A Five Year Retrospective Study of Nonmelanoma Skin Cancer in Social Hygiene Service

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Contents

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 is not well established in Chinese. This is the first local demographic survey to look at the demographic data, clinical characteristics and possibly progress of the disease in patients, who are mostly Chinese, attending Social Hygiene Services.

Keywords: Nonmelanoma skin cancer, demographic data, clinical characteristics, Chinese, Social Hygiene Services

Introduction

Rising incidence of nonmelanoma skin cancer(NMSC) had been observed in different parts of the world in past decades.[1,2,3,4,5] NMSC is now the commonest skin cancer and is the most common malignancy in Caucasians. It was estimated that the life time risk of an American to have NMSC was around 20%.[6] It was also predicted that 900,000 to 1,200,000 new cases per year would be diagnosed in United States.[7] NMSC now poses a serious problem in western countries and Australia because of considerable disfigurement, function loss and significant economic burden associated with its treatment.

The cause of NMSC is multifactorial and complex. The interaction among host and environmental factors determines the development and progression of NMSC.[7] The host factors in Caucasian include older age, male sex, skin type I, childhood freckling, Celtic ancestry, red, blond or light brown hair, blue or light coloured eyes, fair skin and genodermatoses.[8,9] Ultraviolet light exposure has been the principal pathogenic environmental factor and it acts by inducing DNA mutations in epidermal cells[10] and immunosuppression, leading to unrestrained growth and tumour formation.[11]

The worldwide increasing trend in incidence of NMSC is probably related to more chance of sunlight exposure as a result of changing lifestyle and holiday habit. It was suggested that sun-exposure in childhood and early adulthood initiated a process of carcinogenesis that manifested 40 to 60 years later.[12] Furthermore, people now have longer life expectancy which allows extended process of carcinogenesis. In addition, accumulation of ultraviolet light exposure is further aggravated by stratospheric ozone layer depletion.[13] Ozone is a component of earth‘s atmosphere which protectively shields the ultraviolet B and ultraviolet C radiation. It was estimated that the annual incidence of basal cell and squamous cell carcinoma (BCC and SCC) would increase by three and five percent respectively for every one percent reduction of the average thickness of ozone layer.[13]

According to Weinstock MA[14], there were many forms of NMSC but the term usually referred to the most common forms, BCC and SCC. BCC arises from basal keratinocytes of epidermis and adnexal structures. It is a locally invasive, slow-growing tumour which rarely metastasize.[15] Although its mortality is low, it is a potentially serious disease as a result of considerable morbidity due to the disease complication itself or the treatment. SCC is a malignant neoplasm of the epidermal keratinocytes, and has complex biologic behavior that depends on presentation, tumor size and depth, etiology, and anatomic site. It is more likely than BCC to metastasize.

NMSC is comparatively less common in African and Asian races[16,17], probably due to the photoprotection by melanin pigment or due to genetically determined difference.[18] In Hong Kong, skin cancer is expected to gain more importance. There are two underlying reasons. Firstly, our younger generation are adopting the western life style with more ultraviolet light exposure during outdoor recreational activities. Secondly, our geriatric population is growing, reaching more than 10% of our total population of 6.3 million by mid-1996 estimation.[19] However, the epidemiological data of NMSC among Chinese, is deficient. Therefore, it is worthwhile to begin our first local demographic survey on this important dermatological disease. The objectives of this survey are to study the demographic data including age and sex distribution, the clinical characterisics including the clinical type and site of distribution as well as its natural history in Chinese patients living in Hong Kong.

Materials and Method

All histological diagnoses of skin biopsies performed in Social Hygiene Service(Dermatology) from 1993 to 1997, were screened. The medical records of those patients with a histological diagnosis of BCC and/or SCC, supplemented with clinical photos, were retrieved for data analysis. If medical records were unavailable due to various reasons, clinical history and data contained in the histological reports would be studied instead.

Only those lesions that occurred at first presentation and sent for histological confirmation within the study period, would be included as the indexed lesions. A pre-designed questionnaire was completed for each patient. Data including age, sex, duration of symptoms before presentation and clinical characteristics of the lesions (site, size, clinical type and complication) would be recorded. Any associated pre-malignant or malignant cutaneous disease as well as specific disease with predisposition to skin cancer, would be noted. The questionnaire also recorded the method of treatment, pattern of referral to various specialties, and recurrence rate of those patients who have been followed up in our service.

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, who were seen in Social Hygiene Services.

Results

I. Patient Characteristics/Demographic Data

BCC (Table 1, Figure 1-3)

273 patients were found to have histological diagnoses of BCC. Ten patients were excluded because no informative record cound be found. Only 263 patients were studied including 236 medical records plus histological reports and 27 histological reports only. The studied patients included 202 Chinese(76.8%), 59 Caucasian(22.4%) and two patients of other ethnic origin(0.8%).(Fig 1) These two patients of other ethnic origin belonged to one Thai and one Indian, both were female. Their clinical data were not further studied. None of our patients had both the diagnoses of BCC and SCC. The total number of lesions studied was 208 for Chinese and 65 for Caucasian.

