

CANCER AS A PUBLIC HEALTH PROBLEM

DR. J. F. PERCY, GALESBURG

Of all the public health problems that confront the so-called civilized portion of mankind, cancer is admittedly one of the most important.

Up to the time of the present war, it was estimated that at least 30,000 scientific men and women were devoting their time to unraveling the mystery of its causation. As to what this is, there is absolutely nothing known at the present time. One thing seems to be positively known about cancer, viz: that in its beginnings, it is a local disease. Whether this local condition is caused by a germ or a cell is, however, not known. The theory on which the advocates of either the germ or the cell idea of its causation is based is most convincing until one reads the views and arguments on the other side of the question.

There is a popular notion that a tumor and cancer are two different conditions. This is not true. Tumor means any growth. Every cancer is a tumor but every tumor is not a cancer. For the purpose of this paper I am going to assume that cancer is due to the misplaced activity of the body cells at the point of origin of the disease.

As you will readily recall, the tissues of the body are made up of many cells. They have been likened to the bricks in a house, one upon the other in a marvelously orderly arrangement. But they differ from the bricks in the wall of the house in that they are never still. They divide and subdivide indefinitely. As soon as the mother cells are worn out, daughter cells take their place. One beautiful characteristic of these developing cells is that they always respect their neighbor cells and never invade foreign territory. Each kind of tissue in the body, whether it is bone or muscle, nerve structure or skin, has its own peculiar cells. Each of these groups of cells does its own work and follows its own cycle of life. When a tumor that is not cancer, develops in any one of these four groups of cells, it is always made up of the cells characteristic of that tissue. But when a tumor develops that the expert pathologist, aided by the eye of the microscope, pronounces cancer, the whole orderly arrangement of the cells in any of these tissues is wholly changed.

The minute anatomy is no longer normal for that special tissue. Disorderly arrangement is substituted for orderly arrangement. The cells grow, cell upon cell. They crowd together in wild disorder. Those in the center of the mass are jammed so closely together that they are deprived of their nourishment from the body fluids and die; and as a result we get the common picture of ulceration.

This process of visible destruction is one of the too well known horrors of the advanced case of cancer. When this breaking down of the tissues commences because of deprivation of the blood supply, it is increased and hastened by the entrance of the pus producing organisms. This always indicates the later and usually hopeless stage of cancer. Unfortunately the victim of the disease up to this advanced stage suffers no pain. Did pain characterize the early stages of cancer, its possessor would insist upon its immediate removal. As a result, in the vast majority of cases, there would be no "late stages" of the disease. When this process of ulceration is initiated it of necessity also involves the blood vessels and lymphatics. When these open channels are broken into, the debris of the disease, i.e., the cancer cells and pus organisms, enter the blood stream and the changes in the individual patient begin to be marked. He shows even to the ordinary observer that he is sick. He loses weight, he no longer cares for food, and his skin loses its normal look and becomes dry and sallow, often a lemon yellow. When these broken down cancer cells get into the blood stream they may be arrested in any vessel that is too small to permit them to pass on. When this occurs they start a new growth in this new environment and they grow with seemingly increased virulence. It makes little difference where the new growth starts, in the lip or in the female breast, when these cells or germs get into the circulating blood they may stop in the liver or spine, or in the walls of the intestine and at once begin their characteristic mischief like a German soldier transplanted to Belgium or France or Serbia. These, then are some of the reasons why the cancer cell is the anarchist among cells. It is the supreme disturber and destroyer of the orderly processes of normal physiological growth.

