Transarterial Chemoembolization (TACE) in Multifocal Primary Liver Cancer Supported by *syngo* DynaPBV Body

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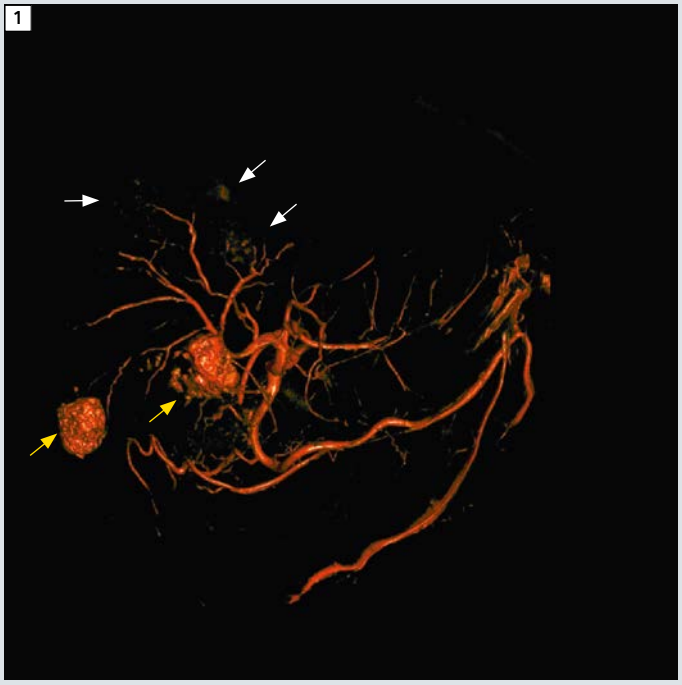

1 3D-reconstruction during arteriography for planning. Post-cTACE imaging of 2 HCCs in segment 5 and 6 (yellow arrows) and 3 hypervascular non-treated HCCs in liver segments 7 and 8 prior to chemoembolization (white arrows).

Patient history

A 65-year-old male with non-specific bilobar liver lesions was referred to our center due to diagnosis of suspected primary liver cancer for complementary examinations and to discuss therapy algorithm.

Diagnosis

First, a detailed laboratory examination showed a chronic hepatitis C virus (HCV) infection. A biopsy of one representative liver tumor was performed during contrast-enhanced ultrasound examination. To assess the extent of liver involvement, a dynamic MRI completed the diagnosis. MR imaging showed a multifocal hepatocellular carcinoma and advanced liver cirrhosis. Both contrast-enhanced ultrasound and MRI of the liver showed HCC-typical characteristics

"*syngo* DynaPBV Body helps us in the definition of perfusion of the tumor, especially in hypovascular metastasis. When we use small particles for TACE of secondary liver tumors we are willing to use *syngo* DynaPBV Body before and after treatment to assess the effectiveness and the safety of TACE."

