CURRENT OPERATIVE SURGERY

General Surgery

Edited by
A. Cuschieri,

and
T. P. J. Hennessy,

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Preface

In producing this volume, the editors had to select a number of procedures which have emerged within general surgical practice over the past 10 to 15 years. The selection was not an easy one and was influenced to some extent by the editors' clinical interests, but incorporated those procedures which are topical and which constitute a significant change from the orthodox scene.

Some of the operations included are, as of right, newer forms of surgical treatment which are as yet not in general use but remain under study in a number of centres and still require long-term evaluation within prospective clinical trials. The history of general surgery is characterized by operations which appeared *ab initio* as logical and useful but subsequently were observed to be attended by long-term consequences which precluded their continued usage. Rather cryptically, Heneage Ogilvie remarked that 'a gastric operation is always good ... until it is found out'. On average it takes 10 to 20 years (at times a whole generation of surgeons) to confirm the benefit of or alternatively to discredit an operation.

Other procedures in current usage indicate a different approach to orthodox surgical practice, consequent on the realization that traditional therapy is either too ablative or attended by a substantial morbidity. Often these alternative approaches concern more conservative surgery such as splenic preservation for trauma, and lumpectomy with postoperative radiotherapy for the primary local control of breast cancer.

The third category of the newer surgical procedures constitutes a resurgence of well-established but previously unpopular operations. Often the change follows the emergence of new technology which allows a more effective and safer use of these procedures, as in sclerotherapy and gun transection for oesophageal varices.

In this volume we have chosen examples of the above categories of 'newer operations' and trust that we have achieved the right balance and breadth of interest. The entire artwork for this volume has been ably undertaken by Mr M. J. Courtney. Aside from a uniform style throughout, the volume has been enriched by excellent line drawings of the various operative procedures.

We are greatly indebted to our fellow authors for their cooperation and for the excellence of their contributions. In this respect our editorial work has been an easy task. We would like to express our appreciation for the advice and help obtained from our publishers during the preparation of this volume. In particular, we are grateful to Dr G. Smaldon who was receptive to the idea for the *Current Operative Surgery* series, and kept us on course and strove valiantly to keep us on schedule. Finally, we would like to thank our secretaries, Mrs Joyce MacKenzie and Mrs Bernadette Kelly, for their assistance and excellent typing.

A. Cuschieri
T. P. J. Hennessy

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F.C. Campbell
A. Cuschieri

CONSERVATIVE SURGERY OF THE BREAST

Prior to the advent of effective diagnostic techniques, the surgery of all breast disease was dominated by the fear of cancer. Benign disorders could only be reliably distinguished from cancer by histology after excision and the natural inclination for all diagnostic biopsies, duct removals, etc. was to carry out wide local excision, together with a large surrounding margin of healthy breast tissue. Failure to do so risked transection of a cancerous lump and spillage of cancer cells, which in theory had drastic consequences. Little consideration was given to any breast deformity. This approach persists in the present day to some extent, despite the widespread availability of good preoperative diagnostic facilities, such as mammography, aspiration cytology and needle biopsy.

For established breast cancer, the surgeon's primary consideration was the achievement of 'adequate tumour clearance' which required excision of the whole breast with tumour, all draining lymphatic channels, any structures which they crossed and all accessible nodes. To this end, breast cancer was treated by radical mastectomy,[1] extended radical mastectomy[2,3] and eventually super radical mastectomy[4,5] The breast itself was considered an inessential organ and cosmetic results seemed unimportant. However, numerous well-conducted clinical trials have conclusively shown that radical breast excision and wide lymph node dissection, however extreme, failed to improve the survival of women with breast cancer.[6–12] Recent evidence suggests that the biological aggressiveness of the cancer which can be assessed after surgery, is a much more important determinant of prognosis than physical factors, such as the choice of operation or spillage of cancer cells.[13]

Another development which has changed our approach to breast surgery is the recognition of the psychiatric morbidity associated with the loss of a breast.[14] Approximately half of all women undergoing mastectomy react adversely to this procedure and are dissatisfied with their resulting scars. Profound social withdrawal occurs in 10–15%[15] but fortunately, many of those persistently distressed can respond well to breast reconstruction. Most surgeons, therefore, have become concerned to minimize breast deformity, and in the case of cancers, have begun a search for acceptable methods of breast conservation which would allow optimum local cancer control.

The modern surgical treatment of women with operable breast cancer entails a preliminary explanation by the surgeon to the patient of the available surgical options, with their advantages and disadvantages. With some guidance, the intelligent patient makes the final decision herself. In general, breast conservation is requested by the younger premenopausal patients although exceptions are encountered and breast awareness seems to be an important factor at all age groups.

This chapter includes a description of the modern approach to the common clinical problems of women with breast disease and thereafter deals with conservative surgery for breast cancer, namely subcutaneous mastectomy and reconstructive surgery after mastectomy.

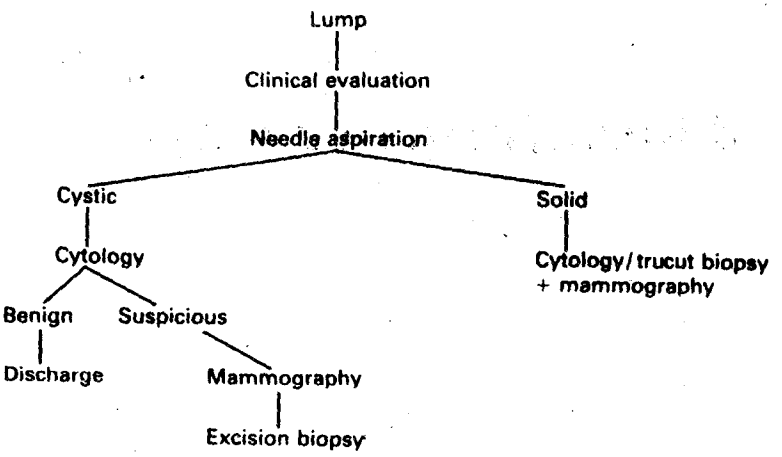

Figure 1.1 *Management of a breast lump.*

Assessment of patients

The pathological classification of breast disease is complex. The clinical spectrum is narrow however, and the patient commonly presents to the surgeon with one of the following:

1. Breast lump
2. Breast lumpiness
3. Nipple discharge
4. Nipple excoriation
5. Breast pain

The approach to any of these problems is dominated by 2 questions:

Does the patient have breast cancer?
Does the patient have a benign condition for which there is an effective treatment?

