

Metastatic pancreatic cancer



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Patient history

A 69-year-old male patient with a metastatic pancreatic cancer was included in a phase 1 study. Pancreatic ductal adenocarcinomas (PDACs) are highly metastatic with poor prognosis, mainly due to delayed detection (Ref. 1). An MRI was performed before and after treatment, including diffusion-weighted imaging (DWI) with 6 b-values (0, 50, 200, 400, 600 and 800 s/mm²). DWI is increasingly employed in liver imaging for multiple reasons: it can add useful qualitative and quantitative information to conventional imaging sequences, it is acquired relatively quickly, it is easily incorporated into existing clinical protocols, and it is a non-contrast technique (Ref. 2).

MRI before treatment

An MRI exam showed multiple liver metastases. In addition to morphological findings, the functional imaging allowed to highlight the heterogeneity of the disease. The imaging showed D map of a liver metastasis in segment 5, with 2 components: the posterior component, which was less necrotic and more cellular than the anterior one (Figure 1). DWI has been investigated as a tool to evaluate tumor response to therapy and potentially predict which lesions will respond to treatment, by providing information regarding tumor viability, cellularity and vascularity (Ref. 2).

MRI after treatment

The metastases were stable after treatment according to RECIST 1.1 criteria (97+90=187 mm vs. 89+84=173 mm, +8%). However, the analysis of the IMV data showed that apparent diffusion coefficient (ADC) and apparent (or measured) diffusion coefficient (D) increased and pseudo diffusion coefficient (D*) and perfusion fraction (f) decreased (Figure 2 a, b). These results suggested that both the cellularity and the perfusion decreased after treatment, which may reflect a response to treatment. Increased ADC is observed within metastatic hepatic lesions following chemotherapy. This change is usually interpreted as a surrogate marker of tumor response to treatment (Ref. 3). The size of the lesion was stable while the IMV parameters changed after treatment suggesting a response to treatment.

