

The prophylaxis of cancer / Charles H. Mayo.

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Mayo, Charles H. 1865-1939.
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Publication/Creation

Chicago : American Medical Association, 1910.

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THE PROPHYLAXIS OF CANCER *

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Among the great problems which confront the world to-day is that of cancer. The question of tuberculosis has been practically answered. The bacillus is known, as well as its modes of entrance to the body, its varying methods of attack and the causes of death from the disease. Up to a few years ago what the public learned of tuberculosis was through the advertising of interested dealers of patent medicines, promoters of health resorts and the exaggerated statements of irregular practitioners. To-day, with what may be called a world movement, tuberculosis is gradually being controlled and the percentage of deaths is yearly being lessened.

In view of the wonderful progress made in the prevention, care and curability of tuberculosis which has developed in the short time since the public was first taken into the work as assistants, is it not time that we should more generally diffuse what knowledge we have of cancer?

This world-wide disease is not confined to any certain people, but occurs among all races of mankind, and, indeed, is found throughout the vertebrate kingdom. Fish often have goiter, and in certain waters cancer seems to develop from these secondary changes in the thyroid. The disease also occurs in birds. In over a thousand instances primary cancer has been found in mice and thousands of cancers have been grown by inoculation (Bashford). Domesticated animals are somewhat more susceptible to it than animals in the wild

* Chairman's Address before the Section on Surgery of the American Medical Association, at the Sixty-first Annual Session, at St. Louis, June, 1910.

state. This fact is explained as due to their longer life, the disease being more common in the relatively aged in both man and animal. While cancer is said to be uncommon in some countries, in Japan, for instance, there are 25,000 deaths a year from the disease in that country. In England it is estimated that, of individuals over 35 years of age, one out of every eight women and one out of every eleven men die of cancer, a greater death-rate for age period than from tuberculosis. We are not far behind in this country, with 80,000 cases constantly in progress and over 40,000 deaths each year from the disease.

It is undoubtedly true that the public is at present looking more anxiously for a specific or cure than for prevention of cancer, but it is in the line of prevention that the medical profession has assumed its present position of importance in the world. Practically all of the acute diseases with which the population of the earth is afflicted are due to bacterial infection. It follows naturally, therefore, that the medical profession should search diligently for the germ of cancer, that an antagonistic remedy may be developed for its cure.

While it would be extremely interesting and useful to discover the parasitic origin, if such it be, of cancer, it is not vital. It requires but little judgment to decide that to prevent disease is better than to cure it. To prevent a case of diphtheria should be greater cause for elation than greatly to reduce the mortality by the use of antitoxin. The use of antibodies or serums as cures when the disease has been permitted to develop, and their use as vaccines for the prevention of disease, should by no means be discredited. It has been by such prevention and control of disease in children, and the reduction of mortality in adults, that the length of human life has been increased, and more people now than formerly reach a cancerous but not a proportionate old age. This fact, together with better diagnostic facilities and more carefully collected vital statistics, makes it appear that cancer is on the increase. The sooner this subject becomes one of general discussion, as tuberculosis has been in the various scientific meetings and in literature, the sooner may the adult hope to reach old age.

What is cancer? I shall not enter into a special description of cancer and its varieties beyond quot-

ing briefly from Dr. L. S. Pilcher, who described the condition as follows:

It is in the lawless proliferation of preexisting epithelial cells in luxuriant, irregularly arranged masses that invade underlying and surrounding tissues, permeating, destroying them, and finally themselves attaining a mass which can no longer be adequately nourished by an accessible blood supply, and which itself then falls into central decay, while at the periphery the process still goes on, that cancer consists.

We must consider the irritation of groups of epithelial cells as the primary origin, and that such an arrangement occurred as a prenatal inclusion (this is questioned), or postnatally as a result of some mechanical or inflammatory condition. There is then a cell proliferation which becomes cancerous only when there is infiltration of the tissues.

From all the information which has been presented on the subject it is evident that there often exists a precancerous condition. The unproved type, that of prenatal displacement, we are unable to recognize. The postnatal type we recognize at least in the presence of tumors of a temporary, benign character in their more regular and uniform arrangement of structure and cells, such as warts of the skin, papillomata of the bladder and fibromata of the breast, as well as cell inclusions which occur in the scars of inflammations, or burns and the results of long-continued local irritation to tissues. These growths resemble the embryologic development of cells merely in the power of cell multiplication and in the continuance of type in the metastasis and transplantation of the growth. Youth, because of the vigorous growth of the cells, is less subject to cancer, yet more susceptible to poisons, but the active lymphatics in youth cause rapid dissemination of disease when it occurs.

