PE9.27 Pork - a Supplementary Aid in Treatment after Intracerebral Hemorrhagic Apoplectic Shock
178.00

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Abstract. The article presents results of investigations of neurorehabilitation effect of the meat of pigs , which had had hemorrhagic apoplectic shock. During neurological testing significant acceleration of recovery processes of the experimental animals was found. The results of the investigations confirm that the meat of pigs-convalescents is a source of substances possessing curative –recovering and stress-protective effect in the case of acute disorder of cerebral circulation (hemorrhagic apoplectic shock).

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Key words: hemmorhagic apoplectic shock, modelling, rats, pork, neurorehabilitation effect

I. INTRODUCTION

The possibility of formation of pre-set characteristics of meat raw materials during life of the animals is an interesting and important scientific problem. The methods are known, which allow influencing chemical, mineral, amino acid composition, tenderness, color stability and other characteristics by correcting characteristics of ingredient composition of feeds. The study of prospects of purposeful changes of meat raw materials properties by immediate manipulation with animals seems extremely interesting.

The purpose of the investigation was the study of curative and recovery effect of meat raw materials obtained from pigs which had had apoplectic shock, in the experiments on laboratory animals.

II. MATERIALS AND METHODS

The meat raw materials were obtained from pigs which successfully had recovered from one-sided autohemorrhagic apoplectic shock and slaughtered on the 52nd day after operation.

Method of A.N.Makarenko [1] was used for reproduction of hemorrhagic apoplectic shock in animals. With the use of this method, apoplectic shock is being modeled by breaking Capsula Interna of the brain using knife mandrin (Fig.1).

One-sided hemorrhagic apoplectic shock was modeled on laboratory animals under the conditions of ether anesthesia.

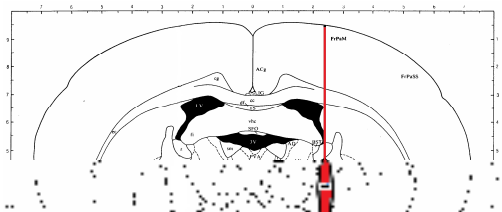

Fig.1. Arrangement of the device for modelling of acute hemorrhagic apoplectic shockt.

А – device in a position with the moved out mandrin-knife. 1 – tungsten mandrin-knife; 2- direction needle – cannula; 3 – holder of stereotaxis apparatus; 4 – fixative of upper part of mandrin-knife; 5 – cutting lower end of mandrin knife;

Б. Device in a position, when it is submerged into brain structures, **В**. Scheme of modeled destruction in stereotaxis coordinates

Manipulations with animals and their handling in vivarium were carried out according to International rules of humane handling of animals.

The investigation of curative-preventive effect of meat was carried out on white nondescript male rats at 3 months age with the model of hemorrhagic apoplectic shock.

Four groups were formed, 7 animals to each. In the experimental groups I, II and III modeling of acute one side hemorrhagic apoplectic shock under the conditions of ether anesthesia was conducted. Group IV was control and consisted of intact groups.

The diets of the experimental animals differed in the kind of the added meat of pigs (5 g) : group 1 obtained raw meat of pigs, which had had shock; group II – cooked meat of pigs, which had had shock; III – raw meat of intact pigs. The pigs of the control group consumed common vivarium diets. All the diets were balanced over principal nutrients.

At an early time of post-shock period (2 weeks) the indicators of the general state of white rats were studied: viability, dynamics of change of body weight.

As a result of the operation the affection of moving ability was experimentally reproduced in animals - paresis or paralysis. Therefore, for adequate evaluation of changes, testing of the dynamics of general moving activity of the animals was carried out. The test “open field’ and “setting paws on support” [3] were carried out: before operation, on the 2^{nd}, 3^{rd}, 6^{th},7^{th}, 10^{th}, 11^{th} and 15^{th} day were used. On the 15^{th} day the animals were slaughtered and the brain was extracted. The material for histological examination was fixed with aqueous solution of formalin. Sections with the thickness 5 μm were obtained on the rotor microtome “Microm HM 315”, The sections were stained by hematoxyline of Erlich and water-alcohol eosin.

Dehydration in alcohols and paraffin-embedding were carried out according to generally accepted technique [2].

The results were processed using the program Microsoft Excel.

III. RESULTS AND DISCUSSION

The results have shown reduction of average live weight of laboratory animals on the first day after operation in the experimental groups. As Diagram 1 shows, the indicators of weight gains of rats, consuming both raw and cooked meat of the operated pigs, are similar to those of the control group, while those of the group 3, sharply differ from the control.

