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THE EARLY DIAGNOSIS OF MALIGNANT  
GROWTHS.

By J. COLLINS WARREN, M.D.,  
OF BOSTON.



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THE great impulse which antiseptic treatment has given to operative surgery has brought with it renewed courage to the surgeon in the struggle with malignant disease. Many forms of cancer which have formerly been regarded as beyond the reach of surgical interference, are now being subjected to new methods of treatment, and the operations devised for their eradication are furnishing materials for statistics replete with interest. Although we are not sufficiently familiar with the nature of this formidable disease to authorize the hope that any royal road to that desirable goal—a cure for cancer—is likely to be discovered, there is reasonable ground for hope that the more radical operations of to-day will help to lift the treatment of this disease out of the slough of despondency in which it has been buried.

It is hardly necessary for me to urge upon such an audience as this the importance of an early recognition of the disease as an important aid to surgical treatment, and yet it seems to me that this branch of the subject has not received the attention that it should in the light of modern surgery. Few surgeons are free to admit that their powers of diagnosis are unequal to the task, but the number of cases of cancer which are kept under observation until the disease has reached that stage which places it beyond the reach of the knife would present a formidable list, and one far from flattering to our pride, could they be accumulated and counted.

If to the increased safety, which brings with it bolder methods

of operating, we could add increased accuracy of diagnosis, the percentage of cures ought to be advanced to a still higher point than it has already by the present improved methods. Until the future reveals to us that long-hoped-for panacea for cancer, it will be along these lines that surgeons will still seek to make progress.

It is with the hope of stimulating further research in this direction that my observations are submitted to the members of the Association.

The importance of an early recognition of malignant disease was first strongly impressed upon me by the following experience:

CASE I.—A lady, forty-five years of age, was brought to me by her physician to show an induration in the breast below the nipple, which had followed a blow received from a sharp object eight weeks before. The swelling immediately following the injury had diminished somewhat, but had not entirely disappeared. There was no retraction of the nipple, no dimpling of the skin, and no enlargement of the glands in the axilla. The patient's general health was good. The growth appeared to be of an inflammatory nature, and I accordingly advised her to report to me again in a few weeks. At her second visit, two months later, the breast was found to be entirely infiltrated with cancerous disease, which had also invaded the axilla. Operative interference seemed then to hold out little hope of success, an opinion which she received from other surgeons, and, in spite of a resort to the use of caustics, she died seven months later.

The class of cases which run such an acute course as this are not usually regarded as amenable to operative treatment, but who can say that a prompt removal of the small indurated mass, together with the organ which contained it, might not have saved a life?

It is precisely in this class of doubtful cases that the surgical specialist is frequently consulted by the general practitioner, and it would be more creditable to surgery could a definite reply always be given. The golden opportunity is but too often lost while waiting for the external signs which are the expression of an advanced stage of the disease.

The favorable results attending the removal of cancers by operative measures appear to be in direct proportion to our ability to include a sufficiently large area of the surrounding tissues. The area involved around slowly growing cancers is probably less than that infiltrated in the acute forms, and it is for this reason that greater success attends their removal. Could we attack the acute types in their earliest stages of development, it might be as easy a problem to encircle the diseased tissue with the knife as it is in a case of extirpation of cancer of the lip.

A knowledge of the anatomical relations of this infected zone to the primary seat of the disease is indeed a most important element of success in operative treatment.

The attempt to make a microscopical examination of morbid growths before their removal dates back to the earliest period of surgical histology. A sharp-pointed grooved director, armed with an ivory handle, which screwed on to a case of the same material, was frequently used by the last generation of surgeons for exploring various forms of swellings. The presence of fluid of any kind could thus be readily detected, and such fragments or juices as could be extracted from a solid tumor were placed upon the slide, teased with needles, and submitted to microscopic examination. More elaborate instruments were from time to time invented, but the imperfect development of the art of studying morbid growths microscopically made the method uncertain, and led to mistakes in diagnosis.