Bashford shows that, while no race of mankind is exempt from cancer, the predilection for the disease in certain countries is more from local irritation than from the peculiarities of climate, soil and diet. I shall mention only a few well-known sources of irritation as a cause of special cancer. For instance, carcinoma of the mouth is rare in European women but common in men, yet in Ceylon and India women suffer greatly from cancer of the mouth because of the chewing of betel-nuts and holding the plug in the mouth. In this country leukoplakia

carcinoma is found mostly among those who use tobacco. Cancer of the skin of the abdomen, a rare condition, is common in natives of Kashmir, who wear abdominal charcoal heaters next to the skin. Lip or pipe cancer is an example of radiant actinic irritation, and there are numerous tumors from chemical and infective sources. Chimney-sweep cancer and innumerable other special forms are seen. It has been shown also that it may occur in a circumscribed area, and that any epithelial lining or covering may become cancerous. Why this is not still more common following chronic irritation or, if due to a special germ or parasite, why it does not occur after acute simple injuries it is impossible to say.

It is generally supposed that carcinomas often develop from severe single injuries, but there is no evidence that single injury does other than call attention for the first time to a preexisting tumor or hasten the growth in early or dormant malignancy. It is an apparent fact that in classifying the causes which may render precancerous conditions active we should include nerve-cell fatigue, such as is seen in the modern business world. The organs of convenience, *e. g.*, stomach, bladder and large bowel, which were added late to primitive life, have poor cell resistance and are prone to cancer degeneration.

Cancer of the stomach, bladder and large bowel undoubtedly often result from chronic local irritation. The tumor may often originate about the base of the appendix and in the wall of the cecum. It has been found by MacCarthy in a study by serial section of over 5,000 appendices which had been removed for so-called chronic subacute appendicitis, that 0.5 per cent. of them were carcinomatous, although the external appearance of these appendices did not always indicate such a condition. The diagnosis was made at operation in only 23 per cent. of the cases. It has been shown that diverticulum of the large bowel is sometimes the cause of cancer, and in such cases it is only in finding comparatively early growths which have not destroyed the diverticulum that the original location of the change can be shown. Therefore, in advising the early removal of chronic, inflamed appendices, we are avoiding the possibility of the development of a few cases of unrecognized cancer, not to mention the possibility of its development in some of

the appendices which are removed in a precancerous condition.

Just at this time ulcers of the stomach seem to have taken a leading position as the cause of cancer development. It is not hard to understand how cell groups may become isolated by connective tissue development as a result of erosion or ulceration. This condition is becoming more and more commonly recognized and it is estimated that a large percentage of the cases of cancer of the stomach have developed on ulcer. The trend of popular treatment in gastric surgery is to recognize the cancerous tendency of ulcers and excise them in their precancerous condition, reserving gastrojejunostomy for the cases of obstructed pylorus from closure or probable stenosis following excision of the ulcer. The question presents itself as to whether the supposed repeated medical healing of ulcers relieves the tendency to cancer.

Papillomata of the bladder are often found in the benign stage, yet we know that they develop cancer, and they should, therefore, be thoroughly removed as a precancerous condition.

It has been noted that the prostate gland is very subject to hypertrophy and hyperplasia, yet operation for its removal has been advised only when the distress and necessity become very great. Our present knowledge of the condition shows a high percentage of cancerous changes in the gland, which should be taken into consideration in deciding the advisability of operation before the proliferation of tissue becomes an infiltration, and some relief an absolute necessity. The mortality following operation in this early stage is low in comparison with that resulting from deaths of patients with symptoms who have not been operated on, to say nothing of the suffering which will have been avoided. Operation, however, is not advised merely because there is hypertrophy, which is common, but to avoid the changes incident to chronic irritation when it exists.

Patients with thyroid tumors who require operation, prove that chronic irritation of an adenoma may cause carcinoma in about one in twenty-five or thirty cases. A rapidly growing hard goiter should be looked on as a menace and early operation advised.

In a consideration of the irritative effects of the tumors of the body of the uterus, in which fibroids are common, we find $11\frac{1}{3}$ per cent. to be sarcomatous and

2.5 per cent. carcinomatous; yet the fibroid itself would be capable only of sarcomatous malignant change. In 1,000 hysterectomies for fibroids in women over 50 years of age, Sutton found that 10 per cent. of the tumors were cancerous. The condition will be found fifteen times in the cervix to once in the body of the uterus, yet in the cervix it is associated with fibroids in only $\frac{1}{3}$ per cent. Of the cases of cancer of the body of the uterus 40 per cent. are associated with fibroids, that is, over one hundred times more frequently than in cervical cancer. The first stage in such cases is adenomatous proliferation of the endometrium; the second, lawless cell-growth and invasion, or cancer. Fibroid of the uterus, while a fairly common condition, may often not be realized by the patient. Operation should not be advised in all cases, but in those which are giving symptoms; myomectomy in the young and hysterectomy in the older individual being the methods of choice. Chronic erosions are probably a greater menace than is commonly supposed, and they should receive attention.

