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Original Article

Surgical management of cutaneous tumour: part II

皮膚腫瘤的外科診治：第二部份

ECK Chan 陳祖鈞

In the part II of this article, skin grafting and flap reconstruction will be discussed. These will be relevant when the excision is complete and the defect is too large for primary closure. To achieve a proper coverage of the wound, one must equip with a full understanding of the reconstructive modalities before the primary surgery is performed. Furthermore, the choice of suture material as well as surgical aspect of some common malignant cutaneous tumour and that of benign tumour group will be addressed.

皮膚移植及皮瓣重建術將於此節討論。當病灶切除後餘下的缺損太大以致未能一期縫合時將會應用。在施行切除術前，應對重建術有全面理解，以適當覆蓋傷口。此外，外科縫合物料的選用及常見的良性及惡性腫瘤的外科治療也予以討論。

Keywords: Cutaneous tumour, surgical management

關鍵詞：皮膚腫瘤，外科診治

Skin Graft

In cases when the wound cannot be closed primarily, skin graft can be used to cover the wound. Split thickness skin graft (SSG) is an easy choice as the take rate is high in a well vascularised wound bed. It is also used as a temporary biological cover material in case the on-table diagnosis cannot be confirmed even with frozen section; in this scenario, the grafted area can be excised with a larger margin and covered with a definitive reconstructive measure in the second operation after the conventional histological diagnosis has been made, as appropriate. SSG can be obtained from a flat surface like anterior thigh or forearm. Local anaesthetic (LA) with adrenaline is administered to balloon up the donor skin as well as to produce anaesthetic effect, the graft which comprises of epidermis and a variable thickness of dermis can be shaved off by a special dermatome or simply by a scalpel if the SSG required is small. The donor site is then dressed by calcium alginate dressing or tulle dressing and kept intact for 10 to 14 days. The SSG is fenestrated by scalpel or mesher to produce holes to prevent haematoma or seroma accumulation between the wound bed and the dermal side of the SSG (Figures 1a-1c). The SSG must be anchored securely with suture or glue, as

Private Practice

ECK Chan, FRCS(Edin), FHKAM(Surgery), Specialist in Plastic Surgery

Correspondence to: Dr. ECK Chan

Room 2102, Oterprise Square, 26 Nathan Road, Tsim Sha Tsui, Kowloon , Hong Kong.

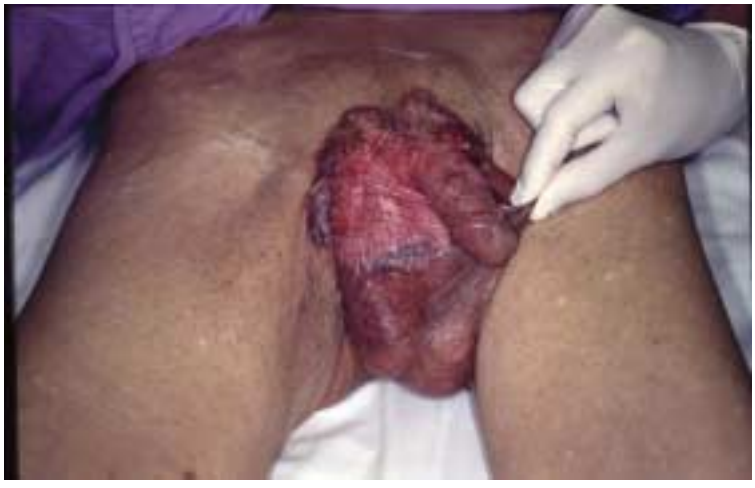

Figure 1a. Extramammary Paget's disease of perineum.

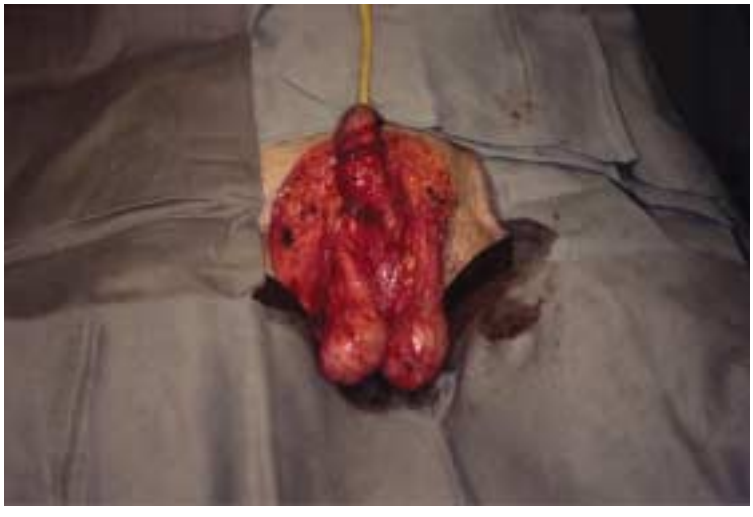

Figure 1b. Lesion excised.

