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Original Article

Surgical management of cutaneous tumour: part I

皮膚腫瘤的外科診治：第一部份

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The skin is the largest organ of the body, and tumours of the skin represent a significant proportion of workload to dermatologists, plastic surgeons and other clinicians. Since cutaneous tumours are superficial and can be easily accessed, surgical procedures for diagnosis and treatment are commonly the first steps of management. The amount and extent of surgery done by an individual clinician vary according to one's experience and preference as well as the patient's perspective. The nature of the tumour, the location and underlying structure as well as the physical and psychological condition of the patients are to be seriously weighed. This article is divided into two parts, the principles of using different skin biopsy methods for diagnosis, the technique of excision and closure will be addressed in the first part while skin grafting and flap reconstruction that may be required when the defect cannot be closed primarily, the choice of suture material, the commonly encountered malignant and benign tumours will be discussed in the second part.

皮膚是身體的最大器官，而皮膚腫瘤的診治也是皮膚科專科醫生、整形外科醫生及其他醫生的重要工作。由於皮膚腫瘤位置表淺，故外科手術常為首項診治程序。手術的規模和程度取決於手術者的經驗和患者的意見。然而，腫瘤的性質及部位、鄰近的組織結構與及患者的身心狀況均需慎重考慮。本文分兩部份，首部份論述不同活檢法的選取原則及切除與縫合技巧；次部份論述當未能作一期縫合時所需的植皮及皮蒂重組術、材料選用與及常見的惡性及良性腫瘤。

Keywords: Cutaneous tumour, surgical management

關鍵詞：皮膚腫瘤，外科診治

Introduction

The skin is the largest organ of the body with components derived from all three germ layers. Tumour of the skin thus represents a very heterogeneous collection of neoplasms in relation to the different cell types that comprise the skin. Skin tumours create lots of concern and medical consultations since they are easily seen and detected by the patients and the relatives. As skin tumours are superficial and easily accessible, surgical procedures for diagnosis and treatment are commonly deployed as the first steps of management.

The amount and extent of surgery done by an individual clinician vary according to his/her

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previous experience and preference but all should be familiar with some fundamental techniques.

When deciding on the appropriate type of biopsy and surgical treatment of a cutaneous tumour, it is important to note that the approach should be individualised.

The invasiveness, the histological subtypes, the size and shape and the location of the tumour, as well as the adjourning structures and the patient's preferences have to be seriously considered.

Lots of patients request removal of skin tumour due to the worry of malignancy or cosmetic consideration. As 86% of basal cell carcinoma (BCC) and 66% of squamous cell carcinoma (SCC) locate in the head and neck region,[1] and the enormous number of cutaneous tumours that are to be removed due to cosmetic or personal reasons, it is not difficult to recognise that aesthetic element is of such importance in cutaneous surgery.

The patient's physical and psychological status, age, skin colour, skin laxity and cosmetic considerations play an important role in the choice of therapy.[2]

This article is divided into two parts, the principles of using different skin biopsy methods for diagnosis, the technique of excision and closure will be addressed in the first part while skin grafting and flap reconstruction that may be required when the defect cannot be closed primarily, the choice of suture material, the commonly encountered malignant and benign tumours will be discussed in the second part.

Biopsy techniques

A biopsy is to confirm or disprove a clinical diagnosis and to assess the pathological characteristics of a lesion. The biopsy is intended to obtain adequate tissue for diagnosis and cause least disturbance to the lesion and the subsequent management.

A skin biopsy is best performed at the most developed but untreated area,[3] and normal skin edges should be included for pathologist to compare the lesion with the neighbouring normal.

Shave biopsy, punch biopsy, incisional and excisional biopsy will be discussed. Others like curettage, scissor and needle biopsy are not recommended in suspected lesions.

Good surgical biopsy starts with scrubbing the area with 4% chlorhexidine or povidine iodine. 70% isopropyl alcohol is not favoured by the author due to its flammable nature and the irritation to eroded skin in some cases and conjunctiva in other situations.

Drawing and planning are of utmost importance. It has to be done before local anaesthetic is injected since the later will distort the orientation of the lesion. The drawing plans the area of excision and the lines of closure, and also orients the final axis of wound. One can draw a line between the normal from the abnormal skin and dot with an appropriate clinical margin, a line of axis at the two poles of the lesion should be made along the lines of minimal tension which can be created by asking the patient to contract the relevant muscles (Figure 1a). If it is for excision, the dotted lines are made ellipsoid along the axis in order to eliminate the redundant dog-ear that arises if a circular wound is closed primarily.

Local anaesthetic (LA) is administered to minimise the discomfort during surgery, 1-2% lignocaine is the most commonly used agent, adrenaline is often added to improve the haemostatic effect and prolong the anaesthetic time, 1:200,000 to 1:400,000 concentration will be adequate for that purpose. Adrenaline added LA is not routinely recommended to areas which are supplied only

Figure 1a. The line of minimal tension can be created by asking the patient to contract the relevant muscles.

by end arteries but may still be used only with special care and experience; the 3Ps are commonly quoted: phalanges, penis, and pinna. Special precaution should also be made to patients with cardiac instability and allergy.

Injection should be given with gentleness since it is the first step the patient encounters in the real surgical procedure.

One should use a small needle like 27G or smaller, insert the needle with a slight punch force at 45 degrees, take a half second break and then inject very slowly and gradually to avoid sudden push, it appears that the immediate pain is due to the pressure of the anaesthetic solution forcing open the tissue on rapid injection. Some surgeons may add sodium bicarbonate to reduce the acidity of the lignocaine solution and some others considered warming up the solution to the body temperature is important.

The technique of injection is to infiltrate the whole marked area to create a slight swelling but not to inject into the lesion so as to avoid disturbing the tumour or disseminating the tumour cells. After injection, one should wait for at least seven minutes until the adrenaline vasoconstricting effect to appear, which is evident by a pale halo in the normal surrounding skin (Figure 1b).

Figure 1b. A halo is produced by the vasoconstriction effect of adrenaline added lignocaine.

Shave/Saucerization biopsy

A shave biopsy is a superficial procedure that removes the epidermis and a thin layer of the adjoining dermis. It is good for removal of raised lesions that is confined to the epidermis and is helpful in diagnosing superficial BCC and SCC and may be used to distinguish a flat seborrhoeic keratosis from a lentigo maligna.[4,5] It is not recommended for deep seated tumours or pigmented lesions that the depth and margin assessment are essential.

Steps: Drawing is performed and local anaesthetics is administered, a very light force is applied to the lesion and the surrounding skin so as to raise and evert the mass, a scalpel with No. 15 blade or a half razor blade which is bowed is held parallel to the surface and cut through the base of the lesion in a back-and-forth sawing motion. Bleeding is minimal after adrenaline added LA and can easily be controlled by pressure. Topical aluminum chloride or ferric sulfate may help, rarely diathermy is required.

Punch biopsy

A punch biopsy is used to remove a core of tissue from the lesion. This type of biopsy is good for cases where histological examination of the deeper dermis is needed. Disposable punch biopsy instrument with the core size ranging from 2 mm to 10 mm in diameter are commercially available. The punch biopsy instrument behaves as an excisional biopsy instrument when it is applied for a lesion small enough to be completely removed and as an incisional biopsy instrument when it is used in the case of a larger lesion which is partially removed. Todd et al states that the same histological diagnosis can be made with a 2 mm punch biopsy as compared with standard elliptical biopsy in 94% dermatoses and benign and malignant tumours studied.[6]

Steps: Drawing is performed and local anaesthetic is administered, a light force is applied to tent the neighbouring skin and to stabilize the lesion, the punch cutting tool is perpendicularly placed onto the desired position and rotated through the full thickness of dermis (Figures 2a & 2b); on cutting through the dermis, a 'give' is detected. The cylinder of tissue is removed from the punch core with a needle and the base of the tissue is clipped off from the underlying subcutaneous layer with scissors (Figure 2c). Bleeding is controlled by pressure or sutures, the defect can be left to granulate if small or be closed by sutures if large punch biopsy was made.

Incisional biopsy

It is intended to obtain a representative specimen from a large lesion that is inappropriate to be excised in one goal; in some respect, a punch biopsy is a form of incisional biopsy produced by a punch cutting instrument instead of a scalpel incising into the lesion. Recent data suggested that it does not adversely affect the local recurrence and mortality compared with excisional biopsy in melanoma,[7] but it may lead to an underestimation the thickest part of the tumour and subsequently affecting the margin of excision, thus it is not the most preferred method of biopsy in melanoma, except when the suspected lesion is large and complete removal implies a significant surgery or cosmetic deformity. But it is a very useful method in other tumours including BCC and SCC.

Steps: Drawing is performed and local anaesthetics is administered, an ellipsoid piece of tumour including the centre of suspicion to the peripheral normal skin is removed and the incision should be deep to include the subcutaneous tissue, haemostasis with diathermy or suturing is then performed and the wound is closed by suturing.

