

# Case Report

## Head and Neck: Parotid Carcinoma



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**Patient history**

A 90-year-old patient in good general health condition, presented with a clinical right parotid mass with fast evolution over two months. The mass is mobile and hard to palpation with no facial paralysis or pain. A MRI was performed using conventional sequences, diffusion weighted imaging (DWI) and T1 dynamic contrast enhancement (DCE).

**Morphological findings**

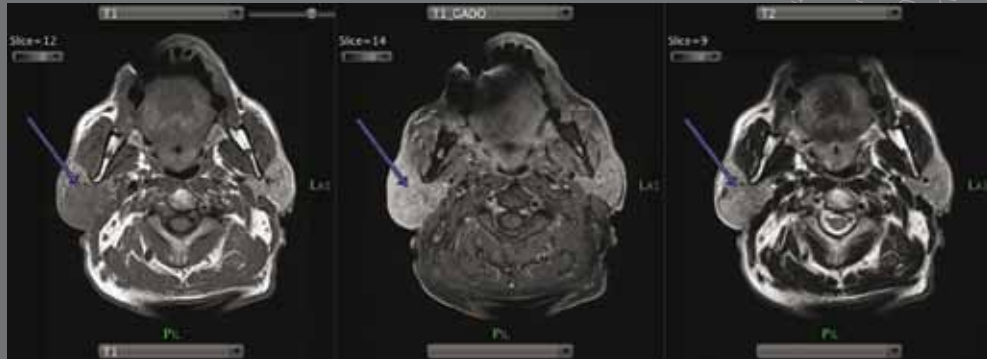
Conventional sequences used spin echo T1 (T1W), spin echo T2 (T2WI) and T1WI after injection of gadolinium with FAT SAT (T1WI C+). Conventional MRI showed a right parotid tumor with low signal in T1WI and frank and inhomogeneous enhancement in T1WI C+. Normal parotid gland signal and tumor signal were identical on T2WI. This mass is located in the superficial lobe and extends to the deep lobe. The adjacent glandular parenchyma shows signs of parotiditis, with inflammatory changes spreading toward the superficial parotid fascia. Lateral part of the mass spreads to the superficial parotid fascia and has a blurred pattern. Mandible, sterno-cleido-mastoidien muscle are spared.

No obvious lymph node metastasis were seen.

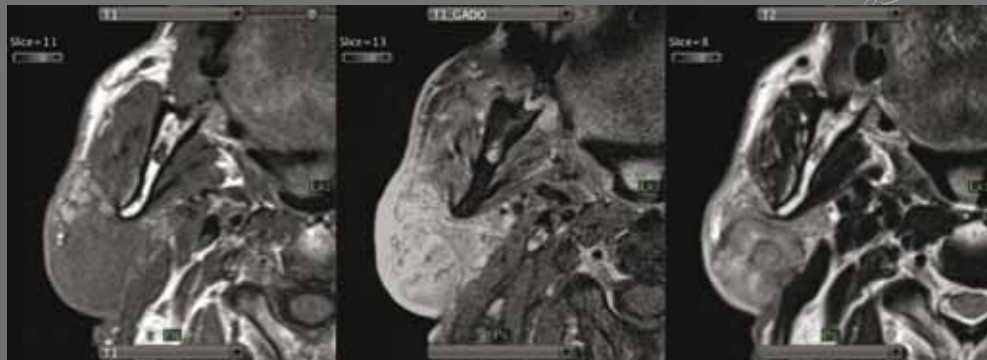
**Post treatment and analysis**

Dynamic maps such as Peak Enhancement, Curve Wash-out, Wash-in, Ktrans were computed using the Extended Tofts Model available in the Automated Head & Neck Olea Sphere™ Application. (Olea Medical®, La Ciotat, France). A multiparametric display (Permeability maps, T1, T2, ADC) available in Olea Sphere™ was used to draw regions of interests and to provide quantitative values of the tumor metrics.

