HISTOLOGIC STUDY OF SOME ORGANS IN ORGANISM OF LAMBS FED CLENBUTEROL

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SUMMARY

In three groups of lambs fed both low-, moderate- and highconcentrated, the effect of clenbuterol on the histostructures of some organs has been studied. Lambs received at 10 mg/kg feed clenbuterol daily for 42 days. In each group, of four animals samples for histologic analyses of duodenum, jejunum, abomasum, liver, lung and kidneys have been taken. Results of the study show a certain effect of feeding type on the histostructures of duodenum, jejunum and abomasum. Supplementation of 10 mg clenbuterol/kg of feed daily produces no essential changes. In all three experimental groups stagnation and distrophic effects were established in the liver, as well as a series of changes in their kidneyes, concerning mainly Malpigic corpuscules. In lungs, inflammatory processes observed in pulmonary parenhim with a predominant heamoragic character occur mainly in animals of experimental groups, but the presence of these processes in some animals of the control groups does not give sufficient grounds for caterogical inferences.

INTRODUCTION

Studies of the effect of B-adrenergic agonist drugs are mainly related to their role for changing both protein and fat contens in the organism of animals (BAKER et al, 1984; DICKS et al, 1984; COLEMAN et al, 1988; HU et al, 1988; CLAEYS et al, 1989). An increasing of total weight and feed efficiency was also established in sheep receiving clenbuterol (KIM et al, 1987). A certain interest also represent the date about the effect of these substanses on both the growth and carcass characteristics of animals (MERKLEY, HARWOOD, 1989). On the other hand side effects have been observed induced by clenbuterol (BROCKWAY, et al, 1987). A possibility is there that changes, occuring in metabolism when using Beta agonists, also influense some organs of both digestive and secretory systems participating most actively in metabolism (WARBURFON et al, 1988). In the present study we set ourselves the task of investigating the state of the instostructures in both small intestines, abomasum, liver, kidneys and lungs of lambs reseiving clenbuterol.

MATERIAL AND METHODS

The trial was conducted on 60 male lambs, three-breed cross, weaned at 45 days of age, average live weght of 15,4 kg. For 90 days, animals divided into 6 groups of 10 each received respectively: 1 and 4 groups- low cocentrated feeding- 4.0 MJ energy/kg and 200 g protein/kg mixture; 2 and 5 groups- moderate- concentrated feeding- 5,1 MJ energy/kg, 200 g protein/kg of mixture; 3 and 6 groups- high- concentrated feeding- 6,0 MJ energy/kg, 200 g protein/kg mixture.

When reaching 26,5 kg of live weight, 10 mg of clenbuterol per kg of feed has been additioned, mixed with starch at a ratio of 1:1 mg/g for 4,5 and 6 experimental groups. Control 1,2 and 3 groups reseive above-mentioned energy and protein without clenbuterol until accomplishing the experiment. After 42 days, of 4 animales of experimental and control groups samples were taken for studying the histosyructures in both small intestines, abomasum, liver, kidneys and lungs. Samples of these organs have also been taken a week after stopping clenbuterol in experimental groups. Materials for histologic study were fixed in formalin and coloured with heamatoxilin-eosin.

RESULTS AND DISCUSSION

Data obtained in the study for developing the histostructures in both duodenum, jejunum and abomasum may be examined in two aspects: on one hand, determining the effect of different feeding type and on the other hand studying the clenbuterol effect under low, moderate and high-concentrated feeding on these structures. In table 1, development of histostructures is given for duodenum in control 1,2 and 3 groups, and experimental 4,5 and 6 groups. From the measurments of histostructures in duodenum, the significance arises about feeding types used in the experiment under relevant combinations of energy for developing this part of intestine. Clenbuterol supplementation does not change that regularity. A certain dependance emerges in developing the histostructures of duodenum on the feeding tyre. Comparing the results obtained by measurments under single feeding types between control and experimental groups does not give graunds for considering Clenbuterol supplementation has influenced significantly this intestinal area.

In the jejunum of the small intestines total thickness is practically equal under different feeding types for control groups (table 2). For separate histostrustures higher papuses shoud be pointed out under high concentrated feeding compared to low one. Much more marked are the differences in the histostructures between experimental groups. Under highconcentrated feeding, Clenbuterol supplementation indused probably additionaly a poorer development of most structured in that intestinal area.

In the abomasum of control groups a greater height of the glands has been established in animals under high-concentrated feeding. In the rest of structures differences have been established between the groups (table 3). In experimental groups, trend toward poorer development of muscular layers and total depth for control animals high-concentrated feeding, is here more clearly expressed and statistically significant. studying the results of measurments under different feeding types, clenbuterol supplementation was established to exert no significant effect on development of histostructures in the abomasum.

The liver of animals examined in control groups was without visual changes. Only a lamb fed high concentrate a pelleting of cytoplasla of the heapatocites and hyperemia observed. Clenbuterol supplementation in animals under high-concentrated feeding leads strenthening these processes, heapatocites in liver of animals are of unclear cell borders, pelleted cytoplasma, lysis or rexis of nuclei. Arranging of beams is very changed under the pressure of enlarged sinuses. In lambs of experimental groups low-and moderate concentrated feeding, the condition of liver is similar to high consentrated feeding. Stagnation phenomena are slighly poorerly expressed but here often pelleting of cytoplasma and degradation of heapatocites are observed. A week after stopping the clenbuterol, in some of these animals a trend arises toward normalization but in cases the changes described above remain.