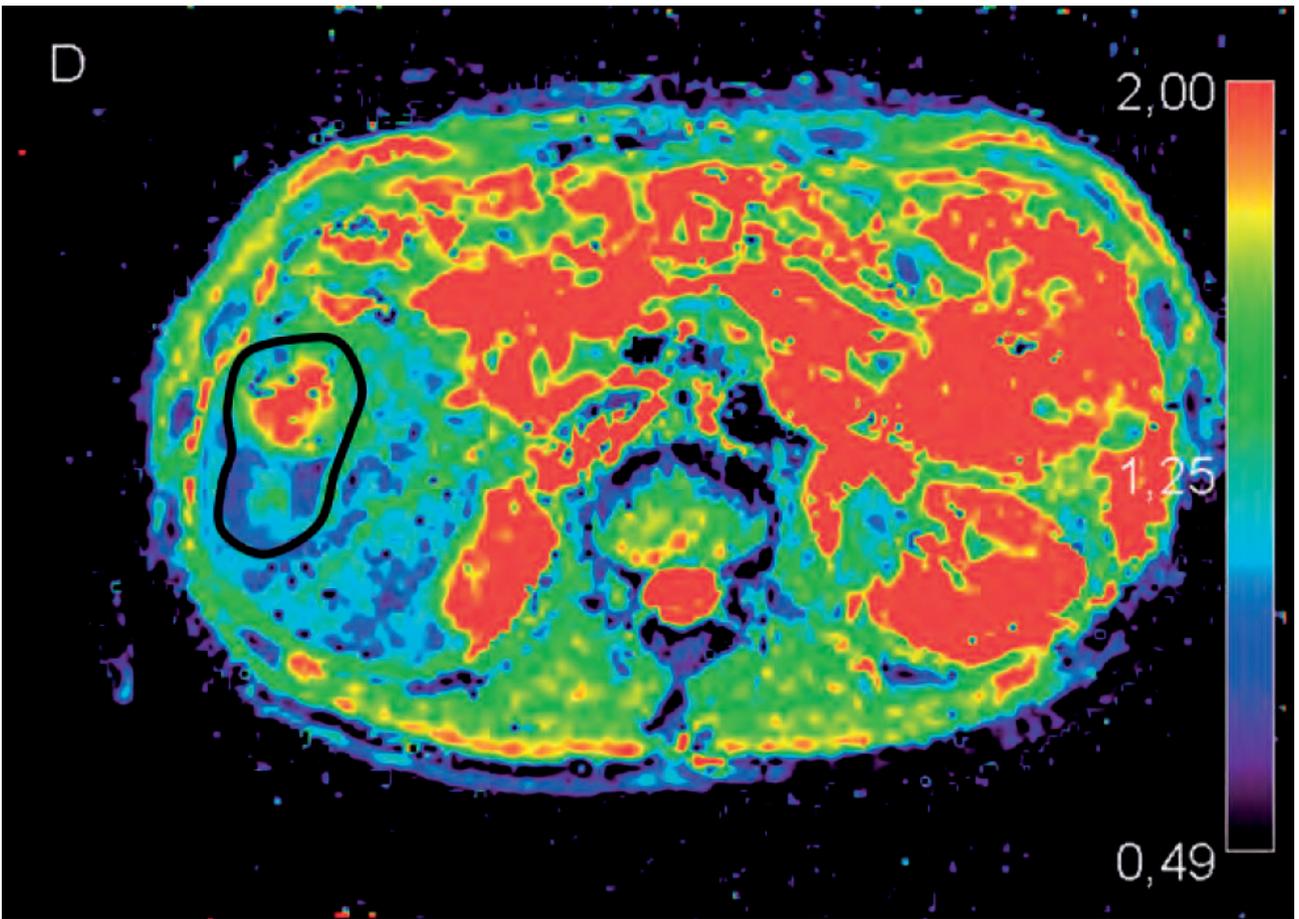


Figure 1 D map of a liver metastasis

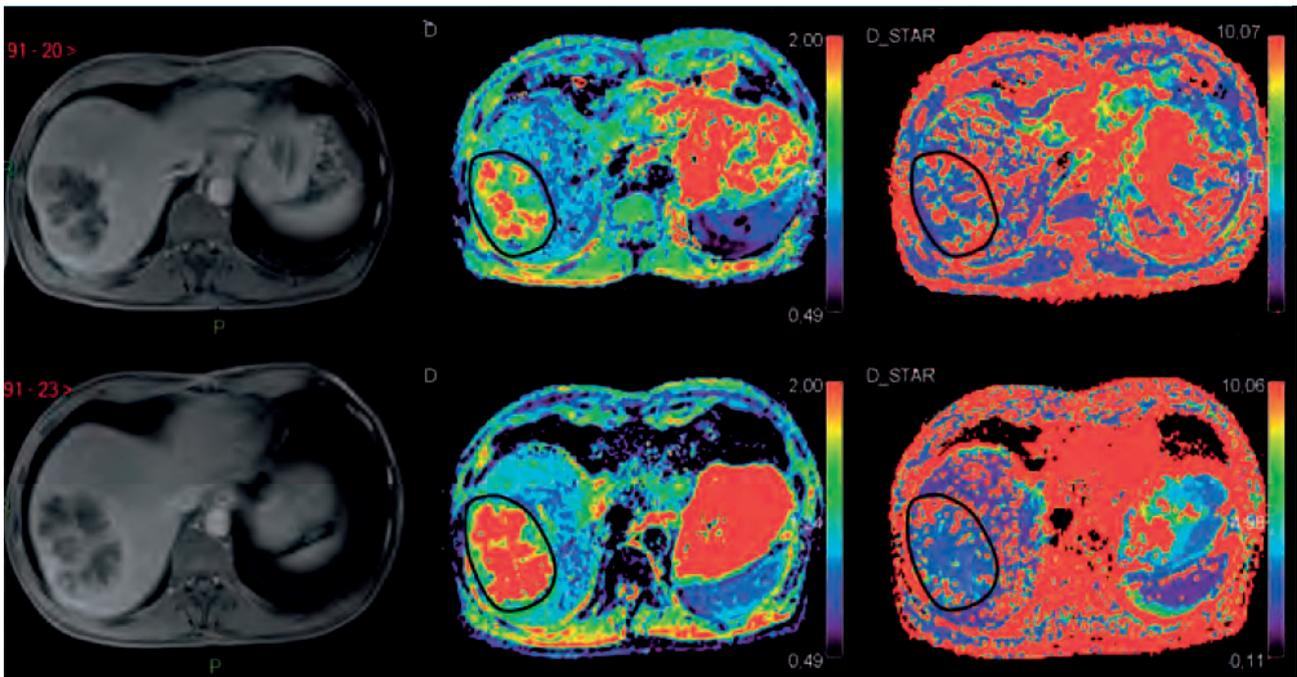


Figure 2a. T1-weighted post-contrast imaging (left column), D map (middle column) and D* map (right column) before (upper row) and after treatment (lower row).

Table1: ADC and IVIM parameters of the 2 target lesions.		
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Lésion 1		
ADC	1,81	2,15
D	1,57	1,96
D*	9,01	6,65
f	0,1	0,07
Lésion 2		
ADC	1,73	1,84
D	1,37	1,54
D*	17,94	6,56
f	0,2	0,14

Figure 2b.

References :

1. Pancreatic cancer exosomes initiate pre-metastatic niche formation in the liver, Bruno Costa-Silva, Nicole M. Aiello, Allyson J. Ocean
2. DIFFUSION-WEIGHTED IMAGING OF THE LIVER: TECHNIQUES AND APPLICATIONS. Sara Lewis, MD, Hadrien Dyvorne, PhD, Yong Cui, MD, and Bachir Taouli, MD
3. Intravoxel Incoherent Motion (IVIM) MR Imaging of Colorectal Liver Metastases: Are We Only Looking at Tumor Necrosis? Melanie Chiaradia, MD, Laurence Baranes, MD, Jeanne Tran Van Nhieu, MD, Alexandre Vignaud, PhD, Alexis Laurent, MD, PhD.

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