On the Treatment of Malignant Tumor with an Extract from Tubercle Bacilli (Tubercle Vaccine)

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The vaccine treatment of tuberculosis has been the subject of our research since 1944 which is still being continued at this moment.

Study on the vaccine treatment of leprosy was started in 1947 in conjunction with the vaccine treatment of tuberculosis, and this study, too, is being continued at the present moment. The main reason these two studies are being pursued in conjunction with each other is because the bacilli of both diseases are acid-fast and have various common properties in the standpoint of bacteriology and immunoserology. We believe that the two studies have much to contribute to each other.

The fact that our tubercle vaccine (substance extracted from tubercle bacilli) has a definite healing effect, hitherto unobservable in chemotherapy, on skin tuberculosis, pulmonary tuberculosis and leprosy has already been reported in detail in the Japanese Journal of Dermatology, Vol. 74, No. 3 (1964).

When the close relationship between tubercle bacilli and lepra bacilli is taken into consideration, it is not difficult to affirm the fact that our tubercle vaccine is effective in the treatment of leprosy, but on the other hand, we discovered the interesting fact that our tubercle vaccine also has a subduing effect against malignant tumors, especially against the growth of cancer cells, the causes of which are entirely different from either tuberculosis or leprosy. We are, therefore, at the present moment, studying the results of a number of clinical cases.

It is, however, not so simple, as in the case of tuberculosis and leprosy, to explain the acting mechanism of our tubercle vaccine against cancer. We hope to clarify this point through continuous research in the future.

Since our speciality is in the field of dermatology, we have been treating skin cancer. Skin cancer can be observed externally, can be easily examined histologically by biopsy, and can be studied directly during the process of treatment. In spite of all these apparent advantages in the treatment of skin cancer compared to cancer of other parts of the body, the number of patients that come to our outpatient clinic are only three or four during the year. We have, therefore, asked the cooperation of other departments in our study on the treatment of cancer.

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Our interest has naturally been extended to the treatment of cancer other than of the skin and we have been indirectly studying the results of effects of clinical treatments entrusted to other departments.

Our tubercle vaccine, when used in clinical treatments, has proved to have no side effect. Most remarkable among the favorable points of this vaccine treatment are that there has been not a single report on leukopenia (a very common effect observed in the use of other anti-cancer agents), that local views show apparent healing, and that general conditions show favorable improvement, and for these reasons there has recently been an increase in the number of patients desiring our vaccine treatment.

We have, nevertheless, made no report so far on the progress of our research in this particular field. The small number of skin cancer patients and the consequent lack of clinical experiments has hampered us in making final decisions on such important data as the concentration of substance, the amount of dosage, the method of injection (subcutaneous, intracutaneous, intravenous, or arterial), and the interval between injections. Proper decisions concerning these data are yet to be made through future study. We, therefore, do not consider this the best time for making this report, but under the above mentioned circumstances we have been obliged to explain our motive in beginning this research and to report on a part of its results.

Our Motive in Applying Extract from Tubercle Bacilli (Tubercle Vaccine) to the Treatment of Malignant Tumor

(A) That our tubercle vaccine (substance from tubercle bacilli) is effective in the treatment of skin tuberculosis and pulmonary tuberculosis or leprosy can be affirmed from the immunoserological viewpoint when one considers the unique correlation between the antigen and antibody.

Mizuno and Yoshida have reported, however, that this tubercle vaccine is quite effective in the treatment of rosacea.

In this report they stated that, although the cause of rosacea was basically different from that of tuberculosis, it seemed apparent from the results of clinical treatments that there was in the tubercle vaccine some kind of active effect that subdued the rise of granuloma, in other words, an anti-granuloma action. Their opinion is that there seems to be in the tubercle vaccine a certain action that subdues the abnormal proliferation of mesenchymal cells.

After the publication of this report, as if to endorse it, there have been reports of healing effects of the tubercle vaccine upon Wegener's granulomatosis (Mizuno and Kobayashi), (Nonaka and Nakajima) and lymphocytoma (Harada and Fukumoto).

We, too, in the meantime used the tubercle vaccine on a patient who was suffering from a combination of acne conglobata, which is a chronic granulomatous inflammation, and verruca vulgaris, which belongs to a benign epidermal tumor (both a high degree condition that appears mainly on the face) and observed remarkable effects leading eventually to healing.

After this success we applied the tubercle vaccine to a number of patients with verruca vulgaris and verruca plana juvenilis and succeeded in healing them.

These facts altogether mean that the action of the tubercle vaccine subdued the abnormal proliferation not only of granulomatous tissue, namely mesenchymal cells, but also of benign epidermal tumors, namely ectodermal cells.

We, therefore, thought it would be possible to say in a general way that the tubercle vaccine (substance from tubercle bacilli) has an action that subdues the abnormal proliferation of tissue cells.

This is the reason why we planned and began to apply the tubercle vaccine to the treatment of malignant tumors also.

(B) The following discussion has not been proved and is therefore only an assumption, but it is true that what we have observed and that from which we have reasoned has strengthened our belief in the effect of the tubercle vaccine.

In the leprosarium, which we visited regularly over a period of more than 20 years, we noticed that a number of cancer patients was surprisingly small.

Recently, however, it has been reported that a number of cancer patients in the leprosarium is increasing every year. According to the study through autopsy made by Fukushi, Ri, Sasaki and Maruyama of the cause of death of leper patients, the percentage caused by malignant tumors was 1.5% (18/1200) during the oleum gynocardiae period (1910—1937) and 19.6% (57/291) during the chemotherapy period (1959—1961).

In analyzing the increase during the chemotherapy period, there are some who attribute it to carcinogenic effect of the drugs for leprosy treatment, while there are some who strongly asssert that, as a result of the progress in drugs for leprosy treatment, there has been a gradual decrease in the death of leprosy patients, thus increasing a number of cancer age patients. Still, to us, the increase in percentage seems too large to be explained away in this way.

We reasoned that, as a result of anti-leprosy chemotherapy, all or at least a great number of lepra bacilli in the patient's body disappeared thus creating a new condition conducive to the rise and growth of cancer. We further reasoned that, therefore, the existence of lepra bacilli, or more particularly some part of their bacterium constituents or some substance from the metabolic products possessed the action of subduing the rise and growth of cancer.

According to the report prepared by Fukushi, Sasaki and Sugai, the death of leprosy patients from cancer occured almost all in the resorption stage or the almost cured stage of leprosy and never in the progressive stage. We believe this is an extremely powerful evidence in support of our consideration.

On the other hand, the number of cancer patients in the sanatoriums that we have visited in different parts of Japan was also extremely small.

It has also been reported that, in recent years, as a result of the appearance of anti-chemotherapeutic bacilli, there has been an increase in persistent tuberculosis patients, leading to the subsequent increase in the cases of senile tuberculosis (those who have reached so-called cancer age), and yet we have not heard that there has been any particular increase

in the number of cancer occurences among these older patients.

We believe that there is a factor common to these two phenomena. This factor is that there has been observed no increase in cancer occurences in senile tuberculosis patients while there has equally been observed hardly any occurences of cancer among leprosy patients in the progressive stage.

We have, therefore, strengthened our belief that, as in the case of lepra bacilli, the existence of tubercle bacilli, especially some certain substance originating in them, possesses the action of subduing the rise and growth of cancer.

The fact that a number of cancer patients in leprosariums is showing a trend towards increasing, while in sanatoriums the number is decreasing, seems on the surface to be contradictory evidence, but when we further consider the fact that in the former case even when the leprosy patient is completely healed there are apparently sociological barriers making it difficult for that person to return to the ordinary society, while in the latter case those in the sanatorium are only those who are not yet cured, we can understand why this discrepancy arises.

We, from a viewpoint different from (A), assumed that there must be an anti-cancerous property in some certain substance of lepra bacilli and tubercle bacilli and, since it is impossible at present to cultivate lepra bacilli, we at this stage planned to use the tubercle vaccine in the treatment of malignant tumors, especially cancer.

Preparation for Vaccine Therapy

1. Tubercle vaccine used in experiments

The tubercle vaccine, namely the substance extracted from tubercle bacilli (human type), mainly polysaccharide and nucleic acid, which we are at the present moment using in the treatment of benign and malignant tumors, has a property closer to Vaccine C which we are at present using in the treatment of skin and pulmonary tuberculosis, and leprosy.

The method of preparation of tubercle vaccine.

Purely cultured human type tubercle bacilli were suspended in distilled water. This suspension was heated under acid-reaction until the tubercle bacilli components were extracted. The extract was separated from residue by filter. The protein was then removed from the extract with protein precipitants and after dialysis the substance insoluble in alcohol but soluble in water was isolated, using the alcohol precipitation method. The 1.0% solution of this substance was the stock solution. This stock solution was diluted with saline from 1.0 to 0.1 γ/cc to suit the case. And a portion was diluted with saline containing carbolic acid in 0.5% as in the old Tuberculin or general vaccines.

The virulence of the substance from tubercle bacilli was examined on healthy animals (rabbits, guinea pigs, mice) and absolutely no toxity was observed.

