

The “Target sign” and the “Lollipop sign” in hepatic epithelioid hemangioendothelioma

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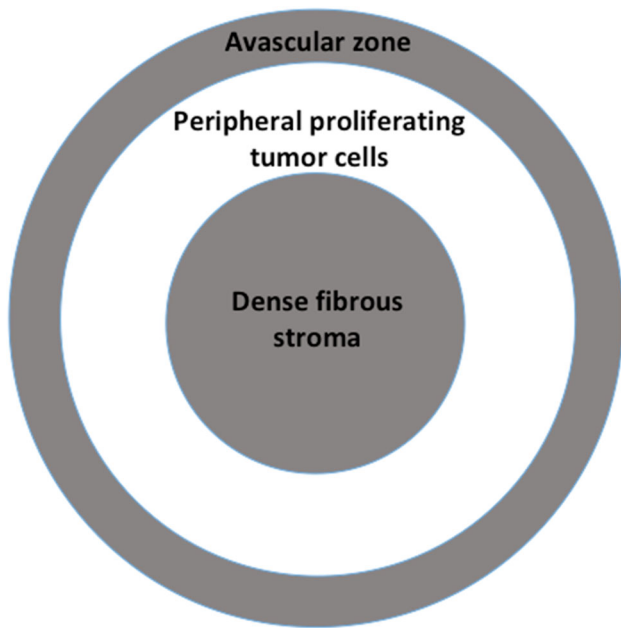
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The “Target sign” and the “Lollipop sign” are characteristic radiological findings of Hepatic Epithelioid Hemangioendothelioma (HEH) described in contrast-enhanced CT and MR imaging. HEH is a rare liver tumor of vascular origin, with relatively specific imaging characterized by peripheral location of the nodules, capsular retraction, coalescence of multiple lesions, a target-like appearance, and the “Lollipop sign.”

The “Target sign” is generated by a more sclerotic-fibrous center, a layer of cellular proliferation, and a peripheral narrow avascular zone between the tumor nodules and liver parenchyma caused by tumor infiltration and occlusion of hepatic sinusoids and small vessels (Fig. 1). This configuration with concentric rings of varying attenuation/intensity gives a stratified pattern to the hepatic lesion which resembles a “target” [1].

MRI is the best technique for lesion characterization with evidence of the target sign in particular on T2-weighted images as well as the dynamic study [2]. On T2 images, a target appearance consists of a core with high signal intensity (similar to fluid), a thin ring with low signal intensity, and a peripheral halo with slight hyperintense signal. On dynamic study, it consists of an hypodense/hypointense core, surrounded by a layer of enhancement and a thin peripheral hypodense/hypointense halo (Figs. 2,3).

The “Lollipop sign” (Fig. 4) is a combination of two structures: the well-defined tumor mass on enhanced images (the candy in the lollipop) and the adjacent occluded vein (the stick), because HEH has the tendency to spread within the portal and hepatic vein branches (Fig. 5) [3]. The vein should terminate smoothly at the



edge or just within the rim of the lesion; vessels that traverse the entire lesion or are displaced and collateral veins cannot be included in the sign.

The “Target sign” and the “Lollipop sign” are specific findings of HEH but they can also be seen in other entities. In particular, differential diagnosis for the imaging appearance of HEH includes peripheral cholangiocarcinoma, abscesses, and liver metastases from various primary cancers (such as breast and colon cancer). In this context, key differentiating features are

Fig. 1. Schematic illustration of three-layered “target sign” in HEH. The central dense fibrous myxoid stroma with necrotic areas is surrounded by peripheral proliferating tumor cells. The outer narrow rim corresponds with the peripheral avascular zone caused by vascular infiltration or occlusion of hepatic sinusoids and small vessels.

