Angiomyolipoma of the Nasal Cavity: A Distinct Entity. A Case Report and Literature Review

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Abstract

Angiomyolipoma (AML) is a mesenchymal tumor commonly found in the kidneys. Extra-renal AML is uncommon and especially rare in the nasal cavity. To our knowledge, fewer than five cases of nasal AML are reported in the United States. We present a case of nasal AML in a 65-year-old man with a history of rhinosinusitis and obstruction of the left nasal cavity. The lesion comprised of admixed spindled smooth muscle cells, mature adipose tissue, and thick-walled blood vessels. Smooth muscle differentiation of the spindled cells was confirmed by expression of smooth muscle actin. Surprisingly, melanocytic markers, such as HMB45, were negative. The histologic features and immunoprofile suggest that nasal AML is pathologically distinct from neoplastic AMLs/perivascular epithelioid cell tumors (PEComas) that typically occur in the kidney. We propose that nasal AML is a hamartomatous lesion rather than neoplastic. Although AML is rare in the nasal cavity, it should be considered in the differential diagnosis of clinically benign nasal masses.

Keywords Angiomyolipoma · Perivascular epithelioid cell tumor · Smooth muscle cells · HMB-45

Introduction

AML is a mesenchymal tumor composed of variable proportions of blood vessels, smooth muscle cells, and adipocytes [1]. AML occurs sporadically or in association with tuberous sclerosis. It is considered a perivascular epithelioid cell tumor (PEComa) and characteristically expresses both smooth muscle markers and melanocytic markers [1]. AML most commonly occurs in the kidney and rarely in the liver, skin, gastrointestinal tract, heart, lung, spinal cord, and oropharynx [2–6]. The majority of nasal AMLs have been described in Asia and the Middle East, with fewer than five cases reported in the United States [7, 8]. Here, we report a case of AML originating in the nasal vestibule.

Case Report

A 65-year-old male presented with a two-year history of rhinosinusitis and nasal congestion/obstruction. He denied epistaxis. Neither a personal or family history of tuberous sclerosis was reported. Computed tomography (CT) revealed a 1.7 × 1.6 cm soft tissue mass with hypervascularity arising from the left lateral nasal vestibule (Fig. 1). Gross examination of the excisional biopsy specimen demonstrated a 1.2 × 1.0 × 0.2 cm unoriented ellipse of tan-pink skin and a loosely attached, ovoid, tan-pink, soft tissue mass that measured 1.2 × 1.1 × 0.8 cm and demonstrated focal yellow discoloration. Microscopically, the mass was separate from the skin ellipse and showed no surface epithelial lining. The tumor comprised three disorganized components: adipose tissue (approximately 30%) with no cytological atypia, mature, spindled smooth muscle cells (SMCs), and thick-walled blood vessels (Figs. 2, 3). Immunohistochemically, SMCs were diffusely positive for smooth muscle actin (SMA), desmin, and caldesmon (Fig. 4). Melanocytic markers, including HMB-45, Melan-A, SOX-10, and microphthalmia, were all negative (Fig. 5). The Ki-67 proliferative index was very low (< 1%).

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Fig. 1 CT showing a 1.7×1.6 cm soft tissue mass arising from the left lateral vestibular mucosa. There is hypervascularity noted within the mass. The remainder of the sinuses are unremarkable

Fig. 2 An unencapsulated, polypoid mass with no epithelial lining (hematoxylin-eosin, original magnification ×20)

Fig. 3 Angiomyolipoma. An intricate mixture of thick-walled blood vessels, mature adipose tissue and spindled mature smooth muscle cells (hematoxylin-eosin, original magnification ×100)

Fig. 4 Angiomyolipoma. Strong expression of smooth muscle actin (SMA) in the smooth muscle component (original magnification ×100)

Discussion

AML belongs to the family of perivascular epithelioid cell tumors (PEComas) which includes lymphangioleiomyomatosis (LAM), clear cell “sugar” tumor”, and similar tumors that occur in a variety of visceral, cutaneous, and soft tissue sites [1]. By definition, a tumor of this family is characterized by the distinctive morphology of perivascular epithelioid cells (PECs) and a “myomelanocytic immunophenotype”. Most AMLs are benign, although a malignant form of AML has been reported [9, 10]. The

malignant variant of AML is typically the epithelioid subtype and is documented in both the kidney and liver [11]. Clinically, AMLs may occur sporadically or in association with tuberous sclerosis complex (TSC). TSC is associated with over 20% of renal AMLs and in 5–15% of hepatic AMLs [3, 12].

