Influence of some bacterial vaccines' preventive anti-blastoma effects on experimental malignant tumor growth

Paata Khorava

A.Gvamichava Oncology National Center, Tbilisi, Georgia;
E-mail: paata_khorava@hotmail.com

ABSTRACT

The present work suggests goal-directed immune-correction and immune-rehabilitation of oncological patients with the use of bacterial vaccines. Have been studied preventive anti-blastoma effects of Proteus vaccine, Staphylococcus antitoxin and their complex divaccine on experimental malignant tumor growth. Experiments have been carried out on white rats (100-120 g) and mice (20-22 g.) with the use of strains - Sarcoma-45 and Ehrlich's ascitic tumor. The results of experiments have shown that in case of Ehrlich's carcinoma all three investigated groups on the background of reduced intoxication revealed increased percentage of mean life-span and consisted 14,4 day (18%), 16 day (31,7%) and 15.5 day (27%) respectively. In the same groups excessive body mass was detected by 41,5%, 47,4% and 40,2% respectively. In case of S-45, using the Proteus vaccine, animals' life span was increased by 63% and by 22,4% - using the Staphylococcus antitoxin. In case of complex divaccination malignant tumors completely underwent regression during 32 –60 days after tumor inoculation. On the 40th day of immunization by complex divaccine malignant tumor did not develop in 77% of cases, while in remaining 23% of cases - tumor tissue was of minimal size (<1cm^3) and animals life span 2,5 times exceeded the life-span of control group animals. Thus, the received results are quite encouraging and the above-suggested method could be used for treatment of oncological patients.

KEYWORDS: *cancer, immunetherapy, bacterial vaccines*

Various investigations and clinical observations have shown that cancer growth depends on organism's reactivity, nonspecific resistance and stable homeostasis. There is interrelation between cancer and organism, between cancer and immune-biologic forces. Due to dose limitation (in order to avoid side effects - cardio-, nephro-, neuro- and hepatotoxicity, myelo-depressive effects of preparations etc.) the radio- and chemotherapy in most cases is difficult and less effective. On the background of leukopenia and agranulocytosis the lethal outcome in case of intercurrent infections is high [2].

In the latest decade in addition to traditional treatment methods the immune-therapy has been used successfully. With this purpose immune-therapy using the new generation less toxic bacterial polysaccharides directed to stimulation of specific and antibacterial immunity and increase organisms nonspecific resistance is of great value [1]. Use of bacterial polysaccharides has double significance: 1) stimulation of specific antibacterial immunity (reduction of infections) and 2) increase nonspecific resistance (improvement of treatment results). Nowadays, there are numerous immune preparations produced on the basis of microbes with different taxonomic groups, however they are not used as anti-microbial and anti-blastoma preparations [3].

Since 1998 year, investigation of anti-blastoma effects of bacterial vaccines have been carried out in laboratory and vivarium of chemical cancerogenesis at Oncology National Center. Have been studied the anti-blastoma, preventive and therapeutical effects of Proteus vaccine, cleansed antitoxin of Staphylococcus, complex di-vaccine of Staphyloccocus-Proteus and corresponding hyper-immune plasmas.

MATERIAL AND METHODS

Experiments have been carried out on white rats (100-120 g) and mice (20-22 g.) with the use of strains - Sarcoma-45 and Ehrlich's ascitic tumor.

Anti-cancerogenetic effects were evaluated by the rate of inhibition of malignant tumor growth, duration of life span, reduced ascitic fluid and changes in body mass. Received data were analyzed statistically.

RESULTS AND DISCUSSION

The I series of experiment involved investigation of Anti-cancerogenetic effects of Proteus vaccine, cleansed antitoxin of Staphylococcus, complex di-vaccine of Staphyloccocus-Proteus. The group I was control and the II, III, IV – basic groups. In the basic groups, with 5 day interval vaccination was carried out 3 times and on the 5th day from the last injection the intra-peritoneal inoculation of EAT was performed.

In the control group the normal saline solution (three times a day, with 5 day interval - placebo effect) was injected.