The pain attending the operation, and the danger of inflammation following it, were additional reasons for abandoning the method as unsatisfactory and unsurgical. In the meantime, the technique of histology has been so perfected that accurate observations can be made from comparatively minute fragments of tumors. The work of the freezing microtome or more elaborate section-cutter is beyond comparison with the needle-work or free-hand cutting of even a few years ago. Antiseptic surgery has reached that point that such a little operation as this can be performed almost with absolute certainty of absence of inflam-

mation. Local anæsthesia with ether spray or with cocaine can now make such an exploration devoid of pain.

Some simple form of instrument that could be easily kept aseptic, and which would remove a minute portion of the tumor "en bloc," so that the anatomical relations of the elements could be preserved, was needed, and at my suggestion Dr. S. J. Mixer adapted an instrument, devised by him for removing fragments of powder from the skin, for this purpose.

It consists in a fine canula, the size of which may vary from No. 6 to No. 16 Charrière's filière. The end of the canula is sharpened on its inner edge, which, when the instrument is gently rotated between the thumb and finger, acts like a trephine. The calibre of the instrument varies from two to five millimetres in diameter, a size which gives ample material for microscopic sections whether cut transversely or longitudinally. A small staff is kept within the canula to protect the cutting edge when not in use and to remove specimens from the canula.

The method of making an examination is exceedingly simple, and can readily be carried out at the physician's office.

The surface of the spot to be examined having been made aseptic and sprayed with ether or injected with a few drops of a five per cent. solution of cocaine, the skin is punctured with a tenotome and the canula is introduced through the small opening. When the canula brings up against the tumor the instrument should not be pressed forward, but rotated gently and persistently between the thumb and one finger until it finally begins to enter the diseased tissue. After the canula has penetrated the growth from half an inch to two inches, it should be gently withdrawn a distance of two to three millimetres and then rotated in a direction slightly oblique to that which it had first taken. Continuing the instrument in this direction for a short distance the edge will cut the mass which is already contained within the canula so that it can be readily removed. The instrument is now withdrawn, its end placed upon a glass slide, and the stilette being introduced, pushes out a worm-like mass of tissue, which may be as large as five millimetres in diameter and three centimetres in length, or even longer. This fragment of tissue

can be laid upon the freezing microtome and an immediate diagnosis be made, or it can be placed in weak alcohol, which gives place the following day to strong alcohol.

A specimen, obtained in this way, represents the different layers of the growth from its periphery to its centre: their anatomical relations have not been disturbed; in fact, the tissue, when it is cut with the microtome, has scarcely been touched during the process of removal, and is consequently in the best condition for microscopic study.

Supposing this little operation to have been performed in one's office, it will be necessary, in order to keep the parts aseptic, to apply a secure dressing. This can best be accomplished by applying a minute quantity of iodoform gauze over which purified cotton is placed and made adherent with collodion, or a fragment of cotton saturated with iodoform collodion, or even a piece of rubber adhesive plaster will be sufficient. The wound always heals by first intention and in no case have I observed any subsequent inflammation.

The best illustration of the advantages offered by this method of exploration is afforded in diseases of the breast.

A patient calls, frequently in company with her physician, and in great mental distress, as the question of cancer has been raised and left doubtful. An induration exists but no typical symptoms of cancer are present. The surgeon is appealed to for a definite opinion. To ask them to wait a few weeks is virtually to confess ignorance. A puncture with the canula may bring serum, the tumor disappearing, as has happened more than once to me; or, the fragment having been removed, a microscopical examination is sent to the physician in a few days and the question of diagnosis definitely settled.

