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Pathology

Study of Basal Cell Carcinoma and Its Morphological Spectrum

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Abstract Original Research Article

Introduction: Basal cell carcinoma is the most common skin malignancy worldwide with a predilection towards sun exposed areas especially head and neck areas. It is a slow growing tumour with propensity for local invasion, however metastasis is seldom seen. The histopathological variants seen in BCC are nodular, micronodular, cystic, superficial, pigmented, adenoid, infiltrating, sclerosing, keratotic, infundibulocystic, metatypical, basosquamous etc. Aim: The aim was to study morphological spectrum of BCC cases in a tertiary care hospital in southern region of New Delhi. ***Materials and Methods:*** This study was a retrospective analysis in which nine cases of BCCs were included. Result: The mean age of presentation was 68.4 years. There was female preponderance (77%). Face was the most common location (88%) with cheek being the commonest and the ulceration was the most common clinical presentation (66.6%). Among the nine cases of BCC's, 33.3% were solid, 22.2% were each of basosquamous and adenoid variant,11.1% each of pigmented and fibroepithelioma of Pinkus each. Conclusion: Histopathological evaluation is one of the most valuable means of diagnosis in case of BCCs and can be done by correlating clinical presentation with pathological features.

Keywords: Morphological Spectrum, Basal Cell Carcinoma, skin malignancy micronodular, cystic.

INTRODUCTION

Basal Cell carcinomas (BCC) are considered to be the most common cutaneous malignancies accounting to approximately 70% of all malignant diseases of the skin in the western countries [1]. Amongst the Asian races however, the incidence is lower whilst in India, the incidence ranges from 12% to 30% [2]. BCCs are more common among the elderly male population with a predilection for head and neck region [3]. Extensive local tissue destruction is common and if not adequately managed, however metastasis is exceptionally rare [4].

Recently, it has been documented that BCC originates from keratinocyte, derived from pluripotent cells of interfollicular epidermis and those present in the outer sheath of the hair follicle [5]. Many overlapping histopathologic features of BCC are seen with other cutaneous tumours thus, if misdiagnosed or in case of overdiagnosis, treatment and prognosis may be affected. The histopathological variants of BCC include nodular, micronodular, cystic, superficial, pigmented, adenoid, infiltrating, sclerosing, keratotic, infundibulocystic, metatypical, basosquamous etc [3]. Hence, awareness of the histopathological variants and potential histologic mimics of BCC is essential for correct histopathological evaluation.

AIM OF THE STUDY

The aim was to study morphological spectrum of BCC cases in a tertiary care hospital in southern region of New Delhi.

MATERIALS AND METHODS

This was a retrospective analysis of nine cases of BCCs reported in the hospital over a three year time period from year 2016 to 2018. For each of the case, the clinical parameters were evaluated including, age, sex, location of the tumour, relevant clinical history of the disease and final histopathological diagnosis. The histology was evaluated using routine Haematoxylin and Eosin (H&E) stained slides by pathologists. The tumors were classified according to the World Health Organization (WHO) classification [6]. Cell morphology, differentiation, stromal changes, and

histological prognostic factors were noted. The results were analysed based upon the clinical history, gross and histopathological findings. Proportions were described as percentages.

RESULTS

There were 09 cases of cutaneous BCC during this period. The age of the patients ranged from 47 to 80 years with higher incidence in female patients (7 cases) as compared to males. The duration of the lesions varied from 2 months to 10 years.

Table 1: Distribution of cases with Clinical Details

Case no	Age	Sex	Duration of the lesions	Site	Clinical diagnosis	Histological subtype
1	80	Female	1 year	Forehead	Ulcer forehead ?SCC	Fibroepithelioma of Pinkus
2	77	Male	5 months	Left supraorbital	Swelling leftsupraorbital region ?BCC	Pigmented BCC
3	78	Female	3 months	Left Cheek	Slow growing ulcer ?BCC	Basosquamous BCC
4	47	Female	2.5 yrs	Face-Cheek	Slow growing ulcer ?BCC	BCC-Adenoid Variant
5	75	Female	4.5 years	Right nose	Hypopigmented black crusted plaque right infra orbital ?Melanoma	Basal Cell Carcinoma
6	74	Female	1 year	Cheek	Ulcer ?BCC	Basal Cell Carcinoma
7	76	Female	1.5 years	Presternal	Non healing ulcer	Basal cell Carcinoma (solid type)
8	54	Female	4 months	Upper eyelid	Non healing ulcer	Basosquamous BCC
9	55	Male	7 months	Nose	Swelling lateral aspect of nose? BCC	BCC-Adenoid Variant

On evaluating the lesions on the basis of location, occurrence on the face, localized to the cheek was the most common site (3cases, 33.3%), followed by the nose (2cases, 22.2%). The forehead, sternum, upper eyelids and supraorbital comprising of one case each (1.11%) were the other sites.