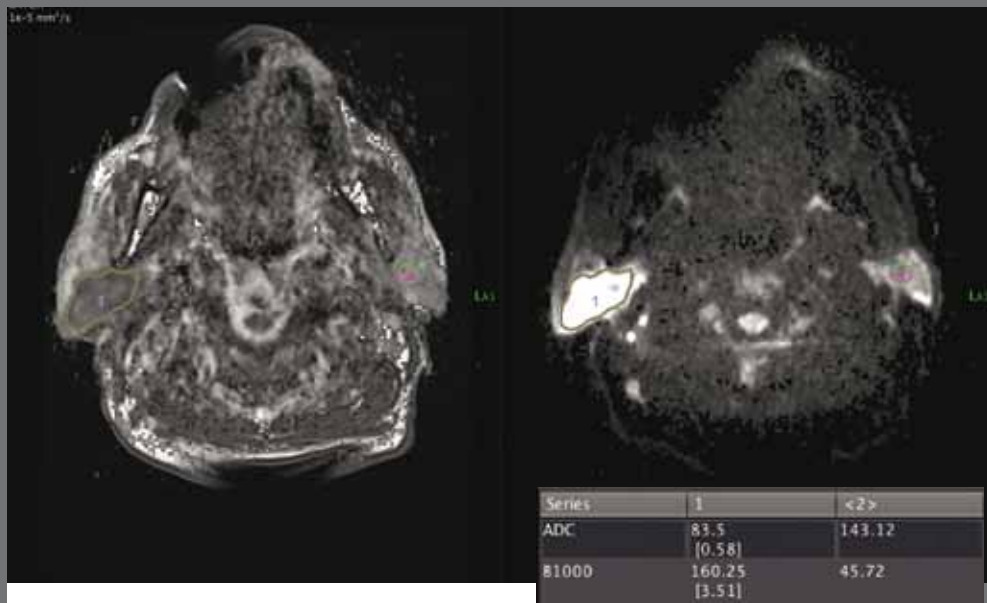
Volume and statistics on ADC/B1000 were obtained using a 3D semi-automated segmentation tool.



■ Figure 1: Axial T1, T1 Gado, T2



■ Figure 2: Zoom on the right parotid mass (Axial T1, T1 Gado)



■ Figure 3: 2 regions of interest were drawn : one in the tumor (Hypersignal B1000) and the other on the healthy side  
 ■ Figure 4: ADC values :  $0.8 \cdot 10^{-3} \text{ mm}^2/\text{s}$  (ROI 1 : tumor area) and  $1.43 \cdot 10^{-3} \text{ mm}^2/\text{s}$  (ROI 2 : healthy parotid)

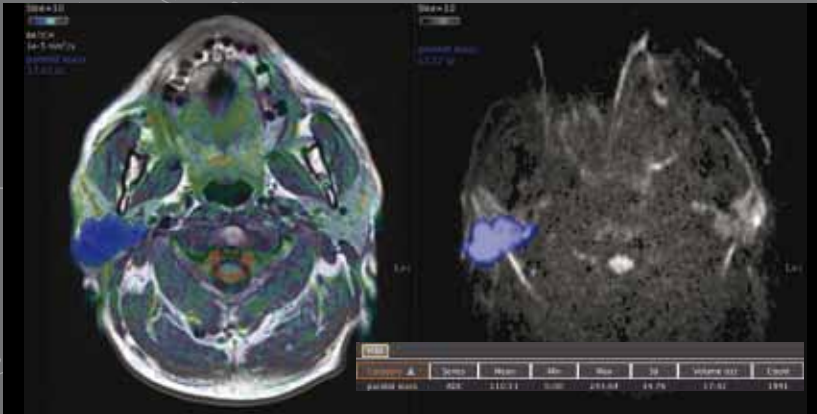


Figure 5 & 6: Volume generated from the hypersignal B1000 and displayed on the ADC map. Mean ADC within this volume:  $1.1 \cdot 10^{-3} \text{ mm}^2/\text{s}$