What starts the aberrant growth of cells which, when we recognize it, we call cancer? An endless amount of valuable

literature has developed about this marvelous scientific enigma. The theory most generally accepted at the present time is that most malignant growths have as the exciting cause of their development some form of irritation. There are many curious and apparently significant facts lending strength to this theory. As an illustration of this eighty-five per cent of the cancers of the lip develop in smokers. Fifty per cent of the cancers of the stomach are found developing from the edge of a previous ulcer. Dr. Fibiger, of Denmark, noticed that the native rats that died around the sugar warehouses of that country never had cancer of stomach or intestines; while the rats that came over in the ships from America and died, frequently had cancer of the stomach or intestines. In looking about for the explanation, he discovered that the American rats often ate American cockroaches. He then imported some of these cockroaches from America and fed them to the Danish rats, with the result that these rats also developed cancer of the stomach and intestines. This led to the further investigation of the cockroaches found in America, which disclosed that they frequently harbored a small parasitic worm which was not found in Danish roaches. The irritation caused by the intestinal worms undoubtedly was the explanation of the frequent presence of malignancy in the intestinal tube of the American rodents. Many more instances could be cited where the development of malignancy seems to be coincident with the production of a chronic irritation. Cancer of the kidney is one of these where presence of stone in fifty per cent of the cases probably accounts for presence of cancer. In eighty-five per cent of the cases of cancer of the gall bladder, gall stones are found. Cancer of the groin is very common in chimney sweeps, and in sailors. In the first-named the soot, together with the loop of rope in which they swing, produces the necessary irritation and this is found, i.e., the irritation from the rope, true also of the sailors. In Kashmir, a province of India, the natives carry a charcoal stove under their cloaks and against the skin of the abdomen to ward off the cold. The most frequent form of cancer, therefore, in this region of the world is that of the skin of the abdomen. In China cancer of the pharynx is very common among the male portion of the population, while it is almost unknown among the women. The explanation is that the men eat at the first table at meal

time when the rice is hot, while the women eat at the second table when the rice is cold, thus escaping the irritation produced by the hot rice. Cancer of the tongue is frequently found with bad teeth. The so-called black moles, when irritated, frequently give rise to a most vicious and destructive form of cancer. Dr. A. J. Ochsner, of Chicago, in an address before the American Medical Association three years ago, made the interesting statement that there would be much less cancer of the stomach when Americans stopped eating so much manure with their food, referring more especially to the use of uncooked vegetables that had been raised on ground fertilized from barn yards and privies.

There is no reliable evidence that goes to show that cancer is in any measure contagious. The writer saw the late Dr. Senn, of Chicago, have a rather large piece of active cancer tissue, which he had just removed from the breast of one of his patients, transplanted under the skin of his own arm and sewed in. The whole mass gradually disappeared and the doctor died some fifteen years later from causes that in no way could be related to his courageous experiment. The question of heredity as related to the cancer question is still a mooted one. From statistics it would appear that those who have had cancer in their family stand a little better chance of not having it than those who have never had a case in the family. But statistics of families in this country are based on too meagre data and we would do well to question it when based on this kind of evidence. When we get to the point where we have vital statistics that cover the disease over a period of at least one hundred years, we shall be in a better position to draw conclusions on the basis of heredity.

This statement is more to the point when one is familiar with the unique scientific investigations of Miss Maud Slye of Chicago. This worker has made an exhaustive study of cancer as it affects mice. Her work in this connection would also seem to show that the disease is not transmitted by inheritance. Her investigations also certainly show—and she is authority for the statement—that in mice at least a predisposition to its development is positively inherited. Experimenting with thousands of mice, Miss Slye has succeeded many times in breeding in and

breeding out, at will, cancer in mice, and made it succeed as an experimental problem depending on what strain she selected with its known hereditary predisposition.

Another significant fact in the work of this original investigator, at least as far as it applies to the study of the problem of cancer heredity in mice is that it is not the second or the **third generation which shows up the predisposition to cancer development in families, and what it is to be; but the fourth, fifth or even sixth generation that emphasizes or controls the determining factors.**

So when the human family finally arrives at a knowledge of predisposition to cancer as a family problem they may be immeasurably aided in the study by knowing what diseases troubled not only their grand parents, but the great grand parents as well.

It is a curious fact also in the enigma of cancer that a little injury to the body is more frequently followed by cancer than a severe one. Cancer rarely develops from a fracture of one of the larger bones of the trunk; but a comparatively slight bruise of one of these bones may develop the disease at seat of the injury and this too, months or years after its receipt. Just why this is so, can not in our present state of knowledge be explained. Why the supposed irritation of a slight bruise should be more potent in this regard than a more extensive and severe one merely illustrates the difficulties under which we labor when we try to explain some of the facts which now seem to be fundamental in the development of this real scourge of the race.

