a high obstruction was established, and high jejunostomy was indicated. An incision was made parallel to the left costal cartilages under gas-oxygen and local anaesthesia. A distended loop of jejunum was selected and a catheter was introduced by the usual Mayo method. A few ounces of green fluid came through the tube, but there was no subsequent drainage. Fluid, however, could be freely introduced.

A, Duodenal tube. B, High jejunostomy (tube inserted too low). C, Stab wound in colon. D, Caecal drainage. E, Drain in pelvis.

Vomiting continued throughout the third day. A second jejunostomy after identification of the flexure was considered, but it was felt that the same result might be obtained by drainage of the stomach and duodenal contents through the medium of a duodenal tube. The tube was swallowed with great difficulty between two attacks of vomiting, and, after lavage, by means of a nasal tube. It was now possible to aspirate fluid every half-hour with a Record syringe. Three pints were withdrawn in twelve hours. The character of the fluid completely changed; at first it was black, afterwards it became orange-coloured, with a foul, but not a faecal, smell. The toxicity of this fluid was made evident by the fact that if aspiration was delayed on any occasion the condition of the patient became rapidly worse.

The mechanical difficulties encountered were dealt with in the manner indicated, but, in addition, it was necessary to cope with progressive failure of strength from toxæmia and loss of fluids.

Biochemical Considerations.

Every few hours a pint (12 pints in all) of 10 per cent. glucose solution in distilled water was administered intravenously. During and at the end of each transfusion insulin was given hypodermically (1 unit to 3 grams of glucose). Fluids were given continuously by the drop method into each axilla; water, peptonized milk, and panopepton were introduced through the jejunostomy tube. It was interesting to note that, immediately after a transfusion, duodenal regurgitation increased, necessitating aspiration on each occasion.

At one stage the urine became alkaline, dehydration was marked, and slight tetanic spasms (cramps) occurred in the arms, suggesting the condition of alkalosis so commonly observed in the presence of high obstruction. Improvement followed the administration of colossal calcium and the substitution of hypertonic (3 per cent.) saline solution for distilled water when administering the glucose.

Towards the end of the illness a dilemma arose in connexion with treatment. Duodenal contents in the presence of high obstruction are notoriously toxic. Their retention is fatal. On the other hand, if they are abundant and freely drained the patient cannot survive their loss for any prolonged period. After forty-eight hours of frequent aspiration through the duodenal tube the patient became dehydrated and stuporose, and threatened with a physiological death.

Wilkie of Edinburgh was confronted with a similar dilemma in somewhat similar circumstances. High obstruction followed appendicectomy; the jejunostomy opening was made too low. A second jejunostomy was performed at a higher level. After a period of free drainage rapid emaciation followed and death appeared imminent. The upper and lower jejunostomy tubes were connected outside the abdomen so that the duodenal contents could be delivered into the lower intestines. An immediate improvement in the condition of the patient followed, with ultimate recovery.¹

Wilkie's method was adopted in the present case in a modified form. The duodenal contents, immediately on their withdrawal, were injected through the jejunostomy tube with an aspirating syringe. Coincidentally with this procedure the caecum commenced to drain. It was noticed that the peptonized milk, panopepton, and other materials given via the jejunostomy opening passed through the caecal tube unaltered.

Termination.

With the caecum draining and the duodenal contents saved the general condition of the patient improved. On the morning of the fifth day he announced that he felt better and was going to recover. The Record syringe failed to find any fluid in the stomach and duodenum, and some bile appeared for the first time in the caecal drain. The bile was green, and not intermixed with the other faecal material. (This has been noticed in other patients suffering from pancreatic disease.)

For six hours the patient made rapid strides towards recovery; there was no further regurgitation into the duodenum; his appearance was transformed. He was given a hypodermic of omnopon to promote rest, and all who were watching him felt that at last recovery was assured.

On the evening of the sixth day the signs of high obstruction again appeared; restlessness and delirium quickly followed. Aspiration of the duodenal contents and intravenous medication gave no response. He died twelve hours later.

Towards the end of the illness respirations became fast without any pulmonary complication; air hunger was followed by the appearance of acetone and diacetic acid in the urine. Alkalosis had now given place to acidosis. Alkali solutions, rigidly avoided at first, were freely administered in combination with glucose, but without effect in the end.

A post-mortem examination was refused, but the loop of bowel was examined, and proved to be the site of perforative diverticulitis.

The following points in the case are noteworthy.

