Research Journal of Poultry Sciences 4 (1): 4-6, 2011
ISSN: 1993-5285

Effects of Meclofenamic on Fertility of Male Chicken

Mohammed H. Al-Nazawi
Department of Physiology, Biochemistry and Pharmacology,
College of Veterinary Medicine and Animal Resources,
King Faisal University, P.O. Box 3498,
31982 Al-Ahsa, Saudi Arabia

Abstract: The effect of oral administration of meclofenamic at doses of 10, 20 and 40 mg kg^{-1} body weight on sperm traits, secondary sex characters and some metabolites in male chicken was investigated. No difference between normal motility and defect sperm in control and treated birds. Weight of walttles and combs were not affected. Testosterone, ascorbic acid, total protein and cholesterol concentration were similar in control and treated groups. It is suggested that no adverse effects on semen quality were observed.

Key words: Meclofenamic, sperm, fertility, male, chicken, Saudi Arabia

INTRODUCTION

The meclofenamic acid a member of aminobenzoic acid is an important group of anti-inflammatory drugs for poultry (Papich and Riviere, 2001). Administration is via drinking water for bacterial infection and inflammation in poultry. Meclofenamic acid has the advantage of good activity against bacterial pathogens important to poultry including *E. coli*, *Hebsiell* sp., *Pseudomonas* sp., *Staphylococoeus* sp. and *Chlamydia* sp. (Flammer, 1998). Meclofenamic acid have been described as having remarkable safety record.

No report of adverse effects on reproduction but the use of meclofenamic acid has been discaraged in pregnant animals because of toxicity to developing cartilage in the foetus. At high doses these drugs are reported to cause toxic effects including inhibition of the neurotransmitter, gamma-aminobutyric acid, CNS excitement, convulsions, ocular problems and anthropathy (Corrado *et al*., 1987; Gough *et al*., 1992; Papich and Riviere, 2001) but no reports on fertility of male chicken have been produced. This study was designed to investigate some reproductive traits in chicken semen following meclofenamic administration.

MATERIALS AND METHODS

Birds and treatment: Male chickens (commercial hybrids) aged 20-23 weeks at slaughter were used. They were housed in a group of 4-6 birds in metal cages and maintained in environmentaly controlled room at 21°C under 15 h of artificial light daily, with free access to food and water. Birds were divided into 4 groups of 20 birds each. Groups 1-4 were given meclofenamic at 0, 10, 20 and 40 mg kg^{-1} body weight, respectively. The dose for each bird was suspended in water and given by crop tube daily for 10 days. Control birds (group 1) received the vehicle only.

Collection of samples: At the end of experiment semen were collected by mechanical stimulation method (Lake, 1957). Semen from all cocks of the same group were pooled. Birds were killed by cervical dislocation and the testes quickly removed, weighed, frozen in liquid nitrogen and stored at -21°C until analysis.

Biochemical analysis: Total cholesterol and ascorbic acid concentrations were estimated spectrophotometrically (Cecil CE 373 Spectrophotometer) by the methods of Knobil *et al*. (1954) and Maickel (1960), respectively. Total protein was estimated by the Biuret method (Sigma kit, UK).

Sperm motility assay: The motility of epidiymal sperm was evaluated microscopically within 2-4 min of their collection (Pant *et al*., 1995) and data were expressed as percentages.

Sperm count: The sperm were counted using a hamocytometer following the methodology of Pant *et al*. (1995).

Morphological abnormalities: A portion of the sperm suspension placed on a slide glass was smeared out with another slide, fixed in 95% ethanol and stained with eosin. A total of 200 sperm from each birds were examined for

abnormalities in different regions of spermatozoa according to the method described by Pant *et al.* (1995).

Statistical tests: The Multiple range test (Steel and Torrie, 1960) was used to evaluate the effect of drugs on cock semen.

RESULTS AND DISCUSSION

The effect of meclofenamic acid on sperm motility count and abnormalities in chicken are shown in Table 1 and 2. No effect of meclofenamic cid has been observed. No adverse effects on semen quality were observed following treatment of bulls with anti-inflammatory drugs such as phenylbutazone (Williams *et al*., 1990; Barth and Wood, 1998). Other investigations on enrofloxacin and marbofloxacin in male chicken (Al-Nazawi, 2008), salphasalazine in dogs (England and Allen, 1993), Streptomycin, oxytetracycline or tilmicosin in bulls (Barth and Wood, 1998) indicated that these were no deleterious effect on seminal characterstics. However, nitrofurans have been shown to have a deleterious effect on spermatogenesis in rats (Haganas *et al*., 1978). The length of treatment and doses used were chosen to be approximately the same asis often used in treating various illnesses in birds. However, twice the normal dosage of the drug used in this experiment is not recommended and is not commonly administered by veterinarians (Table 3).

Meclofenamic acid at doses used has produced no effect on testicular ascorbic acid, cholesterol and protein. These parameters are useful indicators in assessing fertility in animals. Cholesterol is a precursor of androgens, ascorbic acid is important in steroidogenesis and protein contents depend on the number of spermatozoa present in the testes (Kitabachi, 1967; Arneja *et al*., 1981; Ali *et al*., 1984; Al-Nazawi, 2008).

