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43.1 Uses

ACE inhibitors are commonly used to treat hypertension and congestive heart failure.

43.2 Mechanism

ACE inhibitors are believed to result in angioedema through increased bradykinin activity, which causes transient vasodilation and extravasation of fluid into the extracellular space, resulting in soft tissue edema. ACE inhibitor-induced angioedema is a class effect and is not dose dependent.

43.3 Discussion

The use of ACE inhibitors is believed to be the most common cause of angioedema, comprising approximately 35 % of all cases of angioedema. Conversely, angioedema occurs in approximately 0.1–1 % of patients treated with ACE inhibitors. ACE inhibitor-induced angioedema is primarily localized in the head and neck, especially in the

face, mouth, tongue, lips, and larynx. The distribution of involvement tends to be diffuse and bilateral (Fig. 43.1), although focal or unilateral lingual and peritonsillar edema have been reported (Fig. 43.2). Patients with suspected angioedema are typically assessed clinically and via laryngoscopy, but may present for radiological imaging. The edema of the affected tissues appears as relatively low attenuation on CT and as low T1 and high T2 signal on MRI, without much abnormal enhancement. Patients often present shortly after initiating ACE inhibitors, but can sometimes develop angioedema many years after starting the medication. The severity of angioedema can also vary considerably from benign facial swelling to severe airway obstruction. Treatment consists of stopping the medication, instituting steroids and antihistamines, and supportive care for airway protection, which may require intubation or tracheotomy.

43.4 Differential Diagnosis

Several other drugs, such as rituximab, alteplase, fluoxetine, laronidase, lepirudin, and tacrolimus, can also cause angioedema. Otherwise, the imaging differential diagnosis for angioedema includes infection, longus coli calcific tendonitis, vascular malformations (Fig. 43.5), and neoplasms (Fig. 43.6).

- Phlegmon appears as ill-defined areas of hypoattenuation and swelling on CT, while abscess is characterized by a rim-enhancing

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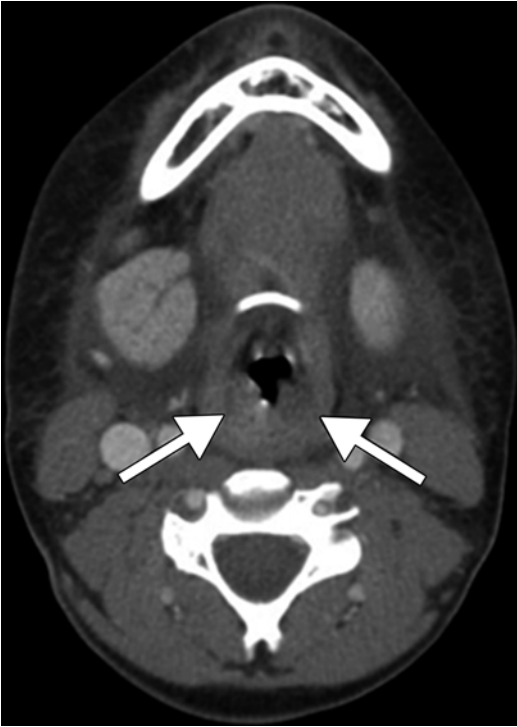


Fig. 43.1 Diffuse AACE inhibitor induced angioedema. Axial contrast-enhanced CT image shows circumferential mucosal pharyngeal swelling (*arrows*) and diffuse stranding of the parapharyngeal and subcutaneous fat bilaterally

fluid collection (Fig. 43.3). Clinical parameters, such as fever and elevated white blood cell count, are typically present.

- Longus colli calcific tendonitis can present with prevertebral space edema. Identifying a calcification on CT along the course of the tendon helps to make the diagnosis (Fig. 43.4). Patients can present with neck pain and fever.
- Vascular malformations, such as lymphatic malformations (Fig. 43.5), can present as focal or diffusely infiltrative trans-spatial lesions. These lesions are often initially diagnosed in children or young adults. Patients may present acutely due to hemorrhage within such a lesion.
- Neoplasms, such as squamous cell carcinoma (refer to Chaps. 1, 2, and 8), can present as an infiltrative mass in the oral cavity or pharynx. Tumors typically demonstrate enhancement, but may contain areas of necrosis that do not enhance.
- Radiation therapy for head and neck cancers of the aerodigestive track often produces diffuse pharyngeal mucosal edema (Fig. 43.6). This is generally mild and chronic and may be accompanied by other changes, such as subcutaneous fat reticulation.

