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Original Article

Review of the clinical features of skin cancer: A study of 1,048 cases from a hospital in West China

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Abstract

Background Skin cancer (SC) is a group of malignancies which include primary and metastatic tumors which involve the skin and its appendages. Up to the present, only a few studies on the clinical features and the trend of SC have been reported but the status in West China is still undetermined.

Patients and methods The SC cases were from a major hospital in West China. A total of 1048 cases from 1981 to 2006 were included in our study. The clinical features of SC including age, gender, lesion location and pathological diagnosis were analyzed. In order to illustrate the trend of SC incidence, the patients from 1981-1993 and 1994-2006 were assigned to group A and B, respectively. The percentage of SC in all malignancies (Ms), including all kinds of internal carcinomas and skin cancers, and the percentage of SC in inpatients and outpatients (IOPs) between group A and B were separately compared to illustrate the trend in SC incidence in this area.

Results (1) Of the 1048 SCs included, 308 (29.4%) were squamous cell carcinoma (SCC), 293 (28.0%) basal cell carcinoma (BCC) and 168 (16.0%) cutaneous malignant melanoma (CMM). Ratio of male to female was 1.5: 1.0. Median age was 54.0±23.0 years. 40.8% of the SCs occurred on the head, 35.0% on the trunk and 24.2% on the extremities. Median age of CMM (53.0±22.5) was less than those of BCC (58.0±18.3 years) and SCC (57.0±20.0 years). 83.6% of the BCCs, 49.8% of the SCCs and 13.5% of the CMMs occurred on the head. (2) Of the 168 CMMs, 106 (63.1%) occurred on the acral, 23 (13.7%) on the head, 24 (14.3%) on the trunk and 15 (8.9%) on the limbs. Of the 106 acral melanoma (AM), 41 (38.7%) occurred on the plantar skin, 19 (17.9%) on the heel, 15 (14.2%) on the subungual skin of thumbs, 13 (12.3%) on the subungual skin of big toes and 18 (17.0%) on other acra. (3) The percentages of SC in IOPs (SCs/IOPs) in Group A and B were 0.0038% (325/8,457,672), 0.0066%

(723/11,037,720), an increase of by 74%. The percentages of SC in all Ms (SC/Ms) were 2.1% (325/15,363) and 3.1% (723/23,364), an increase of 48%. During the same period, the percentages of Ms in IOPs (Ms/IOPs) were 0.18% (15,363/8,457,672) and 0.21% (23,364/11,037,720), increased only by 17%.

Conclusions In our study, SCC, BCC and CMM were major SC types. The head and trunk are the main sites for SC occurring. AM is the most common CMM. In past 26 years, the percentages of SC in all malignancies and in inpatients and outpatients have increased in this hospital. The finding in our study provides a clue for understanding of the trend of SC in West China.

Key words
Skin cancer; squamous cell carcinoma; basal cell carcinoma; cutaneous malignant melanoma; acral melanoma

Introduction

Skin cancer (SC), including primary and metastatic tumors, covers a heterogeneous group of malignancies which involve the skin and its appendages. SC has been extensively studied because it is one of the most common malignancies among Caucasians. As indicated by some reports on Caucasians, basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and cutaneous malignant melanoma (CMM) are the most common SC types. Most of SC occurs on the head.[1] In the past several decades, the incidence of SC has increased.[1] Since SC is relatively rare in China, there are only a few reports on SC. To our knowledge, this is the first research on the clinical features and trend of SC incidence in West China.

Compared to other SC types, higher incidence rate, poorer prognosis and more difficult pathological diagnosis than other SCs are the characteristics of CMM in Caucasians.[2] Some studies have illustrated the clinical and pathogenesis of CMM in Caucasians,[1] and other reports in non-white populations suggest the clinical features of CMM are greatly different from those in Caucasians.[3,4] Up to the date, no studies on CMM have been reported in West China. The clinical features of CMM in this area are undetermined.

In this study, our aim was to illustrate the clinical features of SC and CMM based on the clinical information from a major hospital in West China. The percentages of SCs/Ms and SCs/IOPs were attained to indicate the trend in SC incidence.

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However, this is only a representative study and more population-based researches should be conducted to systematically study the clinical features and the trend in incidence of SC in West China.

Patients and methods

All patients with SC included in our study were from a major hospital in Xi'an city which is a central city in West China. All pathological reports of this hospital were screened to select the cases which were diagnosed as SC. Before being included in this study, the pathological diagnosis was reconfirmed under the criteria proposed by Barnhill *et al.*[5]

The SCs included in our study consisted of the following criteria: (1) the patients were originally diagnosed as SC from January 1, 1981 to December 31, 2006; (2) all the cases must be pathologically re-examined and confirmed; (3) SCs in our study included SCC, BCC, CMM, cutaneous metastatic tumors, cutaneous lymphoma, Paget's and extramammary Paget's disease, malignancies from appendages (including sweat and sebaceous glands, nerves, hair follicles and vascular tissues), Bowen's disease, mycosis fungoides (MF) and leukemia cutis. Malignancies from fat, muscle, cartilage, bone and tendon sheath were excluded. In addition, the cases without either pathological slides for re-examination or definite diagnosis were also excluded.