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 for male, 70.7 for female and 68.9 for both sexes. The corresponding median age was 69, 70.5 and 70. 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(Fig 2).

For Caucasian patients, the mean age for male, female and both sexes were 54.5, 51.3 and 53.9 whereas the corresponding median age were 50 ,53 and 51 respectively. The age distribution pattern showed that only 40% of patients were over 50 years old.(Fig 3)

SCC (Table 1, Figure 4)

57 patients had histological diagnoses of SCC. 54 patients were studied and all of them were Chinese. 51 medical records plus histological reports and three histological reports only were retrieved for data analysis. Three patients were excluded because no informative record could be found. The male to female ratio was 1:1.45.(Table 2) The BCC to SCC ratio in Chinese was 3.74:1. The mean age were 70.7 for male, 76.4 for female and 74.1 for both sexes. The corresponding median age were 73, 76 and 74 respectively. The age distribution pattern had shown that over 90% of patients were older than 60 years old.(Fig 4) The total number of lesions were 55.

II. Duration of symptom(Table 1)

Chinese BCC patients, on average, had symptoms of 41 months for male, 33.8 months for female and 36.7 months for both sexes before their first presentation to our service. On the other hand, the duration of symptoms for Caucasian BCC patients were shorter: 31 months for male, 12 months for female and 26.4 months for both sexes. For SCC patients, the corresponding figures were 22.8 months for male, 19.6 months for female and 20.9 months for both sexes.

III. Associated conditions(Table 2)

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 our 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, which occurred in only six(3%) BCC patients but not in any of the SCC patients.

Three particular diseases predisposing to skin cancer were also included in our study. They were Nevoid basal cell syndrome, xeroderma pigmentosa and naevus sebaceous.

IV. Characteristics of Lesions

1.Site of Lesions :

BCC (Table 3, 4)

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

If considering the risk of site of lesions (Table 4), 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 figure for Caucasian patients were 23.1%, 29.2% and 47.7%, which was in an inverse order as that in Chinese. The difference in the site distribution according to the risk of site of lesions, between Chinese and Caucasian patients, was also statistically significant ($p<0.001$).

SCC (Table 5)

The descending order 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%).

2.Clinical Types :

BCC (Table 6)

In Chinese patients of both sexes, pigmented BCC(58.1%) was the commonest clinical type followed by rodent ulcer type(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 commonest type was rodent ulcer(58.5%), then superficial(29.2%), morphoeic(4.6%) and cystic(4.6%). The difference in clinical types between Chinese and Caucasian patients 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.

3.Size and complication of lesions(Table 7):

BCC

In both Chinese and Caucasian patients, most of the lesions were small and belonged to either <1cm category(46.6% and 56.9%) or 1-2 cm category(41.8% and 36.9%). Only 6.3% of Chinese and none of Caucasian patients had lesions >2 cm. The maximum size of the lesion was 15cm which also showed local bone destruction in one Chinese patient. No metastasis was noted in all patients.

SCC

The lesions were relatively larger than BCC lesions. Only 25.5% and 38.2% of the lesions belonged to the smaller size category of <1cm or 1-2 cm. 23.6% of the patients had lesions >2cm. Two patients were suspected to have lung metastasis and were referred to other specialties for further investigations.

V. Method of treatment and referral pattern(Table 8,9)

Excisional biopsy was the principle mode of therapy in our service (54.8% in Chinese BCC, 78.5% in Caucasian BCC and 43.6% in Chinese SCC patients).(Table 8) Most of the lesions excised were small and situated at low risk sites. Non-definitive operation such as incisional, punch and shave biopsies or curettage were performed on the rest to obtain histological diagnoses and then referred to other specialties.

165/315(52.4%) were ultimately referred to other specialties, mainly plastic surgery, surgery, skin tumor clinic, radiotherapy and others. Out of these, a total of 32 patients (10.2%) were referred to a combined skin tumor clinic.(Table 9)

VI. Recurrence rate of BCC and subsequent new skin cancer

Recurrence of BCC was defined as one that arose contiguous with the scar caused by previous removal of BCC. Sixty-three(31.2%) Chinese patients and 35(59.3%) Caucasian patients were followed up in our clinic. The follow up period was 18 and 24 months for Chinese and Caucasian patients respectively. Recurrence of BCC occurred in six Chinese patients(9.5%) and in five Caucasian patients(14.3%). Subsequent new skin cancer was counted when a new skin cancer occurred at another site and at least 3 months after their first diagnosis. Occurrence of BCC at other sites were found in four(6.3%) Chinese patients and 10(28.6%) Caucasian patients respectively. None had subsequent SCC or malignant melanoma.

Discussion

Many epidemiological studies of NMSC in Caucasian were published.[2,3,5,6,7] Therefore, the incidence, clinical characteristic and the natural history of the disease were well recognized. However the clinical details of NMSC in Chinese was not well described. To our knowledge, this was the first local survey in an attempt to review clinical characteristics of NMSC patients attending Social Hygiene Service in Hong Kong.