Experimental malignant tumors (Takizawa cancer and Ehrlich ascitic cancer) was planted in pure bred mice and treated with tubercle vaccine: 1) as soon as tumor was transplanted;

and 2) after a certain period had elapsed, that is, after the tumor cells had grown. Concentration, dosage, interval of injection, etc., of the vaccine was varied and combined in various ways and the result was compared (Maruyama, Fukumoto and Urabe 1958-1959), but so far a favorable result has not been obtained from either 1) or 2).

We reasoned that, because of the very short period between the rise of tumor and death caused by it in case of experimental malignant tumors in mice, there must be an essential difference between the experimental malignant tumor and human cancer (for instance, the experimental tumor has a greater malignancy than human cancer) and, in spite of unfavorable results in animal experiments, we decided to make clinical experiments. After each preparation of a new vaccine, examination of the virulence of the substance was made on healthy animals. Beginning with a very small amount, we started treatment on the human body and at the present moment are making close observations.

2. Treated objects

Treatment using this vaccine was made on cancer of the lung, esophagus, stomach, intestine, liver, pancreas, uterus, ovary etc. (The treatment of skin cancer, verruca vulgaris, verruca plana juvenilis, and rosacea has already been reported in the Japanese Journal of Dermatology (1966) and therefore will be omitted from this paper.)

3. Choice of patients for the experiment

Most of the patients receiving this treatment were those who were hospitalized in the Nippon Medical School Hospital, Social Insurance Hospital and Kashima Hakujuji Hospital. Most cases were inoperable or recidivated.

Kind of cancer, and histological findings are shown in Tables 1 and 2.

4. The method of vaccine therapy

Although there are two types, A and B, the difference is only in the amount of solution and not in its component (vaccine A... 1.0γ/cc, vaccine B... 0.1γ/cc).

Directions for using this vaccine are as follows:

Injection should be made subcutaneously once every other day (outside upper arm).

The 1 method

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	→
Vaccine	A	(−)	B	(−)	A	(−)	B	(−)	A	(−)	B	(−)	A	(−)	B	

Type A should be injected on the first day and Type B on the 3rd day. This cycle is to be repeated.

The 2 method

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	→
Vaccine	B	(−)	B	(−)	B	(−)	B	(−)	B	(−)	B	(−)	B	(−)	B	

When our vaccines have been used, chemotherapies (anti-cancer agents), radiotherapies and steroid hormones were not applied in our cases.

Results of Vaccine Therapy

Table 1. Kind of cancer and result of therapy

Diagnosis	cases	very effective	effective
gastric cancer	388	49	110
pulmonary cancer	108	20	45
carcinoma of the intestine	96	9	40
carcinoma of the breast	35	3	10
carcinoma of the uterus	35	13	9
carcinoma of the esophagus	28	9	8
carcinoma of the bile duct	18	2	5
ovarian cancer	17	4	5
sarcoma	15	3	8
carcinoma of the pancreas	14	5	7
maxillary cancer	13	2	5
pharyngeal & laryngeal cancer	13	5	1
hepatoma	12	4	4
carcinoma of the urinary bladder	6	3	3
brain tumor	6	2	2
skin cancer	5	2	1
seminoma	4	0	3
Hodgkin's disease	4	1	1
carcinoma of the tongue	3	2	1
mediastinal tumor	3	1	0
malignant melanoma	2	1	1
spinal cord tumor	2	0	1
multiple myeloma	2	2	0
ureteral tumor	1	1	0
prostatic cancer	1	0	1
mixed tumor	1	0	0
malignant struma	1	1	0
Total	833	144	271

Table 2. Histopathologic Diagnosis (301 Cases/833 Cases)

Histopathologic Diagnosis	cases
adenocarcinoma	251
squamous cell carcinoma	31
carcinoma simplex	14
seminoma	3
fibrosarcoma	3
Hodgkin's disease	2
leiomyosarcoma	2
hemangiosarcoma	1
reticulum cell sarcoma	1
lymphosarcoma	1
malignant melanoma	1
transitional cell carcinoma	1
Total	311

The criteria on appraisal of effectiveness.

The criteria on decision of objective improvement were 4 items, i.e. 1) the shrinking or disappearance of tumor. 2) the decrease of ascites or pleural effusion, 3) prolongation of life and 4) others.

The criteria on subjective improvements were 3 items, i.e. 1) increase in appetite, 2) disappearance of characteristic cancer pains, and 3) others.

In case of deciding effectiveness by placing emphasis on objective symptoms, we made it a necessary condition that improvement be observed in at least one of the above four items. We considered it very effective when improvement in a total of three items or more out of the objective and subjective symptoms could be observed, and effective when improvement could be observed in two or less. When there could be observed no improvement in objective symptoms, we decided that it was not effective, even though there were signs of subjective improvement. The criteria on deciding prolongation of life. In cases of lung cancer, we followed Kaneda's criteria (average living period). In cases of cancer of the digestive organs such as esophagus, stomach, intestine, liver, pancreas, etc., we judged the effectiveness with Yamagata's criteria (the average life period from onset). Table 3 shows the results of the vaccine therapy.

Comment

Recently the chemotherapy of cancer has made remarkable progress and there are many therapeutic drugs promising favorable effects, judging from the results on experimental malignant tumors of animals.

But in the case of human cancer complicated phenomena arise because of variance in the patient's condition, the place in the body where the tumor arises, and, furthermore, the sensitivity of the tumor towards the drug. It is, therefore, very seldom that reports of remarkable success in cancer treatment are made.

It has been commonly agreed that the normal dosage of anti-cancer agent for human patients should be less than 1/10 of the amount obtained by translating the effective amount used in treating experimental animal tumors. This small amount with subsequent unfavorable results has presumably brought on the present trend of using greater dosages in the treatment of cancer.

The problem of side effects then arises when the above mentioned effective amount for experimental animals is translated to human use and applied with no reduction, which naturally sets a limit to the use of too large a dosage. The best method, therefore, in using anticancer agent is to discover a way to apply a dosage of a highly concentrated drug so that it can exert its effect on the tumor tissue while keeping the interference upon normal tissues at a minimum.

With these points in view anti-cancer agent are in most cases being applied locally, and methods such as injection into the tumor, intravenous injection, or local perfusion are being

studied. These are still in the stage of research and are not yet applied in general use. This is a rough outline of the present situation of chemotherapy of cancer.

Radiotherapy and operative therapy of cancer are a separate problem, so next we must consider the problem of immunotherapy. It is, however, very difficult to discuss this problem at the present stage because not only is the true nature of cancer still unclear but even the existence of a germ itself is not clear.

Our research on the treatment of malignant tumors indeed originated from the vaccine therapy for tuberculosis, but this does not mean simply that it is an immunotherapy. It is, nevertheless, not difficult to understand from results of experiments that the substance extracted from tubercle bacilli has an action capable of subduing the abnormal growth of tissue cells.

It should be noticed here that the tubercle vaccine (substance from tubercle bacilli) acts effectively not only upon chronic specific inflammations such as tuberculosis and leprosy but also upon benign tumors such as verruca vulgaris, verruca plana juvenilis, lymphocytoma, and still further, upon malignant tumors such as precancerous dermatosis, Wegener's granulomatosis or cancer.

Especially when the fact is taken into consideration that only a very small amount of tubercle vaccine (substance from tubercle bacilli), quite contrary to the use of chemotherapeutical drugs, is needed to affect the focus to a great extent, it is fair to believe that the action of the vaccine is very effective.

When we, furthermore, take into consideration the fact that the tubercle vaccine causes no side effects, that absolutely no sign of leukopenia (which is a common effect observed in cases using many of the anti-caner agent) can be observed, that local views show apparent healing, and that general conditions show favorable improvement, it seems that this tubercle vaccine is worth a trial in clinical application as an anti-cancer substance, whatever its mechanism of action may be.

Conclusion

1) We have used the tubercle vaccine (an extracted substance from tubercle bacilli consisting mainly of polysaccharide and nucleic acid) in the treatment of skin tuberculosis, pulmonary tuberculosis and leprosy and have ascertained definite healing results that could not be expected of chemotherapy.

2) Later, we discovered that this vaccine was effective in the treatment of rosacea, verruca vulgaris, verruca plana juvenilis and skin cancer. In other words we ascertained the fact that our vaccine was effective in controlling the abnormal growth of the tissue cells.

3) We then used the vaccine in the treatment of 833 cases of cancer of the lung, esophagus, stomach, intestine, liver, pancreas, uterus, ovary, etc., out of which the vaccine proved very effective in 144 cases, showed some effect in 271 cases, and no effect at all in 316 cases. 62 cases are still under observation and 40 cases have been lost. In all these cases the

cancers were all in the final stage where operation was impossible or those that were relapses after operation. When this fact is taken into consideration, it may be said that the tubercle vaccine is quite effective as an anti-cancer substance. As the results of the cases treated so far shown, the effectiveness of this vaccine from the point of view of objective symptoms can be said to be the shrinking or disappearance of the tumor, the reduction of edema, and the prolongation of life, and of subjective symptoms to be the increase in appetite and the reduction or disappearance of pain.

