SOME RESULTS OF THE COMBINED ADMINISTRATION OF SARCOLYSIN AND BRAIN TISSUE EMULSION IN EXPERIMENTAL CONDITIONS

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M. E. Timoshechkina and G. I. Budilina

Laboratory of Experimental Biotherapy (Head—Corresponding Member AMN SSSR Professor M. M. Maevskii) and Laboratory of Pharmacology (Head—Candidate Med. Sci. A. P. Belikova), Institute of Experimental and Clinical Oncology (Director, Active Member AMN SSSR Professor N. N. Blokhin) of the AMN SSSR, Moscow

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It is common practice nowadays in the treatment of malignant tumors to use ionizing radiation and chemotherapeutic preparations, which severely depress the protective reactions of the organism and hemopoiesis. For this reason, the specific forms of treatment given in cancer hospitals must be supplemented by various types of stimulant therapy designed to increase the compensatory powers of the organism and ameliorating the side effects of chemotherapy and radiotherapy [1-4].

On the basis of data showing an increase in the resistance of the organism to malignant growth by preliminary injections of 10% brain tissue emulsion in animal experiments [5, 6], it was decided to study the effect of this biological preparation on the treatment of malignant disease with sarcolysin.

EXPERIMENTAL METHOD

Experiments were conducted on healthy animals and animals with malignant tumors (rats with sarcoma 45). Altogether 80 mice, 200 rats, and 32 rabbits were studied. The technique of preparation of the 10% brain tissue emulsion has been described previously [5, 6]. The dose of brain tissue emulsion given to each albino mouse was 0.3 ml/20 g, for each rat 0.3 ml/100 g, and for each rabbit 0.5 ml/kg body weight. The course of treatment of the animals with the biological preparation consisted of six intraperitoneal injections at intervals of 72 hours. Sarcolysin solution was injected intraperitoneally 4 times at intervals of 72 h, in doses of 2 and 4 mg/kg for rats and 2 mg/kg for rabbits. The experimental results were analyzed statistically by the Student—Moshkovskii formula and by the use of the X^2 criterion. Blood was investigated once every 5 days.

TABLE 1. Effect of Brain Tissue Emulsion on Toxicity of Sarcolysin

Group of mice	Sarcolysin (in mg/20 g)	Emulsion of muscle tissue (in ml/20 g)	Survived	Dead
1	0.6	—	12	8
2	0.7	—	8	12
3	0.6	0.3	8	12
4	0.7	0.3	4	16

EXPERIMENTAL RESULTS

To ascertain the effect of brain tissue emulsion on the action of toxic doses of sarcolysin, experiments were conducted on 80 noninbred mice, divided into 4 groups (20 mice in each). The results of these experiments showed some increase in the toxicity of sarcolysin as a result of the administration of brain tissue emulsion (Table 1).

To discover the effect of brain tissue emulsion on the therapeutic (antitumor) activity of sarcolysin experiments were carried out on 120 male rats with sarcoma 45. Untreated rats with sarcoma acted as controls. For a dose of sarcolysin of 2 mg/kg, the inhibition of tumor growth

TABLE 2. Effect of 10% Emulsion of Brain Tissue on Hemogram of Rabbit

Time of taking blood	No. of leukocytes/ /mm³	Basophils	Eosinophils	Pseudoeosinophils			Lymphocytes	Monocytes
				juvenile	stab cells	segmented		
Before injection of brain tissue	7,149	1	2	—	2	26	67	2
After 2nd injection	12,265	3	6	—	3	62	24	2
" 4th "	10,293	0	1	—	4	46	41	8
" 6th "	5,430	0	2	1	3	52	30	12
10 days after end of experiment	9,173	3	3	—	2	55	29	10

amounted to 89.4%, and when combined with brain tissue this rose to 91.4%, while for a dose of sarcolysin of 4 mg/ /kg the corresponding values were 95.9 and 96.6% inhibition.

In the next experiment the effect of 10% brain tissue emulsion was studied on the composition of the peripheral blood in different animals. Investigations were carried out on 32 healthy rabbits, 60 healthy rats, and 140 rats with sarcoma 45, before administration of the preparations, during the course of treatment, and for 6-8 days after the course had ended. The observations showed that administration of brain tissue emulsion produced no appreciable change in the composition of the red blood. As regards the white blood picture, an increase in the leukocyte count was observed after the first 3-4 injections of the brain emulsion. In the leukocyte formula pseudoeosinophils as a rule were predominant, with an increase in the numbers of eosinophils and monocytes (Table 2).

At the end of the course of injections of brain tissue emulsion, the level of the leukocytes returned to its original value, but the changes in the formula described above persisted. In the middle of the course the platelet count rose (in rats from 210,000 to 320,000), and then fell again to its initial level. In the rabbits and rats receiving sarcolysin in conjunction with brain tissue emulsion, the leukopenia was less severe than in the animals receiving sarcolysin alone. Similar results were obtained in the experiments on the rats with sarcoma.

The investigations showed that the 10% brain tissue emulsion, in the doses mentioned above, did not depress the antitumor activity of therapeutic doses of sarcolysin. Experiments on mice showed that a single intraperitoneal injection of 10% brain emulsion in a dose of 0.3 ml/20 g increased the toxicity of sarcolysin when given in doses of LD_{40} and LD_{60}, although the results lie outside the limits of statistical significance.

Under the influence of brain tissue emulsion the leukocyte count in the peripheral blood rose in the rabbits and rats after the 2rd-4th injection of the biological preparation and then fell to its original level. The changes in the leukocyte formula took the form of predominance of pseudoeosinophils, an increase in the number of eosinophils, and an increase in the monocytosis at the end of the course of treatment. It was also observed that when administration of sarcolysin was combined with that of brain tissue, its toxic action on the blood of the animals was somewhat less marked than after administration of sarcolysin alone.

The changes described above are evidence of the stimulant action of this biological preparation on the recipient's blood and are in agreement with data reported in the literature. Sarcolysin is known to cause agranulocytosis and thrombocytopenia, and it may therefore be concluded that the results obtained will be of definite importance in the combined treatment of tumors.

SUMMARY

A study was made of the effect produced by a 10% brain tissue emulsion on the antineoplastic activity of sarcolysin given in therapeutic doses, and on the peripheral blood of the animals treated with sarcolysin alone, or in combination with the preparation in question. A 10% brain tissue emulsion failed to reduce the antineoplastic activity of therapeutic doses of sarcolysin, but had some stimulating effect on the peripheral blood; as a result, in combined treatment with sarcolysin and brain extract the toxic action of sarcolysin on the blood of healthy and tumor-affected animals was less pronounced than when the antineoplastic preparation was administered alone.

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