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TRIALS FOR CONTROLING PASTEURELLA ANATIPESTIFER INFECTION IN DUCKS
(With 2 Table)

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(Received at 24/9/1991)

محاولات للسيطرة علي عدوي مرض الباستريلا
أناتيبستغر في البـــط

بخيت سالـــــــــــــــم

أجري إختبار الحساسية المعملية لميكروب الباستريلا أناتيبستغـــر أنواع ٢ ، ٣ ، ٥ المعزولة من البط لمختلف المضادات البكترية · وقد أفاد البحث أن هذه الأنواع عاليـــة الحساسية لعقار الفلمكوين وحمض الاوكساليتيك · وقد جرب الفلمكوين في إختبار الوقاية والعلاج التجريبي للنوع ٣ فقط قبل وأثناء وبعد العدوي الصناعية بالميكروب وكان له تأثير في عدم ظهور أي من الأعراض الإكلينيكية للمرض بالإضافة الي عدم ظهور صفات تشريحية مرضية للميكروب المحقون مع نقص في نسبة العزل للميكروب من الأعضاء المختلفة للطيور المعالجة والمعدية بالميكروب · وقد لوحظ أن سكر اللاكتوز عند استعماله في مياه الشـــرب لمدة ثمانية أيام بنسبة ٥ر٢٪ قد أعطي نتائج مشجعة للوقاية من العدوي الميكروبية لميكروب الباستريلا أناتيبستغر في البط ·

SUMMARY

IN-VITRO: Sensitivity tests of pasteurella anatipestifer (PA) serotypes 2, 3 and 5 to 24 antimicrobial agents proved that all tested serotypes were highly sensitive to Flumequine and Oxalinic acid.

Flumequine was tested for therapeutic efficacy against PA serotype "3" in ducklings. The efficacy of the drug was evaluated according to clinical signs, survival rates and frequency of isolation from different organs following challenge.

IN-VIVO: Flumequine used either before, during or after experimental infection significantly prevented the appearance of both clinical signs and lesions of the disease and reduced the rate of reisolation of PA when compared with untreated birds. Lactose gave similar results like flumequine when given in drinking water at a rate of 2.5%.

INTRODUCTION

Pasteurella anatipestifer infection is one of the bacterial disease problems associated with commercial duck production in Egypt (IBRAHIM, 1991). And other parts of the world (DEAN, et al. 1973). This disease causes serious economic losse: which result from mortality and condemenations.

Various chemotherapeutic agents have been used with varying degrees of success to control field outbreaks. Most drugs have become gradually less effective with continous use. Effective drugs are needed to prevent economically disastrous losses when other control measures fail. Sulfamethazine in drinking water or feed was reported to prevent the onset of clinical signs, ASPLIN (1955), but it was contraindicated due to its adverse effect on the kidneys, GERLACH (1970).

The present investigation was undertaken to determine the efficacy against PA infection by flumequine and lactose in drinking water as a means of prevention and control tools for sick birds.

MATERIAL and METHODS

In-vitro:

Sensitivity test: Tested pasteurella anatipestifer: PA serotype 2, 3 and 5 were obtained from Dept. of Poultry Diseases, Faculty of Vet. Med., Assiut University.

The paper disc technique was carried out after FINEGOLD and BARON (1986) using unidisks of antimicrobial agents produced by oxoid, Basingstoke, Hampshire, England. The discs included flumequine (30 ug), oxalinic acid (10 ug), furazolidone (50 ug) framycetin (100 ug), enroflocin (5 McG), sulfadimethoxyzole and trimethoprim (5 cg), chloramphenicol (30 ug), colistine sulphate (10 ug), gentamycin (10 ug), neomycin (3 ug), ampicillin (10 ug), apramycin (15 ug), streptomycin (10 ug), oleandomycin (15 ug), doxycycline (30 ug), tetracycline (30 ug), oxytetracycline (30 ug), compound sulphonamide (300 ug), spectinomycin (10 ug), cephalexin (30 ug), lincomycin (2 ug), penicillin G (10 iu), chlortetracycline (30 ug) and cloxacillin (5 ug). Interpretation of the results was recorded according to the recommendations of CASTLE and ELSTUB (1971).

