in the United States in young to middle-aged adults, but fortunately more severe symptomatic otosclerosis is relatively uncommon. In most instances it is familial, following an autosomal dominant transmission with variable penetrance. The basis for the osseous overgrowth is completely obscure, but it appears to represent uncoupling of normal bone resorption and bone formation. Thus, it begins with bone resorption, followed by fibrosis and vascularization of the temporal bone in the immediate vicinity of the oval window, in time replaced by dense new bone anchoring the footplate of the stapes. In most instances the process is slowly progressive over the span of decades, leading eventually to marked hearing loss.

Tumors

Epithelial and mesenchymal tumors that arise in the ear—external, middle, internal—all are rare save for basal cell or squamous cell carcinomas of the pinna (external ear). These carcinomas tend to occur in elderly men and are associated with sun exposure. By contrast, squamous cell carcinomas of the canal occur most often in middle-aged to elderly women and are not associated with sun exposure. Wherever they arise they morphologically resemble their counterparts in other skin locations, beginning as papules that extend and eventually erode and invade locally. Basal cell and squamous cell lesions of the pinna are locally invasive but they rarely spread. Squamous cell carcinomas arising in the external canal may invade the cranial cavity or metastasize to regional nodes, accounting for a 5-year mortality of about 50%.

KEY CONCEPTS

Ears

- **Infections** of the ear are common in children and typically viral in etiology. Chronic infections can be complicated by bacterial infections, which can lead to secondary complications including perforated eardrum as well as spreading to the ossicles or mastoid spaces.
- **Otosclerosis,** with its associated hearing loss, is caused by the abnormal deposition of bone in the middle ear.

NECK

Most of the conditions that involve the neck are described elsewhere (e.g., squamous cell and basal cell carcinomas of the skin, melanomas, lymphomas), or they are a component of a systemic disorder (e.g., generalized rashes, the lymphadenopathy of infectious mononucleosis or tonsillitis). What remains to be considered here are a few uncommon lesions unique to the neck.

Branchial Cyst (Cervical Lymphoepithelial Cyst)

The vast majority of these cysts are thought to arise from remnants of the second branchial arch and are most commonly observed in young adults between the ages of 20 and 40. These benign cysts usually appear on the upper lateral aspect of the neck along the sternocleidomastoid muscle. Clinically, the cysts are well circumscribed, 2 to 5 cm in diameter, with fibrous walls usually lined by stratified squamous or pseudostratified columnar epithelium. The cyst wall typically contains lymphoid tissue with prominent germinal centers. The contents of the cysts may be clear and watery or mucinous and may contain desquamated, granular cellular debris. The cysts enlarge slowly, are rarely the site of malignant transformation, and generally are readily excised. Similar lesions sometimes appear in the parotid gland or in the oral cavity beneath the tongue.

Thyroglossal Duct Cyst

Embryologically, the thyroid anlage begins in the region of the foramen cecum at the base of the tongue; as the gland develops it descends to its definitive midline location in the anterior neck. Remnants of this developmental tract may persist, producing cysts, 1 to 4 cm in diameter, which may be lined by stratified squamous epithelium, when located near the base of the tongue, or by pseudostratified columnar epithelium in lower locations. Transitional patterns are also encountered. The connective tissue wall of the cyst may harbor lymphoid aggregates or remnants of recognizable thyroid tissue. The treatment is excision. Malignant transformation within the lining epithelium has been reported but is rare.

Paraganglioma (Carotid Body Tumor)

Paraganglia are clusters of neuroendocrine cells associated with the sympathetic and parasympathetic nervous systems. As a result, these neoplasms can be seen in various regions of the body. While the most common location of these tumors is within the adrenal medulla, where they give rise to pheochromocytomas (Chapter 24), approximately 70% of extra-adrenal paragangliomas occur in the head and neck region. The pathogenesis of paragangliomas is not fully understood. However, loss of function mutations in genes encoding succinate dehydrogenase subunits or cofactors, proteins that participate in mitochondrial oxidative phosphorylation, occur frequently in both hereditary and spontaneous paragangliomas. How these mutations contribute to tumor development is not yet clear, but it is suspected that they do so by altering cellular metabolism, which you will recall is one of the hallmarks of neoplasia (Chapter 7). Interestingly, the incidence of these tumors is greater in people living at high altitudes.

Paragangliomas typically develop in two locations:

- Paravertebral paraganglia (e.g., organs of Zuckerkandl and, rarely, bladder). Such tumors have sympathetic connections and are chromaffin-positive, a stain that detects catecholamines.