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Special features of non-melanoma skin cancer in Hong Kong Chinese patients: 10-year retrospective study

香港華人患者中的非黑素瘤皮膚癌的特點：10年回顧性研究

Objective. To determine the incidence and clinical characteristics of non-melanoma skin cancer in Hong Kong Chinese patients.

Design. Retrospective study.

Setting. Social Hygiene Services, Hong Kong

Patients. Records of 528 Chinese patients with a histological diagnosis of non-melanoma skin cancer from 1990 to 1999 were reviewed.

Main outcome measures. Demographic data, site and clinical type of cancer, predisposing factors, history, recurrence, and the development of new skin cancers.

Results. Non-melanoma skin cancer is uncommon but not rare among the Chinese population in Hong Kong. The incidence of newly-diagnosed basal cell carcinoma in 1990 was 16.0 per 10 000 new skin case attendances and, in 1999, the incidence was 31.8 per 10 000 new skin case attendances. The corresponding figures for squamous cell carcinoma in 1990 and 1999 were 6.9 and 11.6 per 10 000 new skin case attendances. The incidence of basal cell carcinoma among the Hong Kong Chinese population in 1990 and 1999 was 0.32 and 0.92 per 100 000, respectively, whereas that of squamous cell carcinoma was 0.16 and 0.34 per 100 000, respectively. Demographic data and the site distribution of non-melanoma skin cancer were comparable to those reported in Caucasians living in North America and Europe, but different from those in Caucasians living in Australia and Hawaii. Pigmented basal cell carcinoma was the most common type of non-melanoma skin cancer (60.1%) in Chinese patients, in contrast with rodent ulceration in Caucasians. Multiple skin cancers, recurrence, and subsequent new skin cancers were less frequently observed than in studies of Caucasians.

Conclusion. When compared with reported findings in Caucasians, Chinese patients show differences in the clinical type and multiplicity of lesions, predisposing factors, recurrence, and subsequent new skin cancer rates for non-melanoma skin cancer. Pigmented basal cell carcinoma seems to be an important differential diagnosis with regard to pigmented lesions in the Chinese population.

目的：確定香港華人患者中非黑素瘤皮膚癌的發病率和臨床特徵。

設計：回顧研究。

安排：香港；社會衛生服務局。

患者：對 1990 年至 1999 年間， 528 名組織學診斷為非黑素瘤皮膚癌的華人患者的記錄進行了評估。

主要結果測量：人口學數據，癌位置和臨床類型，易感染因素，病史，復發和新皮膚癌的發展。

結果：非黑素瘤皮膚癌在香港華人中不常見，但非罕見。1990年出現的皮

Key words:
Carcinoma, basal cell;
Carcinoma, squamous cell;
Incidence;
Risk factors;
Skin neoplasms/epidemiology

關鍵詞：
癌，基部細胞；
癌，鱗狀細胞；
發病率；
危險因素；
皮膚瘤／流行病學

HKMJ 2001;7:22-8

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膚癌新病例中基部細胞癌的發病率是萬分之 16.0 ，而在 1999 年是萬分之 31.8 。而鱗狀細胞癌在 1990 年及 1999 年的發病率相應是萬分之 6.9 和萬分之 11.6 。在香港華人中基部細胞癌的發病率在 1990 年和 1999 年分別是十萬分之 0.32 和 0.92 。而鱗狀細胞癌的發病率分別是十萬分之 0.16 和 0.34 。非黑素瘤皮膚癌的人口數據和位置分佈與生活在北美歐洲的白人中所報告的可比，但與生活在澳洲和夏威夷的白人不同。色素基細胞癌在華人中是非黑素瘤皮膚癌的最常見類型(60.1%)，而在白人中最常見的則是侵蝕性潰瘍。多重皮膚癌，復發，和隨後的新皮膚癌率比在白人的研究中少見到。

結論：當與報告的白人中的數據比較時，華人患者在臨床類型和損害多重性，易感染因素，復發，和隨後的非黑素瘤皮膚癌新皮膚癌率中不同。色素基細胞癌似乎是在華人中色素損害的重要不同診斷。

Introduction

Non-melanoma skin cancer (NMSC) usually refers to basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) of the skin.[1] In Caucasians, NMSC is the most common malignancy and the lifetime risks are estimated to be 28% to 33% for BCC, and 7% to 11% for SCC.[2] In the United States, the annual age-adjusted incidence of NMSC is 232.6 per 100 000 among Caucasians, whereas in Australia, the incidence is as high as 2389 per 100 000 in men, and 1908 per 100 000 in women.[3] A major upward trend in the incidence of NMSC worldwide has been noted, possibly resulting from an ageing population and increasing sunlight exposure.[4,5] Consquently, there is considerable morbidity and a substantial economic burden associated with NMSC in terms of loss of function, disfigurement, and treatment costs.