A few examples may serve to show what can be accomplished by this method:

CASE II.—A patient forty-two years of age had a tumor of over a year's standing in the left hemisphere of the right breast. There was great neuralgic pain and mental anxiety. No glands in the axilla, no retraction of the nipple. The swelling was quite hard and had been growing lately. Puncture with a fine canula was followed by a

flow of serum, with some diminution in the size of tumor. A fragment of the solid tissue was removed and examined under the microscope and found to contain acini and gland ducts supported in a dense and hypertrophied fibrous interstitial tissue. The diagnosis chronic mastitis was made. The indurated masses were subsequently excised to relieve pain and the breast allowed to remain.

CASE III.—Miss C., fifty years of age, came to my office with a small lump on the axillary margin of left breast, of several years' standing. It did not appear to be connected with the breast. The existence of glands in the axilla was doubtful. A little cocaine was injected subcutaneously; a small puncture was made with the knife and the exploring canula was introduced without pain. The puncture was sealed with absorbent cotton and collodion, and the patient returned home having suffered in no way from the examination. A diagnosis of cancer was sent to her physician a few days later, and the breast and axillary contents were subsequently removed.

CASE IV.—W. W. K., thirty years of age, while throwing a stone into the water one day, injured his thigh and was carried home, where it was found that the bone was fractured. At the end of three months union had not taken place and the callus seemed to the attending physician unusually large. On being sent for in consultation, I expressed the opinion that the growth was malignant, and on my return home sent to his physician a canula. He readily obtained for me a specimen, which on examination proved to be sarcoma. The thigh was accordingly amputated two weeks later and the diagnosis confirmed.

CASE V.—A man about fifty years of age entered the hospital with a suspicious ulcer on the right side of his tongue. On questioning him it was found that there had been a sore there for a great many years, during which period it had healed once or twice for a short time. The present lesion had existed for six months. During the last three months he had been under observation and had been taking iodide of potash. There was no gluing down of the tongue to the floor of the mouth: when the tongue was shown the ulcer projected fairly over the incisors. It was suggested at a consultation, that the mixed treatment should be given for a few weeks. But as the edges were growing and the size of the ulcer was increasing and no glandular involvement had yet occurred, I decided to remove a portion for microscopic examination. A few drops of cocaine made it possible to introduce the canula through the base of the ulcer from end to end, so that a section of the

whole new formation could be made. This was done on the spot with the freezing microtome and the diagnosis of cancer determined.<sup>1</sup> Half the tongue was excised two days later and no glands were found enlarged.

CASE VI.—L. C., thirty-five years of age, entered the hospital with a swelling in the right iliac fossa, following a swelling of the right testicle which had since subsided. There was some pain in the affected part and the patient was transferred to the surgical wards, as it was thought possible that an abscess or necrosis of the bone was to be dealt with. The exploring canula was introduced and the diagnosis of sarcoma having been established, a cutting operation was avoided.

This little instrument has now been used in over one hundred cases by myself, Dr. Mixter and others, and with little or no discomfort to the patient, and satisfactory results. It has been even used in abdominal tumors; in one case in which the diagnosis was doubtful, the growth was found to be a fibroid and not as had been feared a sarcoma, and laparotomy was successfully performed by Dr. Homans. I have used it in one or two growths involving the abdominal parietes and peritoneum, but not in deep-seated organs.

In two cases of tumor of the kidney I employed successfully the following method: A large-sized aspirator needle having been introduced with due antiseptic precautions into the tumor, a certain amount of bloody fluid was drawn into the vacuum chamber. On withdrawing the needle it was separated from the tubing and the contents of the needle itself were pushed out by a fine stilette on to a cover-glass. In both cases a small amount of solid tissue was found which had caught in the interior of the needle. The liquids which had passed into the bottle were discarded. In the first case a diagnosis of carcinoma of the kidney was made and in the second sarcoma of the kidney, both of which diagnoses proved to be correct at the operations subsequently performed.

