BURSAL LESION SCORING FOR THE ASSESSMENT OF SEVERITY OF INFECTIOUS BURSAL DISEASE

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Infectious bursal disease (IBD) is an acute infectious viral disease of chicken, which causes necrosis and atrophy of the bursa of Fabricius (BF) .Out of the two serotypes of IBDV, serotype1 is established as a pathogen to chickens. IBDV produces two distinctly different disease syndromes namely the clinical form and the subclinical form in susceptible chickens depending on age at infection. The clinical form is mostly observed in chickens of 5-8 weeks of age with typical lesions of IBD and a highly variable mortality. The subclinical form occurs when the newly hatched susceptible chicks are affected and at this age this remains undetectable. In the present study, Oedematous and haemorrhagic bursae collected at acute stage of IBD and bursae form the healthy birds and the birds recovered from IBD in commercial poultry farms at Namakkal of Tamilnadu were subjected to histopathological examination (HPE). Bursal lesion score of the atrophied bursae, which were collected from chicken recovered from IBD 14 days after the IBD outbreak,was determined as per the method of Muskett *et al.*, (1979) on a 0 - 5 scale.

Microscopically the bursae collected from the normal birds revealed epithelial lining covering large polyhedral bursal follicles. The bursal follicle contained normal population of lymphoid cells in the cortex and medulla (Fig. 1).

During the early phase of the disease, the bursae were enlarged, oedematous and the mucosal surface was covered by thick mucous. Microscopically there was abundant interfollicular oedema containing a few erythrocytes and heterophils. The interfollicular space was widened and the follicles revealed lymphoid necrosis and depletion. A few follicles revealed cellular debris in the medullary area (Fig. 2).

During the acute phase, the bursal haemorrhages on the plica were observed in a few birds. Microscopically there were haemorrhages in the mucosal, desquamation of lining epithelium and interfollicular and intrafollicular haemorrhages. The follicles revealed marked lymphoid depletion and a few follicles revealed eosinophilic cystic cavities in the medullary areas. There was infiltration of heterophils, plasma cells and macrophages in the interfollicular stroma. Heterophils and macrophages were also observed intrafollicularly (Fig.3).

Thirty two bursae collected at 14 days after IBD outbreak showed bursal lesion scores varying from 1 to 5. These birds were in dying stage and subsequently recovered. Two samples had a bursal score of 1 (Fig. 4), three samples had a bursal score of 2 (Fig. 5), eleven samples had a bursal score of 3 (Fig. 6), seven samples had a bursal score of 4 (Fig. 7) and nine samples had a bursal score of 5 (Fig. 8). The average bursal lesion score was 3.56.

Bursal score 1 The bursa histologically revealed scattered lymphoid necrosis in a few follicles. The cortex and medulla were indistinct. There was mild increase in interfollicular stromal tissue.

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Bursal score 2 The bursal plica revealed moderate to severe lymphoid depletion in most of the bursal follicles. The lining epithelium was corrugated.

Bursal score 3 The bursa revealed severe lymphoid depletion in almost all the follicles, which appeared pale and vacuolated. There was infiltration of heterophils in the bursal follicle and inter-follicular stroma. The lining epithelium was denuded in a few plicae. In a few follicles there were cellular debris and cystic cavities. The lining epithelium was corrugated.

Bursal score 4 The bursa revealed loss of lymphoid follicles glandular transformation and increase in inter follicular connective tissue. Cystic cavities were observed in some follicles. Infiltration of macrophages, plasma cells and lymphoid cells were observed in the connective tissue stroma. The lining epithelium was corrugated.

Bursal score 5 Bursa microscopically revealed complete loss of architecture. There was no intact lymphoid follicle and the entire area was filled up by fibrous tissue. The lining epithelium was highly corrugated.

Histopathological picture of the oedematous and haemorrhagic bursae collected at acute stage was similar to that described by several workers (Helmboldt and Garner, 1964; Faragher, 1972; Henry *et al.*, 1980; Okoye and Uzoukwo, 1982; Fadly and Nazerian, 1983; Lukert and Saif, 1991). The internal epithelium of the plicae was hyperplastic, odematous and infiltrated by heterophils. The interfollicular stroma close to the bursal epithelium was oedematous and eosinophilic containing reticular cells and a few fibroblasts. Most of the bursae collected on 14th day PI revealed marked lymphoid necrosis in the follicles involving both cortex and medulla. A few erythrocytes, heterophils, plasma cells and macrophages were seen within the follicles. The mean bursal score on 14-day PI was 3.56 (range 1 to 5), indicating pronounced damage to the bursa. Ismail *et al.* (1987) observed a bursal score of 2.8 and 4.0 on 3rd day and 4.0 and 4.0 on 14-day PI with IM-IBDV (serotype 1) and VA-IBDV (variant of serotype 1) indicating rapid bursal atrophy produced by variant IBD viruses on a 0-4 scale. Nakamura *et al.* (1992) reported bursal lesion score of 3.3-3.8 by a very virulent Japanese strain (90-11) on a 0-5 scale. Van den Berg *et al.* (1991) observed a bursal lesion score of 3-4 on a 0-5 scale by the highly virulent Belgium strain 849 VB. Whereas Bumstead *et al.* (1993) observed a score of about 3 by the highly virulent European strain (CS 89) on a 0-5 scale.