In the beginning of this paper it was stated that there was only one thing known positively about this condition, viz., that in the beginning it is always local. Cancer never commences as a large mass. At first it is so small as to be microscopic in size. More than this, it is marvelously slow in the vast majority of cases, in its development; if on the surface, its removal or destruction is one of the simplest problems in all of medicine or surgery. But right at this stage usually commences the great tragedy of cancer as it affects the individual patient. It is usually not removed when it is a little insignificant growth, and because it is not we have the real explanation

of the title of this paper, "Cancer as a Public Health Problem." The problem is, to get the individual would-be sufferer to act early and quickly. But suppose there is doubt as to the real character of the growth? The answer is simple. If an experienced physician or surgeon is in doubt as to the nature of the growth, the patient should be given the benefit of the doubt and have it removed at once. If the abnormal growth is permitted to develop until there is no doubt as to its nature, effective treatment is futile in just the degree that its removal is delayed.

If it progresses to the stage where the neighbors or the casual passer-by can make the diagnosis, its destruction becomes the greatest problem in surgery, and the necessary treatment frequently required is so heroic in its character as to make the surgeon and the layman alike question the wisdom of making the attempt.

When we remember in an acute way how awful and how hopeless the latter stages of the disease are, we shall better appreciate the wisdom back of the official motto of the American Society for the Prevention of Cancer when it says: "In the Early Recognition of Cancer lies the only hope of Cure."

Should there be any little mass that persists, or, if sore, that heals suspiciously slowly; any lump that can not be accounted for; any discharge that is unnatural, i. e., persistent or offensive or bloody, find out, if you value the joy that comes from freedom from suffering, what it is that is back of it.

Why women especially will hide a tumor or ignore an abnormal discharge is one of the mysteries of every physician's professional life. One can not help but question whether there may not be in cancer a toxic product which affects the brain of the sufferer in such a way that he will not or cannot sense its relationship in an intelligent way to the doom due to neglect that awaits him. It is well known that the tubercular are usually optimistic even when well advanced in the disease and probably the same explanation will hold good in regard to cancer, that it in its progress elaborates after all a beneficent toxic substance which will rationally explain their unwarranted hopefulness.

Therefore, and to repeat: Early recognition, combined with adequate removal, usually means a comparatively easy and

complete cure. Late recognition and delayed treatment always means suffering that can not be described by words, or written by the pen, and it also means sufficient morphine to ease the patient away into, at best, a slow and miserable death.

The ravages of tuberculosis in all the centuries of the past were immeasurably reduced by public education as to the best means for its suppression. The same means must be adopted to diminish the ruin and waste of good human blood and tissue from cancer. In five years, by thorough and persistent teaching of the public, the physicians of Germany increased the number of cancer patients who could be treated with an increasing hope of relief from forty per cent when they started the propaganda, to eighty per cent.

Reliable statistics show that one out of every eight women that we pass in the street and who have reached or passed the thirty-fifth year of age, will die of some form of cancer, and that one man out of every twelve will die in the same useless way. If what was said in the beginning of this paper is true, and the best recognized authorities agree that it is true, that the beginnings of cancer are always in one little, local spot—what is the most practical and hopeful thing to do in order to circumvent the trouble? The answer is that every man and woman should be thoroughly and completely examined twice a year after they are twenty-five years of age.

From its practical side we do not consider it incongruous to see a dentist twice a year in order to prevent the pain incident to decaying teeth. Why should the same thing not be done in order to be sure that cancer is not developing somewhere on the outside or under our skins? It is most unfortunate that the onset of cancer and tuberculosis is not ushered in by pain as one of the very first symptoms, as is true of some forms of diseased teeth, instead of its being among the very last of the symptoms which close the chapter of life in the sufferer from cancer. Pain is a beneficent thing when it starts us on the road that will steer us away from the conditions that are back of it whether physical or moral.

