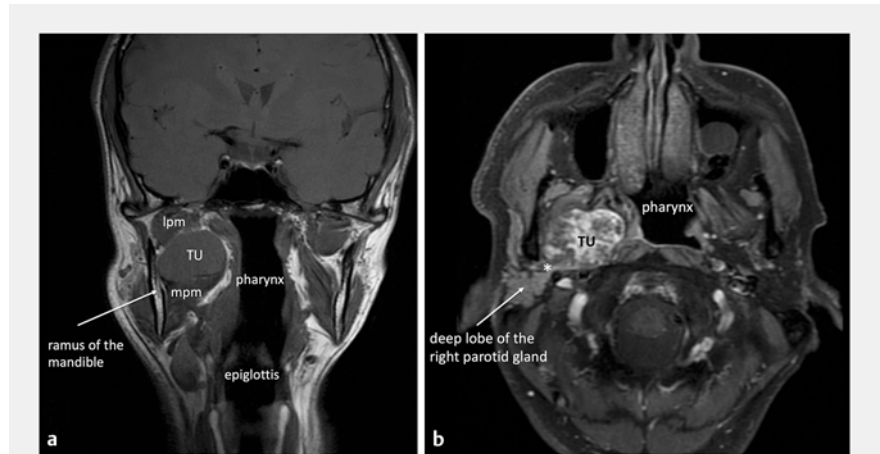


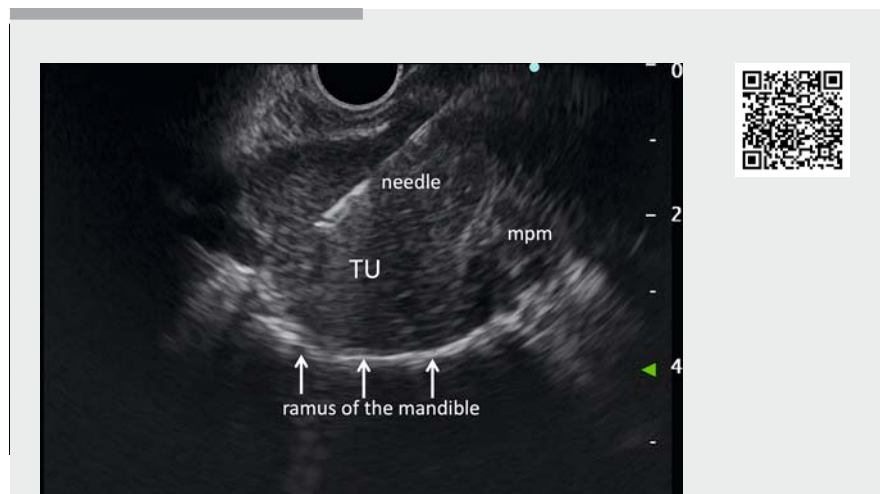
Transoral endoscopic ultrasound-guided fine-needle biopsy of a tumor of the parapharyngeal space

The parapharyngeal space is a pyramid-shaped space located between the base of the skull and the hyoid bone, lateral to the naso-oropharynx and medial to the jaw [1,2]. It contains the deep lobe of the parotid gland, cranial nerves IX–XII, the internal jugular vein, and the carotid artery [1]. A variety of benign and malignant tumors arise in the parapharyngeal space, the most common being of salivary gland and neurogenic origin [1]. Because of its deep location and concerns about damaging adjacent structures, the parapharyngeal space is difficult to access for biopsy [1–3]. Percutaneous, transoral, or transnasal approaches have been used; however, sampling may be challenging even under imaging guidance [2–5]. Here we report for the first time a technique of transoral biopsy using a flexible gastrointestinal echoendoscope.

A 41-year-old man with a remote history of mucoepidermoid carcinoma of the left parotid gland presented with a tumor of the right parapharyngeal space (► Fig. 1). A multidisciplinary tumor board recommended biopsy; however, this was deemed difficult due to the tumor location. After discussion with a gastroenterologist experienced in endoscopic ultrasound (EUS), a decision was made for biopsy under EUS guidance. With the patient in the left lateral position and under intravenous sedation, a flexible echoendoscope (Olympus GF-UCT180) was introduced in a standard manner into the oral cavity and torqued clockwise. After passing the palatopharyngeal fold, the EUS transducer was gently wedged against the right lateral wall of the pharynx (► Fig. 2). In this position the tumor was easily identified on the EUS image. Three passes with a 22-gauge Acquire needle (Boston Scientific) were performed (► Fig. 3, ► Video 1). The specimen was processed for histological evaluation, which revealed pleomorphic adenoma of the deep lobe of the right parotid gland (► Fig. 4). The patient was dis-



