

Nonmelanoma Skin Cancer: A Five-year Retrospective Study in Social Hygiene Service of Hong Kong

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ABSTRACT

Nonmelanoma skin cancer, including basal cell carcinoma and squamous cell carcinoma, is the commonest skin cancer in Caucasians. Its incidence is rising, due to increased ultraviolet exposure as a result of a change in lifestyle and holiday habit. The characteristics of nonmelanoma skin cancer among Caucasians, including the demographic data, predilection sites, natural history of the disease, morbidity and mortality, are well documented. However, the details of the disease in local Chinese are not well established. This is the first survey to look at the demographic data and clinical characteristics of nonmelanoma skin cancer in patients, who are mostly Chinese, attending the dermatology clinics of Social Hygiene Service in Hong Kong.

Keywords: nonmelanoma skin cancer, demographic data, clinical characteristics, Chinese, Hong Kong

INTRODUCTION

There is a worldwide increase in the incidence of nonmelanoma skin cancer (NMSC).^{1,2,3} It is the most common form of skin cancer and malignancy in Caucasians. The life time risk of an American to have NMSC was estimated as 20%.⁴ Approximately 900,000 to 1,200,000 new cases per year were diagnosed in the United States.⁵ NMSC has posed a serious problem in western countries because of considerable disfigurement, functional loss and significant economic burden associated with its treatment.

The cause of NMSC is multifactorial and complex, involving an interaction between host and environmental factors.⁵ The host factors include old age, male gender, skin type I, childhood freckling, Celtic ancestry, hair colour (red, blond or light brown), eye colour (blue or light colour), fair skin and various genodermatoses.⁶ Ultraviolet light exposure is the principal pathogenic environmental factor acting through induction of DNA mutations in epidermal cells⁷ and immunosuppression.⁸

The worldwide increasing trend of NMSC is probably related to increased sunlight exposure as a result of changing lifestyle and holiday habit. Sun exposure in young age initiates a process of carcinogenesis that manifests 40 to 60 years later.⁹ Furthermore, longer life expectancy of people nowadays allows extended process of carcinogenesis. Ultraviolet light accumulation is further aggravated by stratospheric ozone layer depletion. This resulted in an increase in annual incidence of basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) by three and five percent respectively for every one percent reduction of the average thickness of ozone layer.¹⁰

NMSC is comparatively less common in non-Caucasian races,^{11,12} probably due to photo-protection by melanin pigment, or to genetically determined difference.¹³ In Hong Kong, skin cancer is expected to gain more importance. This is because our younger generation is adopting the western life style with more outdoor recreational activities and hence more ultraviolet light exposure. In addition, our geriatric population is growing and reaches more than 10% of our total population.¹⁴ Therefore, it is worthwhile to begin our first local survey to study the demographic data, pre-existing skin diseases and clinical characteristics of NMSC in patients attending the dermatology clinics of Social Hygiene Service.

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MATERIAL AND METHODS

All case records, histological records and clinical photographs of patients with a histological diagnosis of BCC and/or SCC, seen in Social Hygiene Service from 1993 to 1997, were retrieved for data analysis. Lesions which were recurrent or re-excised were excluded. Data including age, sex, pre-existing skin diseases and clinical characteristics of the lesions (including site and clinical type) were recorded.

Chi-square test, using Statistical Package for Social Studies, was applied to analyze the difference in site distribution and clinical types between Chinese and Caucasian BCC patients. This cannot be done in SCC patients because all of them are Chinese in this study.

RESULTS

1. Patient characteristics/demographic data

BCC (Table 1, Figure 1)

There were 273 patients with histological

diagnosis of BCC. Ten patients were excluded because the records were incomplete. The studied patients included 202 Chinese (76.8%), 59 Caucasians (22.4%) and two patients of other ethnic origin (0.8%). Clinical data of the two patients of other ethnic origin, one Thai and one Indian, were not further studied. None of our patients had both the diagnoses of BCC and SCC. The total number of lesions were 208 for Chinese and 65 for Caucasians.