A few years ago a tumor of the breast of a woman 35 or more years of age, which was not of infective origin, was considered malignant in proportion of four to one, and it seemed probable that nearly one-half of the tumors which were considered benign at the time of operation eventually became malignant. In the last ten years the increasing knowledge of the public, which has led to earlier operation, has reduced the proportion of probable malignancy at least 10 per cent. Tumors of the breast, not themselves malignant, may create a change in the adjacent breast tissue by chronic irritation, or they may change within their own structure. Well-collected statistics show that the results following operations for cancer of the breast indicate that 80 per cent. of the patients remaining well three years were operated on within six months of the development of the tumor, and about an equal number, who had no palpable glands in the axilla at the time of operation, remained well. It is obvious that a patient should not be obliged to have the growth of a tumor watched for marked evidences of malignant change, a delay which might reduce the chances from the best average of cure; that is, about 50 per cent. for three years, to a possible 20 per cent. cure, or much less.

Considering that the mammary gland is very prone to cancer, are we justified in hesitating to advise early removal for examination of supposed simple tumors as freely as in those which are considered malignant? Physicians should not assume the responsibility of delay, but should inform patients that in retaining this source of chronic irritation they must do it at their own risk and responsibility. From a careful observation of the operative cure of cancer of the breast it appears quite probable that an early operation, even though incomplete so far as the removal of muscle, axillary lymphatics, fat and fascia is concerned, will still give better results than the most radical operation which is done late. I by no means wish to decry the late radical operation, but would urge, rather, that the radical operation be performed early in order to have the cures approximate 80 per cent.

Are there cures for cancer? At present we recognize none other than that obtained by removal from the body by means of knife, cautery, paste or destructive rays. All methods used to cause a disappearance by absorption within the body by body tissues or fluids are as yet failures as cures, although growths have been checked and even shrunk by such measures.

It must be admitted that there is a wide difference in the malignancy of cancer, in the character of its growth and the tissues involved, yet but little consideration is given to another important point—that there is just as wide a variation in the resistance of the individuals for the same type of cancer. Some patients who have this power of resistance and who remain well for several years after operation are often claimed by the surgeon as examples of the benefits of some particular method of operation or of some unusual care which has been given them. Such patients do well with oft-repeated secondary operations, while others melt away with the disease or through metastasis.

A promising effort is being made to utilize cytolysis by using serums made from patients proved resistant to cancer, and from embryos of the same species, to create a destruction of the cells of embryonic type and character and power of regeneration, as seen in cancer.

Cancer is a disease of adult life. The patient is naturally the one most vitally interested, and he should be informed, in the precancerous stage, of his danger. We lose many opportunities for disseminating life-saving

knowledge to the public by a mistaken regard for the sensitive feelings of the patients, until their condition has become practically helpless from an operative standpoint. The layman requires considerable explanation before he can be made to realize that the risk is not in surgery, but in delayed surgery. He considers all operations alike in their danger and severity, while in reality there is a very wide variation. It is a simple operation to remove stones from the gall-bladder. A delayed operation may require their removal from the cystic or even the common duct, and very often a pancreatitis will have developed. On an average, one in thirty of these cases has developed cancer as a local condition around a gall-stone which has chronically irritated some mucous area of the gall-bladder duct. In nearly all of the cases of primary cancer of the gall-bladder and liver ducts gall-stones have been found.

If surgery for cancer is in disrepute to-day it is partly because too large a proportion of patients are accepted without explanation for operation at a stage when there is no possibility of cure, and when their families, if not themselves, should have been informed of their hopeless condition. If they had been left they would have served as living examples of the results of delay instead of the unsatisfactory results of ill-advised surgery.

We can, however, say this: that we know nearly or quite as much concerning cancer as we do of other medical and surgical diseases. The danger of local irritation of a chronic character has been underestimated. Our present knowledge of the prophylaxis of cancer indicates that all tumors should have a medical examination and the majority of them a surgical consultation in order that we recognize the precancerous condition, and reduce mortality by prevention.

*Reprinted from the Journal of the American Medical Association
Nov. 5, 1910, Vol. LV, pp. 1605-1607*

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