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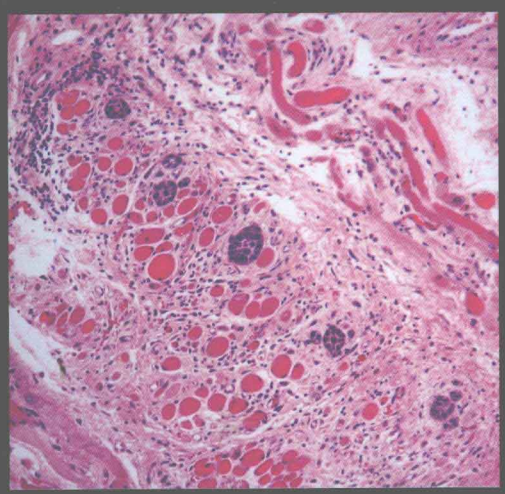
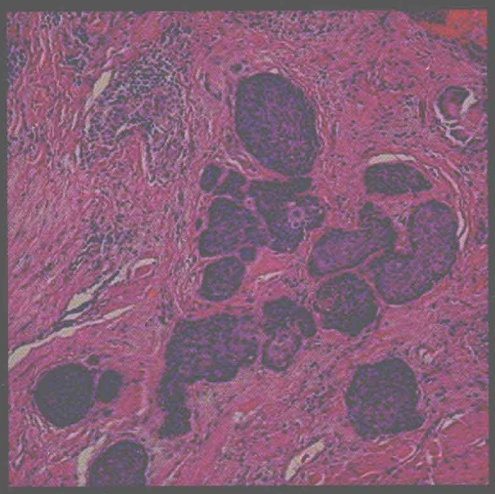
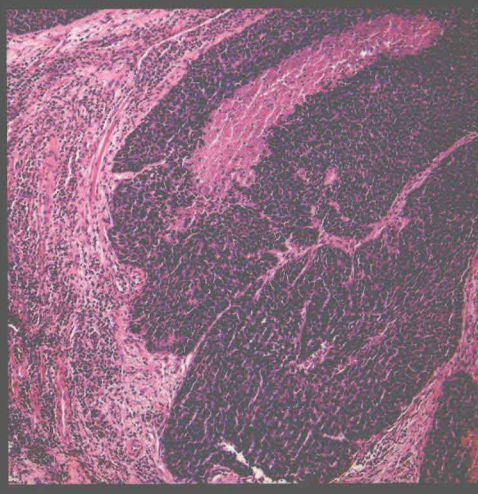

Margaret Brandwein-Gensler

HEAD AND NECK

Cambridge Illustrated Surgical Pathology

Margaret Brandwein-Gensler, MD

Montefiore Medical Center, Albert Einstein College of Medicine of Yeshiva University

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PREFACE

The field of head and neck pathology is relatively small as compared to other pathology specialties. For most hospitals, the volume of specimens submitted by otolaryngologists, head and neck surgeons, and oral surgeons is much lower than that of gastrointestinal or gynecological specimens. Yet the vast array of benign and malignant tumors that affect the head and neck, and the ever-expanding classification schemata necessary for diagnosis and prognostication, makes this specialty unceasingly fascinating. Losing oneself in the ever-branching, nosological subclassifications should not diminish attention to our ultimate responsibility: to accurately guide surgeons and clinicians and convey the prognostic implications of a particular diagnosis.

This atlas is written for general surgical pathologists, head and neck pathologists, and residents in pathology and otolaryngology. My intention is that this atlas becomes an accessible, practical go-to text. The general surgical pathologist reading head and neck specimens is challenged by diagnostic diversity in the face of specimen rarity. I hope that looking at these images and focusing on the key diagnostic points and differential diagnoses will lead the pathologist along the "right" path. I must add, though, that there is no greater teacher than the actual slides; remember that the slides are always trying to tell you something.

I would like to acknowledge my mentors and teachers: the late Andy Huvos, Douglas Gnepp, and Michael Prystowsky. Mike's vision and scientific leadership of The Einstein Montefiore Head and Neck Research Group has resulted in an outstanding environment, and I am grateful for the opportunity to be part of this group.