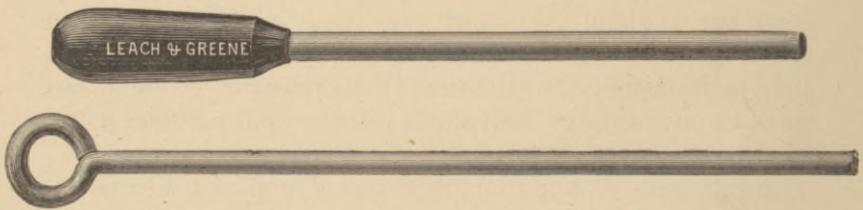
For the purpose of determining how large a fragment of tissue

<sup>1</sup> At the Massachusetts General Hospital a salaried histologist is present on operating days and specimens are examined before, during, or after an operation, and stained sections prepared for the purpose either of diagnosis or demonstration.

could be removed, I have had the size of the canula gradually increased until Charrière's No. 16 has been reached.

No ill effects are found in using this larger size, the wound made being apparently as trivial as a puncture with an aspirating needle. The sections made from the fragments removed are ample enough in their dimensions for the most complete microscopical demonstration. Morbid growths of the skin constitute a large class of the neoplasmata, particularly those seen in "office practice," and in many cases the diagnosis is obscure. The canula can be used without pain or discomfort in many of these cases. I have found it easy to demonstrate the epithelial nature of doubtful growths upon the face by this method, which can be so used as to cause no additional disfigurement in the lesion.

FIG. 1.

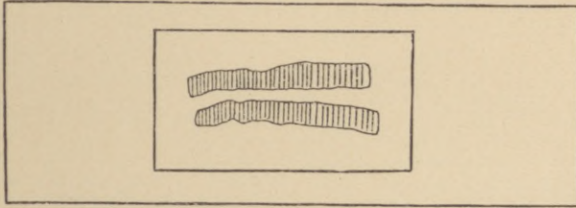


The advantages of the instrument, of which a drawing of the large size is given, are its simplicity, which enables one to keep it in an aseptic state of cleanliness, and the ease with which it is handled. It requires a little practice first to introduce it gently into the new growth by a rotary rather than a pushing motion, so as not to bruise or injure the anatomical structure of the plug removed; secondly, to withdraw the canula a short distance and then to advance it in a slightly different direction in order to cut off the plug which lies inside the canula. The latter is the most difficult part of the manœuvre to accomplish without causing pain to the patient.

Doubtless, further use will suggest improvements in the instrument, or a far better instrument. My object in bringing the result of my observations before the Association is to show that modern improvements have made an old and discarded

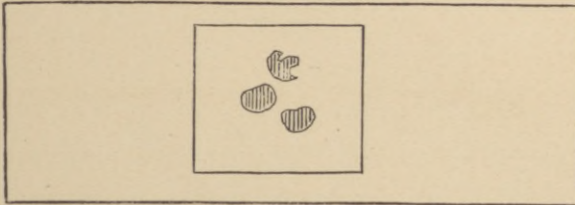
method not only practicable but a valuable addition to our means of surgical diagnosis in difficult cases.

FIG. 2.



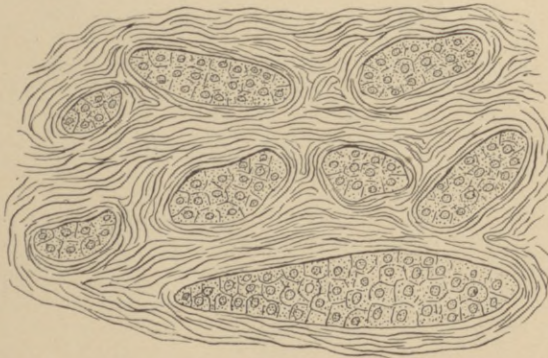
Exact size of sections taken longitudinally from a specimen removed by the canula and mounted on a slide.

FIG. 3.



A specimen. Cross-sections from such.

FIG. 4.



A drawing taken from a microscopic field in the section of Fig. 2 which was taken from a cancerous breast.





