

INFECTIOUS BURSAL DISEASE IN TAIWAN

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It was proved that infectious bursal disease certainly existed in chicken flocks of Taiwan and caused severe economic loss. The clinical signs and pathologic changes observed from several outbreaks in Taiwan were similar to those of described by workers of other countries. The causal agents were isolated from naturally affected chickens and identified as infectious bursal disease (IBD) virus with agar gel precipitation test. Serologic study showed that antibody against IBD virus persisted in survivors for 1 year or longer. General serologic survey of chicken flocks in Taiwan indicated that 100% of the breeder flocks and 94.1% of the broiler flocks were contaminated with IBD virus. Totally calculated, 57.74% of the chickens were positive in IBD antibody.

Gumboro disease was first recognized in chickens by Cosgrove⁽¹⁾. The name infectious bursal disease (IBD) was proposed by Hitchner⁽⁵⁾ in 1970. IBD is a viral disease of young chickens which primarily affects lymphocytes of the bursa of Fabricius (BF) and other lymphatic organs, especially where B-cells multiplies. It therefore depresses the humoral antibody response of chickens to various vaccines and predisposes to certain infections.

This report described clinical observations, postmortem examinations, virus isolation and identification, and general serologic study of IBD field outbreak in Taiwan.

MATERIALS AND METHODS

Field cases: From January 1980 to March 1981, several outbreaks of IBD at Pingtung, Tainan and Kaoshiung were studied.

Postmortem examinations: Each bird submitted to this laboratory was necropsied. BF and visceral organs were fixed in 10% formalin solution. Paraffin sections were cut 6 μ m thick and stained with hematoxylin and eosin.

Virus isolation: BF from dead birds were made into 10 x suspension with Earle's solution and centrifuged at 4,000 rpm for 30 minutes, the supernatant fluid was inoculated by chorio-allantoic membrane (CAM) route into 10-12-day-old embryonating eggs originated from SPF flock. The inoculated embryos were daily checked for 10 days.

Agar gel precipitation (AGP) test^(2,3,4,6): BF from experimentally infected chickens (4 days postinoculation) or naturally affected chickens were made into 2 x suspension with PBS. After freezing-thawing

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or sonification, the suspension was centrifuged at 8,000 rpm for 30 minutes to sediment large particles. The supernatant fluid was used as AGP antigen. "OMNIVET" Gumboro disease AGP antigen was used as control. The agar plates were held at room temperature and read 24-48 hours later.

Serologic study: Seventeen counties of the island were included in this study. Totally 1,945 samples from 101 broiler flocks and 440 samples from 30 breeder flocks were studied with AGP test. Antibody response of three survivors from outbreak flock No. 2 were evaluated for one year.

Identification of isolated virus: Viral isolates from naturally affected chickens were inoculated into embryonating eggs and experimental chickens. BF and affected lesions were homogenized and made into AGP antigen. Identification of this antigen were conducted with standard serum.

RESULTS AND DISCUSSION

IBD in Taiwan had the highest incidence in 6-9-week-old layer. The mortality rate ranged from 0.8% to 2.5% (Table 1). Affected chickens usually died 3-4 days after showing clinical signs which were shown in Table 2.

The gross lesions and its incidence

Table 1. Occurrence of IBD in Taiwan (1980-1981)

Case No.	Date	County	Kind of Flock	Age (WK)	Raised No.	Loss No.	Rate of Mortality
1	Jan. 1980	Pingtung	Layer	6	20,000	400	2 %
2	May 1980	Tainan	Layer	6	22,500	190	0.8 %
3	Nov. 1980	Kaoshiung	Layer	6	4,000	100	2.5 %
4	Mar. 1981	Kaoshiung	Layer	9	5,000	100	2.0 %