Excisional biopsy and excision

Excisional biopsy and excision are two terms of theoretical difference. The procedure will be very

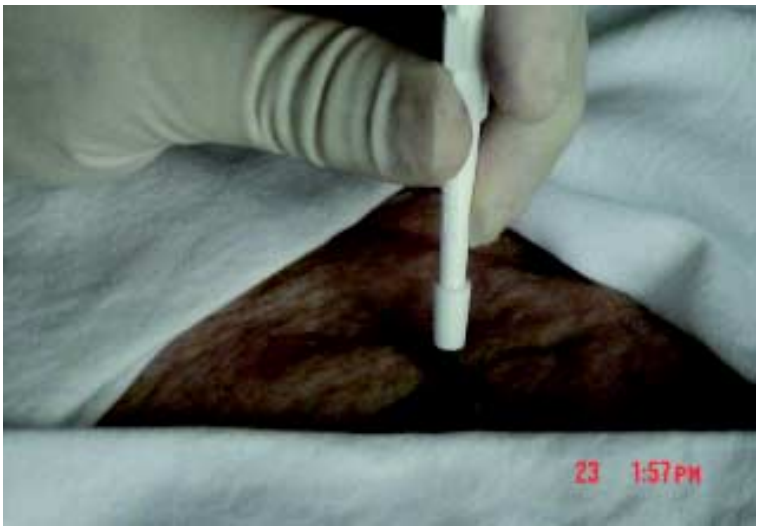

Figure 2a. Perpendicular position of the 3 mm punch biopsy instrument.

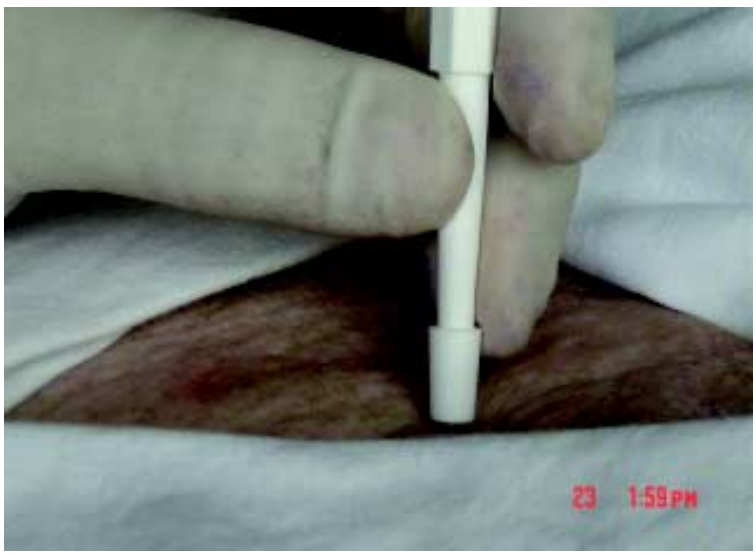

Figure 2b. The punch biopsy instrument is rotated through the full thickness of skin.

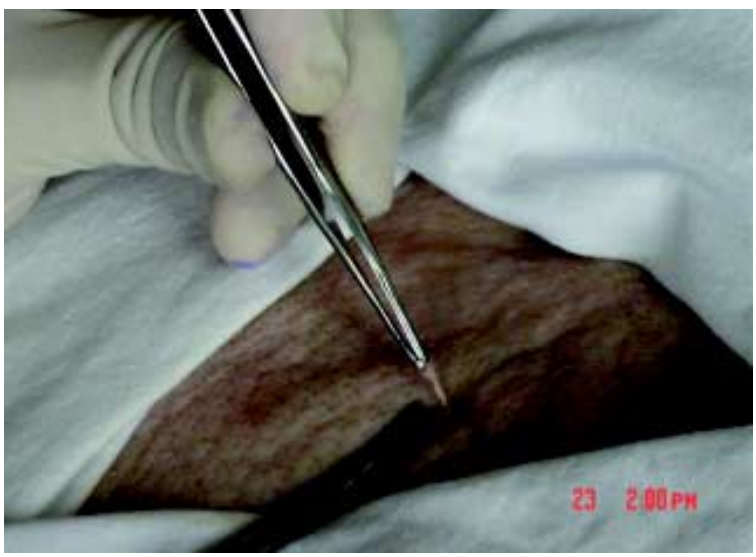

Figure 2c. The core of tissue is detached from the subcutaneous base.

similar but the intention may be different, the term excision applied to the procedure when the procedure is intended to clear the tumour with the appropriate margin, and excisional biopsy is meant to be a biopsy in which the whole mass is removed (margin is not a consideration). These two terms will be practically the same if the tumour is benign or the margin is not exaggerated, it is not so if a wider margin is required as in malignant melanoma. Most clinician will consider excisional biopsy/excision when the lesion is not too large and the wound can be closed primarily without difficulty, in other case some other form of biopsy is performed for a large lesion and a definitive excision is planned in the later operation.

