Basal Cell Carcinoma: A 6-Year Clinicopathological Study from the Sub-Himalayan Region of North India

Abstract

Background: Basal cell carcinoma (BCC) has not been studied in the population of the Sub-Himalayan region in the North India, as it has been done in the rest of India. This study was performed to analyze the clinicopathological spectrum of BCC in this population. Materials and Methods: The present study is a hospital-based open-cohort observational study which was carried out in the Departments of Pathology and Dermatology at a tertiary care center of Himachal Pradesh, India, from January 2012 to December 2017. All the patients with the histopathological diagnosis of BCC were included in this study. Results: Of the 46 cases of BCC analyzed during the 6-year study period, 30 (65.3%) cases were female and 16 (34.7%) cases were male. The mean age was 65.7 ± 12.9 years and 31.4% (14/46) were in the 61–70 years age group. Majority of the lesions were located in the head-and-neck area and the nose was the most common site. The most common histological type was the solid variant. Conclusion: This study highlights that BCC is not rare in Indians and is more common in females in this region. This study also reveals the frequency of clinicopathological patterns of BCC in this region.

Keywords: Cancer, Himachal Pradesh, histopathology, skin

Introduction

Basal cell carcinoma (BCC) is uncommon in dark-skinned races.[1–3] The nonmelanoma skin cancers (NMSCs) comprise 1%–2% of cutaneous neoplasms in Indians, in contrast to one-third in Caucasians.[4] BCC is the most common cutaneous malignancy in whites and the second most common after squamous cell carcinoma (SCC) among the darker skin population including Indians.[4] However, geographical variation in the frequency of NMSCs has been observed in India where the North and South divide is observed.[4,5] Reviews on the subject from India admit that there is a paucity of data on NMSCs from the Indian subcontinent.[4] The aim of the current study was to report our clinical experiences in the clinical and histopathological spectrum of BCC patients reporting to a tertiary care center in the sub-Himalayan state of North India.

Materials and Methods

This open-cohort observational study was conducted in a tertiary care referral hospital of Kangra district in Himachal Pradesh, India. The hospital is the largest in the region and caters to the medical needs of the population residing in the physiogeographic region of Shivalik and lesser Himalayas, and includes the lower hills of Kangra, Hamirpur, Una, Bilaspur, lower parts of Mandi, and Chamba districts. The region experiences subtropical monsoon, mild and dry winter, snow in places, and hot summer. Within this zone, altitude varies from 350 m to 2500 m. A total of 46 patients were recruited over a period of 6 years from January 2012 to December 2017. The diagnosis of BCC was based on the clinical examination, gross, and histopathology findings. All the 46 cases were discussed individually in the dermatopathology meetings held every month in the Department of Pathology and attended by the faculty and residents of the Departments of Pathology and Dermatology. All the histopathology slides were examined by two pathologists from the faculty. Among the two pathologists, one author (RKR) remained consistent throughout the study to maintain reporting. Wherever there was a difference of opinion among the two, the view of the senior faculty member was followed.

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was considered as the final histopathological diagnosis. Informed consent was obtained from each participant on a structured pro forma. A detailed history was taken, and examination was done in all cases. The data obtained were entered in a Microsoft Excel sheet and analyzed with the statistical software SPSS Version 21.0 (IBM Corp., Armonk, NY, USA). Qualitative data have been calculated in the form of frequency and percentage. Quantitative data have been presented as the mean ± standard deviation. The study was approved by the Institutional Ethics Committee.