Following the above criteria, there were 1,332 cases initially diagnosed as SC. 270 cases without pathological slides and 14 cases without definite diagnosis were excluded. Finally, 1,048 cases were included in our study.

The following clinical data of each case were recorded, gender, and age initially diagnosed (year), lesion location and pathological diagnosis. As to the lesion location of SC, the body area was divided into three parts, the head (including face and scalp), trunk (including neck, chest, abdomen, buttock, perineum and back) and extremities (including the upper arms, forearms, legs, hands and feet). As CMM on the acral area (AM) differs with CMM on non-acral in clinical, pathological and prognosis features,[6] extremities were further subdivided into two parts, limbs (including the upper arms, forearms, legs, dorsal parts of hand and feet) and acral (volar, plantar and subungual skin).

As the number of IOPs in this hospital has increased in the past 26 years, the comparison with the annual numbers of SC cannot really elucidate the trend of SC

incidence. The percentages of the SCs/IOPs and SCs/Ms were employed to illustrate the trend of SC. The patients from 1981-1993 and 1994-2006 were assigned to group A and B. The percentages of SCs/IOPs and SCs/Ms between group A and B were compared to illustrate the trend of SC incidence, respectively. The percentage of Ms/IOPs was also taken to avoid the bias from the yearly increase of Ms.

Results

1. General clinical features of SC

1,048 SCs were included in our study. The percentage of SCs/Ms was 2.7% (1,048/38,727). The SCs occurred more in males than females, with ratio of 1.5:1.0. The majority of the SCs were initially diagnosed in older patients, with median age of 54.0±23.0 years. The SCs occurred more frequently on the head than the trunk and the extremities. Of the 1,027 SCs with definite primary tumor location, 419 (40.8%) were on the head, 359 (35.0%) on the trunk and 249 (24.2%) on the extremities. The remaining 21 SCs had no definite primary tumor location.

As **Table 1** shows, SCC, BCC and CMM were the most prevalent SC types. SCC accounted for 29.4% (308 cases), BCC 28.0% (293 cases) and CMM 16.0% (168 cases), with SCC: BCC: CMM ratio of 1.8: 1.7:1.0. As for the common SC types, 83.6% of the BCCs occurred on the head, and the SCCs on the head and trunk were 49.8% and 33.2%, respectively. For SCC and BCC in males, the percentage of SCC (67.5%) was higher than that of BCC (54.5%). The median ages of SCC (57.0±20.0 years) and BCC (58.0±18.3 years) were older than that of CMM (53.0±22.5).

Table 1 Constitutive ratio of the SC

Subtype of SC	n (%)
SCC	308 (29.4%)
BCC	293 (28.0%)
CMM	168 (16.0%)
Cutaneous metastases	81 (7.7%)
Cutaneous lymphoma	47 (4.5%)
Paget's disease	46 (4.4%)
Malignancies from appendages	40 (3.8%)
Bowen's disease	30 (2.9%)
Mycosis fungoides	30 (2.9%)
Leukemia cutis	5 (0.4%)

2. Clinical features of CMM

There were a total of 234 cases diagnosed pathologically as malignant melanoma. Of them, 168 cases (71.8%) primarily occurred on skin. The CMMs occurred more in male than in female, with male: female ratio of 1.3:1.0. The majority of the CMMs were initially diagnosed in adults, with the median age of 53.0±22.5 years.

The number of acral melanoma (AM) was more than that of CMM on non-acral areas such as the head and the trunk. AM accounted for 63.1% (106) of CMM, and 23 CMMs (13.7%) occurred on the head, 24 (14.3%) on the trunk and 15 (8.9%) on limbs (except acral).

Of the 106 AMs, 41 (38.7%) were primarily on the plantar skin, 19 (17.9%) on the heel skin, 15 (14.2%) on the subungual skin of thumb, 13 (12.3%) on the subungual skin of big toe and 18 (17.0%) on other acra.

3. Trend of SC incidence in the hospital

We compared the percentages of the SCs/Ms and the SCs/IOPs between groups A and B, respectively. The results showed that the incidence of SC has increased during the past 26 years in this hospital. As **Table 2** shows, there were 325 and 723 SCs in groups A and B, respectively. The percentages of SCs/IOPs in group A and B were 0.0038% (325/8,457,672) and 0.0066% (723/11,037,720), increased by 74%. Similar change was also observed in the percentage of SCs/Ms. SCs/Ms in groups A and B were 2.1% (325/15,363) and 3.1% (723/23,364), increased by 48%. During the same period, the percentages of the Ms/IOPs were 0.18% (15363/8,457,672) and 0.21% (23,364/11,037,720), increased by 17%.

Discussion

As there is no population-based survey concerning clinical features and trend of SC incidence in West China, the data of SC from this hospital are the only sources to understand the clinical features and the trend of SC incidence in West China. The patients attending to this hospital were from whole region of West China and over 740,000 per year. Therefore, our results can partially represent the entire area to illustrate the clinical features and the trend of SC in this area.

