

EFFICACY OF FEED ADDITIVE SULFAMONOMETHOXINE AND ORMETOPRIM AGAINST CHICKEN INFECTIOUS CORYZA : A CASE STUDY

Y. Nakai, K. Ogimoto¹, A. Kuwano², K. Nakamura² and M. Kato^{2,3}

Department of Animal Science
Ibaraki University, Ami, Ibaraki 300-03, Japan

Summary

A mixed infection of *Haemophilus paragallinarum* (Hpg), *Mycoplasma gallisepticum* (Mg) and *M. synoviae* (Ms) was detected in layers of a poultry farm in Iwate prefecture in Japan by pathological, serological and bacteriological investigation. Hpg strains were isolated from three of five birds investigated and all strains were identified to be type C. The Hpg isolates were more susceptible in vitro to a combination of sulfamonomethoxine and ormetoprim (Ektecin) than each of sulfamethoxazol, sulfamonomethoxine, oxytetracycline, tetracycline, streptomycin, erythromycin and thianphenicol. After a total of six days' medication of 1% feed additive Ektecin, symptoms of infectious coryza of hens in the farm almost disappeared and no Hpg was detected even from birds showing nasal discharge.

(Key Words: Chemotherapy, *Haemophilus*, Chicken, Infectious Coryza, Sulfamonomethoxine, Ormetoprim)

Introduction

Infectious coryza (IC), caused by *Haemophilus paragallinarum* (Hpg), is one of the important diseases in chickens and in Japan prophylactic treatment for IC infection has been performed by using killed vaccines of Hpg type A (Kato et al., 1960) and type C (Kume et al., 1978; Sawata et al., 1987). Although incidence of the disease has decreased after development of the vaccines, the disease has not been overwhelmed in the country yet and at the outbreak of the disease the economical loss of farms is enormous. Therefore, prophylactic and therapeutic medication are still required.

Sulfamonomethoxine was shown to be effective to IC (Nakamura et al., 1979). Moreover, synergistic effect between sulfonamides and some of

a group of pyrimidine and triazine compounds against bacteria were known (Havas et al., 1973). In the present study, in vitro effect of a combination of sulfamonomethoxine (SMM) and ormetoprim (OMP) against Hpg isolated from a farm was observed and its efficacy against IC was investigated in a contaminated farm

Materials and Methods

Poultry

Two poultry houses of a farm in Iwate prefecture in Japan were investigated. The farm reared a total of 10,000 layers (5,000 birds/house), commercial breed "Shaver Starcross 288", in wire-floored cages.

Detection and identification of microorganisms

Microbial samples were obtained from the orbital sinus of hens using cotton swabs and were inoculated into selective cultivation media. *Haemophilus* was isolated from the chicken meat infusion plate supplemented with 3% chicken serum after 24-48 hr incubation at 37 °C in 10% CO₂. Characterization of isolated Hpg was performed as mentioned by Uchida et al. (1979). *Mycoplasma* was isolated from the PPLO agar plate supplemented either with 2% equine serum,

¹Department of Animal Microbiology, Tohoku University, Sendai 981, Japan

²Veterinary Products and Chemicals Research Center, Tokyo 134, Japan

³Address reprint requests to Dr. M. Kato, Veterinary Products and Chemicals Research Center, Research Institute, Daiichi Pharmaceutical Co., LTD., Tokyo 134, Japan

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0.002% DNA solution and 0.01% DPN solution or with 12% swine serum, 0.01% DNA and 0.01% cystein hydrochloride after incubation for 3-7 days in 10% CO₂.

Drug susceptibility test

The minimum inhibitory concentration (MIC) test was performed by the agar plate dilution method recommended by the Japan Society of Chemotherapy (Ad Hoc Committee of J.S.C, 1981).

Serological test for infected birds

Sera of the hens were investigated for Hpg type A infection by the hemagglutination inhibition test using a commercial antigen, "Hpg type A hemagglutination antigen" (Kitasato Laboratories, Japan). The sera were also tested by the agglutination test using commercial antigens of *Mycoplasma gallisepticum* (Mg) and *M. synoviae* (Ms) (Kitasato Laboratories).

Medication

Hens were medicated with 1% feed additive Ektecin (final concentration; 300 ppm sulfamonomethoxine and 100ppm ormetoprim) for a total of six days, namely three days continuous ad-

ministrations were performed twice at a interval of five days.

Results and Discussion

Five hens were selected randomly from the farm, and autopsied to be observed pathologically (table 1). The symptoms of IC were observed in four birds (#2-5). Serum samples from these five birds were tested for Hpg, Mg and Ms (table 2). All samples were positive against Mg and Ms antigen; however, none of them were positive against Hpg type A antigen. After bacterial cultivation, Hpg strains were isolated from #3, 4 and 5 birds and *Mycoplasma* spp. were detected from #2, 3 and 4 (table 3). Therefore, the respiratory infection of the hens were diagnosed as the mixed infection of Mg, Ms and Hpg.

