

SHORT COMMUNICATION

EFFICACY OF GENTAMICIN AFTER INTRAYOLK ADMINISTRATION IN EXPERIMENTALLY INDUCED OMPHALITIS IN BROILER CHICKS

Muhammad Ashraf, Qamar Arif and Kashif Aziz Khan¹

Department of Pharmacology and Toxicology, ¹Department of Pathology,
University of Veterinary and Animal Sciences, Lahore.

ABSTRACT

A study was conducted to observe the effect of intrayolk injection of gentamicin on experimentally induced omphalitis in broiler chicks. *Escherichia coli* was injected into yolk sac to induce omphalitis and treatment was done by intrayolk injection of gentamicin. Results showed that mortality decreased and feed intake increased after treatment. Intrayolk injection of antibiotics is suggested as an alternative to oral administration for the treatment of omphalitis in chicks.

Key words: Omphalitis, intrayolk injection, gentamicin, broiler chicks

INTRODUCTION

The development of antimicrobial drugs represents one of the most important advances in therapeutics as an effective treatment of serious infections. It has improved the quality of life and has permitted advances in many other areas of medicine. It is fortunate that most antimicrobials are relatively non-toxic, however, all have adverse effects (e.g. allergic reactions, toxic effects or effects on the normal bacterial flora) that may be troublesome or even life threatening. Thus, as with all forms of drug therapy, good clinical judgement and overall management are important to optimal patient care.

During early age of life, omphalitis (yolk sac infection) is the most frequent cause of death in chicks (Jordan, 1990). *Escherichia coli*, proteus spp., *Staphylococcus aureus* and streptococcus spp. are the common bacterial causes of omphalitis (Anonymous, 2000). Characteristic lesions are poorly healed navels, sub-cutaneous edema and bluish color of the abdominal muscles around the navel. Unabsorbed yolk material and peritonitis are common lesions. Mortality usually begins within 24 hours and peaks by five to seven days (Anjum, 1997).

Antimicrobial intervention in poultry is milestone in a total disease prevention programme that emphasizes preventive disease management. Use of antimicrobials in poultry industry has been fundamental intervention strategy since the 1960's (Wages, 2000). There are antibiotics approved for use as injections in day-old chickens and turkeys to control omphalitis or yolk sac infections. This procedure has been performed for over 30 years in the poultry industry. Marek's disease *in-ovo* vaccination technique provided a window of opportunity for an injection of antibiotic for effective control of the

yolk sac infection by placing the antibiotic at the point of contamination, when the yolk sac is withdrawn into the body cavity.

The use of antibiotics in chicks and poults and/or in the developing embryo provides the poultry veterinarian a useful tool for controlling yolk sac infections in chicks and poults during first week of life. Therefore, this project was designed to evaluate the efficacy of gentamicin after intrayolk administration in experimentally induced omphalitis in broiler chicks.

MATERIALS AND METHODS

Isolation of pathogenic strain of *E. coli* was made from the diseased birds. Identification of organisms was carried out on the basis of their cultural, morphological and staining characteristics, sugar fermentation and biochemical reactions, as described by Rehman *et al* (1996) and Jalil and Das (2001). Pathogenicity of isolate was tested in 3 weeks old chickens, as described by Lee and Arp (1998). Isolate was cultured in the nutrient broth and was incubated for 24 hours. Viable count of the broth was done by plate count method (Collins, 1995).

Isolated strain of *E. coli* was subjected to *in-vitro* antibiotic sensitivity by disc diffusion method. The antibiotic discs used were ampicillin, enrofloxacin, norfloxacin, streptomycin, oxytetracyclin, neomycin, gentamicin, ceftiofur and trimethoprim-sulfamethoxazole.

One hundred and five day-old broiler chicks were purchased from local hatchery and were divided into 3 groups A, B and C. Yolk sac infection was induced in group "B" and "C" by inoculating pathogenic isolate of *E. coli* intrayolk (10^3 c.f.u./0.1ml) whereas group "A" was kept as negative control. For intrayolk inoculation the umbilical area was cleaned with methylated spirit and sterile insulin syringe was used to inject the inoculum. The

needle was placed perpendicular to the surface of skin and inserted 10mm into yolk sac immediately posterior to the umbilicus, where the yolk sac touches the abdominal wall (Sander *et al.*, 1998; Khan, 2002).