4) In the use of this vaccine there could be observed absolutely no cases of ill side-effects such as the loss of appetite, nausea, vomiting, diarrhea, fever, the feeling of fatigue, bleeding and decrease in the number of leucocytes as often seen in the use of anti-cancer chemical drugs.

5) It is not yet clear whether the effectiveness of this tubercle vaccine upon the cancer cell results from direct or indirect action, and it is hoped that this can be clarified in the near future.

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On the treatment of malignant tumor with tubercle vaccine (Extract from tubercle bacilli).

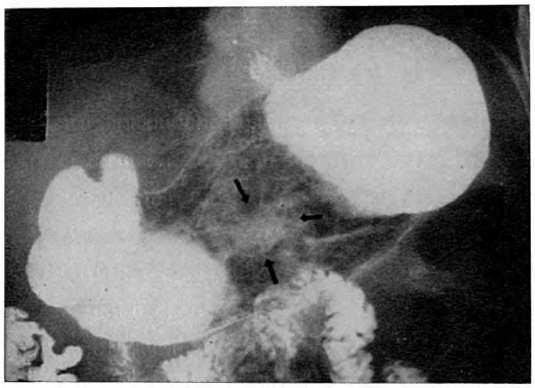

Fig. 1. Case No. 1. 76 yrs., male. Cancer of the stomach.
Before the treatment.
Irregular crater forming ulceration was seen.

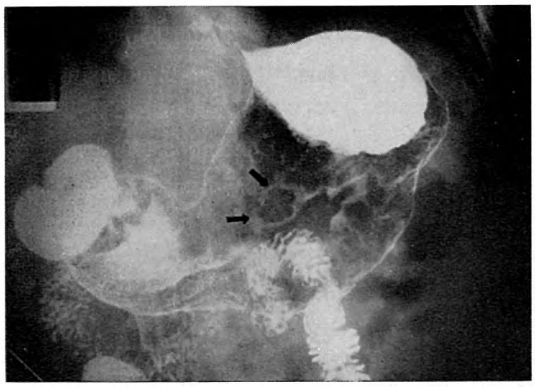

Fig. 2. Case No. 1.
8 months after the start of vaccine treatment.
Carcinomatous ulceration became smaller, remaining only at the peripheral portion.

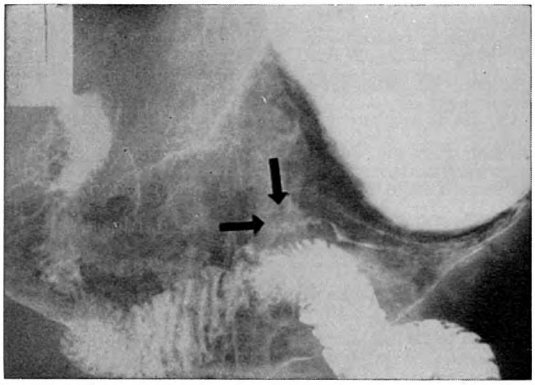

Fig. 3. Case No. 1.
After 2 years and 2 months with the treatment.
The ulceration and the tumor seemed to be getting marked improvement.

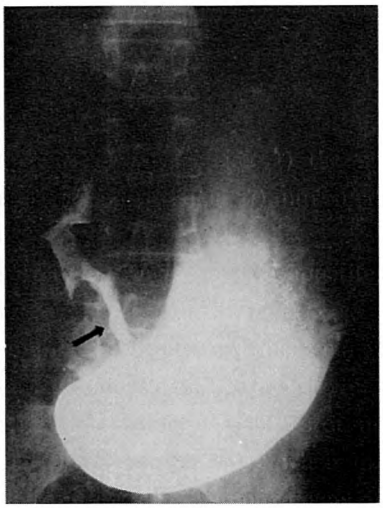

Fig. 4. Case No. 2. 52 yrs., female.
Cancer of the stomach at the pyrolus part.
Before the treatment.
Stenosis of the pyrolus required gastro-jejunal anastomosis.
Far advanced case.

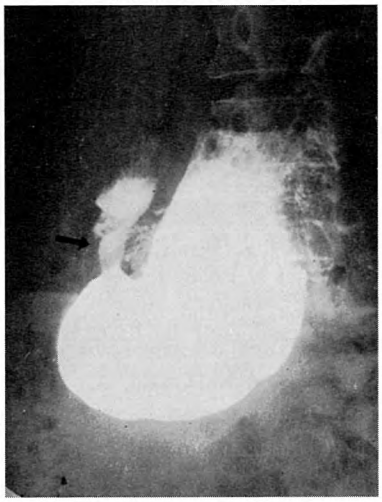

Fig. 5. Case No. 2.
After 5 months with the treatment.

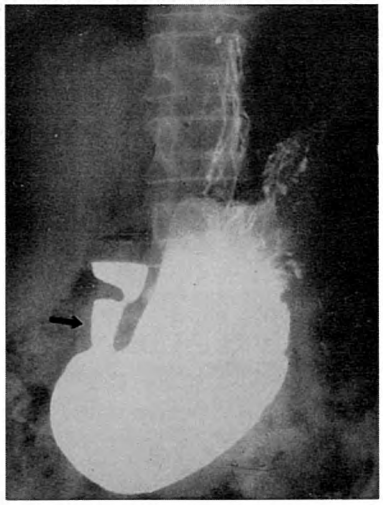

Fig. 6. Case No. 2.
After 1 year and 5 months.
Stenosis of the pyrolus by the tumor showed marked improvement.

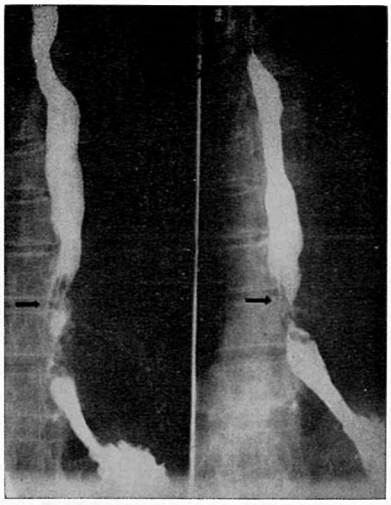

Fig. 7. Case No. 3., 60 yrs., female.
Cancer of the esophagus (squamous cell ca.)
Before the treatment.

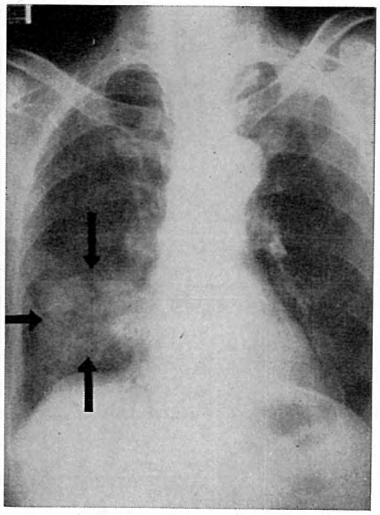

Fig. 10. Case No. 4., 68 yrs., female.,
Cancer of the lung. Before the treatment.

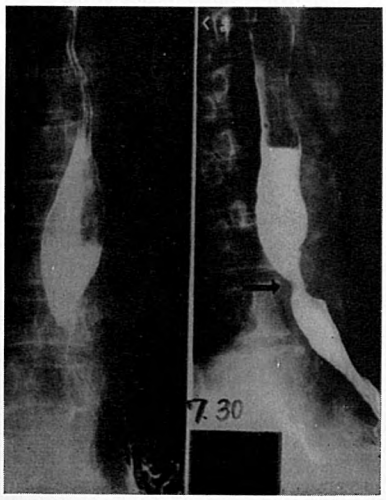

Fig. 8. Case No. 3.
Two weeks after the start of the treatment.

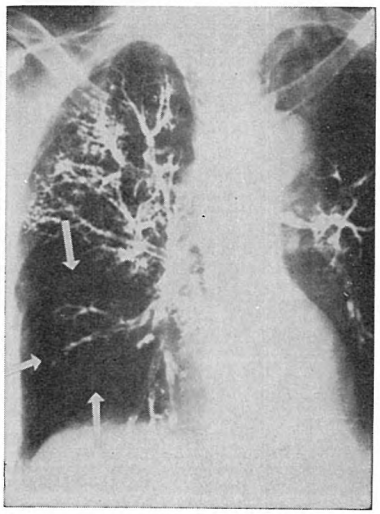

Fig. 11. Ditto with Fig. 10. Bronchogram.

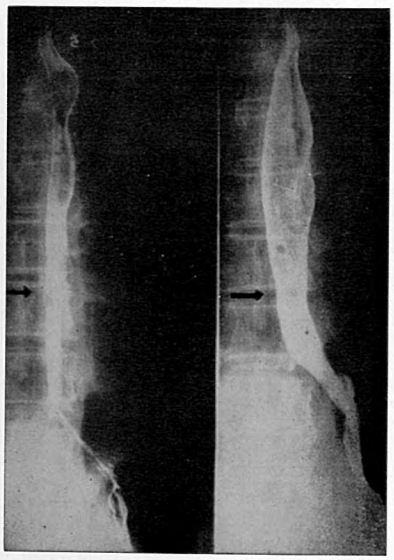

Fig. 9. Case No. 3.
Three months after the start of the treatment. Tumor sign disappeared almost completely.