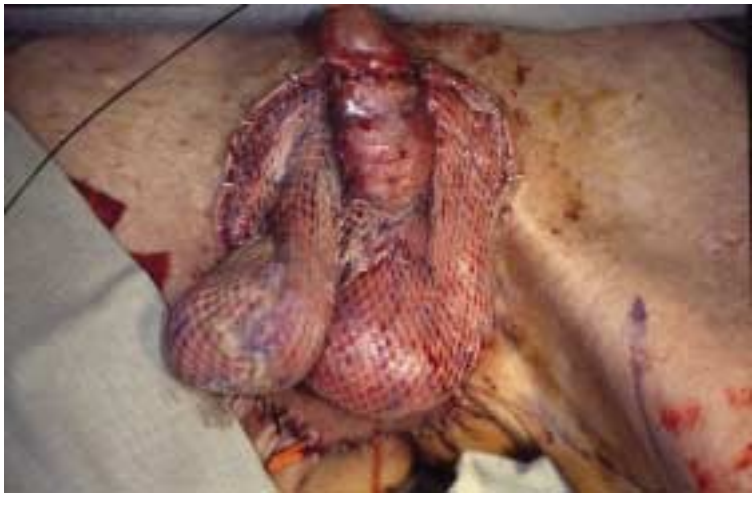

Figure 1c. SSG is meshed and used to cover the defect.

any movement between the SSG and the wound bed surface is detrimental. The graft should not be applied to bare bone (where periosteum has been stripped off), or bare cartilage as the graft will not be taken. The applied graft is covered by bolster dressing, which composes of an undermost layer of tulle dressing and wet then dry gauze and the whole dressing is anchored by multiple stitches which gives a compression effect.

In other situations, full thickness skin graft (FTSG) that is harvested from the preauricular, post auricular, supraclavicular, flexural areas of the body can be applied to the wound bed and is sutured to secure. The donor defect should be closed primarily or be grafted in some special circumstances. The advantage of the FTSG is the better colour and textural match as well as the better function of the skin graft, but this choice is limited by the availability and the lower percentage of successful 'take' this is particularly evident if the bed is not well vascularised as after irradiation or highly scarred areas.

Flap reconstruction

Another armamentarium used is local flap, which is a piece of skin and superficial fascia transferred from the nearby surface. A flap is a tissue structure that contains its own intravascular circulation while being transferred from the donor to the recipient site and a graft is a tissue that is transferred without its own blood supply. The latter survives entirely on the blood supply of the recipient site.

Surgeons use the local tissue next to the wound to cover the defect; this neighbouring tissue carries its own blood supply which is different from a graft. Due to its neighbourhood location, the skin flap is always almost the best match ever, whilst skin graft harvested from a faraway site is insurmountable (Figures 2a-2c). But this requires more surgical experience and produces an extra wound. A local flap can be of random pattern blood supply and axial pattern blood supply, the difference of these two is that the latter contains an anatomically identifiable arterial and venous system. The safety rule for an average random pattern flap is of 1:1 length-to-width ratio, though this can be up to 2:1 ratio in highly vascularised area like the face. An axial pattern flap raised with the known arterio-venous system can override this ratio, and at times it may be transferred completely and barely based on these vessels, in such case, it is named island flap. The merits of a flap which carries its own blood supply is that it can be used to cover bare bone or cartilage and can also be used in the case when a graft of the other structure (e.g. cartilage) is also required to reconstruct the defect in one goal. This graft-on-flap application can be exemplified in the reconstruction of large full thickness loss of skin and cartilage of the nose.

Occasionally, a distant flap is used. It is a piece of tissue (cutaneous containing in this context) that was transferred from a distant anatomical region. One example is deltopectoral flap which is used to cover lower chin wound, this is achieved by raising the upper chest skin flap which is based on the perforating vessels at the 2nd and 3rd intercostal space just lateral to sternum, this pedicle flap can be used to cover large defect of the face and the neck. This flap usually required division of the base in two to three weeks time. In the history tracing back to year 1597, Taglicocozzi had been using this similar principle by using the arm flap for nasal reconstruction.