Ethical approval
The permission was taken from Institutional Ethics Committee prior to starting the project. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Results
Forty-six patients were recruited over a period of 6 years from January 2012 to December 2017. Females were 30 (65.3%) and males were 16 (34.7%). The male-to-female ratio is 1:1.8. The mean age was 65.7 ± 12.9 years and majority (82.6%) of the patients were in the 51–80 years age group. The mean age of males was 67.0 ± 13.8 years and the mean age of females was 65.0 ± 12.5 years. The age and sex distribution are shown in Figure 1. The total duration of the lesion before the presentation was variable and ranged from 1 month to 15 years. The mean duration of symptoms was 39.5 ± 43.1 months; 45.8 ± 47.7 months for males, and 35.3 ± 40.3 months for females, respectively. The lesions were predominantly found in the head-and-neck areas in 84.7% (39/46) patients and in 15.2% (7/46) patients at other sites such as the forearm, back, chest, and thigh. The distribution of lesions according to site is shown in Table 1. The clinical presentation was variable and is shown in Table 2. Nodular BCC was the most common presentation [Figure 2]. The distribution of the histopathological variants is shown in Figure 3. The photomicrographs of the histopathology variants of BCC are shown in Figure 4. Of the 12 solid variants, one patient had keratotic differentiation, six patients had adenoid variant of BCC, and three patients had basosquamous cell carcinoma and infiltrative BCC each [Figure 5]. Recurrence Table 1: Distribution of basal cell carcinoma lesions according to the primary site (n=46)

| Site               | Cases (%) |
|--------------------|-----------|
| Head-and-neck areas| 39 (84.7) |
| Nose               | 11 (23.9) |
| Cheek              | 9 (19.5)  |
| Zygomatic area     | 6 (13)    |
| Eyebrow            | 4 (8.6)   |
| Forehead           | 3 (6.5)   |
| Lips               | 2 (4.3)   |
| Eyelids            | 1 (2.1)   |
| Scalp              | 1 (2.1)   |
| Postauricular      | 1 (2.1)   |
| Neck               | 1 (2.1)   |
| Others (forearm, back, chest, and thigh) | 7 (15.2) |

Table 2: Frequency distribution of clinical presentation

| Site               | n (%) |
|--------------------|-------|
| Nodular            | 35 (76) |
| Without ulceration | 20 (43.4) |
| With ulceration    | 15 (32.6) |
| Pigmented          | 6 (13) |
| Plaque             | 3 (6.5) |
| Without ulceration | 2 (4.3) |
| With ulceration    | 1 (2.1) |
| Morpheaform        | 1 (2.1) |
| Superficial        | 1 (2.1) |

Figure 1: Age and sex distribution

Figure 2: Morphology of basal cell carcinoma; (a) a large ulcerated and crusted-pigmented noduloplaque basal cell carcinoma over the forehead. (b) a small nonpigmented nodular basal cell carcinoma over the forehead. (c) a superficial spreading basal cell carcinoma with annular-beaded borders in the retroauricular area. (d) a black-hyperpigmented melanotic basal cell carcinoma with beaded borders. (e) an amelanotic basal cell carcinoma with minimally pigmented beaded borders over the nasal bridge. (f) A typical rodent ulcer in the right nasolabial fold
of the disease was observed in one patient. This patient had a lesion for 6 years and had undergone an excision biopsy in 2007. In 2012, after 5 years of excision biopsy, he again presented with a recurrence at the site of the original lesion. There was extensive cutaneous and subcutaneous involvement by multiple noduloulcerative lesions over the trunk. Bilateral axillary lymph nodes were palpable, firm, and appeared fixed to the underlying structures. Biopsies were performed from the tumor located at the site of the original lesion as well as from the lesion over the left side of the chest. This was infiltrative BCC [Figure 6].

Discussion

Skin cancers are uncommon and do not rank among the most common 14 malignancies in India. The epidemiological data on incidence, prevalence, and mortality figures are not available from India.[6] BCCs are more common in males, presumably due to greater occupational and recreational exposure to ultraviolet (UV) light. Some Indian series have reported an unusual female preponderance,[7-10] similar to our study. The possible reasons for female preponderance in our study are that about 80% of the field work in agriculture, from sowing to harvesting, postharvest management, and dairy management is done by women farmers in this region.[11] In Himachal Pradesh, women farmers are the veritable backbone of subsistence agriculture. The state has a total population of 68, 64, 602, and 90.2% people live in a rural setup.[12] Rural women spend a lot of time not only in managing their homes but also managing their farms and animals. It has been documented that hill farm women spend 15–16 h/day of time in farming, animal husbandry, and homestead activities, thus depicting the load of drudgery shouldered by them in day-to-day activities.[13] Thus farmers, especially females from this region have higher cumulative chronic sun exposure. The mean age was the sixth decade of life and was similar in both male and female patients. In this study, 84.7% lesions were located in the sun-exposed

