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Effect of Amoxicillin on Some Hematological Parameters in Broiler Chickens

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Abstract: The efficacy of amoxicillin and allicin in broiler chickens was investigated in twenty apparently healthy broiler chickens. The chickens were divided into 2 groups and treatment was orally administered in drinking water for five consecutive days. Group 1; untreated control, group 2; treated with therapeutic dose of amoxicillin (20 mg kg^{-1} b.wt.) blood samples were taken at the end of experiment, serum samples were used for hematological analysis of RBCs, WBCs, Hb and PCV. Amoxicillin produce significant decrease in RBCs, Hb and PCV and significant increase in WBCS. In conclusion, administration of amoxicillin (20 mg kg^{-1} b.wt.) produces some hematological changes. Care must be taken when used amoxicillin therapeutically in poultry farms because of their adverse effects on adverse effects on haematological picture.

INTRODUCTION

In the modern intensive poultry production, antimicrobial agents are being increasingly used to enhance feed efficiency, promote health, improve productivity and are also used for disease prophylaxis and treatment (Johnston, 1998).

Hematological constituents usually reflect the physiological responsiveness of the animal to its external and internal environments and this is serving as a veritable tool for monitoring animal health. Hematological profile in animals is an important indicator of physiological or pathophysiological status of the body (Khan and Zafar, 2005).

Amoxicillin, an acid stable, semi-synthetic drug belongs to a class of antibiotics called the penicillins (β-lactam antibiotics). It is shown to be effective against a wide range of infections caused by wide range of gram positive and gram negative bacteria in both human and animals (Brogden *et al*., 1979). It is a congener of ampicillin (a semi-synthetic aminopenicillin) differing from the parent drug only by hydroxylation of the phenyl side chain. It has found a niche in the treatment of ampicillin-responsive infections after oral administration (Gordon *et al*., 1972).

The present study was carried out to evaluate efficacy of amoxicillin in healthy broilers by throwing light on any side effect of amoxicillin that could be reflected on hematological picture.

MATERIALS AND METHODS

Drug (Amoxicillin): Amoxicillin is semisynthetic broad spectrum penicillin derived from the basic penicillin nucleus 6-amino penicillanic acid. It was used in a therapeutic dose of 20 mg kg^{-1} b.wt. once daily for 5 consecutive days orally or intramuscularly (Brander *et al*., 1997). Amoxicillin trihydratewas obtained as a pure powder from Sigma Aldrich Chemical Co., St. Louis, USA.

Experimental design: Twenty apparently healthy, 30 days old unsexed Hubbard broiler chickens (obtained from El-Kahera poultry Company, Egypt) were used in the current study. The chickens were allocated into 2 separated groups, 10 birds for each. The chickens were floor reared in separate units under hygienic measures. A continuous lightening pattern was used feed and water were provided ad-libitum. Chickens were fed on balanced commercial ration free from any medications obtained from cairo poultry company.

Broiler chickens were classified into 2 groups, each of 10 chickens. Group 1; control untreated and group 2; treated with 20 mg kg^{-1} b.wt. of amoxicillin. Amoxicillin were orally administered in drinking water for 5 consecutive days.

Blood samples: Blood samples were taken 24 h after the end of medication. Blood samples were collected on heparin for hematological studies.

Hematological assay: The counting of red and white blood cells was performed (Nutt and Herrick, 1952). The concentration of Hemoglobin (Hb) was determined (Kececi *et al*., 1998). The Packed Cell Volume (PCV) values were determined by using microhematocrit method (Kececi *et al*., 1998).

Statistical analysis: The obtained results were statistically explained by Snedecor and Cochran (1982).

RESULTS AND DISCUSSION

The effect of oral administration (in drinking water) of amoxicillin (20 mg kg^{-1} b.wt.) for 5 consecutive days on some serum hematological parameters in healthy chickens was recorded in Table 1 and Fig. 1. Oral administration of amoxicillin in drinking water for 5 consecutive days in healthy broiler chickens produced significant decrease in RBCs, Hb and PCV and significant increase in WBCS at 24 h post administration when compared with non treated broiler chickens.

In the current research, administration of amoxicillin to healthy broiler chickens induce significant decrease in total erythrocytic count, haemoglobin content and packed cell volume our results were in complete harmony with Al-Mayah and Al-Ahmed (2005) the previous researchers reported that total erythrocytic count, haemoglobin those reported by Jensen and Demain (1988) and content and paked cell volume % were decreased following administration of amoxicillin for 5 day in chickens. Our observed data are agreed with those reported by El-Kahky (1991) who reported another beta lactams (cefoperazone) induced a significant decrease in

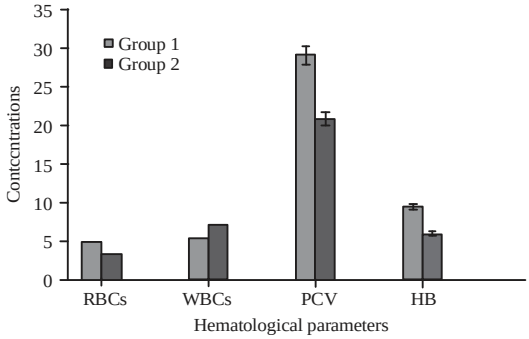

Fig. 1: Effect of amoxicillin (20 mg kg^{-1} b.wt.) administered in drinking water for 5 consecutive days on some hematological parameters in broiler chickens (n = 10)

Table 1: Effect of amoxicillin (20 mg kg^{-1} b.wt.) administered in drinking water for 5 consecutive days on some hematological parameters in broiler chickens (n = 10)

Hematological parameters	Group 1 control	Group 2 amoxicillin treated
Total erythrocytic count (RBCs) ($10^6/\mu L$)	4.87±0.01	3.21±0.02***
Total leucocytic count (WBCs) ($10^6/\mu L$)	5.29±0.03	7.08±0.05***
PCV (%)	29.04±1.17	20.83±0.85***
Hb (g dL^{-1})	9.47±0.41	6.01±0.23***

total erythrocytic count, haemoglobin content and packed cell volume % of rabbits. Our result coordinated with that reported by Wold *et al*. (1978) who stated that another β-lactamines (cefamandole) caused slight decrease in total erythrocytic counts, hemoglobin content and paked cell volume % in laboratory animals.

In the present study, healthy broiler chickens received tested dose of amoxicillin for 5 consecutive days evoked significant increase in total leukocytic count, this change in leukogram indicating the harmful effect of the drug on haematological parameters of the broiler chickens (Chaleva and Dzhurov, 1987). These obtained results go in agreement with Alla (2007) in health broiler treated with amoxicillin. Our results parallel to Mahfouz (2007) in healthy rabbit treated with amoxicillin. β-lactamines (cefoperazone) in therapeutic dose produced a significant increase in total leukocytic count of rabbits (El-Kahky, 1991).

CONCLUSION

Administration of amoxicillin (20 mg kg^{-1} b.wt.) produces some hematological changes. Care must be taken when used amoxacillin therapeutically in poultry farms because of their adverse effects on hematological picture.

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