These questions can be answered in the majority of women before recourse to surgery by clinical evaluation, mammography, aspiration cytology or trucut biopsy. Each problem is managed in a slightly different manner:

1. **Lump** (Figure 1.1). Needle aspiration is indicated for all breast lumps to determine whether they are solid or cystic. Aside from confirming the diagnosis, aspiration of a cyst is therapeutic and obviates the need for excision in the first instance. Aspiration of a cyst should always be followed by repalpation of the area. Excision biopsy is advisable in the presence of a residual lump after aspiration or when the cyst fluid is blood-stained or mucoid or its cytology is suspicious. In practice malignant cystic lesions are very rare.

All solid lumps should have aspiration cytology or trucut needle biopsy. The former is less painful for the patient and it is possible to carry it out for *all* breast lumps, whereas trucut biopsy is rarely successful with fibroadenomas since the large needle cannot penetrate their tough rubbery substance. Mammography is indicated for all solid lumps to help ascertain the nature of the lesion and for complete examination of the opposite breast. A confident diagnosis can be made preoperatively in the majority of patients.

2. **Lumpiness** (Figure 1.2). The clinical recognition of a discrete lump in a breast which is nodular is often difficult. Nonetheless a carcinoma may arise just as frequently in a lumpy breast as in one with a smooth consistency. A careful examination is extremely important in this very common condition, and in the absence of suspicious features such as localized nodularity or oedema, a young woman aged under 35 years may be reassured and discharged. Mammography has a poor yield in young women but it is recommended for women over 35 years and for all patients with suspicious clinical features. A marker biopsy is indicated in the presence of suspicious mammographic abnormalities (subclinical lumps, areas of disordered architecture, vascularity or microcalcification).

3. **Nipple discharge** (Figure 1.3). A blood-stained nipple discharge is associated with a duct papilloma or carcinoma, but it is not generally realized that a serous discharge from a single duct also has an appreciable risk.[16] The first step in clinical evaluation therefore is to ascertain whether the

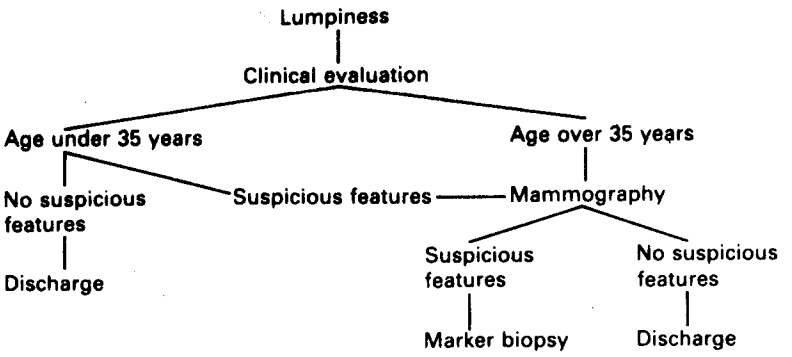

Figure 1.2 *Management of lumpiness or nodularity of the breast.*

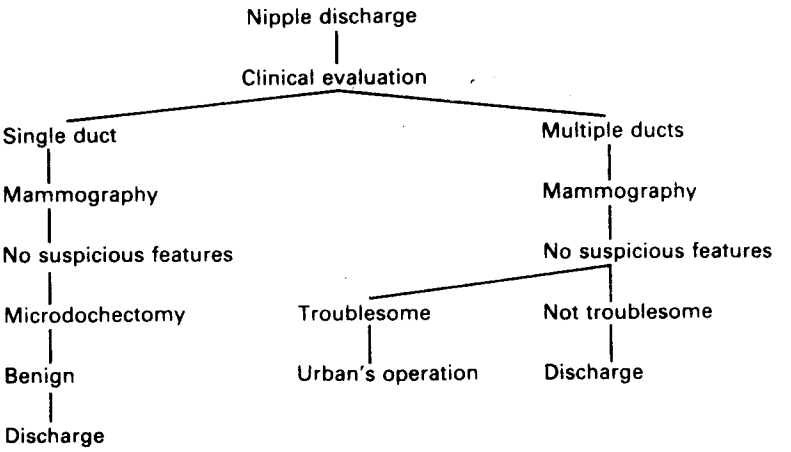

Figure 1.3 *Management of nipple discharge. It is important to distinguish single duct from multiduct discharge.*

discharge emanates from a single duct or from multiple ducts. A careful examination is imperative and each breast should be gently compressed around the periphery of the areola. Multiduct discharge is usually serous or white, often affects both breasts, but is rarely associated with carcinoma. Mammography is indicated and in the absence of suspicious features, the patient can be reassured. If the discharge is troublesome then the patient would be best advised to have surgery (Urban's subareolar excision of lactiferous ducts) since there is no effective drug therapy. Surgery is always indicated in single duct discharge to exclude intraduct carcinoma. A microdochectomy will reveal the cause of the discharge and is also therapeutic.

4. Nipple excoriation (Figure 1.4). Paget's disease of the nipple is the commonest cause of excoriation. Paget's disease may be diagnosed, after careful clinical examination and mammography, by nipple biopsy which can be carried out under local anaesthesia at the outpatient clinic.

