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What is the Role of the Dermatologist in the Management of Skin Cancer?

In 1096 William, Archbishop of Rouen, France prohibited the wearing of a beard, sparking a prosperous age for those who took on a career as a barber. As the fashion spread throughout Europe, the barbers came to be held in high regard and common people and Royalty alike trusted the barbers' ability in not only shaving and haircutting, but to slice off unsightly skin growths that had developed. The barber-surgeons were also thought to have expertise in the areas of blood-letting, cauterisation, wound-closure and tooth extraction. The Company of Barbers guild merged with surgeons by order of Henry VIII in 1540 and came under the name of United Barber-Surgeons Company in England.¹

The barber-surgeons were the first surgical dermatologists and despite probable sepsis by way of their unsanitary techniques, it is also likely that they inadvertently excised malignant lesions. Today, skin cancer management is a multidisciplinary endeavour by dermatologists, plastic surgeons, pathologists, cancer physicians, surgical oncologists and radiologists. In the Western world it is also a public health concern where fair skin and increased sun exposure has caused melanoma incidence to

increase in the UK from 6.4 to 47.1 per 100,000 of the over 65 population between 1975 and 2005.²

The role of the surgical dermatologist in skin cancer management involves; examination, clinical diagnosis, biopsy, surgical excision, appropriate treatment of draining lymph nodes, follow up and managing metastatic disease. Patient communication is essential in order to educate patients on appropriate behaviour in the sun and on self-examination. It is also paramount importance when breaking bad news, or indeed giving reassurance when a lesion is benign.

For the UK dermatologist, skin cancers will be a feature of many of the differential diagnoses. Their role therefore is to primarily identify the lesion based on clinical features and history. Though incidence in skin cancer has increased in recent years, a decrease in tumour thickness has also been reported,³ representing improved early clinical recognition and therefore a more optimistic prognosis for the patient.⁴

If one suspects a malignant tumour, a biopsy to confirm or refute suspicions can be particularly useful when the larger lesion could prompt an unnecessarily wide excision requiring complex closure. Before biopsy or surgery, the patient must be fully informed of recovery and follow up protocol, and the likelihood of bleeding, scarring, or the need for further procedures. When taking a pre-operative history, it is useful to determine if the currently patient has hypertrophic or keloid scars as this may occur at incision sites of prone patients.

Different skin biopsy techniques exist. A shave biopsy is employed for benign lesions whereas a punch biopsy is suitable for biopsies of some tumours. Both however are limited in assessing only the upper levels of the lesion. Full-thickness incisional biopsies or excisional biopsies allow the pathologist to examine the whole depth of the tumour and its edges. This is the method of choice for suspected melanoma and for differentiating between keratoacanthoma and squamous cell carcinoma.⁵ The ellipse excisional biopsy is the most commonly used technique when assessing skin cancer as it allows the pathologist to examine the edge of the specimen and comment on the progression of pathology from normal skin to tumour. The shape of the excised tissue also lends itself to straightforward wound-closure, though additional absorbable subcutaneous sutures may be necessary for larger excisions.

Management depends on cancer type, site and size of the lesion, tumour staging and wishes of the patient; though a common characteristic of management in all skin cancers is excision.^{6 7 8} Practice in dermatological surgery has grown over the last 25 years due to an increase in skin cancers which require surgical treatment.⁹ Furthermore, as skin cancer incidence increases with age, prevalence too is only set to rise with the increasing elderly population.¹⁰

Basal Cell Carcinoma (BCC) is the most common skin tumour in Europe and Australia¹¹ and is usually seen in the head and neck, where anatomical location may favour the development of a particular subtype.¹² Sun exposure is the major risk factor and so it is most often seen in elderly Caucasians. Typically inspection shows a skin-coloured nodule with a 'pearly' quality. It is soft in consistency and therefore easily injured by minor trauma such as shaving. The term 'rodent ulcer' is used to

describe the then ulcerated surface of the tumour. Once ulceration occurs, secondary bacterial infection can lead to irritation and discharge - requiring topical antibiotics prior to surgery. BCC rarely metastasises¹³ but is a locally infiltrative and destructive tumour; therefore non-treatment is not an option.

Simple primary nodular BCCs may be removed by curettage and cautery, however the wound heals with an unsightly pale, depressed scar and as such C&C is only suitable for BCCs in areas where this is not a concern. This is also not a suitable option for recurrent BCC with overall 5 year cure rates around 60%¹⁴

Surgical excision is appropriate for the majority of BCCs and the tissue can be examined histologically to confirm the diagnosis and assess adequate tumour margins. BCCs which are well-defined and less than 2cm in diameter require an excision including a 4mm margin of normal surrounding skin to excise the tumour completely in 98% of cases.¹⁵

Mohs micrographic surgery (MMS) was first developed in 1938 and refined by its inventor Frederik Mohs into the modern technique in the 1970s.¹⁶ Excised skin with narrow margins around the visible tumour is stained and examined under the microscope by the Mohs surgeon or pathologist. If no free margin of uninvolved skin is seen, further serial excision continues until the complete circumference of the excised edge can be said to be tumour-free. Mohs achieves the lowest recurrence rates for BCC.¹⁷ It is particularly appropriate for treatment of recurrent, poorly defined, histologically aggressive, incompletely excised, large tumours and those arising in areas such as the face where preservation of normal skin is important for an

optimum cosmetic result.¹⁸ The excised tissue may be frozen or formalin-fixed (slow Mohs); the latter may be processed automatically and therefore requires less technician time than frozen tissue, but this is at the expense of a longer waiting time for the patient.¹⁹ Though it is the treatment of choice for recurrent BCC, Mohs' procedure is more time-consuming and expensive than standard surgical excision. Debate remains on whether MMS should be used for primary tumours as standard surgical excision remains a highly effective option following histologically complete excision with a less than 2% recurrence after 5 years.²⁰

