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Short communication

The effect of acetylosalicylic acid and berberis on ascites syndrome parameters in broiler chickens

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Abstract

One-hundred and thirty day-old broiler chickens were kept for 6 days and on the seventh day, 120 chickens were selected and randomly divided into 5 groups with 2 replicates. To cause ascites, an amount of 0.12% sodium was added to the drinking water of 4 groups of chickens. On the fourteenth day, the amount of sodium was increased to 0.24% and at the same time, treatment with acetylosalicylic acid and berberis was started. At the age of 14 and 21 days, random sample chickens from each replicate were necropsied and were examined in terms of the factors associated with ascites. The results showed that the ratio of the weight of the right ventricle (RV) to the weight of the total ventricles (TV) and all other factors on 14th day revealed no significant difference between the groups ($p>0.05$). On 21st day, the RV/TV ratio in the ascites control group was significantly higher than that in the control group ($p<0.05$). The RV/TV ratio in the groups receiving acetylosalicylic acid and berberis were lower than those in the ascites control group; however, this reduction was not significant ($p>0.05$). The rate of mortality in the groups receiving acetylosalicylic acid and berberis was lower than that in ascites control group. Considering the results obtained, it can be suggested that the treatment with acetylosalicylic acid and berberis is effective to prevent ascites.

Key words: ascites, acetylosalicylic acid, berberis, broilers, sodium chloride

Introduction

A variety of factors may cause ascites syndrome including high sodium in the diet or water that may increase the flow and resistance to blood flow, and causes ascites accordingly (Mirsalimi and Julian 1993,

Julian 2000). Prostaglandins regulate the constriction and dilation of blood vessels. Besides, prostaglandins are involved in the formation of blood clots. Prostaglandin synthesis is reduced by acetylosalicylic acid (Vane 1971) by irreversibly acetylating serine at the active site of the prostaglandin synthetase (Roth and

Table 1. The effect of ASA, berberis and 0.24% concentration of Na⁺ on RV, TV, RV/TV ratio and PCV at the day 21 (values are mean ± standard deviation).

Group	ASA (%)	Berberis (%)	RV (g)	TV (g)	RV/TV (%)	PCV (%)
1	–	–	0.41 ± 0.09 ^a	2.41 ± 0.38 ^a	15.73 ± 1.68 ^a	29.3 ± 1.88 ^a
2	–	–	0.63 ± 0.16 ^b	3.03 ± 0.74 ^b	19.42 ± 2 ^b	31.1 ± 2.51 ^a
3	0.20	–	0.57 ± 0.11 ^b	3.25 ± 0.3 ^b	17.64 ± 2.66 ^{ab}	30.4 ± 2.45 ^a
4	–	1.00	0.49 ± 0.08 ^{ab}	2.92 ± 0.38 ^{ab}	17 ± 2.37 ^{ab}	31.3 ± 3.09 ^a
5	0.20	1.00	0.49 ± 0.09 ^{ab}	2.67 ± 0.46 ^{ab}	18.48 ± 1.67 ^b	29.6 ± 2.75 ^a

ASA: acetylosalicylic acid, RV: right ventricle, TV: total ventricles, PCV: packed cell volume (haematocrit), g: gram.

* Values within a column with different lower-case superscripts are significantly different (p<0.05).

Siok 1978). Since the ascites may be affected by vasoconstriction and blood clotting, it seems that controlling the prostaglandin synthesis through acetylosalicylic acid may recover the condition (Balog et al. 2000). The berberis with the scientific name of *Berberis vulgaris* will reduce the blood pressure (Fatehi et al. 2005, Fatehi-Hassanabad et al. 2005), causes hypoglycemia (Shamsa et al. 1999) and has anti-inflammatory effects (Fatehi et al. 2005). Berberine is a known alkaloid in berberis with a variety of medicinal activities including strong vasodilator and antiarrhythmic actions (Fatehi et al. 2005). Considering the fact that no study is conducted on the effect of berberis on the ascites syndrome in broiler chickens and there are different reports about the impact of acetylosalicylic acid on this syndrome, this investigation was designed to examine the effects of both items on the improvement of the parameters related to ascites syndrome.

Materials and Methods

In this study 130 day-old Ross 308 broiler chickens were used and they were kept for 6 days. At the age of 7 days, 120 chickens were chosen and divided into 5 experimental groups with 2 replicates and 12 chickens per replicate. In order to create experimental ascites, an amount of 0.12% sodium obtained from sodium chloride was added to the drinking water of all the groups except the control group (group 1). On the 14th day, 2 chickens of each replicate were chosen randomly, the blood samples were taken and then they were unconscious and slayed. The heart was taken out of the body and the right ventricle (RV) was separated from the junction to the ventricular wall. The weight of RV and the weight of the total ventricles (TV) was measured. The amount of hematocrit was measured by hematocrit tubes.

Then, the amount of sodium in drinking water was increased to 0.24% in all the groups except the control group, and the treatment with berberis and

acetylosalicylic acid was started simultaneously in the treatment groups (3, 4 and 5). The dosage of acetylosalicylic acid was selected on the basis of previous studies (Balog et al. 2000), and an amount of powdered dried berberis was selected and used in this study (Table 1). To examine the impact of treatment with acetylosalicylic acid and berberis, 5 chickens at the age of 21-day were randomly selected from each replicate and were sampled as mentioned above. The mean in the experimental groups were compared applying Tukey's test. All the experiments were done in accordance with the principles for care and use of laboratory animals, and approved by the Ethics Committee of the University of Zabol (UOZ.ECRA/2016/009).

Results and Discussion

The results obtained by statistical analysis of different parameters under study including RV weight, TV weight, RV/TV ratio and the hematocrit on the 14th day show no significant difference between the groups (p>0.05). The findings related to RV weight, TV weight, hematocrit percentage and RV/TV ratio at the age of 21st day are shown in Table 1. The rate of mortality has been affected by the treatment with acetylosalicylic acid and berberis; the quantity of dead chickens during the days 14-21 in the groups 1, 2, 3, 4 and 5 was 0, 4, 2, 2 and 0, respectively. No mortality was observed during 7-13 days of the experiment. During necropsy of dead chickens the gross lesions were found: enlargement of the heart, dilation of the right ventricle, right atrium and vena cava, hydropericardium, accumulation of fluid within the peritoneal cavity, congestion of the liver and lungs. Balog et al. (2000) applied different amount of acetylosalicylic acid in the diet to treat the ascites. The results of their study suggested that the ascites symptoms were significantly decreased in the group of broilers receiving 0.2% acetylosalicylic acid (Balog et

al. 2000). Lamas da Silva et al. (1988) and Dewil et al. (1996) suggested the role of non-steroidal anti-inflammatory medicines as a preventive agent against ascites (Dewil et al. 1996, Lamas da Silva et al. 1988). There has been no study reported about the impact of using herbal medicines like berberis on the treatment of ascites syndrome. Therefore, this is the first study about the beneficial effects of berberis on the parameters related to ascites in the broiler chickens. Considering the present results, it may be suggested that the acetylosalicylic acid can recover the symptoms related to ascites. Also, the berberis can be used to recover the ascites condition. However, the combination of acetylosalicylic acid and berberis for the treatment of ascites requires further investigation.

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