Sir James Paget described a disease of the mammary areola which preceded the development of clinical cancer[17] and which is nowadays considered to be an epidermotropic carcinoma of nipple ducts. However, patients frequently present with Paget's change in the nipple, which is accompanied by clinical or mammographic evidence of an underlying carcinoma. When this is the case, then treatment appropriate for the carcinoma

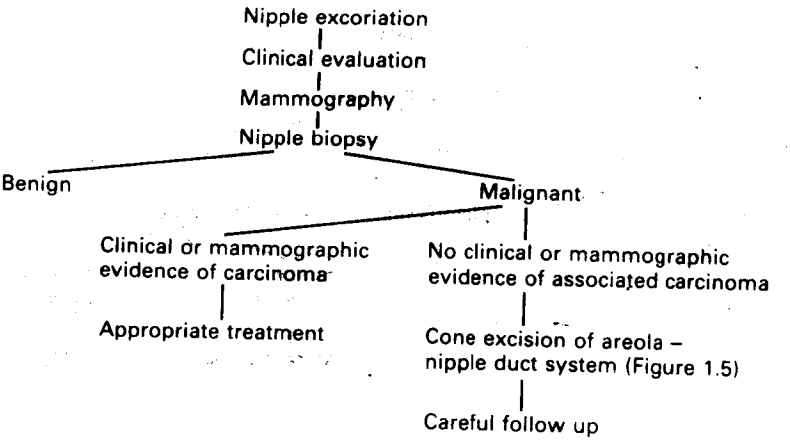

Figure 1.4 *Management of nipple excoriation.*

should be carried out. With increasing surveillance for breast cancer, true Paget's disease of the nipple is diagnosed more frequently. These patients show no evidence of a palpable mass or mammographic abnormality and may be treated with conservative surgery, i.e. with a cone excision of the areola and nipple duct system to a depth of 5 cm (Figure 1.5). In a recent study, women treated in such a manner showed no evidence of recurrence at 50 months of follow up.[18]

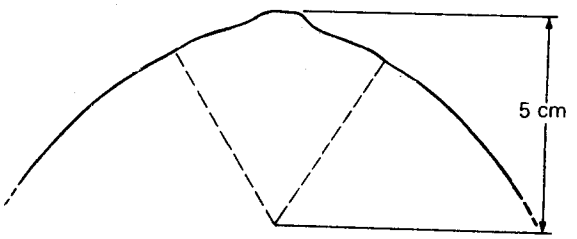

Figure 1.5 *Diagrammatic scheme of cone excision of nipple for Paget's disease. Primary closure after excision preserves the breast mound with an acceptable cosmetic appearance.*

5. Breast pain (Figure 1.6). Breast pain is rarely associated with carcinoma but it is the commonest symptom which brings a woman to the Breast Clinic. A careful and detailed history is necessary to distinguish two definite categories of pain, namely cyclical mastalgia where a strong relationship to the menstrual cycle is evident and non-cyclical mastalgia where no such relationship exists. Clinical examination will reveal areas of local tenderness which should be noted on representative drawings. Mammography is indicated for all women over 35 years or for younger women with suspicious clinical features.

Irrespective of whether pain is cyclical or non-cyclical, most women will require only firm reassurance, the recommendation of a good supporting bra and the occasional simple analgesic. It is when symptoms have failed to respond to this regime that the distinction of cyclical from non-cyclical mastalgia becomes important. The former may respond well to specific agents which can alter the hormonal environment of the breast whereas the latter is unlikely to benefit. Three drugs are effective in relieving the tenderness of cyclical mastalgia. Evening Primrose Oil (Efamol) is the richest natural source of essential fatty acids which are important cofactors for prolactin metabolism. This drug is virtually free from side-effects, and has been shown in a placebo-controlled trial to improve cyclical mastalgia.[19] It is given in a dose of 500 mg six times daily, together with ascorbic acid 200 mg three times daily. Bromocriptine, a dopamine agonist, is also effective, but is associated with nausea, vomiting and headache. Side-effects can be minimized by starting with a low dose of 1.25 mg daily, gradually increasing to 2.5 mg twice daily. Adequate contraceptive methods should be used during therapy. Danazol has a place in treatment of cyclical mastalgia but is associated with weight gain and amenorrhoea.

Reliance is placed on conventional analgesics for non-cyclical mastalgia. Excision of 'trigger spots',

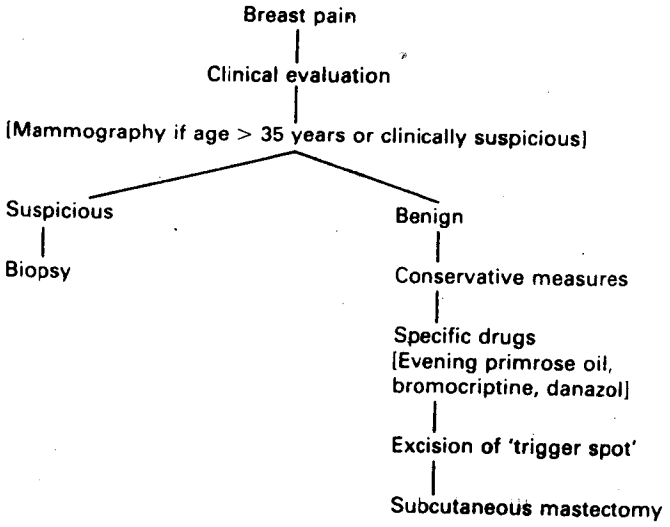

Figure 1.6 *Clinical approach to breast pain. The majority of women require only simple supportive measures and reassurance.*

i.e. localized areas of maximum tenderness, may also be helpful. Subcutaneous mastectomy should be considered in the last resort for refractory pain, either cyclical or non-cyclical, which makes the patient's life a misery. A good cosmetic and symptomatic result is often achieved in such circumstances.[20]

Diagnostic procedures

Fine needle aspiration cytology

An accurate preoperative diagnosis avoids the traditional, but unpleasant approach whereby the patient must proceed to theatre for a frozen section biopsy, not knowing whether she will awaken with a diagnosis of cancer. Most centres use a trucut needle biopsy to obtain a tissue diagnosis preoperatively, but fine needle aspiration cytology which requires skilled expertise, and a trained cytologist, has a higher diagnostic yield, is less traumatic for the patient and can provide an immediate answer at first attendance.