1. The ease of diagnosis.
2. The good fortune in finding the perforation in a loop of bowel easily extruded.
3. The free drainage of the caecum after some days, with complete emptying of the lower coils of intestine in the presence of persistent high obstruction.
4. The efficacy of the retained duodenal tube as a means of high drainage.
5. The extreme toxicity of the obstructed duodenal contents.
6. The signs of hepatic and pancreatic insufficiency in the presence of continued obstruction.
7. A condition believed to be alkalosis changing to acidosis.
8. The dramatic relief from obstruction followed by a fatal relapse.

In conclusion, I wish to acknowledge my great indebtedness for the untiring help of Dr. Magennis and Dr. Gilbert Wilson in the management of the case. Dr. T. T. O'Farrell kindly examined and made sections of the specimen removed after death.

REFERENCE.

- ¹ *Brit. Journ. of Surg.*, 1924, xi, 568.

THE EARLY DIAGNOSIS AND TREATMENT OF CANCER.*

BY

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In his opening remarks Mr. Donaldson suggested that the problem of cancer might be considered under four headings: etiology, early diagnosis, treatment, and education of the public, and, having described briefly some of the views held on the etiology of cancer and indicated lines on which further investigation is proceeding, he continued as follows.

My object now is to discuss the second, third, and fourth parts of the problem, and it is as well to begin by trying to picture the situation as it exists to-day. To do this, I will try and describe what happens to thousands of people each year.

First, there are the average men and women, going about their daily life, occasionally thinking of the question of cancer. One day they experience some perplexing

* Abstract of an address delivered at the Royal Institute of Public Health on November 20th, 1929.

symptom; it is not a symptom that they are used to; they cannot assign any definite cause, such as a blow. They immediately think—Is it cancer? They try to put it out of mind; they put off going to their medical adviser for fear that he may pronounce it to be malignant disease, then later on they are forced to seek medical advice. They do not go and say: "Look here, I want to know whether I have cancer," but they go and give a general story, sometimes actually hiding the main symptom, hoping in their hearts that the doctor will realize they are nervous of cancer and tell them that they have not got it. It is an interesting psychological fact that people fear to admit they are afraid.

Then we come to the average practitioner: he is perhaps unable at a first glance to find out exactly what is the matter with this particular patient, but it is obvious that it is not an acute condition, so he recommends a bottle of medicine and a little rest, and tells the patient that if he does not feel better to come and see him again. The patient, consciously or subconsciously, takes this to mean that he has not got any malignant disease, and he does not feel ill enough to repeat the visit. A few months later, however, the symptoms are much worse, and he goes to see his practitioner, who now has no difficulty in seeing what is the matter. But precious time has been lost, and the chances of curing the patient are very much less. Yet no one is to blame; it is the system that is to blame. Many times have I had a letter from a doctor saying: "I have treated Mrs. X on and off during the last six months for toothache, indigestion, or what not, but only yesterday did she tell me that for the last nine months she had noticed irregular haemorrhage. When I knew this I at once examined her, and now send her to you, as I fear she has got an advanced cancer."

Then we come to the last part of our story—the present state of treatment of cancer. That is left largely in the hands of experts, but even here things are not satisfactory. The number of cases that can be dealt with by the experts is very limited, and naturally the early cases are given preference, as their chance is better. To get their patients treated quickly general practitioners have, therefore, to send many of them to general surgeons, who perhaps are rather less experienced in the treatment of malignant disease. It is becoming more and more common to find in the smaller country towns such general surgeons attached to a firm of general practitioners, and it is obvious that the combination is of very great value to the community, but for the particular object of cancer treatment such surgeons cannot have sufficient experience to be really up to date.

That, then, is a fair picture of the present state of affairs.

It would be as well now to consider, first, what should be the ideal, and, secondly, how any system can be grafted on to the existing one. Who is the first professional person to come in contact with the patient? Obviously, the general practitioner. He, therefore, is the keystone to an arch on which all the rest depends. One of the primary thoughts he must have in his mind when a patient comes to see him is, Has this patient got early malignant disease? Can every practitioner be made an expert in diagnosis of cancer? The answer is undoubtedly, No. He can only suspect the possibility that from the symptoms the patient may have malignant disease, and then at once send the patient to a diagnostic centre. Now what is needed in these diagnostic centres?

First, there is the question of the staff. This staff must be a well-organized team, trained in the science of cancer diagnosis. This is where we meet with the first difficulty. It is essential that the centres should be so plentiful that patients do not have to travel far from their homes in order that a diagnosis can be made, and yet these preliminary centres need highly skilled staffs, including surgeons, radiologists, and pathologists, and other specialists. Though it is not easy to find a number of such teams, nevertheless it should be possible to find one in each county hospital.

