

Imaging Approach to Cystic Liver Lesions

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Cystic liver lesions are common findings in daily practice detected by US, CT, or MRI. In certain situation, diagnostic conclusion may be a challenge. This article is presented as a practical approach to cystic liver lesions, in order to help us reaching the diagnosis as fast and accurate as possible. In this approach, cystic liver lesions are divided into 2 categories; solitary cystic lesions, and multiple cystic lesions.

Solitary cystic liver lesions

Solitary cystic liver lesions are classified into neoplastic and non-neoplastic groups. Common neo-

plastic group in adults includes biliary cystic tumor, cystic form of intraductal papillary mucinous tumor of bile duct (IPMT-B), and other necrotic tumors. Common non-neoplastic group includes hepatic simple cyst, and liver abscess. Key features that help diagnosing these diseases involve both clinical and imaging findings⁽¹⁾. Summary of these key features are shown in Table 1.

Hepatic simple cyst (Figure 1)

Hepatic simple cyst is a benign, congenital or developmental lesion, derived from biliary epithelium

Table 1. Key features of solitary cystic liver lesions.

Diseases	Clinical	CT/MRI
Hepatic simple cyst	Asymptomatic	Homogeneous, round, no wall, no enhancement
Liver abscess	Fever, sepsis	Presence of air, enhancing wall, hyperemia
Biliary cystic tumor	Middle-aged female	Multiseptations, mural nodules, calcification, variable SI
Cystic form of IPMT-B	Male = Female	Multiloculated, papillary projections, communication to bile ducts
Other necrotic tumors	Symptomatic	Irregular rim enhancement, solid with central necrosis



Figure 1. Solitary simple cyst of the liver. CT shows a homogeneous, round-shaped cyst without enhancement and imperceptible wall.

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that does not communicate with the biliary tree⁽²⁾. This simple cyst is usually discovered incidentally without symptoms. Hepatic simple cyst may present as a single cyst or multiple cysts. At CT/MRI these simple cysts show water density/SI, round-shape, imperceptible wall, and without enhancement.

Liver abscess (Figure 2)

Liver abscess is a localized collection of pus, associated with destruction of liver parenchyma and stroma⁽²⁾. It is commonly caused by pyogenic infection. However, in certain endemic areas, amebic, and hydatid cystic liver abscesses need to be considered. Fungal liver abscess tends to occur in immunocompromised host. At CT/MRI liver abscess shows rim

enhancement with surrounding hyperemia. Presence of air is rare, and suggests air-forming organism. Coalescence of small abscesses may be found, particularly in pyogenic liver abscess.

Biliary cystic tumor (Figure 3)

Biliary cystic tumor is often found in middle-aged female. It is considered to be premalignant or malignant tumor, and surgical removal is always recommended⁽³⁾. At CT/MRI, biliary cystic tumor shows cystic mass with internal septations, wall calcification, and mural nodules. Cyst component shows variable SI at MRI depending on cystic content, which may be a mixture of mucinous, serous, or hemorrhagic fluid. Both CT and MRI are not able to definitely distin-

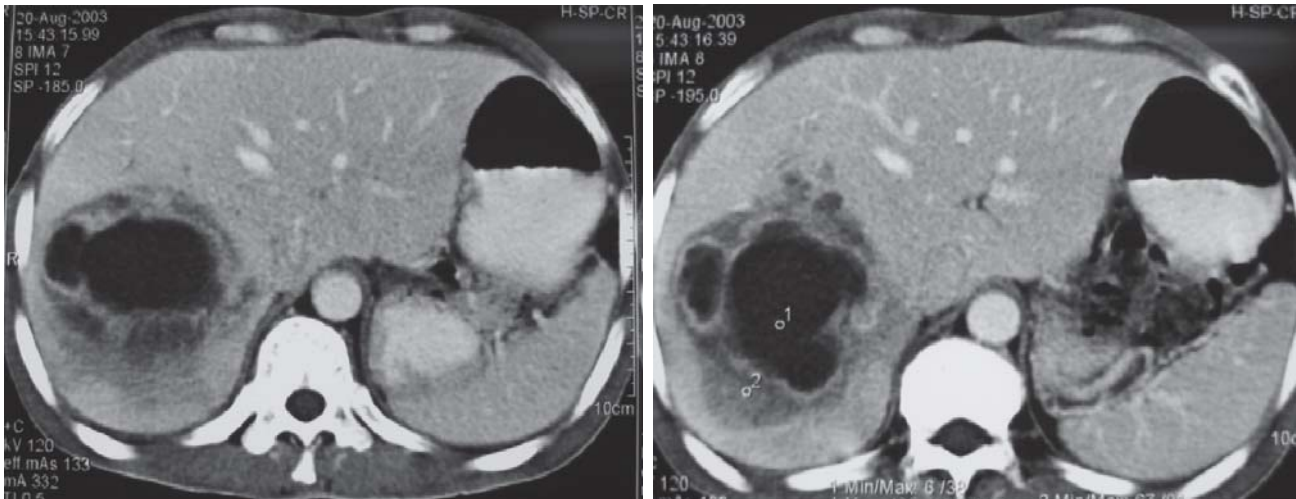


Figure 2. Liver abscess. CT shows thick wall cyst with rim enhancement, surrounding edema and hyperemia.

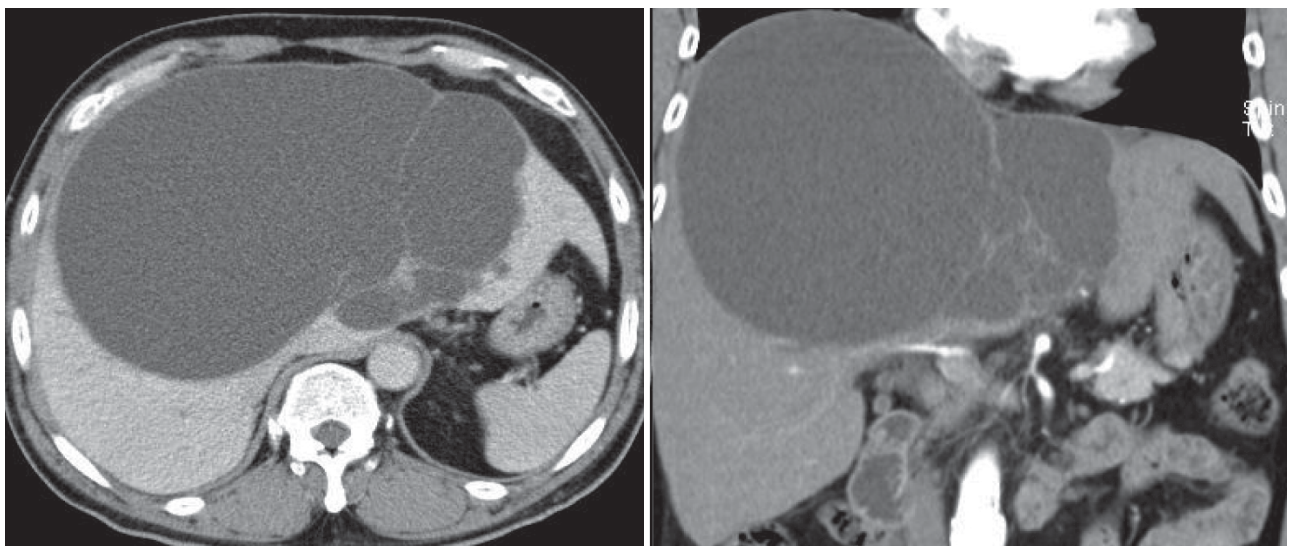


Figure 3. Biliary cystadenoma. CT shows a large multiloculated cyst with fine internal septations.

guished benign (biliary cystadenoma) from malignant counterpart (biliary cystadenocarcinoma). In general, the more solid mural nodules, the higher the chance of being malignant.

Cystic form of intraductal papillary mucinous tumor of bile duct (IPMT-B) (Figure 4)

IPMT-B is characterized by the presence of intraluminal papillary tumors with fibrovascular cores in the dilated bile ducts. Excessive mucin produced by neoplastic cells may cause cystic dilatation⁽⁴⁾. IPMT-B may be a counter part of IPMT of the pancreatic duct⁽⁴⁾. At CT/MRI, it shows multiloculated appearance with highly vascular papillary projections⁽⁵⁾. The cystic mass of IPMT-B may show similar CT/MRI

appearance to biliary cystic tumor. The key differentiation is that IPMT-B usually communicates with biliary tree, but biliary cystic tumor does not⁽⁶⁾.

Other necrotic tumors (Figure 5)

Primary malignant liver tumor, such as HCC or cholangiocarcinoma, may show extensive necrosis with cystic degeneration. CT/MRI usually shows dominant irregular solid tumor with central necrosis or cystic change, which is different from predominant cystic appearance of other cystic tumors.