Social Hygiene Service is a public institution that handles the majority of dermatological patients in the public sector. Patients are referred from general practice and other specialties of public and private sector. In general, more than 90% of our patients are Chinese. Those Caucasian patients seen in our service are usually government servants or their dependants. It is also a common practice in our service to obtain histological diagnoses on suspicious skin cancerous lesions by either definitive treatment or non definitive treatment before referral to other specialties. It is seldom to perform cryotherapy, topical 5 flurouracil or photodynamic therapy based

on clinical diagnosis only at patients' first presentation to our service. Therefore, by searching the histological diagnosis of each biopsy done in our service, we are able to identify most of the patients with NMSC known to us.

I. Incidence

We have demonstrated that NMSC was uncommon but not rare in Chinese. Around 15000 new dermatological patients attended our clinics per year from 1993 to 1997.[19] Majority of them were ethnic Chinese and approximately 80% of patients with NMSC presented to us as new cases. Therefore, the total number of NMSC new cases per year in Chinese patients attending our service constituted only a small proportion of the total new skin case attendance.

It is impossible here to postulate any local incidence rate of NMSC because a substantial number of patients might be treated in private sector or other specialties. We do not have any registry to register these skin cancers locally. Furthermore, any incidence rate based on treated skin cancers alone will be an underestimate because some cancers might be undiagnosed or even treated destructively without histological diagnoses.

The incidence of NMSC in other geographical area[1,2,6,7], however, is very variable. Generally speaking, there is a worldwide increase in both BCC and SCC. In United States, the overall incidence rate of NMSC was 233 per 100,000 per year among Caucasians in 1977-78, with BCC to SCC ratio of 4:1.[6] The incidence had increased by 15-20% over 6 years.[6] In Canada, the incidence of BCC increased by 60.6% in men and 48.4% in women and the incidence of SCC increased by 59.2% in men and 67.4% in women from 1973 to 1987.[2] The age-standardized annual incidence per 100,000 population in 1987 was 212.6 for BCC and 48.1 for SCC.[2] In United Kingdom, the number of medically treated BCC and SCC increased by 235% and 153% respectively from 1978 to 1991.[1] The age-standardized annual incidence rate of BCC and SCC were respectively 83.1 and 19.0 per 100,000 population in 1990.[20]

In Southeast Australia, the incidence of medially treated NMSC increased by 19%, including 11% increase in BCC and 51% increase in SCC from 1985 to 1990.[5]

A population based cohort study in Queensland estimated a high age adjusted incidence rates of NMSC: 2528/100,000/year in men and 1676/100,000/year in women, with BCC to SCC ratio of 4.5 to 1 during the period from 1985 to 1992.[21] In Western Australia, 16% of men and 14% of women developed at least one basal cell carcinoma whereas 2.8% of men and 2.2% of women had at least one squamous cell carcinoma.[22] Multiple skin cancers occurred in more than half of the subjects who had a skin cancer at first examination.[22] This was in contrast to present study that multiple skin cancers at first presentation were uncommon in Chinese.

A nationwide survey of treated skin cancers was conducted in Japan from 1971 to 1975.[23] In their study, the crude incidence rate of NMSC estimated based on the 1970 consensus was only 1.4 per 100,000 person years. In another epidemiological study in Japanese residing in Hawaii, the crude rate was 123 per 100,000 person years which was 88 times higher than the corresponding figure from Japan.[24] A marked increase in incidence of NMSC was also recorded among Caucasian residing in Hawaii, when compared with those living in North America.[25] This could be explained by the differences in the latitude of places they are living which governed the cumulative amount of ultraviolet light exposure. The differences in lifestyle of people living in different places also contribute. Similarly, as 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 will be among the highest in comparison with other provinces of China.

II. Patient Characteristics/Demographic Data

BCC

NMSC occurred mostly in the elderly group with male predominance in both BCC and SCC.[6] In Minnesota, an epidemiological study of BCC showed that 80% of the patients were greater than 50 years old and the mean age was 64.6.[26] In present study, the mean age of Chinese BCC patients was greater(68.9) and 91% of them were greater than 50 years. 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 by the relative composition of each gender in each age group in different population. In Hong Kong, the male to female population ratio was estimated to be 1:1, 1:1.12 and 1:1.35 in people greater than 50, 60 and 70 years old respectively.[19] Therefore, we would expect to see more female patients with NMSC with increasing age.

In 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). This was not surprising because most of them, may or may not be accompanied by their families, came to Hong Kong to work. On retirement, they usually returned to their native countries and hence the older age group was less represented in present study.

SCC

The incidence of SCC increases more rapidly with age and with cumulative sun exposure than does the incidence of BCC.[15] The male to female ratio was 4:1 with 50% of patients were over 65 years of age.[27] As expected, the mean age of our SCC patients(74.1) was greater than BCC patients in both sexes(68.9). Ninety percent of them were greater than 60 years old. Male predominance, however, was not observed. It is important to note that our SCC patients were less representative than our BCC patients, possibly because a substantial number of SCC patients who had more aggressive tumor, were managed by other specialties.