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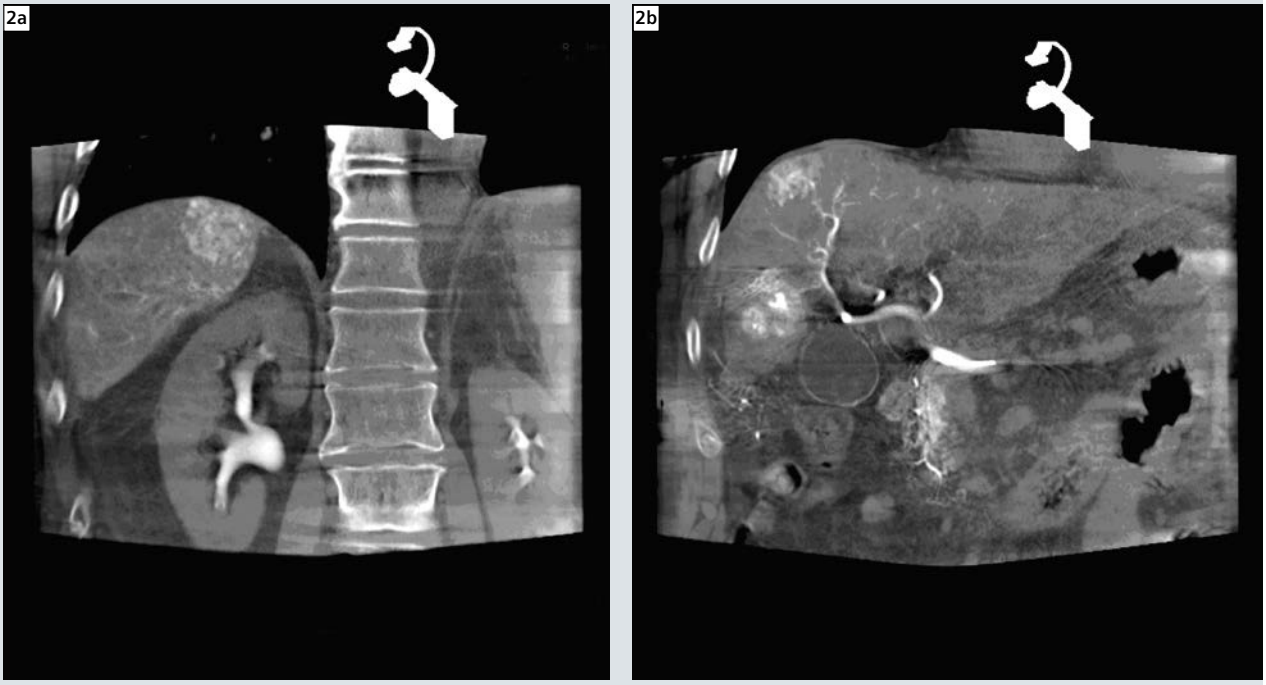
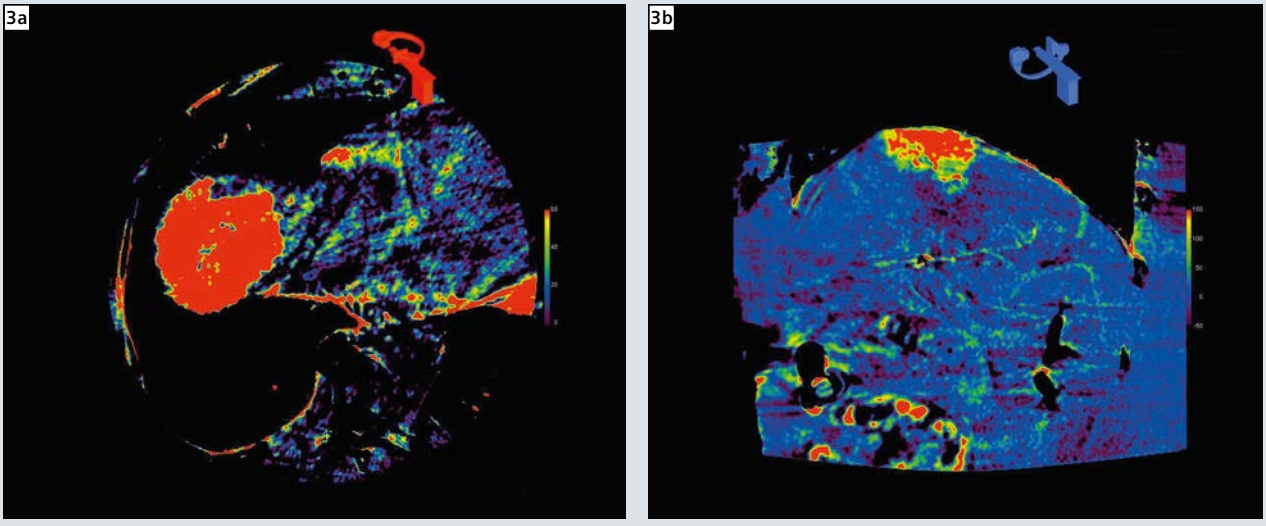


2 *syngo* DynaCT images with hypervascular HCC [a] in segment 7 and [b] in segment 8. Note lipiodol and residual perfusion of the previously treated HCC in liver segment 6.