I would like to thank my many colleagues in pathology and surgery who have been my teachers over the years. I am especially grateful for the valuable suggestions by Drs. Nasser Said Al-Naief and Rashna Madan, and for Rashna's superb contributions on thyroid and salivary cytology.

I dedicate this book to my wonderful parents, Lester and Cyla Brand; my dear husband, Matthew; and our family: Nechama, Yaacov, Alexandra, Blima, Akiva, Shaindy, Ari, Shimmy, Rachele, and Shlomo. Thank you for tolerating my absence.

Margaret Brandwein-Gensler

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1 SINONASAL TRACT

American Joint Cancer Committee Staging Criteria (6th ed.) Sinonasal Malignancies

Primary tumor (T)	
Maxillary sinus	
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ
T1	Tumor limited to the maxillary sinus mucosa with no erosion or destruction of bone
T2	Tumor causing bony erosion or destruction including extension into hard palate and/or middle nasal meatus, excluding extension to posterior maxillary wall and pterygoid plates
T3	Tumor invades bone of posterior maxillary wall, subcutaneous tissues, orbital floor, medial orbit, pterygoid fossa, and/or ethmoids
T4a	Tumor invades anterior orbit, skin of cheek, pterygoid plates, infratemporal fossa, cribriform plate, sphenoid, or frontal sinuses
T4b	Tumor invades orbital apex, dura, brain, middle cranial fossa, cranial nerves other than maxillary division of trigeminal nerve, nasopharynx, or clivus
Nasal cavity and ethmoid sinuses	
Tx	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in-situ
T1	Tumor restricted to any one subsite, with or without bony invasion
T2	Tumor invades two subsites in a single region or extends into an adjacent region within the nasoethmoidal complex, with or without bony invasion
T3	Tumor invades medial orbit, orbital floor, maxillary sinus, palate, or cribriform plate
T4a	Tumor invades anterior orbital contents, skin of nose or cheek, minimal anterior cranial fossa extension, pterygoid plates, sphenoid, or frontal sinuses
T4b	Tumor invades orbital apex, dura, brain, middle cranial fossa, cranial nerves other than maxillary division of trigeminal nerve, nasopharynx, or clivus
Regional lymph nodes (N)	
Nx	Cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node $\leq$3 cm
N2a	Metastasis in a single ipsilateral lymph node >3 cm but $\leq$6 cm
N2b	Metastasis in multiple ipsilateral lymph nodes $\leq$6 cm
N3	Metastasis in a lymph node >6 cm

Distant metastasis (M)	
Mx	Cannot be assessed
M0	No distant metastasis
M1	Distant metastasis

Stage I	T1	N0	
Stage II	T2	N0	
Stage III	T3	N0	
	T1		
	T2	N1	
	T3		
Stage IVA	T4a	N0	
	T1	N1	M0
	T2		
	T3	N2	
	T4a		
Stage IVB	T4b	Any N	
	Any T	N3	
Stage IVC	Any T	Any N	M1

ANATOMIC DEFINITIONS FOR THE SINONASAL TRACT

Nasal vestibule

Anterior boundary: nares

Posterior boundary: perpendicular line dropped from the frontonasal suture through the anterior aspect of the inferior turbinate

Nasal cavities

Anterior boundary: continuous with the vestibule

Posterior boundary: posterior choanae

Superior boundary: cribriform plate

Inferior boundary: hard palate

Medial boundary: nasal septum

Lateral boundary: lateral nasal wall with maxillary and ethmoid ostia and turbinates

Turbinates

Scrolllike projections of bone and vascular soft tissue

The superior turbinate is smallest, and the inferior turbinate is largest

Attaches to the lateral nasal wall anteriorly, the free edge, is posterior

Schneiderian mucosa

Pseudostratified columnar ciliated epithelium with goblet cells

The lamina propria is loose and well vascularized, with serous and mucinous glands

continued on next page

continued

Olfactory mucosa (OM)

