SANGUINEOUS DISCHARGE FROM THE NIPPLE AND ITS SIGNIFICANCE IN RELATION TO CANCER OF THE BREAST*

A Study Based on 108 Cases

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There are few clinical problems which present such wide divergence of opinion as the subject of the bleeding nipple. It is striking that a clinical problem of this nature is so far from possessing a common opinion. To many surgeons, a bleeding nipple immediately conveys the idea of cancer—with the necessity for radical mastectomy; while to others the condition means a benign tumor which is either locally excised or disregarded. Unfortunately the solution to the problem of the bleeding nipple is provided too commonly by a mastectomy—a procedure aimed to cover a lack of diagnostic ability on the part of the surgeon. We feel that in the majority of cases, it is possible to make a correct clinical interpretation of the physical signs presented and arrive at the exact pathological process or diagnosis. This is made more possible by the use of microscopical examinations of stained smears of nipple discharges and by transillumination. If one has successfully used these newer aids and correctly interpreted physical signs, then the problem of therapy becomes simple. After all, diagnosis is the *chief* issue.

The literature on the subject is replete with case reports of two to five such cases. The attempt to draw conclusions as to diagnosis and correct therapy is obviously forced from too few cases. On the other hand, there are some studies made on larger numbers of such cases by able observers, but since their opinions vary so markedly, it will require a number of studies dealing with large series to settle the question. Among our most experienced breast surgeons there is a definite contradiction of opinion. Cutler of our clinic in his recent paper on "Transillumination as an Aid in the Diagnosis of Breast Tumors" (Surgery, Gynecology and Obstetrics, June, 1929, pp. 721-729), briefly states the situation in saying that "many investigators favor the view that a hæmorrhagic discharge from the nipple of a nonlactating breast is evidence of a benign rather than of a malignant lesion and is almost a sign of intracanalicular papilloma (Bloodgood, Greenough and Simmons, Deaver and McFarland, Sistrunk). Miller and Lewis, on the other hand, found the same proportion of benign and malignant tumors, associated with this symptom, and Judd, in a review of 100 cases, reached a similar conclusion."

Our first reason for making this report is that the study is based on an unusually large series of cases presenting this syndrome. The second reason

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is that the weight of evidence herein presented will help to strengthen the contentions of those whose studies have shown that the benign and malignant tumors are about equally divided in frequency. The third reason is to emphasize the aid afforded by the microscopic study of the smear and the use of transillumination. The last two features are new and important in this field. No patient who has a sanguinous, serous or serosanguinous discharge from the nipple has had a complete preoperative study unless the smear examination and transillumination are included.

The 108 cases herein studied represent those which have come to the Breast Clinic of the Memorial Hospital * during the past ten years. They include only those with serous, serosanguinous or sanguinous discharge from the nipple. No patient who has had a recent trauma is included in this study.

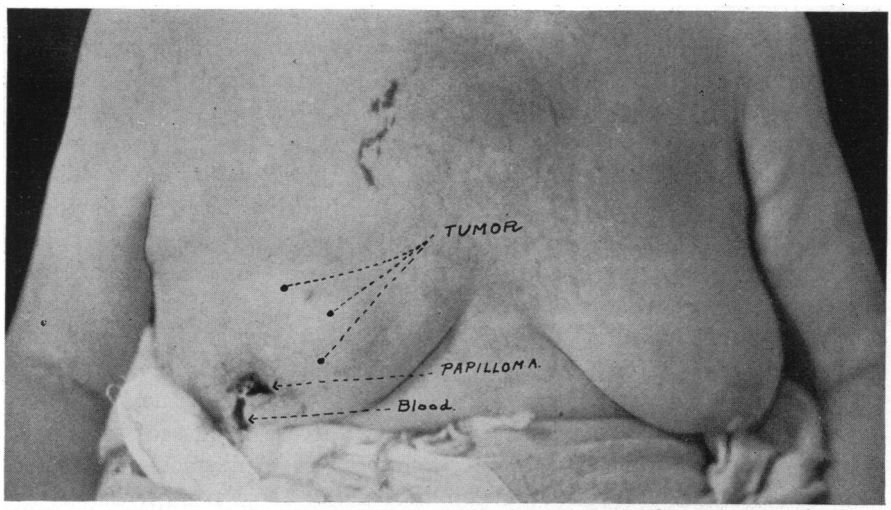

FIG. 1.—Shows the tumor situated above the nipple. A papilloma is presenting at the nipple surface from which blood flows continuously. Hæmoglobin 40 per cent. Diagnosis, papillocyst adenocarcinoma.