The male to female ratio for Chinese and Caucasian patients was 1:1.46 and 4.36:1 respectively. The mean age for Chinese patients was 66.2 years for male, 70.7 for female and 68.9 for both sexes. The youngest male patient was a four-year-old Chinese boy with nevoid basal cell syndrome whereas the youngest female patient was a 28-year-old Chinese lady suffering from xeroderma pigmentosa. The age distribution pattern showed that 91% of patients were greater than 50 years old in both sexes (Figure 1).

For Caucasian patients, the mean age for male, female and both sexes were respectively 54.5, 51.3 and

Table 1. Patient characteristics

Characteristics	BCC						SCC		
	Chinese			Caucasian			Chinese		
	M	F	Total	M	F	Total	M	F	Total
Number of patients	82	120	202	48	11	59	22	32	54
Male to female ratio	1 : 1.46			4.36 : 1			1 : 1.45		
Range of age (years)	4-88	28-93	4-93	35-83	34-63	34-83	47-90	31-99	31-99
Mean age (years)	66.2	70.7	68.9	54.5	51.3	53.9	70.7	76.4	74.1
Number of lesions	83	125	208	54	11	65	22	33	55

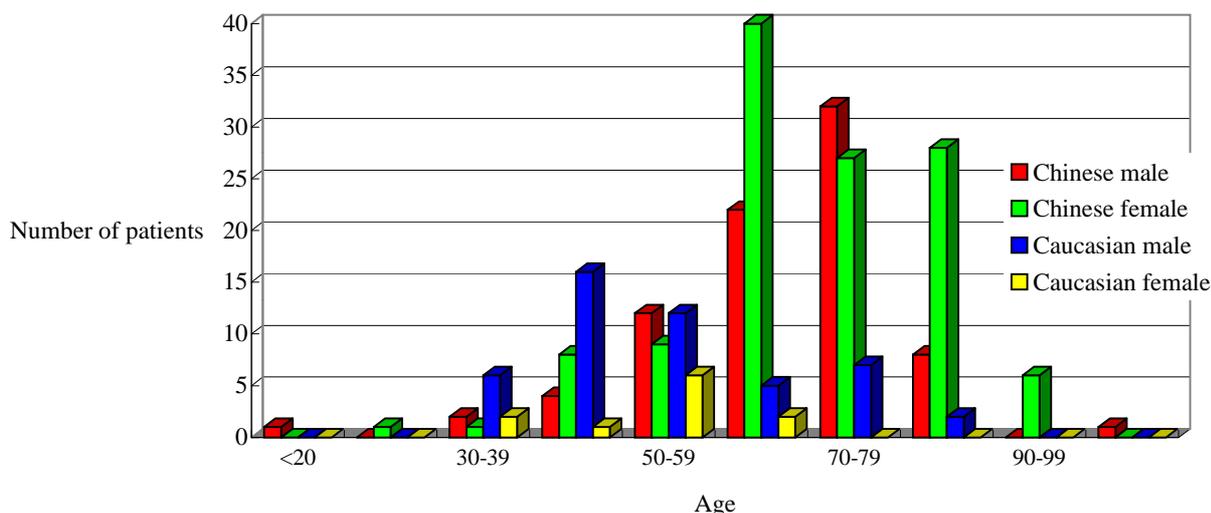


Figure 1: Age distribution of BCC patients

53.9 years. The age distribution pattern showed that only 40% of patients were over 50 years old (Figure 1).

SCC (Table 1, Figure 2)

There were 57 patients with histological diagnosis of SCC. Fifty-four patients were studied and all of them were Chinese. Three patients were excluded because of incomplete records. The male to female ratio was 1:1.45 (Table 1). The BCC to SCC ratio in Chinese was 3.74:1. The mean age were 70.7 years for male, 76.4 for female and 74.1 for both sexes. The age distribution pattern showed that over 90% of patients were older than 60 years old (Figure 2). The total number of lesions were 55.

II. Pre-existing skin diseases

Thirty-six (61%) Caucasian patients had premalignant conditions, including actinic keratosis, Bowen's disease and arsenic keratosis, and 14 (23.7%) had past history of skin cancer.

Among Chinese, 12 (22.2%) SCC patients and only eight (4%) BCC patients had premalignant conditions. One of the SCC patients had arsenic keratosis due to prolonged intake of Chinese herbal medicine containing arsenic for childhood asthma. Past history of skin cancer was uncommon accounting for only six (3%) BCC patients but none of the SCC patients.

Three BCC patients had predisposing conditions, namely nevus basal cell syndrome, xeroderma pigmentosa and naevus sebaceous, and one SCC patient

had the tumour developed at pre-existing varicose venous ulcer.

III. Characteristics of lesions

1. Site of lesions:

BCC (Figure 3)

In Chinese, including both sexes, head and neck region (88.5%) was the commonest site of involvement, followed by trunk (5.8%), limbs (2.9%) and genitalia (1.4%). In Caucasians, 55.4% of the lesions occurred in head and neck region followed by trunk (27.7%) and limbs (16.9%) (Figure 3). The difference between Chinese and Caucasians was statistically significant ($p < 0.001$).

In assessing the frequency of development of NMSC at sites of recognised degree of risk, it was found that the proportion of lesions at high (nose, periocular, perioral, ear, chin), middle (scalp, forehead, periauricular, cheek) and low (neck, trunk, limbs) risk sites in Chinese patients were respectively 49%, 37% and 12.5%. The corresponding figures for Caucasian patients were 23.1%, 29.2% and 47.7%, which was in an inverse order as that in Chinese. The difference between Chinese and Caucasian was also statistically significant ($p < 0.001$).

SCC (Figure 3)

The descending order of frequency of site of involvement, in both sexes, was as follows: head and neck region (65.5%), limbs (20.0%), trunk (10.9%) and genital (3.6%).

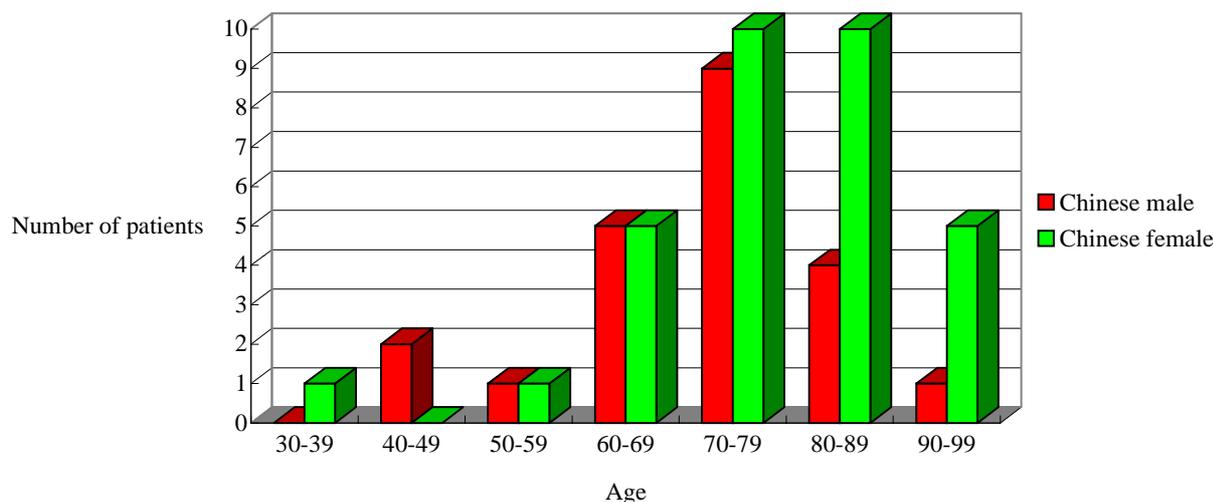


Figure 2: Age distribution of SCC patients

2. Clinical types:

BCC (Figure 4)

In Chinese, pigmented BCC (58.1%) was the most common clinical type followed by rodent ulcer (35.6%), superficial (2.4%), cystic (1.9%) and morphoeic type (1%). On the other hand, pigmented type was rarest in Caucasian patients and occurred in 3.1% of patients only. The most common type was rodent ulcer (58.5%), followed by superficial (29.2%), morphoeic (4.6%) and cystic (4.6%). The difference between Chinese and Caucasian was statistically significant ($p < 0.001$).

SCC

Majority of SCC patients (92.6%) presented as either chronic ulcerated lesions or hyperkeratotic lesions with or without erosion. Few patients (7.4%) presented with erythematous plaque-like lesions.