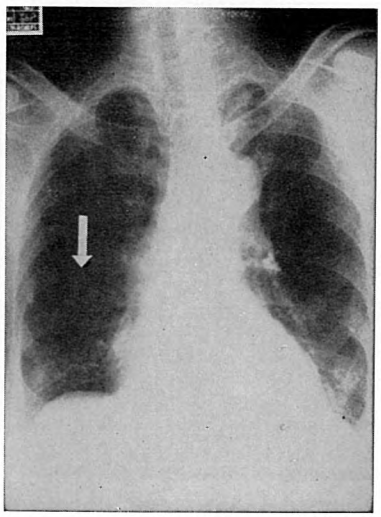

Fig. 12. Case No. 4.
Five months after the treatment.
Scarcely abnormal sign was seen.

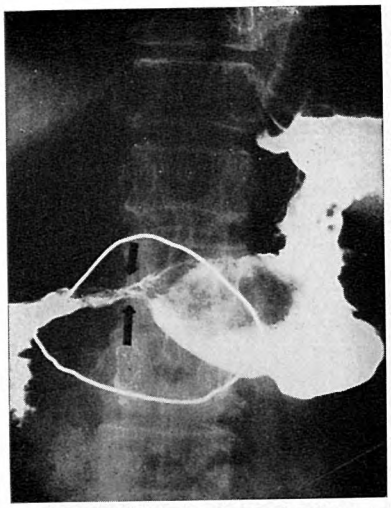

Fig. 13. Case No. 5. 74 yrs., female.
Cancer of the stomach. White line shows the size and shape of the tumor.

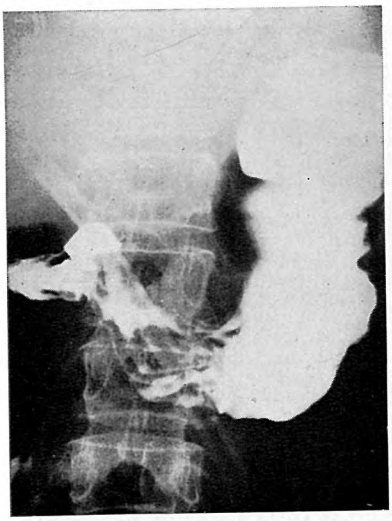

Fig. 14. Case No. 5.
Five months after the start of vaccine treatment.

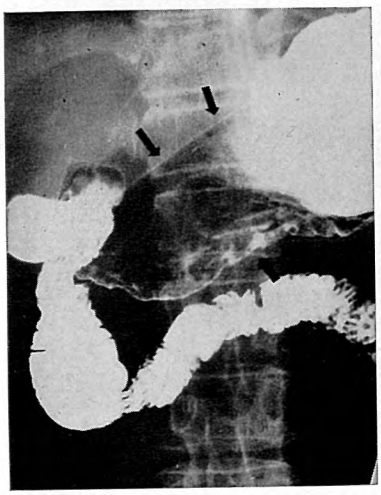

Fig. 15. Case No. 5.
6 months after the start of the vaccine treatment. The tumor disappeared almost completely.

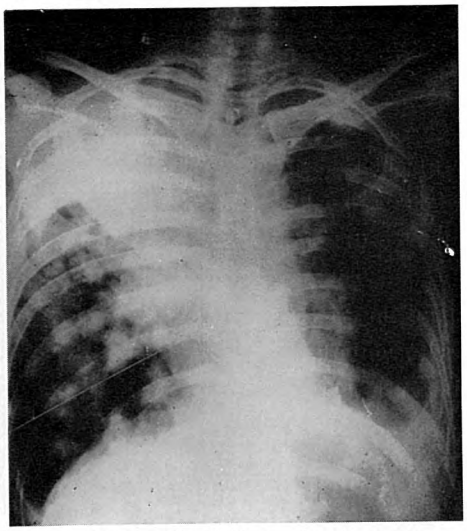

Fig. 16. Case No. 6. 36 yrs., female.
Lung metastasis of breast cancer, which was found 3 years after the surgical operation for breast cancer. Histological finding of the breast cancer was adenocarcinoma.

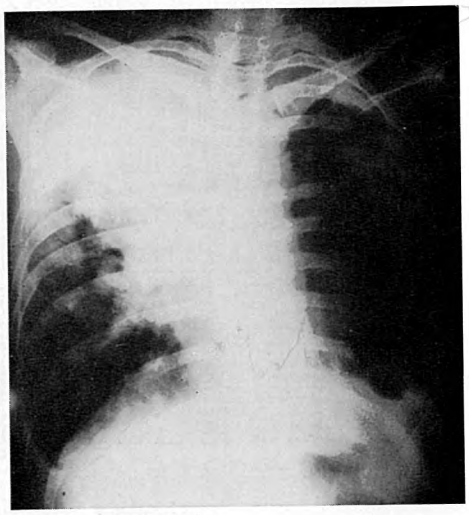

Fig. 17. Case No. 6.
Ten days after the start of the vaccine treatment.

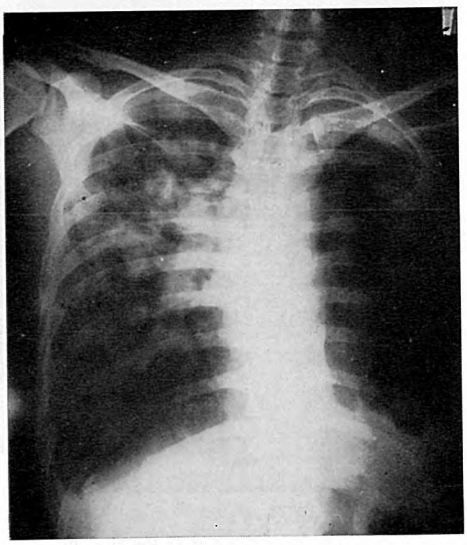

Fig. 18. Case No. 6.
40 days after the treatment.

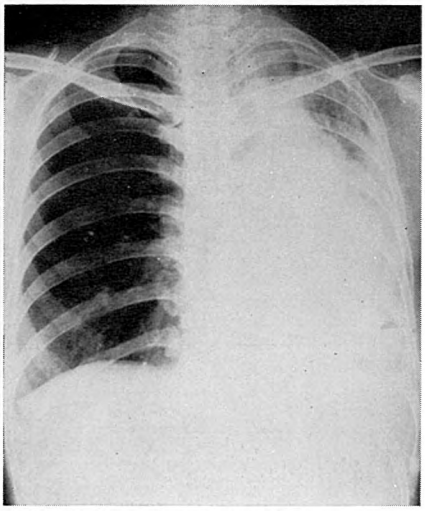

Fig. 19. Case No. 7. 50 yrs. female.
Cancer of the lung. Distinct atelectasis was seen over the left lung.

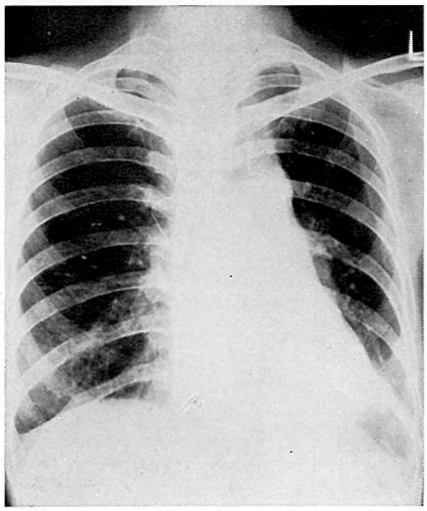

Fig. 20. Case No. 7.
After 2 months treatment with the vaccine.

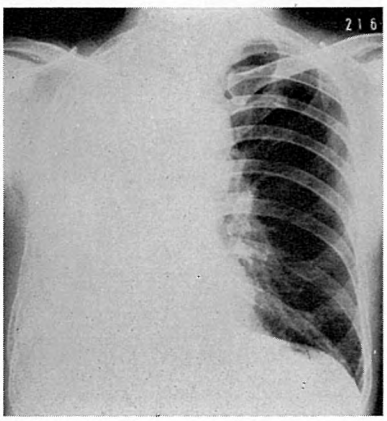

Fig. 21. Case No. 8. 60 yrs. male.
Cancer of the lung (squamous cell carcinoma).

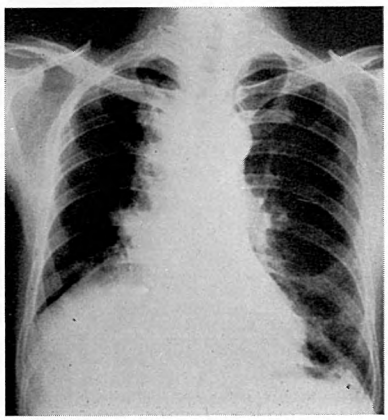

Fig. 22 Case No. 8.
One month after the treatment. The sign of atelectasis disappeared nearly completely.