No patient who has had childbirth or miscarriage within the past two years is included. This excludes many cases of discharge from the nipple offering a problem for solution; but these cases are usually easily diagnosed by a study of the smear. There are no inclusions in this report of Paget's disease, eczema of the nipple, ulcerations or infections. No discharge originating on the nipple surface can be properly included. In fact we feel that it is not proper to include those cases with the brownish, greenish and yellowish discharges unless the smear of this material shows an abundance of red blood cells, as these cases are usually chronic mastitis. We have made a careful effort to exclude these cases. Miller and Lewis (Journal of American Medical Association, November 17, 1923, p. 1651) state: "A thin serous or bloodstained discharge is regarded as indicative of an intracanalicular papilloma; a frank bloody discharge, of carcinoma; and a mucoid or dark

* The author is indebted to Dr. Burton J. Lee, chief of the Breast Service, for the use of the material in this study.

chocolate colored discharge of chronic mastitis." In general we agree with these observers; but as the chocolate, green and yellow discharges are indicative of chronic mastitis, and as the cancer problem could be easily settled by the smear, we see no reason for giving consideration in this report to such a discharge, as it is not a true serous, serosanguinous or hæmorrhagic discharge. The clinician must be sure that he is dealing with a bonafide case of bleeding from the nipple. If there is any question, this can be settled by microscopic examination of the smear. Many patients present themselves to the physician stating that they have had a bloody discharge from the nipple. In general a patient will interpret any colored discharge from the nipple no matter if brownish, greenish or yellowish as a bloody discharge. In fact, it was found necessary to exclude from this report, nearly 200 cases of discharge from the nipple because they were not sanguinous, serosanguinous or bloody. In many instances the discharge in its gross appearance seemed to be serosanguinous, but on microscopic examination proved not to be; these smears contained pus cells, desquamated lining cells, cell detritus and crystals—such a smear being typical of the discharge found in chronic mastitis, but not found in cancer. By thus excluding those cases which do not have true serous, serosanguinous, or bloody discharge, the proportion of cancer cases of this report has been increased.

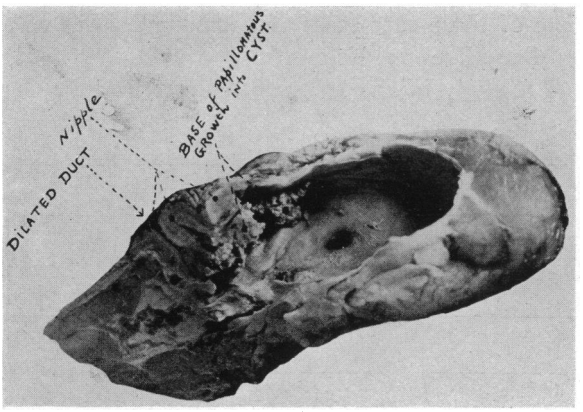

FIG. 2.—(Same case as Fig. 1.) Showing the dilated terminal duct through the nipple down which the papilloma descended. The smooth walled cyst was filled with serosanguinous fluid and with the shaggy papilloma. There is a connection of this cyst with a similar cyst containing similar elements.

The transillumination test is one which is of very great value in localizing the lesion responsible for the bleeding into the mammary system. This test had as a basis, a suggestion made by Ewing who for a number of years has used as a rough laboratory test for carcinoma, the comparison of light permeation through normal and carcinomatous tissue. Ewing's technic is to cut a thin slice of the suspected tissue approximately one millimetre thick. On holding this tissue to the light (daylight or artificial) the light rays will not readily penetrate the dense hard carcinomatous tissue so that the area of carcinoma appears much darker than the surrounding normal tissues. Five years ago Ewing suggested that we attempt to utilize clinically a light permeation test. We attempted this experiment on a series of cases. A small electric light surrounded by thick rubber tubing was employed, but the light developed so much heat that it was not a practical thing to use. We did not then