All the groups were kept under close observation for appearance of clinical signs. On appearance of clinical signs, the group "C" was treated with injection of gentamicin intrayolk @ 2mg per chick, as described for intrayolk bacterial broth inoculation. The injection was repeated after 8 hours. Mortality, postmortem lesions and feed intake of each group were noted for 10 days. Chi-square test was used to compare the mortality between control and treated groups.

RESULTS AND DISCUSSION

The isolate was highly sensitive to gentamicin, ceftiofur, norfloxacin and ampicillin, moderately sensitive to enrofloxacin and neomycin and was resistant to trimethoprim-sulfamethoxazole, streptomycin and oxytetracycline.

Birds were depressed, off-feed and huddled together 12-hour post-infection. These signs were the same as reported by Deeming (1995). Postmortem examination of birds revealed larger yolk sac, greenish brown color of contents, watery consistency, engorged, dilated sub-cutaneous and yolk sac blood vessels. Kidney, liver and lungs were dark and swollen. Sainsbury (1992), Anjum (1997) and Ahsan-ul-Haq and Ahmad (2001) described these findings earlier.

On the appearance of clinical signs and after confirmation of omphalitis by postmortem lesions, treatment was started (36 hours after infection). No bird died in control group (A) during the experiment. Mortality in non-medicated group (B) was 50% and in treated group (C) was 7.14% ($P < 0.05$). Feed intake was 2.60 gm per day per bird in infected group before treatment. Feed intake after treatment in infected non-medicated group was 4.66 gm and in treated group was 6.33 gm per day per bird. It was inferred that the mortality in treated group was lower and feed intake was higher than the infected, non-treated group.

The treatment of omphalitis by antibiotics is beneficial. Antibiotics were recommended for treatment and control of omphalitis by Sainsbury (1992), Deeming (1995), Anjum (1997), Anonymous (2000), Wages (2000) and Ahsan-ul-Haq and Ahmad (2001).

Treatment of omphalitis by intrayolk injection of gentamicin was done in this study, Anjum (1997) recommended the use of gentamicin for control of mortality due to omphalitis. Wages (2000) reported the placement of antibiotics at the site of contamination i.e.

yolk sac and stated that gentamicin and ceftiofur were most commonly used antibiotics.

Thus, the present study suggests the intrayolk injection of antibiotic as an alternative to the oral administration for the treatment of omphalitis.

LITERATURE CITED

- Ahsan-ul-Haq and T. Ahmad, 2001. Poultry Hygiene and Disease Prevention. Pakistan Book Empire, Lahore.
- Anjum, A.D., 1997. "Poultry Diseases", VetAg Publications, Faisalabad, Pakistan.
- Anonymous, 2000. Controlling yolk sac infection. Intl. Hatchery Pract., 14(6): 27-28.
- Collins, C.H., P.M. Lyne and J.M. Grange, 1995. Collin's and Lyne's Microbiological Methods, 7th Ed., Butterworth Heinemann, Oxford, U.K.
- Deeming, D.C., 1995. Possible effect of microbial infection on yolk utilization in ostrich chicks. Vet. Rec., 136(11): 270-271.
- Jalil, H. and P. Das, 2001. Biochemical and serological characterization of *Escherichia coli* from commercial poultry. Pakistan J. Sci. Res., 53(1-2): 10-14.
- Jordan, F.T.W., 1990. "Poultry Diseases", 3rd Ed., ELBS and Bailliere Tindall, London, U.K.
- Lee, M.D. and L.H. Arp, 1998. Colibacillosis. In: A Laboratory Manual for the Isolation and Identification of Avian Pathogens, 4th Ed., Am. Assoc. Avian Pathologists, Pennsylvania U.S.A.
- Khan, K. A., 2002. A study on the pathogenesis of yolk retention in broiler chicks. M.Sc. (Hons.) Thesis Dept. Vety. Pathol., Univ. Agri. Faisalabad.
- Rehman, R., M. Rabbani, S.A. Khan and C.M. Saleem, 1996. Pathological aspects of early chick mortality due to bacterial infections. Pakistan J. Sci. Res., 48(3-4): 101-107.
- Sainsbury, D., 1992. "Poultry Health and Management", 3rd. Ed., Blackwell Scientific Publications, London, U.K.
- Sander, J.E., E. M. Willingham, J. L. Wilson and S. G. Thayer, 1998. The effect of inoculating *Enterococcus faecalis* into yolk sac on chick quality and maternal antibody absorption. Avi. Dis., 42: 359-362
- Wages, D., 2000. Antibiotic use in poultry. Presented in a Seminar "Antimicrobial Resistance" in Centre for Veterinarian Medicine's Workshop, USA.