymph node impression smears, the percentage of clinical and subclinical forms of JD was found to be 13.51 and 86.49 %, respectively. Findings of the present investigation in respect of tissue impression smears are in consonance with the findings of Vohra et al. (2008), who reported 53.8% positive cases for MAP in the intestinal tissue, but in contrast with the findings

Plate 02a: Photomicrograph showing pink coloured MAP organism in the intestinal impression smear (Ziehl-Neelsen, 1000X)

Plate 02 b: Photomicrograph showing clump of pink coloured MAP organisms in the intestinal impression smear (Ziehl-Neelsen, 1000X)

Plate 02c: Photomicrograph showing pink coloured MAP organism in the impression smear of MLN (Ziehl-Neelsen, 1000X)

Plate 02d: Photomicrograph showing clumps of pink coloured MAP organisms in the impression smear of MLN (Ziehl-Neelsen, 1000X)
of Sikander et al. (2012 and 2014), who reported the low incidence (6.7%) in cattle and buffaloes and 22.64% in Nilli-Ravi buffaloes. According to Singh et al. (2014) and Maroudam et al. (2015), impression smears showing the groups of brightly pink coloured bacilli within the resident macrophages in the lesions of intestine is highly suggestive of paratuberculosis.

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Conflict of Interest: Authors have no conflict of interest.

References:


