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ORIGINAL ARTICLE

Basal Cell Carcinoma-Mimicking Lesions in Korean Clinical Settings

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Background: Basal cell carcinoma (BCC) is the most common form of skin cancer and possesses various clinical features including translucency, ulceration, pigmentation, telangiectasia, and rolled borders. Accordingly, many cutaneous lesions can mimic BCCs and differential diagnosis is difficult. **Objective:** To clarify the differences in clinical characteristics between BCCs and BCC-mimicking lesions (BMLs), and to determine which clinical characteristics are helpful for an accurate clinical diagnosis of BCC. **Methods:** We performed clinicopathologic analysis of cutaneous lesions that received a clinical diagnosis of BCC. All lesions included in this study showed more than one of the following characteristics of BCCs: translucency, ulceration, flecked pigmentation, black or blue hue, telangiectasia, and rolled borders. We compared six clinical characteristics between the BCC group and the BML group. **Results:** Among 48 lesions in the BML group, there were 15 premalignant or malignant lesions and 33 benign lesions. Various dermatoses mimicking BCC that have not been reported in the dermatological literature were identified, including angiosarcoma, vulvar intraepithelial neoplasm, foreign body granuloma, intravascular papillary endothelial hyperplasia, sarcoidosis, and others. Compared to the BML group, the BCC group had a significantly higher frequency of translucency (76.3% vs. 52.1%, $p<0.001$), ulceration or erosion (44.2% vs. 27.1%, $p=0.022$), black or blue hue (40.0% vs. 22.9%, $p=0.020$), and rolled borders (49.5% vs. 14.6%, $p<0.001$). Cutaneous lesions with two or less clinical features of BCC were significantly more likely to be BMLs. **Conclusion:** The results of this study could be helpful for the differential diagnosis of BCCs and BCC-mimicking cutaneous lesions. **(Ann Dermatol 26(4) 431～436, 2014)**

-Keywords-
Basal cell carcinoma, Differential diagnosis, Mimicking

INTRODUCTION

Basal cell carcinoma (BCC) is the most common form of skin cancer, and its prevalence has been consistently increasing. BCCs have several textbook clinical characteristics such as translucency, ulceration, pigmentation, telangiectasia, and rolled borders. These characteristics are shared by many skin diseases and each subtype of BCCs should therefore be differentiated from a variety of other cutaneous disorders (Table 1)[1]. A variety of cutaneous lesions can mimic the clinical features of BCCs, including adult-onset xanthogranuloma, rhabdomyomatous mesenchymal hamartoma, Darier's disease, epidermal cysts, lymphoma, and several others (Table 2)[2-15]. Therefore, the differential diagnosis of BCC and BCC-mimicking lesions (BMLs) is complex, yet there have been no studies clarifying the differences in clinical characteristics between BCCs and BMLs, and which clinical characteristics are most helpful for making accurate clinical diagnoses of BCC. Accordingly, we conducted a comparative study between BCCs and BMLs.

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MATERIALS AND METHODS

Six clinical characteristics of BCCs

There are six textbook clinical characteristics of BCCs: translucency, ulceration, pigmentation, telangiectasia, and rolled borders[1]. In this study, "pigmentation" was divided into flecked pigmentation and black or blue hue since pigmented BCCs, which are frequent in Asia, possess various degrees of pigmentation[16]. We defined "flecked pigmentation" as multiple small spots of pigmentation, and "black or blue hue" as homogenous pigmentation. More than one of these six clinical characteristics of BCCs was present in all cases reported as a BML, or in cases mistakenly reported as BCC, in the dermatological literature (Table 2).

Table 1. Differential diagnosis of basal cell carcinoma

Clinical subtype	Differential diagnosis
Nodular	Intradermal nevus
	Squamous cell carcinoma
	Skin appendage tumors
	Seborrheic keratosis
	Dermatofibroma
Pigmented	Malignant melanoma
	Skin appendage tumor
	Compound nevus
	Blue nevus
Morpheaform	Scar
	Morphea
	Trichoepithelioma
Superficial	Bowen's disease
	Paget's disease
	Psoriasis
	Eczema
Fibroepithelioma	Skin tag
	Fibroma
	Papillomatous dermal nevus

Modified from Fitzpatrick's dermotology in general medicine. 8th ed. New York: McGrow-Hill, 2012:1294-1303[1].

Subjects

We enrolled 656 patients with cutaneous lesions, of which the first clinical diagnosis was BCC at the Skin Cancer Clinic of the Department of Dermatology at Pusan National University Hospital, from August 2002 to July 2011. The study was approved by the ethics committee of PNUH (E-2013023). All lesions showed more than one of the six characteristics listed above. The number of patients in the BCC group was 608, and in the BML group was 48. The demographic data are shown in Table 3.

