

Scanning Electron Microscopy of Basal Cell Carcinoma

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ABSTRACT

AIM: The present study describes the three-dimensional ultrastructural aspects of three solid basal cell carcinomas with scanning electron microscopy and compares the findings with light microscopy.

MATERIAL AND METHODS: A small fragment of the surgical piece was obtained from the three potential solid facial basal cell carcinomas, which were surgically removed and were fixed in glutaraldehyde. The diagnosis was confirmed by light microscopy. These fragments were then dehydrated and metalized and the outer surface of the dermis was examined using scanning electron

microscopy.

RESULTS: The first tumor was an adenoid subtype, cell nests with peritumoral retraction and also strands of cells with adenoid pattern were observed. The second tumor was a typically solid BCC, tumoral nests and at higher magnification peritumoral retraction were shown in a three dimensional way. The third tumor had cells with fusiform pattern in some areas. The scanning electron microscopy examination at lower magnification identified the tumor nests, with higher magnification, part of the cells showed a similar fusiform pattern.

CONCLUSION: The nests of neoplastic cells were easily observed, as well as the typical peritumoral retraction of basal cell carcinoma. The ultrastructural findings are similar to light microscopy and could be used to document tumor morphology in a three dimensional way.

Key words: Basal cell carcinoma; Scanning electron microscopy; Light microscopy

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INTRODUCTION

Basal cell carcinoma (BCC) is the most common form of human skin cancer^[1-3]. Some of its features include low occurrence of tumor metastasis as well as local invasion. Late diagnosis or lack of treatment is associated with significant morbidity^[4].

Exposure to sunlight, including ultraviolet light, is the main risk factor for the genetic susceptibility of BCC, which is evidenced by its high occurrence in photoexposed areas^[5,6].

There are no precursor lesions described for BCC, and the genesis of this neoplasm is still controversial^[7]. There is evidence of the origin from immature pluripotent cells of the interfollicular epidermis and cells present in the outer sheath of the hair follicle, based on experiments of activation of the Hedgehog pathway in different compartments of the epidermis and on the expression of follicular pattern cytokeratins, which has defined it as malignant neoplasm of follicular germ cells (trichoblasts)^[8,9]. Moreover, there is association of BCC with abnormalities in the embryonic follicular development gene, SHH (Sonic Hedgehog), a hypothesis strengthened by the

rarity of palmoplantar and mucosal lesions where no hair follicles are found^[10].

BCCs are divided into five types: nodule-ulcerative, pigmented, sclerodermiform or fibrosing, superficial and fibroepithelioma.

BCC prognosis has improved in recent years, mainly due to early diagnosis and prompt treatment with minimal sequelae. The treatment includes electrodesiccation and curettage, surgical excision, or Mohs surgery^[1,2].

The present study aimed to describe the three-dimensional ultrastructural aspects of the solid basal cell carcinoma and compare the findings obtained via scanning electron microscopy (SEM) with the findings of light microscopy.

METHODS

A small fragment of the surgical piece was obtained from the three potential solid BCCs located on the face, which were surgically removed. The largest fragment was submitted to traditional diagnostic pathology. The small fragments were fixed in glutaraldehyde. The diagnosis was confirmed by light microscopy. These fragments were then dehydrated and metalized and the outer surface of the dermis was examined using SEM.

RESULTS

The first tumor was diagnosed by light microscopy as an adenoid and presented not only typically BCC grouped cells (Figure 1A), but also strands of cells resembling glandular tissue (Figure 1B). SEM easily identified cell nests with peritumoral retraction (Figure 1C) and also strands of cells with adenoid pattern (Figure 1D).

The second tumor was a typically solid BCC that comprised

cell nests with peritumoral retraction (Figure 2A). At higher magnification, peripheral palisade of cells around the margin of the tumor nests was well evidenced (Figure 2B). SEM showed tumoral nests (Figure 2C) and at higher magnification, peritumoral retraction (Figure 2D).

The third tumor had similar features compared to the second one (Figure 3A). At higher magnification, the tumor cells were seen more in a fusiform pattern in some areas (Figure 3B). SEM examination at lower magnification identified the tumor nests (Figure 3C). At higher magnification, part of the cells showed a similar elongated pattern, as previously seen in light microscopy (Figure 3D).