DISCUSSION

There were many epidemiological studies of NMSC in Caucasian.^{2,3,4,5} The incidence, clinical characteristics and natural history of the disease were

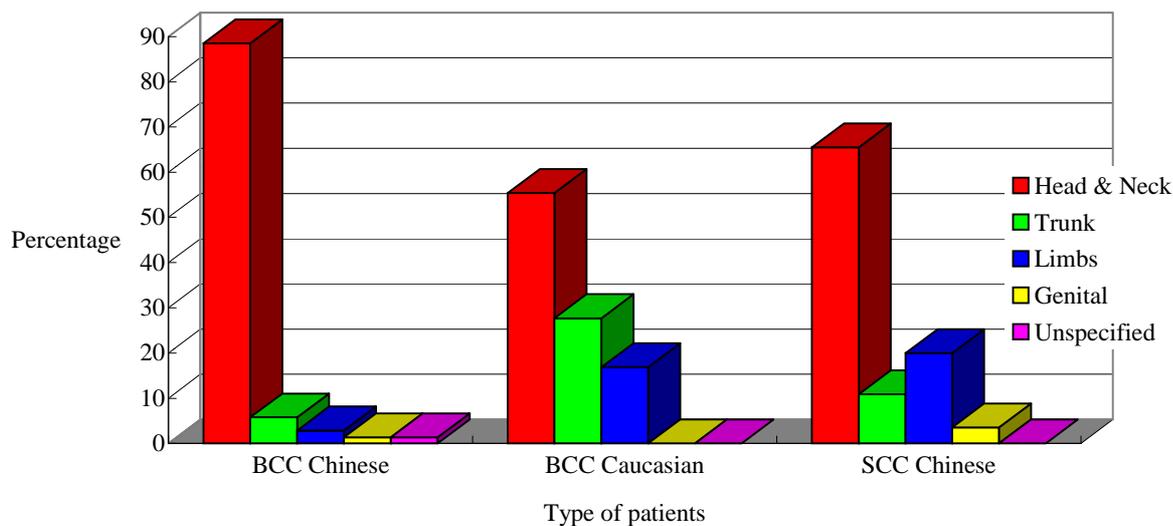


Figure 3: Site distribution of BCC and SCC lesions

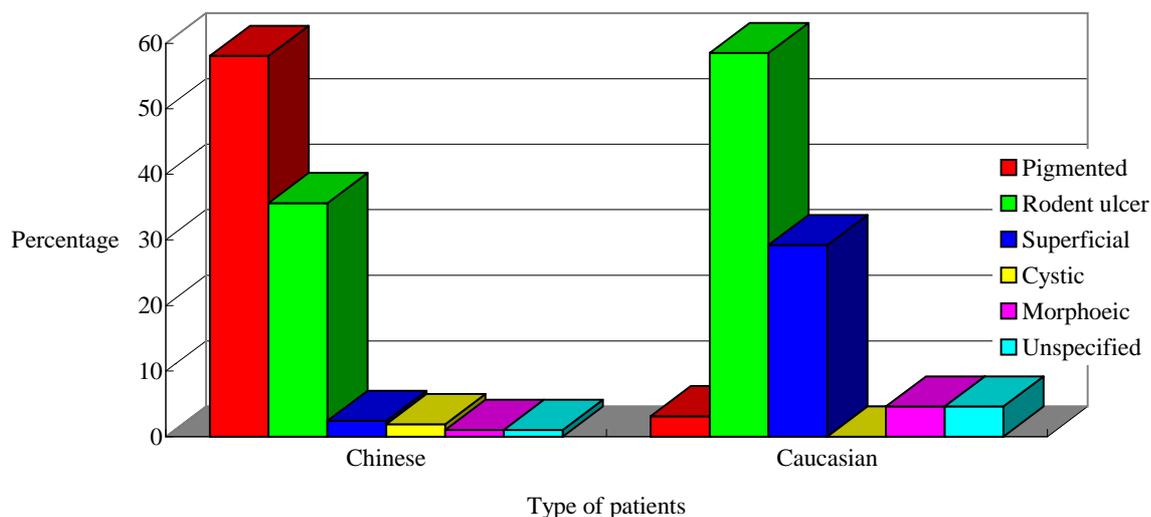


Figure 4: Clinical types of BCC lesions

well recognised in Caucasian. To our knowledge, this was the first survey in an attempt to review the demographic data and clinical characteristics of NMSC patients attending dermatology clinics of Social Hygiene Service in Hong Kong.