Non-melanoma skin cancers are keratinocyte-derived malignancies of the epidermis. The disease usually occurs in the head and neck region, thus strongly suggesting that ultraviolet light is the major aetiological environmental factor.[6] The amount of ultraviolet light reaching the earth's surface has been further intensified because of the depletion of the ozone layer.[7] Other contributory factors include genetic susceptibility to ultraviolet light–induced damage, immunosuppression, viral infection, or chemical or chronic injury.[6]

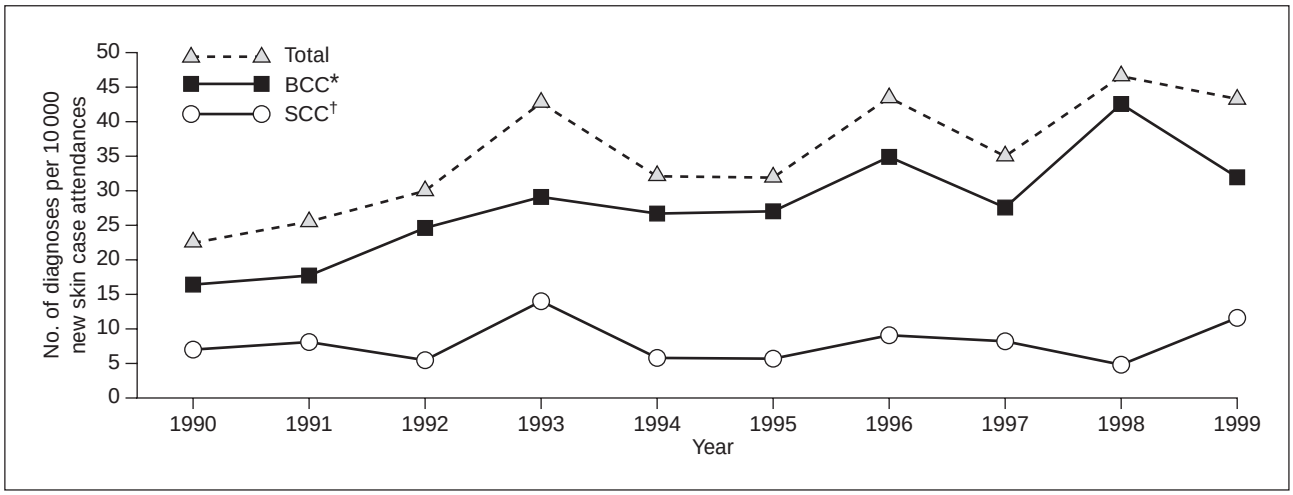
Non-melanoma skin cancer is relatively less common in non-Caucasians, including Chinese people, although local epidemiological data is deficient. An earlier study by local plastic surgeons reported that 98% of primary excised NMSC lesions were situated in the head and neck region, and half of these were on the nose.[8] Additional detailed information on the aetiology, pathogenesis, management, socio-economic impact, and preventive measures regarding NMSC in Chinese populations is required. This study aimed to determine such information—specifically, the incidence and predisposing factors, clinical characteristics, and the recurrence rate and subsequent new NMSC rate—in Chinese patients attending Social Hygiene Services (SHS) dermatology clinics of the Department of Health, Hong Kong.

Methods

This descriptive study enrolled Chinese patients with a histological diagnosis of BCC and/or SCC, who were seen in clinics administered by the dermatology department of the SHS between 1990 and 1999. Medical records, histological reports, and clinical photographs were retrieved for data analysis. The Chi squared test was applied for statistical comparison when appropriate.

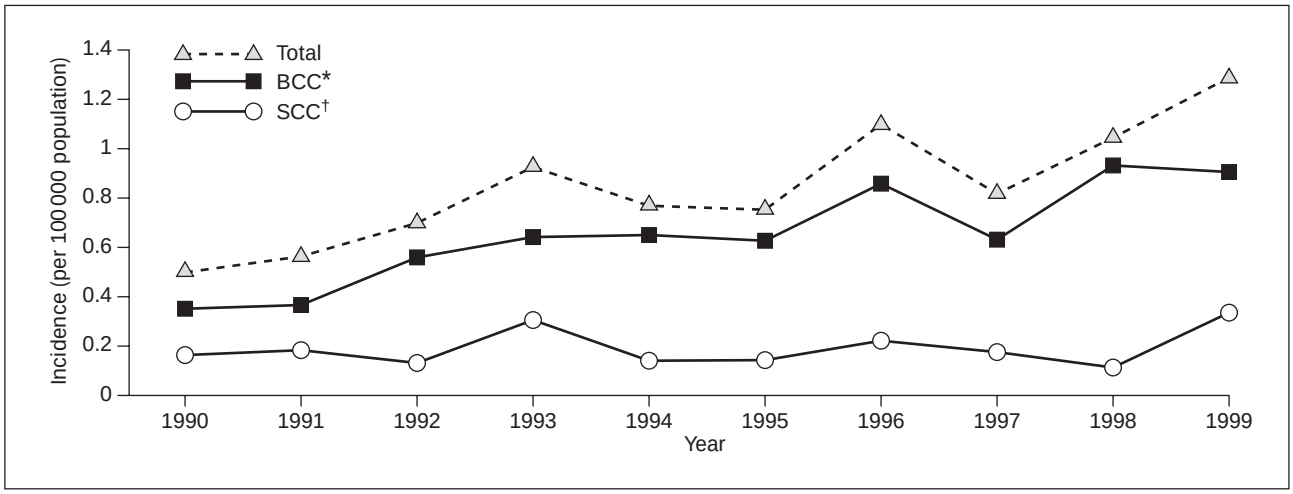
The SHS is the major public dermatological institute in Hong Kong. It serves the entire territory of Hong Kong and receives referrals from all sources. The institute treats patients with skin diseases, sexually transmitted diseases, and leprosy. The majority of patients seen are Chinese. Skin lesions that are clinically suspicious for cancer are usually examined by biopsy. It is not usual practice to perform cryotherapy, topical treatment with 5-fluorouracil, curettage, or photodynamic therapy solely on clinical grounds. Hence, by searching the histological diagnoses of biopsies completed by the department, it was possible to identify the majority of Chinese patients with NMSC.

Only lesions that were diagnosed for the first time within the study period and confirmed by histology, were included as indexed lesions. Precautions were taken to avoid double entry by checking the identity card number and name of patients. Metastatic lesions, lesions which recurred, were re-excised, or occurred subsequently at sites other than the primary sites, were excluded. Information collected included general demographic data, the site and clinical type of the lesion, predisposing factors (precancerous lesions, history of skin cancer, and particular associated conditions),



* BCC basal cell carcinoma
† SCC squamous cell carcinoma

Fig 1. Trend of number of histological diagnoses of non-melanoma skin cancer in Chinese patients per 10 000 new skin case attendances



* BCC basal cell carcinoma
† SCC squamous cell carcinoma

Fig 2. Trend of incidence of non-melanoma skin cancer in Chinese patients per 100 000 population

recurrence, and subsequent new skin cancers. Recurrence of BCC was defined as a malignancy that arose contiguous with the scar caused by the previous removal of a BCC. A subsequent new skin cancer was defined as the occurrence of skin cancer at another site at least 3 months after the initial diagnosis.

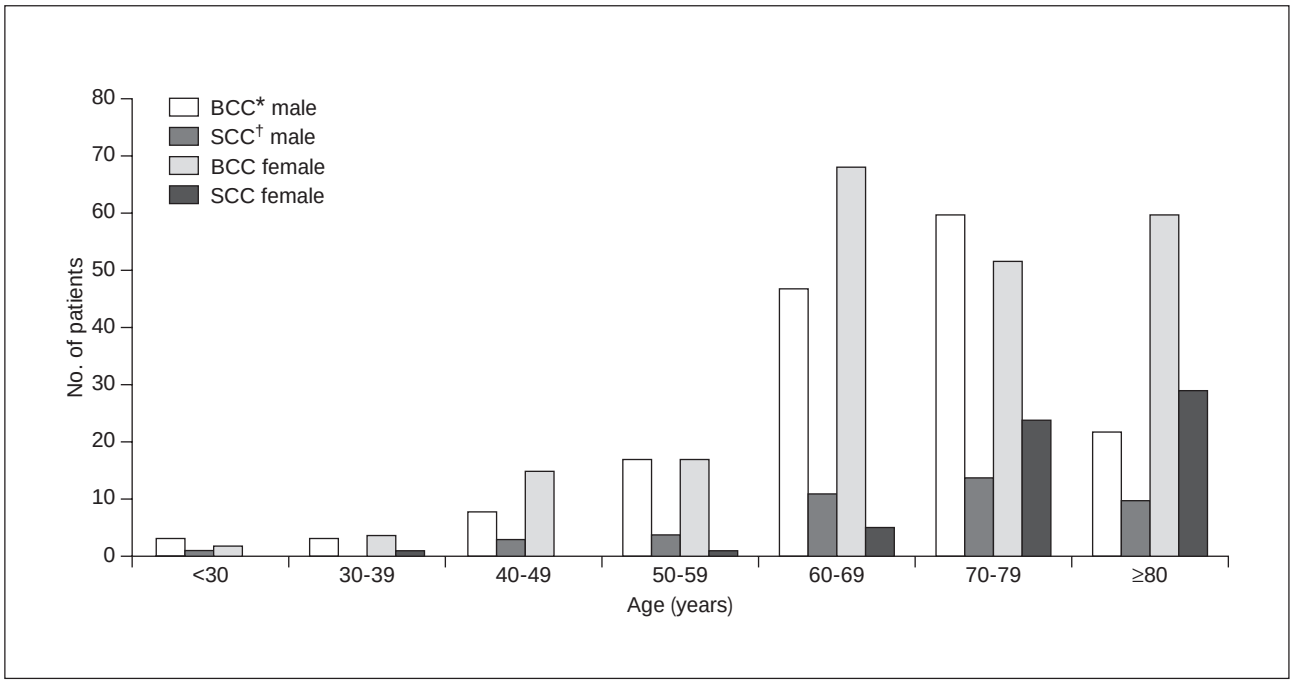
Results

Demographic data and 10-year trend

During the study period, 528 Chinese patients had a histological diagnosis of NMSC (412 BCC and 116 SCC). The BCC to SCC ratio was 3.55:1. Both the number of histological diagnoses of NMSC per 10 000 new skin case attendances (Fig 1), and the incidence of NMSC per 100 000 population (Fig 2) indicated a gradual increase in incidence over the past decade. The number of patients diagnosed with NMSC increased approximately two-fold for BCC, and by 68% for SCC (Fig 1). The overall incidence of NMSC in Chinese patients rose from 0.32 to 0.92 per 100 000 population for BCC and from 0.16 to 0.34 per 100 000 population for SCC during the 10-year study period (Fig 2).

Forty-six patients were excluded from further analysis owing to incomplete records. Clinical data from 379 patients with BCC (161 male and 218 female) and 103 patients with SCC (43 male and 60 female) was subsequently analysed for demographic and lesion characteristics. Approximately 70% of clinical photographs were available for retrieval and interpretation.

For patients with BCC, the male to female ratio was 1:1.32. The overall mean age was 68.9 years (male, 67.6 years; female, 69.9 years). Approximately 82%



