Head & Neck: Parotid Pleomorphic Adenoma

Patient history

46 year-old man, non smoker, with a right parotid mass detected several months ago. The mass is solid but mobile, the patient shows no weight loss, nor pain or facial paralysis. An MRI is performed using conventional sequences, diffusion weighted imaging (DWI) and dynamic contrast enhancement (DCE).

Morphological findings

Conventional sequences where spin echo T1 (T1WI), spin echo T2 (T2WI) and T1WI after injection of gadolinium (T1WI C+). Conventional MRI shows a 27mm tissue mass located anteriorly in the superficial lobe of the right parotid gland. Hypointense T1, hyperintense heterogeneous T2 finely encapsulated, with slight heterogeneous enhancement, suggestive of a pleomorphic adenoma. In T2, a hypointense posterior nodule (13 mm) is seen, suggestive of epithelial content within the mass or foci of carcinoma.

No obvious lymph node metastases were seen.

Diffusion-Weighted Images (DWI)

In the light of multiparametric data, DWI and DCE show two different functional behaviors within the two components described. On DWI, the anterior part of the mass shows signs of hypocellularity (ADC=2.2 $10^{-3}$ mm²/s), whereas the nodular posterior part shows a more cellular content, (ADC =1.5 $10^{-3}$ mm²/s), but still considered hypocellular (Yabuuchi et al, Radiology, 2008).

Dynamic contrast enhancement (DCE) post-processing using permeability models

DCE confirms the two different perfusion profiles: the anterior hypocellular component shows a slow wash-in and a TTP over 300s, being considered benign (Yabuuchi et al, Radiology, 2008) [Ref. 1]. Conversely, the posterior hypercellular component shows a fast Wash-in, a TTP of about 100s and a slow wash-out.
**Histopathology diagnosis**

The final histological examination confirmed the diagnosis of benign mixed tumor (pleomorphic adenoma) with two histopathologic components, i.e. myoepithelial with rich stroma anteriorly and a rich epithelial content posteriorly.

**Conclusion**

Malignant transformation of a pleomorphic adenoma (carcinoma ex pleomorphic adenoma) is the major complication of pleomorphic adenoma. In the case presented, DCE and DWI confirmed that the posterior cellular component had functional parameters in the range of benign masses, rejecting the malignant transformation hypothesis. Precise post-processing algorithm is the key of correct functional assessments.
**Figure 4 & 5:** Fused ADC/T1 to switch from one map to another; Regions of interest (ROI) 1 and 2 located in each of the tumor components; Values obtained on the ADC in these 2 ROI: 2.2 \(10^{-3}\) mm\(^2\)/s (anterior) and 1.5 \(10^{-3}\) mm\(^2\)/s (posterior).

**Figure 6** Multiparametric display: T1, T2, Peak enhancement, Curve Washout, Washin and Permeability curves (Mean curves of ROI 1 and 2 confirming the 2 different behaviors of the anterior and posterior components within the lesion).

**Figure 7** Quantitative values on the regions of interest 1 (anterior part) and 2 (posterior part): Washin: 0.66 and 0.34; Peak enhancement: 205.84 % and 95.62 %; Curve Washout: 1.9 % and 41.81 %.

**Figure 8** 2 components of the tumor pointed out on the Overlay T1/Peak enhancement; T1/Curve washout; T1/Washin.
References