This is a method good for tumours that involve a certain depth of dermis and is the form of biopsy that gives the most accurate diagnosis, since the pathologist has the chance to analyze the whole lesion with its immediate margin.

Excision removes the epidermis and dermis, and a thin layer of subcutaneous fat in one block. The repair of the wound is usually primary closure, but in case where the wound is too large, the principle of reconstructive ladder should be followed: primary closure, skin graft, local flap, distant flap, and free flap. Thus before the surgery is started, the surgeon should be familiar with the various modalities of wound closure/coverage, as well as the nature of the lesion, the margin required, the pre-procedure diagnosis, the local anatomy, and the expected cosmetic and functional outcomes.[8,9]

Surgical excision may be a treatment of choice for lesions: 1) in anatomic sites where there are freely movable tissue, 2) when cosmesis is of prime concern, 3) when quick healing is of prime concern, 4) when clinical margins are indistinct and histological margin is essential. Tumour with clinically indistinct margins, SCC with poorly differentiated histology, morpheaform or sclerotic BCC, tumour that invades the deep dermis, and recurrent nonmelanoma skin cancer could be treated with Mohs surgery due to their high risk of recurrences.[8,10-14] In institution where Mohs surgery is not practised, excision with frozen section control of margins is highly recommended.

Steps: Drawing is performed and local anaesthetics is administered, an ellipsoid excision with 3:1 length to width ratio and a 30 degree angle at either end is made to minimise the redundant dog-ear, the scalpel should be held and cut perpendicularly with single stroke (Figure 3a). The excision should include a layer of subcutaneous tissue (thickness depends on the pathology); it is advisable to cut the full layer of the subcutaneous fat in case of melanoma, but a thin layer in SCC or BCC.[9]

Figure 3a. The scalpel cuts perpendicularly with single stroke.

Tissue removed and haemeostasis performed, wound may be undermined with blunt scissors at the plane of the superficial subcutaneous fat (Figure 3b). Undermining may help reduce tension, improve eversion, and avoid dog-ear.[3,15,16] Undermining should be done at the sub-dermal plane in the face, at the subcutaneous plane in the trunk and limbs, and at the subgaleal plane as in the scalp; the adequacy of undermining depends on the tension of the wound within the context of the local anatomy (Figure 3c). At times, due to the close proximity of the lesion to a line of reference e.g. hair line or brow line, undermining will be done only on one side, so that the pulling of the undermined skin only affects the other side, and the line of reference will be kept undisturbed. This produces a more aesthetic pleasing result.

A layered closure is appropriate for most wound by using absorbable suture material with buried knots for the tension bearing layer, and nonabsorbable material in the form of

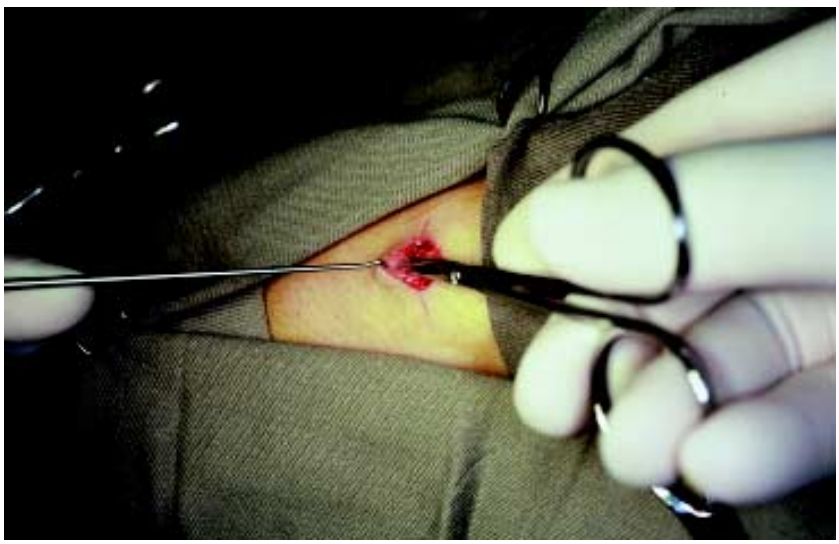

Figure 3b. The wound is undermined with scissors.

