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Imaging Approach to Liver Mass
Part 2: Liver Mass with Underlying Chronic Liver Disease

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Three liver nodules that need to be considered in patients with underlying chronic liver disease are as following:

1. Benign regenerating nodules
2. Benign dysplastic nodules
3. Malignant hepatocellular carcinomas (HCC)

At present time, Ultrasonography (US) is the recommended screening imaging modality to detect liver nodules in chronic liver disease. However, the best imaging modality to characterize these 3 nodules is MRI (Magnetic Resonance Imaging)[1,2].

1. Benign regenerating nodules (Figure 1, 2)

At US, regenerating nodules are either hypo- or hyper-echoic. Sometimes, US shows heterogeneous echotexture of the liver without definite mass. At MRI,

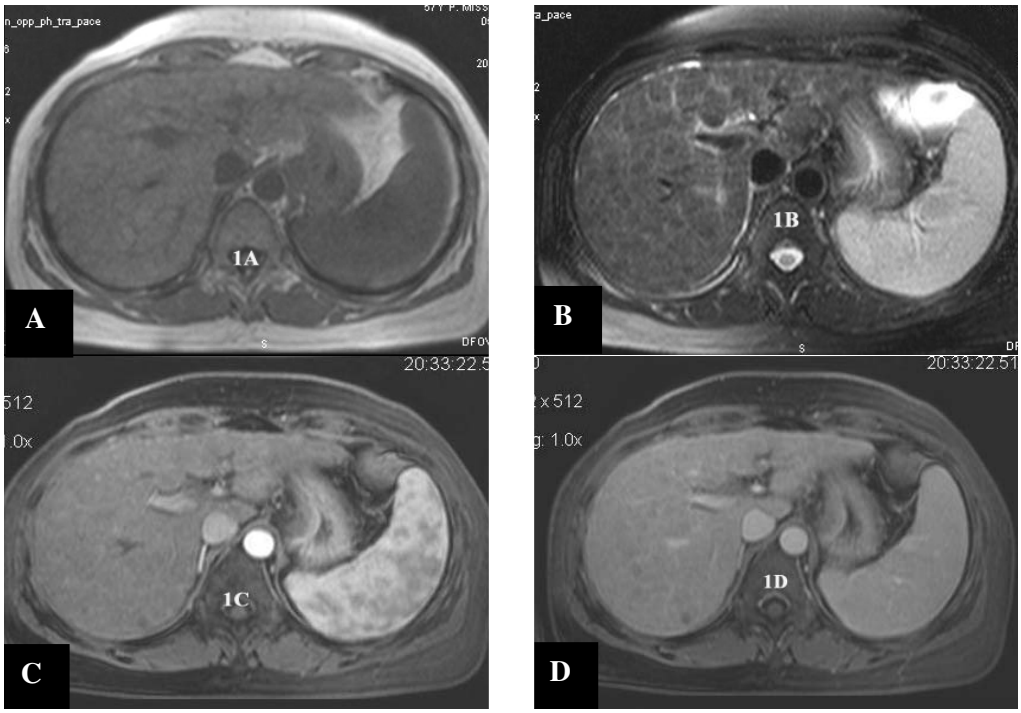

Figure 1. Benign regenerating nodules
A: T1W MRI shows diffuse small nodules of low- to iso-signal intensity.
B: T2W MRI shows nodules to be relatively low signal intensity with surrounding thin band of high signal intensity fibrosis.
C: Hepatic arterial phase T1W MRI shows no evidence of enhancement.
D: Portal venous phase T1W MRI shows no evidence of rapid washout

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benign regenerating nodules show low- to iso- signal intensity to the liver parenchyma and without definite enhancement (Figure 1A-D). Thin band of fibrosis surrounding these benign nodules usually show high signal intensity at T2W. Siderotic nodules, the regenerating nodules which contain abundant iron, show signal drop at both T1W and T2W secondary to iron effect[3] (Figure 2).

2. Benign dysplastic nodules (Figure 3)

Even though dysplastic nodules are benign, they are considered premalignant and eventually will develop into HCC, although the dormant period is not clearly determined[4]. US is not specific for dysplastic nodules and MRI is usually needed to determine its nature. At MRI, dysplastic nodules usually show high SI at T1W, low SI at T2W and without definite arterial enhancement after gadolinium. High SI at T1W is probably secondary to intra-lesional copper component[5].