Squamous Cell Carcinoma (SCC) is the second most common skin cancer but the most common skin cancer in darker skin.²¹ It is derived from the epidermal keratinocytes or epidermal appendages and is locally invasive. The potential to metastasize is associated with immunosuppressant therapies, size of the tumour, tumour growth rate and location.²² Risk factors include human papilloma virus infection which is known to be associated with squamous cell carcinoma of the genitalia, and may have a role in the development of cutaneous SCC.²³ Chemical carcinogens such as arsenic and chromium may also contribute to SCC development, and exposure should be determined when taking a history. In the 1940s and 50s, ionising radiation was used to treat skin conditions such as acne and dermatitis with resultant development of SCC.²⁴ Patients with albinism are more likely to develop early-onset skin tumours, especially SCC²⁵, which are most frequently seen on the ear, lip and dorsa of the hands and appear as a wart-like or crusted nodule which is tender on palpation. Surgical excision for small tumours should be removed with a 3-5mm margin with larger margins for larger tumours.²⁶ High risk tumours are best excised by wide excision or Mohs surgery with adjuvant radiation therapy. These

patients should be kept under review for 5 years due to a higher risk of regional and local recurrence. For patients with Xeroderma pigmentosa, multiple SCCs may develop. Surgery may not be the best option in this case and systemic retinoids should be considered to impede the development of new lesions.²⁷ Intraepidermal carcinoma or Bowen's disease may resemble SCC and in fact may progress to invasive SCC on rare occasion.²⁸

Merkel Cell Carcinoma (MCC) is aggressive, with a tendency toward local recurrence with lymph node involvement. Guidelines for treatment have not been standardised due to the rarity of the condition, though a multimodality approach is favoured with wide local excision (3cm margin) being appropriate if feasible, sentinel lymph node dissection and radiotherapy to eliminate the high incidence of regional metastases.²⁹

Malignant melanoma arises from the melanocytes of the epidermis and can be identified using the Glasgow 7-point or the American ABCDE methods.

Major Features	Minor Features
Change in Size	Diameter > 7mm
Irregular Shape	Inflammation
Irregular Colour	Oozing
	Change in sensation

- A** Asymmetry
- B** Border Irregularity
- C** Colour Variation
- D** Diameter > 6mm
- E** Evolving (i.e. growth, changing appearance)

Commonly recognised risk factors include sun exposure, blistering sunburn, Fitzpatrick skin type 1, common moles and genetic influences such as congenital melanocytic nevi and CDKN2A and CDK4 gene mutations.^{30 31 32} Ultraviolet B radiation is important in causing both sunburn in the short term, and in the long-term development of skin cancer.³³ Psoralen plus ultraviolet A therapy is used in the treatment of psoriasis, though number of treatments and dose are limited due to an increased long-term risk of developing skin cancer.³⁴ Dermatoscopy allows closer inspection of the lesion and an initial assessment that is clinically suspicious of melanoma should include a full skin examination including the soles of the feet and subungual areas.

Melanoma can be separated into 4 categories; superficial spreading, nodular, lentigo maligna and acral melanomas. Superficial spreading malignant melanoma comprises around 80% of all melanomas in Caucasians, while acral melanoma of the palms and soles is the rarest in Caucasian skin, but the commonest in Asian skin.³⁵ Melanoma should be graded by the TNM staging classification³⁶, where tumour classification is ascertained using Breslow thickness - the distance between the granular layer of the skin to the deepest tumour cell.³⁷ Recommended excision margins increase with tumour thickness, with the deep excision margin extending through adipose tissue and down to, but not including, the deep fascia.³⁸

Skin cancer excision presents the surgical dermatologist with a resultant skin defect. Several options are available and the method of wound closure should be planned in advance of tumour excision. Where possible, incisions should be made along the natural lines of the face known as relaxed skin tension lines. Scarring along these

lines tend to be finer and less obvious, whereas incisions made perpendicular to these lines leave wider noticeable scars.³⁹ As the size of the skin deficit increases, the higher the dermatologic surgeon must climb the 'reconstructive ladder' to appropriately close the wound. Small defects may be dressed and left to heal by second intention in areas where suture may give rise to distorted edges. Primary closure using buried dermal absorbable sutures and skin level sutures maintains skin apposition and equalises tension across the wound. Steri-strips™ give extra support to the wound and be applied in addition to sutures, or after the sutures are removed.⁴⁰ Split-thickness and full-thickness skin grafts may be used to cover larger defects where common donor sites are the buttock, abdomen or thigh.⁴¹ In the face however, it is better to use local skin flaps where possible as it gives a better colour match for an optimum aesthetic result. The type of skin flap used will depend on the site of the deficit and traditional flaps may need to be tailored to the individual wound.

There has been a dramatic increase in the need for skin cancer treatment since the 1960s and as such, dermato-oncology and surgical dermatology have evolved into widely represented sub-specialties. Though melanoma incidence is projected to increase, survival is decreasing due to an increased public awareness and improved clinical and surgical management. Maintaining this standard of clinical practice is imperative for furthering the improvements in skin cancer management in order to cope with the projected increasing demand. For the surgical dermatologist, this will include continuing education in current research, management protocols and the newest surgical techniques.

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