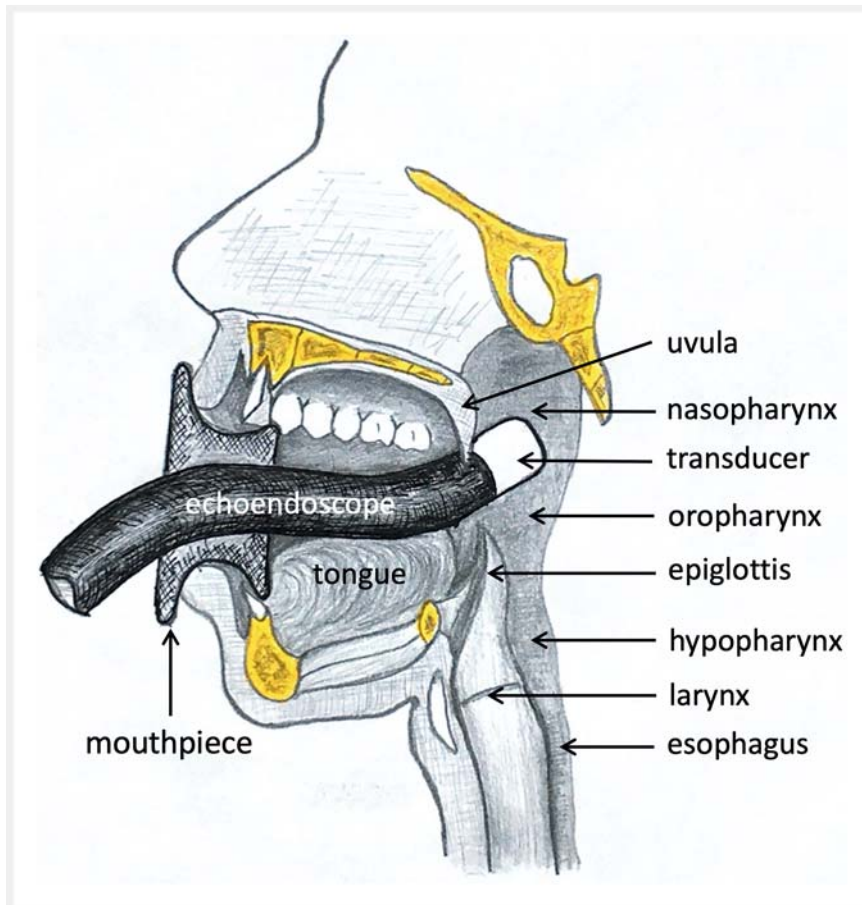
► **Fig. 1** Magnetic resonance images showing a tumor (TU) of the right parapharyngeal space. **a** Unenhanced T1-weighted coronal image. The tumor is located between the wall of the naso-pharynx, lateral (lpm) and medial pterygoid muscles (mpm), and ramus of the mandible. It is 34 mm × 25 mm in size, has well-delineated borders, and a homogeneous low-intensity T1 signal. **b** Gadolinium-enhanced transverse image. The tumor has an inhomogeneous enhancement pattern. A connection to the deep lobe of the right parotid gland is visible (asterisk).



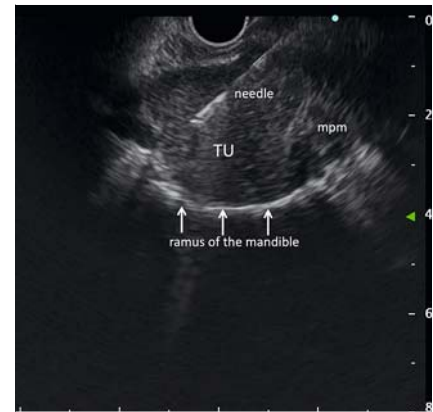
► **Video 1** Successful transoral endoscopic ultrasound-guided biopsy of a tumor of the parapharyngeal space (pleomorphic adenoma of the deep lobe of the parotid gland).

charged 48 h later after an uneventful course. The tumor was resected 4 weeks later. Surgical pathology confirmed the diagnosis of pleomorphic adenoma of the deep lobe of the right parotid gland.

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► **Fig. 2** Schematic drawing of the anatomy of the mouth and throat (midsagittal plane), showing the position of the echoendoscope during endoscopic ultrasound (EUS) examination and fine-needle biopsy of the tumor.



► **Fig. 3** EUS image of a tumor of the right parapharyngeal space located between the pharyngeal wall, the medial pterygoid muscle (mpm), and the ramus of the mandible. The tumor (TU) is 34 mm × 28 mm in size, has well-delineated borders and a hypoechoic, homogeneous echo pattern. A needle passing through the pharyngeal wall into the tumor is visible.

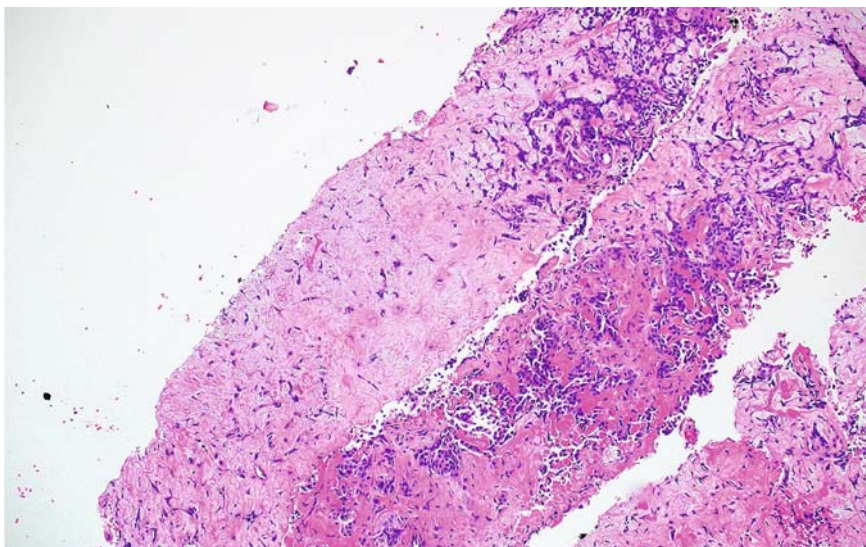
Competing interests

The authors declare that they have no conflict of interest.

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► **Fig. 4** Specimen obtained by EUS-guided fine-needle biopsy under 100× magnification. Typical appearance of a pleomorphic adenoma of the parotid gland with epithelial, myoepithelial, and stromal components. Hematoxylin and eosin stain.

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Endoscopy 2021; 53: E145–E147

DOI 10.1055/a-1216-9928

ISSN 0013-726X

published online 5.8.2020

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Georg Thieme Verlag KG, Rüdigerstraße 14,
70469 Stuttgart, Germany

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