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Infarcted angiomatous nasal polyps

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Abstract Angiomatous nasal polyps are a rarely reported subtype of inflammatory sinonasal polyps that are characterized by extensive vascular proliferation and ectasia. Compromise of their vascular supply may occasionally lead to infarction, resulting in clinical, radiological and pathological features that simulate a neoplastic process. In the present paper, the salient characteristics of this unusual entity are described. The clinical, radiological and pathological features of two patients with infarcted angiomatous nasal polyps are presented. Grossly, the polyps had an unusual inhomogenous appearance and texture and were associated with a foul odor. CT findings included bony expansion and destruction. MRI findings included markedly inhomogenous contrast enhancement on T1-weighted images. Histopathologically, both cases showed abundant vascular ectasia, with widespread intraluminal thrombosis and necrosis. Recanalization and reparative changes were also present. Angiomatous nasal polyps are poorly documented in the literature. Although entirely benign, they may simulate neoplastic processes, thus awareness of their existence is of considerable importance.

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Introduction

Angiomatous nasal polyps, also known as angioectatic polyps, are rarely reported in the literature [1, 2]. Considered a subtype of inflammatory sinonasal polyps, angiomatous polyps are characterized by extensive vascular proliferation and ectasia, in contrast to non-angiomatous polyps, which generally show a decreased density of blood vessels compared to normal nasal mucosa [1]. The blood vessels present in these polyps may be subjected to compromise at certain areas within the nasal cavity, leading to venous stasis, thrombosis and infarction [2]. Such angiomatous nasal polyps undergoing infarction may show clinical, radiological and pathological features that simulate a neoplastic process, and so be a source of diagnostic difficulty [2, 3].

In the present paper, we report the clinical, radiological and pathological features of two patients with infarcted angiomatous nasal polyps that caused significant diagnostic difficulty at the time of their presentation.

Case report

Case 1

A 32-year-old male presented with an 18-month history of bilateral nasal obstruction, snoring, headaches and facial pain. He was a non-smoker and had no significant past medical history. Examination revealed a large polypoid mass in the right nasal cavity, extending into, and filling, the nasopharynx. The mass had an unusual inhomogenous appearance and was associated with an

offensive odor. Computed tomography (CT) demonstrated opacification of the right maxillary sinus, as well as a soft tissue-density mass extending from the region of the right middle meatus into the nasopharynx, with deviation of the nasal septum to the left. Magnetic resonance imaging showed the maxillary component of the mass to have low signal intensity on T1-weighted images and high signal intensity on T2-weighted images. The nasal cavity and nasopharyngeal components also had low signal intensity on T1-weighted images, but had mixed signal intensity on T2-weighted images (Figs. 1, 2). The entire mass showed markedly inhomogenous enhancement following gadolinium contrast administration, particularly in the nasopharyngeal component (Fig. 3).

The patient proceeded to undergo removal of the mass. At surgery, the nasal cavity component of the mass was noted to arise from the area of the right middle meatus and to extend posteriorly along the inferior turbinate into the nasopharynx. The anterior part of the mass was debulked endoscopically; the remainder was delivered into the nasopharynx and removed transorally.

The gross appearance of the removed mass showed soft, translucent areas, alternating with firm, black, necrotic areas that were associated with a strong, offensive odor. Light microscopy was performed after staining sections with hematoxylin and eosin. The surface of the lesion was covered by respiratory epithelium with areas of ulceration and squamous metaplasia. The substance of the lesion showed an abundance of irregularly shaped, thin-walled blood vessels, many showing intraluminal thrombosis. This was associated with widespread areas of ischaemic necrosis. The stroma also displayed abundant deposits of extravascular collagen, and numerous haemosiderin-laden macrophages. There was evidence of