The lesions were clinically diagnosed as BCC in only five cases, (55.5%) and as squamous cell carcinoma (SCC) and malignant melanoma in one case each. Two of the case clinically presented as non healing ulcer.

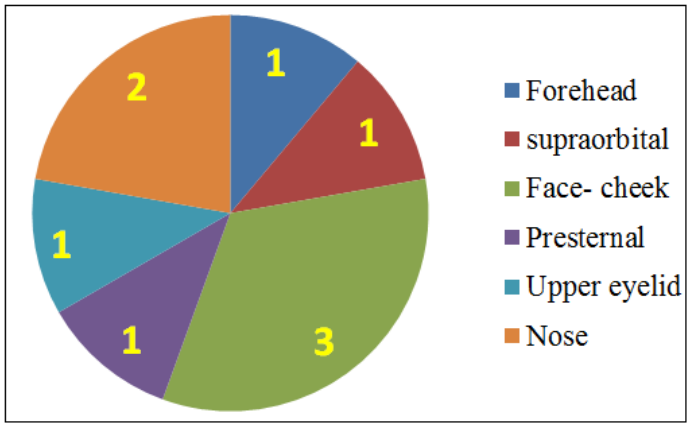

Fig-1: Pie chart showing distribution of cases according to anatomical site

The size of the lesions ranged from 0.7 to 4 cms. Ulceration was seen in four cases, melanin pigment in three cases, and cystic change in two cases. Three of the cases were solid variants of BCC (Figure-1) while one of the case was diagnosed as pigmented BCC (Figure-2) due to presence of abundant melanin pigment. The stromal reactions were also studied and showed predominantly mononuclear inflammatory infiltrate in six of the cases. Two of the cases showed, foreign body granulomatous reaction. Retraction artefact was seen in all the cases.

Table-2: Distribution of Cases with Pathological Findings

Case No	Size of the lesion	Gross	Histopathological Diagnosis
Case 1	4x3x2 cm	Globular Grey tan soft tissue, irregular outer surface. Cut surface grey white solid.	Fibroepithelioma of Pinkus
Case 2	1.6x0.8cm	Partially skin covered tissue, focally ulcerated. Cut section shows grey tan area	Pigmented BCC
Case 3	3x1.5x1.5cm	Multiple irregular grey tan soft tissue pieces	Basosquamous BCC
Case 4	2.5x1.6cm.	Flat tissue with attached skin surface shows an ulcerated area Cut surface shows grey white areas	BCC-Adenoid Variant
Case5	0.2x0.1x0.1cm	Tiny Skin biopsy	BCC
Case 6	3x1. 6x0.4cm	Wedge of the skin surface shows grey brown discoloration. No ulceration is seen. Cut surface shows grey white areas and fatty tissue.	BCC
Case7	1.5x1cm	Skin covered tissue piece with central pigmented lesion, black brown in color Cut section shows grey white area	BCC-Solid type
Case 8	0.5X0.5cm	Skin covered soft tissue piece, grey tan in colour	Basosquamous BCC
Case 9	1.2X0.8X0.5cm	Skin covered swelling. Cut surface grey white solid	BCC-Adenoid Variant

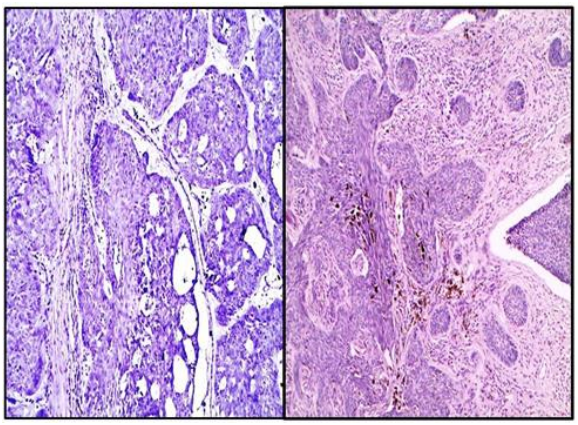

Fig-2: Microphotograph of solid variant of BCC showing solid nests and islands of basaloid cells (H&E, 40X)