If it is discovered that the patient is suffering from malignant disease he or she must at once be transferred to a centre for treatment. These centres should be relatively few. Any person should be able to get a diagnosis

made without any appreciable interference with his daily life; but treatment centres cannot be efficiently and economically run except in large institutions. The question arises—how to staff these large institutions. The staffs must be people who devote the greater portion of their lives to treatment of malignant disease; they must also act as a team, and frequent consultations should be held between the surgeons, specialists, radiologists, physicists, and pathologists. Such institutions must not only be for the treatment of the individual patient, but centres for education and research into treatment; post-graduate courses, both in treatment and in diagnosis, should be frequently held.

Patients who have passed through such a centre must be under its foster-care for the remainder of their lives, and for this purpose the centre would need an efficient follow-up department, which would write and ask the patient to come up to be examined at frequent intervals. There should be also a social service attached, which knows what happens to incurable patients. Much more could be done than is done at present for relieving pain in these cases. How many surgeons interested in neurology have worked out methods for destroying the pain-conducting nerves, yet it is not difficult to imagine operations for dividing the posterior roots, which, though not prolonging life, would make the last months more bearable.

Now we come to the last part of the problem, but by no means the least—namely, the education of the public. If we are successful in solving this all the rest of the difficulties will disappear. There are a few people who say that if we tell the public all about malignant disease a generation of neurasthenics will be produced who will go about imagining that they are suffering from cancer. Nothing, however, is further from the truth. There are millions of people who now spend hours of agony fearing that they have this dread disease, and if they could once summon up courage to go to a centre and be told that they have not got malignant disease they would go away quite happy. It must be the common experience of most practitioners, certainly of gynaecologists, that patients come complaining of some indefinite symptom. When, after careful examination with negative results, patients are told that there really is nothing serious, no tumour or cancer, etc., an expression of relief at once comes over their faces and they admit that that is what they had been fearing.

Until recent years tuberculosis claimed as many deaths as cancer, but very few people suffer from apprehension that they have tuberculosis. And why? Because they talk about it; because they know some of the symptoms; because they are not frightened or ashamed to go to a doctor and say: "I want you to go over my lungs and see that I have not got consumption." It may be said that there is another reason—namely, that consumption is curable; but so is cancer, if taken early enough. At present nine out of every ten people believe that no patient is ever cured of cancer. It therefore may be said that the first great step towards education is to make people talk more about it.

The next step is to get reliable facts published concerning the disease, and here I would appeal to the newspapers to go to committees for their articles on cancer rather than to individuals, whose object is often to promote their own welfare rather than that of the public. I am afraid this suggestion will not appeal to the less reputable organs of the press. It is much more exciting to have a headline such as "Eating tinned lobsters is the cause of cancer," than to publish a carefully thought-out article which has been discussed and passed by a committee of experts.

There are some who may say that the symptoms are so insidious and so often common to other conditions that it would be unwise to broadcast that these symptoms are possibly the early warnings of cancer; but, after all, the majority of people do not suffer from any symptom and will not be worried by such knowledge. To quote one small instance, in the case of women the two common sites for cancerous growth are the breast and the uterus. If every woman knew that the absence of any lump in the breast meant that she had not got cancer of the breast, and the absence of any irregular vaginal haemorrhage meant that

she had not got malignant disease of the uterus, it would relieve thousands of women of a haunting fear. Conversely, they should be told that if they have a lump in the breast they must at once consult a doctor, and likewise if they have any irregular haemorrhage. When, however, such propaganda is sent out it should also be explained that not every lump in the breast is cancer, and that a great many cases of irregular haemorrhage are not due to this serious condition.

It has been suggested that it is a good thing to tell the public the statistics of people dying from malignant disease. It is often said that cancer is on the increase, a statement which, though probably true, is by no means as true as the figures would seem to suggest. We must allow for the greater age to which people live, and for the better diagnosis owing to the higher average diagnostic ability of the general practitioner compared with that of a past generation. But how is broadcasting these facts going to help the public?

There is, however, one thing that will appeal to the people, and that is their pocket. Few of us are really very frightened of dying; most of us dislike the idea of pain during the process of dying; but all of us fear being put out of action and seeing our relatives suffering because the breadwinner is laid low and additional expenses are being incurred for treatment. Can this expense and worry be avoided, and can any scheme for this object be made to help in the education of the public? I believe it could be if a special insurance policy could be taken out for cancer, and if the premium on such a policy could be reduced on the production of a certificate that the individual had been examined within the last six months and shown to be free from any signs of malignant disease. Such a system would, I venture to suggest, appeal to millions of people. It is true that the insurance companies are not primarily philanthropic societies, and inquiries suggest that they are averse to the principle of frequent medical examinations in connexion with insurance. On the other hand, if a case of cancer is treated early the prospects of a permanent cure are very good, and the patient will go on paying premiums for a great many more years, and the insurance companies will not have to pay the large sums of money which are forfeited on the death of the patient.