III. Duration of symptom

As expected, asymptomatic slow growing BCC needs a long time before a patient, especially the geriatric group, to seek medical treatment. On the other hand, SCC lesions have more aggressive behaviour and hence they were detected earlier.

It was demonstrated that BCC Caucasian patients presented to our service earlier than Chinese patients (26.4 vs 36.7 months). When comparison was made

between BCC and SCC Chinese patients, the former had a longer duration of symptoms before presentation (26.4 vs 20.9 months). As our Caucasian patients were younger and they were more alert about the dangers of skin cancer, they were more likely to recognize the lesions earlier. In Chinese, many of elderly patients were less health cautious and medical practitioners in this locality may not have a high index of suspicion in detecting skin cancer. Therefore, greater awareness and early adequate treatment were important to reduce its morbidity and mortality.

IV. Associated conditions

Among BCC patients, premalignant conditions, mostly actinic keratosis, were uncommon in Chinese(4%) as compared with Caucasian (61%), although they more often occurred in SCC patients(22.2%). It was shown that actinic keratosis was prevalent in 40% of Caucasian population.[28] It was also found that increasing number of solar keratosis(>20) was associated with three times the occurrence of NMSC.[28] It was not the scope of present study 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 in Chinese. Possibly, there might be factors such as immunity and genetic differences which might played an important role in the development of NMSC in Chinese.

V. Clinical Characteristics

1.Site of Lesions :

BCC

The site distribution of NMSC in other studies were summarized in Table 10. Comparatively, the site distribution of BCC in Chinese patients simulated those found in Minnesota[26] , United Kingdom[20] and South Europe[29] but appeared different from that in Haiwaii[25] and Southeast Australia[5].

The head and neck region remained the most frequent site of occurrence in Chinese(88.5%). This was comparable to results found in Minnesota(84.6%)[26], United Kindom(81%)[20] and South Europe(80.5%)[29]. In all these studies, the order of site distribution was in the same descending order: head and neck, trunk, limbs and then genital. It was also shown that there was a slight male predominance in trunk involvement[20,26,29] but female predominance in lower extremities.[26,29] Such site predilection phenomenon was also observed in Chinese patients, although the figures were too small for statistical analysis. However, trunk(5.8%) and limb(2.9%) involvement in Chinese were both less than Caucasian, in both present study (trunk 27.7% and limb 16.9%) and other studies.[20,26,29] This could be explained by Chinese people having spent less time in sunbathing or outdoor activities so that their site of involvement was more restricted to the usual sun-exposed area.

The Caucasian patients in present study represented an interesting group as they shared similar characteristics with those obtained in studies done in Haiwaii [25] and Australia[5], rather than Minnesota[26], United Kingdom[20] and South Europe[29]. Many of our Caucasian patients have come from United Kingdom and Ireland, although their length of stay in Hong Kong is unknown. While residing in this locality in the subtropical region with warm and sunny climate, they have plenty of opportunity to enjoy sunbathing or outdoor activities. Their recreational habits were similar to those in Haiwaii and Southeast Australia. It was found that intermittant exposure to ultraviolet light during recreational activities was more important in the pathogenesis of BCC.[30,31] Therefore, it was not surprising that the mean age of presentation was earlier in Caucasian living locally(51) and in Haiwaii(56.5).[25] Furthermore, the site of distribution was more shifted from head and neck region(55.4%) to trunk and limbs (44.6%) in both sexes. This phenomenon was also observed in Haiwaii[25] and Australian study[5]. This made us believe that environmental factor such as different geographical and climate variation may affect the age of onset and distributional pattern of BCC in patients of same ethnic origin.

SCC

The site of distribution of SCC in Chinese was predominantly head and neck (65.5%) and then trunk(10.9%), limbs(20%) and genital(3.6%). It correlated well with

site distribution of SCC in Caucasian found in United Kingdom and South Europe.(Table 10) In comparison with the site distribution in BCC Chinese patients, there was comparatively more trunk and limb involvement in SCC. This was because other environmental factors such as chemical, injury, in addition to ultraviolet light, might also have caused SCC.

2.Clinical Types :

Pigmented BCC has been recognized for many years to be a clinical and histological variant of BCC.[32] The other clinical types were the classical rodent ulcer, superficial, cystic and morphoeic type. The relative proportion of each type in Caucasian in other study was as follows: rodent ulcer 45-60%, superficial 15-35%, pigmented 1-2% and morphoeaform 4-17%.[33] Similar trend was also observed among Caucasian in present study. Pigmented BCC lacks the characteristic features of BCC such as telangiectasia and pearly rolled edge. The biological behaviour of the pigmented and non-pigmented type is no different.[34] Its prognostic significance has been debated. Sometimes its clinical appearance resembles malignant melanoma. It was believed to be less malignant because they were more often excised with an adequate margin. It was shown that only 2.5% of the pigmented BCC rather than 17.7% of the non-pigmented BCC were excised incompletely.[34]

Undoubtedly, 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.[17] The difference is probably related to the ethnicity in that we have more epidermal melanin. Physicians in our locality may mistaken a BCC lesion as seborrhoeic wart, melanocytic naevus or even malignant melanoma. From time to time, a shave biopsy may be ordered for 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 wide margin excision for any suspected skin cancer lesions. In this locality, it should be bared in mind that pigmented BCC is always a differential diagnosis of any pigmented lesion. Careful clinical history taking and physical examination is

mandatory to differentiate pigmented BCC from other pigmented dermatological conditions.