Compared to some reports on SC in Caucasians, we have found that the clinical features of SC in this hospital were greatly different from those of Caucasians. First, the numbers of SCC and BCC were approximately equal in our study (1.8:1.7). In Caucasians, the number of SCC is obviously less than that of BCC (1-2:4).[1,7] Second, the percentage of SC occurring on the head (40.8%) is significantly lower than that of the American white population (80%).[1] Third, the percentage of SCs/Ms was 2.7%, and SC was not in the list of top ten common malignancies in our study. It is well known that there are great differences in

genetic and social conditions between white population and non-white population. Due to racial (blue eyes, a fair complexion, sunburn easily, suntan poorly, freckle with sun exposure and red or blond hair) and social factors (recreational outdoor exposure and so on), SC in Caucasians is one of the more common malignancies, and most of SC arise on skin areas that are intensively exposed to ultraviolet radiation (UR), such as head.[8] UR is recognized as a main etiological factor of SC in Caucasians.[1,7]

The gender, lesion distribution and constitutive ratio in our study were consistent with several reports from other regions of China.[9,10] The median age of SC in our study (54 years old) was a little younger than that in other regions of China (60 years old). The percentage of SC/Ms in our study (2.7%) was higher than that in other reports (0.5% to 1.5%).[11,12] Due to few reports on SC in China, the differences can't be properly evaluated.

In our study, the majority of the CMMs (63.1%) were on the acra. Contrarily, most of CMM occur on the head in Caucasians.[1] The same genetic and social factors may also be the answer to the differences in lesion distribution of CMM between our study and other reports on Caucasians. A number of investigations have indicated that UR is closely related with CMM in Caucasians, and most of CMM occurs on head and trunk which are intensively exposed to UR.[13,14] But in non-white populations, CMM mainly occurs on the acra which is a weight-bearing region and often suffers from trauma (friction, stab or crush) and pressure that seem to be important risk factors for CMM.[15,16] In clinic, we have treated several CMMs malignantly transforming from chronic ulceration or scars after trauma.

As **Table 2** showed, the percentage of Ms/IOPs has increased from 0.18% of group A to 0.21% of group B. The results indicate that the incidence of all malignancies in this hospital has increased in the past 26 years. This finding is supported by other population-based reports on trend of all malignancies in West China.[17-19] Because there are few reports on SC in West China, the percentages of SCs/IOPs and SCs/Ms were the only way to illustrate the trend of SC. As **Table 2** showed, increases of SC/IOPs and SC/Ms between group A and group B were 74%

Table 2 Comparison of SCs/IOPs, SCs/Ms and Ms/IOPs between Group A and B

	A (%)	*B (%)*	*Increase*
SC	325*	723*	
SCs/IOPs	0.0038%	0.0066%	74%
SCs/Ms	2.1%	3.1%	48%
Ms/IOPs	0.18%	0.21%	17%

SC* (number of the SC cases), SCs/IOPs

(percentage of SC in IOP), SCs/Ms (percentage of SC in Ms), Ms/IOPs (percentage of Ms in IOPs), Increase (percentage of increase), A (Group A from 1981 to 1993) and B (Group B from 1994 to 2006).

and 48%, greatly higher than that of Ms/IOPs (17%). The results suggest that the percentage of SC has increased in the past 26 years in this hospital. But the conclusion of the increasing trend of SC in this area can't be drawn only from our findings. The conclusion should be verified by other reports such as population-based investigations on SC. Besides in white population, the increasing trend of SC has also been proved by some investigations on yellow populations, including Japanese and Chinese of Singapore.[20-22] It is well known that the increasing trend of SC is a result of multi-factors such as UR, ozone deletion, environmental pollution and so on. UR is the key factor resulting in SC.[23] As estimated, for a 2% decrease in total column atmospheric ozone, an increase of a 6% to 12% in non-melanoma SC is to be expected.[13,24] The ozone layer has decreased by approximately 2% over the past 20 years world-widely.[24] In China, the ozone layer has been reported to have decreased by average 1.2-1.7% during the same period.[25] Besides UR, other environmental pollutants such as arsenic, cadmium and lead may be other important risk factors for SC in West China.[26] Known to all, arsenic is closely with SCC.[1] In west China, the sources of arsenic pollution are mining and smelting. The pollutant is discharged into the environment and causes the pollution of water, atmosphere, soil and biological species and causes a series of acute, chronic diseases and malignancies. In some regions of west China, the content of environmental arsenic in polluted areas is higher than that in non-polluted areas.[27] There are some other SC-related factors including development of health knowledge and so on, which can't be evaluated. Though our finding needs to be further confirmed by other reports, which should be regionally or nation-widely conducted, the finding is still an important clue to comprehensive understanding of the increase of SC in China during the past several decades.

In summary, our study is a retrospective investigation based on the clinical information from a major hospital in West China and the clinical features and the trend in SC incidence in this hospital were investigated. We found some differences in the clinical features between SC and CMM compared to the results from Caucasians. The percentage of SC in this hospital has increased in the past 26 years. All these findings might be helpful to our further understanding of the features of SC and CMM and benefit the future SC

diagnosis and prophylaxis in west China.

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