Social Hygiene Service in Hong Kong works under the Department of Health and provides care for patients with sexually transmitted disease, skin disease and leprosy in the public sector. The majority of patients are Chinese. The Caucasian patients seen in the service are usually government servants or their dependants. It is a common practice to obtain histological diagnosis on clinically suspicious skin cancerous lesion. Cryotherapy, topical 5-fluorouracil or photodynamic therapy are seldom performed for lesions diagnosed solely on clinical ground. Therefore, by searching through the histological diagnosis of each biopsy done in the service, it is possible to identify most of the target patients.

I. Incidence

We have demonstrated that NMSC was uncommon but not rare in Chinese. Among the approximately 15,000 new dermatological attendees in Social Hygiene Service each year during the study period,¹⁴ majority were Chinese and approximately 80% of NMSC patients presented as new cases. Therefore, the total number of Chinese patients with new NMSC diagnosis per year constituted only a small proportion of the annual total new skin case attendance.

It is impossible to postulate any local incidence rate because a substantial number of patients might be treated in the private sector or other specialties, such as general surgery or plastic surgery. There is no local skin cancer registry here in Hong Kong. Furthermore, any incidence rate based on treated skin cancers alone will be an underestimate because some lesions might be undiagnosed or even treated destructively without histological proof.

There is a worldwide increase in incidence in both BCC and SCC.^{1,4,5} Among Caucasians in the United States, there was a 15-20% increase in incidence rate of NMSC, reaching 233 per 100,000 per year. The BCC to SCC ratio was 4 to 1.⁴ In the United Kingdom, the number of medically treated BCC and SCC increased by 235% and 153% respectively.¹

The age-standardized annual incidence rate of BCC and SCC were respectively 83.1 and 19.0 per 100,000 population.¹⁵

In Southeast Australia, the incidence of medically treated BCC and SCC increased by 11% and 51% respectively.³ In Queensland, a high age-adjusted incidence rates of NMSC was estimated via a population based study: 2,528/100,000/year in men and 1,676/100,000/year in women, with a BCC to SCC ratio of 4.5 to 1.¹⁶ Sixteen percent of men and 14% of women developed at least one BCC, whereas 2.8% of men and 2.2% of women had at least one SCC.¹⁷ Multiple skin cancers occurred in more than half of the subjects at first examination.¹⁷ This was in contrast to the present study that multiple skin cancers at first presentation were uncommon in Chinese.

The incidence of NMSC among Japanese living in Hawaii was 123 per 100,000 person years which was 88 times higher than those living in Japan.^{18,19} A marked increase in incidence was also recorded among Caucasian residing in Hawaii, when compared with those living in North America.²⁰ This might be due to the difference in the latitude of residence which governed the cumulative amount of ultraviolet light exposure. The different lifestyles also contributed. Similarly, Hong Kong is situated in the southern part of China with availability of various types of outdoor recreational activities. It is likely that the local incidence of NMSC might be among the highest in comparison with other provinces of China.

II. Patient characteristics/demographic data

BCC

NMSC occurred mostly in the elderly with male predominance.⁴ In Minnesota, 80% of the BCC patients were greater than 50 years old and the mean age was 64.6 years.²¹ In the present study, the mean age of Chinese BCC patients was greater (68.9 years) and 91% of them were greater than 50 years old. The male to female ratio showed slight female predominance of 1:1.46. These differences in age and sex distribution among various studies could be accounted for by the different age and gender composition of studied population. In Hong Kong, the male to female population ratio was estimated to be 1:1.12 in people greater than 60 years old.¹⁴ Therefore, we would expect to see more female patients with NMSC with increasing age.

In the present study, the mean age of the Caucasian patients were substantially younger and only 40% of them were greater than 50 years old. The male predominance was more evident (4.36:1). Our studied group represented a younger age group because most of them came to work and then returned to their native countries on retirement.