In vivo sensitivity test:

Experimental birds:

Fifty four, 10-day-old duckling (native breed) were obtained from a commercial hatchery. They were housed in healthy disinfected pens. Feed and water were provided

ad libitum, without any addition of antibutics. Rearing temperatures were similar to those used commercially.

Challenge procedure:

Pasteurella anatipestifer serotype 3 was used. It was propagated in tryptose soya agar for 24 hours at 37°C. Broth cultures were made in tryptose soya broth and incubated for 14 hours. The birds of first five groups were inoculated subcutaneously with 0.2 ml dose of tryptose soya broth culture containing 10^9 CFU/bird of PA serotype 3 as a pathogenic challenge organism.

Flumequine 10%:

(El Nasr Pharmaceutical Chemicals Company), soluble powder, dosage 1 gm/L of drinking water.

Lactose 2.5%:

(wt:vol) in tap water.

Experimental protocol:

Ducklings were divided into six groups of 9 birds each. Groups were treated as follows:

Group 1: Flumequine (1 gm/ 1 lit) in drinking water two days before the time of experimental infection with PA pathogenic strain. The same drug was given in drinking water (1 gm/ 1 litr) for another 5 successive days post-infection.
Group 2: Lactose 2.5% (wt:vol) in tap water at period as in group 1.
Group 3: Flumequine (1 gm/ 1 lit) in drinking water at time of infection for five successive days.
Group 4: Flumequine (1 gm/ 1 lit) in drinking water after infection by 24 hr. and persist for four successive days.
Group 5: Infected without treatment.
Group 6: Tap water without infection.

At the termination of the experiment, (7 days) all surviving ducklings were killed by cervical dislocation and examined for pathological lesions. Reisolation of PA organisms was conducted from brain, nasal cleft, bone marrow, spleen, liver, heart blood and bursa on tryptose soya agar, then incubated in candle jar for 24-48 hr.

RESULTS

Results of in vitro sensitivity test are shown in Table 1, flumequine was selected because of it is greatest ability to inhibit growth of field isolates of PA.

Mortality in 5th group after PA infection began 24 to 48 hr. after challenge with peak mortality occurring at 72 hours with 55.5% (5 dead birds from 9 non treated control).

The clinical signs of the affected ducklings included listless, ocular discharge and diarrhea. In the advanced stages of the disease the birds showed incoordination, shaking of the head, torticollis, and turning their backs and some of them were found dead within 6 to 12 hr. after the onset of signs. The survival birds were emaciated and showed extensive lesions of fibrinous airsacculitis, pericarditis, perihepatitis, and meningitis, during 72 hours from infections.

Infected ducklings showed typical clinical signs and gross pathology similar to that seen in natural infection. Flumequine - medicated ducklings before, during and after infection by 24 hr. showed lower frequency of isolation in some organs as shown in Table 2.

No mortalities were observed in these treated groups in comparison with infected unmedicated one. Also, duckling treated with lactose before infection with PA showed lower frequency of isolation from different organs, Table 2.

DISCUSSION

Pasteurella anatipestifer serotypes 2, 3 & 5 were sensitive to flumequine, oxalinic acid, furazolidone, framycetin, enrofflocin, of variable sensitivity to sulfadimethoxyzole and trimethoprim, colistine sulphate, gentamycin, neomycin and ampicillin and resistant to apramycin, streptomycin, oleandomycin, oxytetracycline, cephalexin, lincomycin, penicillin G and cloxacilin. On the opposite side, CHANG (1984), FLOREN (1987) and RACHAC and VLADIK (1987) reported that all isolated strains of PA were sensitive to lincomycin, penicillin, streptomycin, oxytetracycline and sulfamethoxy - pyridazine. While my results concerning ampicillin support the findings of previous investigators.