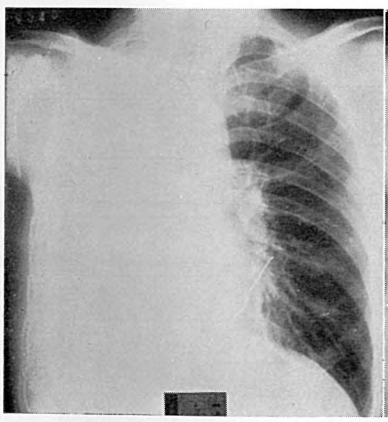

Fig. 23. Case No. 9. 52 yrs. male.
Cancer of the lung.

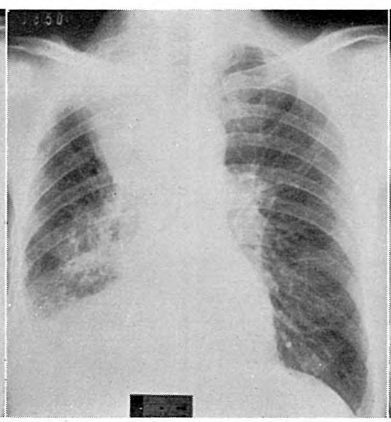

Fig. 24. Case No. 9.
After 10 days treatment.

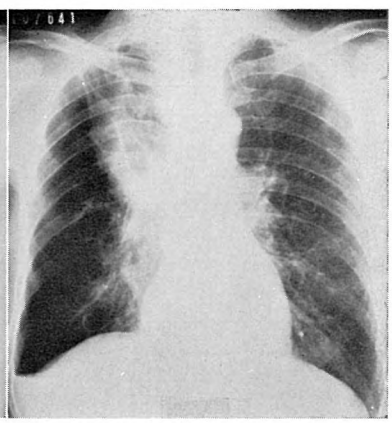

Fig. 25. Case No. 9.
After 1 month treatment.

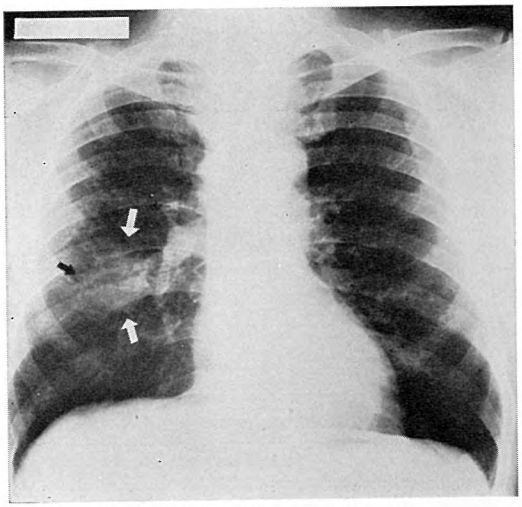

Fig. 26. Case No. 10. 67 yrs., male.
Cancer of the lung.

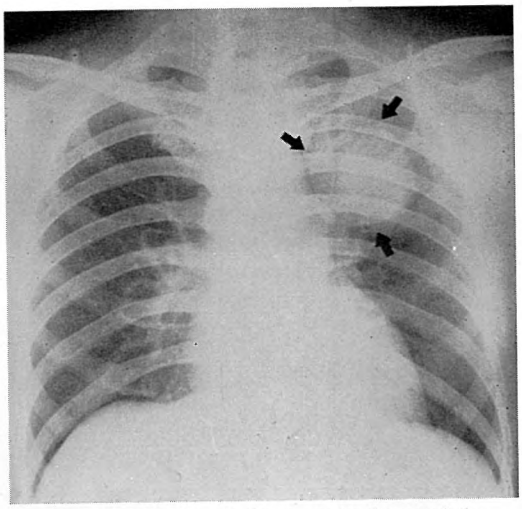

Fig. 29. Case No. 11. 43 yrs , male. Cancer of the lung. Round shaped shadow was seen on the left upper region of the lung.

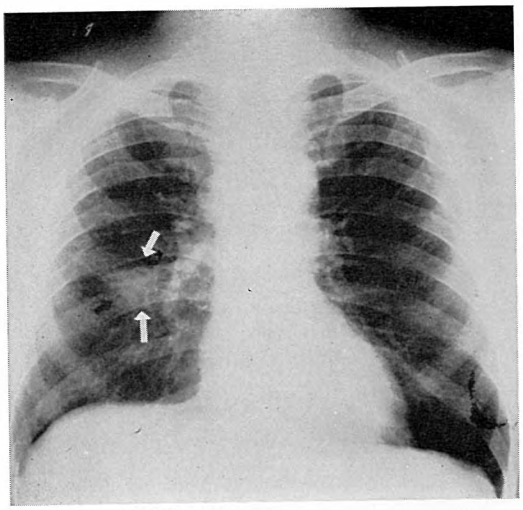

Fig. 27. Case No. 10.
After 2 months treatment with the vaccine.

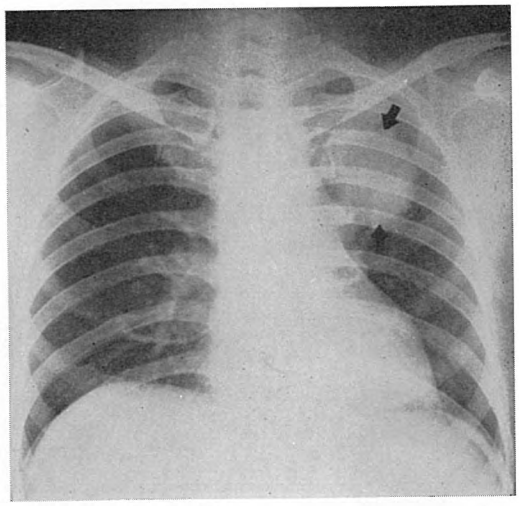

Fig. 30. Case No. 11.
After 2 months treatment with the vaccine.

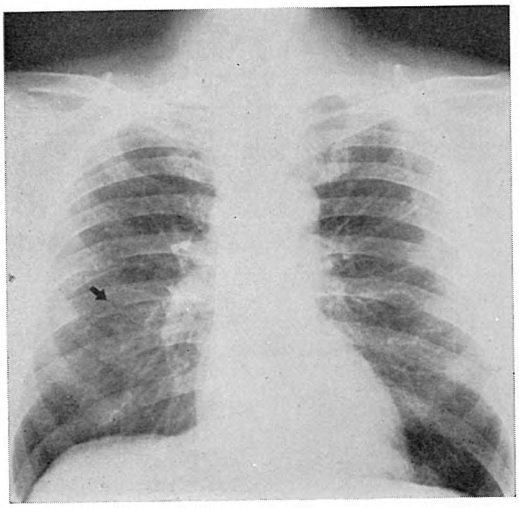

Fig. 28. Case No. 10.
After 5 months treatment with the vaccine.
Abnormal shadow which had been seen before the treatment disappeared completely.

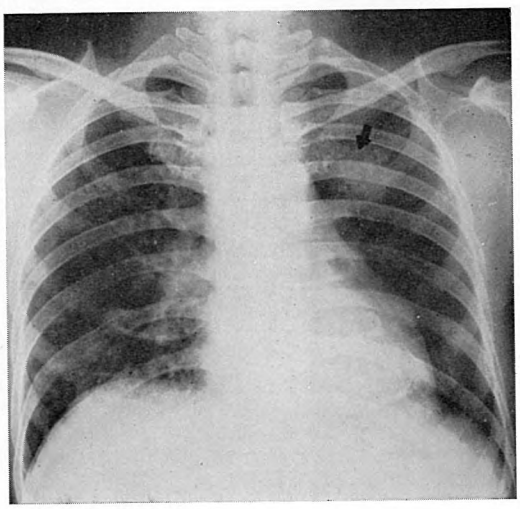

Fig. 31. Case No. 11.
After 3 months treatment with the vaccine.
Abnormal shadow was becoming distinctly smaller.

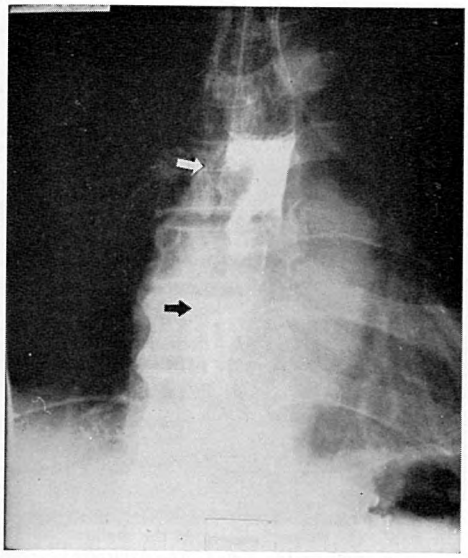

Fig. 32. Case No. 12. 64 yrs., male. Cancer of the esophagus. Defect of the shadow and stenosis of esophagus was evident.