These Hpg isolates were determined as Hpg type C by the comparison of characteristics of Hpg standard strains of type A and type C (table 4). It supported the results of the serological observation.

Drug susceptibilities of these isolates were observed (table 5). Patterns of MIC of the isolates were similar to the standard strains except against thianphenicol (TPH). Two of three isolates were

TABLE 1. PATHOLOGICAL ASPECTS OF HENS RANDOMLY CHOSEN FROM A FARM

	Hen's number				
	1	2	3	4	5
Nasal discharge	- ¹	+ ²	+	+	+
Facial swelling	-	-	-	-	+
Nasal mucus	-	+	+	+	+
Respiratory mucus	-	+	-	+	-
Ovary atrophy or hematoma	-	+	-	+	-

¹ No symptom was observed.

² The symptom was observed.

TABLE 2. SEROLOGICAL ASPECTS OF THE HENS

Antigen	Hen's number				
	1	2	3	4	5
<i>Mycoplasma gallisepticum</i>	+	+	+	+	+
<i>Mycoplasma synoviae</i>	+	+	+	+	+
<i>Haemophilus paragallinarum</i> type A	-	-	-	-	-

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TABLE 3. BACTERIA ISOLATED FROM THE HENS

Bacteria	Hen's number				
	1	2	3	4	5
<i>Mycoplasma</i>	-	+	+	+	-
<i>Haemophilus</i>	-	-	+	+	+

TABLE 4. CHARACTERISTICS OF THE ISOLATED *HAEMOPHILUS*

Characteristics	Isolated strain			Standard strain	
	3	4	5	221 (type A)	YT-11 (type C)
Gram stain	-	-	-	-	-
Morphology	sr ¹	sr	sr	sr	sr
V factor required	+	+	-	+	+
Hemagglutination	-	-	-	+	-
CO ₂ required	+	+	+	+	+
Catalase produced	-	-	-	-	-
Nitrate reduced	+	+	+	+	+
Motility	-	-	-	-	-
H ₂ S produced	-	-	-	-	-
Indole produced	-	-	-	-	-
Glucose fermented	+	+	+	+	+
Satellite phenomenon	+	+	+	+	+

¹ short rod

TABLE 5. DRUG SUSCEPTIBILITY OF THE ISOLATED *HAEMOPHILUS*

(MIC: µg/ml)

Drugs	Isolated strain			Standard strain	
	3	4	5	221 (type A)	YT-11 (type C)
Sulfamethoxazol (SMX)	1.6	1.6	1.6	1.6	0.8
Sulfamonomethoxine (SMM)	1.6	0.8	1.6	1.6	0.8
Oxytetracycline (OTC)	3.2	1.6	1.6	0.8	0.8
Tetracycline (TC)	1.6	1.6	1.6	0.8	0.8
Streptomycin (SM)	3.2	6.3	3.2	<50	<50
Erythromycin (EM)	1.6	1.6	1.6	3.2	1.6
Thianphenicol (TPH)	0.4	0.8	50	25	50
Ektecin	0.8	0.4	0.2	0.2	0.05

highly susceptible to TPH, which suggested that the efficacy of TPH was variable against different strains of Hpg. In 8 kinds of drugs, Ektecin

(the combination of SMM and OMP) was most effective against the Hpg isolates.

Hens in the contaminated farm were medicated

by Ektec in for a total of six days. By the treatment, respiratory symptoms of almost of the hens were improved. Five birds were chosen from ones still showing nasal discharge and were in-

vestigated pathologically and bacteriologically. Slight clinical signs were found only in the nasal sinus and ovary of some birds and no Hpg was isolated (table 6). The hens were considered to be

TABLE 6. PATHOLOGICAL AND BACTERIOLOGICAL ASPECTS OF HENS SHOWING NASAL DISCHARGE IN THE FARM AFTER EKTECIN TREATMENT FOR A TOTAL OF SIX DAYS

	Hen's number				
	11	12	13	14	15
Nasal discharge	+	+	+	+	+
Facial swelling	-	-	-	-	-
Nasal mucus	±	±	±	±	±
Respiratory mucus	-	-	-	-	-
Ovary hematoma	+	-	-	-	-
<i>Haemophilus</i> isolated	-	-	-	-	-

¹ The symptom was observed

² No symptom was observed.

³ A small amount of mucus was observed.

⁴ No *Haemophilus* was detected.

recovering from IC.

The results indicated that administration of 1% feed additive Ektec in was effective to the hens of the farm contaminated with IC.

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