Table 3. Demographic data of both groups

	BCCs	BCC-mimicking lesions
Total number	608	48
Male : Female	1 : 1.2	1 : 1
Mean age (yr)	65.4 (18～89)	64.9 (32～87)
Mean duration of disease (mo)	35.8 (4～360)	34.6 (1～240)
Location of lesion		
Head and neck	556 (91.4)	46 (95.8)
Trunk	40 (6.6)	2 (4.2)
Extremities	12 (2.0)	0 (0.0)

Values are presented as number, mean (range), or number (%). BCC: basal cell carcinoma.

Table 2. Reported cases of other dermatoses mimicking basal cell carcinoma in searching PubMed/MEDLINE*

Case	Diagnosis	Diagnostic pitfalls
Bohn and Sanchez-Sosa[2]	Rhabdomyomatous mesenchymal hamartoma	Focal ulceration
Lovato et al.[3]	Adult onset xanthogranuloma	Yellowish hue, telangiectasia
Russell et al.[4]	Darier disease	Telangiectasia, translucency
Akinyemi et al.[5]	Diffuse large B-cell lymphoma	Ulceration, rolled border
Ghaffar et al.[6]	Epidermoid cyst	Telangiectasia, translucency
Hinz et al.[7]	Lymphoepithelioma-like carcinoma	Central erosion, telangiectasia
Lott et al.[8]	T-cell primary cutaneous anaplastic large cell lymphoma	Ulceration, rolled border, translucency
Hague and Ilchyshyn[9]	Allergic contact dermatitis due to nickel	Ulceration, rolled border
Bechara et al.[10]	Pomade crust	Ulceration
Askar et al.[11]	Syringocystadenoma papilliferum	Ulceration, translucency
Goto et al.[12]	Digital syringomatous carcinoma	Ulceration, rolled border
Ingleton et al.[13]	Cutaneous cryptococcosis	Erosion, rolled border
Tsao et al.[14]	Chronic varicella zoster infection	Erosion, rolled border, translucency
Lobur et al.[15]	Irritant contact dermatitis	Erosion, rolled border

*Studies published between 1983 and 2011 with the searching terms of "mimicking basal cell carcinoma."

Assessment

1) Final diagnoses of the BML group

After histopathologic evaluation, we analyzed which cutaneous diseases can mimic BCC.

2) Comparison of the six characteristics between the BCC group and the BML group

On the basis of clinical photographs, we evaluated how often each characteristic (translucency, telangiectasia, flecked pigmentation, ulceration or erosion, black or blue hue, and rolled borders) was found in the BCC group and the BML group. All statistical analyses were performed by means of IBM SPSS Statistics 21.0 (IBM Co., Armonk, NY, USA).

To compare the six characteristics between the BCC group and the BML group, statistical analysis was performed using Fisher's exact test. The level of significance in this study was set at a *p*-value of below 0.05.

Table 4. Final diagnosis of basal cell carcinoma-mimicking lesions

Final diagnosis	Patients, n (%)
Premalignant and malignant lesion	
Actinic keratosis	6 (12.5)
Squamous cell carcinoma	4 (8.3)
Malignant melanoma	2 (4.2)
Angiosarcoma	1 (2.1)
Paget's disease	1 (2.1)
Vulvar intraepithelial neoplasm	1 (2.1)
Benign lesion	
Seborrheic keratosis	6 (12.5)
Intradermal nevus	4 (8.3)
Keratoacanthoma	3 (6.3)
Trichoblastoma	3 (6.3)
Scar	3 (6.3)
Apocrine hidrocystoma	2 (4.2)
Compound nevus	2 (4.2)
Trichoepithelioma	2 (4.2)
Cutaneous myxoma	1 (2.1)
Dilated pore of Winer	1 (2.1)
Foreign body granuloma	1 (2.1)
Intravascular papillary endothelial hyperplasia	1 (2.1)
Lymphomatoid keratosis	1 (2.1)
Rosacea	1 (2.1)
Sarcoidosis	1 (2.1)
Sebaceous hyperplasia	1 (2.1)

Table 5. Comparison of six clinical characteristics between basal cell carcinomas (BCCs) and BCC-mimicking lesions*

Clinical features	BCCs, n (%)	BCC-mimicking lesions, n (%)	*p*-value
Translucency	464 (76.3)	25 (52.1)	<0.001
Telangiectasia	253 (41.6)	25 (52.1)	0.158
Flecked pigmentation	230 (37.9)	21 (43.8)	0.416
Ulceration or erosion	268 (44.2)	13 (27.1)	0.022
Black or blue hue	243 (40.0)	11 (22.9)	0.020
Rolled border	301 (49.5)	7 (14.6)	<0.001

*Fisher's exact test was utilized for statistical analysis. The level of significance in this study refers to a *p*-value of below 0.05.