There is yet another line in which the public must be educated, and that is concerning the meaning of the word "research." Nine out of ten people, even among the better educated, believe that research means that a person suddenly thinks of an experiment and does something to see what will happen, much in the same way as a little boy will put a match under some gunpowder to see what comes next. Nothing is further from the truth. Research may be considered under two headings: first, laboratory research; secondly, clinical research. Both of these are essential if any advance is to be made in the fight against cancer; but it is about the clinical side of research that the public must learn.

If we labelled any hospital as a "Research Hospital" it would be very difficult to get patients to come and be treated. The patients would imagine that the surgeon, like the little boy with the gunpowder, is going to do an experiment not knowing in the least what will happen. What are the real facts? In clinical research a patient is treated by the most up-to-date methods known to science, but instead of letting that patient go out of the hospital and all the facts concerning him be forgotten, extremely careful notes are taken before the treatment is started, during the treatment, and after the treatment. When some hundreds of similar cases have been treated these notes are collected and carefully compared to see the value of such treatment or the value of any modification that has been made in that treatment. It is true that to a greater or lesser extent all hospitals are research hospitals, because experience is gained by somebody every time a patient is treated, but in a busy general hospital the need to treat thousands of patients as quickly as possible prevents the medical attendant from making as careful records as is desirable. For that reason it is far better to segregate patients suffering from cancer in special hospitals, the staffs of which are specially chosen for their interest in and knowledge of that

disease. Such a hospital must lay itself out for the careful observation and making of records.

It is quite true there are in this country cancer hospitals but are there sufficient? There are in the British Isles over 40,000 deaths from cancer every year, and every one of these cases should have careful records and special investigations if rapid advances are to be made in the treatment of malignant disease. Can the existing hospitals deal with such numbers? It is obviously absurd. Even if there was sufficient accommodation in the existing hospitals I venture to say that there is not one single hospital which at present quite "fills the bill" as a research centre. It is our duty to demand that such centres be created. Every such centre should have an efficient and well-equipped research laboratory attached to it so that clinical research and laboratory research can go hand in hand. It must not be forgotten that it is the patient who is suffering from the disease, and it is the patient who must be cured.

There is yet another difficulty that the public cannot realize—namely, that progress is a matter of evolution. One point gained leads to another, but the final goal is often a long way off, and it must be a really philanthropic person who is prepared to put down money to help a cause the ultimate goal of which may not be reached until after the death of the donor. If one could guarantee to have a solution to the problem within a specified time there would be no difficulty in getting money, but that is not possible. But think of the magnificent gamble! By subscribing a million or even half a million to a hospital the goal may be reached within a comparatively short time.

UNION AND NON-UNION OF FRACTURES.

WITH SPECIAL REFERENCE TO FRACTURES OF THE NECK OF THE FEMUR IN ELDERLY PEOPLE.

BY

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(With Special Plate.)

In most situations in the body fracture of a bone is normally followed by a process of repair which leads eventually to restoration of the continuity, strength, and rigidity of the broken bone. This is bony union. Failure of bony union is non-union, because no other kind of union can give the strength and rigidity which are essential to the normal functioning of a bone.

For the purposes of this inquiry it matters not whether the fibrous tissue between the fragments of an ununited fracture is thin and loose or thick and firm, nor whether the ends of the fragments themselves are atrophied and pointed or enlarged and shaped to the semblance of a joint (pseudarthrosis). It is sufficient that non-union as a rule causes great disability, so that bony union is the ideal to be aimed at in the treatment of nearly all fractures.

The causes of non-union given in textbooks of surgery are many and various, and the following classification is fairly typical of them all.

I. Local causes:

- (a) Imperfect immobilization—said to be the most frequent of all causes.
- (b) Great separation of the fragments.
- (c) Interposition of bone, muscle, or tendon.
- (d) Poor blood supply through injury of the nutrient artery—for example, in fracture of the neck of the femur.
- (e) Tumours—sarcoma in callus or pathological fracture through tumour.
- (f) Infection and excessive suppuration.

II. General causes—for example, acute infectious diseases, scurvy, syphilis, osteomalacia, gout, rickets, rheumatism, chronic nephritis, diabetes, alcoholism, anaemia resulting from prolonged lactation or long-continued fever.

Before commenting on these alleged causes I would suggest that there is really only one common cause of non-union—namely, absence of haemorrhage between and around the fractured surfaces—and that the great majority of the causes given above may be identified with it.