Unusual presentation of melanoma liver metastases superimposed to multiple Focal Nodular Hyperplasia nodules
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Patient: 47 years, female

Clinical History:

Unusual case of well known multiple focal nodular hyperplasia (FNH) foci colonized by haematogenous spread of melanoma metastases in a young woman previously operated for cutaneous melanoma. Morphological change of FNH appearance at Spiral CT and pathogenesis of “hidden” metastatic melanoma lesions, almost exclusively located within multiple FNH, are described.

Imaging Findings:

A 47-year-old female underwent resection of a cutaneous melanoma of the right arm in 2001. A pre-operative abdominal CT had revealed multiple areas of FNH located in segment II, IV and VII of the liver. Post-operative follow-up included lymphatic drainage areas (i.e neck and groin) and liver examined by ultrasound (US) every year and total-body CT every two years. In 2003, US examination confirmed three FNH nodules with hypoechoic or slightly hyperechoic pattern, the largest one (located in segment VII) showing the typical central scar. Colour Doppler and contrast-enhanced US examination (Sonovue, Bracco®) added further informations on lesions vascularity. A subsequent abdominal CT scan confirmed the multiple liver FNH lesions (Fig. 1a,b). On February 2005, US liver and neck examination demonstrated a change in morphology of FNH foci and an enlarged right laterocervical lymph node, which was resected: histology of the resected specimen revealed a melanoma metastasis. On March 2005 an abdominal triple phase contrast-enhanced spiral CT examination (Iomeron 350 Bracco®) confirmed a clear change in enhancement pattern of the three foci of FNH showing multiple hypodense areas within the hypervascular lesions: the FNH lesions had been colonized by multiple tiny hypodense nodules with a pattern typically referable to haematogenous melanoma metastases diffused through by the arterial route; only a single metastasis measuring 1 cm was located outside the FNH in segment VI (Fig. 2a,b,c,d). Liver biopsy and cytological examination of the specimen confirmed the diagnosis of melanoma metastases superimposed to FNH foci.

Discussion:

FNH is a benign liver lesion histologically composed of hyperplastic liver parenchyma, with normal hepatocytes, characterized by a fibrous central stellate scar which divides the lesion into lobules. When present, the central scar is pathognomonic: it appears in 35% of nodular lesions <3 cm and in 65% of nodular lesions >3cm [1-3]. FNH usually appears as a single (77%) well circumscribed lesion without a capsule and large in size (average size 4 cm; range 1-11 cm) [3]. The hyperplastic process, generating the FNH nodule, is considered to be secondary to increased local arterial flow compensating an impaired local portal blood flow, primarily due to an anomalous artery.
without the corresponding portal vessel or secondary to portal vein thrombosis or to arteriovenous malformations. The regenerative hyperplasic response can later evolve into fibrosis, assuming the feature of the central scar. The peculiarity of our case was a change in morphology and size of FNH foci, during the follow-up of a patient operated for cutaneous melanoma. The whole normal liver usually provides a fertile terrain in which metastases can establish, not only because of its reach dual blood supply but also because of humoral factors that promote cells growth. The fenestrations in the sinusoidal endothelium allow a foothold in the space of Disse for tumour emboli arriving via the bloodstream. In our patient, the arterial hyperaemia of FNH induced an almost exclusive melanoma cells insemination within the FNH lesions, attracted by a strong “sump effect” during the haematogenous metastatic arterial spread. Malignant lesions located within FNH may not be demonstrated radiologically because they can have the same attenuation on pre-contrast scans and may enhance in a similar fashion. In cases such as Ewing’s sarcoma or rectal adenocarcinoma [4,5] metastasizing into FNH, the change in morphology can be detected suddenly, due to the usual hypovascular pattern of these metastases, contrasting with the hyperdense host lesion. On the contrary, the possibility to miss an occult liver melanoma metastasis “guest” of a hypervascular benign lesion is higher, due to the higher frequency of a hypervascular pattern in melanoma metastases. On arterial phase enhanced CT these vascular metastases can show intense enhancement or a homogenous enhancement compared with the surrounding liver with a tiny hyperattenuating rim. On portal venous phase CT they can be detected due to their appearance as hypoattenuating lesions or by detecting a hypoattenuating ring at the periphery of hypervascular metastases during the delayed phase. In conclusion, patients with known hypervascular benign lesions warrant careful follow-up, with in-depth morphologic monitoring to avoid missing hidden metastases superimposed on the benign hypervascular lesions. Radiologists reading liver CT studies should be aware of the possibility of benign “hosting malignant” lesions, and carefully compare the ultimate findings with the previous pattern to monitor any possible change in the enhancement morphology of the “background” lesion. **Differential Diagnosis List:** Melanoma liver metastases superimposed to multiple Focal Nodular Hyperplasia nodules

**Final Diagnosis:** Melanoma liver metastases superimposed to multiple Focal Nodular Hyperplasia nodules

**References:**


Description: Fig. 1a: Spiral CT in arterial phase showing three foci of FNH (segments II, IV and VII) with typical hypervascular pattern in arterial phase. Origin:

Description: Fig. 1b: Spiral CT in portal venous phase showing three foci of FNH (segments II, IV and VII) with minimal central wash-out. Origin:
**Figure 2**

*a*  
Description: Fig.2a: Spiral CT in arterial phase obtained in March 2005, showing multiple hypodense metastatic lesions almost exclusively located within the three foci of highly hypervascular FNH.  

*b*  
Description: Fig.2b: Spiral CT in portal venous phase obtained in March 2005, showing multiple hypodense metastatic lesions almost exclusively located within the three foci of highly hypervascular FNH.
Description: Fig. 2c: Spiral CT in delayed phase obtained in March 2005, showing multiple hypodense metastatic lesions almost exclusively located within the three foci of highly hypervascular FNH. Origin:

Description: Fig. 2d: Spiral CT in portal venous phase obtained in March 2005, showing a single metastasis measuring 1 cm located outside the FNHs in segment VI. Origin: