

MAMMARY TUBERCULOSIS PRESENTING AS CARCINOMA

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A series of 5 cases of mammary tuberculosis is presented. These patients were admitted to the Surgical Unit at Groote Schuur Hospital between the years 1951 and 1955.

CASE REPORTS

Case 1

F.C., a married Coloured woman aged 44 years, complained of a swelling in the right breast and right axilla for 1 month. There was no pain in the breast and no increase in the size of the lump during this period. No discharge issued from the nipple. She was otherwise well with no symptoms referable to other systems.

On examination, the patient appeared to be well. The right breast was enlarged, with extensive *peau d'orange*. The skin was slightly red and warm, but no defined mass was felt. The right axillary glands were enlarged, firm and fixed. One enlarged mobile gland was palpable in the right supraclavicular fossa and one in the left axilla. The other systems were normal. X-ray of the chest appeared normal.

A diagnosis of inoperable carcinoma was made and the patient was given a course of X-ray therapy to the breast (4,000 r). Ten months later the breast was considered normal by the patient, but some thickening and fibrosis was felt on palpation. The right axillary glands had disappeared. The gland in the left axilla was much larger than previously, and was removed. X-ray of the chest was repeated, and appeared normal.

Pathological Report: 'The specimen consists of numerous lymph nodes, the largest 6x5 cm. The appearances are those of caseous tuberculosis. Histologically, this is confirmed as an active spreading caseous tuberculosis which has involved adipose tissue beyond the node capsule.' (Fig. 1).

The wound healed well. A short course of anti-tuberculous chemotherapy was given. Five years later the patient was well, with no recurrence. Apart from some thickening of tissues in the axilla and axillary tail, the right breast was normal.

Case 2

A.T., a married Coloured woman aged 50 years. Two months previously the patient complained of a cough productive of mucoid sputum, and pleuritic pain in the left chest. She was given an injection by her doctor and these symptoms rapidly disappeared. About 3 weeks later a swelling appeared in the region of the left axilla, which rapidly increased in size and broke down, discharging a creamy material.

On examination, the patient looked well. In the upper and outer quadrant of the left breast were 2 small scars, between which was a firm rounded mass attached to skin and underlying muscle. Numerous firm mobile glands were present in the left axilla. X-ray of the chest appeared normal. The diagnosis lay between tuberculous adenitis and carcinoma of the axillary tail. The mass in the breast was excised, and was found to consist of caseous material with much surrounding fibrosis. The remaining glands were then excised.

Pathological Report: 'The specimen consists of axillary tissue

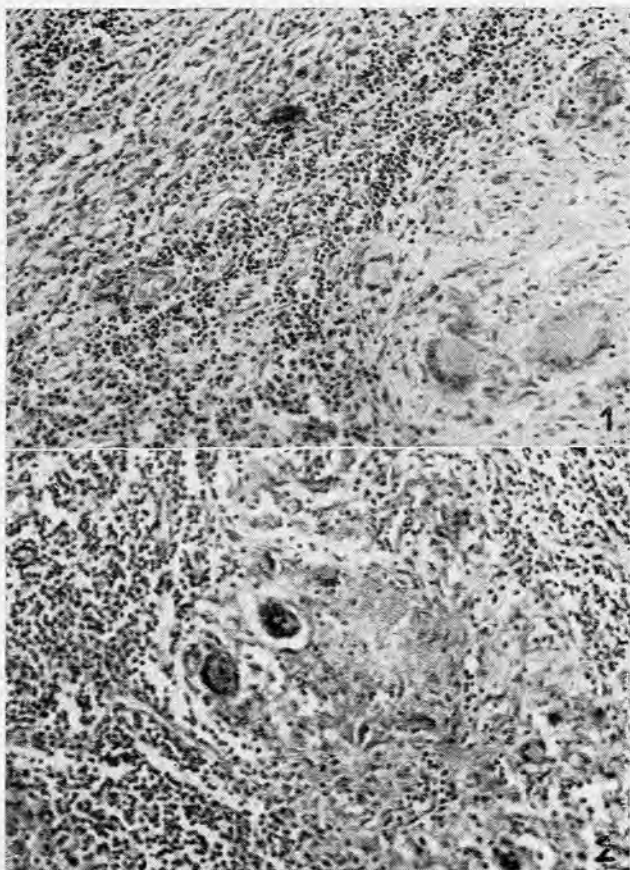


Fig. 1. Case 1. Typical tubercle follicle surrounded by tissue suggestive of fibrosed lymph gland.

Fig. 2. Case 2. Typical tubercle follicles in lymphoid tissue.

with overlying skin, weighing 220 g. There are many enlarged glands and fibrosis of the surrounding adipose tissue. The glands measure up to 2 cm. in diameter, and on section are white, containing small yellow foci. The histology is that of tuberculous lymphadenitis' (Fig. 2).

A short course of anti-tuberculous chemotherapy was given. The patient has not been traced since discharge from hospital.

Case 3

S.H., a married Coloured woman aged 50 years, complained of a painless swelling in the right breast for 1 month. During this period there was a noticeable increase in size.

On examination a hard, mobile mass was palpable in the right axillary tail and *peau d'orange* was present over more than half the breast. Firm, mobile axillary glands were present on the right side, extending almost to the apex. The other systems were normal. A diagnosis of inoperable carcinoma of the breast was made, and a full course of X-ray therapy was given (3,800 r to 4 fields). The mass in the breast and the glands became slightly smaller. A radical mastectomy was performed 2 weeks after completing treatment. Repeat X-ray of the chest appeared normal.

Pathological Report: 'The specimen consists of breast with underlying muscle and axillary fat. In the upper and outer quadrant 12.5 cm. from unfixed, non-retracted nipple, is a hard mass 3 cm. in diameter. On section the mass appears to be encapsulated, and section shows a partly translucent surface with opaque, pale yellow areas of caseation. In the axilla are 2 firm masses, 5.5 × 2.8 cm. and 4 × 1.8 cm. respectively, which on section have the same appearance. Histologically, the features are those of tuberculous adenitis. The inflammatory process is relatively inactive, although tubercle bacilli were demonstrated in material taken from the glands.' (Fig. 3).

A short course of anti-tuberculous chemotherapy was given. The wound healed well and there has been no recurrence 3½ years later.

Case 4

M.S., a married Coloured woman aged 67 years, was admitted with epistaxis and hypertension. A swelling in the right breast was discovered on routine examination. It had been present for 3 months, gradually increasing in size, and was painless. No discharge from the nipple had occurred.

On examination, a hard non-tender mass 1½ inches in diameter was felt in the axillary tail of the right breast. It was attached to the underlying muscle but not to the chest wall. Fixed, hard axillary glands were present, including the apical glands. There was no oedema. The patient was hypertensive with no signs of cardiac failure. The other systems and an X-ray of the chest were normal. A diagnosis of inoperable carcinoma was made and a full course of X-ray therapy was given (3,800 r to 4 fields). Four months later the breast lump was slightly smaller and tender on palpation; the axillary glands were unchanged. A local mastectomy was performed.

Pathological Report: 'The specimen consists of—

(1) A breast with axillary tissue but no underlying muscle. In the upper and outer quadrant of breast tissue is an elongated mass of caseous tissue of 7 cm. × 3 cm.;

(2) Two separate glands measuring 3 cm. × 4 cm. in diameter respectively, both of which show extensive caseation. Histology is that of necrotic material. The fibrous encapsulation and occasional epithelial and giant cells would suggest a tuberculous aetiology despite the fact that tubercle bacilli are not demonstrable.' (Fig. 4).

The wound healed well, a short course of anti-tuberculous chemotherapy was given; 1½ years later there was no recurrence, but chronic oedema of the right arm of moderate degree was present.

Case 5

C.J., a married Coloured woman aged 36 years, complained of a swelling in the right breast for 2 years, gradually increasing in size, and painless. She first noticed it just before the birth of her last child. There was some recent loss of weight.

On examination, a swelling was felt in the right breast in the region of the axillary tail, 1 × 2 inches in size. It was hard, non-tender and mobile. Small, firm, mobile glands were palpable in the apex of the right axilla and in the right supraclavicular fossa. The other systems were normal, as was an X-ray of the

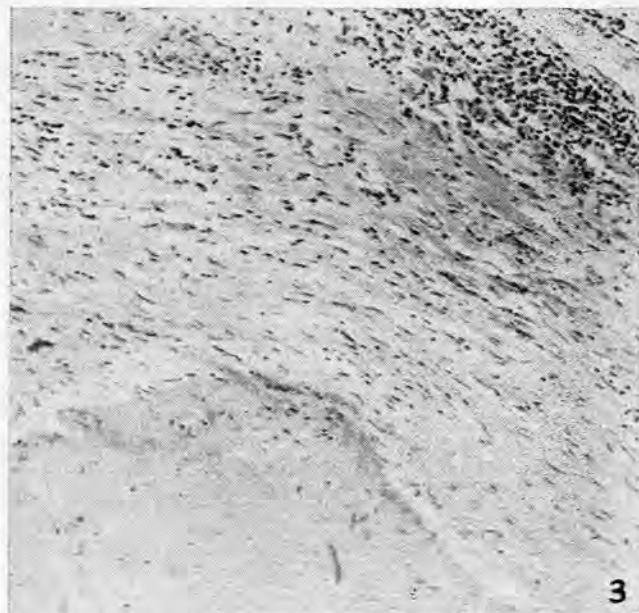


Fig. 3. Case 3. Caseous necrosis surrounded by dense fibrous tissue. Remnants of lymphoid tissue at periphery.

chest. A diagnosis of inoperable carcinoma was made and a full course of X-ray therapy given (3,800 r to 4 fields). The supraclavicular glands became smaller and the breast lump was recorded as $1 \times \frac{1}{2}$ inches in diameter. The breast lump was excised, and when caseation was found, the axillary glands were also excised.

Pathological Report: 'The specimen consists of two pieces of adipose tissue, together weighing 24 g. In section, both reveal a similar appearance of multiple glands in which 90% of the

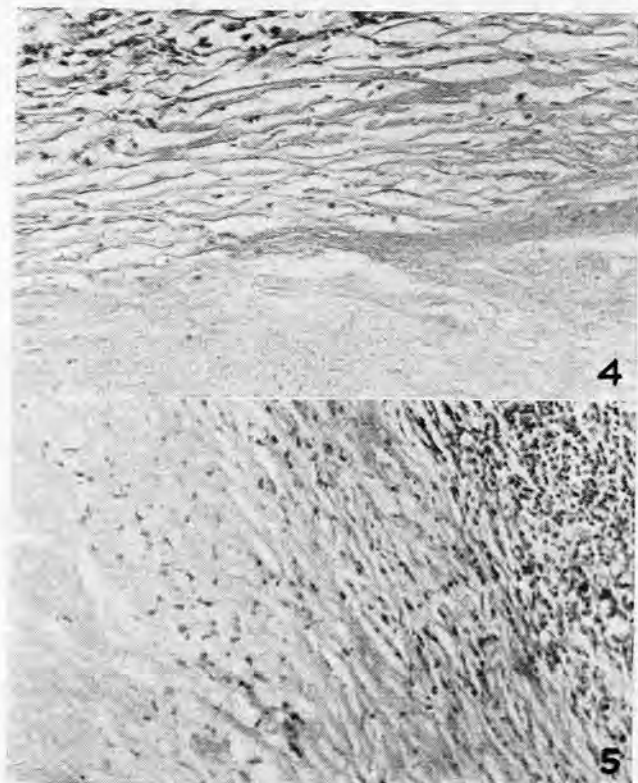


Fig. 4. Case 4. Caseous necrosis encapsulated by hyaline fibrous tissue. Remnants of lymphoid tissue at the periphery.

Fig. 5. Case 5. Encapsulated caseous necrosis in lymph node.

tissue shows coagulative necrosis. The histology is that of fibrocaseous tuberculosis. The necrotic tissue is surrounded by dense fibrous tissue, in which signs of active tuberculosis are slight. Acid-fast bacilli, though demonstrable, are scanty.' (Fig. 5).

The wound healed well, and 1½ years later the breast was normal, with no recurrence. A course of anti-tuberculous chemotherapy with INH and PAS was given for 7 months.

GENERAL DISCUSSION

Mammary tuberculosis was recognised in 1829 by Sir Astley Cooper as 'scrofulous swelling of the bosom'. Velpeau (1854) distinguished 3 forms of the disease, disseminated tuberculosis, lymphatic tumours, and lymphatic degeneration. Scott (1904) added a fourth variety which he called tuberculosclerosis, pointing out that the clinical features and macroscopic appearance was very difficult to differentiate from that of carcinoma. In 1903 Scott-Schley found that 65 cases had been recorded in the literature and in 1931 Morgan reviewed 439 cases.

Incidence. Mammary tuberculosis accounted for 1.5% of all patients with pathological conditions of the breast at St. Bartholomew's Hospital between 1890 and 1903 (Scott, 1904), and 1.7% of all such patients at the Memphis

General Hospital between 1922 and 1934 (McGehee and Schmeisser, 1935). There was 1 case for every 200 cases of mammary carcinoma at the Mayo Clinic from 1909 to 1934 (Harrington, 1936). At Groote Schuur Hospital, 1-2 cases of mammary tuberculosis are seen each year, where the number of patients admitted with breast conditions averaged 146 per annum during 1954 and 1955. It occurs predominantly in married women, and a significant number occur during pregnancy or lactation.

Age. The disease occurs most commonly in the 3rd, 4th and 5th decade, with occasional cases in older people (Morgan 1931). In the 27 cases described by Scott (1904), the average age was 36 and the range 18 to 66 years.

Sex. Predominantly in females. Of Morgan's 439 cases, 22 were males.

Pathology. The lesion is usually one of two main varieties:

1. The nodulo-caseous lesion, where caseation predominates and there is little fibrosis. Sinuses are prone to occur.
2. The fibrous type, where fibrosis predominates and there is little or no caseation.

Mode of Infection

The possibilities to be considered are: (1) Direct inoculation of the breast *via* the skin, with or without axillary gland enlargement (primary complex), (2) infection *via* the duct system, (3) Spread from the chest wall, (4) Haematogenous dissemination from a focus elsewhere, and (5) Lymphatic dissemination from a focus elsewhere.

The development of a primary complex involving breast and regional glands had not been reported in the literature, although tuberculous lesions have been reported in other parts of the body from a local primary inoculation. Inoculation *via* a wound in the breast leading to a local lesion only is no doubt possible, but infection through broken skin (as in a case quoted by Morgan (1931) of a woman with a breast lump which was massaged with ointment by a tuberculous husband with the subsequent discovery of both carcinoma and tuberculosis in the breast) is not convincing, and the ability of the tubercle bacillus to penetrate normal skin is doubted by Rich (1944). Duct lesions are equally rare; they have been periductal rather than intraductal, indicating that the pathogenesis of the lesion is less likely to be concerned with spread through the duct than from some other source, possibly the subareolar lymphatics.

If haematogenous dissemination were common, one would expect to find lesions of the breast in patients with miliary tuberculosis, but this does not occur. Nagashima (1925) investigated 34 patients dying from miliary tuberculosis and found no lesions on serial section of the breast; guinea-pig inoculation of breast tissue was negative. Raw (1924), with experience of 10,000 sanatorium cases, found 7 cases of mammary tuberculosis, of which 5 were due to spread from tuberculous glands in the neck, 4 extending to the axillary glands and by direct spread to the breast, and *via* the supraclavicular glands to the chest wall; 1 was due to direct spread from a tuberculous arthritis of the shoulder, and 1 was of doubtful tuberculous aetiology; none of these patients had pulmonary tuberculosis. Rich (1944), in discussing the apparent resistance of certain tissues to tuberculous infection, mentions heart, skeletal muscle, testis, ovary, pancreas, thyroid and parathyroid; the breast

may well be in the same category. The reasons for this selective resistance are not known.

Spread from the chest wall, i.e. from lesions in the ribs, costal cartilages, sternum or spine, is responsible for some cases. The vast majority of cases reported in the literature are clearly of lymphatic origin. The most important link between the breast and the thorax is the internal mammary chain of lymph nodes.

Route of Lymphatic Spread

The internal mammary chain of glands appears to be the principal group through which infection in the thorax can pass to the breast by retrograde lymphatic spread. Through the deep lymphatic plexus of the breast it connects with the pectoral glands, and also by a circuitous route through the cervical glands. There are connections with the internal mammary glands of the opposite side and, through these, with the opposite axilla. In addition, infected glands in the chain may break down and cause infection of the breast by direct extension through the soft tissues of the chest wall, or by infection of the overlying costochondral cartilages and thence to the breast.

The lungs are drained into the broncho-pulmonary glands, from which lymphatics pass through the superior and inferior tracheo-bronchial glands to the paratracheal glands. Afferents of these glands are joined by afferents from the internal

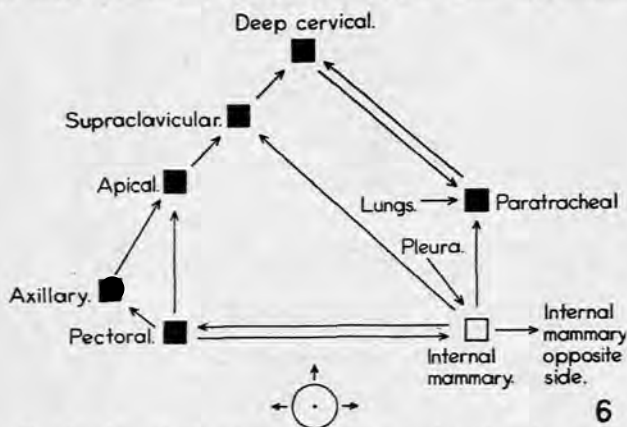


Fig. 6. Lymphatic connections between breast and mediastinum.

mammary glands to form the broncho-pulmonary mediastinal trunk. The greater part of the parietal pleura drains into the internal mammary chain. Infection may also pass from the cervical glands, when they are part of a primary complex, to the axillary glands, but this appears to be relatively uncommon (Fig. 6).

According to Burke (1954), the presence of tuberculous pleurisy, overt or occult, in mammary infection, may be of importance. He showed that radio-opaque material and dye injected into the pleural space of the guinea-pig is regularly conveyed to the internal mammary lymph nodes and to the retroperitoneal lymph nodes situated close to the descending aorta at the level of the lower thoracic and upper lumbar vertebrae. Intrapleural injection of tubercle bacilli had a similar effect; even when the dose was small and there was no macroscopic pleurisy these lymph nodes were enlarged, but only 2 of 23 guinea pigs showed enlarged tracheobronchial nodes. The results of autopsy examination of patients

who died of pulmonary tuberculosis were comparable. A survey of 14 patients with cold abscess of the chest wall (parasternal), showed that all but 3 had an antecedent or co-existing tuberculous pleurisy. Burke noted that the bone overlying the nodes frequently showed degenerative change which would render it liable to infection.

In Morgan's series (1931) the swelling most commonly occurred in the upper and outer quadrant of the breast, and was insidious in onset and painless. The duration was commonly less than 6 months. The longest duration was 14 years, while in another case it was 8 years. In the lactating breast the course was more acute, the involved areas becoming red and tense and the patient complaining of pain. Of the 439 cases in the series, 15 also had carcinoma of the breast—a most important point, because it may be overlooked. He considered that the majority of his cases were of lymphatic origin. The majority had no signs of active tuberculosis elsewhere.

Raven (1949) reported a case in which the patient had a cold abscess presenting through the breast. The track was found to dip down into the mediastinum through an intercostal space close to the sternum. Forrest and Parkes (1955) reported a case in a woman aged 77, in whom the lesion presented in the upper and outer quadrant of the breast and was diagnosed as a carcinoma; it was tuberculosis of the pectoral lymph glands. The case came to autopsy (death of cardiac origin) and the tracheobronchial lymph nodes were found to be enlarged and caseating. The internal mammary nodes were not examined. The lungs showed old calcified or ossified foci. No other active tuberculous lesion was found.

The Lymphatic Lesion in the Adult and Elderly. Reinfection may, though rarely, occur in elderly people. A woman aged 69, who had nursed her tuberculous daughter, developed a tuberculous ulcer on the dorsum of the hand, followed by extensive fresh caseation of the axillary lymph glands (Pagel 1948). Late extension of a tuberculous process from a primary focus in the lungs is less frequent than from foci in the glands.

Endogenous Lymphoglandular Recrudescence

Acid-fast bacilli may remain viable in 'old' lymph nodes for many years, even when calcification is present (as shown by guinea-pig inoculation). Favourable circumstances such as diabetes, starvation, fatigue etc., may cause them to multiply. Such a process may be found at puberty, in early adolescence, and after the age of 45, unaccompanied by any progressive pulmonary lesion. It may eventually lead to progressive broncho-pulmonary tuberculosis, especially at puberty, or lymphatic spread to other glands may occur, or the focus may rupture into mediastinal structures, e.g. oesophagus, blood vessels or tracheobronchial tract. Ulceration of the stomach wall and melaena has been recorded (Pagel 1948). Drainage of the thoracic lymph trunks into the venous system may also lead to haematogenous dissemination, producing distant foci which may heal, or develop producing 'organ tuberculosis'. (Similarly, recrudescence may occur in a pulmonary primary focus.)

Endogenous lymphoglandular recrudescence in the mediastinal glands probably accounts for most cases of mammary tuberculosis, including those of this series with the possible exception of case 2, which have been due to recrudescence in a small sub-pleural lesion. The internal mammary group

of glands probably forms the link in the chain between the thorax and the breast, producing the breast lesion either by retrograde lymphatic spread to the pectoral glands or by direct spread through the chest wall. While it cannot be proved that haematogenous dissemination to the breast is rare, it seems likely that this is so, and certainly the well-documented cases in the literature suggest or show a connection with a caseating lymph gland.

DISCUSSION OF THE CASES

These 5 patients presented in a remarkably similar way with a swelling in the upper and outer quadrant of the breast. There was little or no pain. The duration varied from 1 month to 2 years, and the increase in size from a fairly rapid increase to little change. The final diagnosis in each case was tuberculous adenitis, involving the pectoral group of axillary lymph glands. The age incidence is a little higher than in most series. The occurrence in married women with children is usual. Pregnancy or lactation is not an uncommon association.

In case 2 the diagnosis of tuberculosis was suspected from the history of break-down of the lesion with sinus formation, but the residual mass could not be distinguished with certainty from a carcinoma; a tuberculous lesion does not rule out the possibility of a carcinoma in the same breast.

In the remaining 4 cases a confident diagnosis of carcinoma was made. This presents a problem; for the extensive glandular involvement and/or lymphoedema was a contra-indication to surgery in 4 cases, and the correct diagnosis was not made until after a full course of X-ray therapy had been given and palliative surgery undertaken. In case 5 the mass was examined before proceeding with mastectomy, because the similarity to case 4 was recognized, and local excision was then performed. The extensive X-ray therapy had no adverse effect in any case, and in case 1 it was followed by a remarkable remission. Admittedly, this case was not proved to have a tuberculous lesion of the right breast, but the subsequent behaviour of the left axillary gland, which was tuberculous, makes a presumptive diagnosis reasonable, and 5 years later the patient is well, with no sign of recurrence.

The differential diagnosis in patients presenting with sinus formation includes chronic pyogenic infection, actinomycosis, and possibly gumma, although this is now rare. Examination of the pus or a biopsy from the wall of the abscess may be required to establish the diagnosis. When the patient presents with a 'tumour', the differentiation from carcinoma is very difficult unless some sign such as redness or increased warmth of the skin or fluctuation is present to suggest inflammation. This may be present in the nodulo-caseous lesion, especially in lactating women, but is absent in the fibrous lesion. In the latter, the differential diagnosis includes traumatic fat necrosis, plasma-cell mastitis, carcinoma, and possibly the rare lesion sarcoidosis. It may even remain in doubt after histological examination. All the cases in this series are clearly of lymphatic origin, the pectoral group of glands being predominantly involved. None of the patients showed signs of active tuberculosis, but the history of a previous pulmonary episode with pleuritic pain in one patient may be significant (Burke 1954). The patho-

genesis suggested is that of endogenous lymphoglandular recrudescence with retrograde lymphatic spread.

The racial incidence, all the patients being Cape Coloured, probably reflects the socio-economic circumstances of this group. The course run by tuberculosis is similar to that found in the European, and the incidence and course of carcinoma of the breast is also similar to that in the European. Had these patients been Africans, the diagnosis of tuberculosis would always have been seriously considered, because the African adult frequently reacts to tuberculosis as an unsensitized person, developing widespread glandular involvement, and comparatively seldom suffers from carcinoma of the breast.

After operation all the patients were given a short course of anti-tuberculous chemotherapy. The wounds healed by first intention and there was no recurrence.

Since surgery is usually required to establish the diagnosis, there have been few reports of treatment by chemotherapy alone. A case reported by McKeown and Wilkinson (1952) of a cold abscess in the breast, in which the only operation was a biopsy through healthy tissue, healed completely in 3 months after treatment for 6 weeks with PAS and streptomycin.

The problem of diagnosis, particularly in the patient with the fibrous type of lesion, remains unsolved. When the 'carcinoma' is considered operable there is no difficulty. An excision biopsy and examination of the mass is essential, and mastectomy can be avoided. Consideration of the diagnosis of tuberculosis is warranted by a lesion in the axillary tail of the breast with extensive lymph-gland involvement which appears from the history to have developed concurrently with the lump in the breast, and lymphoedema of the breast is also a common finding. Although a biopsy in inoperable carcinoma is usually considered undesirable, it is preferable to the alternative of a large dose of X-ray therapy, which may be associated with considerable morbidity; although radiotherapy has not proved harmful so far as the tuberculous lesion is concerned, and may even produce some degree of regression. Should the lesion prove to be a carcinoma, X-ray therapy may then be given immediately, followed by palliative surgery if necessary. The macroscopic appearance of the lesion in each of the cases reported was clearly that of tuberculosis.

Biopsy and conservative treatment may be sufficient, as in McKeown and Wilkinson's case, but excision followed by a short period of antibiotic cover is preferable, provided the lesion can be completely excised without undue hazard to major vessels and without deformity.

The appearance of calcification in the breast lesion or the axillary glands would be most helpful. It was absent in the cases reported, which is not surprising in an active and probably fairly recent lesion.

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