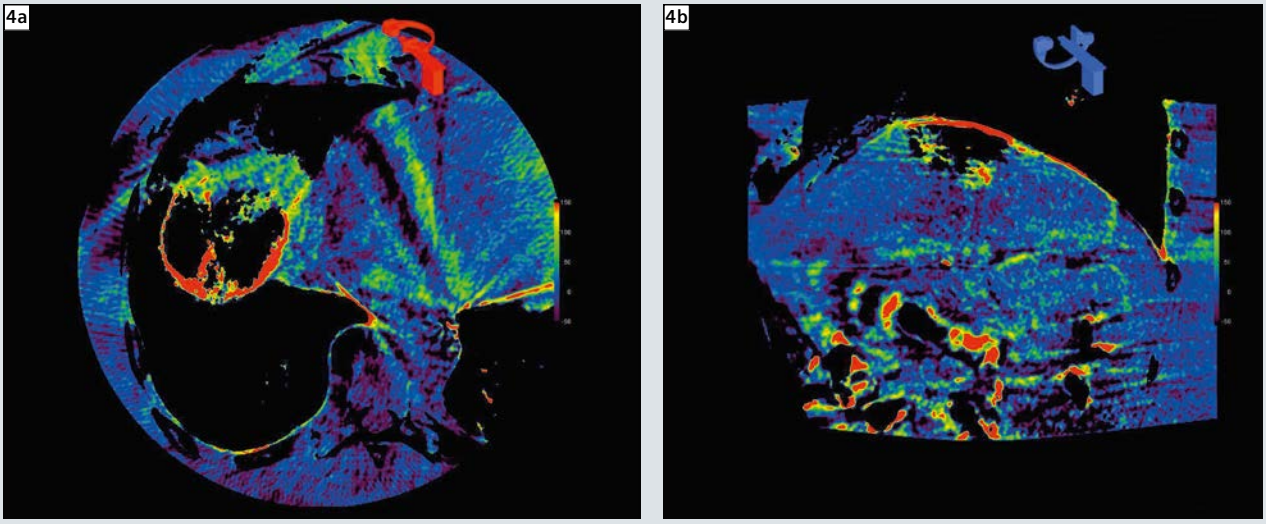
like wash-out phenomenon and "nodule-in-nodule" sign. Finally, the histopathology demonstrated a well differentiated HCC. No ascites or hilar lymph nodes and no extrahepatic disease were noted.

Treatment

In a multidisciplinary tumor board we decided to treat the multifocal HCC in this patient evaluated as Child-Turcotte-Pugh "A" by performing a conventional TACE (cTACE) with farmorubicin and lipiodol. The patient's situation improved with a good partial response after the first cycle of cTACE of 2 hypervascular HCCs in segment 5 and 6 (yellow arrows on fig. 1). Unfortunately, liver function decreased at that time and further cTACE was not longer possible.



3 Blood volume map of a 80 x 65 mm HCC tumor located in the liver dome before cTACE showing an increased and homogenous perfusion of the tumor. No necrotic areas, and normal perfusion of the remaining liver parenchyma.

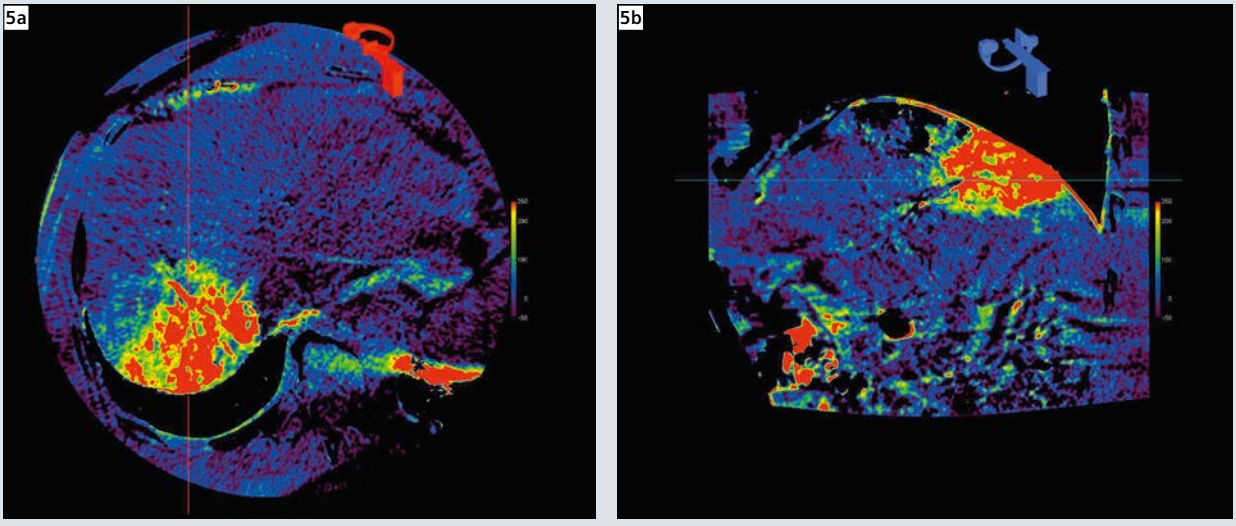


4 Blood volume map of same HCC tumor during cTACE with farmorubicin and lipiodol showing a near complete hypoperfusion of the HCC.