Technique. The equipment is simple and inexpensive. A 10 ml syringe fitted with a fine disposable hypodermic needle and containing 0.2 ml heparin (5000 u/ml) is mounted into an aspiration gun (Figure 1.7)

The breast is gently swabbed with an antiseptic solution, while the lump is raised into prominence by the opposite hand. With continuous suction applied to the gun, multiple rapid 'runs' are made into the lump in a slightly tangential direction so as to avoid puncturing the chest wall (Figure 1.8). Within 15–30 seconds the operator will see aspirate material appearing in the bottom of the syringe. The needle is withdrawn maintaining a reduced suction. The cellular aspirate is emptied forcibly onto a slide and smears are prepared. The haematological 'Diff Quick' stain is used. This allows the cytologist to issue a report within a few minutes of the aspiration (Figure 1.9).[21] If no duct cells are found on the smears the aspirate is regarded as unsatisfactory and the procedure should be repeated. The final report is issued after staining with Giemsa or Papanicolaou.

Breast cytology smears are graded on the 1–5 Papanicolaou scale (Table 1.1). Grades 1 and 2 are benign and if there is no discrepancy between the cytological report and the clinical or mammographic findings, these lesions do not require removal. In our experience 90% of grade 4 and 98% of grade 5 are malignant and thus all of these require urgent attention. Grade 3 is either an active benign cellular lesion or an invasive cancer and since the two cannot be reliably differentiated by cytology, our policy has been to biopsy all these lesions irrespective of clinical and mammographic findings.

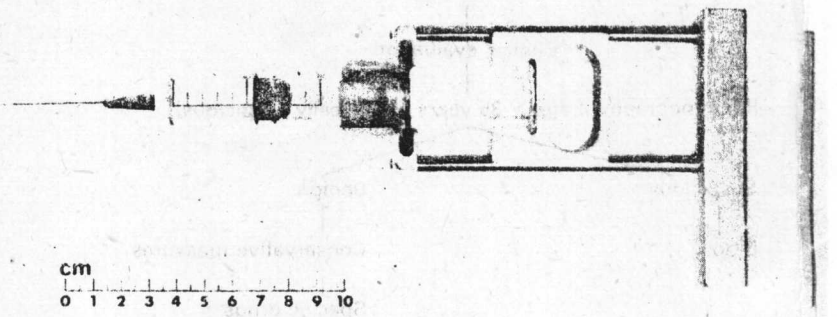

Figure 1.7 *Fine needle aspiration gun used at the Ninewells Breast Clinic. It accommodates a 10 ml Gillette syringe.*

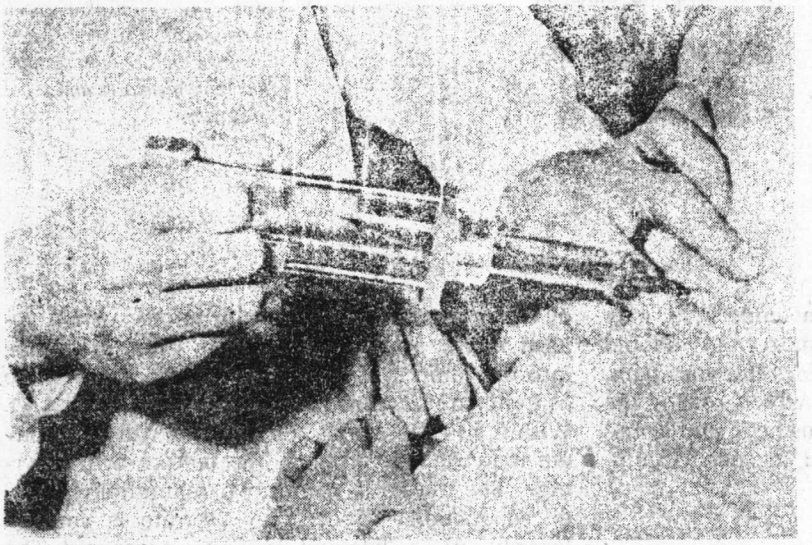

Figure 1.8 *Fine needle aspiration gun in use. The left hand is used to steady the lump. Several runs are made through the lump while maintaining suction with the right hand.*

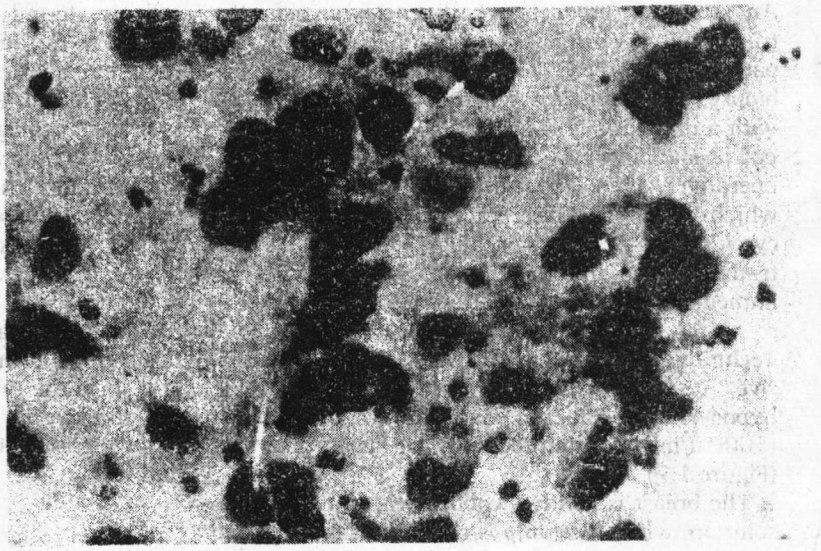

Figure 1.9 *Cytology smear using 'Diff Quick'.*

Table 1.1 *Cytological grading of breast smears.*

Grade	Definition
1	Normal
2	Hyperplastic duct cells
3	Irregularly proliferating cells
4	Cells highly suspicious of malignancy
5	Conclusive evidence of malignancy

Marker biopsy

Mammography is a useful tool for the early diagnosis of breast cancer, and may show features suggestive of malignancy in a clinically normal breast. Approximately half of these radiologically suspicious lesions are malignant and therefore accurate localization with complete excision of the radiological abnormality but with minimal removal of normal breast tissue is mandatory.