Table 2. Clinical Signs of IBD in Taiwan

No.	Malnutrition	Anemia	Lethargy	Anorexia	Leg Weakness	Ruffled Feather	Dehydration	Diarrhea Y	G
541	+	+	+	+	+	+	+	-	+
542	-	-	+	+	-	-	+	-	+
543	+	+	+	+	+	+	+	+	+
544	-	-	-	-	-	-	-	-	-
545	+	+	+	+	+	+	+	-	+
546	-	-	+	+	-	-	-	-	-
547	+	+	-	+	+	+	+	+	+
548	-	-	+	+	-	-	-	-	-
549	-	+	-	+	+	+	+	+	+
550	-	+	-	+	-	+	+	+	+
Total	5	7	7	10	5	6	7	4	7

were shown in Table 3. Histologic examination of BF revealed necrosis of lymphocytes and cystic cavities in the medulla of follicles, interfollicular edema mixed with heterophils and phagocytic cells (Figure 2). The medulla may contain swollen or vacuolized reticulum cells.

Embryonating eggs for virus isolation began to die on the 3rd day postinoculation. Gross lesions of the dead embryos were edematous distension of abdominal region, hemorrhage on body surface, mottled necrosis and hemorrhage of liver, and mottled necrosis of kidney. The titer

of harvested virus was $10^{2.0-4.0}$ EID₅₀/ml (Table 4).

AGP antigen made from BF of dead birds from outbreak No. 2&3 reacted with standard serum of IBD. Marked precipitation band was observed.

The antibody response of survivors No. 551, 552, 553 were evaluated with AGP test for one year. Antibody rised to 4-8x one week after survival and reached the peak (16-32x) four weeks after survival. Antibody titer remained in the peak for almost one year (Figure 1).

The results of general serologic survey

Table 3. Incidence of Gross Lesions in IBD

No.	Mus. HR.		Liver		Spleen		Kidney	
	Breast	Leg	Enlarg.	Decolor	Enlarg.	Atrophy	Enlarg.	Urate Depos.
1	+	+	-	-	-	+	-	-
2	+++	+++	-	+	-	-	-	+
3	+++	+++	-	+	+	-	-	-
4	+	+	-	+	+	-	+	+
5	+	+	-	-	-	+	+++	+
6	+	+	-	-	-	-	+	+
7	+	+	-	-	+	-	-	-
8	+	+	-	+	-	-	++	+
9	+	+	-	-	+	-	-	-
10	+	+	-	-	-	-	+	-
Total	10	10	0	4	4	2	5	5

No.	B. Fabricius		Edema	Hemorrhage			Trachea Mucus	Bloody Ascites
	Enlarg.	Atrophy		Bursa Fabric.	Proven.	Cecal Tonsil		
1	++	-	+	+	+	-	-	-
2	+	-	-	-	+++	+	-	+
3	+	-	-	+	+	-	-	-
4	+	-	+	-	+	+	-	-
5	+	-	-	-	++	+	-	-
6	+	-	-	-	-	-	-	-
7	+	-	-	+	+	+	-	-
8	-	+	-	-	-	-	-	-
9	++	-	+	+	+	+	-	-
10	-	+	-	-	-	-	-	-
Total	8	2	3	4	7	5	0	1

