

## Comparison of Completely versus Incompletely Excised Cutaneous Squamous Cell Carcinomas

P Ang,<sup>1</sup> MBBS, MRCP (UK), AWH Tan,<sup>2</sup> MBBS, MRCP (UK), CL Goh,<sup>3</sup> FAMS, M Med, FRCP (Edin)

### Abstract

**Introduction:** This is a retrospective case series of cutaneous squamous cell carcinomas (SCCs) which were incompletely excised in National Skin Centre, Singapore from 1991 to 1995. This study compared the characteristics of completely excised versus incompletely excised cutaneous SCCs. **Materials and Methods:** All patients with histologically confirmed SCCs were traced from computerised medical database and information regarding patient profile, tumour characteristics, surgical treatment and outcome were collated. All patients were recalled for clinical examination and documentation of cure. Completely excised and incompletely excised SCCs were compared with regards to the patient and tumour characteristics. **Results:** There were 57 patients with 63 SCCs who were treated with surgical excision over the 5-year period. Fifty were recalled for physical examination. There were 30 males and 27 females and their mean age was 83.3 years. All except 1 were Chinese of Fitzpatrick skin type 4. One-third of patients had daily or weekly sun exposure in the past and 21.1% had occupational sun exposure; 3.5% had prior arsenic exposure and 3.5% were previously treated with radiotherapy for other malignancies. The mean duration of SCCs was 18.7 months; 7.9% of patients had multiple SCCs and 15.9% had underlying actinic keratoses. The mean diameter of the tumours was 1.97 cm and nearly half were located on the head and neck. All the SCCs were primary and localised to the skin; 84.1% of them were completely excised with a 4 to 6 mm margin. Incompletely excised SCCs were associated with the male sex, larger tumours and tumours on the genitals and lower limbs. **Conclusion:** In our experience, the tumour clearance rate is 84.1% following conventional excision. Incomplete excision is associated with male sex, larger tumours and those on the genitals and lower limbs.

Ann Acad Med Singapore 2004;33:68-70

**Key words:** Incomplete excision, Squamous cell carcinoma, Tumour clearance

### Introduction

Non-melanoma skin cancer is the most common skin cancer worldwide and its incidence has risen in the last few decades.<sup>1-3</sup> Approximately 80% of non-melanoma skin cancers are basal cell carcinomas and the rest are squamous cell carcinomas (SCCs). While the former grow slowly by contiguous extension and are largely localised, SCCs have the potential to metastasize to regional lymph nodes and distant organs via the blood stream, and hence are associated with a higher mortality rate. SCCs can be treated with various techniques, including curettage and electrodesiccation, cryotherapy, radiotherapy, surgical excision and Mohs micrographic surgery.<sup>4</sup> We report our data on completely versus incompletely excised SCCs in our series of patients.

### Materials and Methods

All patients with histologically confirmed SCCs which were excised in the National Skin Centre from 1991 to 1995 were traced from computerised records and the data collated. Histologically unconfirmed SCCs, SCCs treated with other modalities and in situ SCC were excluded. Information regarding the patients' sex, age, aetiological risk factors, tumour duration, tumour characteristics, surgical treatment and outcome were recorded. All patients were also recalled for physical examination. Tumours which were completely excised and incompletely excised were placed into two subgroups and compared.

### Results

A total of 57 patients and 63 SCCs were identified over this

<sup>1</sup> Consultant

<sup>2</sup> Registrar

<sup>3</sup> Medical Director and Senior Consultant  
National Skin Centre, Singapore

Address for Reprints: Dr Ang Por, National Skin Centre, 1 Mandalay Road, Singapore 308205.

period. There were 30 males and 27 females, giving a ratio of 1.1 to 1. All were Chinese with Fitzpatrick skin type 4 except for 1 Caucasian. Their ages ranged from 52 to 104 years, with a mean of 83.3 years. One-third (19/57) of patients had daily or weekly sun exposure in the past and 21.1% (12/57) of patients had past or present occupational sun exposure. Two (3.5%) patients had prior arsenic exposure and 2 (3.5%) were previously treated with radiotherapy for other malignancies. None were transplant recipients or immunosuppressed. Only 1 patient had psoriasis treated with ultraviolet A (UVA) phototherapy.

The SCCs were present for a mean duration of 18.7 months before diagnosis (range; 3 weeks to 120 months). Almost half (30/63, 47.6%) of the SCCs were located on the head and neck, 25.4% (16/63) on the lower limbs, 19% (12/63) on the upper limbs, 4.8% (3/63) on the genitals and 3.2% (2/63) on the trunk. The mean diameter of the SCCs was 1.97 cm; 15.9% (10/63) of tumours had underlying actinic keratoses. None had metastases to regional lymph nodes or distant organs.