Technique. X-ray localization is carried out on the morning of surgery, using a needle or radio-opaque dye. The radiologist passes a needle or injects 0.5 ml of a mixture of 25% Hypaque and methylene blue (this latter stain allows recognition at surgery) into the centre of the suspect area. Mammograms taken in two planes confirm the localization.

The needle or dye is exposed through a circumferential incision and with reference to the mammograms, the suspect area is excised. The specimen is returned to the x-ray department while the patient remains anaesthetized. If specimen radiology confirms that the suspect area has been removed, the wound is closed and the patient returns to the ward. Urgent paraffin histology is more reliable than frozen section histology, particularly in the case of subclinical lesions where the histological differentiation between proliferative benign lesions, dysplasia, in situ or early invasive cancer can be difficult, even to an experienced pathologist.

Excision biopsy

This is indicated as a diagnostic procedure for all clinically suspicious lumps irrespective of negative preoperative investigations. Some surgeons still prefer frozen section histology, with immediate mastectomy on finding a positive result. Our own preference, however, is for urgent paraffin histology so that the diagnosis can be explained to the patient in advance of her definitive operation and the most appropriate procedure can be chosen.

Circumareolar and circumferential incisions for central and lateral lumps respectively are recommended because they confer better cosmetic results than radially disposed incisions.

Breast conservation in the primary treatment of breast cancer

This method of treatment has been in use since 1954,[22] and is currently being reassessed by two clinical trials in the UK. The first prospective randomized trial comparing local excision and postoperative radiotherapy with radical mastectomy was conducted at Guy's Hospital.[21] Although results were similar between the two groups in stage 1 disease, patients with stage 2 cancer randomized to the local excision arm, fared substantially worse with an unacceptably high incidence of loco-regional recurrence. The most important criticism levelled against this trial concerns the dose of radiotherapy administered which is universally considered to be too low and certainly inadequate to sterilize residual tumour tissue within the breast and axilla. A more recent trial comparing radical mastectomy versus quadrantectomy with axillary dissection and radiotherapy has not shown any differences in loco-regional recurrence, disease-free interval or survival to date.[12] Other studies have also suggested that local excision followed by radiotherapy to the breast, axilla and neck is as effective as conventional mastectomy in achieving adequate local control of the disease.[24,25]

Indications

Although these have been clearly defined and universally accepted, most surgeons practising this approach limit the procedure to mobile tumours not exceeding 3.0 cm in diameter. Skin fixation wide of tumour and deep tethering are contraindications to the procedure.

Procedure and nomenclature

The treatment consists of wide local excision through non-involved breast tissue with axillary sampling or lower axillary clearance. Postoperative radiotherapy is commenced two to three weeks postoperatively. A total of 45–50 Gy are administered in 20 fractions to the breast, ipsilateral axilla and supraclavicular nodes. Irradiation of the breast alone is performed in some centres when the axillary nodes are found to be not involved by histological examination.

Several names have been used to describe wide local excision of breast cancer: lumpectomy, tylectomy, quadrantectomy and segmentectomy. Aside from the different and rather confusing terminology, the surgical principle is the same. The tumour is excised with a minimum of 1 cm margin of apparently non-involved breast tissue. In small to medium breasts this approximates to removal of the affected quadrant. The term tylectomy is of Greek derivation and correctly describes excision of a lump but does not qualify its removal with normal surrounding breast tissue. Segmentectomy is an inaccurate term for the procedure and is best avoided.

Our practice has been wide local excision through curved transverse incisions which should not exceed 5 cm in length and lower axillary clearance.

Lower axillary clearance

1. **Incision.** The skin incision which is approximately 5.0 cm long is placed along the axillary tail of the breast and the anterior axillary fold (Figure 1.10). It is deepened to expose the lateral margin of the pectoralis major (Figure 1.11).

2. **Exposure of pectoralis minor.** The pectoralis major is retracted medially to expose the pectoralis minor down to its origin from the chest wall. The pectoral fascia is then incised along the lateral margin of the muscle (Figure 1.12) which is then mobilized and retracted medially. A few pectoral vessels require ligature and division at this stage.

3. **Exposure of the axilla.** The retraction of the mobilized pectoralis minor opens the axilla. The axillary contents are cleared from the level of the axillary vein downwards and between the latissimus dorsi and the chest wall down to and including the axillary tail of the breast (Figure 1.13). The subcapsular vessels and nerve are preserved. The clearance achieved by this technique is equivalent to that obtained by Patey mastectomy.