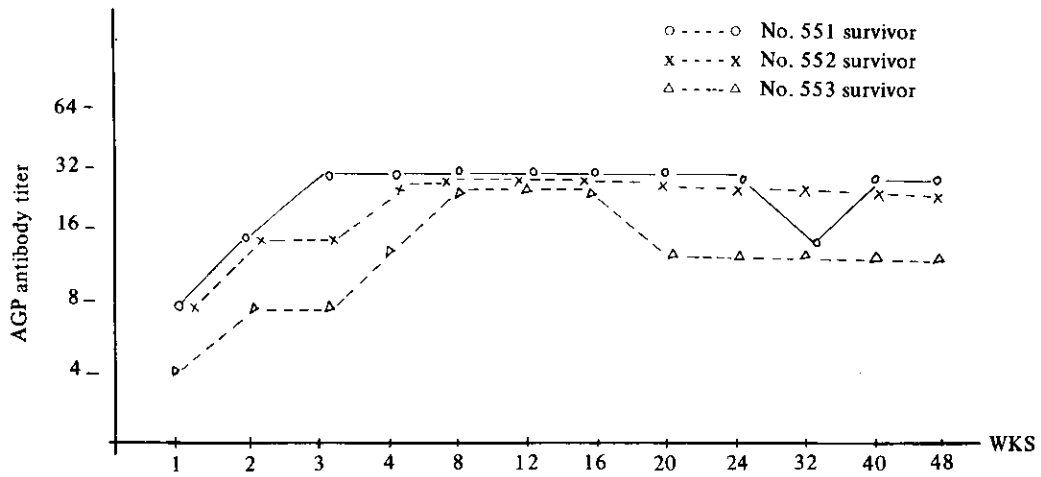


Fig. 1. Antibody response of naturally occurred IBV cases.

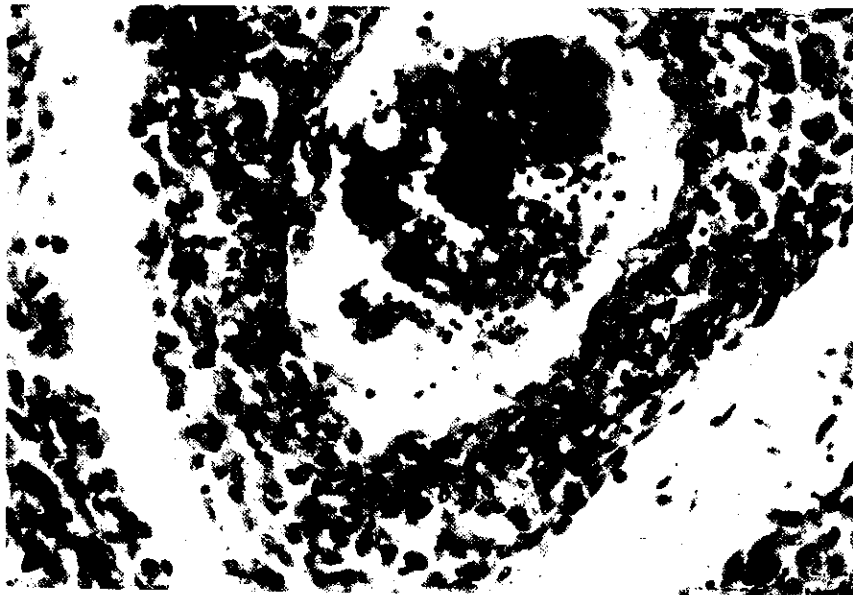


Fig. 2. Atrophic lymphoid follicle of BF.

Table 4. Results of Viral Isolation

Case No.	Strain	Organ	Host	Route	No. Passage	Titer ⁺
1	Pingtung	BF	CE*	CAM	CE-5	3.75
2	Tainan	BF	CE	CAM	CE-8	4.0
3	Luchu	BF	CE	CAM	CE-5	2.5
4	Kaoshiung	BF	CE	CAM	CE-4	2.0

⁺ Log₁₀EID₅₀/ml

* Embryonated chicken eggs.

Table 5. Antibody Investigation of IBD in Taiwan

County	Kind of flock	No. of Positive Farms	No. of Positive Chickens	Positive Rate
17	Broiler	95/101	1052/1945	54.09%
17	Layer	30/30	325/440	73.86%
17	Total	125/131	1377/2385	57.74%

were summarized in Table 5. It indicated that 100% of breeder flocks and 94.1% of broiler flocks in Taiwan were contaminated with IBD virus. Totally calculated, 57.7% of the chickens had been infected with IBD virus.

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臺灣之鷄傳染性華氏囊炎

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鷄傳染性華氏囊炎已被確認在本省存在，並且引起嚴重的經濟損失。在本省流行的幾個病情，其臨床症狀及病理變化方面的觀察結果類似於國外的報告。由這些病例分離到病毒，並以免疫擴散法證明是傳染性華氏囊炎病毒。

抗體調查顯示感染本病恢復的鷄其抗體可持續一年以上。全省鷄群抗體調查，發現種鷄場百分之百為陽性，肉鷄場也有 94.1% 之陽性率，以受檢鷄隻計算則有 57.74% 之陽性率。

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