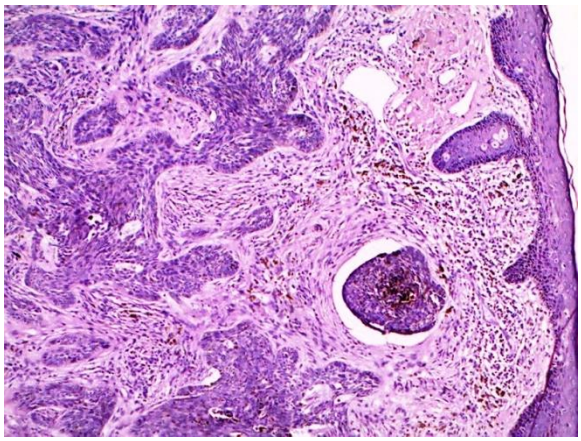

Fig-3: Microphotograph of pigmented variant of BCC (H&E, 40X)

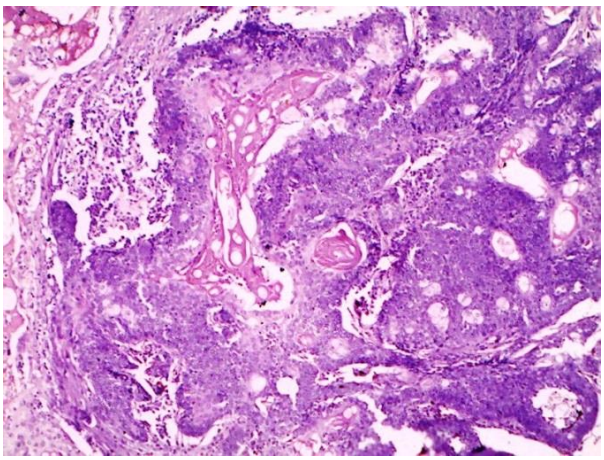

Fig-4: Microphotograph showing basosquamous variants with areas of squamous differentiation (H&E, 40X)

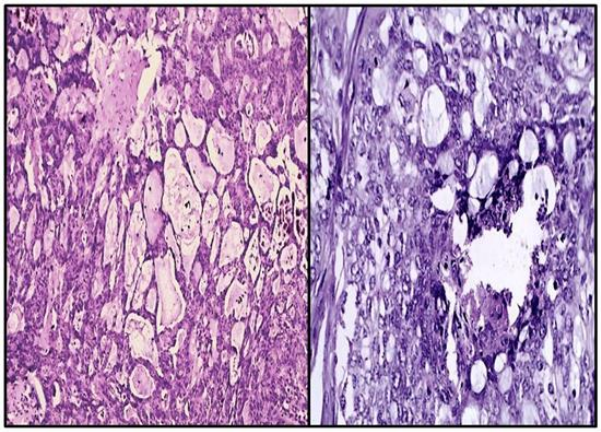

Fig-5: Microphotograph showing adenoid BCC (H&E, 40X)

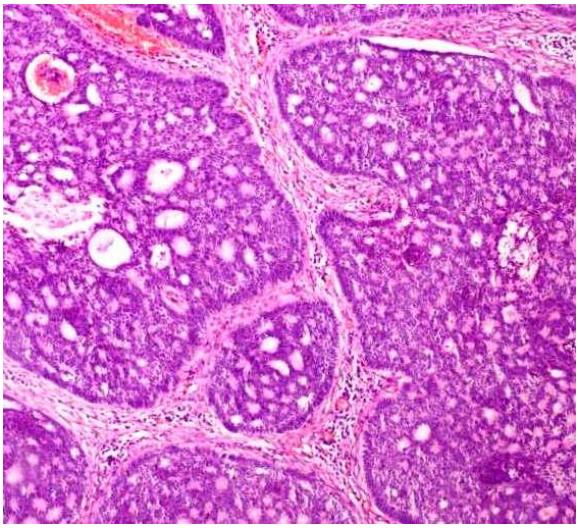

Fig-6: Microphotograph showing thin basaloid cell strands arranged in reticulate pattern in adenoid BCC (H&E, 40X)

DISCUSSION

BCC, is the most common skin malignancy and was first described by Jacob in 1827, accounting for approximately 70% of all malignant diseases of the skin, with a predilection for head and neck area [7]. It is known to typically affect older individuals with predilection for sun-exposed skin including face, hands. This is in concordance to previous studies which have reported that BCCs are found to occur more commonly in older people [7]. However, they have also been documented in children and young adults, more in children who have undergone radiation therapy for enlarged thymus or neoplasms like medulloblastoma [8, 9]. In the present study, the patients were in age group ranging from 47 to 80 years with a mean age of presentation being 69 years. The average age of cases of BCC have been reported to be 65.6 years and 65 years respectively in studies done by Gundalli *et al*., and Scrivener *et al*., this was comparable to our findings [2, 10].