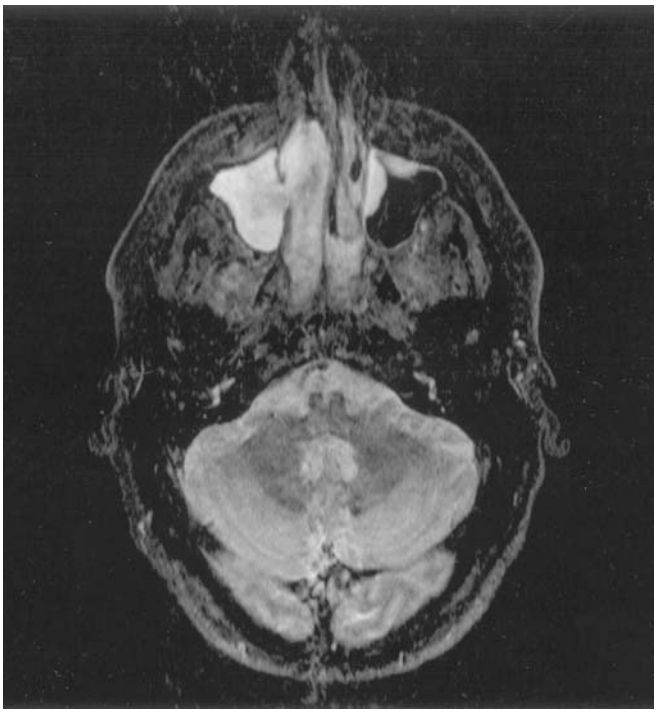

Fig. 2 Axial STIR MRI scan showing high signal intensity of maxillary component, and mixed signal intensity of nasal/nasopharyngeal component

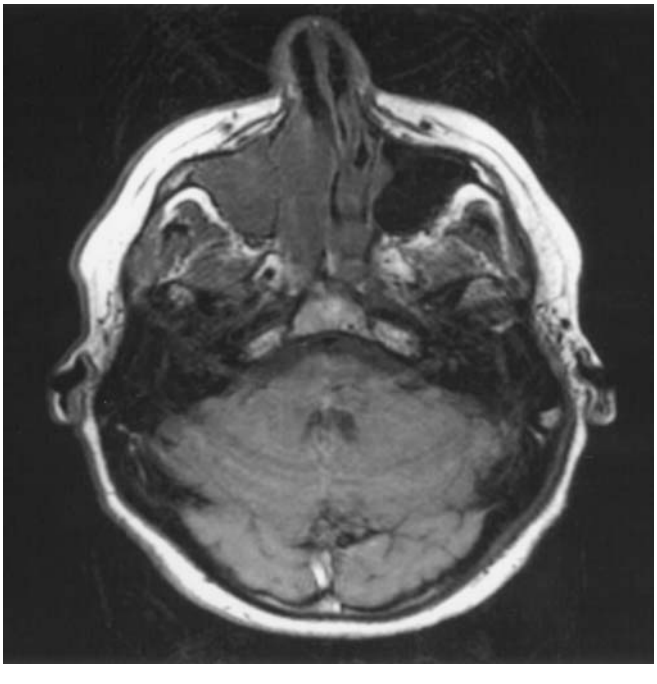

Fig. 1 Axial T1-weighted MRI scan showing angiomatous polyp in maxillary antrum, nasal cavity and nasopharynx

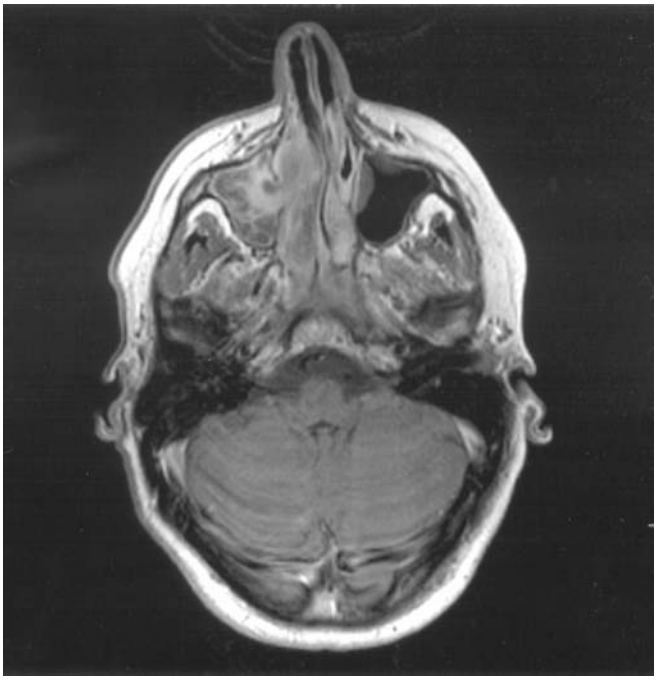

Fig. 3 Axial T1-weighted MRI scan after intravenous gadolinium showing markedly inhomogenous enhancement of nasopharyngeal portion of polyp

organization and recanalization in many thrombosed vessels (Fig. 4). Silver stains for fungi were negative. Follow-up blood tests for auto-antibodies and c-ANCA were also negative.