In the kidneys of animals of control groups, Malpigic corpuscles and function canals of the nephrons are both form and structure normal for them. For experimental groups receiving clenbuterol, occurred changes are concentrated mainly in Malpigic corpuscles. Most of them are of irregular form, there is a narrowing of the area Baulman-Shumlyanski capsule, reaching to sticking of visceral leaf to parietal one. other Malpigic corpuscles an exudat was observed where often exist descwamed cells elements of the blood. In single cases, glumerules are observed where a degradation capilliar stitches occurs and in Baulman-Shumlyanski space many forms of elements, mainly leucocites are observed. Variety in changing degree of extracapilliar and intracapillar level of glumerules on the one hand as well as non-equal affecting of Malpigic corpuscles the other hand, determine clenbuterol effect during developing. A week after clenbuterol stopping, these changes are being observed to some extent.

In lungs, inflammatory processes observed of pulmonary parenhim with a predominating haemorrhage character occured mainly in animals of experimental groups. It should noticed, however, that a part of control animals had similar state of lungs.

CONCLUSION

Investigation of both duodenum, jejunum and abomasum shows a definite effect feeding type on histostructures studied. Suplement of 10 mg clenbuterol per kg feed do to lambs does not induce significant changes. Condition of liver, however, gives a reason to consider that as a result of clenbuterol intake for experimental animals, both stagnation distropic phenomena are developed. In kidneys of these animals a series of changes are observed affectiong mainly Malpigic corpuscles. That determines our standpoint that these organs clenbuterol infiuences negativelly their normal function. Observations lungs of experimental and conrtol animals do not give sufficient reason for categorical inferences regarding the significance of clenbuterol concerning the changes established these organs.

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Table 1

DEVELOPMENT OF HISTOSTRUCTURE IN DUIDENIM

Variable / Groups	Control			Experimental		
	1	2	3	4	5	6
Height of intestinol villae	577 ± 60 ^{a}	465 ± 16 ^{a}	408 ± 8 ^{B}	526 ± 43 ^{a}	512 ± 13 ^{a}	414 ± 8 ^{B}
Lieberkuhn's/glands	481 ± 29 ^{a}	385 ± 8 ^{B}	437 ± 29 ^{ac}	461 ± 23 ^{a}	418 ± 15 ^{aB}	467 ± 4 ^{ac}
Brunner's glands	455 ± 22	484 ± 56	509 ± 20	456 ± 7	496 ± 35	422 ± 23
Ring-shaped muscular layer	180 ± 19 ^{a}	193 ± 22 ^{a}	131 ± 9	171 ± 13 ^{a}	189 ± 20 ^{aB}	136 ± 25 ^{ac}
Longitudinal muscular layer	70 ± 2	81 ± 7	73 ± 9	65 ± 3 ^{a}	88 ± 11 ^{B}	62 ± 5 ^{ac}
Total thickness	1763 ± 70 ^{a}	1612 ± 56 ^{B}	1558 ± 53 ^{B}	1680 ± 44 ^{a}	1665 ± 63 ^{a}	1500 ± 21 ^{B}

Means with different leffers are significant,
$P < 0.1$; $P < 0.05$; $P < 0.025$

Table 2

DEVELOPMENT OF HISTOSTRUCTURE IN JEJUNUM

Variable	Control			Experimental	
Groups	1	2	3	4	5
Height of intestinal popillae	412 ± 40 [a]	485 ± 64 [ab]	497 ± 19 [b]	448 ± 33	498 ± 28
Lieberkuhn's glands	439 ± 31	444 ± 10	473 ± 13	442 ± 4 [a]	459 ± 8
Ring-shaped muscular layer	146 ± 16 [a]	170 ± 26 [ab]	118 ± 4 [b]	177 ± 6 [a]	148 ± 17
Longitudinal muscular layer	78 ± 4 [a]	83 ± 13 [ab]	44 ± 2 [c]	82 ± 12 [a]	82 ± 8
Total thickness	1075 ± 48	1182 ± 73	1132 ± 26	1189 ± 35 [a]	1185 ± 25

Means with different leffers are significant,
P < 0.1; P < 0.05; P < 0.025

Table 3

DEVELOPMENT OF HISTOSTRUCTURE IN ABOMASUM

Variable	Control			Experimental	
Groups	1	2	3	4	5
Height of intestinal popillae	429 ± 8 [a]	413 ± 30 [ab]	478 ± 13 [c]	451 ± 20	451 ± 9
Ring-shaped muscular layer	786 ± 165	593 ± 48	523 ± 60	780 ± 48 [a]	632 ± 53 [bc]
Longitudinal muscular layer	209 ± 50	164 ± 18	151 ± 8	232 ± 13 [a]	211 ± 39 [ab]
Total thickness	1424 ± 199	1171 ± 66	1151 ± 42	1462 ± 55 [a]	1293 ± 68 [ab]

Means with different leffers are significant,
P < 0.1; P < 0.05; P < 0.025