3.Complication :

NMSC can cause significant disfigurement with resultant psychological distress. Tumor can become necrotic, inflamed, infected and painful. Local invasion of BCC into vital structures such as eye, eyelid, lacrimal duct can lead to functional impairment. The complication rate of BCC depends on the size, site and type of the tumour as well as the histological features. High risk site lesions situated in midfacial areas, including nose, periocular, perioral, ear and chin area.[35] Morphoeic type BCC carried the highest complication risk because of its poorly delineated clinical border so that complete excision was difficult.[36] Histological aggressive features included infiltrative, morphoeic or superficial multicentric features as well as spiky shape of cell groups. Metastatic BCC was very rare and its estimated incidence ranged from 0.0028% in dermatologic patients through 0.01% in pathology specimens to 0.1% from surgical centers.[37] It was often detected 10 years or more after the treatment of the primary tumour and usually occurred in middle aged men.[37] Metastatic spread is most often to lymph nodes, lungs and bones.

In SCC, the complication rate depends on treatment modality, prior treatment, location, size, depth, histologic differentiation, histologic evidence of perineural involvement, precipitating factors other than ultraviolet light and host immunosuppression.[38] Metastasis of SCC is more common and is often detected within six months of initial treatment. The rate was around 3% up to 30%.[38]

In present study, only one BCC Chinese patient had local bone destruction and two SCC patients had possible lung metastasis. They were subsequently referred to other specialties for investigation. None of the Caucasian patients had complication. Such a low complication rate may be accounted by our service handling relatively small size of lesions at an earlier stage. Those patients with more aggressive behaviour or larger tumors may be seen in other specialties directly. However, it was important to note that 49% and 23.1% of BCC lesions in Chinese and Caucasian

patients respectively were situated in the high risk site. These lesions often required careful management strategies to avoid recurrence and complication.

VI. Method of treatment

There are many methods to treat NMSC, including simple excision, curettage, cryosurgery, Mohs micrographic surgery and radiotherapy . The cure rate ranged from 85 to 98%.[39] In NMSC, excisional therapy was the principle mode of therapy in our service. Respectively 54.8%, 78.5% and 43.6% of BCC Chinese, BCC Caucasian and SCC patients had their lesions excised. It was mostly performed in small lesions. Lesions which were larger, situated at high risk sites or with aggressive clinical type were often referred to other specialties, mostly plastic surgery, surgery or radiotherapy after histological diagnoses were obtained. In United Kingdom, excision(58%) was also the commonest mode of therapy in BCC, followed by curettage and cautery (24%), cryotherapy(8%) and radiotherapy(8%).[40] In contrast, only one of our patients was treated with curettage. Similarly, 9.2% of our NMSC patients were also referred to radiotherapy.

In Hong Kong, the only skin tumor combined clinic was set up in South Kwai Chung, New Territories West Region since 1995. It received referral from the whole territory for any patients with suspected skin tumor. A conjoint opinion among plastic surgeon, dermatologist and pathologist will be made to diagnose and to decide the best treatment modality for each patient. Patients will be followed up for long term to determine any recurrence or subsequent primary tumours. In our study, 10.2% of patients with NMSC were referred to this clinic. In United Kingdom, only 2% of BCC patients were referred to the combined clinic and thus raising the question of its value and availabilty.[40]

VII. Natural history of the tumor

The natural history of NMSC could not be well documented in this study because a substantial number of patients were ultimately referred to other specialties. Only 31.2% of Chinese and 59.3%of Caucasian BCC patients were followed up in our

clinic. The follow up period was rather short, reaching an average of 18 months for Chinese patients and 27 months for Caucasian patients. The progress of the disease in SCC patients was not investigated in this study because even less patients were followed up in our clinic. It was also impossible to study the mortality rate either, because of lack of hospital patients' data. However, according to 1996 Annual Report from Department of Health, the number of death due to skin cancer other than malignant melanoma was recorded as nine that year.[19]

1.Recurrence Rate of BCC :

The estimates of recurrence rate of BCC varied greatly(1-39%).[41] It was affected by the size of the tumor, its site, primary treatment, adequacy of excision and histological aggressiveness of the tumor. The overall five-year recurrence rate according to the type of primary therapy was as follows : curettage and cautery (26%), radiotherapy(9.7%), surgical excision(9.3%).[42] The overall recurrence rate was 18.2%.[42] The best result was obtained with Moh's chemosurgery, achieving 99% in five-year cure rate.[43] Adequate surgical margin was very important to determine the recurrence rate. Complete eradication required 4mm clear margin for a <2cm tumour in 95% of the cases.[44]

The recurrence rate of BCC in Chinese and Caucasian in present study was not high, 9.5% and 14.3% respectively. There were two reasons to explain this. Firstly, there was a selection bias of patients being followed up in our service. They usually belonged to the good prognostic group in whom they often had their lesions excised completely. Secondly, the defaulter rate was high and the follow up period was short.