Case 2

A 21-year old male with no previous medical history presented with a 2-year history of right-sided nasal obstruction and snoring. Examination revealed a large polypoid mass in the right nasal cavity. CT demonstrated a soft tissue-density mass filling the right maxillary, ethmoid and sphenoid sinuses, extending into the nasal cavity and nasopharynx, and causing radiological loss of the medial wall of the right maxillary antrum and ostiomeatal complex. The mass was associated with expansion of the lateral wall of the maxillary sinus and elevation of the floor of the orbit, and deviation of the nasal septum to the left (Fig. 5).

The patient proceeded to undergo pernasal removal of this mass. At surgery, the mass was again noted to show firm, black, malodorous areas, mixed with soft, translucent areas. Light microscopy (Figs. 6, 7) again showed extensive vascular ectasia and thrombosis, associated with widespread ischaemic necrosis and large areas of organizing haematoma. A small proportion of the sections showed features typical of classical sinonasal polyps.

Discussion

Sinonasal polyps are inflammatory mucosal swellings of the sinonasal tract that usually present as soft, polypoid, translucent masses. Histologically, the surface mucosa is typically intact and covered with respiratory epithelium, often with areas of squamous metaplasia. The stroma is edematous and myxomatous, with variable vascularity and inflammatory infiltrate [4]. Angiomatous, or angioectatic, nasal polyps, on the other hand, comprise an uncommon subtype of sinonasal polyps, which are characterized by large numbers of dilated vascular spaces, with scanty inflammatory infiltrate and abundant extracellular fibrin [1]. Angiomatous polyps are reported to be most commonly a derivative of antrochoanal polyps, but may be a variant of sinonasal polyps of any location [2]. The blood vessels within angiomatous polyps, particularly those derived from antrochoanal polyps, may be susceptible to compromise at certain locations within the nasal cavity. Batsakis has identified four extra-antral sites of vulnerability to vascular compromise for antrochoanal polyps. These are the ostial exit site, the posterior end of the inferior turbinate, the posterior choana and the most dependent part within the nasopharynx [2]. Compression of blood vessels in these areas is hypothesized to result in initial vascular dilatation and stasis and extravascular edema. Venous infarction ensues. This is followed by neovas-

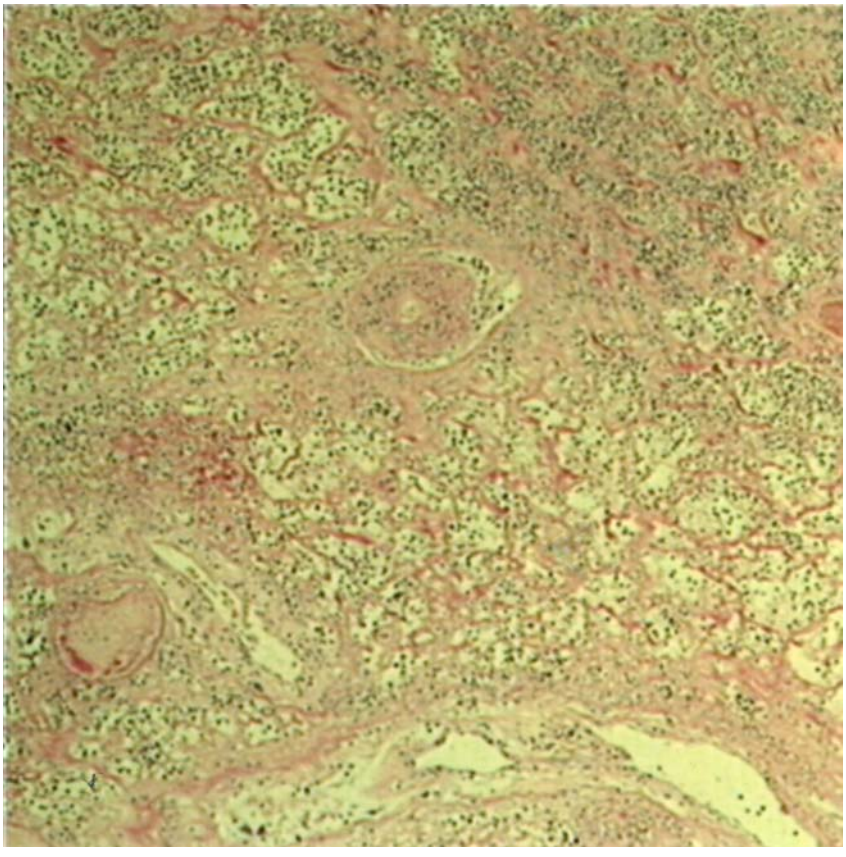

Fig. 4 Photomicrograph showing extensive necrosis and organization, with organization of thrombus within ectatic vessels (HE, ×20)

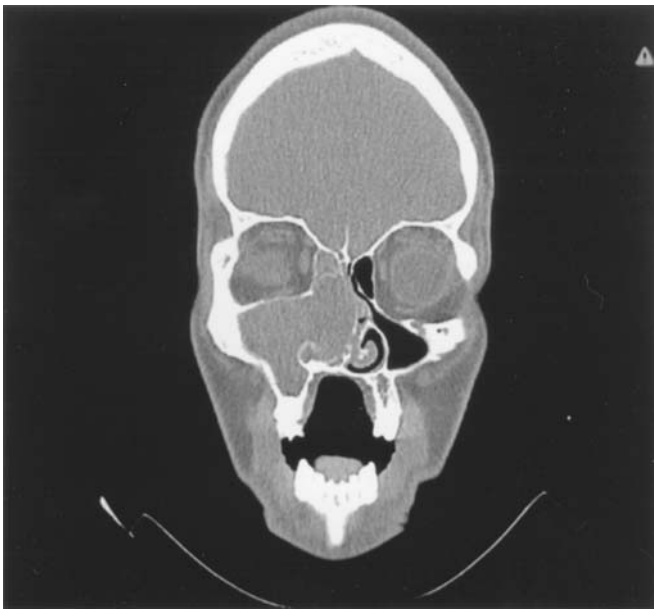

Fig. 5 Coronal CT scan showing expansion of the right maxillary antrum and radiological loss of the lateral wall of the right nasal cavity

cularization of the polyp, setting the stage for repeat vascular occlusion and infarction [2]. Extensive extravasation of blood components through thin-wall vessels results in areas of hemorrhage and accumulation of large perivascular pools of amorphous eosinophilic material [1].

Angiomatous sinonasal polyps are rarely described in the literature. However, the clinical, radiological and pathological features of these lesions have considerable potential for confusion with neoplastic processes, including juvenile angiofibroma, inverted papilloma and malignant tumors. The usual presenting symptoms are nasal obstruction and snoring, however, epistaxis and facial swelling have also been reported [1]. One of the most striking clinical features in both of the cases that we report was the foul odor associated with the lesions, raising suspicions of either a malignant or fungal process. These suspicions were compounded by the unusual appearance of the polyps, with the nasopharyngeal components in particular showing areas of obvious hemorrhage and necrosis. On the other hand, the relatively long history of symptoms (18 months and 2 years, respectively) was felt to be more in keeping with a benign process.

The CT findings in both cases showed the presence of a soft tissue mass extending from the maxillary sinus, through the nasal cavity, into the nasopharynx. The CT findings in case 2, showing elevation of the floor of the orbit, bowing of the lateral wall of the maxillary sinus and radiological loss of the medial wall, were particularly remarkable. The presence of bony expansion and radiological destruction raised suspicions of a neoplastic

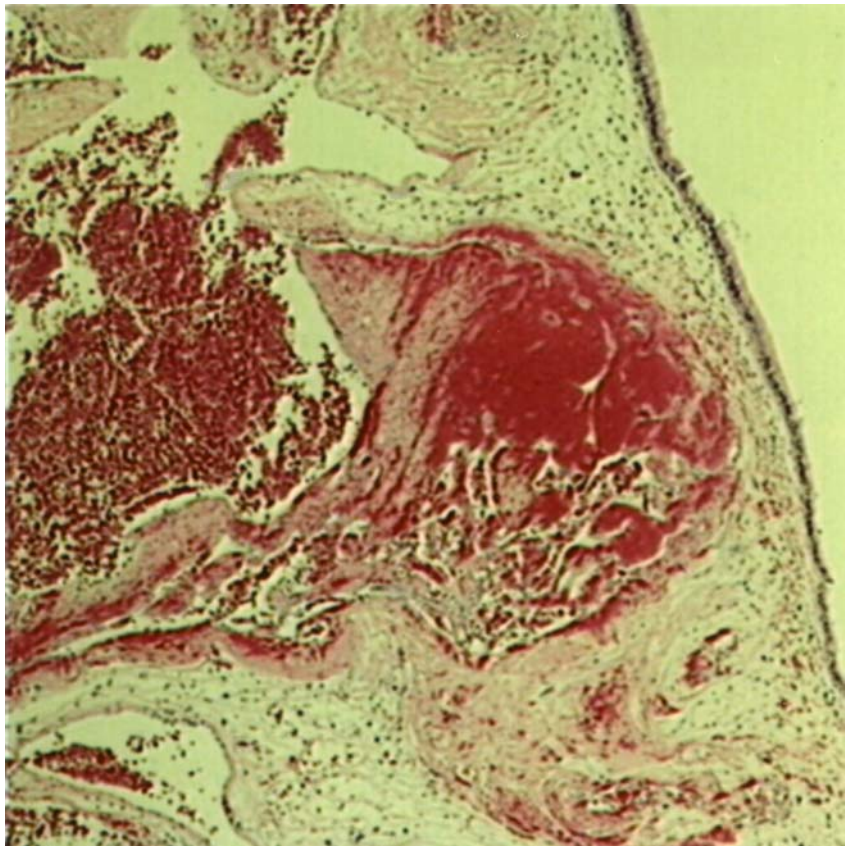

Fig. 6 Photomicrograph showing ectatic vessels with thrombosis and organization. Respiratory epithelium lining polyp also seen (HE, ×40)