Rarely, a free flap will be used. In case of a sizable defect and the above modalities are inappropriate, a flap from a distant body region can be raised with its arterial-venous system and transferred to the defect where the arterial and venous system are then connected to a recipient artery and venous system for blood supply. This type of tissue transfer required expertise of microvascular anastomosis and high demand of surgical technique.

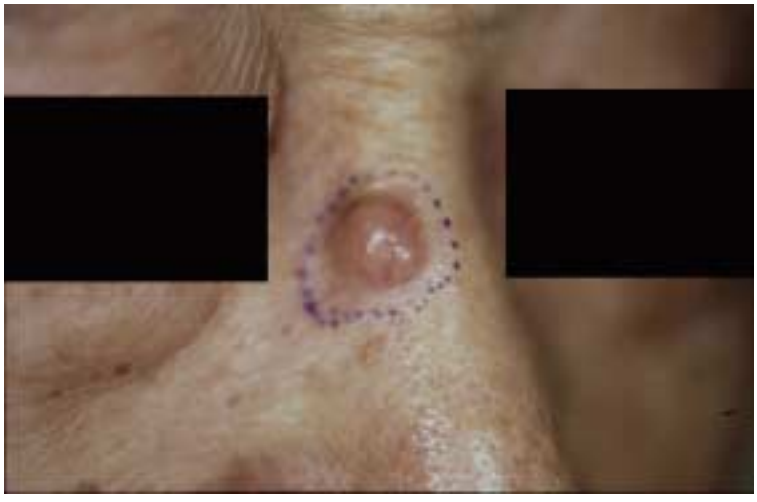

Figure 2a. BCC at nasal tip bridge.

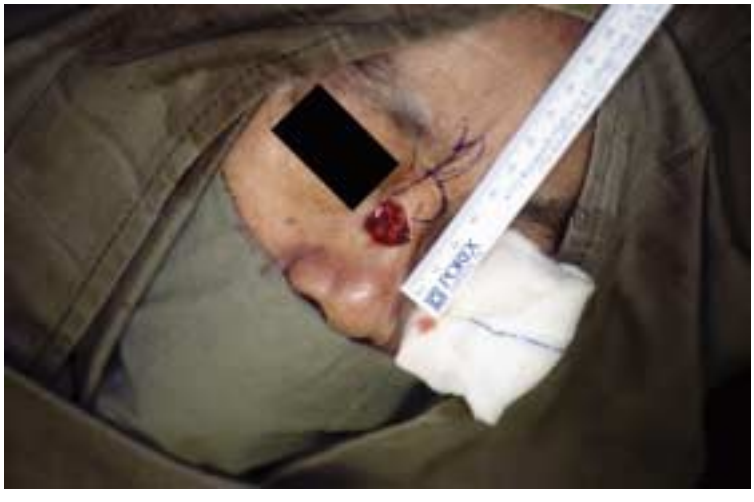

Figure 2b. A local flap is planned; the secondary defect is expected to be covered by another local flap such that the final wound will lie in the glabellar crease. This applies the principle of a bilobed flap.

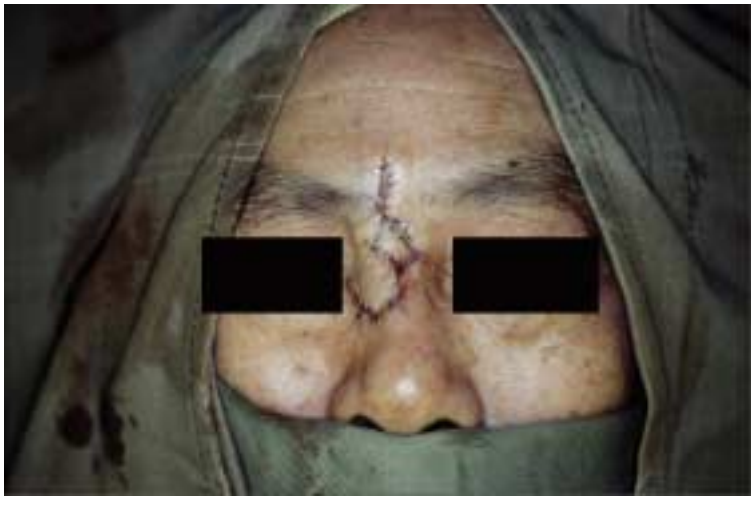

Figure 2c. The defect is covered by a local flap which provides a near-perfect match in color and texture.

