EFFECT OF CRUDE AND TAR-FREE NAPHTHALAN ON DEVELOPMENT OF SARCOMA M-1 IN RATS

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UDC 616-006.3.04-092.9-092:547.912

Application of naphthalan petroleum to the skin of rats inoculated with sarcoma M-1 stimulates development of the tumor. In some cases metastasization of the sarcoma was observed.

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The literature devoted to the action of naphthalan petroleum (a thick black syrupy liquid consisting of a mixture of hydrocarbons and tar) on various pathological states under clinical and experimental conditions is considerable. However, results of the application of this therapeutic petroleum product for the treatment of malignant tumors are few in number and contradictory in nature [1-4].

In the present investigation the effect of naphthalan on growth and development of sarcoma M-1 was studied.

EXPERIMENTAL METHOD AND RESULTS

Crude naphthalan was tested on 92 rats: 63 experimental and 29 control animals. Tar-free naphthalan was tested on 40 rats, including 24 controls. Naphthalan applications were given before inoculation of the tumor and at various stages during its development: 6-7, 9-10, 13-15, and 20-25 days after inoculation of the tumor. The following doses of naphthalan were applied on each occasion: 0.1, 0.05, and 0.01 ml. Malignant disease was produced by injection of a 20% suspension of sarcoma M-1 into the lateral surface of the rats' body in a dose of 0.5 ml. Experiments carried out with crude naphthalan showed that the tumors were larger in rats treated with repeated skin applications of crude naphthalan than in controls. The experimental animals survived for a rather shorter period than the controls, and the rats receiving naphthalan also lost more weight.

In one case in the experimental group of rats, metastasization was observed into the animal's internal organs, which never happened in the control group. This was a rat treated with crude naphthalan in 10 doses, each of 0.05 ml, starting from the 23rd day after inoculation of the tumor. The rat died 46 days after inoculation, and at necropsy a metastasis the size of a pea was found in the liver. Normally, of course, sarcoma M-1 when inoculated subcutaneously does not give metastases in the internal organs.

Experiments using tar-free naphthalan showed that rats inoculated with sarcoma M-1 and treated with tar-free naphthalan survived for a shorter time than the controls, lost more weight, and in most cases showed successful inoculation with the tumor. In this group of experiments metastasization was observed in two cases. In one rat, metastases were found in the liver and spleen; in the other, in the intermuscular bundles of the heart and in the cortex of the kidney (Fig. 1), although in the latter case the metastases could not be detected macroscopically. Both these rats had been treated with tar-free naphthalan starting from the 8th day after inoculation of the tumor, in 10 doses, each of 0.5 ml. The rats died 32 and 44 days after inoculation with the tumor.

The results of these experiments on rats using crude and tar-free naphthalan show that large doses of this product (0.1 ml) accelerate growth of implanted tumors of rats and shorten the life span of the experimental animals. A dose of 0.05 ml also stimulates growth of implanted tumors, although less strongly. Metastasization of sarcoma M-1 in three cases following administration of naphthalan in a dose of 0.05 ml is particularly interesting. Crude naphthalan, in a dose of 0.01 ml per application, also accelerates growth

Department of Pathophysiology, A. Aliev Azerbaijan Postgraduate Medical Institute, Ministry of Health of the USSR, Baku (Presented by Active Member of the Academy of Medical Sciences of the USSR N. N. Zhukov-Verezhnikov). Translated from Byulleten' Éksperimental'noi Biologii i Meditsiny, Vol. 66, No. 9, pp. 88-89, September, 1968. Original article submitted June 13, 1967.

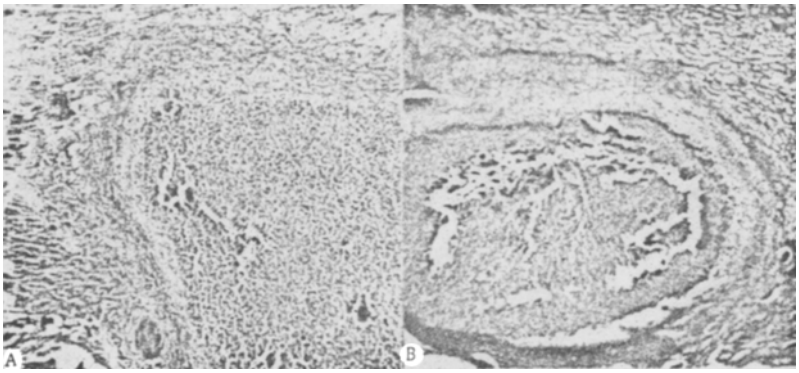

Fig. 1. Large metastatic nodule in intermuscular bundles of the heart (A) and in kidney cortex (B) of rat treated by 10 applications of tar-free naphthaln, each of 0.05 ml, starting on 8th day after inoculation of tumor (rat sacrificed 44 days after inoculation). Objective 10, ocular 7.

and development of tumors (its action was less marked than in the preceding doses), whereas if tar-free naphthalan is given in doses of 0.01 ml at a time, the course and development of tumors implanted in the rats are indistinguishable from those in the control

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