BCC is known to be more common in males, probably due to greater occupational and recreational exposure to ultraviolet light [11]. However in the present case and an unusual female preponderance was seen, this was similar to an Indian study which also reported female predominance [11]. In a previous study conducted in rural part of Punjab, a higher incidence has been observed among female patients possibly because of more outdoor activities such as agriculture which is the main occupation, changes in clothing preferences, and late presentation to health facilities [12].

A predilection towards head and neck region with face being the most common site has been frequently reported in BCC [13]. However, 15% of the lesions may develop on the shoulders or trunk. More so, few cases have been also reported from the lower limbs, perianal region, clitoris and vulva [14-16]. In the present study, most of the cases were localized to the head and neck with cheek being the most common site followed by nose.

Exposure to sunlight is an important risk factor in the etiology of BCC [17, 18]. Ozone layer in the atmosphere increases the levels of UVB radiation at the earth's surface and thereby increases the risk of skin cancer. About 2-4% increased incidence of tumors for each 1% reduction in the ozone layer has been suggested by authors [19, 20]. Other etiological agents are radiation, exposure to arsenic, coal tar, and other hydrocarbons, history of radiotherapy, immunocompromised status of the patients [19].

The origin of BCC is from basaloid epithelial cells located in the follicular bulges and in specific basaloid cells of the interfollicular epidermis. The cells of origin are believed to be pluripotent progenitor epithelial cells in adults [20]. It originates in the epidermis and invades the dermal region in the form of solid or cystic nodules creating various growth patterns [6].

Basal cell carcinoma on microscopic examination show islands or nests of basaloid cells arranged haphazardly, with peripheral palisading and a peritumoral lacuna or artificial clefting [6, 10]. BCC is an epithelial tumour with a low malignant potential, consisting of cells resembling basal cells of epidermal layer.

The nodular or the solid form was the most common histological variant of BCC in the present study, concordant with other studies [6, 21]. Solid type is composed of large nests of basaloid cells with a typical peripheral palisading and retraction or cleft like spaces [6, 21]. Superficial variant of BCCs show nests of basaloid cells originating from basal layer of the epidermis and extend into papillary dermis while nodular form of BCC extends into the reticular dermis. These above two mentioned variants have an indolent behavior [22, 23].

In the Pigmented variant of basal cell carcinoma, melanocytes are seen interspersed through the tumour nests and melanophages in the stroma [1, 6]. One case in our study showed pigmentation (Fig-3) Amongst the other variants of BCC, the aggressive types like micronodular, infiltrative and basosquamous (Fig-4), demonstrate common findings like increased necrosis, mitosis and stromal proliferation, however, features like stromal retraction are less commonly found. These lesions have a tendency for more infiltrative growth and less circumscription with a tendency to recur and also metastasize unlike other BCC where metastasis is a rare feature [24, 25]. In these variants, angulated nests and strands of tumor are usually surrounded by a dense fibroblastic stroma. Although some focal areas of squamous differentiation

are found in BCC but when it is more extensive it is called basosquamous which in turn may be sub-categorised as metatypical or keratotic when basaloid nodules show central squamous areas and horn cysts, thus exhibiting morphologic overlap with squamous cell carcinoma.

Cords of basaloid cells extending from epidermis downwards in an arborizing or fenestrating configuration characterizes fibroepithelial BCC. Adenoid BCC (Fig 5 & 6) showed a histological picture with predominantly adenoid pattern with thin strands of basaloid cells in a reticulate arrangement alongwith with many tubules and few cystically dilated spaces containing mucin. Tumor with a similar histopathological picture is the cutaneous adenoid cystic carcinoma (ACC) and cribriform apocrine carcinoma (CAC) Lack of connection to the overlying epidermis or adnexae and perineural invasion are important distinguishing features from adenoid BCC in ACC while in CAC, the neoplastic cells are pleomorphic as opposed to the monomorphous appearance of adenoid BCC [26].

CONCLUSION

The histopathological diagnosis of BCCs sometimes presents difficulties due to varied patterns and nomenclature. Histopathological evaluation is one of the most valuable means of diagnosis in case of BCCs and can be done by correlating clinical presentation with pathological features. In addition to giving the correct diagnosis, pathologist also describe important morphological parameters of the tumour which have a prognostic implication.

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