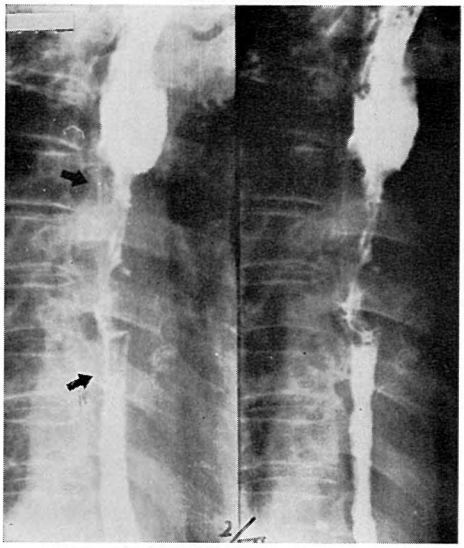

Fig. 35. Case No. 13., male, 67 yrs. Cancer of the esophagus (squamous cell ca.).

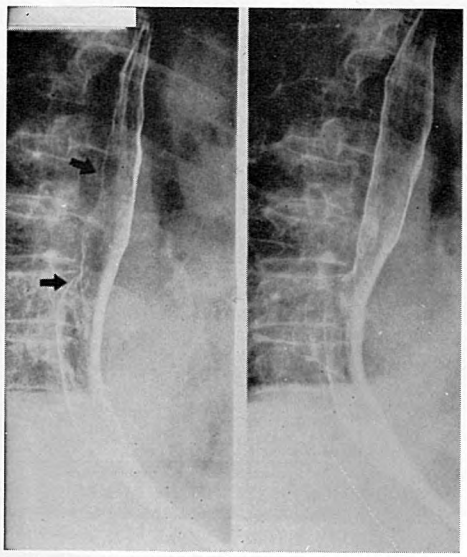

Fig. 33. Case No. 12. After 2 months treatment with the vaccine.

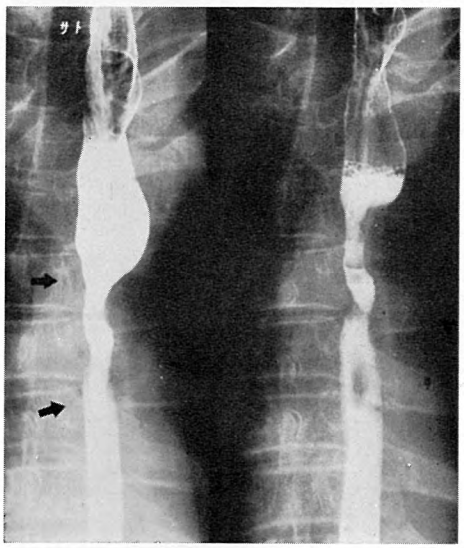

Fig. 36. Case No. 13. After 3 months treatment with the vaccine.

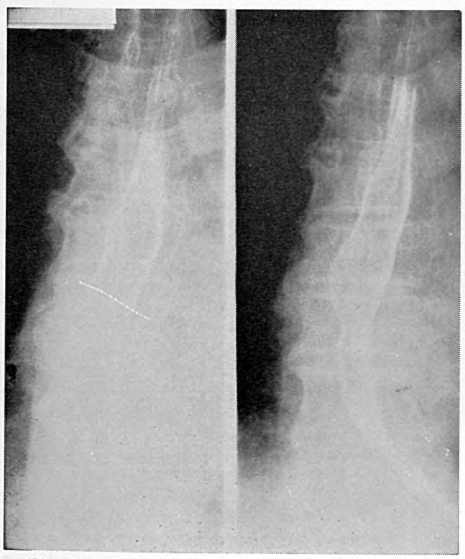

Fig. 34. Case No. 12. After 4 months treatment. Nearly normal finding.

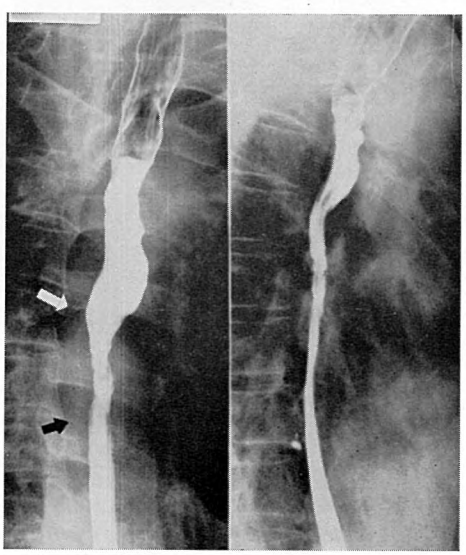

Fig. 37. No. 13. After 4 months treatment with the vaccine. Stenosis of the esophagus evidently improved.

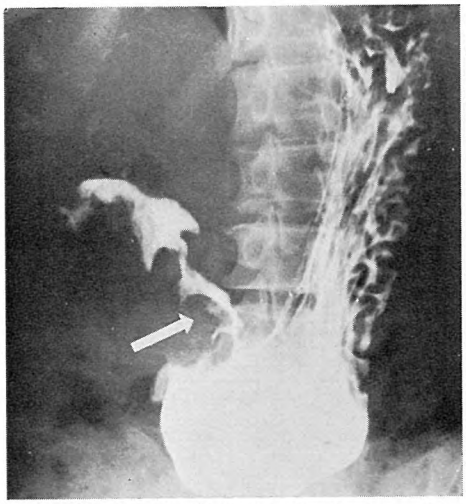

Fig. 38. Case No. 14. 68 yrs., female. Cancer of the stomach. Before the treatment. Remarkable stenosis was seen at the pyrolus part of the stomach.

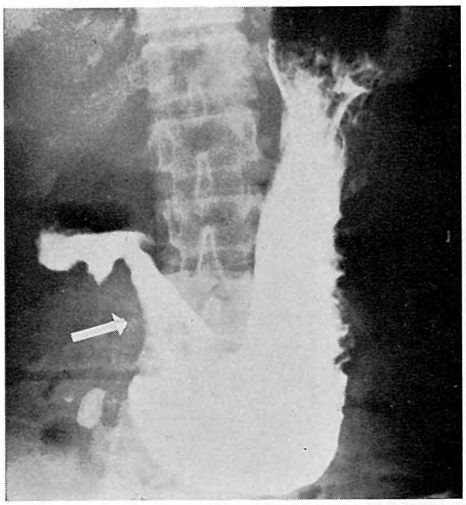

Fig. 39. Case No. 14. One month after the start of the vaccine treatment.

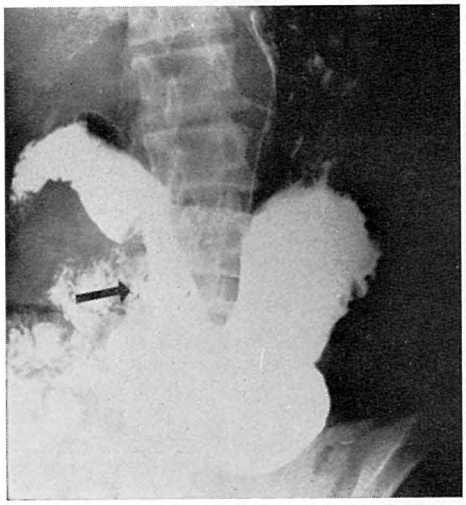

Fig. 40. Case No. 14. Two months after the start of the treatment. Stenosis improved markedly.

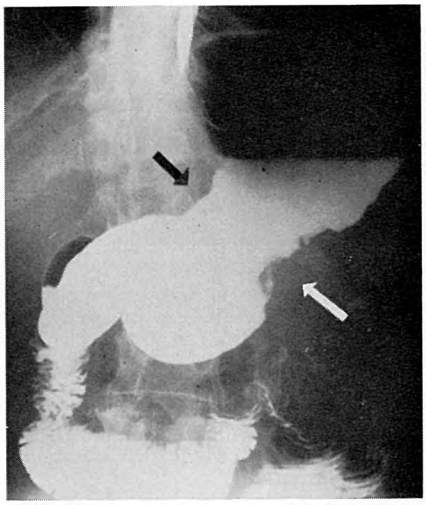

Fig. 41. No. 15., 72 yrs., female. Cancer of the stomach. Defect of the shadow due to the tumor was evidently seen.

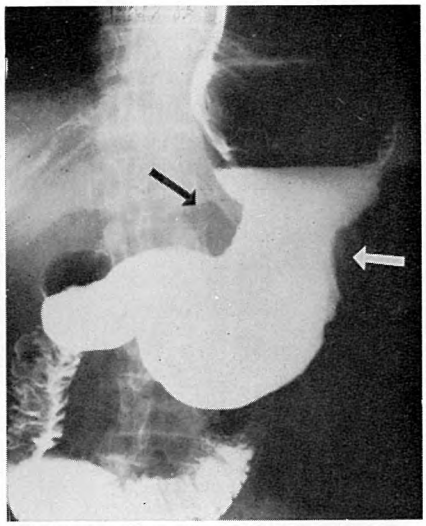

Fig. 42. Carse No. 15. After 2 months treatment with the vaccine.