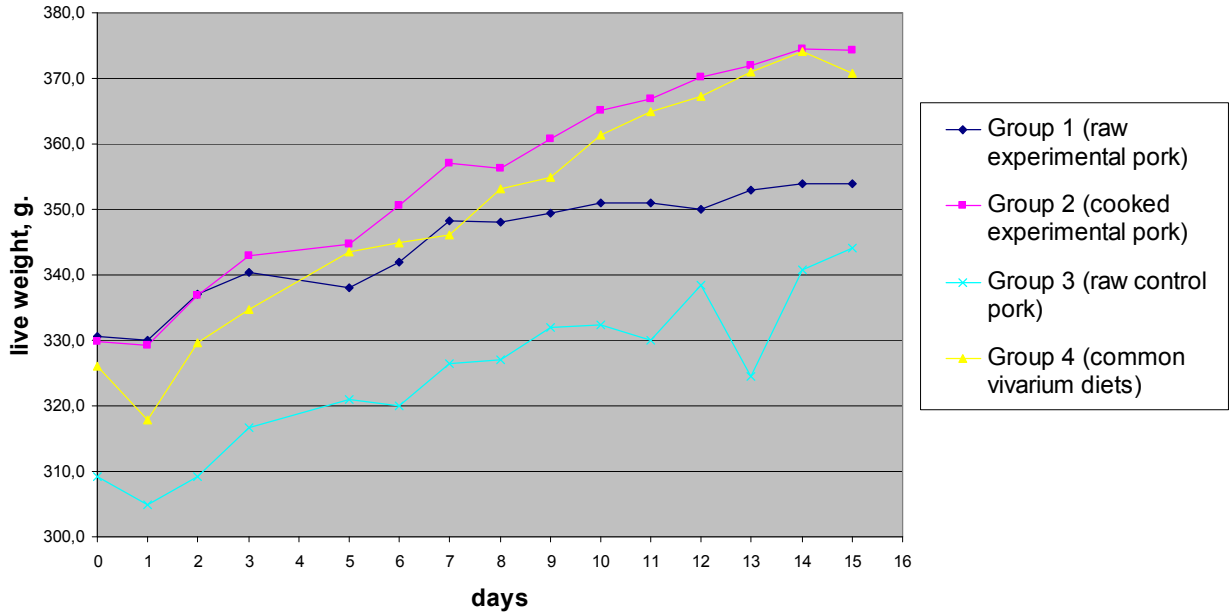

Diagram 1. Average values of live weight gain of survived animals

Weight gains were: in group 1 -11.2%, in group II - 13.2%, in group III - 6.7% and in group IV – 13.4%. Thus, during the studied acute period, dynamics of the gain of live weight in the group, having obtained cooked meat from the animals with the shock, was higher, than in the group of animals, obtaining raw meat of the same animals and in the group, consuming meat of intact animals. This dynamics corresponded to the dynamics of the gain of live weight of the control group of animals, not subjected to modeled shock.

It should be noted, that in the experimental groups, acute periods are distinctly marked: for the experimental groups 1 and II – the 5th and 8th days, for the experimental group III – the 1st, 6th, 11th and 13th days. As a result, one can state, that the use of the meat of animals, who successfully endured autohemmorhagic shock, results in significant reduction of dangerous period for life – from 6 to 2 days.

No deaths of animals were observed during the whole period of the experiment.

Animals with the most similar indicators of nervous activity (without signs of hyper- and hypoactivity) were selected for the interpretation of the results of neurological testing.

The experimental animals, obtaining cooked and raw meat of pigs, which had hemorrhagic shock, had the behavior in the “Open field test”, close to the indicators of the control rats.

The animals which had the meat of intact pigs in their diets showed low rate of recovery of the investigated behavior and adaptation to unusual conditions after the operation in the “Open field test”. After 10 days the animals acquired hyperactivity, suggesting about the absence of inhibitory processes. In the test of “Setting paws on support” no recovery processes were observed.

The meat of pigs-convalescents has a strongly evidenced recovery effect, involving fast stabilization of behavior and emotional states of rats, consuming it during rehabilitation. In the test “Setting paws on support” full recovery of 75% animals in both the 1st and the 2nd groups was observed.

In the investigation of brain, the most pronounced damage of brain tissues, plethora of vessels, was

observed in the animals of group III. Hemorrhage along the direction of the way of mandrin was seen on the saggital section of the brain (Fig.2).