RESULTS

Final diagnoses of the BML group (Table 4)

Among 48 BMLs, there were 15 premalignant or malignant lesions and 33 benign lesions. Cases of precancerous and malignant lesions included six cases of actinic keratosis; four cases of squamous cell carcinoma; two cases of malignant melanoma; and one case each of angiosarcoma, Paget's disease, and vulvar intraepithelial neoplasia. Benign disorders included six cases of seborrheic keratosis; four cases of intradermal nevus; three cases each of keratoacanthomas, trichoblastoma, and scars; two cases each of trichoepithelioma, compound nevus, and apocrine hidrocystoma; and one case each of cutaneous myxoma, dilated pore of Winer, foreign body granuloma, intravascular papillary endothelial hyperplasia, lymphomatoid keratosis, rosacea, sarcoidosis, and sebaceous hyperplasia.

Comparison of the six characteristics between the BCC group and the BML group

Compared to the BML group, the BCC group had a significantly higher frequency of translucency (76.3% vs. 52.1%, $p<0.001$), ulceration or erosion (44.2% vs. 27.1%, $p=0.022$), black or blue hue (40.0% vs. 22.9%, $p=0.020$), and rolled borders (49.5% vs. 14.6%, $p<0.001$). In the case of telangiectasia (41.6% vs. 52.1%,

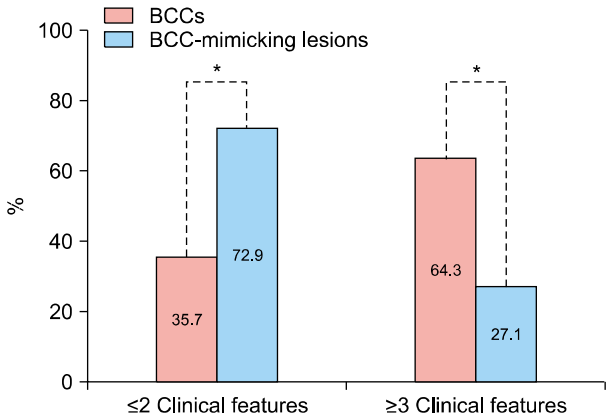

Fig. 1. Percentage according to number of clinical characteristics of basal cell carcinoma (BCC) in cases of BCCs and BCC-mimicking lesions. *$p<0.05$.