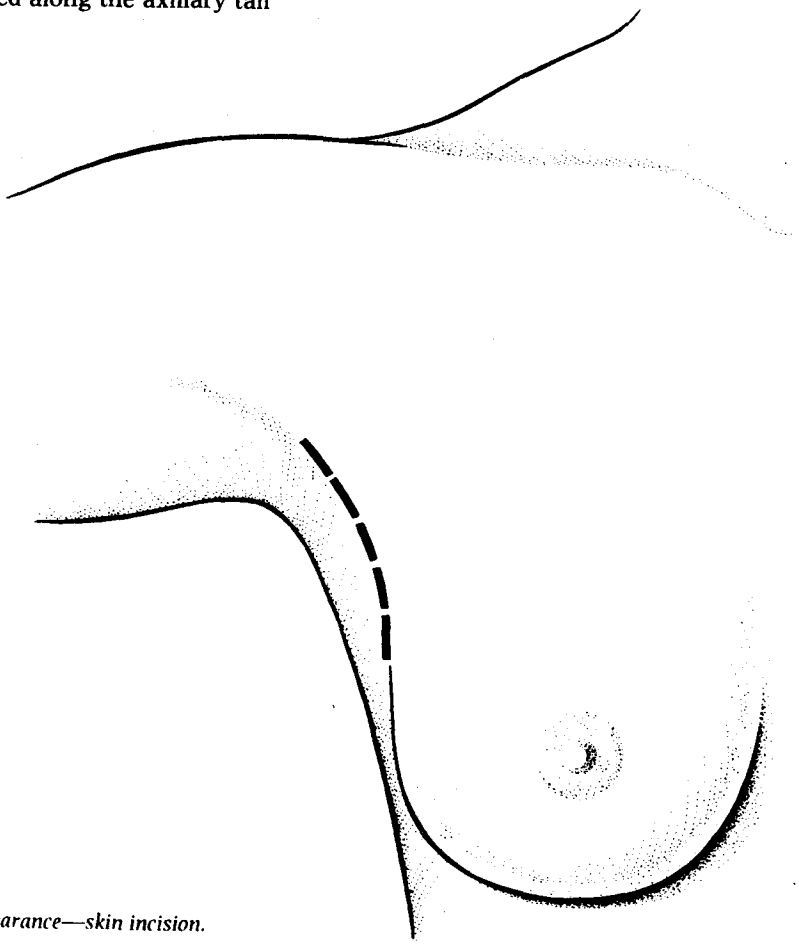

Figure 1.10 *Lower axillary clearance—skin incision.*

Figure 1.11 *Lower axillary clearance—exposure of pectoralis major.*

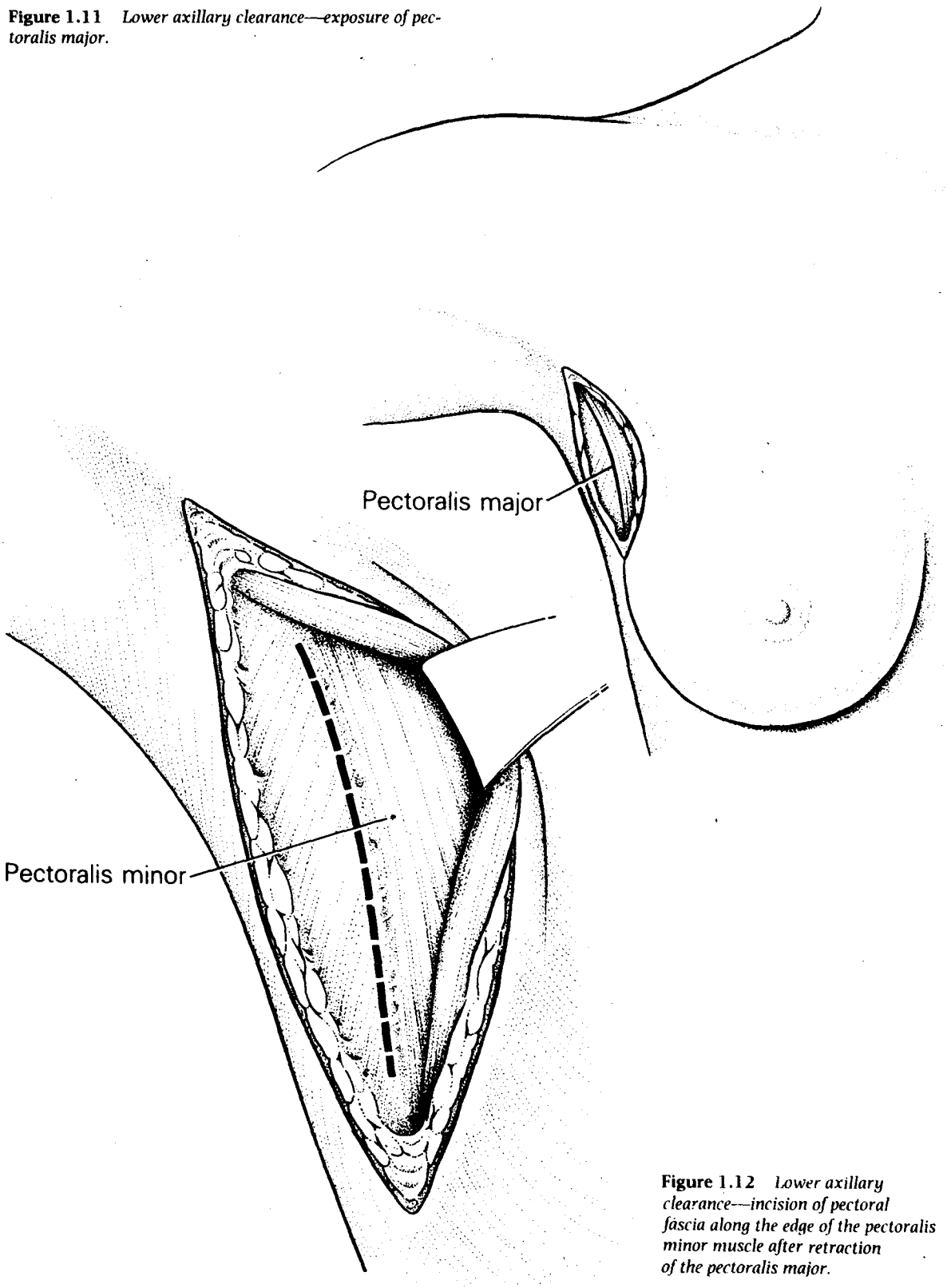

Figure 1.12 *Lower axillary clearance—incision of pectoral fascia along the edge of the pectoralis minor muscle after retraction of the pectoralis major.*