2.Subsequent New Skin Cancer :

Patients with NMSC are at considerable risk of developing new skin tumors. In North America, between 36 and 50% developed another skin cancer in 5 years.[45,46,47] The greatest risk occurred within the first year.[45] It was found that greater number of skin cancers poses a greater risk of new skin cancer formation, and men are at greater risk than woman.[48] Therefore, it was suggested that patients who

have had three or more skin cancers should be reviewed regularly for life.[49] Those who had fewer skin cancers should be reviewed at six-month intervals for first two years, then yearly for at least five years.[49]

In our study, the subsequent development of BCC at other sites was low among Chinese(6.3%) and among Caucasian(28.6%), due to the same reasons discussed in the recurrence rate. In our service, there was not a well established management or follow up schedule for NMSC patients. By noting the natural history of the disease in Chinese, we might be able to predict their clinical outcome and then developed a follow up plan for each patient.

VIII. Drawbacks

There were many restrictions in this sort of retrospective study. Firstly, those lesions treated in other specialties and private sector were not included in this study. However, we believed that our data was representative of early and small NMSC treated locally. Secondly, the progress of the disease could not be well defined because only a small proportion of patients were followed up in our service and the follow up period was short due to a high default rate.

There are ways to solve these problems. Ideally a skin cancer notification form can be designed so that each medical practitioner can report any occurrence of skin cancer. Furthermore, computerized inter-specialties link can be set up among dermatology, pathology, surgery, plastic surgery and radiotherapy units so that patients' clinical data can be interchanged. Last but not the least, establishment of combined skin tumor clinic in each territory region can optimize the treatment modality of each patient. The progress of the disease in each patient can then be studied and based on these information, we can derive a follow up plan for the patient.

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 that of Caucasian in some studies. The most distinguishing feature in Chinese, was that pigmented BCC, instead of the classical rodent ulcer type, was the predominant clinical type. This might result in misdiagnosis of pigmented BCC as other types of benign pigmented dermatological conditions in this locality. The pattern of site distribution of the lesions could also be varied even in the same ethnic group, if people were exposed to different environmental factors. The natural history of NMSC in Chinese was not well defined yet. The complication rate, recurrence rate and subsequent new skin cancer rate were low among BCC patients who were followed up in Social Hygiene Services. With further studies on this aspect, we could optimize our management, including treatment strategies and follow up schedule for each patient. Finally, NMSC is a very important dermatological condition with possible significant morbidity and mortality. It is worthwhile to start our first investigation on this disease in this locality.

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Tables and figures

Table 1. Patient Characteristics/Duration of symptom

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		
Age									
range	4-88	28-93	4-93	35-83	34-63	34-83	47-90	31-99	31-99
mean	66.2	70.7	68.9	54.5	51.3	53.9	70.7	76.4	74.1
median	69.0	70.5	70.0	50.0	53.0	51.0	73.0	76.0	74.0
Duration of symptoms									
mean (month)	41.0 n=68	33.8 n=100	36.7 n=168	31.0 n=31	12.0 n=10	26.4 n=41	22.8 n=20	19.6 n=28	20.9 n=48
unspecified (n)	14	20	34	17	1	18	2	4	6
Number of lesions	83	125	208	54	11	65	22	33	55

Table 2. Associated conditions

Conditions	**BCC(Chinese)**	**BCC(Caucasian)**	**SCC(Chinese)**
1.Premalignant conditons			
Actinic keratoses	8	35	8
Bowen's disease	0	1	3
Arsenic keratoses	0	0	1
Subtotal (%)	**8 (4)**	**36 (61)**	**12 (22.2)**
2.Past history of skin cancer			
BCC	5	14	0
SCC	0	0	0
Lentigo Maligna	1	0	0

Subtotal (%)	**6 (3)**	**14 (23.7)**	**0 (0)**
3.Diseases pre-disposing to skin cancer			
Nevoid basal cell Syndrome	1	0	0
Xeroderma Pigmentosa	1	0	0
Naevus Sebaceous	1	0	0
Subtotal (%)	**3 (1.5)**	**0 (0)**	**0 (0)**

Table 3. Site of Lesions (BCC)