3. Malignant hepatocellular carcinoma (Figure 4)

Small HCC is defined as a lesion of ≤ 2 cm. It is

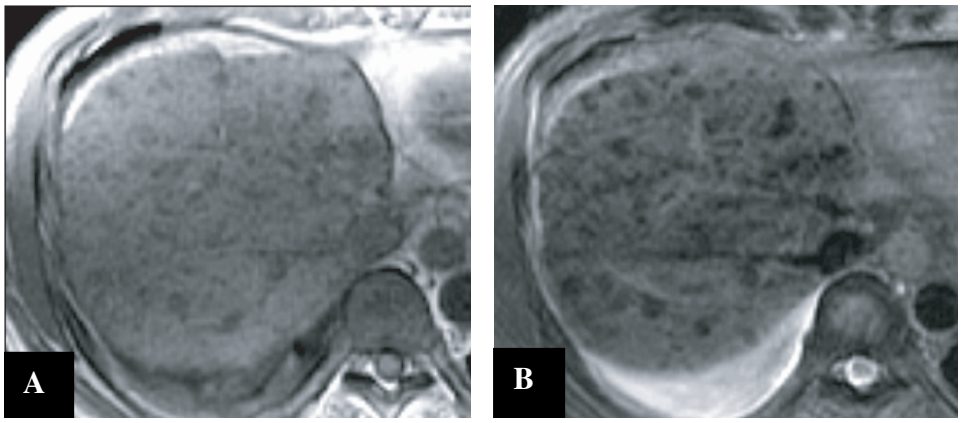

Figure 2. Benign siderotic nodules
Both T1W (A) and T2W (B) shows diffuse low signal intensity nodules secondary to effect of intracellular iron.

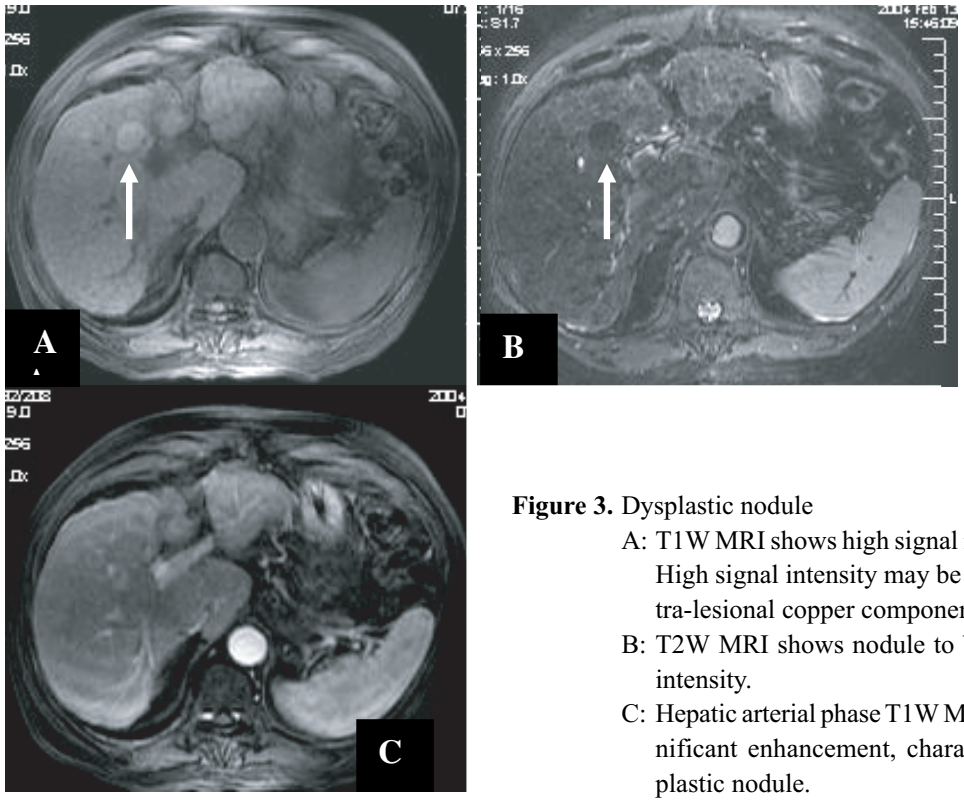

Figure 3. Dysplastic nodule
A: T1W MRI shows high signal intensity nodule. High signal intensity may be secondary to intra-lesional copper component.
B: T2W MRI shows nodule to be of low signal intensity.
C: Hepatic arterial phase T1W MRI shows no significant enhancement, characteristic of dysplastic nodule.