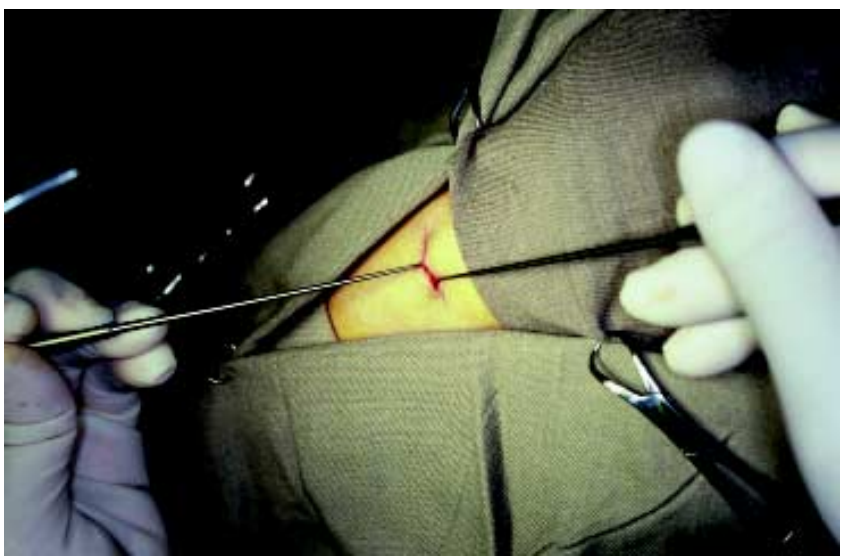

Figure 3c. Undermining is completed when the tension in closing the wound is minimal.

percutaneous stitches or subcuticular stitches for the superficial layer (Figures 3d & 3e). It must be clear that which layer is the tension bearing layer in a wound; it is generally the dermal layer and not the fatty layer in cutaneous surgery. Strangulating force caused by the suture to the fatty subcutaneous layer induces fat necrosis, invites infection, poor wound healing or even wound breakdown. It is correct to close the ends of the ellipse first and proceed to the centre, since such act will gradually reduce the tension of the wound. The cutaneous layer closure is a fine-tuning step to evert and oppose the wound with minimal tension; any tension in this layer delays the stitch removal and increases the stitch mark. In the face, 6-0 nonabsorbable suture will suffice, and in the other parts of body, 4-0 or 5-0 suture material is usually adequate, the finer the suture material leaves the less conspicuous stitch mark. The number of stitches placed in a wound and the inter-stitch distance chosen varies by different surgeons, generally, the same wound closed by

Figure 3d. The dermal layer is closed by using absorbable suture with buried knots.

Figure 3e. The wound is then opposed by subcuticular stitches.

the larger number of stitches decrease the tension taken by each stitch. It is advisable to close with more frequent stitches and smaller suture material than stronger material with fewer stitches. With the dermal stitch in-situ, the cutaneous stitch can be taken off without giving way to the wound holding ability. In the face, the stitches are taken off by three to five days depending on the surgeon's preference, and in the body, 10 to 12 days. The earlier but safe removal of the cutaneous stitch reduces the chances of stitch mark which is produced by the pressure of the suture material.

Finishing suturing, one can be covered the wound with antibiotic ointment and/or further by a layer of non-adherent dressing. On removal of the sutures, adherent dressing or tape is applied and kept for one more week. These tapes are applied on one side of the wound first and then are stretched before applying onto the other side of the wound. The binding force produced is intended to give additional support to the wound in the early healing phase so as to counteract the natural tension of the wound.

Conclusion

Dermatologists, plastic surgeons as well as family physicians face the challenge of looking after patients with cutaneous tumours everyday as this clinical entity represents a considerable proportion of their daily workload. Despite the relative ease of skin examination, significant additional barriers may remain to prevent an efficient diagnosis and treatment of skin cancers and benign tumours, inadequate diagnostic and procedural expertise lessen the chance for the early diagnosis and surgical management of cutaneous tumours in the primary setting.

The acquisition of the knowledge of some common techniques of biopsy and skillful excision of the lesions makes the service complete and comprehensive. The aesthetic concern of the patients upon the surgical management of the skin lesions is easy to understand as the tumours are mostly located in the exposed areas like the face and the neck, it is important to familiarise with some basic principles of surgical biopsy and management of skin tumours.

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