The management of malignant skin cancers

Shaheel Chummun

Neil R McLean

Abstract

Malignant skin cancers are common and are ever increasing annually. They can be divided into two main groups, non-melanoma skin cancers (NMSC), which include basal cell carcinoma and squamous cell carcinoma, and malignant melanoma. This article reviews the various surgical and non-surgical treatment modalities available for the management of skin cancers.

Keywords Basal cell carcinoma; malignant melanoma; skin cancer; squamous cell carcinoma

Introduction

Skin cancer is one of the most common forms of cancer diagnosed in the United Kingdom, with large increases in the number of patients diagnosed in recent decades. Increased exposure to ultraviolet (UV) light remains the most important modifiable risk factor.

Skin cancer can be divided into two main groups, namely malignant melanoma (MM) and non-melanoma skin cancer (NMSC), of which basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) are two of the most common types. Both BCC and SCC are caused by chronic and repeated exposure to sunlight, while malignant melanoma has a stronger association with sporadic intense sun exposure and a history of sunburn, instead of regular and prolonged exposure.

The use of sunbeds before the age of 35 has been shown to increase the risk of malignant melanoma and their use at any age increases the risk of squamous cell carcinoma.[1] The Sunbeds (Regulation) Act 2010 makes it illegal for the under-18s to use sunbeds.

Epidemiology

Over the last 30 years, the incidence of malignant melanoma has quadrupled, and this increase has been more rapid than in any of the 10 commonest cancers in the UK. There has also been a steady increase in incidence with age, with highest rates noted in patients 65 years or older. The increase in incidence has been more significant in MM with Breslow thickness of less than 1 mm. Although this increase is partly due to increased detection and better public awareness, there is evidence that there may be a true rise in the incidence of MM. Mortality rates have also risen in the last 30 years and are worse in men, who tend to present late with thicker tumours.

NMSC is the most common skin cancer diagnosed in the white population worldwide, with BCC being four times more frequent than SCC. It is estimated that approximately 100,000 patients are diagnosed each year in the UK, with an average annual increase in incidence of 3–8%. Despite its high incidence, mortality from NMSCs is mainly from metastatic SCCs and accounts for less than 400 cases each year.

Premalignant lesions

The three most common premalignant lesions are actinic keratosis (AK) and Bowen's disease, which have the propensity to progress to SCC, and lentigo maligna (LM), which can evolve to lentigo malignant melanoma (LMM). These are caused by excessive UV light exposure, and are more common in patients with fair hair and light coloured eyes.

The skin consists of a superficial epidermal layer and a deeper dermal layer, separated by a basement membrane, with epidermal keratinocytes migrating upwards from the basement membrane. Any UV light damage can lead to aberrations in the keratinocyte differentiation process, producing what is clinically seen as AK and Bowen's disease. Lesions are referred to as being in situ if the abnormal cells are restricted to the epidermis, and are malignant or invasive if the cells breach the basement membrane, where they can metastasize via the lymphatics and blood vessels. Invasive SCCs and melanomas frequently arise de novo.

Actinic keratosis (AK), also known as solar keratosis, occurs on sun-exposed skin and 20% of fair-skinned individuals in the UK older than 60 years are estimated to have one or more AKs. AKs typically manifest as small, raised, scaly erythematous lesions over sun-exposed skin. Surrounding areas may show evidence of solar elastosis, such as telangiectasia, blotchy hyperpigmentation, and yellow discolouration of the skin. The actual rate of progression to SCC is unknown, and is thought to range between 0.1 and 16%;[2] 25% of AKs are thought to regress spontaneously. Because of the variable natural history of AKs and the lack of clinical predictors to conversion to SCCs, they are best treated either surgically or non-surgically.

Bowen's disease, known as SCC in situ, is caused by prolonged exposure to sunlight, and unlike AK, has a greater female preponderance (3:1) and is more common on the legs. The rate of progression to invasive SCC ranges between 3 and 5%. Patients often present with an asymptomatic, slowly enlarging, erythematous, well-demarcated scaly patch or plaque. Bowen's disease also may occur on mucous membranes. Histological examination often shows features of thickened epidermis with an intact dermo-epidermal junction. A classic history is presentation of a non–steroid-responsive dermatosis. The diagnosis is often based on clinical features, and treatment is warranted because of its potential for progression to invasive SCC.

Lentigo maligna is a type of in-situ melanoma, in which the abnormal melanocytes are restricted to the epidermis. Also known as Hutchinson's freckle, lentigo maligna usually occurs on sun-exposed skin and can be hard to distinguish from a solar lentigo. Between 5 and 15% of lentigo maligna will progress to lentigo maligna melanoma and surgical excision remains the treatment of choice, although in some cases, radiotherapy may be advocated.