Multiple cystic liver lesions

Multiple cystic liver lesions are also classified into neoplastic and non-neoplastic groups. Neoplastic group

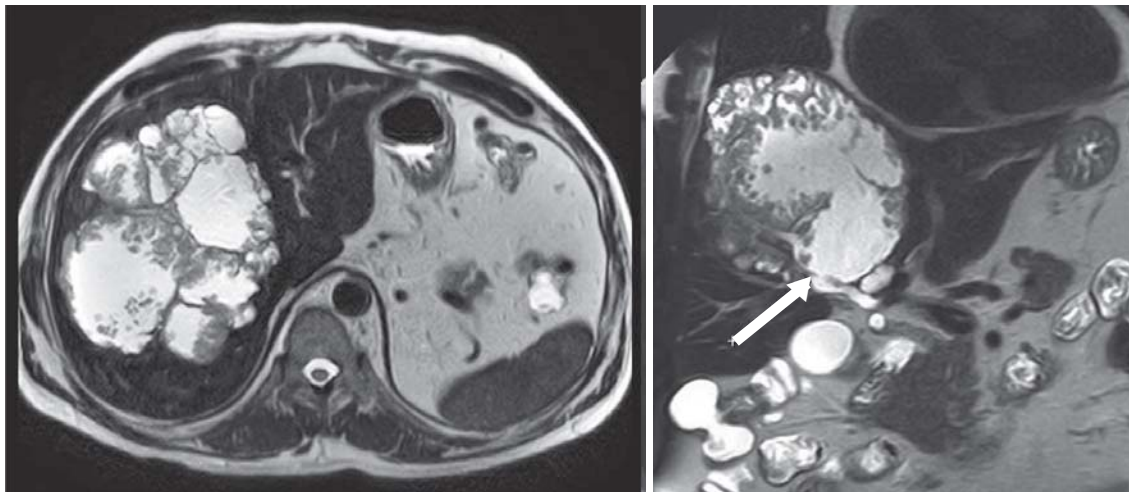


Figure 4. Cystic form of IPMT-B. T2W MRI shows a multiloculated cyst with papillary projections, and possible communication with RHD (arrow).

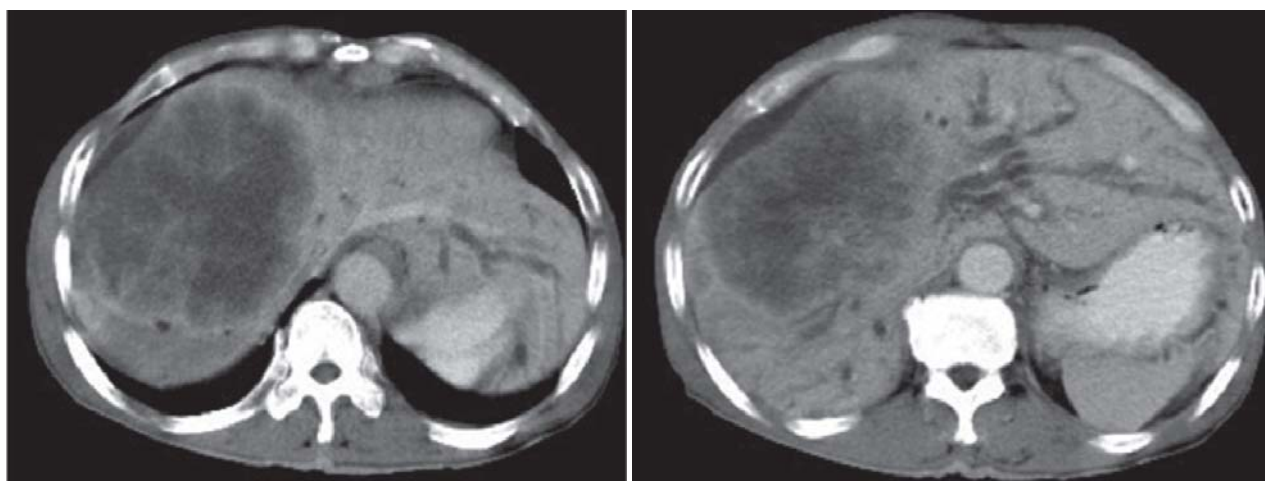


Figure 5. Necrotic cholangiocarcinoma. CT shows a large mass with irregular rim enhancement. The mass causes obstruction and dilatation of the upstream intrahepatic bile ducts.

Table 2. Key features of multiple cystic liver lesions.