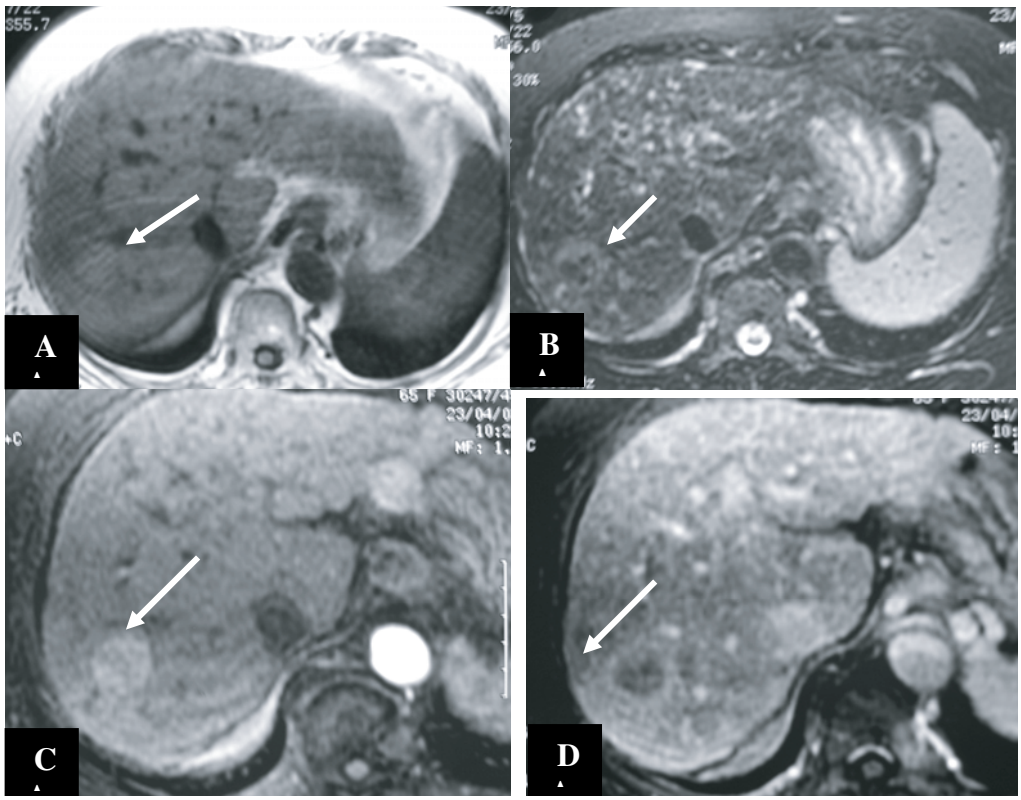

Figure 4. Small HCC
A: T1W MRI shows a 2 cm. mass of slightly high signal intensity.
B: T2W MRI shows the mass to be of heterogeneous high signal intensity.
C: Hepatic arterial phase T1W MRI shows the mass to be of hypervascularity.
D: Portal venous phase T1W MRI shows rapid washout, characteristic for HCC.

important to detect small HCC because treatment is the most effective with high 5-year survival rate when the tumor is small[6]. MRI is currently the best imaging modality to diagnose small HCC. At T1W, the tumor can be either low- or high- signal intensity, but T2W usually shows the mass to be of high signal intensity. Most important MRI feature is that the tumor enhances at arterial phase and shows rapid washout at portal venous phase.

CONCLUSION

1. It is important to have a good clinical history in order to analyze liver mass based upon imaging findings.

2. One of the common clinical scenarios is small liver nodule with underlying chronic liver disease.

3. Three nodules that need to be distinguished in this scenario are benign regenerating nodules, benign dysplastic nodules, and small HCCs.

4. Detection of small HCCs is important because it yields high 5-year survival rate after treatment.

5. MRI is usually the best imaging modality to characterize these lesions.

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