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ABSTRACT OF A PAPER ON  
EXCISION OF THE BREAST  
FOR CANCER.

BY

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## EXCISION OF THE BREAST FOR CANCER\*

[REFERENCE was in the first instance made by Mr. Cheyne to work done on this subject, especially from the pathological side, by various writers, notably by Dr. L. Heidenhain† in Germany and Mr. Harold Stiles‡ in Edinburgh, the methods advocated being based in the main on Mr. Stiles' work. A few remarks having been made on the question of the constitutional or local origin of cancer, Mr. Cheyne went on to discuss the exact nature and mode of spread of a cancer of the breast as follows :]

The view which I think is generally held is that the carcinoma begins as an overgrowth of epithelium in the acini or ducts of the breast, and that it spreads partly by epithelial projections from these acini or ducts pushing their way into the surrounding tissues and partly by fresh infection of neighbouring ducts or acini; and further, that the same overgrowth of gland epithelium which produced the original disease is liable to occur in other parts of the breast, giving rise to multiple breast tumours, and that it is to this fresh overgrowth that local recurrences are most commonly due where portions of breast tissue are left behind. The latter part of this view is, I believe, incorrect. No doubt the earliest commencement of a cancer must be in connexion with the gland epithelium, but I believe that once the disease has commenced the epithelial overgrowth soon pushes its way through the wall of the duct or acinus and passes then into the lymph channels and vessels surrounding it, and that having arrived there the subsequent growth of the tumour occurs entirely by multiplication of the original epithelial cells and their derivatives along these lymph channels. The cancerous tumour is, in fact, a growth in lymphatic canals, and the alveolar spaces are in the main dilated lymph vessels and spaces. Hence the cancer cells are in direct communication with the lymph stream from a very early period of the tumour formation, and are constantly liable to be carried away with the fluid lymph; and may either stick further on, giving rise to secondary nodules in the breast or surrounding fat and fascia, or may be carried to the nearest lymphatic glands, causing infection and tumour formation there. The neighbouring acini around a tumour do not form fresh growth; but, as can be frequently seen in microscopical specimens, they are simply pushed aside, undergo atrophy, and disappear. It can also be readily

\* Read at the Nottingham Medico-Chirurgical Society on April 20th, 1892.

† Langenbeck's Archiv, vol. xxxix., 1889.

‡ Edinburgh Medical Journal, June and July, 1892.



seen in recurrences in connexion with remnants of breast tissue left behind, that although the glandular epithelium shows irritative changes, the cancerous growth has begun in the lymphatic vessels around; and Mr. Stiles has in a number of instances found plugs of cancer cells in lymphatic vessels in apparently healthy breast tissue far away from the primary tumour. Hence the main point to be considered in connexion with the spread of a cancerous growth in an organ is the disposition of the lymphatic vessels in that organ and the paths along which the lymph leaves it.

According to M. Sappey, the mamma is supplied with extremely numerous lymphatics. They commence in connexion with the acini in the form of a plexus around them; they then collect on the surface of the lobule, completely enveloping it in a close plexus, and the plexuses of neighbouring lobules communicate. From the lobules they run along the ducts, still in a plexiform arrangement around them, and so they pass from all parts of the breast towards the nipple. Under the areola the vessels, now of considerable size, form a plexus, called by M. Sappey the sub-areolar plexus, which is also joined by the vessels from the skin of the areola and its neighbourhood. From this sub-areolar plexus the lymph is carried towards the axillary lymphatic glands by larger vessels, of which he describes four, two from the centre and one from the upper and lower part of this sub-areolar plexus respectively. According to M. Sappey, the whole of the mammary lymph follows the above-mentioned course, but subsequent observers have stated that there is also a plentiful return from the under surface of the gland through the pectoral fascia, and this corresponds with the pathological facts, which leave no doubt on that matter. It follows, however, from Sappey's investigations that at whatever part of the breast a cancerous tumour is formed, though some of the infective material will be carried directly in the pectoral fascia and fat to the axilla, part may also pass through the gland itself towards the nipple. Even where the tumour is at the extreme axillary end of the breast—under which circumstances some surgeons advise removal of the tumour alone—although there may be direct flow towards the axilla, there is also a flow backwards through the mamma towards the nipple and infective material may thus very readily be left behind if the tumour alone is removed. Hence, I believe, that in the case of the breast it is absolutely necessary to remove the whole organ wherever the tumour be situated, because it is quite impossible to say what parts are free from the disease and what are not, and I see no reason for running any risk of recurrence by leaving portions of the breast behind. It is, however, easier to speak of complete removal of the breast than to do it, for it turns out that the breast is a much more diffuse and extensive organ than has been supposed. This has been demonstrated by Mr. Stiles by a