know of any "cold" light such as was later employed by Cutler. However, before abandoning the test, one fact was definitely established even with this crude hot light; namely, that a lesion containing blood or surrounded by blood appeared black on being transilluminated. Such a thorough study of the different breast lesions as was subsequently made by Cutler with his cold Cameron light, was not possible. To the suggestion of Ewing and the persistence of Cutler, great credit is due for the development of this new diagnostic aid. The test has been freely employed in this series of cases and found to be of great value. Transillumination is important in studying *every* lesion which produces bloody discharge, but especially in those cases where there is more than one lesion to be palpated; and where the physician is in a quandary as to which one of the lesions is producing the bleeding. This test will clearly distinguish which lesion is to be extirpated unless it is one of those rare cases of papillomatosis in which case one sees the opaque outline of several lesions.

A study of the 108 cases shows the following:

TABLE I

	Cases	Percentage
Malignant neoplasms	51	47.2
Benign neoplasms	57	52.8
	108	100.

TABLE II

	Cases	Percentage
Papillary cyst adenoma or papilloma in a duct	49	45.3
Carcinoma	48	44.4
Sarcoma	3	2.8
Chronic mastitis	8	7.4
	108	100.

Table I shows that this series of 108 cases had approximately half malignant and half benign cases. This supports the contentions of Miller and Lewis and Judd. It differs with the studies of Bloodgood, Deaver and McFarland, Greenough and Simmons and Sistrunk. Such a percentage of malignant tumors in cases of bleeding nipple makes the problem of extreme importance. A physician, seeing a bonafide case of bleeding nipple, immediately must realize from this study that there is almost an equal chance that it may be a malignant tumor. It then follows that radical surgery should be employed in 47.2 per cent. of cases. On the other hand, 52.8 per cent. of bleeding nipple cases are cured by the employment of the simplest type of local removal of the tumor without sacrifice of the breast.

Of the 108 patients studied, 90 or 83 per cent. were submitted to operation: eighteen cases were not.

Papillary Cyst Adenoma.—Of the forty-nine cases of papillary cyst adenoma or papilloma in a duct, forty cases were proven by operation and nine were not treated by surgery. Six of these nine cases had the characteristic tumor within or lying at the edge of the areola, which on pressure toward the nipple, expressed the bloody discharge at the nipple. If no tumor were palpable, the same pressure test, when applied to a particular point, caused this exudation of bloody discharge. This justified the inclusion of these nine cases under this heading, especially since they were young or middleaged women. The carcinomas occurred in women of higher age average than the papillary cyst adenomas and duct papilloma group.

The papillary cyst adenoma producing a serous, serosanguinous or sanguinous discharge at the nipple, is a definite clinical entity. Within the areola,

FIG. 3.—Gives the clinical appearance of a papillary cyst adenocarcinoma. There is marked retraction of the nipple. Shows the bulging of two cystic tumors which contain bloody fluid and a mass of papillomatous tissue.

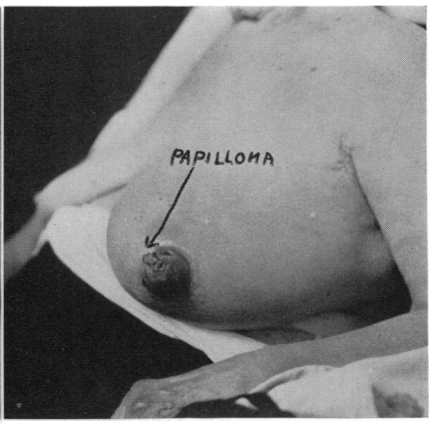

FIG. 4.—Showing fungation of the papillary cyst adenocarcinoma at the nipple. The papillary carcinoma has followed down the terminal duct to the nipple surface. There was continuous bleeding.

at the areolar edge, or behind the nipple, one finds a small tumor or localized thickening. If one presses on this tumor, a discharge at the nipple is produced which may at first be serous. The trauma of pressure may change the type of discharge to serosanguinous, then into bright red blood. The tint of the discharge depends on the amount of blood mixed with the serum in the small cyst; or how actively the blood is flowing from the open terminal capillaries of the fragile soft papilloma. The papilloma grows from the smooth wall of the ampulla into the lumen. It may continue to grow until it distends the ampulla forming a cyst. The papilloma frequently pushes along within the duct for some distance from its pedicle, and even at times appears through the orifice onto the nipple surface in which case there is continuous bleeding. The cyst with its contained papillomatous growth is called a papillary cyst adenoma. (See drawings of various types.)

The life history of this tumor is most interesting. Although it would

be impossible to prove the contention, my belief is, that the tumor remains localized for several years, at which time the papilloma commences to grow backward from its pedunculated attachment, penetrating the basement membrane. At the very point of beginning invasion of the surrounding tissues, a carcinoma is established and there is now a fully developed carcinoma called papillary cyst adenocarcinoma. (See Fig. 13.) This is the next stage beyond papillary cyst adenoma. In this series it took twelve and a half years on an average to develop from one lesion to the other if one uses as a basis of consideration the difference in age averages between the papillary cyst adenoma and the papillary cyst adenocarcinoma. It may be that there is a greater tendency for papillary adenomas to become cancers in the older women. The cancer cases give a longer history of bleeding than the papillary adenoma cases.

The above sequence in the life development of the tumor seems logical for the six following reasons:

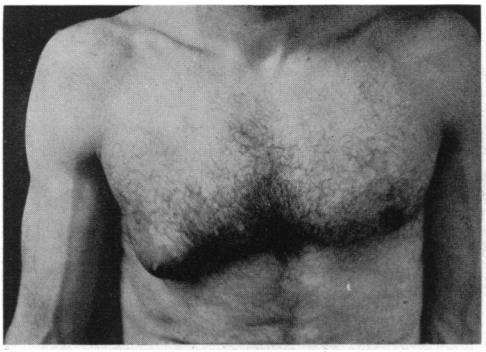

FIG. 5.—The only case of bleeding nipple from chronic mastitis in a male. Diagnosis was established by operation. There was serosanguinous discharge at the nipple.

1. Papillary cyst adenoma occurs in young women as well as those in middle age; but it occurs rarely in the old subjects. The average age for patients with papillary cyst adenoma is forty-two years.

2. Papillary cyst adenocarcinoma occurs in patients of middle age and the older range of years. The average age is fifty-four and one-half years, averaging twelve and one-half years older than the papillary cyst adenoma patients. There are six such cases in our series over seventy-five years of age while in the papillary adenoma group there are only six cases over fifty years of age.

3. Several sections show where this papillary adenoma is beginning to invade the basement membrane. (See Fig. 13.) Some have only begun to invade making it extremely difficult for the pathologist to classify as malignant or benign.

4. There are more papillary cyst adenomas than any other single lesion producing bloody discharge. If it be true that these lesions later go on to the carcinoma stage, one should expect there would be more papillary cyst adenocarcinomas than any other single type of carcinoma. This proves to be the case.

5. It seems logical that the benign papillary cyst adenoma should grow into the malignant papillary adenocarcinoma. Microscopic studies apparently support such a development.

6. Both lesions occur in the identical anatomical positions.

The Duct Papilloma is virtually the same type of lesion as the papillary

cyst adenoma. This lesion is composed of the three identical elements that compose the papillary cyst adenoma; namely, a papilloma attached to the duct wall, a dilated duct and blood free within the lumen. Case No. XLVIII (see Fig. 9) is a good example of the duct papilloma.

In the forty-nine cases of papillary cyst adenoma and duct papilloma, the discharge was serous, serosanguinous or bloody; and in but one instance was the blood stagnant and dark colored.

Diagnosis of papillary cyst adenoma and duct papilloma is based on four points:

1. The characteristic position of a tumor within or at edge of the areola.
2. The discharge is serous becoming serosanguinous or bloody by pressure or trauma over the tumor. This should be verified by a microscopic smear.
3. There is no nipple retraction, attachment to skin or other sign of cancer.
4. Transillumination test will show an opaque tumor *sharply* outlined.

Treatment. — Having accurately localized the papillary cyst adenoma or the thickening due to the presence of the duct papilloma, by both palpation and transillumination, the exact area is marked on the skin with an indelible pencil. The patient must be lying on the examining table as most tumors, especially the benign, shift some distance from the position occupied in the breast when the patient is erect. Subsequent embarrassment of the surgeon at his inability to locate the lesion will thus be avoided by carefully marking the skin.

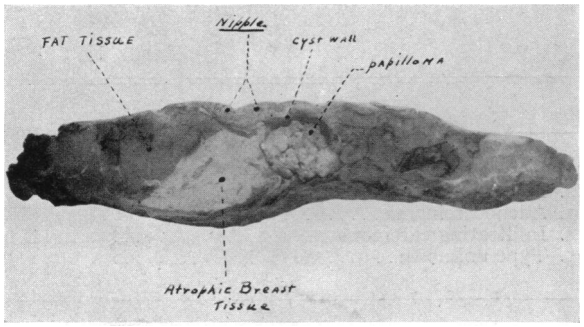

FIG. 6.—Shows the cyst almost completely filled with the papillomatous growth. Diagnosis papillary cyst adenoma. The breast tissue is much atrophied.

A radial incision under novocain anæsthesia is made, commencing near the nipple, going over the dome of the tumor to such a length as to be permitted to excise generously the tissue containing the offending lesion. It is particularly difficult at times to locate the lesion at operation.

Such a simple excision not only eradicates a source of annoyance to the patient, but it is performing important preventive cancer surgery. We believe many of these tumors eventually develop into cancer.

Since the establishment of a diagnosis is the first consideration, therapeutic irradiation has been infrequently employed because extirpation of the tumor immediately solved the problem of diagnosis. However, my belief is that radium employed interstitially would cure all cases of papillary cyst adenoma; and MANY of papillary adenocarcinoma if properly applied.

Sarcoma.—There were three sarcoma cases. In Case LXXXVIII the discharge was dark stagnant blood because the tumor lay at the periphery and the blood traversed a long distance before appearing at the nipple. In

Case IV the blood was thin and watery. The third case (Case VI) was in a male subject. In general, sarcomas disintegreate particularly in the centre of the tumor if there is much tumor bulk. This permits bleeding into the tumor. If located in the mammary system, the blood could easily find its way to the nipple surface.

Chronic Mastitis.—The eight cases of chronic mastitis showed no single papilloma into a cyst or duct, but in definite areas there was such hypertrophy of the lining cells that the proliferation was *comparable* to the papilloma. This could account for the serous and serosanguinous discharge. There was but one case of chronic mastitis which had a definite blood discharge. The blood exuded from one duct orifice and from two other orifices of the same nipple there was the typical discharge of chronic mastitis.

Ewing reported thirty-six of the forty-nine cases of carcinoma as having four pathologic types. In the fifth group of thirteen cases no slide was available for his examination.

TABLE III

	Cases	Percentage
1. Papillary adenocarcinoma	17	34.7
2. Duct carcinoma	12	24.5
3. Adenocarcinoma	5	10.
4. Infiltrating carcinoma	2	4.
5. Type unknown	13	26.5
	49	100.

The pathologic types of carcinoma are of great interest and clinical importance.

1. *Papillary Cyst Adenocarcinoma.*—The beginning of this lesion is described above under the heading of papillary cyst adenoma. We believe this carcinoma to be a later stage in the life history of papillary cyst adenoma. More cases in this report are of this type than any other. This was to be anticipated. Sixteen of the seventeen cases were operated on. This type is of comparatively low grade malignancy until late in the disease, when it takes on the characteristics of the more highly malignant types. Usually this type remains localized for several years before metastasizing to the axilla.

2. *Duct Carcinoma.*—This is the most interesting group of any type because our studies show that as a rule the dark stagnant bloody discharge belongs to this particular group and not to any other group of malignant or benign tumors. There is no previous mention in the literature on the subject pointing to the *type* of breast carcinoma which is responsible for this dark stagnant discharge. This sign is most helpful to the diagnostician. Nearly ten years ago we operated on a patient who had a very small lesion towards the periphery of the breast. The lesion was only 7 millimetres in diameter. There was dark bloody discharge at the nipple. On removal the

lesion proved to be a very early duct carcinoma (see Fig. 12). Soon afterward we encountered a similar case. We began to speculate on the type of carcinoma in such cases and found nearly all to have the same structure. There were twelve cases of duct carcinoma and with one exception (Case XXXIV) which was bloody but not dark blood, *all* duct carcinomas had this characteristic discharge. In more than one instance we have concluded that we were dealing with duct carcinoma because of the dark bloody discharge, and operation proved the assumption to be correct.

In *none* of the twelve cases of duct carcinoma was the tumor situated within the areola or at its edge.

From the above, one must *not* conclude that *every* case of duct carcinoma produces a dark bloody discharge. The majority of duct carcinomas produce no discharge at the nipple. But it is important to know that a case having dark bloody discharge at the nipple and having a tumor situated out in the breast substance away from the areola, will in most instances prove to be duct carcinoma.

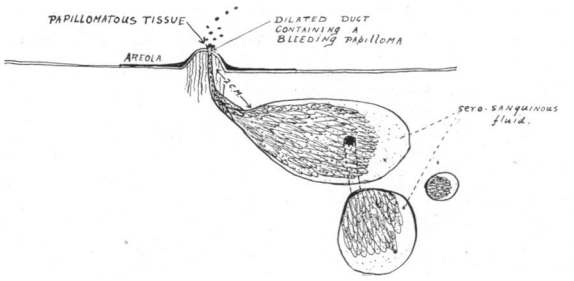

FIG. 7.—Same case as Figs. 1 and 2. Diagnosis papillary cyst adenocarcinoma. Drawing shows relative position of the growths as regards nipple and areola.

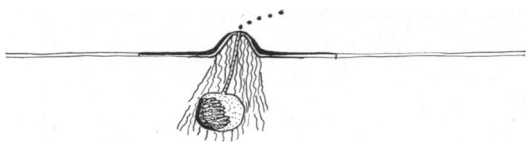

FIG. 8.—Shows a benign papillary cyst adenoma lying directly behind the nipple and having one widely dilated duct leading from the tumor to the nipple surface. Local excision; cured for seven years.

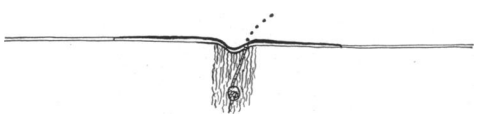

FIG. 9.—Lying behind the nipple which is inverted is a very small dilatation of a terminal duct. Into this projects a small papilloma. Diagnosis is papilloma of a duct or a very early papillary cyst adenoma.

3. *Adenocarcinoma.*—There were five cases of adenocarcinoma. These cases probably should be included under the heading of papillary adenocarcinoma because the pathologic processes and the developmental steps are so similar. Of the five cases, four were proven as having a sweat gland origin. They probably began as lesions of sweat glands which lay within the mammary organ, and having a definite connection with the mammary duct system. Ewing states that many sweat glands scattered through the breast have a direct connection with the mammary system and empty into it.

4. *Infiltrating Carcinoma.*—There were two such cases. We get no assistance from microscopic studies as to their histogenesis. The carcinoma had invaded the tissue so that the exact origin could not be determined.

5. *Type of Carcinoma Unknown.*—Of these thirteen cases, six were not subjected to operation. Seven were proven microscopically by other pathol-

ogists, but the slides were not available for us to study and determine the histogenesis. Of the six unoperated cases, the clinical signs and clinical course of the disease were such that there was no doubt of the diagnosis being cancer.

Treatment of these carcinoma cases is identical with that of any other case of carcinoma of the breast. To date, if the case is considered operable, the radical mastectomy is performed. When sufficient data is compiled on the irradiation therapy of operable breast cancer to compare with the results of operations, the probability is, that the radical mastectomy will be more carefully chosen than at present.

It is interesting that the papilloma descended the duct and appeared upon the nipple surface in six instances. These were in the cases of papillary cyst adenoma and papillary adenocarcinoma, particularly the latter.

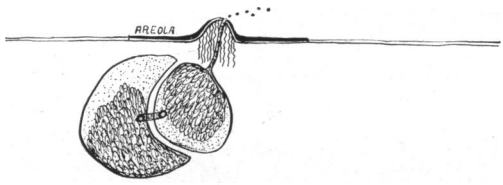

FIG. 10.—The papillary cyst adenocarcinoma. This type of tumor is more bulky than the papillary cyst adenoma. Lies behind the areola in its characteristic place.

