STUDIES ON THE EFFECT OF VITAMINE E TO PREVENT MUSCULAR LESIONS IN PORCINE STRESS SYNDROME.

T. HAENICHEN*, W. BOLLWAHN and H.M. BLENDL

VETERINARY FACULTY, UNIVERSITY OF MUNICH, 8 MÜNCHEN 22, VETERINÄRSTR. 13
BAVARIAN CENTER OF ANIMAL HUSBANDRY GRUB, 8011 GRUB
FEDERAL RUPUBLIC OF GERMANY

There is a high susceptibility to stress in pigs crossbred German Landrace/Pietrain, especially bred for increased proportion of meat compared to fat. Acute necrosis - mainly of the M.longissimus dorsi - can occur and is followed by an often lethal metabolic acidosis. Involved are pigs with 60 kg body weight and above. The treatment of the acute disease is as symptoms require and consists in supporting of the blood circulation and application of buffer solution. The value of additional Vitamin E and Selenium application is in dispute. Certainly there is no therapeutic value concerning etiology of the disease. But an increased resistance of the muscle cells and/or an increased capacity for regeneration under the influence of Vit. E could be taken into consideration. This would explain observations out of veterinary practice which report interruption of series of muscle necrosis as soon as the Vit. E concentrations in feeds were increased. To our knowledge a systematic investigation of the prophylactic and therapeutic effect of Vit. E and Selenium was not yet made.

Material and Methods:

For a trial 20 pigs were used. Feederpigs of 20 - 30 kg susceptible to stress were selected using the halothane test. Two groups were formed. All animals received the same food, however Vitamin E and Selenium concentrations were different. The control groups received food supplemented with 10 ppm Vit. E and 0,1 ppm Selenium whereas the test group's food was standardized to 100 ppm Vit. E and 0,5 ppm Se per kg.Within certain intervals the animals were weighed and bloodsamples were taken 24 hours later for enzyme determination (GOT, CK) to estimate a possible different development of the muscular carrying capacity. When the animals had 70 kg an artificial stimulation was reached by the drug MYOSTRESS (neostigmine - atropine - mixture) - 1 ml per animal, subcutaneously (Bickhardt et al., 1980). Twenty hours later five pigs of each group were treated by an intramuscular Vit.E/Selenium injection (900 mg Vit.E - acetate and 10 mg Sodium selenite). The effect of the increased muscular activity was checked clinically and by enzyme estimation. At 95 - 100 kg body weight the animals were slaughtered. Samples of the M. longissimus dorsi (5 of each body side)were collected for histopathological studies. Meat quality parameters were determined (pH, temperature, Göfo, watery content, rigor, loss of weight, swelling, cook-loss).

Results:

GOT and CK values and standard deviations are given in table I. There was no difference between control and test groups, concerning the increase of GOT and CK values. One animal of the group, which had received the food supplemented with high dosage of Vit. E/ Selenium died shortly after MYOSTRESS-application. At the post mortem examination a servere focal acute unilateral necrosis of the left M. Longissimus dorsi in its caudal and cranial portions was found. The muscle as a whole was changed in the sense of PSE-meat. Pathological investigation at slaughtering revealed no pathological muscular lesions in both groups. Meat quality parameters varied but did not show a significant difference between the groups.

TABLE I

Results ($\bar{X} \pm S$) of enzyme estimation (U/l)

Start of Vitamine E + Selenium supplemented feeding: 27.11.81

Treated group				Control group		
Date	n	GOT U/l	CK U/l	n	GOT	CK
1.12.81	10	12,9 ± 4,3	437 ± 299	10	15,1 ± 5,6	592 ± 744
19.01.82	9	15,9 ± 8,9	3315 ±1487	10	15,5 ± 3,5	3347 ± 2160
9.02.82	8	19,4 ± 5,7	3812 ±3423	10	21,3 ± 7,8	5456 ± 5281
after MYOSTRESS 23.02.82 28.02.82	8	29,9 ± 7,0	4241 ± 276	10	22,9 ± 5,9	4076 ± 297

The mean differences (t-test) between control and treated groups are not significant ($p>0.05$)

Conclusions:

Vit. E and Selenium supplementation of the food and treatment with Vit.E/Selenium after stress did not prevent the occuring of acute necrosis of M. longissimus dorsi in pigs. There was no difference between the test and control groups concerning the frequency of meat with the PSE-characteristics.

Selected references:

ANDERSEN, E. and P. JENSEN (1977) 29, 502-504 ;
BICKHARDT, K., H.J. CHEVALIER, W. GIESE and J.J. REINHARD (1972) Fortschritte d.Vet.Med. suppl. Zbl.Vet.Med. 18;
BICKHARDT, K., D.K. FLOCK and L. RICHTER (1979) Acta Agr.Scand.suppl. 21, 379-385;
BICKHARDT, K., F. MAAS, L. RICHTER and C. SCHWABENBAUER (1980), Proceedings Int.Pig Vet. Soc. 340;
BLENDL, H.M. (1980), Der prakt.Tierarzt 61, 81-84;
JOHANNSEN, U., S. MENGER, H. PFEIFFER and G. v. LANGERKEN (1981), Arch.exper.Vet.Med. 35, 641-660.