At higher magnification, dermal collagen can be seen in the area of tumoral retraction (Figure 4A). With SEM cell diameters can be measured, BCC cells have a diameter between 3 and 5 microns (Figure 4B and C), different from those of adipocytes, which measured approximately 50 microns (Figure 4D).

DISCUSSION

Our findings allowed us to document the morphological aspects of this highly prevalent neoplasm. The nests of neoplastic cells were easily identified using SEM. The typical peritumoral retraction of BCC was also observed, with normal collagen surrounding it.

There was a slight morphological variation of the cells, which appeared round or fusiform, as seen in light microscopy.

The cell size ranged from 3 to 5 microns, differently from that of the adipocytes arranged in lobules, which measured approximately 50 microns.

In the literature review there is no report of SEM in BCC. Our results allowed the description of 3D aspects of this prevalent neoplasm and to compare with those obtained with light microscopy.

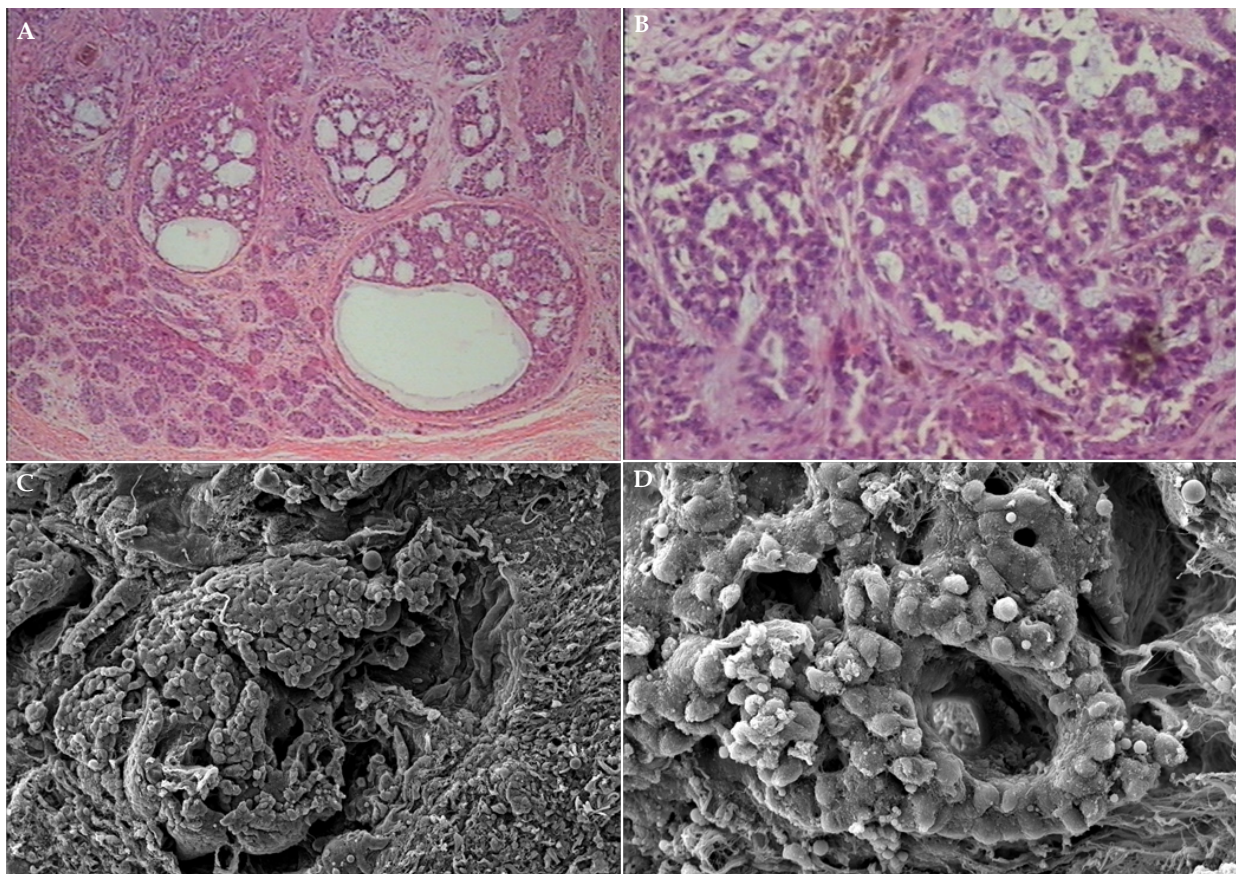


Figure 1 A: Light microscopy - BCC adenoid under low magnification (Hematoxylin & eosin x 150). B: Light microscopy - detail of adenoid strands (Hematoxylin and eosin x 400). C: Scanning electron microscopy - cell nests in dermis (x 350). D: Scanning electron microscopy - detail of adenoid strand (x 950).