SCC

The incidence of SCC increases more rapidly with age and with cumulative sun exposure than BCC.²² The male to female ratio was 4 to 1. Half of the patients were over 65 years of age.²² As expected, the mean age of our SCC patients (74.1 years) was greater than BCC patients in both sexes (68.9 years). Ninety percent of them were greater than 60 years old. Male predominance, however, was not observed in the present study. This might be accounted for by the relative small number of SCC patients studied.

III. Pre-existing diseases

Among BCC patients, premalignant conditions, mostly actinic keratosis, were uncommon in Chinese (4%) as compared with Caucasian (61%). These occurred more often in SCC patients (22.2%). Actinic keratosis was prevalent in 40% of Caucasian population and increasing number (>20) was associated with three times the occurrence of NMSC.²³ It was not our scope

to investigate the host and environmental factors of NMSC in Chinese. However, the lower association rate of actinic keratosis in Chinese might reflect a higher sun-protection ability. Possibly, immunity and genetic differences might also govern the development of NMSC in Chinese.

IV. Clinical characteristics

1. Site of lesions:

BCC

The site distribution of NMSC in other studies were summarized in Table 2. Comparatively, the site distribution of BCC in Chinese patients simulated those found in Minnesota,²¹ United Kingdom,¹⁵ South Europe,²⁴ and Singapore¹¹ but appeared different from that in Hawaii²⁰ and Southeast Australia.³

The head and neck region was the most frequent site of occurrence in local Chinese (88.5%). This was comparable to results found in Caucasian studies done in Minnesota (84.6%),²¹ United Kingdom (81%),¹⁵ and South Europe (80.5%).²⁴ In all these studies, the order of site distribution was in the same descending order: head and neck, trunk, limbs and genitalia. However, trunk and limb involvement in our Chinese patients was less than Caucasian, in both the present study and other studies.^{15,21,24} This could be due to the fact that local

Table 2. Comparison of NMSC among different studies

Places	Rochester, Minnesota ²¹	South Europe ²⁴	South Wales, UK ¹⁵	Hawaii ²⁰	SE Australia ³	Singapore (Chinese) ¹¹	Present study (Chinese)
Study period	1976-84	1989-93	6 months	1983-87	1990	1980-91	1993-97
BCC							
No. of patients	657	1549	315	242	568	131	202
M/F ratio	1:1.75	1.31:1	1.35:1	3.16:1	--	1.4:1	1:1.46
Mean age (years)	64.6	--	--	56.5	--	--	68.9
Head & neck	84.6%	80.5%	81.0%	54.7%	67.0%	78.8%	88.5%
Trunk	10.6%	14.6%	14.5%	35.8%	19.0%	12.1%	5.8%
Limbs	3.9%	4.5%	4.5%	9.4%	13.0%	7.6%	2.9%
Genital	0.9%	--	--	--	--	0.8%	1.4%
Unknown	--	--	--	--	5.0%	0.8%	1.4%
SCC							
No. of patients		228	56		166	115	54
M/F ratio		3.47:1	1:1.07		2.13:1	1.9:1	1:1.45
Mean age (years)		--	--		--	--	74.1
Head & neck		69.5%	66.0%		40.0%	27.9%	65.5%
Trunk		8.3%	9.0%		5.0%	9.0%	10.9%
Limbs		22.6%	23.0%		50.0%	46.9%	20.0%
Genitals		--	--		--	14.4%	3.6%
Unknown		--	--		4.0%	1.8%	--
BCC to SCC ratio		6.79:1	4:1		2.76:1	1.14:1	3.74:1

Chinese residents had less sunbathing or outdoor activities than Caucasians, so that their site of involvement was more restricted to the usual sun-exposed area.