Suture material

To achieve proper closure and best aesthetic outcome as well as adequate holding ability for wound healing requires the precise selection of the suture material. The strength, the thickness, the reaction by the host tissue and the absorption of the material, the handling characteristics and knotting ability determine whether a particular material is suitable for a wound.

Suture material can be classified as absorbable and nonabsorbable material. Within either group, they are divided as synthetic or natural material. Common examples of absorbable material are catgut, polyglactin (Vicryl), poliglecaprone (Monocryl), polyglycolide (Dexon), and that of nonaborbable are nylon (Dermalon), polypropylene (Prolene) and silk.

Since the suture material used in cutaneous surgery does not require the persistence of strength as in abdominal surgery, the material chosen should based on the thickness, reaction from the host and absorption, and handling characteristics. All suture material will be metabolised and absorbed. Suture material is absorbed in one of the two ways, enzymatic digestion and hydrolysis. Enzymatic digestion involves cellular involvement and also more inflammation and subsequent fibrosis and is exemplified by catgut. Hydrolysis is actually the effect of water that breaks the molecular bonds of the material as exemplified by most synthetic absorbable sutures. Silk and catgut produce a significant amount of inflammation and thus not a preferred choice in cutaneous surgery.

Suture material may be monofilament or multifilament. Monofilament material has the advantage of less chance of harbouring bacteria but is usually stiffer and thus worse knotting characteristics. Multifilament material shows better knotting property and strength and it may be coated to improve tissue passage.

A suture will be thinner as the number of 'O's increases e.g. 4-O suture is thinner than 3-O and be thicker when numeric value increases e.g. PDS 1 suture is thicker than PDS O.

In the past, needles are intended to reuse, the suture material is threaded through the eye of the needle and thus the base of the needle is larger than the thread, this may produce excessive trauma when the needle passes through the tissue. In the recent decades, the use of atraumatic needle in which the needle and the thread are of the same diameter, so that the tissue which the needle passes through will be exactly as that is needed. The needle used for cutaneous surgery are cutting or reverse cutting for the percutaneous layer; cutting or tapercut for the dermal layer; round-body and tapercut needle are for the subcutaneous layer.

Basal cell carcinoma

Surgical excision has been shown to be the most effective treatment modality for basal cell carcinoma (BCC).[1-5] Five-year cure rate by excision is above 90%.[6,7] The variability of the recurrence rate may be related to the experience of the surgeon, anatomic location, size, and histological characteristics. Incompletely excised BCC has a recurrence rate of 30-40% compare to that of 1% in completely excised cases.[8]

Fortunately, most BCC in Hong Kong are subtypes that show distinctive clinical border, one local study by Cheng, Luk and Chong indicated that 60% are pigmented types and 33% are rodent ulcers.[9]

Margins of 2 to 10 mm[1,10-15] have been recommended; Wolf and Zitelli demonstrated that a 4 mm margin should be taken in BCC of less than 2 cm in diameter. No data has been shown to suggest an appropriate depth; it appears adequate to include the superficial subcutaneous layer.[11]

Anatomic site is one of the important prognostic factors that predict recurrence. Large tumour size, the infiltrative and morpheoa subtypes and recurrence cases are also of prognostic relevance. BCCs located in the ear, face, and scalp have higher recurrence rate of 43%, 20%, 15% respectively in one study.[16] Rowe noted that the five-year recurrence rate of reexicison of recurrent BCC was 17%.[17]

Although Mohs surgery was addressed as a method with better preservation of normal tissue and lowest tumour recurrence rate, this method is not widely practiced in Hong Kong. This method requires specialised training and the surgery takes long hours to finish. In difficult cases, one should not be reluctant to employ frozen section control for better tumour clearance.

Squamous cell carcinoma

Surgical excision is again an excellent treatment for small primary squamous cell carcinoma (SCC).