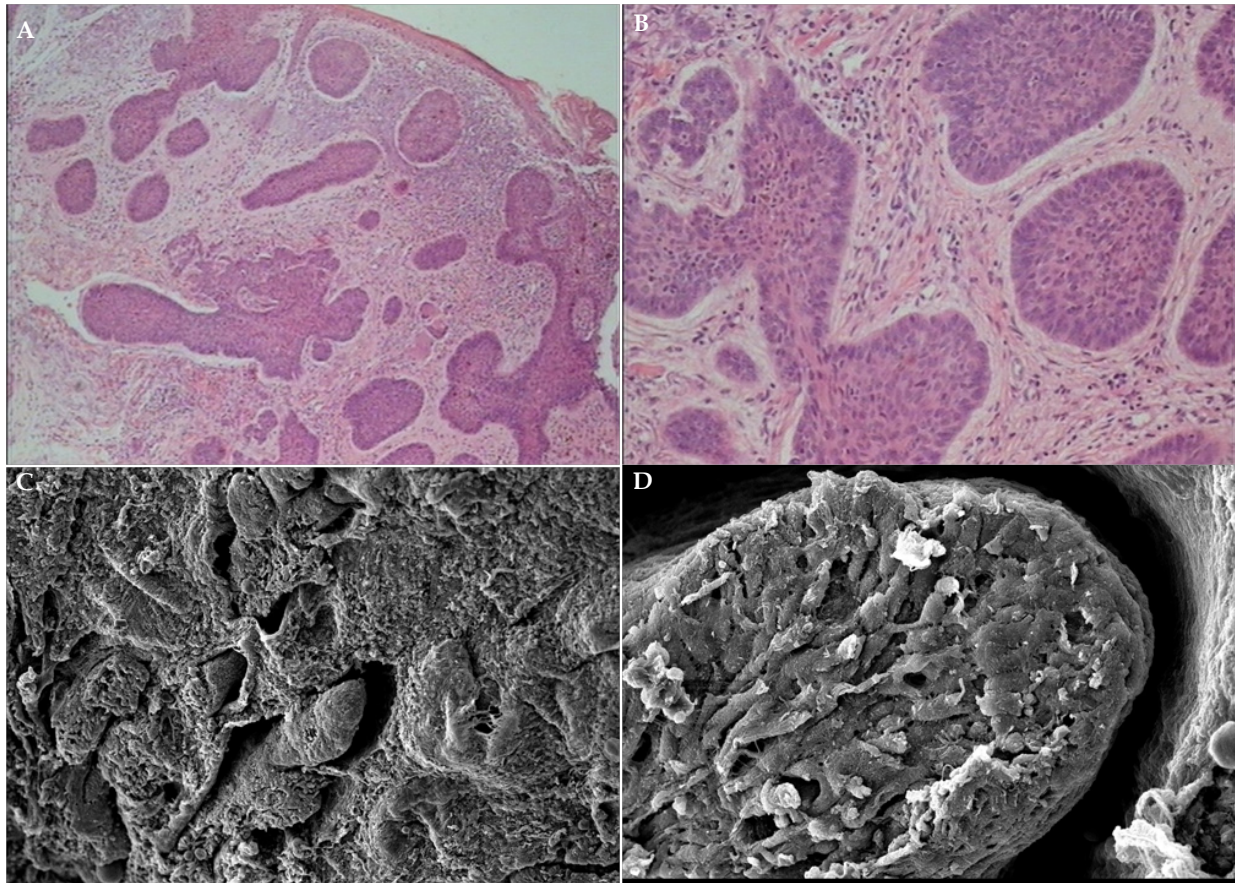


Figure 2 A: Light microscopy - typical BCC under low magnification (Hematoxylin & eosin x 150). B: Light microscopy - detail of cell nests with peritumoral retraction (Hematoxylin & eosin x 400). C: Scanning electron microscopy - cell nests in dermis (x 200). D: Scanning electron microscopy - higher magnification showing cell nest with evident peritumoral retraction (x 1.000).