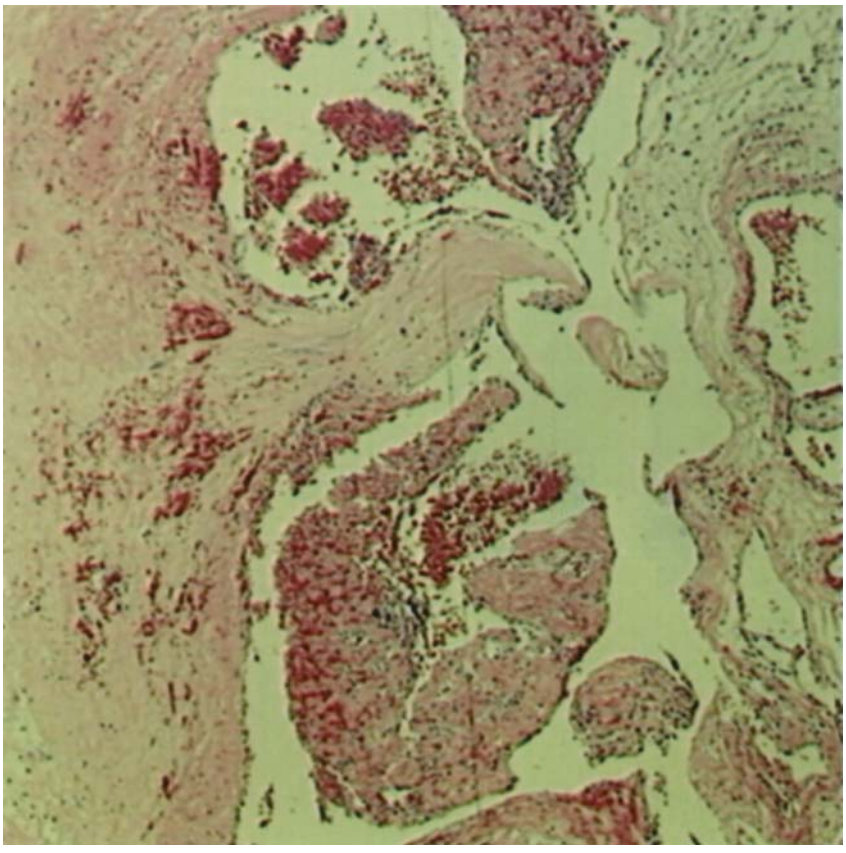

Fig. 7 Photomicrograph showing ectatic vessel with intraluminal thrombosis (HE, ×40)

process; however, bony destruction has been reported rarely with benign sinonasal polyps [5, 6]. On the other hand, there was no evidence of widening of the pterygopalatine fossa in either case, nor was there total opacification of the sinuses or nasal cavity. The absence of these findings was considered to make a diagnosis of juvenile angiofibroma less likely.

The unenhanced magnetic resonance images of the maxillary component of the angiomatous polyp in case 1 depicted the typical appearance of an antrochoanal polyp, with hypointensity on T1-weighted images and hyperintensity on T2-weighted images. The nasal cavity and nasopharyngeal portions of the polyp were also hypointense on T1-weighted images, but displayed areas of mixed signal intensity on the T2-weighted images. It is likely that these areas of mixed signal were caused by the extensive areas of organized thrombus and necrosis in this part of the polyp. The gadolinium-enhanced images showed strong enhancement of the nasochoanal portion of the polyp, which was markedly inhomogenous. Flow voids, which would have been suggestive of juvenile angiofibroma, were not seen. Strong enhancement of the nasochoanal portion of angiomatous polyps after gadolinium, mimicking a hypervascular tumor, on account of the extensive vascular proliferation and ectasia, has been noted previously [7]. In the present case, it is likely that the substantial extent of infarction was responsible for the lack of enhancement of considerable portions of the polyp, particularly the nasopharyngeal portion.

High on the list of preoperative differential diagnoses in both of these cases were juvenile angiofibroma and inverted papilloma. With regard to juvenile angiofibroma, both patients in the present series were outside the usual age range. In addition, radiological features specific to juvenile angiofibroma, such as widening of the pterygopalatine fossa, with bowing of the posterior wall of the maxillary sinus, and flow voids on MRI scans, were absent. The early identification of cases likely to represent juvenile angiofibroma is of particular importance, as this may have important implications for pre- and peri-operative management. In such cases, angiography may be used to differentiate between angiofibroma and angiomatous polyp [8], as well as to perform pre-operative embolization. In contrast, it was not possible to exclude inverted papilloma as a diagnosis in either case on clinical or radiological grounds alone.

The most remarkable pathological features were the abundant presence of dilated blood vessels, many with evidence of intraluminal thrombosis, and the considerable extent of necrosis of the lesion, with extravasation of blood components into the surrounding stroma. The degree of necrosis raised suspicions of either a fungal infection or a severe inflammatory process, such as Wegener's granulomatosis. However, fungal stains were negative, as was serological testing for c-ANCA and autoimmune antibodies. There was also evidence of recanalization of thrombosed vessels. This finding would lend support to Batsakis' theory for the continuing

development of angiomatous polyps, with re-establishment of blood supply preceding repeat thrombosis secondary to vascular compression, thus leading to further infarction. The surface epithelium was ulcerated in areas, and showed extensive squamous metaplasia. Endophytic epithelial nests, typical of inverted papilloma [4], were absent.

Conclusion

Although entirely benign, angiomatous nasal polyps may show features that simulate a neoplastic process. Awareness of these lesions is thus of obvious importance to the otolaryngologist, the radiologist and the pathologist alike. Angiomatous polyps are poorly documented in the literature. In the present paper, we present one of the few simultaneous reports of their clinical, radiological and pathological features. We believe that these cases effectively demonstrate the important characteristics of this uncommon entity and should serve to enhance the clinician's recognition of it.

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