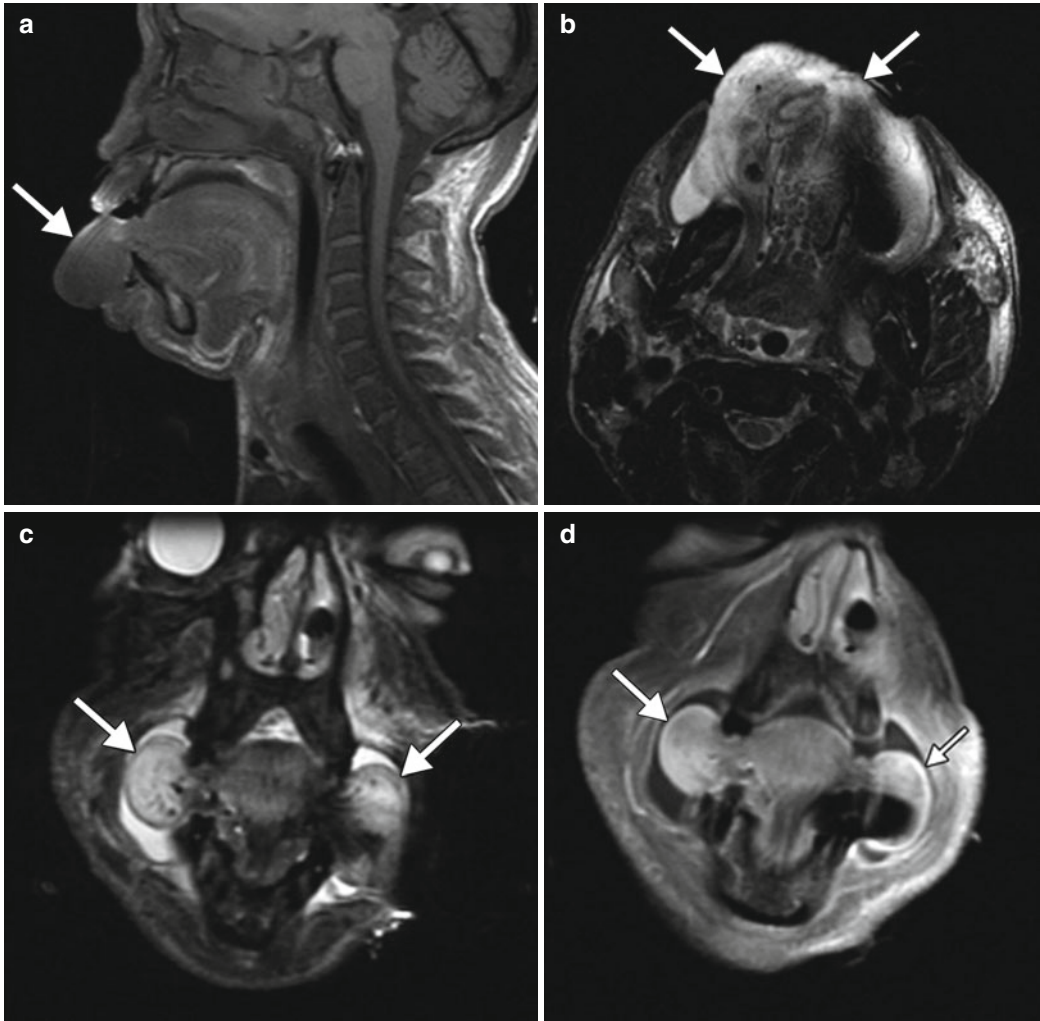


Fig. 43.2 Focal ACE inhibitor angioedema. Sagittal T1-weighted (a), axial (b) and coronal T2-weighted (c), and coronal post-contrast T1-weighted (d) MR images show diffusely massive tongue edema (arrows)



Fig. 43.3 Retropharyngeal abscess. Axial contrast-enhanced CT image shows a discrete rim-enhancing fluid collection in the left retropharyngeal space (*arrow*), consistent with abscess