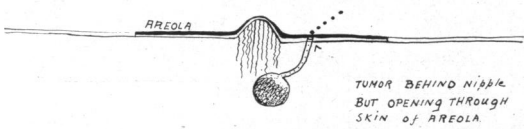

FIG. 11.—Showing an early papillary cyst adenocarcinoma. This is the only case of the series in which the bleeding did not take place through the nipple. There was a small orifice half-way between the nipple and areolar edge, through which blood exuded.

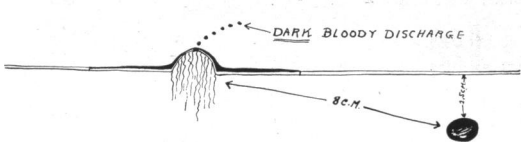

FIG. 12.—Showing the position of a beginning duct carcinoma. The tumor was 2.5 centimetres from the skin surface, situated 8 centimetres from the nipple. The discharge was dark stagnant blood at the nipple characteristic of duct carcinoma.

Certain of the cases serve to illustrate interesting phases and problems arising in this disease. For example:

Case I (see Fig. I) was a papillary cyst adenocarcinoma. Constant bleeding from the projecting papilloma caused a profound *secondary anæmia.* The hæmoglobin was 40 per cent. and the patient very dyspnœic.

Case LXXX brings up the question of what the procedure should be in cases where no tumor is palpable. We think that in such a case the removal of the breast as is frequently practiced, is an unjustified step. This type of case is treated with external irradiation by high voltage X-ray or radium packs. A watchful attitude is then assumed. The patient is observed at intervals. If a tumor develops, the patient is subjected to operation. In some instances the bleeding has ceased rather promptly by the external irradiation alone. In 50 per cent. of these cases so treated the bleeding has returned later, so that external irradiation handles the problem in only half of the cases.

In *Case LXXX*, blood was elicited by pressure upon the areola; but no specific area seemed to be the site responsible for the bleeding. Clinically it was impossible to determine at what site to operate if one desired to perform a local extirpation of the tumor. In this instance, a circular row or

gold seeds containing radium emanation was implanted half-way between the areolar edge and the nipple. The bleeding ceased immediately. This was in all probability a case of a very small papillary cyst adenoma or more probable a papilloma into a terminal duct. The radium placed interstitially destroyed either the lesion or the duct which emptied onto the surface. There has been no further growth of the lesion, and bleeding has never returned.

Case LXXVIII is of interest, as it brings up definite problems for speculation. At the age of thirty-five years, the patient was operated on by us for a bleeding nipple with the diagnosis of papillary cyst adenoma. This diagnosis was confirmed at operation. The lesion was removed. Bleeding ceased. The patient was kept under observation, being seen at intervals of three months. At the end of seven years she developed a carcinoma in this breast, infiltrating in type.

Was the carcinoma present at the time of the first operation? Did a carcinoma develop from another similar lesion which might have been present giving no symptoms? Did the carcinoma develop as an entirely different process than the benign tumor removed seven years previously? The case came under observation before the day of transillumination. This test might have detected a second lesion which did not announce itself by bleeding from the nipple.

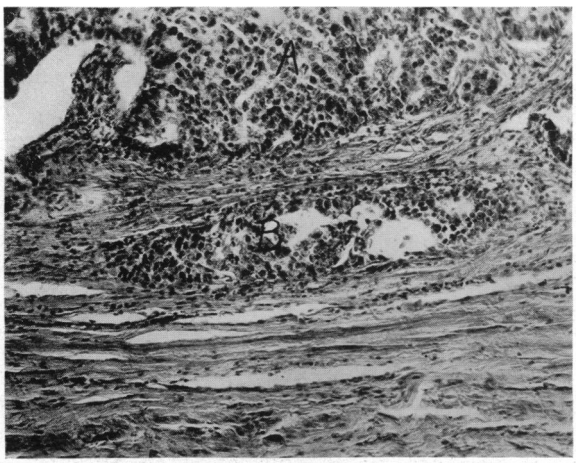

FIG. 13.—A. demonstrates the papillary carcinoma. B. shows a small area where the carcinoma is beginning to invade. Infiltrating adenocarcinoma.

In *Case XCVIII* the discharge was dark stagnant blood. On account of the nature of the discharge, we considered it to be a probable carcinoma even though no lesion was palpable. The value of transillumination was demonstrated in this case. By applying it, a small dark lesion was located out in the breast substance. The type of discharge together with a positive transillumination test justified an operation. The patient was operated on and a small lesion, the size of a split pea, was found. It proved to be a very early duct carcinoma.