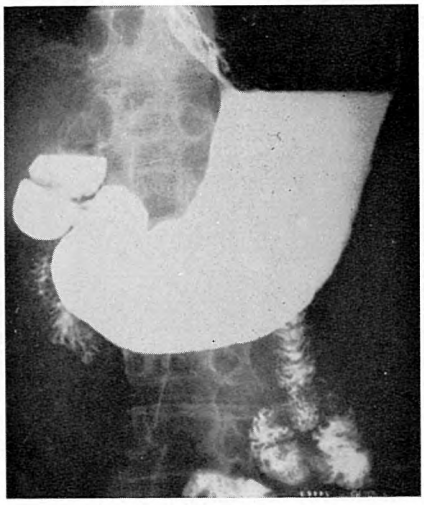

Fig. 43. Case No. 15. After 3 months treatment.

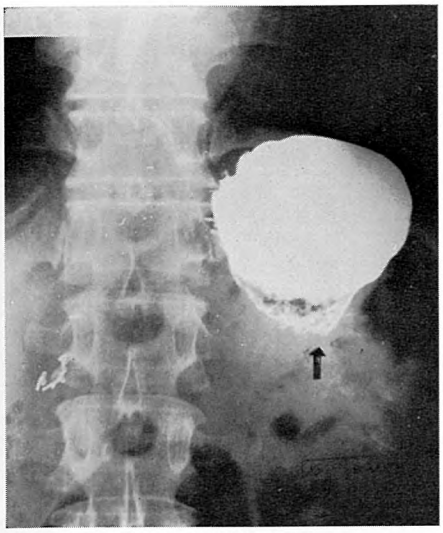

Fig. 44. Case No. 16. 59 yrs., male. Recurrence of cancer after gastrectomy. Marked stenosis was seen.

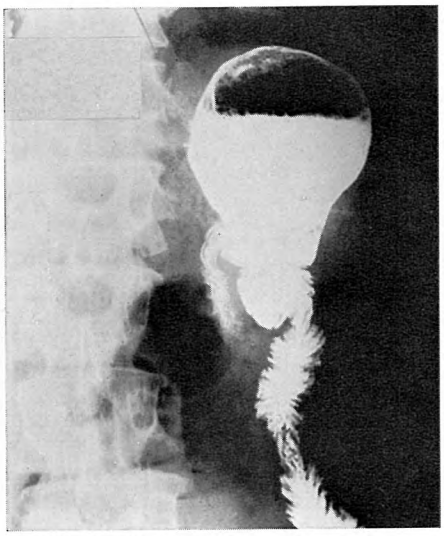

Fig. 45. Case No. 16. After 2 months treatment with the vaccine. The stenosis improved markedly.

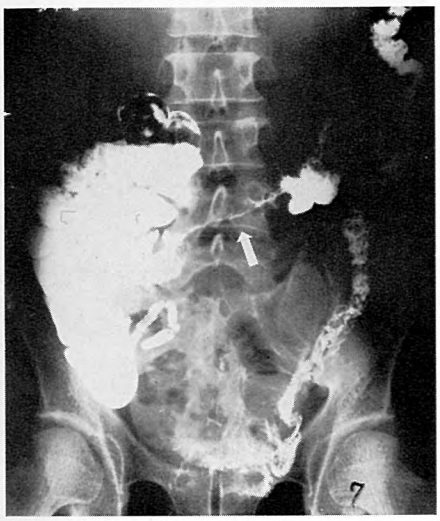

Fig. 46. Case No. 17. 64 yrs., male. Cancer of the transverse colon. Child-head-sized tumor was found at the site of stenosis of the colon when rapalotomy was performed.

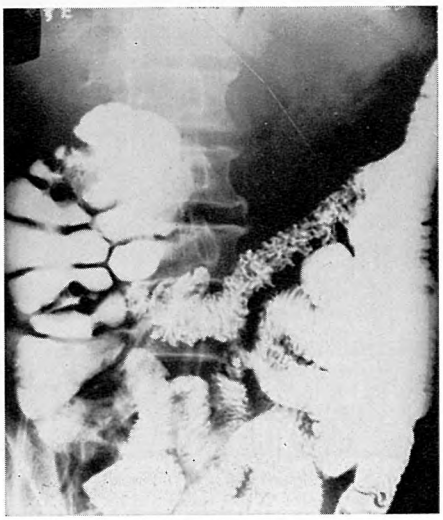

Fig. 47. Case No. 17. After 3 months treatment with this vaccine. Stenosis of the colon improved evidently, and the tumor became non-palpable.

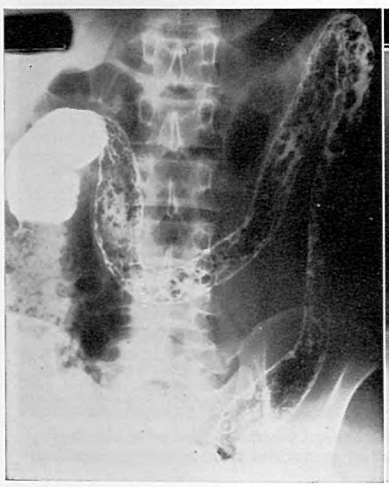

Fig. 48. Case No. 18. 28 yrs., male. Ulcerative colitis. Multiple and extensive ulcer formation was observed.

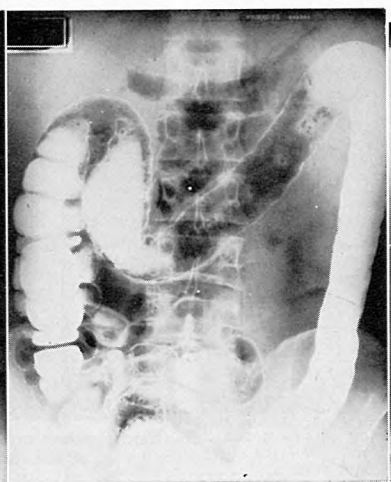

Fig. 49. Case No. 18. After 3 months treatment with the vaccine. Evident improvement of ulcerative sign was seen.

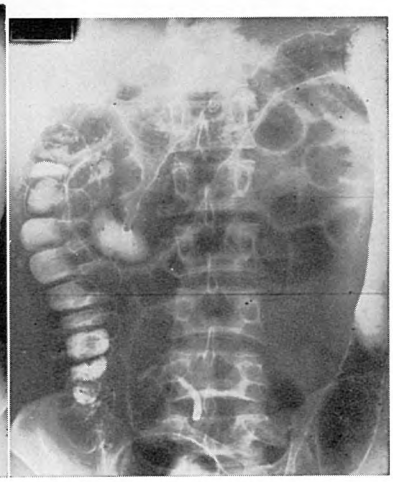

Fig. 50. Case No. 18. After 4 months treatment with the vaccine. Radiogram showed nearly normal sign.

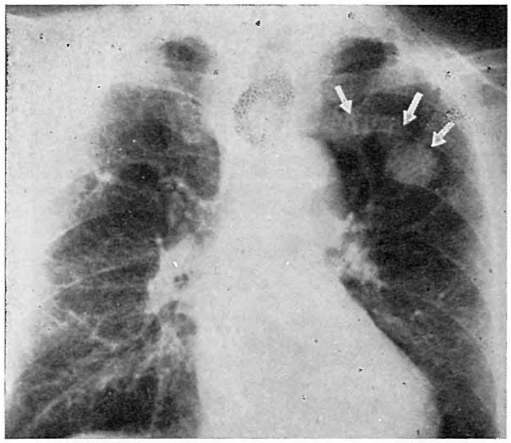

Fig. 51. Case No. 19. 78 yrs., male.
Lung metastasis of colon cancer(adenocarcinoma). Before the treatment.

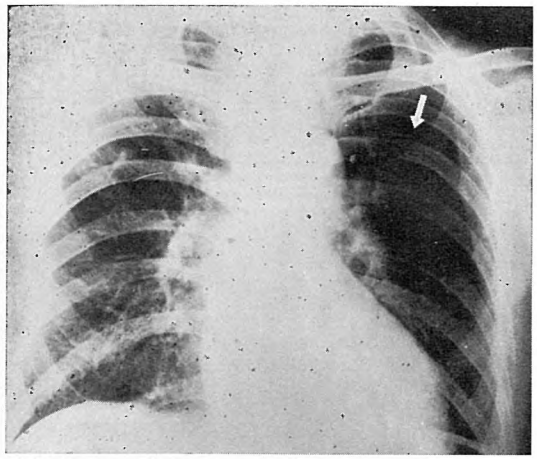

Fig. 52. Case No. 19. After 4 months treatment with the vaccine.

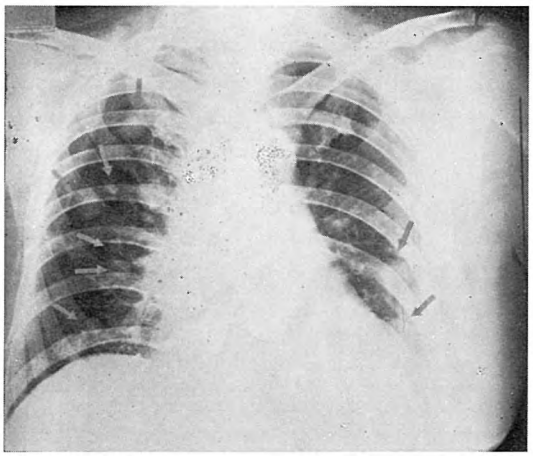

Fig. 53. Case No. 20. 52 yrs., female. Lung metastasis of breast cancer, which was found 3 years after the surgical operation for breast cancer. Histological finding of breast cancer was adenocarcinoma.