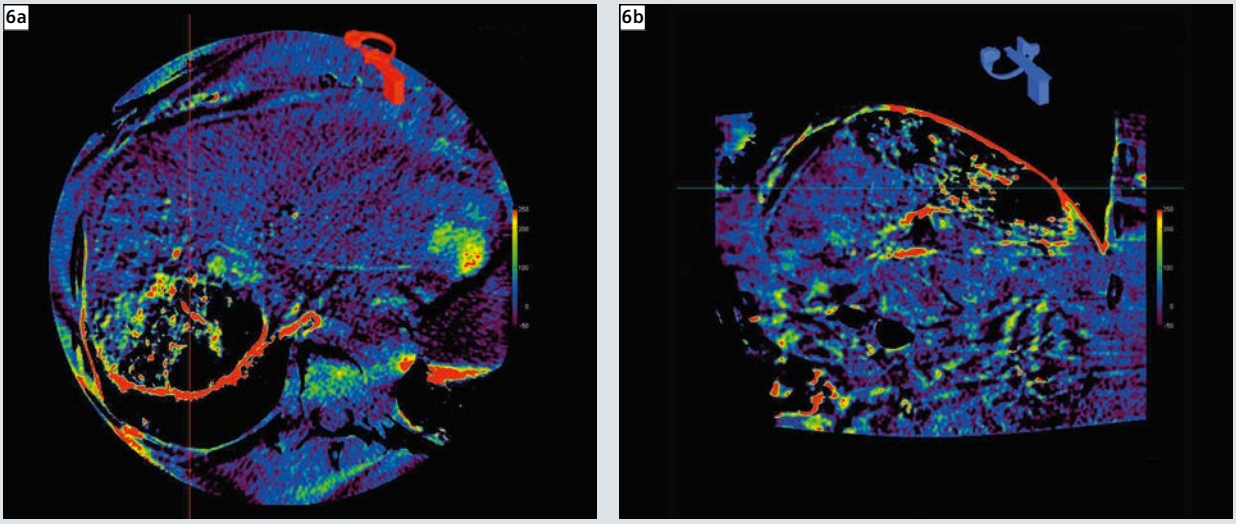
a 4-month interval, cTACE of three HCC in liver segments 7 and 8 was possible with reduced dose of chemotherapeutic agent up to 25 % (white arrows on fig. 1). At follow-up, non-treated HCCs in segment 7 and 8 of the liver showed a local progression. After a further therapy interval, liver function allowed a new cycle of cTACE to treat progredient HCCs in segment 7 and 8 (fig. 2a and 2b). To minimize the adverse effects of further TACE with respect to liver function, we decided to use Parenchymal Blood Volume (PBV) imaging to define an end point for monitoring the course of chemoembolization.

Comments

At the beginning of each cTACE, a blood volume map of the liver was acquired using *syngo* DynaPBV Body functionality. The color-coded cross-sectional images show the hypervascularity of large HCCs (fig. 3a, 3b and 5a, 5b). At the anticipated end point of each chemoembolization, a second blood



5 Blood volume map of a second infiltrative HCC located in the dorsal part of segment 8 and segment 7 before cTACE.



6 Blood volume map of the second HCC after cTACE with devascularization of the tumor.

volume map was acquired to assess vascularization of tumors and tumor perfusion (fig. 4a, 4b and 6a, 6b). The lack of tumor perfusion during chemoembolization led us to stop the treatment, although the classical stasis of contrast medium was not reached. With respect to the reduced liver function in this specific patient, one major aim of the treatment was to limit the amount of cytotoxic drug by assessing the optimal end point of TACE, based on perfusion imaging obtained with *syngo* DynaPBV Body. We also used *syngo* DynaCT images to perform the embolization as selectively as possible.

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