

ONCOLOGY

EFFECT OF AN INFLAMMATORY PROCESS IN THE STOMACH ON THE DEVELOPMENT OF METASTASES OF RABBIT CARCINOMA IN IT

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The question of the relationship between the inflammatory and blastomatogenic processes is attracting the attention of clinicians and experimenters. Many investigators [1, 2, 11, 23, 26] assume that inflammation, pyogenic infection of the neoplasm or the wound after removal of the neoplasm affect the neoplastic process favorably. They consider acute inflammation an antiblastic factor, basing their opinion on the activation of the mesenchyme which occurs during inflammation and which counteracts, in their opinion, the development of a neoplasm. Other investigators [3, 9, 10, 12, 14, 16, 18, 20] state that the inflammatory process, as a result of secondary regeneration under conditions of dystrophic changes in the tissue, leads to pre-cancer, while infection of the already extant neoplasm greatly increases its growth.

L. M. Shabad [24] and his school [6, 13, 17, 21] reached the conviction that inflammation is not a requisite link in the chain of events leading to cancer on the basis of a number of experimental investigations with pure carcinogens.

The present work is devoted to the clarification of the effect of the inflammatory process on the development of malignant transmissible tumors.

Experimental Method and Results

We selected the stomach, in which, even with extensive destruction of many internal organs, metastases of Brown-Pearce cancer are very rarely found, as the object of investigation.

According to the data of Brown-Pearce, after intratesticular injection of rabbit carcinoma, metastases were found in the stomach in 1.8% of the cases; according to the data of A. A. Solovyev [22], in only 2 rabbits out of 66, i.e., in 3% of the cases. G. F. Dyadyusha and N. M. Turkevich [5] followed the metastasis of the indicated strain when inoculated in 383 rabbits; they found not one case of metastasis of the neoplasm to the stomach. Our observations of 128 rabbits, which were administered a suspension of Brown-Pearce neoplasm intravenously, gave the opportunity of noting only one case of implantation of the cancer in the stomach. A. N. Goryeva [4] showed that irritation of the stomach receptors by introduction of 70% ethyl alcohol under the serosa facilitated the metastasis of the carcinoma into the stomach in almost all cases after administration of the cancer suspension into the auricular vein of the rabbit.

In order to clarify the influence of a slow aseptic inflammatory process in the stomach on the metastasis of Brown-Pearce carcinoma, we carried out two series of experiments. In the first series—the abdominal walls of 20 rabbits under general ether anesthesia were opened along the linea alba and the stomach was extruded through the incision. Then 0.5 ml of a 10% emulsion of infusorial earth in peach oil was injected in the muscular layer of the stomach along the lesser curvature. 12 days after administration of the emulsion, all the rabbits were injected in the auricular vein with a 30% suspension of neoplastic tissue in an isotonic solution of table salt, using 1 ml of suspension per 1 kg of the animal's weight. To control the effect of trauma, 0.5 ml of sterile

isotonic table salt solution was administered after laparotomy in the muscular layer of the stomach wall of 20 rabbits along the lesser curvature. 12 days later these same control rabbits were injected in the auricular vein with a 30% suspension of Brown-Pearce carcinoma, using 1 ml per 1 kg of weight. A group of 20 rabbits served as a second control, which were not administered anything in the stomach wall, but received a 30% suspension of carcinoma intravenously (1 ml per 1 kg weight).

Results of the first series of experiments are presented in Table 1.

TABLE 1

Affection of the Stomach and Other Internal Organs of Rabbits with an Inflamed Area of the Stomach Wall by Inoculable Carcinoma

Duration of life after inoculation in days	Metastases											
	stomach	lungs	liver	kidneys	adrenals	urinary bladder	diaphragm	spleen	omentum	serosa of the small intes- tine	serosa of the large intes- tine	post-opera- tive scar
30	-	++	+	++	-	-	-	-	-	-	-	-
25	+	+++	+	+++	-	-	-	-	-	-	-	+
19	-	+++	-	+	+	-	+	-	-	-	-	-
30	-	++	++	-	-	-	-	-	+	+	+	-
27	-	-	-	++	-	-	-	-	-	-	-	-
18	+	++	+	++	-	-	-	-	-	+	-	+
31	-	+	+	++	-	-	-	-	-	-	-	-
22	+	++	+	++	-	-	-	-	+	-	-	-
26	+	+	+	++	-	-	-	-	-	-	-	-
19	-	+++	+	+	-	-	+	-	-	+	-	-
32	+	++	+	-	-	-	-	-	+	-	-	+
23	-	++	++	+	-	-	-	-	-	-	-	+
28	+	+++	+	+	-	-	-	-	+	+	+	+
24	+	-	-	++	-	-	-	-	-	-	-	-
20	-	+++	-	-	-	-	-	-	-	-	-	-
23	+	++	+	+	-	-	-	-	-	-	-	-
29	-	+	+	++	-	-	-	-	-	-	-	-
21	+	+	+	+++	-	-	-	-	-	-	-	-
33	-	+	++	+++	+	-	-	-	-	-	-	-
22	+	++	+	-	-	-	-	-	-	-	-	+

Symbols: + single knots; ++ limited invasion; +++ considerable invasion; - absence of implants.