Our Caucasian patients represented an interesting group as they shared similar characteristics with those in Hawaii²⁰ and Australia,³ rather than Minnesota,²¹ United Kingdom¹⁵ and South Europe.²⁴ Majority of them came from United Kingdom and Ireland, although their length of stay in Hong Kong was unknown. While residing in this subtropical region, they have plenty of opportunity to enjoy sunbathing or outdoor activities. Their recreational habits were similar to those in Hawaii and Southeast Australia. Intermittent ultraviolet light exposure during recreational activities was found to be more important in the pathogenesis of BCC.²⁵ Therefore, the mean age of presentation was earlier in Caucasian living locally (51 years) and in Hawaii (56.5 years).²⁰ Furthermore, the proportion of site of distribution shifted from head and neck region (55.4%) to trunk and limbs (44.6%) in both sexes. This phenomenon was also observed in Hawaii²⁰ and Australian study.³ With similar explanation, we could find higher trunk and limb involvement in Singaporean Chinese than local Chinese. Therefore, environmental factors such as different geographical and climate variation may affect the age of onset and distribution pattern of BCC in the same ethnic group of people.

SCC

The site of distribution of SCC in our Chinese patients was predominantly head and neck (65.5%), followed by trunk (10.9%), limbs (20%) and genitalia (3.6%). It correlated well with results obtained in the United Kingdom¹⁵ and South Europe²⁴ (Table 2). However, there was comparatively more trunk and limb involvement in Australia³ and Singapore.¹¹ The reason for the discrepancy was unclear. People living in Australia, in particular those sun worshippers, may have more cumulative sunlight exposure on the trunk and limbs. In addition, other environmental factors such as chemical, injury, and chronic ulcer might also contribute to the difference in the pattern of site distribution of SCC.

2. Clinical types:

Pigmented BCC is a clinical and histological variant that clinically resembles malignant

melanoma.²⁶ The other clinical types are the classical rodent ulcer, superficial, cystic and morphoeic type. The relative proportion of each type in Caucasians were as follows: rodent ulcer (45-60%), superficial (15-35%), pigmented (1-2%) and morphoeiform (4-17%).²⁷ Similar trend was also observed among Caucasians in the present study. Pigmented BCC lacks the characteristic telangiectasia and pearly rolled edge. Its biological behaviour is no different from the non-pigmented type.²⁸ However, it was more often adequately excised because of its resemblance to malignant melanoma. Only 2.5% of the pigmented BCC rather than 17.7% of the non-pigmented BCC were excised incompletely.²⁸

In this survey, pigmented BCC was the most common clinical type (58.1%) in Chinese. The next were rodent ulcer (35.6%), superficial (2.4%), cystic (1.9%) and morphoeic (1%). This was in contrast with Caucasian in which pigmented type is the rarest. In a Japanese study, 75% of their BCC lesions were also pigmented.¹² The difference is probably related to the ethnic difference in the amount of epidermal melanin. Local physicians may misdiagnose a BCC lesion as seborrhoeic wart, melanocytic naevus or even malignant melanoma. A shave biopsy may also be performed on a suspected seborrhoeic wart and yet it turns out to be a BCC. Thus, it is important for us to have high index of suspicion and to perform appropriate biopsy if necessary. In this locality, we should always consider pigmented BCC as a differential diagnosis of any pigmented lesion. Careful clinical history taking and physical examination is mandatory.

V. Drawbacks

Those lesions treated in other specialties and the private sector were not included in this study. However, we believed that our data was representative as our service has taken care of the majority of skin cases in the public sector.

Ideally, a central skin cancer registry should be established, and a skin cancer notification form can be designed for each medical practitioner to report any occurrence of skin cancer. However, this is still not available in Hong Kong. Alternatively, we can obtain the data from the pathology departments and computerized inter-specialties link which certainly can help us to obtain more accurate information.

CONCLUSION

Nonmelanoma skin cancer was uncommon but not rare in Chinese. The age, sex and site distribution of NMSC in Chinese patients were comparable to most Caucasian studies. The most distinguishing feature was that pigmented BCC, instead of the classical rodent ulcer type, was predominant in Chinese. This might result in misdiagnosis of pigmented BCC as other types of benign pigmented dermatological conditions. The site distribution pattern of the lesions could also be varied even in the same ethnic group, if people were exposed to different environmental factors. Finally, as NMSC is a very important dermatological condition with significant morbidity and mortality, it is worthwhile to start our first large-scale local investigation on this disease and to establish a central skin cancer registry.

Learning points:

Pigmented BCC is the most common clinical type of basal cell carcinoma in Chinese. Diagnostic difficulty may arise. A high index of suspicion with appropriate biopsy on suspicious lesions is advisable.

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