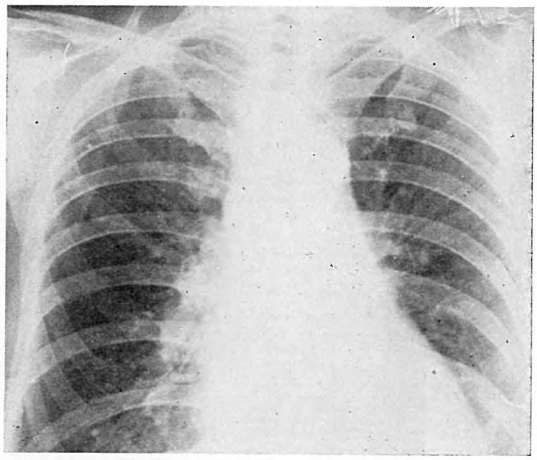

Fig. 54. Case No. 20. 10 months after the start of vaccine treatment.

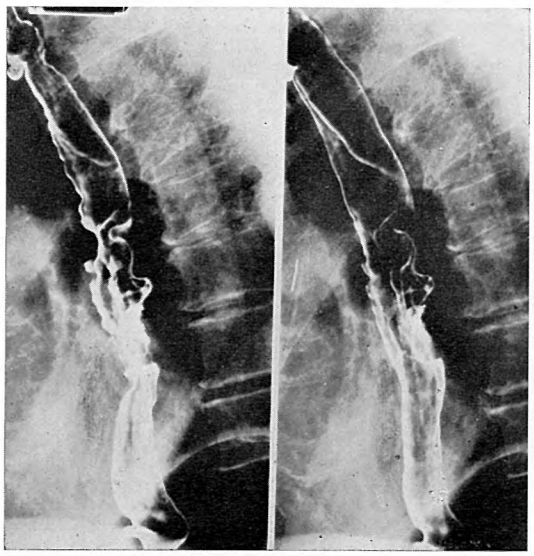

Fig. 55. Case No. 21. 68 yrs., male. Cancer of the esophagus. Before the treatment.

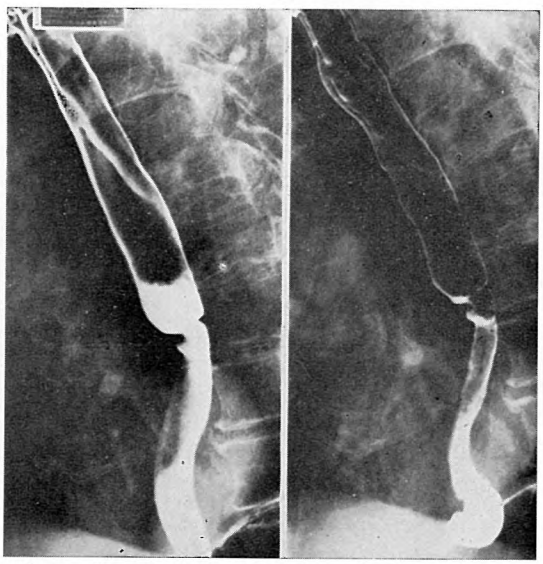

Fig. 56. Case No. 21. 1 year and 8 months after the start of the vaccine treatment. Tumor sign disappeared.

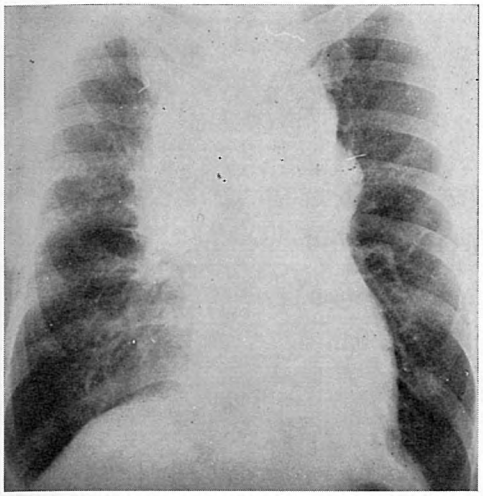

Fig. 57. Case No. 22. 50 yrs., male. Mediastinal tumor. Before the treatment.

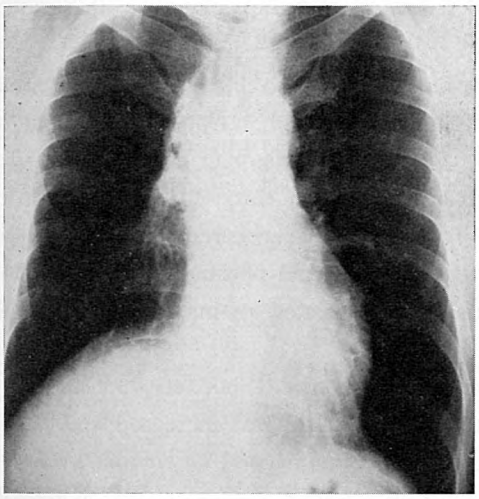

Fig. 58. Case No. 22. 2 years and 5 months after the start of the vaccine treatment.

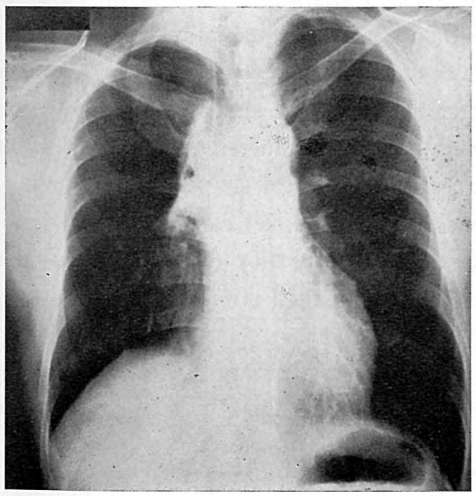

Fig. 59. Case No. 22. 2 years and 8 months after the treatment.

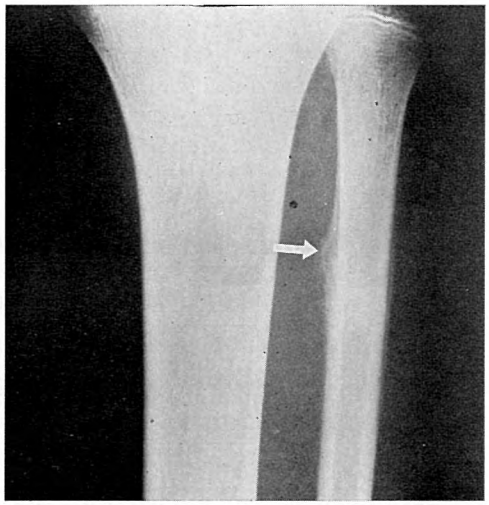

Fig. 60. Case No. 23. 16 yrs., male. Ewing's sarcoma. Before the treatment.

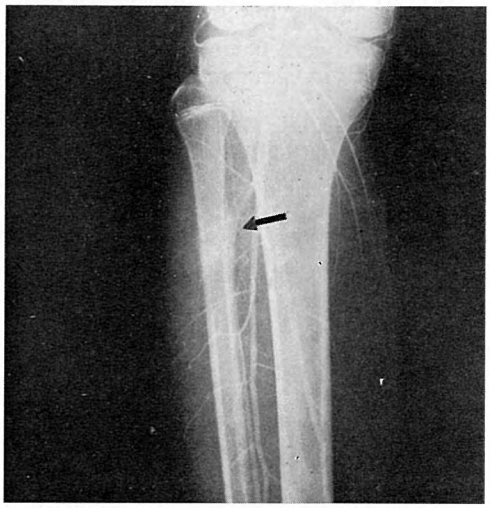

Fig. 61. Case No. 23. Angiogram.

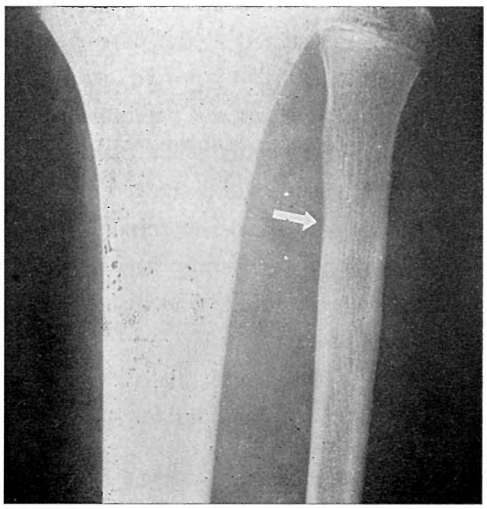

Fig. 62. Case No. 23. 6 months after the vaccine treatment. Tumor sign disappeared almost completly.