very simple method, which I must refer to as it is one of great practical value in determining during the course of an operation not only whether the whole breast but also whether the whole disease has been removed. Mr. Stiles found that when a cut surface on which masses of cells—e.g., epithelial masses—were present was first washed free from blood, then immersed for five minutes in a 5 per cent. solution of nitric acid and then washed under the tap for five minutes, the epithelium was readily differentiated from the other tissues by the naked eye, presenting the appearance of dull white spots or masses, while the fat becomes yellow and the fibrous tissues swell up and become semi-transparent. By treating the breast in this way after removal it is easy to determine whether lobules of the breast or nodules of cancer have been cut through. In practice, as soon as the breast is removed, it is handed over to an assistant, who puts it through the above process while the operator is going on with the dissection of the axilla. By the time the axilla has been thoroughly cleared out the breast is ready for inspection and can be carefully examined before closing the wound, and if any portion of breast tissue or of disease is detected the remaining part is at once sought for and freely removed. I have always used this plan since Mr. Stiles told me of it; and in one very advanced state I found by means of it that I had cut through a nodule of disease in the fat at the outer border of the axilla, which I would certainly have overlooked otherwise, and on searching I found the rest of the nodule and removed it. Mr. Stiles' nitric acid method is also applicable to tumours elsewhere; and in one case, where I was removing an epithelioma on the inner side of the cheek, and involving the lower jaw, I detected by means of it a narrow strand of disease running backwards beneath the ramus of the jaw, which I had not observed on dissecting away the growth. I consider this method a very valuable addition to our operative means, the only objection to it being, I think, the length of time that it takes. In the case of the breast it is necessary to cut off the breast from the axillary fat before clearing out the contents of the axilla in order to have it tested, whereas I find that I can get the axillary fat and glands away much more readily by leaving the breast attached, the weight of the mamma hanging over the side pulling down the axillary contents more easily than can be done by the hand. This is, however, a minor objection, and Mr. Stiles may perhaps be able to meet it.

To return now to the extent of the breast, it is found to reach laterally in all directions, especially upwards and towards the axilla, much farther than has been supposed, and it is impossible to remove it completely by the small elliptical incision figured in the older text-books. In order to take away the breast completely it is necessary that the incisions should extend beyond it at each end, and that a large amount of skin, I believe an amount

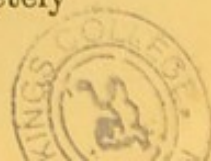
coextensive at any rate with the bulging portion of the breast should be removed. For another reason it is necessary that large portions of skin should be included between the incisions—viz., in order to ensure the removal of the subareolar lymphatic plexus and the vessels proceeding from it towards the axilla, and also to take away as far as possible the bands of fibrous tissue which pass from the breast to the skin, the suspensory ligaments of the mamma, which have been found very frequently to contain breast tissue as well as lymphatic vessels coming from the breast, and which are therefore a source of risk. Further, the skin over the tumour wherever situated should be widely removed, even although it is not actually involved in the disease, and that for the same reason—viz., that the bands of fascia running from the neighbourhood of the tumour to the skin are very likely indeed to be infected with the disease. Where the skin has itself become involved in the disease—to however small an extent—it must be very freely removed; I should say, some three or four inches clear on each side of the nodule, for the lymphatic plexuses in the skin are very numerous, especially at the deeper part where the vessels are largest. Hence, as regards the skin incisions, no absolute rule can be laid down; they must be planned so as to ensure complete removal of the breast and to get wide of the disease, and must usually be irregular in shape. As I said before, they should include practically all the prominent part of the breast and when the growth is above or below the centre of the breast further incisions must be made at right angles, so as to include it. As a rule, even where the removal of the skin has been very extensive, I have generally succeeded in bringing the edges together and thus getting union by first intention by undermining the skin widely and by using button stitches and relaxation sutures of silver wire. Where, however, the skin cannot be brought together at all, or where the patient is very spare and the traction is likely to lead to sloughing the wound can be readily closed by Professor Thiersch's method of skin-grafting, as described by me in *The Lancet* last summer, the grafts being either applied at the time or, if the patient is at all collapsed, after an interval of about ten days.