Diseases	Clinical	CT/MRI
Multiple simple cysts	Asymptomatic	Homogeneous, round, no wall, no enhancement, various sizes
Polycystic liver disease	Co-existing renal cysts (ADPLD)	Homogeneous, round, no wall, no enhancement
Bile duct hamartoma	Asymptomatic	Homogeneous, \pm rim enhancement, all cysts less than 1.5 cm
Cystic metastasis	Known primary tumor	Irregular rim enhancement, multiple

is usually cystic metastasis. Common non-neoplastic group includes multiple simple cysts, polycystic liver disease, and bile duct hamartoma (von Meyenberg complex). Key features that help diagnosing these diseases involve both clinical and imaging findings⁽¹⁾. Summary of these key features are shown in Table 2.

Multiple simple cysts

Simple hepatic cysts are often manifested as multiple lesions. However, their clinical feature and CT/MRI appearance are the same as solitary hepatic cyst, described above.

Polycystic liver disease (Figure 6)

Cysts in ADPLD are similar to simple hepatic cysts. It is a hereditary disease with autosomal dominant transmission⁽²⁾. Co-existing renal cysts are usually observed.

Bile duct hamartoma/von Meyenberg complex (Figure 7)

Bile duct hamartoma is a benign malformation of which the embryonic bile ducts fail to involute⁽²⁾. They are usually asymptomatic and found incidentally. At CT/MRI, these numerous cysts are small, less than 1.5 cm. They are round, homogeneous and may show rim enhancement.

Cystic metastasis (Figure 8)

Liver metastases may appear cystic secondary to necrosis, hemorrhage, or mucinous content. History of primary tumor usually presents. At CT/MR, the lesions are usually multiple, showing solid component and irregular rim enhancement.

Conclusions

1. Cystic liver lesions are not uncommon in clini-



Figure 6. Polycystic liver disease. Coronal CT shows innumerable cysts of various sizes involving both liver and kidneys.

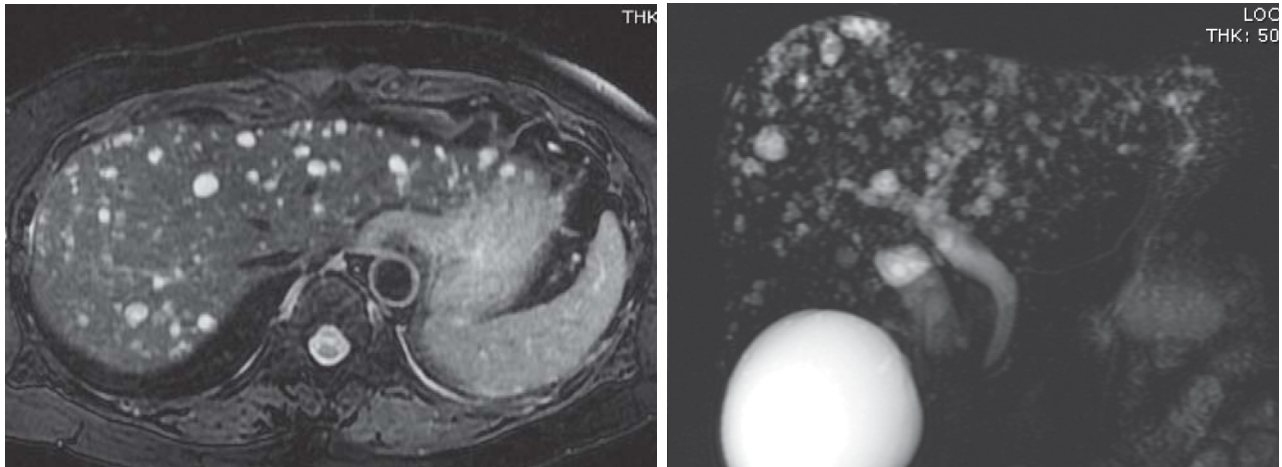


Figure 7. Bile duct hamartoma/von Meyenberg complex. T2W MRI and MRCP show innumerable small cysts scattering throughout the liver. Note a well-distended GB in the MRCP image.