Table 1: Effect of treatment with meclofenamic acid on sperm motility and total sperm account on male chicken (n = 6)

Groups	Mortility (%)	Total sperm count ($\times 10^6$ mL^{-1})
Control	83.2	2.5
Maclofenamic treated (10 mg kg^{-1})	81.4	2.3
Maclofenamic treated (20 mg kg^{-1})	84.6	2.4
Maclofenamic treated (40 mg kg^{-1})	81.2	2.1

Table 2: Effect of treatment with meclofenamic acid on sperm motility and total sperm account on male chicken (n = 6)

Groups	Head detached	Curved	Tail round	Loop	Total abnormal
Control	0.05	1.4	1.02	1.10	3.57
Maclofenamic treated (10 mg kg^{-1})	0.06	1.3	1.12	1.20	3.68
Maclofenamic treated (20 mg kg^{-1})	0.04	1.2	1.10	1.30	3.64
Maclofenamic treated (40 mg kg^{-1})	0.05	1.5	1.31	1.25	4.11

Table 3: Effect of treatment with meclofenamic acid on sperm motility and total sperm account on male chicken. (n = 6)

Groups	Ascorbic acid (μg g^{-1} tissue)	Total protein (mg g^{-1} tissue)	Total cholesterol (μg mol g^{-1} tissue)
Control	23.11	164.0	13.0
Maclofenamic treated (10 mg kg^{-1})	22.60	175.0	12.6
Maclofenamic treated (20 mg kg^{-1})	20.10	172.6	11.9
Maclofenamic treated (40 mg kg^{-1})	21.90	181.9	12.9

ACKNOWLEDGEMENT

The researcher thanks the Deanship of Scientific Research, King Faisal University for financial support (Project No. 10-13, 2009).

REFERENCES

Al-Nazawi, M.H., 2008. Effects of enrofloxacin and marbofloxacin on fertility of male chicken. J. Taibah Univ. Sci., 1: 1-5.

Ali, B.H., A.M. Homeida and A. Knifton, 1984. The effect of furazolidone on fertility of male chickens. Comp. Biochem. Physiol., 78: 43-47.

Arneja, D.V., D. Chand and R. Georgie, 1981. Age influenced variations in plasma cholesterol, testicular cholesterol and testicular ascorbic acid of prepubertal Turkeys. Acta Vet. Brna., 50: 53-59.

Barth, A.D. and M.R. Wood, 1998. The effect of streptomycin, oxytetracycline, tilmicosin and phenylbutazone on spermatigenesis in bulls. Can. Vet. J., 39: 103-106.

Corrado, M.L., W.E. Struble, C. Peter, V. Hoagland and M.S. Jacobo Sabbaj, 1987. Norfloxacin: Review of safety studies. Am. J. Med., 82: 22-26.

England, G., C.W. and W.E. Allen, 1993. The effect of sulfasalazine upon seminal characteristics in dogs. J. Reprod. Fertil., 47: 526-528.

Flammer, K., 1998. Common bacterial infections and antibiotic used in companion birds. Compendium Continuing Educ. Practicing Vet., 20: 34-35.

Gough, A.W., O.B. Kasali, R.E. Sigler and V. Baragi, 1992. Quinolone arthropathy-acute toxicity to immature articular cartilage. Toxicol. Pathol., 20: 436-450.

Haganas, L., L. Ploen and E.M. Ritzen, 1978. The effect of nitrofurazone on the endocrine, secretory and spermatogenic functions of the rat testis. Andrologia, 10: 107-126.

Kitabachi, A.E., 1967. Ascorbic acid in steroidogenesis. Nature, 215: 1385-1386.

Knobil, E., M.G. Hagney, E.J. Wilder and F.N. Briggs, 1954. Simplified method for the determination of total adrenal cholesterol. Proc. Sac. Exp. Biol. Med., 87: 48-50.

Lake, P.E., 1957. Fowl semen as collected by the massage method. J. Agric. Sci., 49: 120-126.

Maickel, R.P., 1960. A rapid procedure for the determination of adrenal ascorbic acid. Anat. Biochem., 1: 498-501.

Pant, N., A.K. Prasad, S.C. Srivastava, R. Shanker and S.P. Srivastqava, 1995. Effects of oral administration of carbofuran on reproductive system of rat. Hum. Exp. Toxicol., 14: 889-894.

Papich, M.G. and J.E. Riviere, 2001. Fluoroquinolones Antimicrobial Drugs. In: Veterinary Pharmacology and Therapeutics, Adams, H.R. (Ed.). 5th Edn., Iowa State University Press, Iowa, pp: 898-917.

Steel, R.G.D. and J.H. Torrie, 1960. Principles and Procedures of Statistics. McGraw-Hill Book Co. Inc., New York.

Williams, R.J., J.A. Smith, F.D. Boudinot and A.P. Knightm, 1990. Pharmacokinetics of phenylbutazone given intravenously or orally in mature Holstein bulls. Am. J. Vet. Res., 51: 367-370.