Site	Chinese			Caucasian		
	Male	Female	Total	Male	Female	Total
1. Head						
Scalp	5	7	12	-	-	-
Ear	3	2	5	4	-	4
Periorbital	5	7	12	-	-	-
Nasal	28	46	74	8	2	10
Perioral + lip	2	9	11	-	1	1
Forehead	3	20	23	11	-	11
Cheek	25	17	42	6	2	8
2. Neck	1	4	5	2	-	2
Subtotal (Head +Neck)(%)	**72(86.7)**	**112(89.6)**	**184(88.5)**	**31(57.4)**	**5 (45.4)**	**36(55.4)**
3. Trunk						
Chest	2	3	5	6	3	9
Abdomen	1	-	1	1	-	1
Back	4	2	6	8	-	8
Subtotal	**7(8.4)**	**5(4)**	**12(5.8)**	**15(27.8)**	**3(27.3)**	**18(27.7)**

(Trunk) (%)						
4. Limbs	-					
Upper limbs	-	1	1	3	2	5
Lower limbs	-	5	5	5	1	6
Subtotal (Limbs) (%)	**0(0)**	**6(4.8)**	**6(2.9)**	**8(14.8)**	**3(27.3)**	**11(16.9)**
5. Genital	1(1.3)	2(1.6)	3(1.4)	-	-	-
6. Unspecifed site	3(3.6)	-	3(1.4)	-	-	-
Total	**83**	**125**	**208**	**54**	**11**	**65**

Table 4. Site of Lesions According to Low, Middle or High Risk (BCC)

Site of lesions	Chinese			Caucasian		
	Male	Female	Total(%)	Male	Female	Total(%)
Low risk sites (Neck, trunk, limbs)	9	17	26(12.5)	25	6	31(47.7)
Middle risk sites (Scalp, forehead, periauricular, cheek)	33	44	77(37.0)	17	2	19(29.2)
High risk sites (Nose, periocular, perioral, ear, chin)	38	64	102(49.0)	12	3	15(23.1)
Unspecified	3	0	3(1.5)	0	0	0
Total	83	125	208(100)	54	11	65(100)

Table 5. Site of Lesions (SCC)

Site	Male (%)	Female (%)	Total (%)
1. Head	12 (54.5)	24 (72.7)	36 (65.5)
2. Neck	0 (0.0)	0 (0.0)	0 (0.0)
3. Trunk	4 (18.2)	2 (6.1)	6 (10.9)
4. Limbs	5 (22.7)	6 (18.2)	11 (20.0)
5. Genital	1 (4.6)	1 (3.0)	2 (3.6)
Total	22 (100)	33 (100)	55 (100)

Table 6. Clinical Types (BCC)

Clinical Types	Chinese			Caucasian		
	Male (%)	Female(%)	Total (%)	Male(%)	Female(%)	Total (%)
1. Rodent ulcer	31 (37.3)	43 (34.4)	74 (35.6)	31 (57.4)	7 (63.6)	38 (58.5)
2. Pigmented	46 (55.5)	75 (60.0)	121(58.1)	2 (3.7)	-	2 (3.1)
3. Cystic	-	4 (3.2)	4 (1.9)	-	-	-
4. Morphoeic	2 (2.4)	-	2 (1.0)	3 (5.6)	-	3 (4.6)
5. Superficial	3 (3.6)	2 (1.6)	5 (2.4)	15(27.7)	4 (36.4)	19 (29.2)
6. Unspecified	1 (1.2)	1 (0.8)	2 (1.0)	3 (5.6)	-	3 (4.6)
Total	**83 (100)**	**125 (100)**	**208(100)**	**54 (100)**	**11(100)**	**65 (100)**

Table 7. Size of Lesions (BCC + SCC)

Size	BCC (%)		SCC (%)
	Chinese	Caucasian	Chinese
<1 cm	97 (46.6)	37 (56.9)	14 (25.5)
1 – 2 cm	87 (41.8)	24 (36.9)	21 (38.2)
>2 – 3 cm	7 (3.4)	--	7 (12.7)
> 3 cm	6 (2.9)	--	6 (10.9)
unspecified	11 (5.3)	4 (6.2)	7 (12.7)
Total	**208 (100)**	**65 (100)**	**55 (100)**

Table 8. Method of Treatment (BCC + SCC)

Method of treatment	BCC (%)		SCC (%)
	Chinese	Caucasian	Chinese
Excisional biopsy	114 (54.8)	51 (78.5)	24 (43.6)
Incisional biopsy	65 (31.3)	7 (10.8)	25 (45.5)
Punch biopsy	21 (10.1)	6 (9.2)	4 (7.3)
Shave biopsy	5 (2.4)	1 (1.5)	2 (3.6)
Curettage	1 (0.5)	-	-
unspecified	2 (0.9)	-	-
Total	**208 (100)**	**65 (100)**	**55 (100)**

Table 9. Referral Pattern (BCC + SCC)

Referral Pattern	BCC		SCC	**Total (%)**
	Chinese	Caucasian	Chinese	
Plastic surgery	43	6	11	**60 (19.0)**
Skin tumor clinic	24	2	6	**32 (10.2)**
Radiotherapy	19	4	6	**29 (9.2)**
Surgery	24	8	8	**40 (12.7)**
Others	2	0	2	**4 (1.3)**
				165 (52.4)