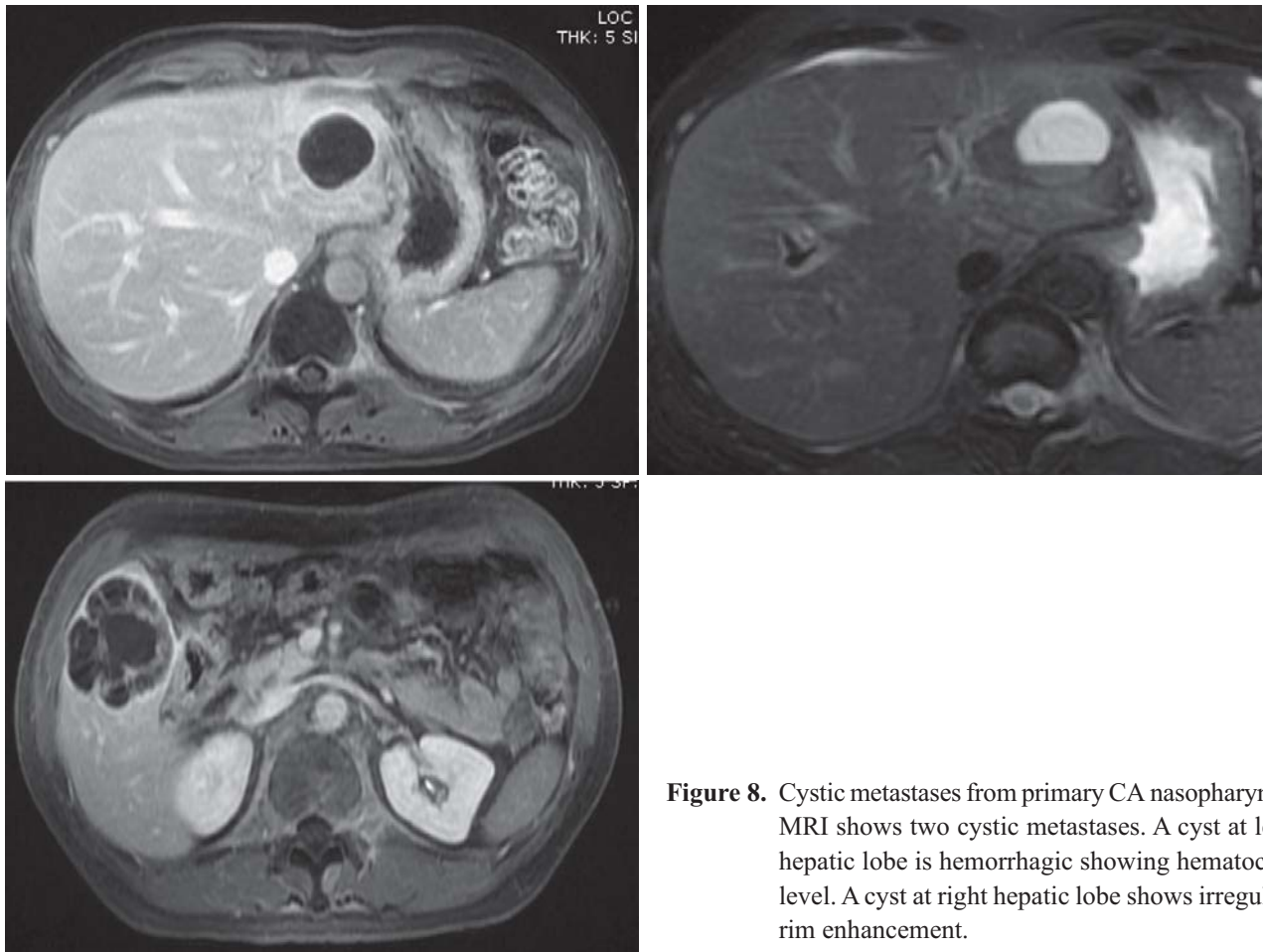


Figure 8. Cystic metastases from primary CA nasopharynx. MRI shows two cystic metastases. A cyst at left hepatic lobe is hemorrhagic showing hematocrit level. A cyst at right hepatic lobe shows irregular rim enhancement.

cal practice.

2. Practical imaging approach is needed for quick and accurate diagnosis.

3. In this approach, lesions are divided into solitary cystic lesions, and multiple cystic lesions. Both

are subcategorized into neoplastic and non-neoplastic groups.

4. Common solitary cystic neoplasms include biliary cystic tumor, cystic form of IPMT-B, and other necrotic tumors.

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5. Common solitary non-neoplastic cysts include simple hepatic cyst, and liver abscess.

6. Common multiple cystic neoplasms are usually cystic metastasis.

7. Common multiple non-neoplastic cysts include multiple simple cysts, polycystic liver disease, and bile duct hamartoma/von Meyenberg complex.

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