* BCC basal cell carcinoma
† SCC squamous cell carcinoma

Fig 3. Age distribution of patients with non-melanoma skin cancer

Table 1. Site distribution of basal cell carcinoma and squamous cell carcinoma

Types	Basal cell carcinoma			Squamous cell carcinoma		
	Male, n=165 No. (%)	Female, n=226 No. (%)	Total, n=391 No. (%)	Male, n=43 No. (%)	Female, n=61 No. (%)	Total, n=104 No. (%)
Head and neck						
Periorbital	11 (6.7)	16 (7.1)	27 (6.9)	3 (7.0)	3 (4.9)	6 (5.8)
Forehead	13 (7.9)	32 (14.2)	45 (11.5)	3 (7.0)	9 (14.8)	12 (11.5)
Scalp	15 (9.1)	13 (5.8)	28 (7.2)	3 (7.0)	5 (8.2)	8 (7.7)
Cheek	40 (24.2)	30 (13.3)	70 (17.9)	8 (18.6)	24 (39.3)	32 (30.8)
Nose	49 (29.7)	77 (34.1)	126 (32.2)	2 (4.7)	2 (3.3)	4 (3.8)
Ear	6 (3.6)	2 (0.9)	8 (2.0)	2 (4.7)	0 (0)	2 (1.9)
Perioral	5 (3.0)	18 (8.0)	23 (5.9)	3 (7.0)	1 (1.6)	4 (3.8)
Neck	3 (1.8)	6 (2.7)	9 (2.3)	1 (2.3)	0 (0)	1 (1.0)
Subtotal	*142 (86.1)*	*194 (86.0)*	*336 (85.9)*	*25 (58.1)*	*44 (72.1)*	*69 (66.3)*
Trunk						
Chest	5 (3.0)	7 (3.1)	12 (3.1)	1 (2.3)	0 (0)	1 (1.0)
Abdomen	0 (0)	1 (0.4)	1 (0.3)	4 (9.3)	1 (1.6)	5 (4.8)
Back	5 (3.0)	8 (3.5)	13 (3.3)	0 (0)	2 (3.3)	2 (1.9)
Subtotal	*10 (6.1)*	*16 (7.1)*	*26 (6.6)*	*5 (11.6)*	*3 (4.9)*	*8 (7.7)*
Upper limbs	2 (1.2)	3 (1.3)	5 (1.3)	7 (16.3)	3 (4.9)	10 (9.6)
Lower limbs	3 (1.8)	10 (4.4)	13 (3.3)	3 (7.0)	10 (16.4)	13 (12.5)
Genital	6 (3.6)	3 (1.3)	9 (2.3)	2 (4.6)	1 (1.6)	3 (2.9)
Unspecified	2 (1.2)	0 (0)	2 (0.5)	1 (2.3)	0 (0)	1 (1.0)

(311/379) of patients were older than 60 years (Fig 3). For patients with SCC, the male to female ratio was 1:1.40. The overall mean age was 74.4 years (male, 69.2 years; female, 78.1 years). Approximately 90% (93/103) of patients were older than 60 years (Fig 3). Twelve (3.2%) of the 379 patients with BCC and one (1.0%) of the 103 patients with SCC were found to have more than one lesion at the first presentation. The total numbers of BCC and SCC lesions were 391 and 104, respectively.

Anatomical sites

The majority of BCC lesions occurred in the head and neck region (336/391; 85.9%), followed by the trunk (6.7%), lower limbs (3.3%), genitalia (2.3%), and upper limbs (1.3%) [Table 1]. The nose was the most frequent site of occurrence in both male and female patients. Within the head and neck region, approximately half of the lesions were situated on either the cheek or the nose. The descending order of predilection site for SCC lesions was the head and neck region (66.3%),

lower limbs (12.5%), upper limbs (9.6%), and trunk (7.7%), followed by the genital region (2.9%).

There were significant site variations in BCC and SCC lesions according to sex. Men had considerably more BCC lesions on the cheek and ear, whereas women had more lesions on the forehead and lower limbs (P=0.005, χ^2=25.47, degrees of freedom [df] =10). With respect to SCC lesions, men had more lesions on the trunk and upper limbs, whereas women had more lesions on the cheek and lower limbs (P=0.008, χ^2=13.68, df=4). No significant differences were found in the site distribution between rodent- and pigmented-type BCC lesions, (P=0.09, χ^2=13.65, df=8).

Clinical types of basal cell carcinoma

Pigmented BCC (60.1%) was the most common clinical type of BCC, followed by rodent ulcer (32.7%), superficial BCC (3.3%), morphoeic BCC (0.8%), and cystic BCC (1.8%). No significant sex variation in the type of BCC was noted (P=0.80, χ^2=0.436, df=2).

