



## Original contribution

# Sinonasal renal cell–like adenocarcinomas: robust carbonic anhydrase expression<sup>☆,☆☆</sup>



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**Summary** We report 3 new patients with sinonasal renal cell–like adenocarcinoma (SNRCLA). One case submitted in consultation demonstrated robust carbonic anhydrase IX (CA-IX) expression, leading us to a broader inquiry of CA-IX and carbonic anhydrase II (CA-II) expression in other SNRCLA, Schneiderian tissues, and histologic mimickers. Robust cytoplasmic and membranous CA-IX expression is demonstrated in 6 of 7 SNRCLAs; CA-II expression was demonstrated in 2 of 5 cases. Robust, diffuse CA-II expression is demonstrated throughout sinonasal seromucinous glands in all 10 normal Schneiderian samples. CA-IX is also expressed in all normal sinonasal samples, albeit focally. The closest salivary mimic to SNRCLA is hyalinizing salivary clear cell carcinoma; only focal CA-IX expression was demonstrated in 1 of 2 cases studied. Carbonic anhydrase expression in Schneiderian tissue speaks to its role in regulating the ion concentration of sinonasal secretions and may also explain the origin of this rare tumor.

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## 1. Introduction

Sinonasal renal cell–like adenocarcinoma (SNRCLA) is an extremely rare neoplasm that mimics the clear cell variant of renal cell carcinoma. In 2002, 2 independent publications

described this unique, low-grade, sinonasal neoplasm with clear cytoplasm that did not fit any known diagnostic category [1,2]. In 2008, we reported 2 additional patients and updated follow-up on the index patients [1–3]. Nine additional patients have been identified in the published literature [4–13]. Here, we report 3 new SNRCLA patients, for a total of 16 reported cases.

Histologically, SNRCLA is composed of monomorphic cuboidal to columnar glycogen-rich clear cells lacking mucin production. The cellular cytoplasm may be “crystal clear” or slightly eosinophilic. SNRCLA is less vascular and pleomorphic, compared to the clear cell variant of renal cell carcinoma. The overall histologic impression is that of a

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**Table 1** Three patients with SNRCLA

Age, sex	Tumor site	Treatment	Follow-up
56 F [4] (Fig. 2)	Nasal, skull base	Surgery, adjuvant radiotherapy	Recurrence free at 22 mo
89 F (Fig. 3)	Sinonasal	Surgery	Recurrence free at 4 mo
73 M (Fig. 4)	Nasal	Surgery, adjuvant radiotherapy	Recurrence free at 20 mo

low-grade neoplasm. To date, no patient developed metastatic disease or local recurrence, and renal carcinoma has not been identified in any of these patients [4].

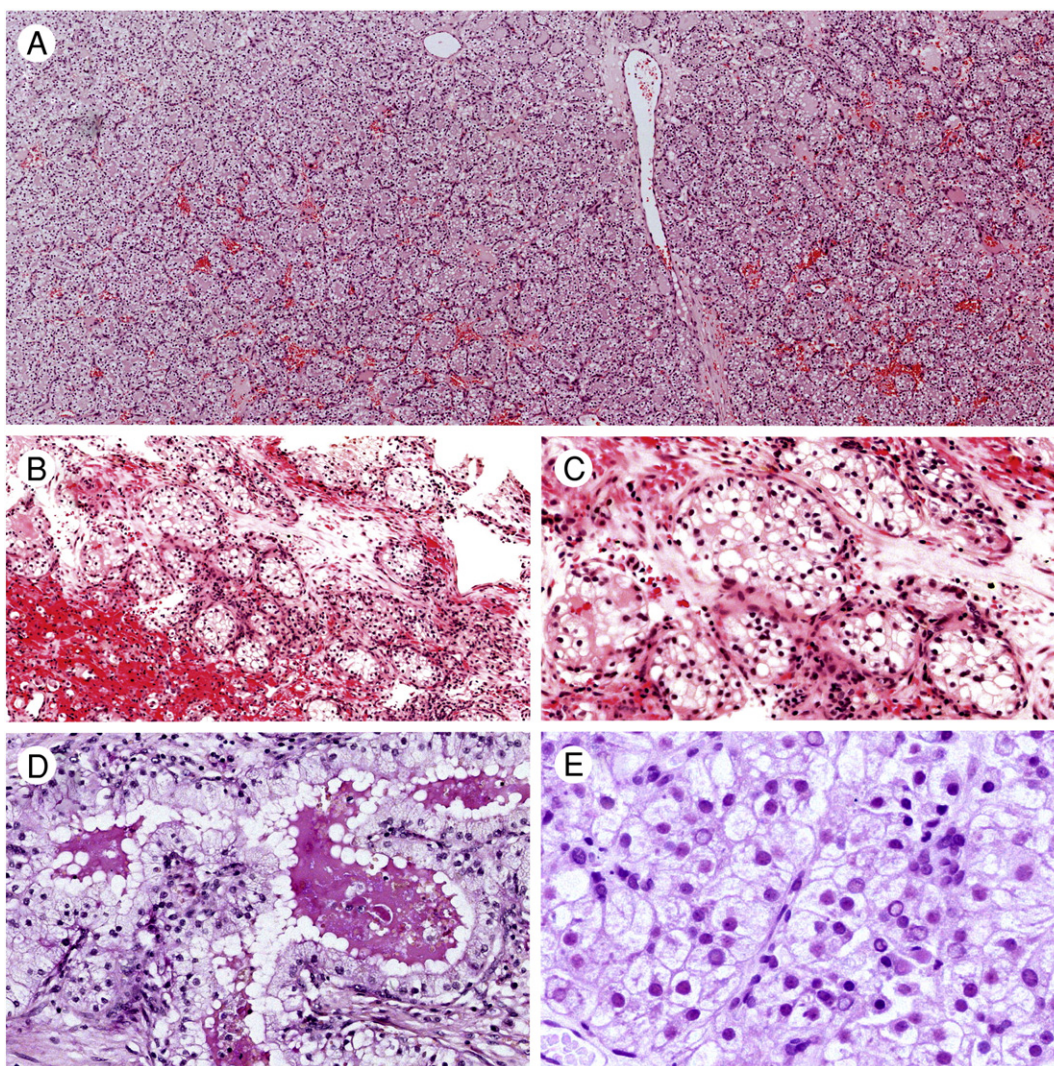
## 2. Materials and methods

### 2.1. Samples

Seven SNRCLA cases were studied; 3 new cases were seen in consultation in the past 2 years. We also studied normal Schneiderian tissues from 10 patients. Other clear cell neoplasia, which might mimic SNRCLA, was also studied: 2 cases each of hyalinizing salivary clear cell carcinoma, mucoepidermoid carcinoma clear cell variant, epithelial-myoepithelial carcinoma, and 1 endolymphatic sac tumor. This study was exempted from institutional review board.

### 2.2. Immunohistochemical

Studies were performed according to manufacturer's protocols. Briefly, 4- $\mu$ m sections were obtained from



**Fig. 1** Sinonasal renal cell–like adenocarcinoma. A to C, This clear cell neoplasm with a hemorrhagic background is quite reminiscent of metastatic renal cell carcinoma. D, Follicular and glandular structures. E, Cuboidal tumor cells with rounded nuclei, fine chromatin, prominent nucleoli, and occasional intranuclear holes.

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