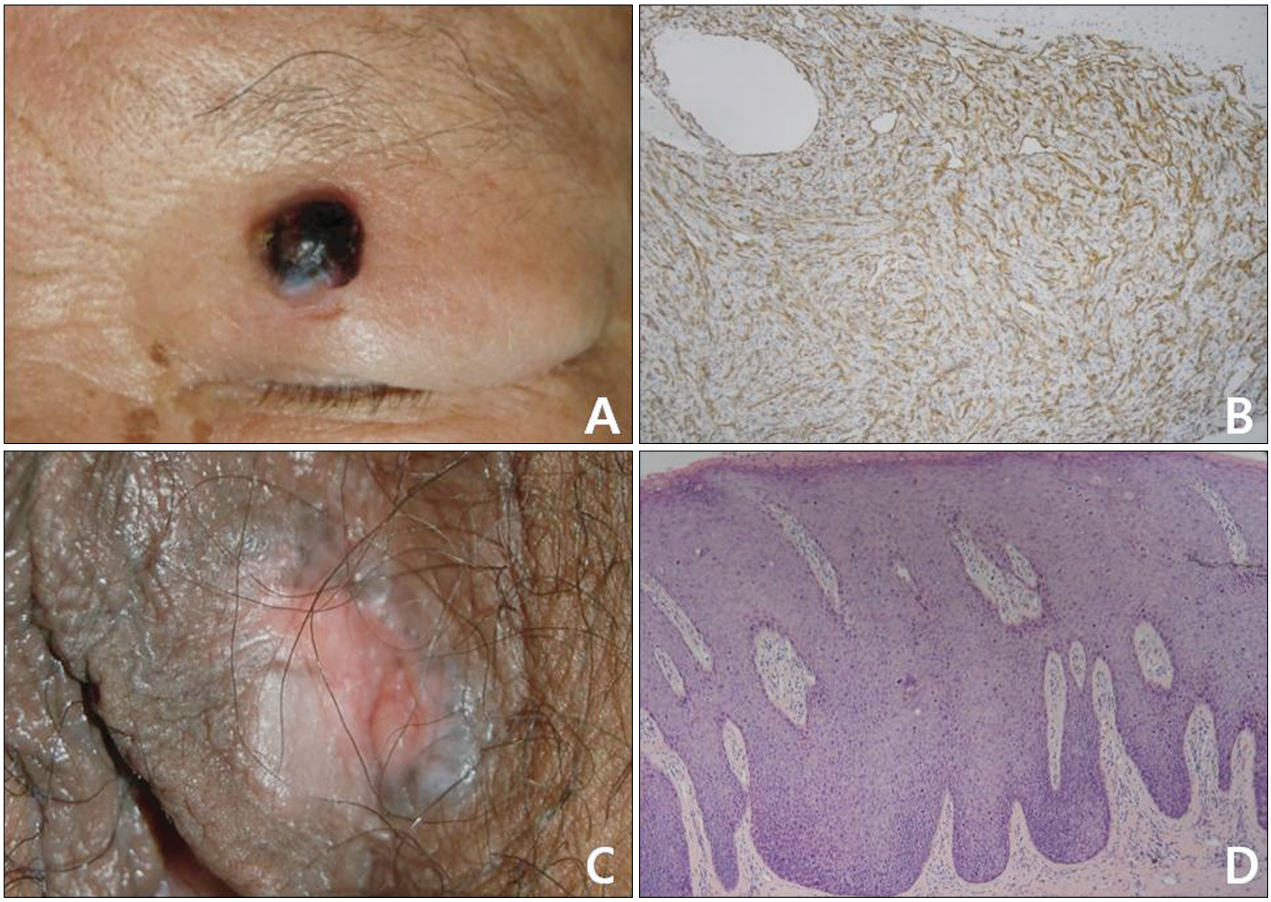

Fig. 2. Various malignant and premalignant cutaneous lesions mimicking basal cell carcinoma. (A, B) Angiosarcoma. Diagnostic pitfalls; black hue (CD31 ×100). (C, D) Vulvar intraepithelial neoplasm. Diagnostic pitfalls; translucency, telangiectasia, erosion, blue hue, and rolled border (H&E, ×100).

$p=0.158$) and flecked pigmentation (37.9% vs. 43.8%, $p=0.416$), there was no statistically significant difference between the two groups (Table 5).

With respect to the number of clinical characteristics in each case, when the number present was two or less, the relevant lesions were highly likely to belong to the BML group (35.7% vs. 72.9%, $p<0.001$). When the number was three or more, they were highly likely to belong to the BCC group (64.3% vs. 27.1%, $p<0.001$; Fig. 1).

DISCUSSION

The clinical characteristics of BCC are commonly known to include translucency, ulceration, pigmentation, telangiectasia, and a rolled border. Of these, ulceration, pigmentation, and telangiectasia are commonly seen in daily dermatological practice. Therefore, various diseases, including infectious skin disorders, can mimic BCC (Table 1, 2), and diagnostic pitfalls might exist between BCC and BMLs. However, there has been no systematic trial to analyze and resolve these issues.

In this study, the BML group included various malignant and benign dermatoses. Among these, there were a variety of additional cutaneous disorders that have not yet been reported: angiosarcoma, vulvar intraepithelial neoplasm, foreign body granuloma, intravascular papillary endothelial hyperplasia, sarcoidosis, and others (Fig. 2, 3).

Among the six main clinical characteristics, translucency, ulceration or erosion, black or blue hue, and rolled borders were found more frequently in the BCC group and this was statistically significant. In the case of telangiectasia and flecked pigmentation, there was no significant difference between the BCC group and the BML group. Telangiectasia and flecked pigmentation could therefore be less reliable clinical characteristics for the diagnosis of BCCs in Korean clinical practice than the other four. Over the past two decades, laser ablation of benign skin lesions such as nevi or seborrheic keratosis on the face has gained wide popularity in Korea. Accordingly, some patients with BCCs are likely to be treated by laser ablation after being