Bipolar olfactory nerve fibers cross through the cribriform plate and terminate in the OM forming olfactory cilia

Bowman's glands, or olfactory glands, which appear similar to serous minor salivary glands

The frontal sinus

Paired sinuses between the internal and external cranial tables

Ethmoid complex

Paired complex of sinuses contains three to eighteen cells, grouped as anterior, middle, or posterior, according to the location of their ostia

Medial boundary: upper nasal fossa

Lateral boundary: lamina papyracea of the orbit

Superior boundary: fovea ethmoidalis which is the medial extension of the orbital plate of the frontal bone

Sphenoid sinus

Situated posterior to the ethmoid sinuses

Superior boundary: floor of the anterior cranial fossa

Posterior boundary: optic chiasm and the sella turcica

Lateral boundary: orbital apex, the optic canal, the optic nerve, and cavernous sinus

Inferior boundary: nasopharynx

Anterior boundary: nasal fossa

Maxillary sinus

Medial boundary: lateral wall of the nasal cavity ("party wall")

The curved posterolateral wall separates the sinus from the infratemporal fossa.

The anterior sinus wall is the facial surface of the maxilla.

Inferior boundary: hard palate

Superior boundary: orbital rim and orbital apex

Nonneoplastic Lesions

Sinonasal Polyps

Sinonasal polyps result from expansion of the Schneiderian mucosa lamina propria by fluids and proteins. This can be caused by chronic allergy, vasomotor rhinitis, infectious rhinosinusitis, diabetes mellitus, cystic fibrosis, aspirin intolerance, and nickel exposure.

Between 10 and 20 percent of children with cystic fibrosis have nasal polyps. Generally, nasal polyps in children are uncommon, and 29 percent of such polyps in children are associated with cystic fibrosis.

Sampter's triad refers to the syndrome of nasal polyps, aspirin intolerance, and bronchial asthma. About 20 percent of patients with nasal polyps have asthma, and conversely about 30 percent of asthmatic patients have polyps.

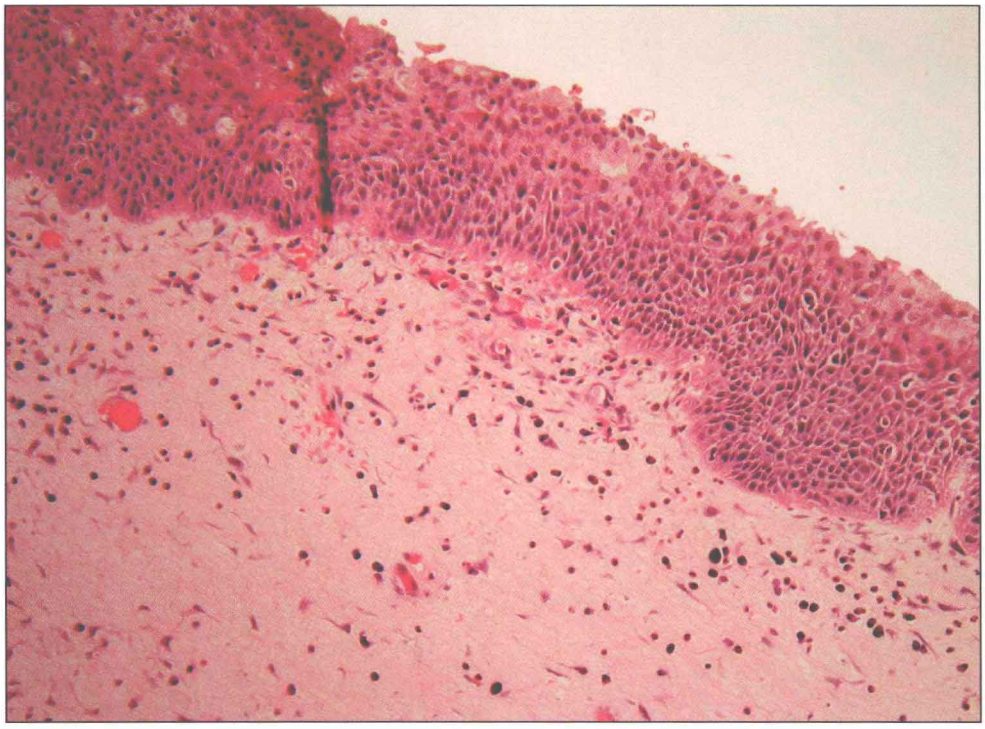


Figure 1.1 The lamina propria of a Schneiderian polyp is distended by proteinaceous exudate with variable inflammation. The underlying seromucinous glands may be present or absent. The basement membrane is thicker than normal.

Gross Examination:

- Single or multiple bilateral lesions; grossly translucent and soft.

Histopathology:

- Thickened basement membrane (Figure 1.1).
- Mucosal surface: respiratory epithelium or squamous metaplasia, ±hyperplasia (Figure 1.2).
- If diffuse squamous metaplasia and hyperplasia are present, then consider inverted papilloma.
- Allergic polyp – Inflamed Schneiderian polyp with minimal to marked infiltrate of eosinophils (Figures 1.3 and 1.4).
- If the surface epithelium has a "pierced" microglandular cribriform pattern, then consider oncocytic Schneiderian papilloma, respiratory epithelial adenomatoid hamartoma, or sinonasal serous hamartoma (Figures 1.5 and 1.6).

Antrochoanal Polyp

Antrochoanal polyps represent 4–6 percent of all sinonasal polyps; they arise in the maxillary antrum and prolapse through a sinus ostium. The polyp can extend posteriorly, further prolapsing through the posterior nasal choanae into the nasopharynx. Thus, a long stalk is characteristic. Stalk torsion can give rise to bizarre reactive fibroblasts within the lamina propria. Clinically, antrochoanal polyps can become quite large, mimicking a tumor.

Figure 1.2 Squamous metaplasia can be common in polyps. Here we see reactive atypia due to inflammation.