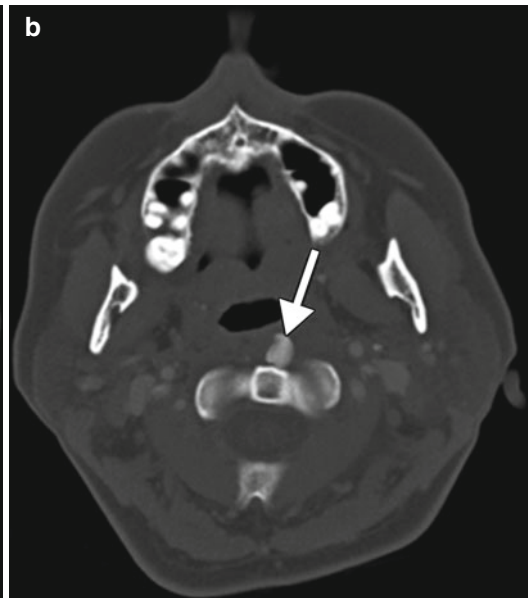
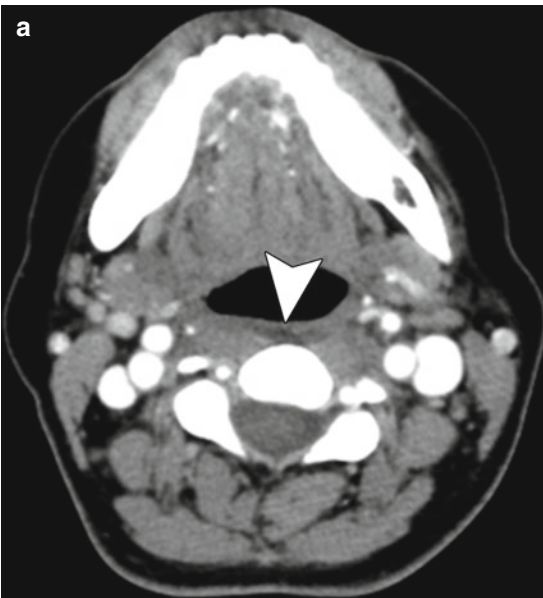


Fig. 43.4 Longus colli calcific tendonitis. Axial contrast-enhanced CT images in the soft tissue (**a**) and bone (**b**) windows obtained at different levels show an effusion in

the prevertebral space (*arrowhead*) and a rounded calcification in the left longus colli tendon (*arrow*)