As a mean bursal score as high as 3.56 was observed on 14-day PI in the present IBD outbreaks, the virulence of IBDV can be compared with that of IM – IBDV (serotype 1) or European Faragher strain or highly virulent Belgium strain (CS 89) or highly virulent Japanese strain (90-11), but it does not belong to variant IBDV since rapid atrophy of bursa was observed only by 14th day. Mean bursal score obtained with experimentally inoculated chicken was 2.1 indicating IBDV infection under experimental conditions is less severe and the atrophy of bursa was observed only by 14th day further indicating that variant IBDV was not involved in the IBD outbreaks.

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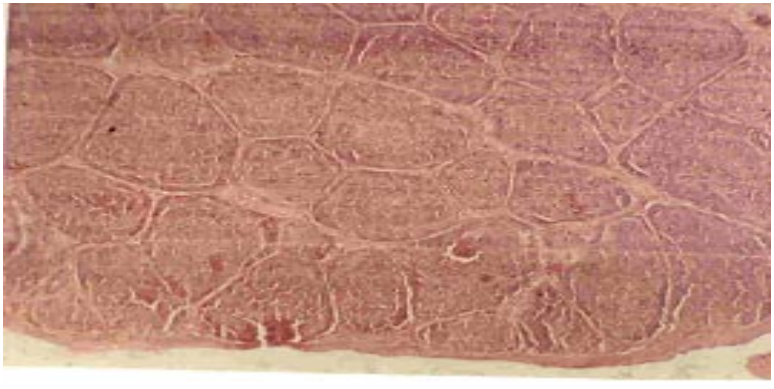

Fig 1.

Normal bursae – Bursal plicae showing the lining epithelial cells and follicles – H&Ex400

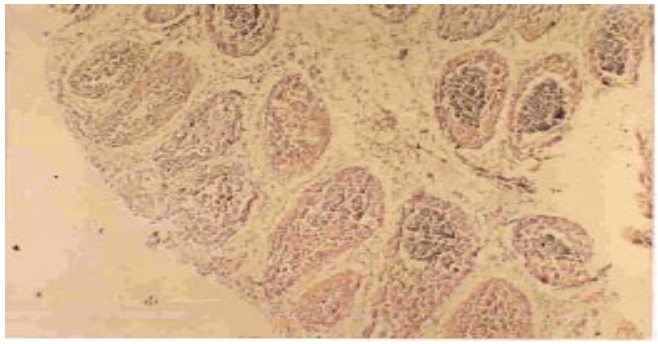

Fig 2.
Bursa showing interfollicular oedema and lymphoid necrosis – H&Ex400

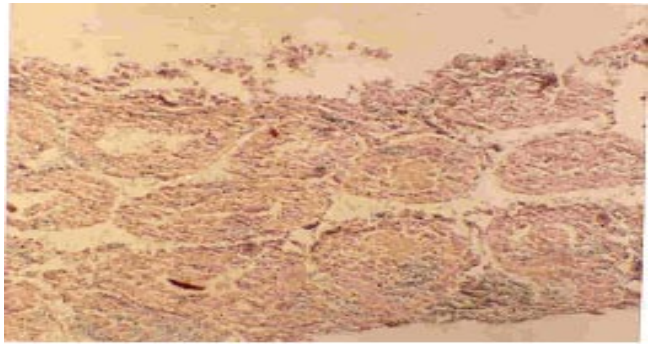

Fig 3.
Bursa showing extensive haemorrhages and lymphoid depletion in the follicles – H&Ex400

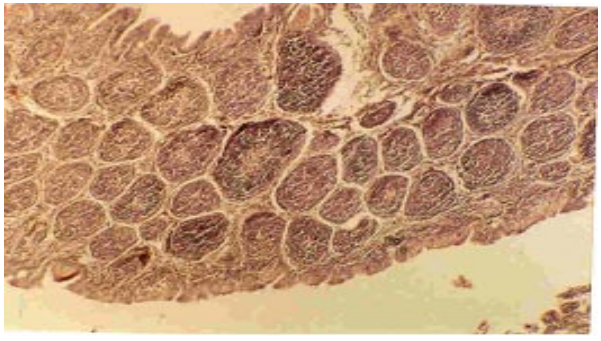

Fig 4.
Bursa showing lymphoid necrosis in a few follicles (score 1) – H&Ex400