Although M. Sappey was of opinion that the whole of the mammary lymphatics ran forwards and joined the sub-areolar plexus, it seems clear from the researches of Langhans, Heidenhain, Stiles and others, and also from clinical experience, that many lymphatics must leave the breast on the under surface and run in the pectoral fascia, generally along with blood-vessels, towards the axillary glands; some, however, I believe, also go towards the anterior ends of the intercostal spaces, where they pass into the thorax and join the anterior mediastinal glands, communicating, also I think, with lymphatics about the sternum. Hence it is essential to remove the pectoral fascia thoroughly co-extensive with the mamma and right on to the sternum. Besides

the presence of lymphatics Heidenhain and Stiles have found that many lobules of the breast are intimately connected with the pectoral fascia, and would certainly be left behind if the breast is simply torn off as is usually done. Indeed, so intimately is the pectoral fascia connected on the one hand with the breast and on the other with the pectoral muscle, that Heidenhain states that it is necessary in all cases not merely to try to dissect the fascia off from the muscle, but also to remove a thin layer of the surface of the pectoral muscle. This is certainly necessary under the tumour and under the central mass of the breast; I doubt if it is so necessary under the peripheral parts of the breast. Heidenhain found that where the skin was freely removed the recurrences practically always took place in connexion with the pectoral fascia.

If the tumour has become adherent to the pectoral muscle the free removal of the affected part is of course indicated, but we must bear in mind that the majority of the lymphatics in muscle run parallel with the muscular fibres, and hence the mere cutting a circular piece out of the muscle will not suffice; the whole strip of affected muscle must be removed. Heidenhain points out that the muscular contractions tend to force on any infective material along the lymphatics, and he holds that once a muscle is attacked, even at one place only, the whole muscle should be looked on as diseased, and should therefore be removed. I doubt, however, whether with a small involvement of the pectoralis major it is necessary to remove the whole muscle. I should in such a case only remove a quantity of muscular tissue on each side, being careful, however, to take the whole length of the fibres as far as possible. The spread of cancer in muscle is a matter of great importance in cases of the malady affecting muscles elsewhere, especially in the case of the tongue, where, as we know, recurrence is extremely apt to occur, mainly, I think, because the whole of the muscles affected are not removed.

In the axillary space the main lymphatics run in the fat towards the glands, but some also, I think, run in the fascia over the serratus magnus, and some upwards between the pectoralis major and minor to enter the axillary space above the latter muscle. It is well, I believe, always to remove the fascia over the serratus as far back as the latissimus dorsi, where I have more than once found nodules of cancer, and also to remove the layer of fat and fascia which one finds between the pectoralis major and minor towards the outer part, where also I have found disease. Lastly, it is imperative in all cases to remove all fat and glands from the axilla whether there is any noticeable disease or not, for the glands are usually very early affected, and the mere absence of hardness does not necessarily imply absence of disease. Further, it is not sufficient simply to pull out the glands which are felt to be enlarged, the fat and glands must be removed completely





by careful dissection, and that for three reasons. In the first place, as I have mentioned, in the early stage the infected glands are not noticeable, and the removal only of enlarged glands does not necessarily mean removal of all the disease; in the second place, if only the glands are taken away, the lymphatic vessels are left in the fat and these are often found plugged with cancer cells some distance from the glands; and thirdly, it is advisable to remove all the fat, because Mr. Stiles has shown that fresh formation of lymphatic tissue frequently occurs around certain fat lobules under the irritation from the breast disease, and these new lymphatic glands may subsequently become the seat of disease. These fat lobules are, according to Mr. Stiles, lymphatic glands which have undergone fatty involution and again become lymphoid in consequence of changes in the mamma set up by the presence of the tumour.

To sum up: in all cases there should be free removal of the skin, especially over the tumour, very free indeed if the skin is actually the seat of disease; complete removal of the breast, bearing in mind its great extent; removal of the pectoral fascia co-extensive with the breast and right on the sternum, along with a thin layer of the muscle behind the tumour and the main part of the breast; removal of the fascia over the serratus magnus in the axillary region and of all glands and fat from the axilla, not by pulling out the glands but by clean dissection; further, if the tumour is adherent to the pectoral muscle, removal of large strips of that muscle. This may seem a very extensive operation where the tumour is small, but the object of the operation is not to remove the tumour but to rid the patient of her disease, and that can only be done by removing, as far as possible, all the probable seats of recurrence. The operation is fortunately one in which, if performed aseptically, the question of mortality does not come into play, and the results of this very free removal seem to me to promise well. Although I have been brought up to deal more freely with these cases than used to be the fashion, my impression is that there has been an improvement as regards recurrences since I began to act closely in accordance with these recent pathological researches. During the past two years I have operated in this free manner in over twenty cases, and, so far as I am aware—and I know about the majority of these cases—recurrence has only as yet taken place in three instances, in one case being intrathoracic, and in another—the second of the cases of skin grafting which I published in *The Lancet* of last year—in the form of a small nodule in the skin over the angle of the scapula, three inches and a quarter away from the edge of my former incision in the skin—a striking instance of the necessity of free removal of the skin once it has become involved in the disease.