Associated conditions

Only 3.4% and 13.6% of BCC and SCC patients, respectively, had associated premalignant conditions. These conditions included actinic keratoses, Bowen's disease, and arsenic keratoses. A history of skin cancer was also uncommon—2.4% and 0.9% for those with BCC and SCC, respectively. Three patients had specific genodermatoses—namely, basal cell naevus syndrome, and xeroderma pigmentosa. Only eight (1.7%) patients had a history of immunosuppression due to underlying malignancy or use of immunosuppressive drugs. No patient had received an organ transplant or phototherapy. Two patients with SCC were noted to have human papillomaviral infections, namely, genital warts and epidermodysplasia verruciformis. Two patients had had a preceding venous ulcer.

Recurrent and subsequent non-melanoma skin cancer

A substantial proportion of patients had been referred to, and were subsequently followed up by, surgical or radiotherapeutic departments. Only 155 patients (129 [34.0%] with BCC, 26 [25.2%] with SCC) were followed up by the SHS for an average of 24 months. Basal cell carcinoma recurred in seven (5.4%) patients. Occurrence of BCC at other sites was seen in 11 (8.5%) patients. Two (7.7%) patients with SCC had a recurrence, and a further two (7.7%) had a subsequent SCC at another site.

Discussion

Non-melanoma skin cancer was uncommon but not rare in the population studied. The incidence of NMSC in Chinese patients attending the SHS per 100 000 population was low compared with the figure reported in western countries.[3-5] Comparisons of the incidence figures between regions and over time suffer from lack of standardisation in data gathering. In addition, the incidence reported in the current study might be an underestimate if, for example, a substantial number of patients with NMSC were treated by other specialties or the private sector.

Multiple NMSC at presentation was similarly uncommon in Chinese patients in this study (3.2% for BCC and 1.0% for SCC). These frequencies were much lower than the figure reported in Caucasians

Table 2 . Comparison of site distribution of non-melanoma skin cancer among different populations

Places	Rochester, Minnesota, United States[10]	Canton of Vaud, Switzerland[11]	Hawaii, United States[13]	Southeast Australia[14]	Singapore (Chinese)[12]	Present study (Chinese)
Study period	1976-1984	1976-1985	1983-1987	1990	1980-1991	1990-1999
Basal cell carcinoma						
No. of patients	657	3811	242	568	131	379
Site (%)						
Head and neck	84.6	74.7	54.7	67.0	78.8	85.9
Trunk	10.6	16.7	35.9	19.0	12.1	6.7
Limbs	3.9	6.3	9.4	13.0	7.6	4.6
Others	0.9	2.3	-	-	0.8	2.3
Unknown	-	-	-	1.0	0.7	0.5
Squamous cell carcinoma						
No. of patients		1176		166	115	103
Site (%)						
Head and neck		75.9		40.0	27.9	66.3
Trunk		5.0		5.0	9.0	7.7
Limbs		17.8		50.0	46.9	22.1
Others		1.3		-	14.4	2.9
Unknown		-		4.0	1.8	1.0

(30.0%).[9] The lower incidence and number of lesions per patient in this study suggest that NMSC is a less significant health issue in Hong Kong society than in the West. However, a gradual rise in both the number of diagnoses of NMSC per 10 000 new skin case attendances, as well as an increasing incidence, was seen during the past decade. An apparent increase in the incidence of NMSC locally is not surprising, given the greater availability of outdoor activities and an increasing ageing population, as well as greater awareness of skin cancer among both patients and physicians, thereby leading to higher detection rates. More large-scale, age-standardised, epidemiological studies are needed to confirm the local NMSC incidence data.

The site distribution of BCC in patients in this study was similar to that seen in the United States,[10] Switzerland,[11] and Singapore,[12] but deviated from that noted in patients in Hawaii[13] and Southeast Australia[14] (Table 2). Similarly, the male predominance of ear and cheek lesions, as well as the female predominance of lower limb lesions, was also comparable to other reports.[5,10] These findings perhaps reflect different densities of sunlight exposure as a result of sex variations in hair style and clothing. A shift in the site distribution of BCC from the head and neck region to the trunk and limbs was noted in Caucasian residents in Hawaii, compared with those living in North America.[13] Such a shift is thought to be due to different environmental factors such as a variation in climate or recreational habits.[13] Similarly, there was also a small difference in the site distribution between Chinese patients in this study and Singaporean Chinese patients, the latter having more trunk and limb involvement.[12] This difference may reflect the different latitudes of the two places, which allows people living in Singapore to wear light or short-sleeved clothing and to sunbathe all year round, for example.