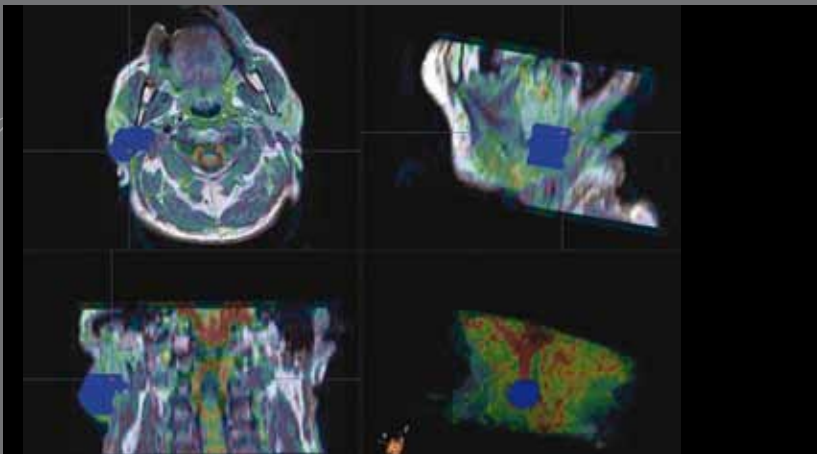


Figure 7: MPR (Multi Planar Rendering) : T1/ADC/ Mass Volume fusion display. Dynamic contrast enhancement (DCE) post processing using permeability models. The tumor shows a fast wash-in with an early time-to-peak (50s) and a Wash-out inferior to 30 %.

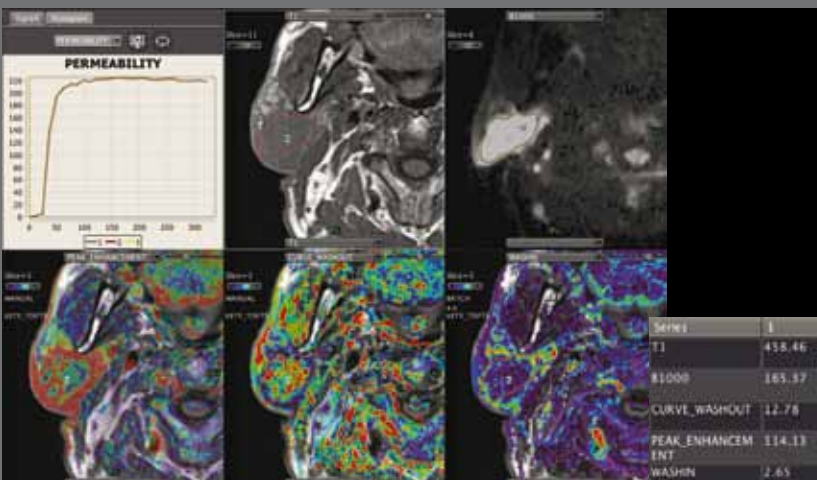


Figure 8: Multiparametric display : T1, B1000, Peak Enhancement, Curve Wash-out, Wash-in and Permeability Curve showing a descending plateau with Wash-out less than 30%

Figure 9: Quantitative values within the area of interest; Peak Enhancement = 114.13 %; Curve Wash-out = 12.78 %; fast Wash-in (slope of the Permeability Curve) = 2.65

## Diffusion-Weighted Images (DWI)

The right parotid mass was highly cellular on DWI with water diffusivity restriction: hypersignal on B1000 gradient and low Apparent Diffusion Coefficient (ADC) values ( $0.8 \cdot 10^{-3} \text{ mm}^2/\text{s}$ ).

## Voxel based analysis ADC/B1000

Using a 3D semi-automated segmentation tool on the hypersignal B1000, the volume of the right parotid mass was assessed at 17.5 cm<sup>3</sup>. The mean value of the ADC in this volume is  $1.1 \cdot 10^{-3} \text{ mm}^2/\text{s}$ .

## Histopathology diagnosis

Complete surgical excision was performed. Histopatohology showed a poorly differentiated parotid carcinoma with no metastatic lymph nodes on the ipsilateral recess (26 n-/26 (all 26 removed lymph nodes were normal)).

## Conclusion

On morphological sequences the aggressive criteria where mild hypointense T2 and superficial parotid fascia blurring. The malignant nature of the lesion was evident based on DCE (perfusion) and DWI (diffusion) criteria and was later confirmed by histological analysis. (Espinoza S. ; Halimi P. Interpretation pearls for MR imaging of parotid gland. Eur Ann Otorhinolaryngol Head Neck Dis. 2013 Feb; 130(1):30-5. doi: 10.1016/j.annorl.2011.12.006. Epub 2012 Jul 20.)



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