Shaheel Chummun *FRCS (Plast) is a Plastic Surgery Specialist Registrar at Frenchay Hospital, Bristol, UK. Conflicts of interest: none declared.*

Neil R McLean *MD FRCS (Plast) is a Consultant Plastic and Reconstructive Surgeon at Wansbeck General Hospital, Ashington, UK. Conflicts of interest: none declared.*

Dysplastic naevus

The dysplastic naevus (DN) remains a surgical conundrum; it shares the benign histological features of the benign common naevus, such as the presence of neoplastic nests of melanocytes, while at the same time exhibiting features of melanoma, including cytological atypia and dermal inflammatory response.[3] Clinically, it is very challenging to differentiate DN from a common naevus and a melanoma. Various therapeutic modalities have been tried in the management of DN, such as 5-fluouracil, imiquimod, isotretinoin and laser therapy. None has proven to be efficacious in ablating the DN.[3]

Surgical excision of the DN is commonly performed with the intention of removing the lesion. In cases of incomplete excision, the NIH Consensus Conference[4] suggested a 2–5 mm re-excision for DN, although no indication for re-excision is defined. One of the reasons for re-excision is the concern that the lesion may represent a melanoma, based on either the surgeon's or patient's concerns or severe dysplasia on histology. Another reason for re-excision is to prevent recurrence, especially if it is thought that the dysplastic naevus may progress to a melanoma.

The National Institute of Health (2013)[3] has set out some recommendations for the management of dysplastic naevi. DN should be considered as a histological variant of the common naevus. Following biopsy, most dysplastic naevi do not require re-excision. However, clinically suspicious naevi should be excised, and those with severe histological dysplasia should be re-excised.

Basal cell carcinoma

Basal cell carcinoma (BCC) is the most common skin cancer in the white populations, representing 75% of all skin cancers. They typically arise in the head and neck area (~83%), followed by the trunk and extremities; ~26% of all BCCs affect the nose alone. Histologically, BCCs arise from the basal layer of the epidermis. UV light plays a significant role in the development of BCCs, and patients with fair skin and light eye colour, who burn rather than tan, seem to be more predisposed to developing BCCs. However, the exact role of UV light is unclear, as patients who tend to develop BCCs usually show less features of photodamage, as is usually the case in patients with SCCs. Intermittent exposure to UV light in childhood and early adulthood may be more significant than chronic exposure, as is the case with SCCs. Other factors include advancing age, a family history of BCCs, immunosuppression in the form of AIDS or following immunosuppressive drugs, premalignant lesions (naevus of Jadassohn, with a 10–15% risk of transformation to BCC) and the presence of pre-disposing conditions such as Gorlin's syndrome and xeroderma pigmentosum. Exposure to ionizing radiation, arsenic and hydrocarbons also contributes to the development of BCCs. The most common subtype of BCC is the nodular BCC (50–60%), which presents as a flesh coloured, pearly nodule with telangiectasia. Other subtypes include superficial spreading (15%), micronodular (15%), infiltrative (7%), pigmented (2%) and the morpheic or sclerosing (2–3%) BCC, typically presenting as an enlarging scar, and is associated with a high rate of positive margins following excision (Figure 1). Features associated with an increased risk of recurrence include location (periorbital, nose, peri-oral, nasolabial folds, pre and post auricular), histological subtype (morpheic or infiltrative), ill-defined borders, size of the tumour (>2 cm), and immunosuppression.

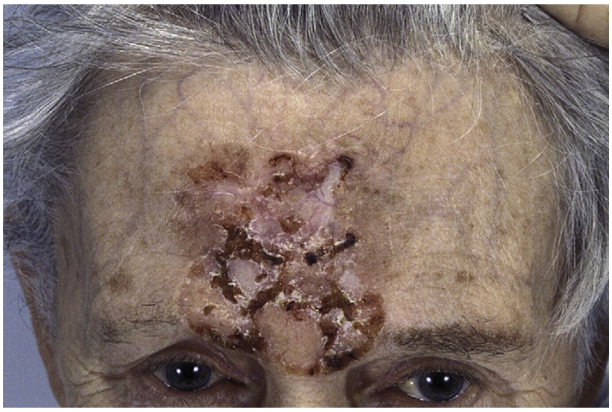

Figure 1 Morpheic basal cell carcinoma of the forehead.

Squamous cell carcinoma

Squamous cell carcinoma (SCC) is the second most frequent skin cancer, occurring mainly in the sun-exposed areas. It can arise de novo or as a result of progression from precancerous lesions such as AK or Bowen's disease. It has a predilection for the head and neck area, mainly the ear, scalp, and lip (Figure 2). Other areas include the dorsum of the hand, forearm and leg. SCCs arise from the basal keratinocytes and undergo uncontrolled growth as they migrate from the proliferative basal layer. They can present as nodular lesions or plaques, with differing degrees of keratinization, which can be in the form of a keratin horn or plug. SCCs also present as ulcers, or arise from chronic wounds, such as burn scars, benign ulcers and sinus tracts (Marjolin's ulcer). SCCs tend to be more common in men, and demonstrate a higher incidence with geographical variation, increasing significantly at lower altitudes. Chronic exposure to UV light plays a significant role in the development of SCCs, especially in lightly pigmented skin. Exposure to carcinogens, such as pesticides, arsenic, organic hydrocarbons and betel leaves can lead to SCCs. Immunosuppression represents a significant risk, especially in renal transplant patients and those with human papilloma virus infection. As with other tumours, SCCs can be graded as well, moderately or poorly differentiated tumours, with the latter associated with a worse prognosis. Unlike BCCs, SCCs tend to be more aggressive and can metastasize not only to the regional nodal basin, but also to the lungs, liver, brain, skin and bone.

It is not clear whether keratoacanthomas represent another variant of SCCs that do not metastasize, or they are an entity on

Figure 2 Squamous cell carcinoma of the upper lip.