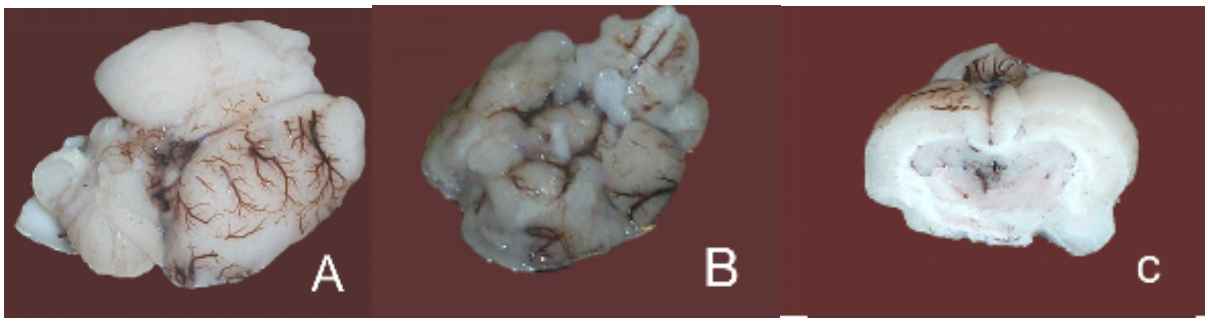

Fig. 2. Macrophotography of the shock nidus of the animals (3rd group). A – top view, widening of vessels of right hemisphere; B - view from below, plethora of vessels of Vilizian circle, C – cross section, hemorrhage in the region of basal ganglions. Direction of needle insertion is seen

There were observed lacunes in the center of injury (Fig.3.1), centres of collection of oligodendrocites, astrocites and microglias . Also, large density of endothelial cells is evident (Fig.3.2), occurred due to hypervascularization (germination of capillaries) of the center of injury.

There are evident differences in the volumes of injures, recorded on the 15th day after modeling of the experimental hemorrhagic shock of the animals of the 1st and 2nd groups and rats, which had not been subjected to therapeutic effect of meat of pigs, which had had shock. This is connected with the effect of meat. Thus, the volume of damage of rats which were not subjected to therapeutic effect of meat of pigs, having had apoplectic shock, was larger.

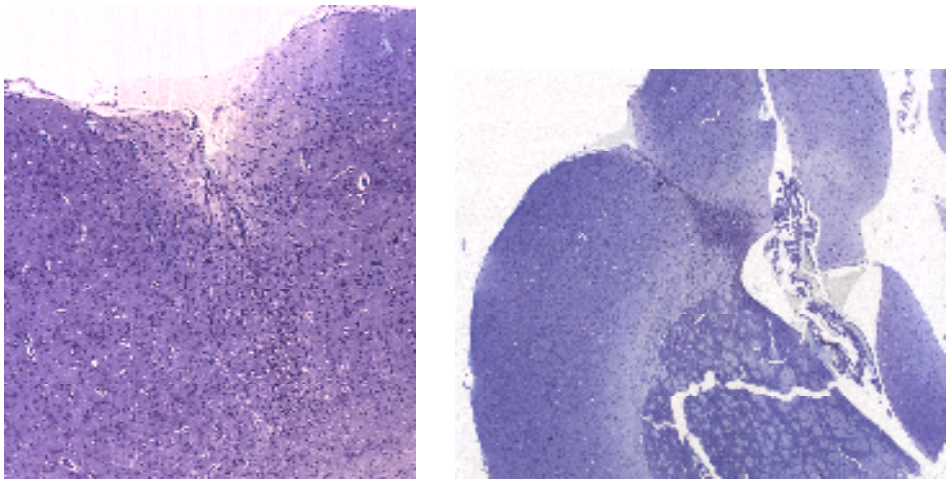

Fig.3. Microphotography of the center of hemorrhagic apoplectic shock in the inner capsule on the 15th day after its modeling: 1- animals of the first group (staining with hematoxylin, x 10); 2- animals of the 3rd group (staining with hematoxylin, x 2.5).

IV. CONCLUSION

Thus, the carried out investigations have shown possibilities of formation of meat raw materials with pre-set curative properties during life cycle of the animal for nutrition of people with acute disturbance of cerebral circulation (apoplectic shock).

The results of the investigations confirm curative and recovery properties of meat of pigs, which had had apoplectic shock, and also the fact that during thermal treatment it doesn't lose its neurorehabilitation properties.

In future we plan to continue studying meat raw materials and methods of their treatment to create the products for prophylaxis and treatment of cerebral vascular pathology.

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