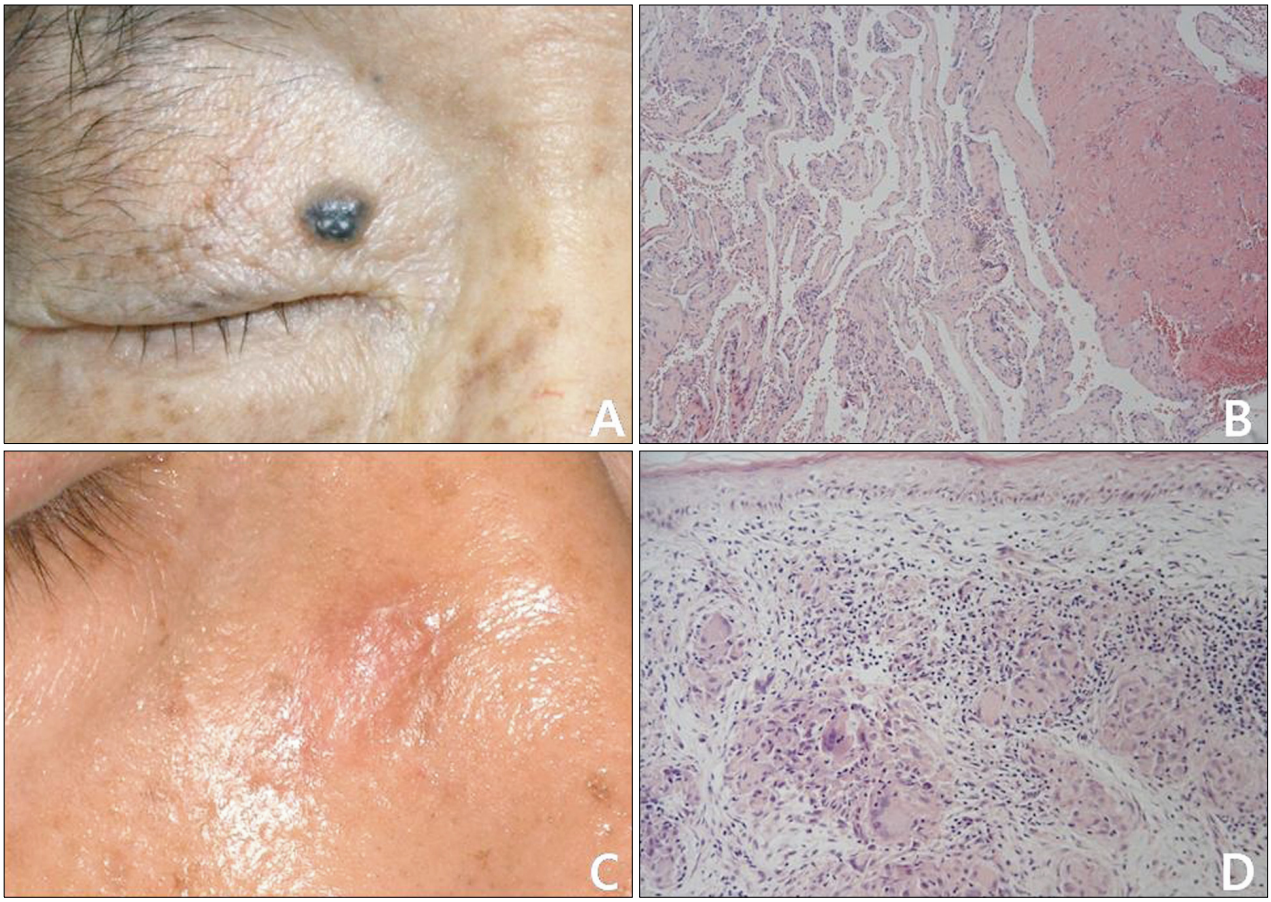

Fig. 3. Various benign cutaneous lesions mimicking basal cell carcinoma (A, B) Intravascular papillary endothelial hyperplasia. Diagnostic pitfalls; blue hue (H&E, ×40). (C, D) Sarcoidosis. Diagnostic pitfalls; translucency, rolled border (H&E, ×100).

diagnosed with these benign skin tumors[17]. In this respect, the results of this study may be helpful for the early detection of BCCs in Korea.

In addition, when a lesion shows two or fewer of the six textbook characteristics of BCCs, it is highly likely to be a BML. When three or more clinical characteristics are present, it is highly likely to be a BCC. Therefore, when one or two clinical characteristics of BCCs are observed at the time of cutaneous lesion examination, other cutaneous disorders should be considered before BCC.

In conclusion, we identified more cutaneous disorders capable of mimicking BCCs than have been previously reported in the literature. In cases of BCC in Korea, translucency, ulceration or erosion, black or blue hue, and rolled borders could be more reliable as diagnostic clinical characteristics than telangiectasia and flecked pigmentation. If a cutaneous lesion suspected to be a BCC possesses three or more clinical characteristics of BCCs, including translucency, telangiectasias, flecked pigmentation, ulceration or erosion, black or blue hue, and rolled borders, it is significantly more likely to be a BCC. The results of this study are thought to contribute to the accurate clinical diagnosis of BCC and provide more detailed information compared to dermoscopic findings alone.

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