Desmoplastic spindle cell cutaneous squamous cell carcinoma cloaked by solar elastosis: Unveiling a potential diagnostic pitfall

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Introduction & Background

Desmoplastic squamous cell carcinoma (dSCC) is an uncommon, poorly differentiated variant of cutaneous squamous cell carcinoma (cSCC) typically arising on chronically sun-exposed skin of the elderly and immunosuppressed. Histologically, dSCC is characterized by a scar-like proliferation of spindled carcinoma cells with a desmoplastic stromal reaction. This subtype carries a higher risk of local recurrence and metastatic spread compared with conventional cutaneous SCC. A major diagnostic histpathological challenge is that dSCC can appear deceptively bland under the microscope, particularly when occurring in areas with marked solar elastosis. In such cases, tumor cells may simulate bland fibroblasts, and superficial biopsy specimens can thereby fail to capture key diagnostic features. This case illustrates this potential diagnostic pitfall whereby dSCC cells are obscured by solar elastosis, emphasizing the importance of clinicopathologic correlation, good clinical judgement, and immunohistochemistry in reaching the correct diagnosis.

Case Presentation

A 90-year-old female presented with a small, pink, dome-shaped papulonodule measuring approximately 5 mm on the left malar cheek **(Figure 1A).** An initial superficial shave biopsy was performed with a clinical differential of intradermal nevus vs. BCC. Histopathologically, there was nodular solar elastosis with bland-appearing stellate fibroblast-like cells, lacking cytologic/nuclear atypia, fibrosis, or other signs of malignancy (**Figure 1B**). Deeper levels through the block were studied, and a Sox10 was negative for a subtle desmoplastic melanoma. A descriptive diagnosis was provided. The patient was asked to return for follow-up in 3 months, by which time the lesion slowly enlarged and developed a focal cutaneous horn. A 4-mm punch biopsy was obtained **(Figure 2)**.This deeper punch biopsy specimen revealed a scar-like proliferation of spindle cells within the dermis and superficial subcutis (**Figure 2B, E**). The cells appeared bland but nuclear enlargement and desmoplastic response was noted, raising suspicion for a potentially malignant neoplastic process (**Figure 2F**).

Figure 1

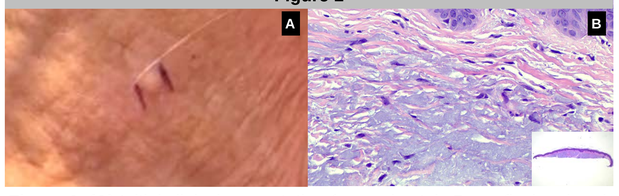

Figure 1. (A) Initial clinical presentation (approximately 5 mm flesh-colored dome-shaped papule) on the left malar cheek. **(B)** H&E at 20x of original shave biopsy demonstrating nodular solar elastosis with some vascular ectasia and small, bland dendrocytoid nuclei in the dermis. **Inset**: scanning magnification of biopsy silhouette.

Additional Clinical & Histologic Observations

Figure 2

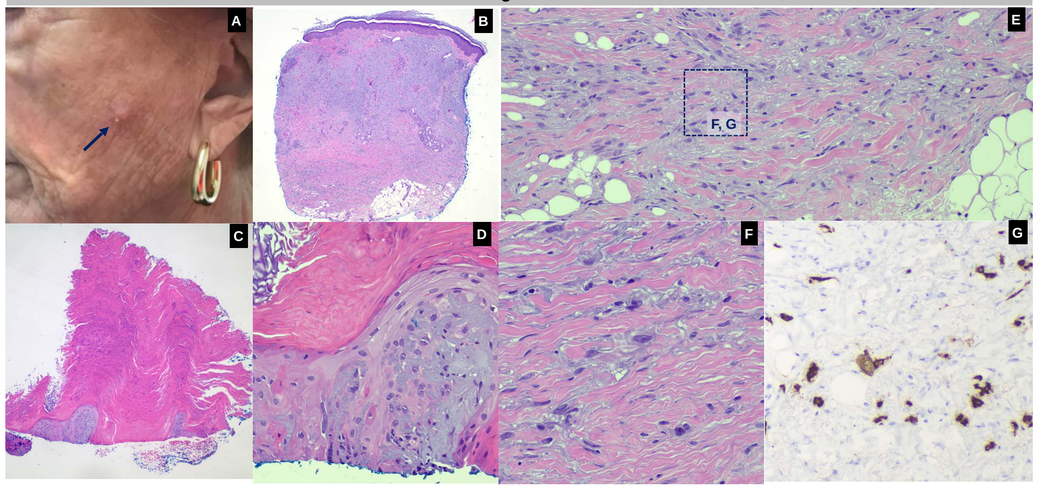

Figure 2. (A) Clinical presentation at 3 months follow-up after initial biopsy. Slight enlargement and minute cutaneous horn formation is detectable (**arrow**). **(B)** Punch biopsy silhouette, demonstrating solar elastosis and subtle dermal hypercellularity with desmoplastic/fibrotic stromal change encroaching into the subcutis (H&E, 1.25X). **(C)** Separate fragment submitted at time of this biopsy demonstrating the cutaneous horn of parakeratin (H&E, 2x). **(D)** Closer inspection reveals atypical, pink/glassy carcinoma cells associated with elastic fiber entrapment dropping from the epidermis (H&E, 20x). **(E)** Closer view of punch specimen demonstrating the spindled cells with desmoplastic/fibrotic stromal response (H&E 40x). **(F)** Upon close inspection, nuclear enlargement with euchromatic features (atypia) is obvious (H&E, 60x). **(G)** AE1/3 marks the tumor cells (AE1/3, 60x).