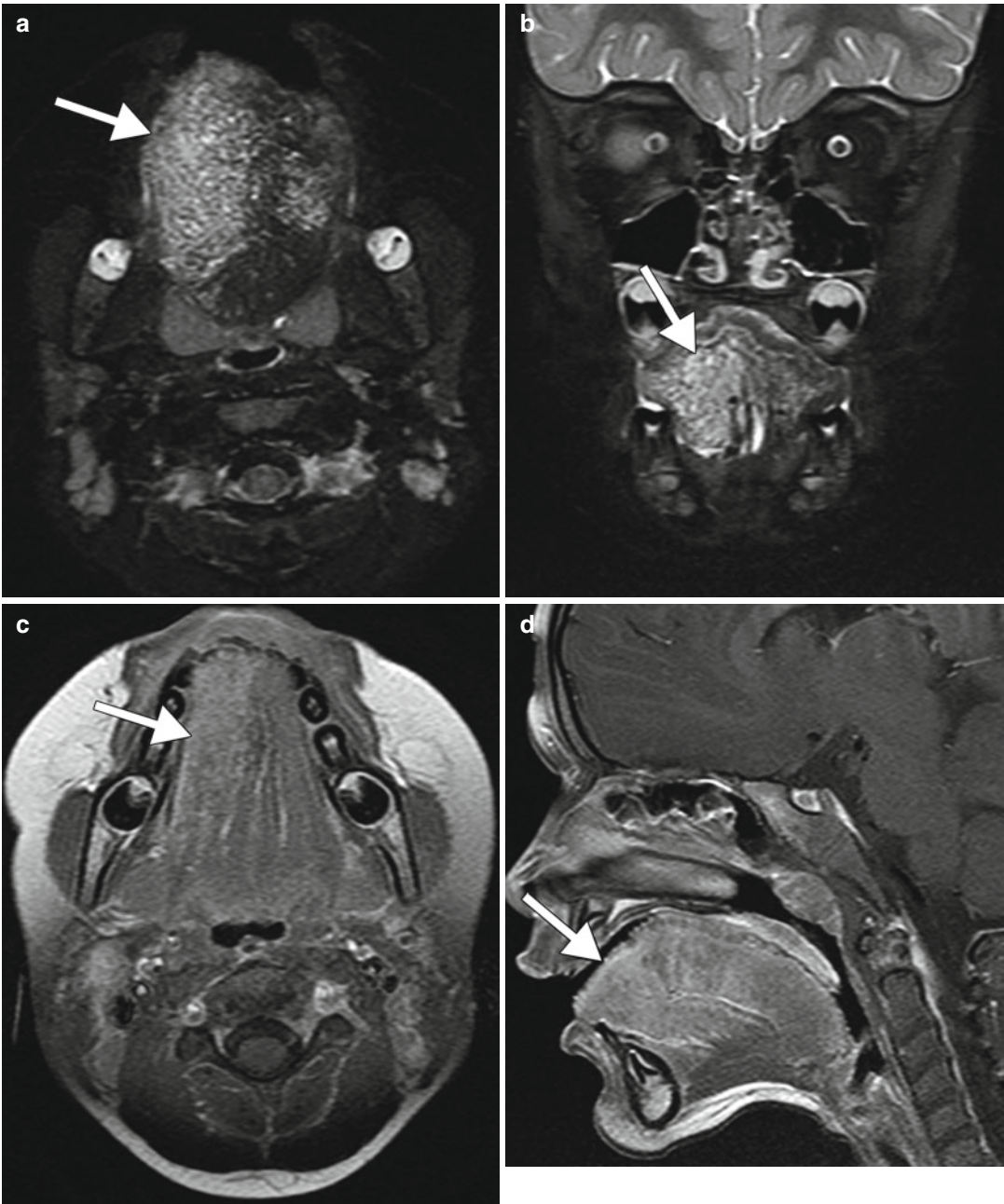


Fig. 43.5 Microcystic lymphatic malformation of the tongue. Axial (a) and coronal (b) fat-suppressed T2 and axial (c) and coronal (d) post-contrast fat-suppressed T1 MR images show a lesion mainly in the right oral tongue (arrows)

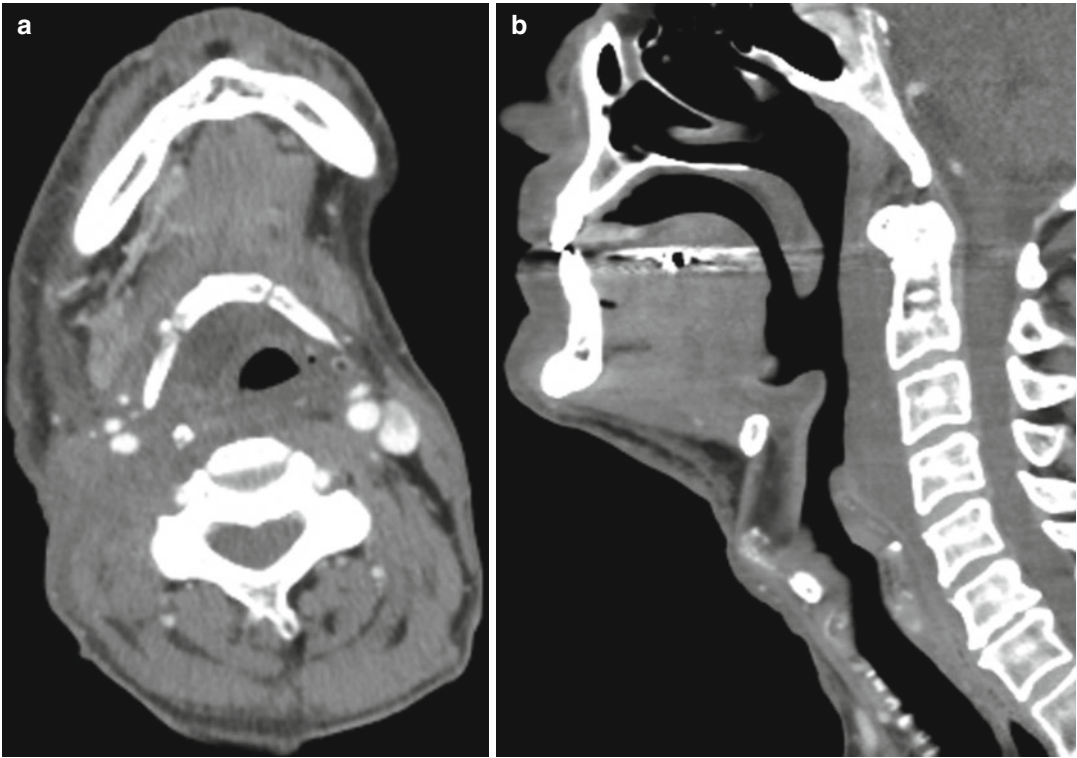


Fig. 43.6 Radiation-induced pharyngeal mucosal edema. The patient had a history of head and neck squamous cell cancer treated with chemoradiotherapy. Axial (a) and

coronal (b) CT images show diffuse edema in the region of the hypopharynx as well as stranding of the subcutaneous fat

Suggested Reading

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