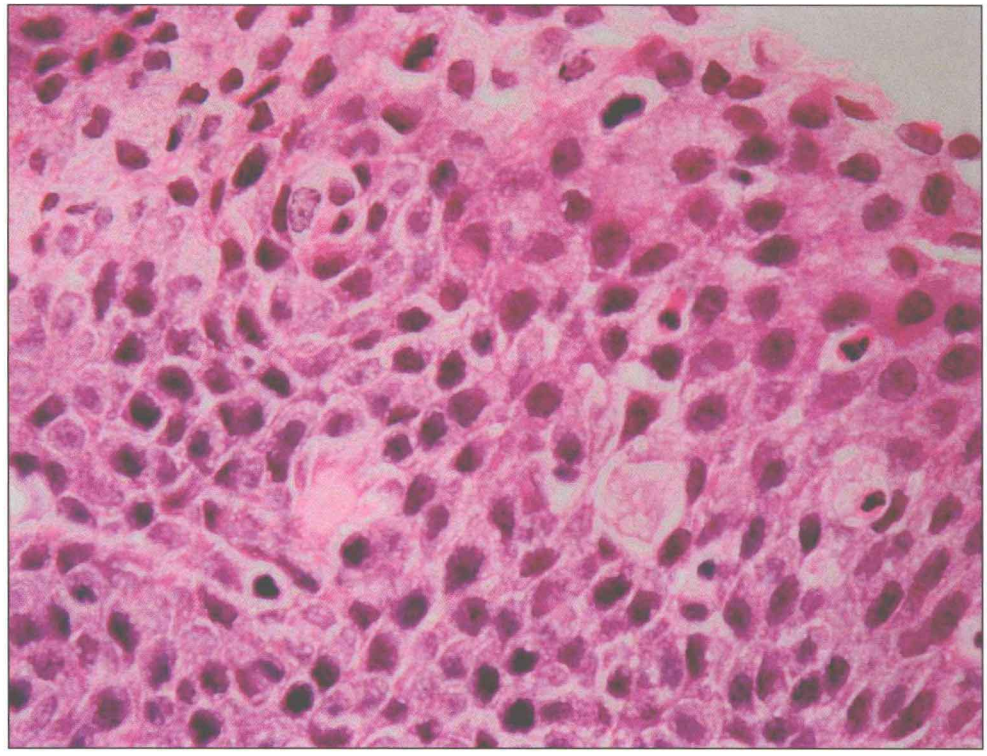
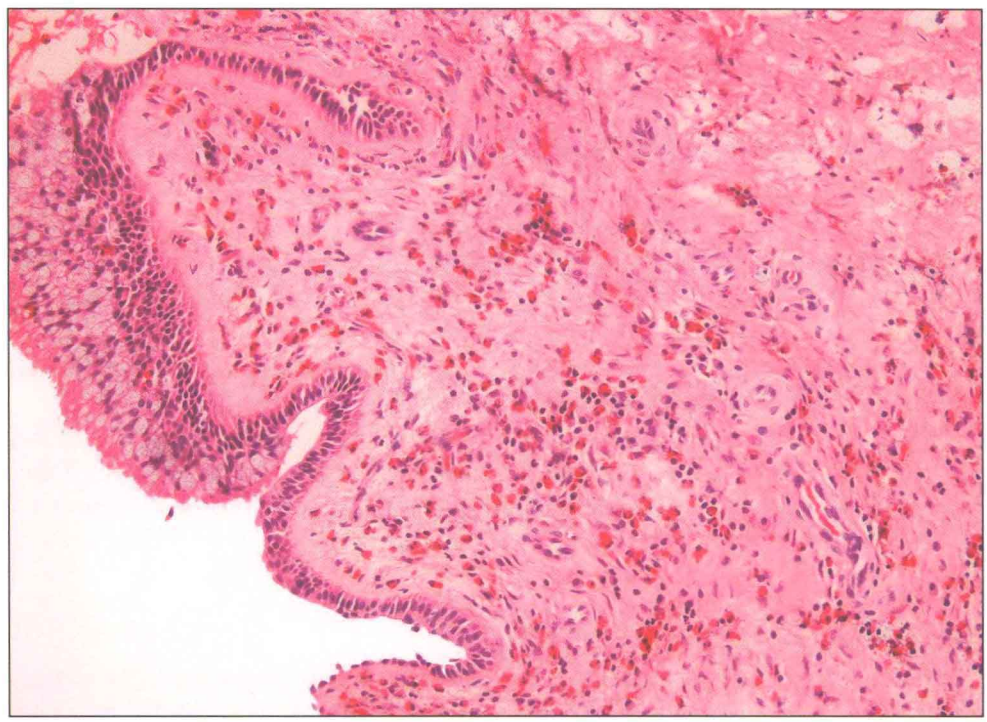


Figure 1.3 Eosinophils are seen in allergic polyps; only a scattering of eosinophils need be seen to deem the process as allergic. By contrast, nonallergic sinusitis or polyps contain a lymphoplasmatic infiltrate.