Table 10. Comparison of NMSC among different studies

Places	Rochester, Minnesota [26]	South Europe[29]	South Wales, UK[20]	Hawaii[25]	Southeast Australia[5]	Present Study (Chinese)
Published year	1990	1996	1989	1993	1993	-----
Study Period	1976-1984	1989 – 1993	6 month	1983 - 1987	1990	1993-97
BCC						
Number of patients	657	1549	315	242	568	202
M/F ratio	1:1.75	1.31:1	1.35:1	3.16:1	----	1:1.46
Mean age	64.6	--	--	56.5	----	68.9
Site						
Head & Neck	84.6%	80.5%	81%	54.7%	67%	88.5%
Trunk	10.6%	14.6%	14.5%	35.8%	19%	5.8%
Limbs	3.9%	4.5%	4.5%	9.4%	13%	2.9%
Genital	0.9%	--	--	--	--	1.4%
Unknown	--	--	--	--	5%	1.4%
SCC						
Number of patients		228	56		166	54
M/F ratio		3.47:1	1:1.07		2.13:1	1:1.45
Mean age		----	----		---	74.1
Site						
Head & Neck		69.5%	66%		40%	65.5%
Trunk		8.3%	9%		5%	10.9%
Limbs		22.6%	23%		50%	20.0%
Genitals		---	---		---	3.6%

Unknown		---	---		4%	----
BCC to SCC ratio		**6.79:1**	**4:1**		**2.76:1**	**3.74:1**

Fig 1. Ethnic distribution of BCC patients

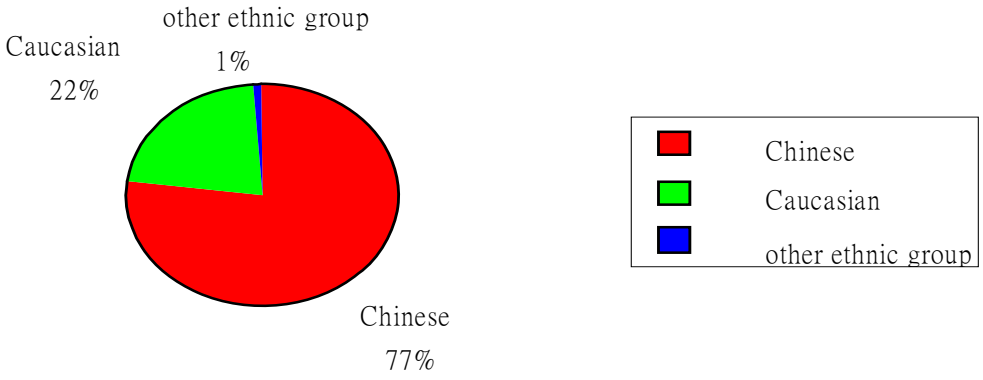

Fig 2. Age distribution of Chinese BCC patients

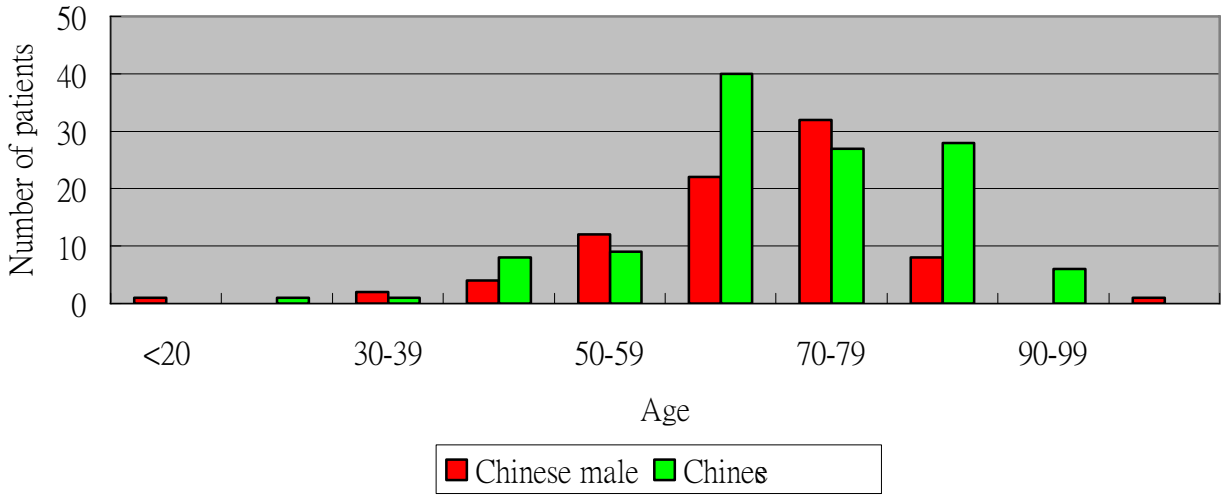

Fig 3. Age distribution of Caucasian BCC patients