Poor prognostic factors are tumour greater than 2 cm,[18] depth of invasion below reticular dermis,[19-21] rapid growth,[22] poor differentiation,[19,20,23-25] perineural invasion,[26-27] Marjolin's ulcer,[18,28-30] tumour on the ear and lip,[18] and of recurrent cases.[26,27] These high risk cases should better be dealt with by Mohs surgery or with frozen section control.[30]

Clinical margins of 2 mm to 10 mm have been recommended according to size, location, histological types and primary or recurrent nature of the tumour.[25, 31-33] Some authors recommend 4 mm for primary SCC of less than 2 cm and with good prognostic features; 6 mm for tumour of larger than 2 cm and at low risk area; and 1 cm margin for cases at high risk sites.[25] The depth should include the subcutaneous layer.[34]

Recurrence rate of low risk cases after excision ranges from 5% to 8%.[18,32] Those with poor risk factors like poor differentiation, invasion below reticular dermis, Marjolin's ulcer, history of rapid growth and at ear/lip, the recurrence can be greater than 25%.[18]

SCC tends to metastasis, the rate ranges from 1% in tumours less than 2 cm, and raise to 14% in cases greater than 5 cm.[35] Deep invasion through dermis is usually associated with metastasis. The lip has the highest rate of metastasis in respect to the anatomical site, half of the cases showed metastasis at presentation.[18] Marjolin's ulcer has a metastatic rate of 40%.[36,37]

Malignant melanoma

Surgical excision is the treatment of choice for primary cutaneous melanoma.[38]

The most important criterion that guides the surgeon for a surgical margin is the depth of the tumour.[39-42] There is a trend of shifting to narrower margin from wide excision margin that was practiced earlier in the century; in the pre-war years, the excision margin was 5 cm, and in 1960s, some even recommend a margin of 15 cm. After the release of the data from the WHO Melanoma Group in 1988, and that of the Intergroup trial, the following margin is the recommended: in-situ melanoma requires 2-5 mm margins, less than 1 mm thick requires 1 cm clinical margin, 1-4 mm requires 2 cm, though no studies have evaluated the margin require for thicker than 4 mm, a 3 cm margin is often recommended.[32, 43-45]

The depth of excision depends on the anatomical location. Excision should extend to the underlying fascia in general, and to subgaleal plane in the scalp. No universal agreement on those locations where the deep fascia is not apparent such as in the face.[38]

Melanoma of thinner than 0.76 mm have a risk of recurrence of 1% per year, that of 1.5-4 mm is

of 12-19% per year for the first two years and gradually drop to 5% per year in the fifth year. Tumour thicker than 4 mm has a 30% risk of recurrence in the first year, the rate changed to 12% per year in each of the following three years.[46,47]

Benign tumours

The list of benign tumours that lead to medical attention is extensive. The lesions require surgical removal are those of uncertain pathology, or that of cosmetic concern. Occasionally, some other personal reasons like advice from a fortune teller or removal is believed to change ones luck also affects the decision. Despite the various reasons, these lesions of concern are most often those on the face and exposed areas, aesthetic outcome after the treatment is then an important element in selecting the treatment of choice. Many ablative methods are used, chemical ablation, laser removal, electrical fulguration or surgery are common examples. All other modality except surgical removal and closure create wounds that are left to re-epithelialize or heal by secondary intention. Such outcome may create depressions and prolonged erythema which are not very appealing and sometimes even require revision at a later stage. This corresponds to the principle of wound healing that a clean sharp incised wound that is opposed properly would heal better and result in a near-invisible scar. Healing with secondary intention induces a prolonged inflammatory process and healing with a heavy element of fibrosis, i.e. scar. Though it is frequently observed that healing on the face which is a very vascularised area result in good scar, this applies in small wound but may not be so in larger wound. Thus it is not the practice of the author to let the wound heal with secondary intention, and to choose ablative methods apart from surgical removal and closure in the lesions bigger than 3-4 mm in diameter, it is especially true in cosmetic removal of facial lesions.

Conclusion

Skin tumour is a common compliant that makes a patient turn up in medical consultation. As the tumours can be malignant or benign, it appears important for clinicians to be familiar with a variety of surgical procedures to achieve successful biopsy and adequate management. Proper selection of a biopsy technique is essential in making a correct diagnosis. When properly performed, the biopsy can be helpful in determining the extent and the choice of subsequent management. Once the diagnosis has correctly been made, selecting the most appropriate treatment is next logical step. In different institution and clinician's preference, a different approach may be required. It must be emphasised that the approach for diagnosis and treatment for each patient must be individualised. Since the lesions are commonly located in exposed area, aesthetic consideration must be included in the formulation of treatment plan with the patient. When the tumour has been adequately ablated, the wound can be closed primarily, or covered with different reconstructive methods which include skin grafting, local flaps, distant flaps and free flaps.

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