Figure 3

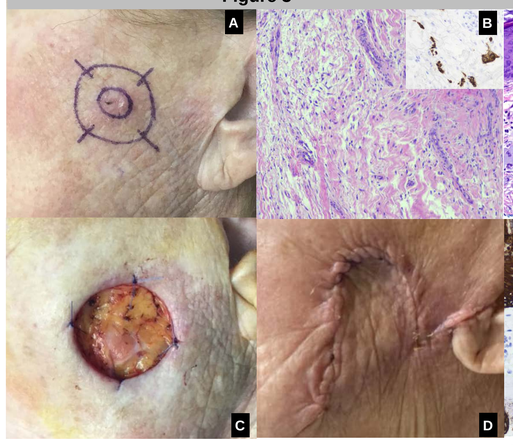

Figure 3. (A) Pre-operative surgical marking. **(B)** En face deep margin histology demonstrating subtle spindled carcinoma cells (inset: AE1/3 marking these subtle carcinoma cells). **(C)** Defect after second stage (cleared). **(D)** Closure following a rhombic transposition flap.

Figure 4

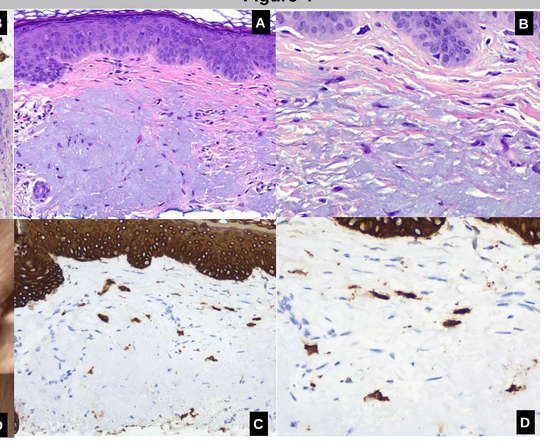

Figure 4. (A) Initial shave biopsy, demonstrating nodular solar elastosis and bland dendrocytoid cells (H&E, 20x). **(B)** At closer inspection, nuclear atypia and cytoplasm are minimal (H&E, 40x). (**C, D**) These bland spindled cells mark with AE1/3 (AE1/3, 20x, 40x, respectively).

Clinical/Histopathologic Course

The specimen underwent a work-up for p40 (+), AE1/3 (+, **Figure 2G**), Sox10 (-), and S100 (-). After careful evaluation of deeper levels and the S100 stain, definitive foci of perineural invasion were not detected. A separate accompanying specimen of the adjacent cutaneous clinical horn demonstrated an invasive squamous cell carcinoma (iSCC) budding from the surface epidermis associated with elastic fiber entrapment and early desmoplastic/infiltrative growth (**Figure 2C, D**). Given these observations, a diagnosis of invasive squamous cell carcinoma, poorly differentiated and with spindle cell and desmoplastic features was rendered.

The patient underwent staged excision with en face margin assessment. The 1st stage revealed residual tumor with epidermal connection and involvement of the deep margin, necessitating further resection. The 2nd stage showed no evidence of residual carcinoma. The patient experienced an uncomplicated post-operative course. CT imaging of the head and neck did not reveal any regional or distant metastatic disease. The patient recovered without complications, and is being monitored with imaging studies at regular intervals. For academic purposes, we revisited the original biopsy and retrospectively performed AE1/3 on the last remaining unstained section, which revealed marking of these bland spindled carcinoma cells, which likely represent the surface of this dSCC (**Figure 4**)

Discussion

dSCC has been estimated to represent approximately 7% of iSCCs, while in practice is probably lower, and is associated with a poorer prognosis compared with conventional SCC. As demonstrated in this case, it may present as a pink, innocuous-appearing papule. In addition, its deceptively bland histologic appearance and potential to mimic scars or be camouflaged by solar elastosis make it a diagnostic challenge, which can delay diagnosis and treatment. Our case demonstrates how superficial biopsies in sun-damaged skin may fail to demonstrate the desmoplastic stromal response, rendering the tumor cells nearly invisible and easily overlooked.

The DDx for dSCC includes desmoplastic melanoma, atypical fibroxanthoma, pleomorphic dermal sarcoma, and dermatofibrosarcoma protuberans. Each of these entities can be distinguished with careful attention to histologic features and appropriate immunohistochemical testing. In our case, the use of broad-spectrum cytokeratin markers and p40 was essential in clinching this diagnosis.

Our case highlights the need for careful clinicopathologic correlation in the setting of a persistent pink papule on chronically sun-damaged skin of the elderly. Awareness of the subtle and potentially misleading histologic features of dSCC is critical in avoiding potential diagnostic pitfalls. Proactive utilization of immunohistochemistry when initial biopsies are inconclusive may be helpful, as early detection and appropriate surgical management are essential for achieving disease control of this aggressive variant of cutaneous squamous cell carcinoma.

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