In the modern treatment of cancer four methods are recognized as of value. The selection depends on the stage of the disease when the patient first presents himself for treatment.

The first of these is excision of the growth by the knife; second, the X-Ray; third, the use of Radium; fourth, the application of heat as devised by the author of this paper.

In the small growth of cancer the knife, made to cut wide of the disease, still holds, in the opinion of many real surgeons, the first place. The operation is much quicker, the convalescence rapid and the resulting scar much less prominent than by any other operative method. The chief danger in the use of the knife, as far as the final results are concerned, is always the possibility of a small nest of cancer cells outside of the main growth being invaded by the knife, and the knife thus infected with the disease spreads it into new areas. In other words, the knife vaccinates the disease into places where it did not exist previously. This is known to surgeons as a process of auto-transplantation of the disease. It is this fact, always feared by the surgeon, that has given the knife treatment of cancer most of its reputation for not curing the disease. But the fault usually has been that the surgeon has attempted to cure the disease with the knife when it was too far advanced to safely avoid this coming in contact with and scattering of the cancer cells and inoculating them from the edge of his cold steel knife into places where they previously had not existed. But in suitable cases the cold steel knife has permanently taken away from the cancer victim a serious menace to his life.

The three remaining methods of treatment are mainly used in those cases of cancer on the borderland of operability with the knife, or that other great majority of cases which are utterly inoperable with the knife. The X-Ray, Radium and the heat method will all destroy a cancerous growth utterly if the malignant mass is in a situation where the treatment can be applied efficiently. Failure of efficient application is the chief trouble with all these methods. Radium or X-Ray, even in large doses, cannot be made to destroy a large mass of cancer because sufficient penetration cannot be obtained. A large mass of cancer in the liver cannot be reached by either the X-Ray or Radium. This is also true of cancer of the stomach or of the abdomen.

The most efficient method of treating cancer today is by a combination of the four methods mentioned above. If the knife is used it should be followed by the use of the X-Ray or

Radium, because these agents can be made to destroy a small focus of cancer if it should remain after the major portion has been removed by the knife.

As has already been pointed out the weak point in the use of the cold steel knife in cancer is the possibility of scattering the disease by its use. In order to avoid this danger the author devised a knife which is heated by electricity. Wherever this knife touches cancer it kills it so that there can be no dissemination of the disease in new areas. A curious and interesting fact regarding the use of heat in cancer is that a mass of cancer is killed when the temperature in the growth is raised to 113° F. and maintained for ten minutes. So that cancer, if it is at all accessible, should be removed by the hot knife, and if it cannot be removed, it should be destroyed by raising the temperature in the growth to fully 113° F. This is far and away the most efficient means so far devised of dealing with the fully developed malignant mass. The small masses that may be left because contiguous to some vital organ or organs, as the large blood vessels or bladder or rectum, can then be reached by large doses of X-Ray applied by those thoroughly conversant with its application.

It has been known to physicians for generations, that if the sufferer from malignant disease should accidentally develop an intercurrent attack of erysipelas, he would also in a rather large percentage of cases be cured of his cancer. The reason for this has never been understood until Delbet of Paris, following some experiments on mice and rats suffering from cancer, announced that it was the heat or fever developed in the body during the progress of the erysipelas that caused the destruction of the malignant growth.

It is also an interesting fact that following the removal or the destruction of a mass of cancer by the hot knife or the application of heat the patient's suffering is practically nothing, completely cooked flesh does not complain.

So far I have very briefly outlined the cancer problem as it affects the public today. There seems to be no very secure foundation on which to base a prophecy as to the lines that further study of the cancer problem and its final treatment, based on this study, will take. Many trained men believe and

numbers of them have tried to find a serum or an agent that will attack the condition through the channels of the blood. But so far nothing of striking effectiveness has been worked out.

I asked a great authority in pathology on the other side of the water, one of my teachers, many years ago, if the *cause* of cancer would ever be discovered and he replied after the manner of the oracle at Delphi: "The man who discovers the cause of cancer will be in a position to describe the anatomy of the human soul."