Case XXIX also demonstrated the value of transillumination. Within the areola lay a small tumor, 7 millimetres in diameter. There was bleeding at the nipple. Pressure with the tip of the finger on the tumor produced increased nipple discharge. The diagnosis was papillary cyst adenoma. Under novocain the tumor was removed. It proved to be a butter cyst. The bleeding did not cease. Almost a year later transillumination of the breast was first successfully utilized. The test on being applied showed a

tiny dark area lying only 4 millimetres from the scar and almost a part of it. This was removed and the bleeding ceased immediately. The second lesion proved to be a papillary cyst adenoma which had been overlooked at the first operation This case, in a striking way, demonstrated the value of transillumination.

Case LXVII is one which brings out another phase of transillumination. In this instance the transillumination test was positive but bilateral. Transillumination of the *left* breast revealed two opaque areas beneath the areola situated at five and seven o'clock from the nipple. They were about the size of small almonds. Pressure upon these caused excretion of serosanguinous discharge at the nipple. In the *right* breast there were also two opaque areas beneath the areola situated at three and nine o'clock. These evidently did not empty their blood into the secretory ducts.

Diagnosis.—Bilateral intraductal papillomatosis. No tumor was palpable in either breast. Bleeding at the nipple ceased by operating on the two tumors of the *left* areola which gave evidence of increased discharge by the pressure sign. This is the type of case on which Cheatle, of London, would remove both breasts as a preventive measure. His procedure may be correct, but in our clinic we find this type of case much more rarely than he finds it. Time only will tell whether or not we should be more radical in our method of handling this particular type of case.

Of the eighty-nine cases operated on, 95 per cent. were cured of the bleeding. Only 5 per cent. failed to have the bleeding stopped by the operation. These failures in all probability would not have occurred had the five cases been transilluminated and the lesion definitely localized.

Etiology.—We considered the possibility of external bacterial infection passing up the nipple ducts as having some bearing on etiology. A bacteriological study was made in a number of cases. The nipples and areolæ were sterilized by an application of 3½ per cent. iodine. Pressure was applied over the areola and a bacterial study made of the secretion obtained. The secretions were sterile. Bacteria seem to play no rôle in the etiology of these tumors.

The history of trauma has not been a prominent factor.

SUMMARY

1. There is wide divergence of opinion as to the significance of a serous, serosanguninous or bloody discharge from the nipple.

2. This study based on 108 cases of bleeding nipple demonstrates cancer in 47.2 per cent.; and a benign condition in 52.8 per cent. The syndrome of a bloody discharge from the nipple is therefore of great clinical importance.

3. Microscopic study of the smear from the discharge is of decided value particularly in excluding many cases which *appear* to have bloody discharge; but which on a microscopic study prove not to be bloody. Two hundred such cases were excluded from this report.

4. Transillumination of the breast is of great help in making a differential

diagnosis and in *locating* the offending lesion. Bleeding tumors are opaque to transillumination.

5. The average age of patients with papillary cyst adenoma and papilloma of the duct is forty-two years; of papillary adenocarcinoma is fifty-four and one-half years.

6. There are more papillary adenomas in cysts than any other single lesion producing bleeding at the nipple.

7. Dark stagnant bloody discharge signifies duct carcinoma in most instances.

8. It is believed that the benign papillary cyst adenomas eventually develop into the papillary cyst adenocarcinomas.

9. *External* irradiation by two high voltage X-ray treatments or by one radium pack of 10,000 millicurie hours stopped the bleeding in 50 per cent. of the cases. However, bleeding ceased temporarily. It is admitted that radiation was not adequately pursued to draw ultimate conclusions concerning cure.

10. In six instances the papilloma descended the nipple duct, appeared at the nipple surface and produced continuous external bleeding. In one case the secondary anemia was profound, the hæmoglobin being 40 per cent.

11. Bacteriological studies of the discharge were negative, ruling out a bacterial origin of etiology.

12. Of the eighty-nine cases operated on, bleeding ceased in 95 per cent.

13. Fifty-two per cent. of bleeding nipple cases are cured by the simplest type of surgery. We consider this extirpation as important preventive cancer surgery.