The experimental data of groups 1, 3 & 4 showed that flumequine was effective for controling PA in ducklings in either preventing mortality, gros lesions and reducing reisolation of the organisms.

ASPLIN (1955) found that sulfamezathine (0.2%) in drinking water or 2000 units penicillin inoculated twice a day intramuscullarly for 5 days prevented symptoms in ducks exposed experimentally to PA. While ASH (1967) proved that a combination of penicillin and dihydrostreptomycin was superior to oxytetracycline in reducing mortality and increasing weight gains in 20-25 days-old ducks that had signs of PA infection. Also, DEAN, et al. (1973) recorded a dietary level of 0.025 sulfaquinoxaline was effective in reducing mortality in naturally infected duckling.

MITROVIC, et al. (1980) in experimentally exposed ducks, a combination of sulfadimethoxine and ormetoprim administered at 0.02-0.12% levels in feed prevented mortality, gross lesions and bacterial reisolatins. While SANDHU and DEAN (1980) found that novobiocin and lincomycin, when fed at adequate concentrations, were the most effective medicaments tested.

Lactose provided in drinking water for ducklings as a 2.5% lactose solution, two days before and five days after infection by PA prevented mortalities, and reduced frequency of isolation of bacteria after infection. The mechanism of action of lactose is not completely known. However, lactose has been reported to have beneficial effects on reducing harmful bacteria in chickens, (RETTGER, et al. 1912).

Based on these results it is suggest that lactose in water can be used to control Pasteurella anatipestifer in ducklings. I prefer lactose than flumequine because of its availability and very low cost.

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Table 1: In vitro sensitivity test for Pasteurella anatipestifer serotype 2, 3 & 5.

Antimicrobial agents	Sensitivity of PA serotypes 2	3	5
Flumequine	(++++)	(+++)	(+++)
Oxalinic acid	(++++)	(+++)	(+++)
Furazolidone	(+++)	(+++)	(+++)
Framycetin	(+++)	(+++)	(+++)
Enoroflocin	(+++)	(+++)	(+++)
Sulfadimethoxyzol & trimethoprim	(++)	(++)	(++)
Chloramphenicol	(++)	(++)	(++)
Colistine sulphate	(+)	(++)	(+)
Gentamycin	(+)	(++)	(+)
Neomycin	(+)	(+)	(+)
Ampicillin	(+)	(+)	(+)
Apramycin	(-)	(-)	(-)
Streptomycin	(-)	(-)	(-)
Oleandomycin	(-)	(-)	(-)
Doxycycline	(-)	(-)	(-)
Tetracycline	(-)	(-)	(-)
Oxytetracycline	(-)	(-)	(-)
Compound sulphonamide	(-)	(-)	(-)
Spectinomycin	(-)	(-)	(-)
Cephalexin	(-)	(-)	(-)
Lincomycin	(-)	(-)	(-)
Penicillin G	(-)	(-)	(-)
Chlorotetracycline	(-)	(-)	(-)
Cloxacillin	(-)	(-)	(-)

(++++) , (+++) = Highly sensitive (++) = Moderate.
(+) = Slight. (-) = Negative.

Table 2: Reisolation of PA from different organs after challenge.

Organs	Group1		Group2		Group3		Group4		Group5		Group6	
	Days post infection											
	3	7	3	7	3	7	3	7	3	7	3	7
Nasal cleft	(-)	(-)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(-)
Brain	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(-)	(+)	(+)	(-)	(-)
Heart blood	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(-)	(-)
Liver	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(-)	(-)
Spleen	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(-)	(-)
Bone marrow	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(-)	(-)
Bursa	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(-)

(+) = Positive reaction. (-) = Negative reaction.