Radiation-Induced Epidermal and Adnexal Squamous Atypia Mimicking Squamous Cell Carcinoma: An Underrecognized Entity

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Introduction

Radiation therapy can induce keratinocyte atypia, a challenge to differentiate histopathologically from squamous cell carcinoma (SCC). We present two cases of keratinocyte atypia initially diagnosed as squamous cell carcinoma but later re-interpreted as reactive squamous atypia secondary to acute radiation.

Case 1

Figure 1: Papule on right postauricular neck within radiation field

- An 82-year-old man, mid-way through postoperative, adjuvant radiotherapy for a high-risk SCC on the right ear, developed a new papule on his right neck within the radiation field (**Figure 1).**
- Biopsy showed marked keratinocyte atypia involving the lower third of the epidermis and extending down pilosebaceous units and eccrine ducts and glands, suggesting SCC.
- During Mohs excision, the atypia in the epithelium of the eccrine ducts and glands was identified as squamous syringometaplasia (ESS). The epidermal and pilosebaceous squamous atypia was also found to be secondary to acute radiation.
- Acute radiation damage to keratinocytes includes prominent nuclei with nucleoli, near normal nuclear to cytoplasmic ratios and necrotic keratinocytes **(Figure 2).**

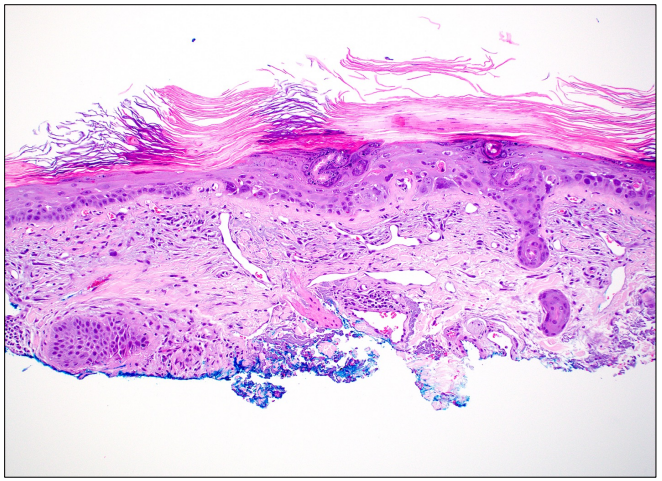

Figure 2. Biopsy shows marked keratinocytic atypia, prominent in the lower third of the epidermis with near normal nuclear to cytoplasmic ratios but with prominent nuclei and nucleoli. Necrotic epidermal keratinocytes are also seen, and there is overlying parakeratosis. The eccrine duct also shows mild epithelial atypia. The dermis has typical radiation dermatitis changes, including ectatic blood vessels and "radiation" fibroblasts. (H&E 10X)

Case 2

Figure 3. Eroded papule on the left nasal ala within the radiation field.

- A 77-year-old man presented with an eroded left nasal ala papule one month after completing primary radiotherapy for basal cell carcinoma (BCC) **(Figure 3).**
- Recurrent BCC was suspected, biopsied, and interpreted as well-differentiated SCC.
- On consultation, the keratinocyte atypia was attributed to acute radiation **(Figure 4).**

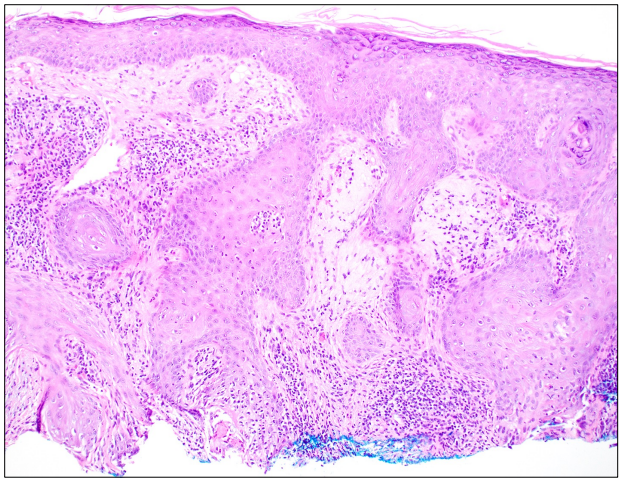

Figure 4. Biopsy showing infundibular squamous atypia with surrounding chronic inflammation, mimicking well-differentiated squamous cell carcinoma, secondary to acute radiation. Dermal radiation changes are also noted, including ectatic blood vessels and "radiation" fibroblasts. (H&E 10X)

Discussion/Conclusion

- Acute and subacute radiation dermatitis is rarely biopsied and thus literature is limited on the histopathologic changes to keratinocytes.
- Radiation-induced keratinocytic atypia can mimic SCC, leading to misdiagnosis and potential overtreatment. Thus, it is recommended to avoid biopsy within in an active radiation field.
- If biopsy is deemed necessary, informing your pathologist that the biopsy is within a recent or current radiation therapy field can help prevent misdiagnosis.