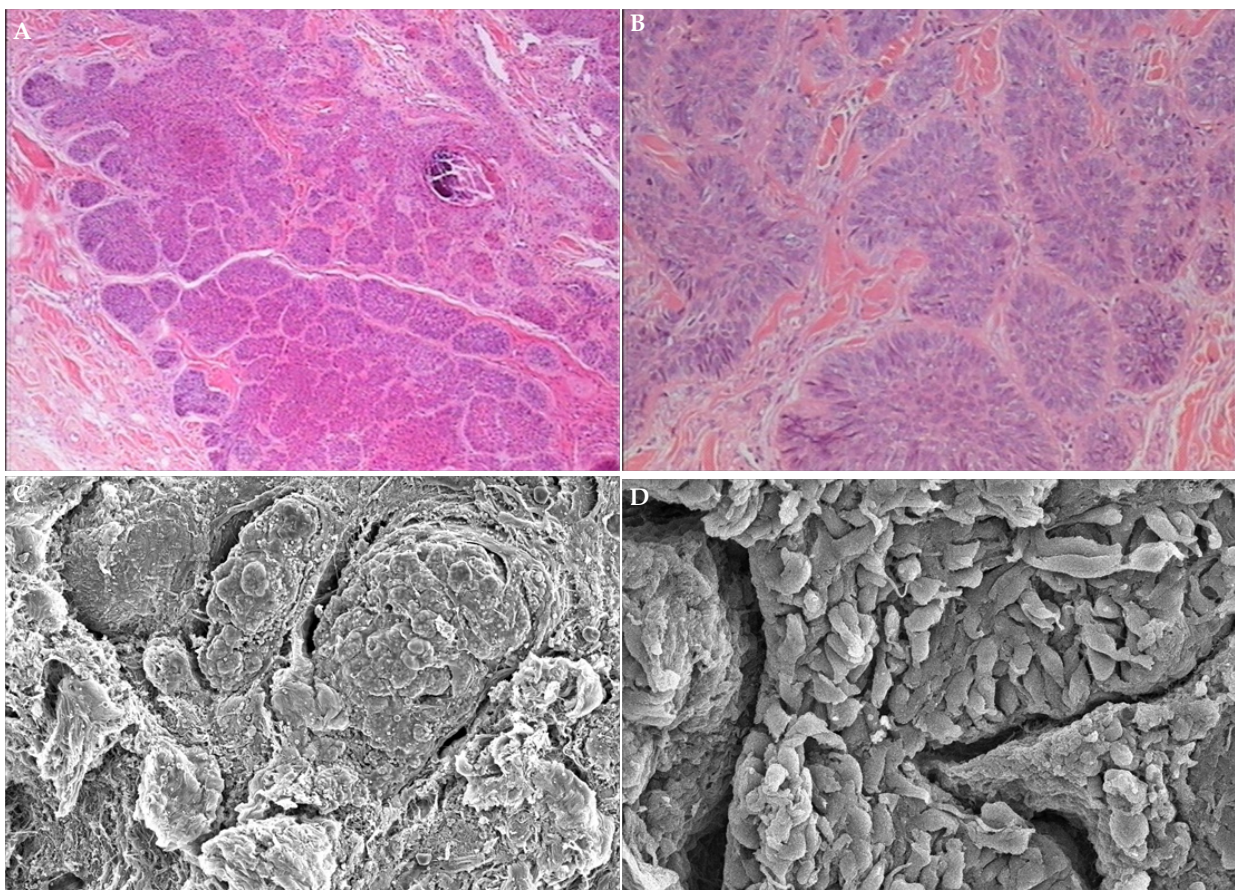


Figure 3 A: Light microscopy - typical BCC under low magnification (Hematoxylin & eosin x 150). B: Light microscopy - detail showing fusiform cells (Hematoxylin & eosin x 400). C: Scanning electron microscopy - cell nests in dermis (x 220). D: Scanning electron microscopy - higher magnification showing fusiform cells (x 1.200).