Nasal AMLs are extremely rare and, to our knowledge, only seventeen cases are reported worldwide [7, 8, 13]. Watanabe & Suzuki proposed nasal AMLs be classified as mucocutaneous AML (MCAML), since the clinicopathologic features of AML of the nasal cavity are similar to those

Fig. 5 Angiomyolipoma. Negative expression by HMB-45 (original magnification $\times 100$)

arising in the skin and oropharyngeal mucosa [14]. AMLs arising at these sites are distinct from the more common renal and hepatic variants. Including our case, the clinical and histologic features of eighteen cases are summarized in Table 1. Patients with nasal AML are predominantly male (14 males; 4 females) and between 28 and 88 years of age (mean 56 years). The most common location reported is the nasal cavity vestibule. Tumors are reportedly small, measuring between 0.8 and 4.0 cm, in contrast to those of the kidney and liver which are larger (up to 39 cm) [15]. No bony erosion or aggressive behaviors are documented in nasal AMLs. Histopathologically, the SMCs of nasal AMLs are spindled and mature, lack epithelioid morphology, and demonstrate no immunoreactivity to melanocytic markers including HMB-45. In contrast, the SMCs in renal and hepatic AMLs are at least focally epithelioid and typically express melanocytic markers [3, 10].

Our case of nasal AML highlights the clinicopathologic features of MCAML that are distinct from the family of PEComas. The three components (blood vessels, SMCs, and adipose tissue) of MCAML are morphologically mature. This may account for the benign clinical course and lack of post-excisional recurrence of all reported cases thus far. Nasal AMLs differ from renal AMLs where the epithelioid dominant subtype exhibit the potential for malignant behavior [1].

Notably, two cases of nasal AML are reported to demonstrate classic morphologic features of PEComatous AML [16, 17]. Both patients lacked a family history of tuberous sclerosis. The morphologic features observed in both included benign-appearing epithelioid or spindled cells with clear or granular cytoplasm, prominent vasculature, and a minor component of adipocytes. Few mitoses were present

in one case and necrosis was absent in both. Moreover, the cells show strong and diffuse HMB-45 immunoreactivity in contrast to other reported MCAMLs. These findings suggest two main subtypes of AML in the nasal cavity, PEComatous (HMB-45 positive, epithelioid SMCs present) and non-PEComatous.

PEComatous AML has not been identified in other areas of head and neck, outside the nasal cavity, thus far. Though rare, the existence of PEComatous AML in the nasal cavity indicates that the classification of MCAML may not always hold true as it was originally defined. A better terminology based on the nature of the lesion versus the location may be warranted. We propose that the name angiomyolipomatous hamartoma be applied to non-PEComatous nasal AMLs given the tumor-like growth of disorganized but otherwise normal appearing tissue, benign behavior reported so far, and lack of distinct morphology and immunophenotype of PEComa.

In the differential diagnosis of nasal AML, the well-recognized mesenchymal hamartomas of the nasal cavity should be considered. Nasal chondromesenchymal hamartoma (NCH) is a benign mass lesion of the nasal cavity predominantly described in young infants [18]. NCH histologically shows mesenchymal elements including smooth muscle differentiation and cartilaginous foci, the latter of which is absent in our case. Smooth muscle tumor with lipomatous differentiation is another entity in the differential diagnosis; although this usually occurs in the uterus and contains SMCs as well as mature fat cells [19]. Unlike our case, NSC does not show abnormally thickened blood vessels.

Nasal AMLs can cause diagnostic difficulty due to non-specific symptoms and appearance on imaging as well as infrequent occurrence. Our case raises awareness of this entity which we consider a hamartoma of the nasal cavity [18]. When evaluating a benign mass lesion in the nasal cavity clinically, nasal AML is suggested in the differential diagnosis alongside more common lesions such as nasal polyp, squamous papilloma, juvenile angiofibroma, and hematoma. Surgical removal of the lesion is considered curative.