As is apparent from the data presented in Table 1, 10 out of 20 experimental rabbits were found to have solitary metastases of the neoplasm in the stomach, 5 rabbits had implants of the neoplasm at the post-operative scar.

In the first group of control rabbits, metastases of the neoplasm were not found in the stomach at all. Single metastases of the neoplasm were found in 5 rabbits of this group on the parietal peritoneum in the area of the post-operative scar.

In the second group of control rabbits no cancer metastases were found in the stomach.

In the second series of experiments on 10 rabbits, we studied the effect of aseptic inflammation of the stomach on the diffusion of metastases of Brown-Pearce carcinoma after inoculation of the tumor in the testes.

A 30% suspension of the tumor in isotonic salt solution, using 1 ml per 1 kg of the animal's weight, was injected in the right testis of the rabbits. 12 days after the inoculation of the tumor, the abdominal wall was opened under ether anesthesia by incising the upper part of the linea alba, and the stomach was extruded through the operative wound. In the stomach wall along the lesser curvature of the middle third, each rabbit received 0.5 ml of 10% emulsion of infusorial earth in peach oil.

The results of the second series of experiments are shown in Table 2.

The presence of cancer metastases in the stomach wall, primarily along the lesser curvature, was found in 5 rabbits. Metastases were observed in the parietal peritoneum in the area of the post-operative scar of 2 rabbits.

Brown-Pearce tumor was inoculated in the right testis of the control group of 10 rabbits, and 12 days later, after medial laparotomy, 0.5 ml of physiological salt solution was injected in the stomach wall along the lesser curvature of its upper third. Stomach metastases were not found in a single rabbit.

TABLE 2

Metastasis of Brown-Pearce Carcinoma to the Internal Organs of Rabbits with an Inflamed Area in the Stomach Wall

Duration of life after inoculation in days	Metastases											
	stomach	lungs	liver	kidneys	adrenals	urinary bladder	diaphragm	spleen	omentum	serosa of the small intestine	serosa of the large intestine	post-operative scar
33	-	+	-	++	-	-	-	-	-	-	-	-
29	+	+	+	+++	-	-	-	-	-	-	-	-
47	+	+	+	++	-	-	-	-	+	+	-	-
37	+	+	+	++	-	-	-	-	+	+	-	-
51	-	++	+	++	-	-	-	-	-	-	-	-
47	+	+	+	++	-	-	-	-	-	-	-	-
34	-	+	+	++	+	-	-	-	-	-	-	-
48	+	+	+	++	-	-	-	-	+	-	-	-
39	+	+	+	++	-	-	-	-	+	-	-	-
40	+	++	+	++	-	-	-	-	+	-	+	+

Symbols: + single metastases; ++ limited invasion; +++ many metastases.

TABLE 3

Metastases of Brown-Pearce Carcinoma to the Internal Organs of Control Rabbits

Duration of life after inoculation in days	Metastases											
	stomach	lungs	liver	kidneys	adrenals	urinary bladder	diaphragm	spleen	omentum	serosa of the small intestine	serosa of the large intestine	post-operative scar
45	-	+	-	++	-	-	-	-	-	-	-	+
50	-	++	+	++	-	-	-	-	-	-	-	-
37	-	+	+	++	-	-	-	-	-	-	-	-
48	-	+	+	++	-	-	-	-	-	-	+	-
35	-	-	+	++	+	-	-	-	-	-	-	-
44	-	++	+	+	-	-	-	-	-	-	-	-
49	-	++	+	-	-	-	-	-	-	+	-	-
52	-	+	-	++	-	-	-	-	-	-	-	-
36	-	++	-	++	-	-	-	-	+	-	-	+
47	-	-	-	++	-	-	-	-	+	-	-	-

Symbols: + single metastases; ++ limited invasion; +++ many metastases.

Thus, the above experiments showed that a slow aseptic inflammatory process in the stomach wall with dystrophic histological changes, produced by infusorial earth, creates a favorable ground for the metastasis of Brown-Pearce cancer to it.

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