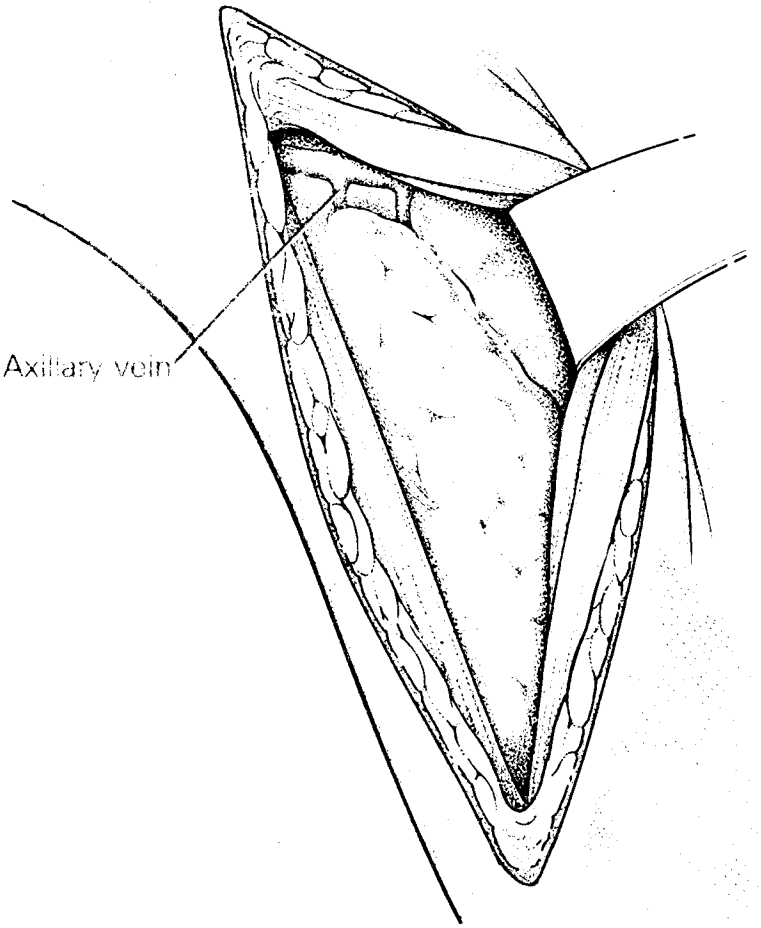

Figure 1.13 *Lower axillary clearance. The axilla is exposed and cleared of fat and lymph nodes from the level of the axillary vein down to the axillary tail of the breast and between the latissimus dorsi laterally and the chest wall medially.*

Subcutaneous mastectomy

In this operation, the breast parenchyma is removed from underneath the skin and immediate or delayed reconstruction is carried out, usually with a silicone prosthesis. Cosmetic results are poorer in fat women because skin and subcutaneous tissues are stretched as prostheses are larger and cause greater tension on suture lines. Thus healing is poorer.

Indications in benign breast disease

Intractable breast pain. The operation is often successful in women with intractable breast pain which has been resistant to any other treatment. It is important to emphasize that all causes of referred pain from other sites should be excluded and that conservative methods should be given a fair trial.

Premalignant breast disease. Epithelial hyperplasia, particularly in the presence of cellular *atypia*, carries an increased risk of malignancy.[26] Women with this condition are usually managed by prolonged follow up, and repeat clinical and mammographic assessment, with surgical intervention as indicated. However, a minority of women will develop a cancerophobia and will request a prophylactic mastectomy. We have also

treated patients having painful fibrocystic disease involving frequent recurrence of macrocyst formation with subcutaneous mastectomy. In addition to their severe symptoms, these patients have a higher risk of breast cancer.[20]

Indications in malignant disease

Subcutaneous mastectomy is the procedure of choice in patients with non-invasive breast cancer. A bilateral procedure is advisable for patients with lobular carcinoma in situ. There is some evidence that subcutaneous mastectomy is an acceptable alternative to simple mastectomy in the treatment of operable invasive breast cancer. Two studies failed to find any significant differences in survival or disease-free interval in patients treated by total or subcutaneous mastectomy.[27,28] Subcutaneous mastectomy is suitable for mobile breast cancers (T1–2) either without or with minimal (< 1.0 cm) skin dimpling. It is however less favoured than wide local excision and radiotherapy by surgeons practising conservation breast surgery. The procedure is unsuitable for centrally placed tumours.

Operative technique

1. **Position of the patient.** The operation is performed with the patient placed symmetrically on the table having both arms abducted. Routine skin preparation is carried out on both sides, including the axillae, and towels are sutured to the skin leaving both breasts exposed.

2. **Incision.** The infralateral submammary incision gives a good cosmetic result and is the incision of choice in patients with small breasts. It allows access for axillary node sampling in patients with cancer but is inadequate for axillary clearance. The submammary approach is difficult in patients with medium to large breasts and is attended by forceful retraction of the skin flap during the procedure. The risk of both operative damage to the flaps and subsequent ischaemic necrosis is enhanced in these patients. The circumareolar lateral incision is safer in these patients and facilitates the mastectomy. Furthermore it permits axillary clearance in patients with cancer. The incision skirts the lower half of the areolar margin and is then extended along the lateral radius to the periphery of the breast mound (Figure 1.14).

Whenever subcutaneous mastectomy is performed for a carcinoma with slight skin dimpling (< 1.0 cm), the affected area of skin is excised as a separate transverse ellipse and the edges approximated by interrupted sutures. However, the exposure is not altered and this added step does not usually jeopardize the blood supply to the breast skin flaps.