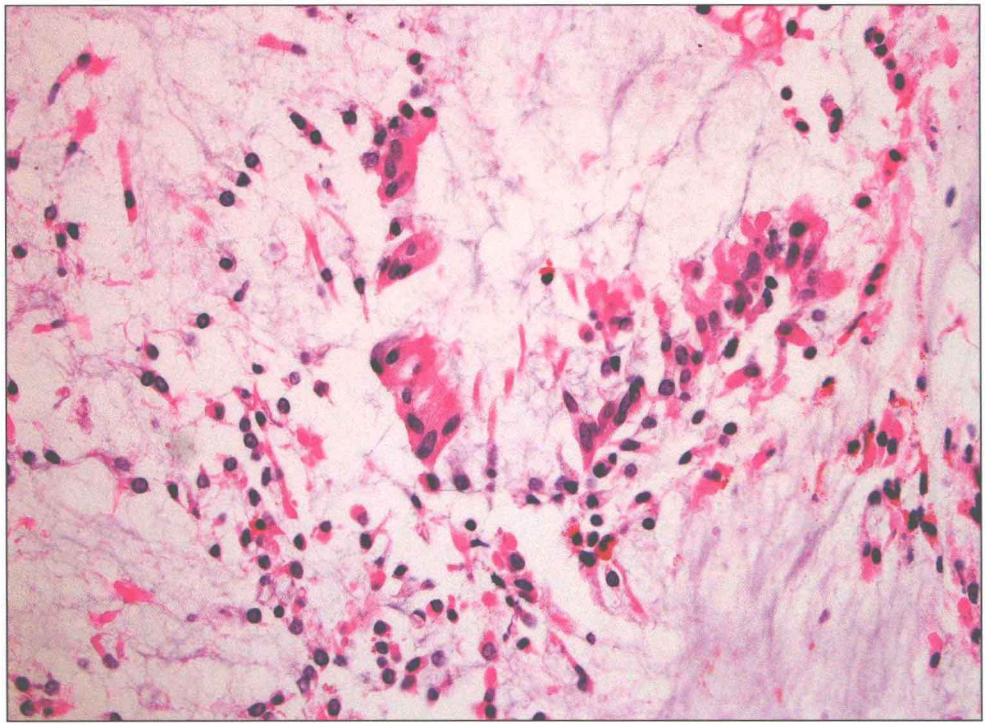


Figure 1.4 Extravasated mucin of an allergic polyp can contain shed respiratory columnar cells, goblets cells, and occasional eosinophils, as seen here. This differs from allergic mucin, which demonstrates eosinophil degranulation and Charcot–Leyden crystals (see Figure 1.13).

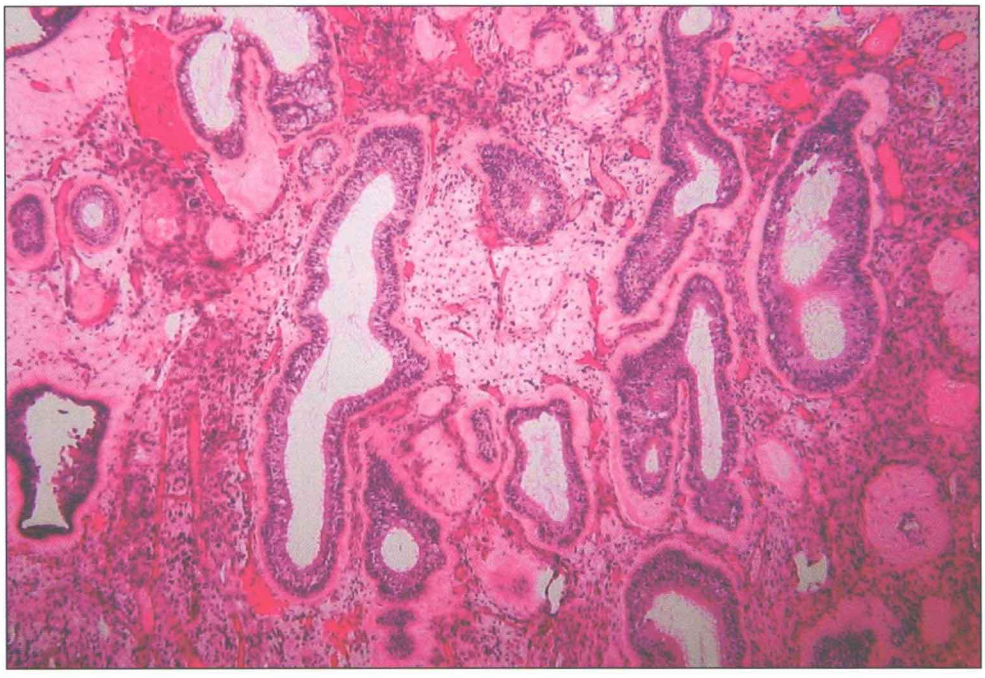


Figure 1.5 Long-standing respiratory polyp: The hyperplastic glands are crowded. The lamina propria is filled with reactive fibroblasts and inflammation. The differential diagnosis of hyperplastic polyps includes respiratory epithelial adenomatoid hamartoma (REAH) and low-grade intestinal-type adenocarcinoma (ITAC).