The results of experiments have shown that in case of Ehrlich's carcinoma growth all three basic groups on the background of reduced intoxication revealed increased percentage of mean life-span and consisted 14,4 day (18%), 16 day (31,7%) and 15,5 day (27%) respectively. At the end of the experiment, in the II-IV groups excessive body mass was detected (41,5%, 47,4% and 40,2% respectively). In the control group this index was 31,3%.

The II series of experiment involved investigation of anti-cancerogenetic effects of Proteus vaccine, cleansed antitoxin of Staphylococcus, complex di-vaccine of Staphyloccocus-Proteus. The group I was control and the II, III, IV – basic group. In the basic groups with 5 day interval vaccination was carried out 3 times and on the 31st day from the last injection the intra-peritoneal inoculation of S-45 cancer strain was performed. In the II and III basic groups cancer growth was inhibited by 34,4% and 25,8%. Life span was increased by 63% and by 22,4%.

In the IV basic group the tumor tissue was of minimal size (<1 cm^3) and by the 60 day after tumor inoculation, .in 90% of cases the malignant tumors completely underwent regression.

Thus, Proteus vaccine, cleansed antitoxin of Staphylo-coccus, complex di-vaccine of Staphyloccocus-Proteus have well expressed anti-blastoma effect. Positive effect

was better manifested in case of Staphyloccocus-Proteus vaccination where in majority of cases malignant tumors completely underwent regression.

On the 40th day of immunization by complex divaccine malignant tumor did not develop in 77% of cases, while in remaining 23% of cases tumor tissue was of minimal size (<1 cm^3) and animals life span 2,5 times exceeded the life-span of control group animals. All of these points on reduced intoxication.

The III series of experiment involved investigation of anti-cancerogenetic effects of complex di-vaccine of Staphyloccocus-Proteus. The group I was control and the II, III, IV – basic groups. In the basic groups with 5 day interval vaccination was carried out 3 times and on the 40th day from the last injection the intra-peritoneal inoculation of S-45 cancer strain was performed.

In the control group cancer developed in 100% of cases. In the basic group, of 30 rats cancer growth developed in 7 animals (23%), and 23 (77%; $p<0,001$) revealed anti-blastoma resistance. This fact once more indicate efficacy of Staphyloccocus-Proteus vaccination.

CONCLUSSION

1. In case of Ehrlich's ascitic tumor the anti-blastoma effect was better expressed in case of inoculation with Staphyloccocus-Proteus divaccine.

2. Effect of bacterial vaccines was better expressed in case of S-45 growth than in case of Ehrlich ascitic tumor growth. Animals' life-span was 2,5 times more compaired to the control group animals.

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Влияние антибластомного превентивного эффекта некоторых бактериальных вакцын мунных плазм перимм их гиперимм на экспериментальных опухолей

Паата Хорава

Онкологический национальный центр им.А.Гвамичава, Тбилиси, Грузия

Р Е З Ю М Е

Состояние иммунного статуса организма имеет решающее значение в онкогенезе и противоопухолевом воздействии. Работа касается целенаправленной иммунокоррекции и иммуно-реабилитации экспериментальных животных с исрользованием бактериальных вакцин. Изучен антибластомный превентивный эффект Т–независимой протейной вакцины,очищенной стафилококковой вакцины и комплекной стафилококо-протейной дивакцины на примере асцитной опухоли Эрлиха (АОЭ) и С – 45. Эксперименты проведены на беспородных крысах (с массой 100–120 г.) и мышах (с массой 20–22г.). В результате опытов установлено, что во время использования вакцын при АОЭ получено повышение средней продолжитетльности жизни животных соответственно на 18% - 31,7% - 27%, тенденция уменьшения асцитной жидкости и интоксикации. При воздействии вышеуказанных вакцын на С – 45 отмечается антибластомный превентивный эффект соответственно на 34,4% и 25,8%,также получено повышение средней продолжитетльности жизни животных соответственно на 63,3% и 22,4%. Полученные результаты весьма обнадеживающие и могут быть исрользованы при лечении онкологических больных.

Ключевые слова: *рак, бактериальные вакцины, иммунотерапия*

□ **International committee of medical journal editors. Uniform requirements for manuscripts submitted to biomedical journals.** Ann Intern Med 1997;126:36–47.

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