Conclusions

Nasal AML is an extremely rare mesenchymal hamartoma, distinct from the neoplastic AML/PEComa most commonly encountered in the kidney and liver. Clinically, nasal AML is unlikely to be associated with TSC and behaves in a benign manner in all reported cases. Nasal AML shares common histologic and immunohistochemical features of AMLs arising in other mucocutaneous sites, including mature SMCs with absence of epithelioid morphology, and lack of expression of melanocytic markers such as HMB-45. These

Table 1 Angiomyolipomas in the nasal cavity

	Author	Country	Year	Age	Gender (M/F)	Location	Size (cm)	Histology	SMA	HMB-45	History of TS	Follow up (months)
1	Wang	USA	2020	65	M	Vestibule	1.2×1.1×0.8	AML without epithelioid cells	Positive	Negative	No	6
2	Pandey [16]	India	2020	54	M	Nasal cavity	2.0×1.7×1.0	Monotypic AML; Spindled and epithelioid cells with clear and eosinophilic cytoplasm; no mitosis	Positive	Positive	No	N/A
3	Ameen [7]	Malaysia	2019	28	M	Inferior turbinate	4.0×3.0×2.5	AML without epithelioid cells	Positive	Negative	No	24
4	Aleem [8]	India	2017	60	M	The roof and lateral wall of the nasal cavity	0.8×0.8	AML without epithelioid cells; sparse focally lymphocytes and plasma cells	Positive	Negative	No	N/A
5	Aleem [8]	India	2017	50	F	Nasal cavity	2.0×1.5×1.0	AML without epithelioid cells; sparse focally lymphocytes and plasma cells	Positive	Negative	No	N/A
6	Iwata [13]	USA	2013	60	M	Inferior turbinate and nasal septum	1.6×0.5×1.3	AML without epithelioid cells	Positive	N/A	No	N/A
7	Ahn [20]	Korea	2013	56	M	The floor of the posterior nasal cavity	2.5×1.5	AML without epithelioid cells	Positive	Negative	No	2
8	Rodriguez [21]	Spain	2012	62	M	Inferior concha	2.5×1.5	AML without epithelioid cells	Positive	Negative	No	Periodic
9	Moreira [22]	Brazil	2011	54	M	Inferior meatus	N/A	AML without epithelioid cells	N/A	Negative	No	N/A
10	ERKILIC [23]	Turkey	2005	52	M	Osteomeatal complex	3.5×2.5×1.5	AML without epithelioid cells	Positive	Negative	No	N/A
11	Go [24]	Korea	2005	44	M	Post choanal septum	1.3	AML without epithelioid cells	Positive	Negative	No	2
12	Tardio [25]	Spain	2002	45	M	Lateral wall	1.5×1.3×1.2	AML without epithelioid cells	Positive	Negative	No	1
13	Banerjee [17]	UK	2001	34	F	Nasal cavity	2.0	Monotypic AML; Spindled and epithelioid cells with clear or granular cytoplasm; very few mitoses	Positive	Positive	No	12
14	Watanabe [14]	Japan	1999	66	M	Mesorrhine	2.0	AML without epithelioid cells; aggregated small lymphocytes	Positive	Negative	No	24

Table 1 (continued)

Author	Country	Year	Age	Gender (M/F)	Location	Size (cm)	Histology	SMA	HMB-45	History of TS	Follow up (months)
15 Watanabe [14]	Japan	1999	88	F	Vestibule to inferior concha	2.0	AML without epithelioid cells; aggregated small lymphocytes	Positive	Negative	No	6
16 Gatalica [26]	USA	1994	64	M	Vestibule	2.0×1.7×1.2	AML without epithelioid cells	Positive	Negative	No	24
17 Guezmes [27]	Cantabria	1990	66	F	Nasal cavity	1.5	AML without epithelioid cells	Positive	Negative	No	N/A
18 Dawlatly [28]	Saudi Arabia	1988	52	M	Vestibule	4.0×1.5×1.0	AML without epithelioid cells	N/A	N/A	No	12

important differences merit a separation of nasal AMLs from PEComatous AMLs. We propose the name angiomyolipomatous hamartoma be applied to these non-neoplastic, non-PEComatous MCAMLs. Although rare, AML should be included in the differential diagnosis of unilateral nasal masses.

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