REVIEW

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Radiologic Pearls for Internists: A Case-Based Review

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ABSTRACT

Modern technologic advances in medical imaging and the increasing use of imaging across all disciplines in medicine have led to a striking rise in incidental findings unrelated to the original study indication. Often, these findings have no clinical relevance and will not impact the current or future health status of the patient. It is incumbent on radiologists to report these findings in a definitive and unambiguous manner. Similarly, it is essential for clinicians to restrain from further diagnostic investigation of incidental findings that are conclusive by imaging. A classic and common example is the finding of a cyst. This article presents several cases of incidentally found cysts for which a confident diagnosis can be made without any need for follow-up.
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INTRODUCTION

Medicine at large has greatly benefited from the remarkable advances in medical imaging over the last 30 years. Unfortunately, along with the consequent immense surge in the utilization of medical imaging has come an equivalent increase in incidental findings that can precipitate a cascade of additional imaging examinations or even invasive procedures in attempts for further characterization.

In response to this epidemic of incidental findings, a growing literature has developed that supports a commonsense approach based on the simple observation that while incidental findings are prevalent, clinically significant incidental findings are not. However, any approach that overlooks incidental findings must be based on clear evidence that can overcome patient and physician anxiety as well as medicolegal threats. Correlation of radiologic findings with pathology has led to the development of imaging criteria that allow some common incidental lesions to be diagnosed with certainty. A classic example is the cyst.

CYSTS

Cysts can occur in any organ and within most structures in the body. True cysts have an endothelial or epithelial cell lining, whereas "false" cysts (pseudocysts) do not. Cysts usually contain simple fluid but can be complicated by hemorrhage or debris. Specific imaging criteria have been established that allow for the reliable diagnosis of a simple cyst. More importantly, there are exclusion criteria, which preclude a definitive diagnosis of a simple cyst and for which follow-up should be performed. When criteria are met and when a patient has no known malignancy, no further work-up is necessary.[1-3]

The imaging features should always be considered in the clinical context. Rarely, a metastatic lesion can mimic a simple cyst, but even then, imaging features can generally identify it as suspicious, because it will usually have at least one feature that is not typical of a simple cyst, such as a thickened wall, internal septations, or mural nodularity.

The following cases show cysts in various locations on different imaging modalities. In all the cases illustrated, the cysts can be confidently diagnosed with one imaging modality and require no further work-up. The follow-up imaging studies available in some instances were performed for reasons other than the cyst.

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Case 1 Staging computed tomography (CT) with intravenous and oral contrast in a 62-year-old woman with newly diagnosed breast cancer (**Figure 1**).

Case 2 Right upper quadrant ultrasound for pain in a 54-year-old man (**Figure 2**).

DISCUSSION

Cysts are the most common liver lesions, and their prevalence increases with age: More than 50% of adults over age 56 years are likely to have at least one liver cyst.[3-5] Simple hepatic cysts have an outer fibrous layer and an inner lining of cuboidal columnar epithelium that produces the cyst fluid.[3,6] They can have thin (<2 mm) internal septations or thin calcifications, but should not have other solid components. Because of their fluid composition, cysts are lower in attenuation on CT and brighter on fluid-sensitive sequences on magnetic resonance imaging (MRI) than other benign or metastatic hypodense lesions.

The presence of thickened walls or septations, enhancement, calcifications, or solid components indicates something other than a simple cyst, such as a cystic metastasis or infection such as a pyogenic abscess or hydatid cyst.[5,7] Fortunately, these entities rarely, if ever, meet the imaging criteria for a simple cyst.

If there is a history of a primary malignancy and the lesion does not meet imaging criteria for a simple cyst, further workup with additional imaging may be warranted. In Case 1, the CT alone is definitive. Breast cancer metastases may be hypo- or hypervascular on enhanced CT. Hypovascular lesions often have a thin rim of peripheral enhancement, whereas simple cysts do not. The MRI was performed for unrelated reasons but confirms the thin, circumscribed wall and fluid composition of the cyst.

On ultrasound, a simple cyst is anechoic with imperceptible walls and accentuated posterior echoes (due to increased through transmission of echoes relative to echoes through adjacent solid tissue). The well-defined fluid–tissue interface should result in sharp borders.[5,6] In Case 2, the lesion meets ultrasound criteria for a simple cyst and no further imaging is necessary.

CLINICAL SIGNIFICANCE

- The discovery of incidental findings on advanced imaging studies is a well-known problem in medicine.
- Cysts are a common incidental finding that can occur almost anywhere in the body.
- Specific imaging features have been identified for computed tomography, magnetic resonance imaging, and ultrasound, and when present, allow for a confident diagnosis of a cyst. Avoiding unnecessary follow-up in these cases may help reduce overutilization of medical imaging and lessen anxiety for the patient.

Case 3 Staging CT of the chest, abdomen, and pelvis with intravenous contrast in a 63-year-old woman with newly diagnosed endometrial cancer (**Figure 3**).

Case 4 Abdominal ultrasound in a 47-year-old woman with abnormal liver function tests (**Figure 4**).

DISCUSSION

Cysts are less common in the spleen than in other solid abdominal organs such as the liver or kidney. Eighty percent of splenic cysts are false cysts that are lined by fibrous tissue but lack an epithelial lining. These usually result from infection, infarction, or trauma and are thought to be related to prior intraparenchymal hemorrhage.[8-10] A minority of cysts are congenital. These have a true epithelial lining and often have septations or peripheral trabeculations. It is virtually impossible by imaging to differentiate a true cyst from a false cyst; however, it is typically of little relevance, as simple cysts without solid components or enhancement are benign.[8,11,12] Rarely, parasitic cysts in hydatid disease can mimic simple cysts. It is uncommon to have solitary splenic hydatid disease, and the

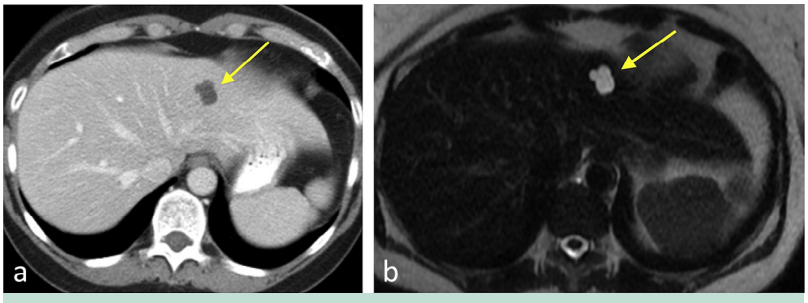

Figure 1 Staging computed tomography (CT) with intravenous and oral contrast in a 62-year-old woman with newly diagnosed breast cancer. (**A**) A low attenuation lesion is found in the left lobe of the liver with sharply delineated margins and no internal enhancement. The lesion is fluid density on CT. (**B**) T2-weighted MRI confirms a lobulated fluid-filled cyst with fine septations and no suspicious features. Either modality separately would suffice to characterize the lesion as benign.