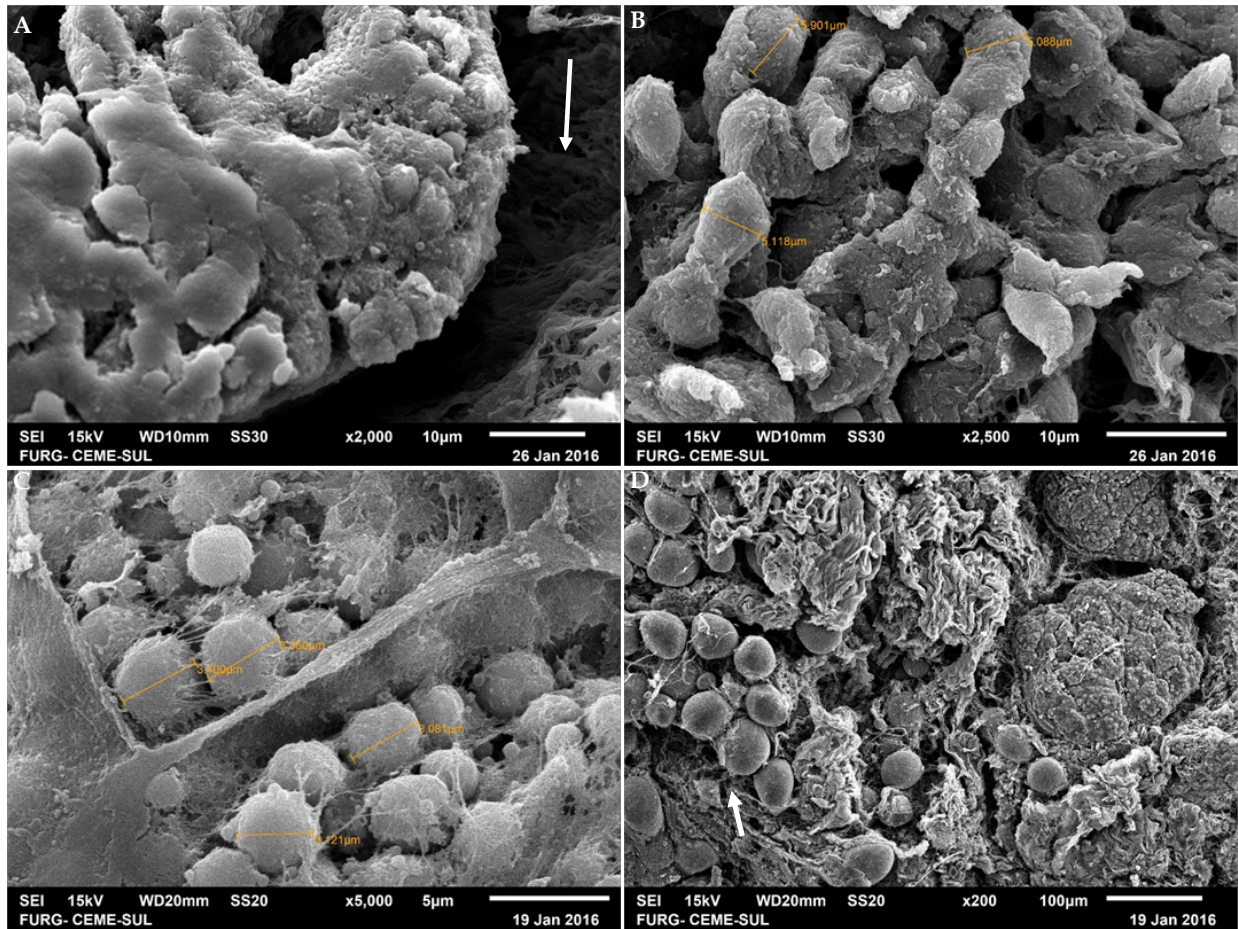


Figure 4 Scanning electron microscopy A: Detail of peritumoral retraction with collagen bundles (arrow) (x 2.000). B: Measurement of tumor cells with 3 microns (x 5.000). C: Measurement of tumor cells with 5 microns (x 2.500). D: Comparison with adipocytes (arrows), measuring approximately 50 microns, two neoplastic cell nests are seen in the superior right quadrant (x 200).

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