The assistant holds the breast under tension and the skin incision is made starting at the areolar end. It is deepened to the plane of separation between the breast parenchyma and the subcutaneous fat. This plane is easily identified as it lies underneath a plexus of veins which covers the large fat globules of the breast tissue (Figure 1.15).

3. **Demarcation and preservation of the nipple disc.** The vascular integrity of the areola and nipple is ensured by the preservation of a disc of breast tissue including the terminal lactiferous ducts about 0.5–1.0 cm in thickness depending on the size of the breast. The diameter of this disc corresponds to that of the areola and is outlined by sharp knife dissection to separate it from the remaining breast tissue. The upper (alveolar) skin edge is lifted up with skin hooks and the breast tissue is divided by scalpel parallel to the areolar skin and nipple (Figure 1.16). Thereafter the periphery of the disc is incised down to the subcutaneous fat corresponding with the areolar margin on the outside (Figure 1.17).

4. **Elevation of the inferior flap.** This is facilitated by traction on the skin edges using skin hooks. The plane is identified and dissection is carried out deep to the venous plexus and should be relatively avascular consisting of loose areolar tissue between the breast fat and the venous plexus. Elevation of the inferior skin flap is completed when the lower half of the breast is separated from the overlying skin and subcutaneous fat and the rectus sheath is exposed at the periphery of the breast (Figure 1.18).

5. **Detachment of the breast tissue from pectoralis major.** The fascia along the lower edge of the exposed breast tissue is divided and the edge of the breast is then grasped in tissue-holding forceps. The breast is thereafter detached from the pectoral muscle (Figure 1.19). Diathermy coagulation of the perforating pectoral vessels is necessary during this step. The mobilization of the breast tissue from the underlying muscle is otherwise easy and consists of both blunt and sharp dissection as necessary. It should extend medially to the sternal edge and superiorly to the clavicle and pectoralis major tendon.

Figure 1.14 *Subcutaneous mastectomy—the circumareolar/lateral incision used for medium to large breasts.*

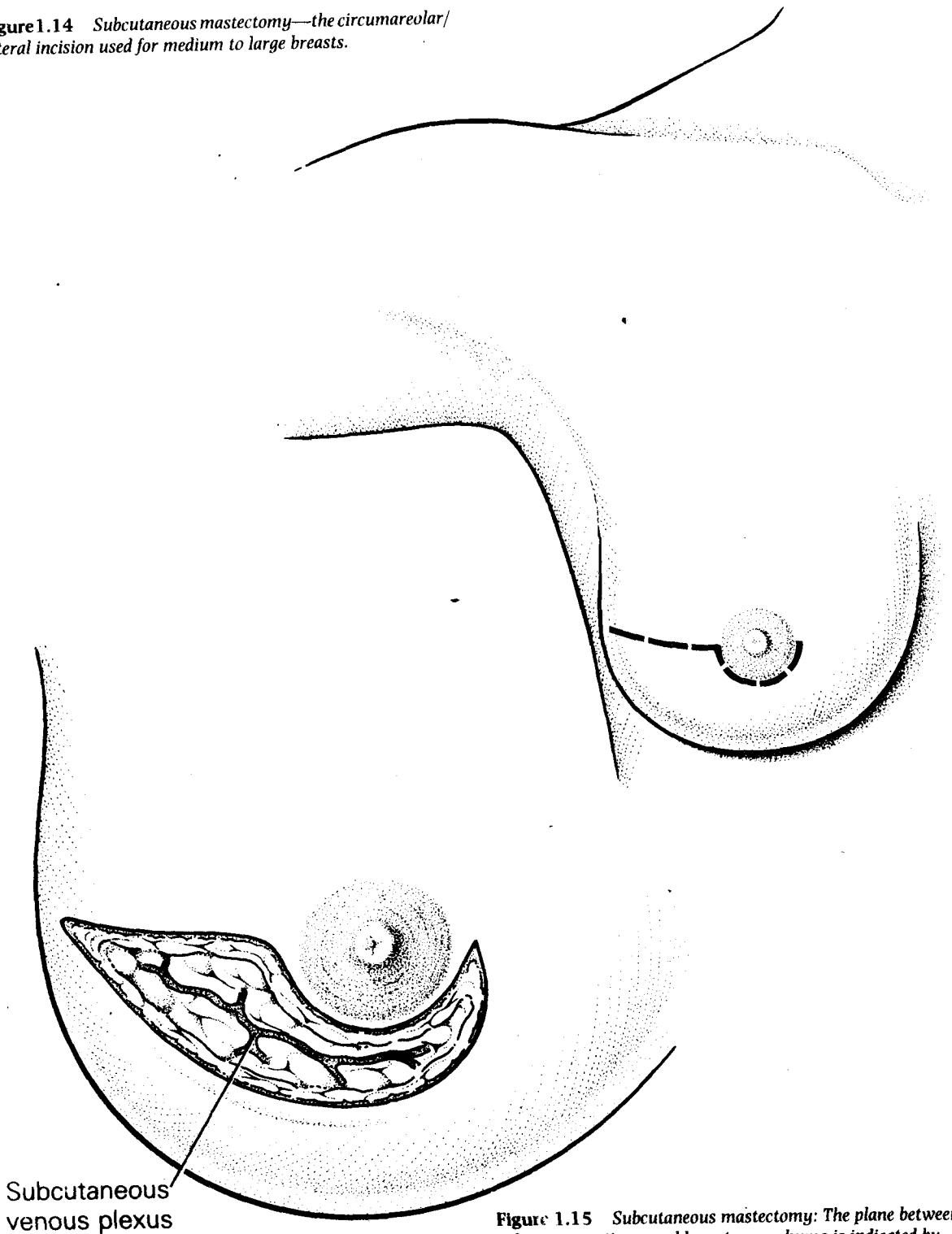

Figure 1.15 *Subcutaneous mastectomy: The plane between subcutaneous tissue and breast parenchyma is indicated by a venous plexus. Dissection should proceed just deep to this venous plexus.*