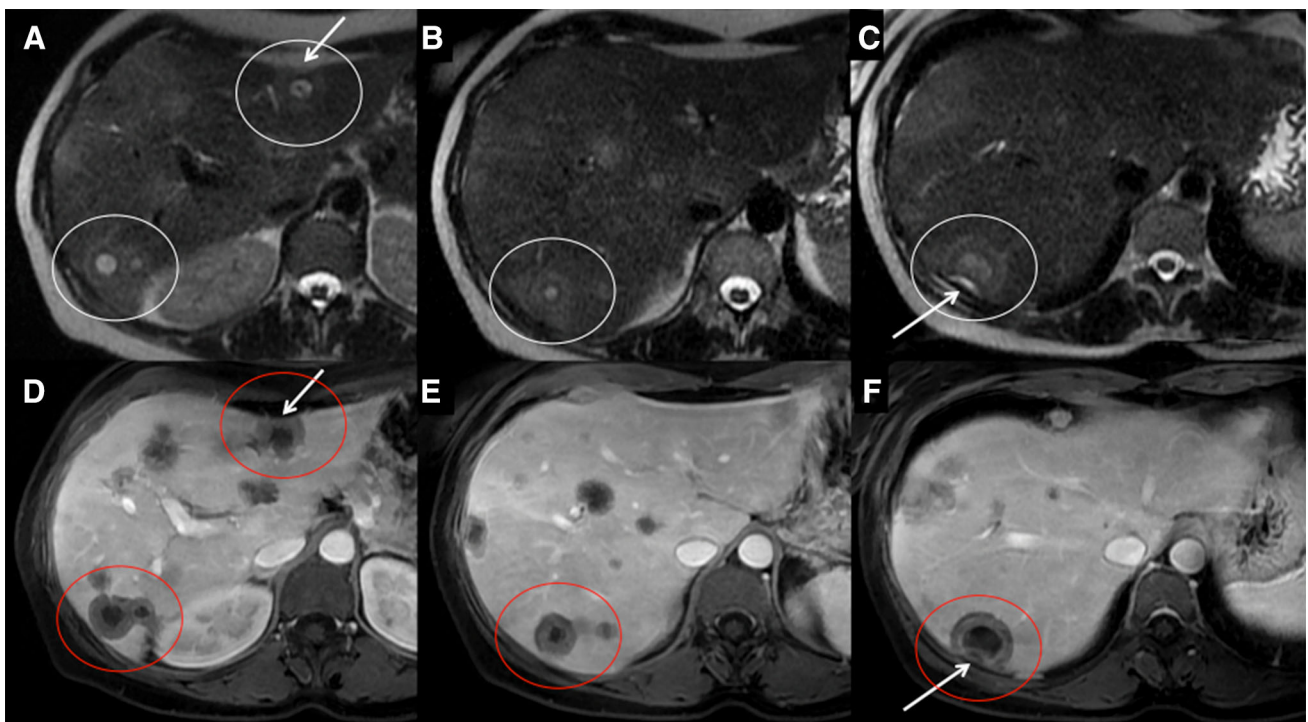


Fig. 2. MRI of a 43-year-old female with HEH. HEH nodules show a three-layered target appearance (white circles) on T2-w images (A–C). After contrast medium administration, these

nodules show a “target sign” (red circles) on portal phase post-contrast T1-w sequence as well (D–F). Please note the capsular retraction (white arrows).

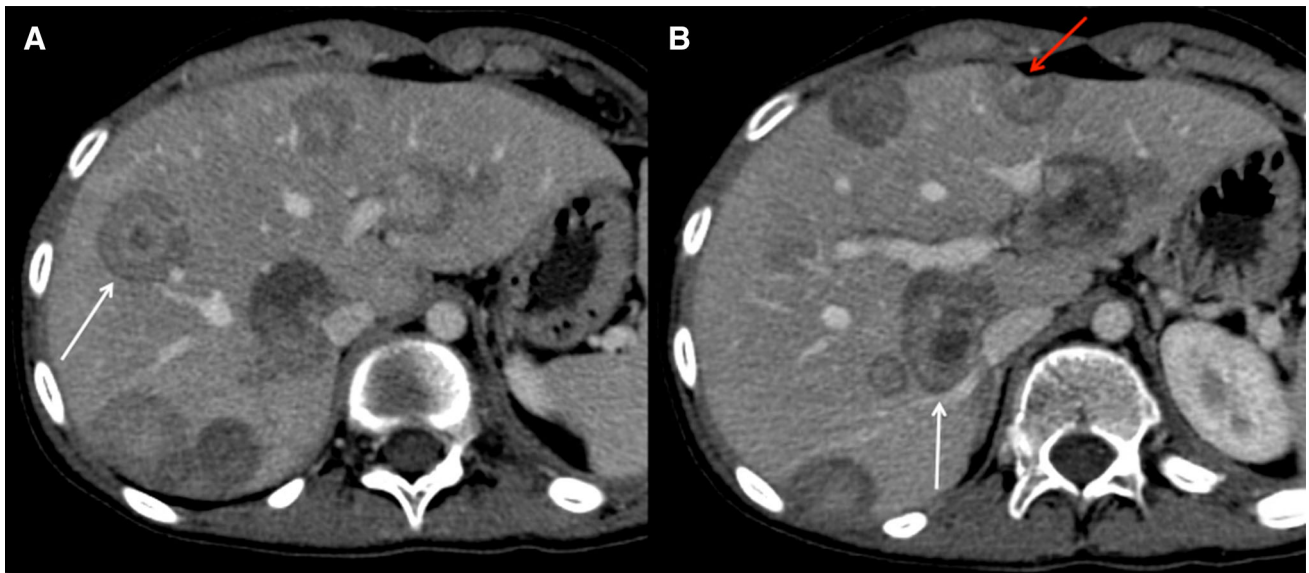


Fig. 3. A 15-year-old female with HEH. CT axial images on portal phase (A, B) exhibit multiple nodules showing a “target pattern” (white arrows). Please note the peripheral location of

the lesions, the capsular retraction (red arrow), and the coalescence of multiple lesions.



Fig. 4. Image of a lollipop.



Fig. 5. Contrast-enhanced multiplanar reconstruction images on CT (A–C) and MR (D) show HEH nodules with hepatic or portal veins entering and terminating in the periphery of the lesion (circles). This configuration resembles a lollipop.

the peripheral location of the nodules, the capsular retraction, and the tendency to show coalescent multiple lesions.

Compliance with ethical standards

Funding No funding was received for this study.

Conflict of interests The authors declare that they have no conflict of interests.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent Statement of informed consent was not applicable since the manuscript does not contain any patient data.

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