Of all 63 SCCs which were excised with 4 or 6 mm margins according to hospital guidelines, 10 (15.9%) were found to be incompletely excised on histology (Table 1). These were from 10 different patients. Surgical failure was defined as residual tumour at or within 1 mm to the lateral or deep margins of the excised specimen. The mean age of the 10 patients was 80.6 years, and 70% were males (Table 1). Four tumours were on the head and neck, 3 were on the lower limb, 2 were on the genitals and 1 on the upper limb. There was a higher proportion of tumours located in the genitals and lower limbs in this subgroup. The mean tumour diameter was 2.28 cm, which was bigger than that of completely excised tumours. Seven underwent successful re-excision, one had re-excision followed

by radiotherapy, one declined further surgery and was treated with radiotherapy alone, and 1 defaulted on follow-up.

The patients in the subgroup of incompletely excised tumours were mostly males (70%), and the tumours tended to be slightly larger (2.28 cm), with a higher proportion on the genitals (20%) and lower limbs (30%).

Fifty patients (87.7%) were contacted or recalled for clinical examination. Eight of these patients had died from other causes. The rest were documented to have been cured of the SCCs at time of last follow-up; none had clinical evidence of recurrence. The mean follow-up was 71.1 months (range, 28 to 109 months). Seven patients could not be contacted.

## Discussion

SCC is a non-melanoma skin cancer with a significant potential for invasive growth, metastasis and death. Known risk factors for the development of SCCs include ultraviolet radiation, fair skin, phototherapy with psoralen and UVA (PUVA), ionising radiation, chemical carcinogens (such as arsenic and polycyclic aromatic hydrocarbons), immunosuppression, certain genodermatoses (such as xeroderma pigmentosum and chronic scars) and inflammatory skin disorders.<sup>4</sup>

Risk factors for recurrence of SCCs include size >2 cm, certain anatomical sites (such as lips, ears, central face and genitals) rapid growth, recurrent tumour, immunosuppression, site of previous irradiation or chronic inflammatory process, poorly differentiated histology, depth >4 mm and perineural or vascular invasion.<sup>4,5</sup> The recommended surgical margins for excision of SCC are 4 mm for low-risk SCCs and 6 mm for high-risk SCCs.<sup>6</sup> Low-risk SCCs are <2 cm in diameter, primary, well-defined, occurring in non-immunocompromised

Table 1. Patient and Tumour Characteristics of Completely and Incompletely Excised SCCs

Variable	All SCCs (57 patients, 63 tumours)	Completely excised SCC (n = 53)	Incompletely excised SCC (n = 10)
Sex			
Male	52.6% (30/57)	48.9% (23/47)	70% (7/10)
Female	47.4% (27/57)	51.1% (24/47)	30% (3/10)
Mean age (Range)	83.3 (52-104) years	83.9 (52-104) years	80.6 (54-99) years
Primary or recurrent	Primary	Primary	Primary
Past history of non-melanoma skin cancers	5.2% (3/57)	6.4% (3/47)	0%
Past radiation	3.5% (2/57)	2.1% (1/47)	10% (1/10)
Past arsenic exposure	3.5% (2/57)	2.1% (1/47)	10% (1/10)
Mean tumour size (Range)	1.97 (0.4-6.0) cm	2.06 (0.4-6.0) cm	2.28 (0.5-5.0) cm
Mean duration of tumour (Range)	18.7 (0.75-120) mo	19.9 (2-120) mo	18.4 (0.75-60) mo
Location of SCCs			
Head and neck	47.6% (30/63)	45.3% (24/53)	40.0% (4/10)
Trunk	3.2% (2/63)	3.8% (2/53)	0% (0/10)
Genitals	4.8% (3/63)	1.9% (1/53)	20.0% (2/10)
Lower limbs	25.4% (16/63)	4.5% (13/53)	30.0% (3/10)
Upper limbs	19.0% (12/63)	20.8% (11/53)	10.0% (1/10)

SCCs: squamous cell carcinomas

patients, slow-growing, without neurological symptoms, well-differentiated and without perineural or vascular involvement.<sup>4,5</sup> High-risk SCCs have the opposite features.

The patients in our case series are predominantly Chinese with skin type 4, with the exception of 1 Caucasian. The sex ratio and age group in our cohort correspond to those in other epidemiological studies.<sup>4</sup>

Most (33.3%) of our patients reported frequent sun exposure and a small proportion were exposed to radiography arsenic or PUVA. Surprisingly, none were immunosuppressed, transplant recipients or had tumours arising from chronically inflamed skin.

The SCCs were mostly located on the head and neck, which correspond to areas of sun exposure. They can be classified as predominantly low risk as most of them were <2 cm in size, primary, in non-immunosuppressed patients and not in sites of previous radiotherapy or chronic disease. None were associated with enlarged lymph nodes.

We evaluated the clearance rate of conventional excision with postoperative margin assessment in our hospital, which does not offer Mohs micrographic surgery. Mohs micrographic surgery is a technique of serial surgical excision followed by on-the-spot histological assessment of margins in a horizontal plane by the surgeon. This method offers high cure rates with maximal preservation of normal tissue and is useful for clearance of skin cancers like basal cell carcinomas and SCCs. However, it is time- and labour-intensive.

Our success rate in achieving tumour clearance with conventional excision is 84.1%; subsequent treatment for incompletely excised tumours achieved a cure rate of at least 90% with a mean follow-up of 71.1 months. This success could be partly due to the low-risk nature of SCCs in the series. Most audits and studies of surgical clearance rates pertain to basal cell carcinomas with surgical failure rates of between 4% to 16%.<sup>7-11</sup> One study reported a surgical failure rate of 11.2% for SCCs with conventional surgery.<sup>12</sup>

The difference in anatomical sites for both subgroups could be due to the difficulty of surgery in the genital area or anticipated problems with surgical closure in the lower limbs, hence a more conservative margin. In addition, a higher proportion of tumours on the limbs are removed by less experienced dermatologists, as compared to head and neck tumours which are usually referred to more experienced dermatologic surgeons or plastic surgeons. However, the subgroup with incompletely excised SCCs was very small, and the data should be subjected to cautious interpretation. Statistical

analysis was not carried out in view of the small number of patients. Risk factors reported to be associated with a higher surgical failure rate in SCCs include older patients, in situ SCC and head and neck location, which was not our experience.<sup>12</sup>

## Conclusion

In our experience, conventional surgical excision for cutaneous SCCs with standard surgical margins is associated with a fairly high success rate, which is comparable to that reported in the literature.<sup>12</sup> Surgical failure in this series is associated with male sex, larger tumours and those located on the genitals and lower limbs.

## REFERENCES

- Gallagher RP, Ma B, McLean DJ, Yang CP, Ho V, Carruthers JA, et al. Trends in basal cell carcinoma, squamous cell carcinoma, and melanoma of the skin from 1973 through 1987. *J Am Acad Dermatol* 1990;23: 413-21.
- Gray DT, Suman VJ, Su WP, Clay RP, Harmsen WS, Roenigk RK. Trends in the population-based incidence of squamous cell carcinoma of the skin first diagnosed between 1984 and 1992. *Arch Dermatol* 1997;133:735-40.
- Glass AG, Hoover RN. The emerging epidemic of melanoma and squamous cell skin cancer. *JAMA* 1989;262:2097-100.
- Alam M, Ratner D. Cutaneous squamous cell carcinoma. *N Engl J Med* 2001;344:975-83.
- Miller SJ. National Comprehensive Cancer Network (NCCN) guidelines of care for non-melanoma skin cancers. *Dermatol Surg* 2000;26: 289-92.
- Brodland DG, Zitelli JA. Surgical margins for excision of primary cutaneous squamous cell carcinoma. *J Am Acad Dermatol* 1992;27: 241-8.
- Blomquist G, Eriksson E, Lauritzen C. Surgical results in 477 basal cell carcinomas. *Scand J Plast Reconstr Surg* 1982;16:283-5.
- Rippey JJ, Rippey E. Characteristics of incompletely excised basal cell carcinomas. *Med J Aust* 1997;166:581-3.
- Griffiths RW. Audit of histologically incompletely excised basal cell carcinomas: recommendations for management by re-excision. *Br J Plast Surg* 1999;52:24-8.
- Kumar P, Orton CI, McWilliam LJ, Watson S. Incidence of incomplete excision in surgically treated basal cell carcinomas: a retrospective clinical audit. *Br J Plast Surg* 2000;53:563-6.
- Hallock GG, Lutz DA. A prospective study of the accuracy of the surgeon's diagnosis and significance of positive margins in non-melanoma skin cancer. *Plast Reconstr Surg* 2001;107:942-7.
- Chiller K, Passaro D, McCalmont T, Vin-Christian K. Efficacy of curettage before excision in clearing margins of non-melanoma skin cancer. *Arch Dermatol* 2000;136:1327-32.