Figure 3: Distribution of histopathology variants

Figure 4: Photomicrograph showing histopathology of basal cell carcinoma; (a) solid variant. (b) pigmented variant. (c) superficial spreading. (d) adenoid cystic variant (H and E, ×200)

Figure 5: Photomicrograph showing infiltrative variant (a) sclerosing. (b) nonsclerosing (H and E, ×400)

Figure 6: Photomicrograph showing infiltrative basal cell carcinoma (H and E, ×200) (a) at the margin of old linear scar (arrows) from the noduloulcerative plaque over the back (inset) (b) from noduloulcerative fleshy plaque in the left axilla (inset)
areas of the head and neck. These results on age and size distribution are consistent with the current knowledge from different observations.\textsuperscript{[1,14]} The study confirmed that even in dark-skinned population, it is the sun-exposed areas where BCC develops. In all the patients, BCC had emerged \textit{de novo} except one, in whom the underlying lesion was a trichoepithelioma. Most BCCs emerge \textit{de novo}, and rarely, complicate underlying scarring processes and chronic dermatoses.\textsuperscript{[9]} Advancing age and exposure to sunlight are the possible risk factors in this region. The aging population and enhanced survival are a threat to the increase in the overall incidence of cancers. UV-B radiation as a radiant energy from the sun has been found to be a risk factor for the induction of skin cancers.\textsuperscript{[15]} An increase in exposure to UV-B radiation at the surface of the earth is expected with depletion of the ozone layer in the stratosphere. As a consequence, the prevalence of skin cancers is increasing.\textsuperscript{[16]} Among the environmental factors, altitude influences the UV level. At higher altitudes, a thinner atmosphere filters less UV radiation. With every 1000 m increase in altitude, UV levels increase by 10% to 12%.\textsuperscript{[17]} Radon and uranium estimation in natural water resources and drinking water were found within safe limits according to the recommendation of the WHO in the state of Himachal Pradesh.\textsuperscript{[18]} As per the WHO, the groundwater level of arsenic in the state does not fall under the category of the most affected states. According to the Ministry of Drinking Water and Sanitation, a population of 32,752 in 150 habitations has drinking water affected by arsenic as a pollutant in Himachal Pradesh.\textsuperscript{[19,20]} The predominant clinical presentation was nodular. The classical rodent ulcer having indurated edge and ulcerated center were observed in 16 patients. Among histopathological types, solid variant was the most common type. Similar results have been observed in other Indian studies.\textsuperscript{[8‑10,21,22]} Adenoid, a rare histopathological variant, has been more frequently reported in this study in comparison to other Indian studies. This variant was located in the sun-exposed areas of the head and neck in all the patients except one in whom it was located on the forearm. It is often regarded as a low-grade malignancy compared to other subtypes such as nodular and morpheaform, and without predilection for any particular region. Case reports from India have observed involvement of unexposed parts such as back and the axilla and having larger size of the lesions.\textsuperscript{[23]} Another rare histopathological variant found in three patients was basosquamous cell carcinoma. It is locally aggressive with features of both BCC and SCC and a propensity for distant metastasis.\textsuperscript{[24]} Recurrence of the disease was observed in one patient and has been reported by Mehta \textit{et al.}\textsuperscript{[25]} The clinical presentation of recurrence and metastasis was unusual. The metastasis from the primary lesion was distributed in cutaneous and subcutaneous areas of the trunk. BCC most often metastasizes to the regional lymph nodes, followed by the bone, lung, and liver.\textsuperscript{[26]}

\section*{Conclusion}

This study provides information on the clinical and histopathological pattern of BCC in this region of India. The female preponderance and higher percentage of adenoid and basosquamous variants were observed. Aging population and chronic sun exposure are the most likely risk factors in this population. The role of higher altitude as a risk factor requires further studies and verification. Developing and maintaining a cancer registry which will include skin cancers is our vision in the future.

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\section*{Declaration of patient consent}

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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\section*{Conflicts of interest}

There are no conflicts of interest.

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