For patients with SCC, the head and neck region was also the predominant site of involvement in SHS patients (66.3%), whereas the proportion of trunk and limb involvement was greater than that seen with BCC. This pattern was similar to that noted in the Swiss study.[11] A greater number of limb lesions were noted in studies of Southeast Australians (50.0%)[14] and Singaporean Chinese (46.9%).[12] In the latter, leprosy and arsenic poisoning were important preceding conditions for SCC, whereas in the current study, these were not major predisposing factors.

A difference in the clinical types of BCC presenting in Chinese patients was evident. Clinical types of BCC consisted of classical rodent ulcer, superficial BCC, cystic BCC, morphoeic BCC, and pigmented BCC. Pigmented BCC—a clinical and histological variant—is more common in pigmented races, probably because of an increased level of epidermal melanin.[15,16] The proportion of each clinical type of BCC in Caucasians has been reported as follows: rodent ulcer, 45% to 60%; superficial BCC, 15% to 35%; pigmented BCC, 1% to 2%; and morphoeic BCC, 4% to 17%.[6] The histopathological and biological behaviour of pigmented BCC is said to be no different from non-pigmented BCC.[17] This statement was supported by our findings that the site distributions of pigmented and rodent ulcer type BCCs were similar.

Pigmented BCC was the most common clinical type of BCC diagnosed in Chinese patients in this study. In a Japanese study, 75% of BCC lesions were reported to show brown to glossy-black pigmentation clinically, especially at the periphery.[18] In this study, the amount and distribution of the pigment, as well as the uniformity of the colour, were variable. Clinical features such as an irregular border and dark or variegated pigmentation were sometimes present. Pigmented BCC lesions had sometimes been misdiagnosed as other pigmented lesions, including seborrhoeic wart, melanocytic naevus, or malignant melanoma. It is thus important to bear in mind that pigmented BCC should always be considered in the differential diagnosis of a pigmented lesion in Oriental populations. In examining these lesions, one should look for helpful clues, such as an ulcerated surface or a translucent pearly nature, which is sometimes not masked by the pigmentation.

Predisposing factors for NMSC which included premalignant conditions and a history of skin cancer, occurred less frequently in this study. These conditions, especially actinic keratoses, appear to be much more common in Caucasians (40%).[19] Three patients had rare genodermatoses such as xeroderma pigmentosa and basal cell naevus syndrome, and were thus particularly susceptible to the development of skin cancer. No patients had received an organ transplant or phototherapy, which are well documented risk factors for developing skin cancer.[20,21]

Lower recurrence and subsequent new skin cancer rates of NMSC were observed in this study than expected from the literature. This observation might reflect selection bias in patients presenting to the SHS, the relatively high default rate, or the short average follow-up period in this particular study. In Caucasians, the overall recurrence rate of NMSC is

reported as 18.3% for BCC and up to 20% for invasive SCC.[22,23] Patients with NMSC are also noted to be at considerable risk of developing new skin tumours. Approximately 60% of patients have been reported to develop subsequent new NMSC 3 years after their primary diagnosis.[24] The greatest risk occurs within the first year, with the major risk factor being the number of skin cancers at initial diagnosis.[24,25] Accordingly, it has been suggested that patients who have had three or more skin cancers should be reviewed regularly for life.[26] Those who have had fewer skin cancers should be reviewed at 6 monthly intervals for the first 2 years, then yearly for at least 5 years.[26] At the SHS, the follow-up schedule for patients with NMSC has not been well-established in the past. To study the natural course of NMSC in this population, a prospective skin cancer study with a central registry and a defined follow-up schedule are essential in the future.

Conclusion

Non-melanoma skin cancer is an uncommon but not a rare disease in Chinese patients in Hong Kong. The head and neck is the most common site of involvement, and pigmented BCC is the most common clinical lesion, in contrast with the classic rodent ulcer commonly seen in Caucasians. Dermatologists should therefore be alert to this possibility when dealing with pigmented lesions in Chinese patients. Although the socio-economic impact of NMSC in Chinese populations is thought to be less significant than in Caucasian populations, this disease remains an important entity to manage. Differences in the multiplicity, predisposing conditions, and clinical progress of the disease seen in this study suggest the merit of further specific investigations into the pathogenesis and biological behaviour of NMSC in people of Chinese ethnicity.

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