

App Review: Management Guide for Incidental Findings on CT and MRI

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Keywords Incidental findings · Incidentaloma · ACR white paper · Management · Free · Phone-compatible · iPad-compatible

App Specs

App icon URL: [<https://a1.mzstatic.com/us/r30/Purple69/v4/0c/70/64/0c7064b2-3605-596e-a567-afa2b10d849a/icon350x350.png>]

App name: Management Guide for Incidental Findings on CT and MRI

App developer: RADIOLOGiQ

App developer website: <https://www.radiologiq.com>

App price: Free

Apple App store URL: <https://itunes.apple.com/us/app/abdominal-ct-incidentalfinding/id689639876>

Google Play store URL: N/A

Category: Medical

Tags: incidental findings, incidentaloma, ACR white paper, management, free, iPhone-compatible, iPad-compatible

Works offline: Y

FDA approval: N/A

Promotion code: N/A (free)

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Quick Review

(1 star: lowest/5 stars: highest)

Overall rating (1–5): 5

Content (1–5): 4

Usability (1–5): 5

Pros: Simple and straightforward functionality packaged in a clean usable design.

Cons: Only available on iTunes store (not Android compatible).

At a glance: Easy to use and attractive app providing a simple clickable algorithm for incidental CT and MRI findings based on ACR white papers.

Introduction

A frequent challenge for radiologists is what to do with incidental findings also known as “incidentalomas” encountered on CT or MRI. Although most incidentalomas are benign findings often of little or no clinical significance, physicians and patients may feel inclined to evaluate them in part due to an unwillingness to accept uncertainty. Evaluation and surveillance of incidentalomas has been cited as among the causes of increased utilization of CT and MR [1]. There is considerable variability in how physicians in different practice settings manage these detected incidentalomas, and some standardization is thus warranted to limit costs and reduce risks to patients. The ACR formed the Incidental Findings Committee to create a consensus

based on review of the literature regarding how to manage incidentalomas.

A series of white papers was released by ACR starting in 2010 with “Managing Incidental Findings on Abdominal CT: White Paper of the ACR Incidental Findings Committee,” [1] which covered the following incidentalomas: cystic renal mass, solid renal mass, liver mass, adrenal mass, and pancreas cystic mass. Subsequently, additional ACR white papers were released between 2013 and 2015 on incidental findings topics including: adnexal findings (2013) [2], vascular findings (2013) [3], splenic and nodal findings (2013) [4], gallbladder and biliary findings (2013) [5], and thyroid nodules (2015) [6].

Purpose/Features/Content

The purpose of this app is to provide the user an easy-to-use, interactive adaptation of the guidelines established by the American College of Radiology’s Incidental Findings Committees. The app helps user manage a wide variety of “incidentalomas,” such as thyroid nodules, liver masses, splenic masses, asymptomatic pancreatic cystic masses, adrenal masses, solid renal masses, cystic renal masses, adnexal cystic masses, and lymph nodes.

Usability

The initial interface is simple and cleanly presented in greyscale (Figs. 1 and 2). The user can scroll by anatomy to select the incidental findings topic.

Once in a topic, the app takes the user through a series of simple clickable steps following the algorithm detailed in the relevant ACR white paper. For example, the user clicks through answer choices regarding lesion characteristics, size, and patient demographics. Figure 3 demonstrates that for the liver mass algorithm, the user has selected a > 1.5 cm mass, low attenuating with suspicious features, in a patient of average risk. The app then generates a color-coded “Guidance” recommendation. Green color is used for low suspicion incidentalomas, e.g., benign findings requiring “no follow-up imaging.” A more suspicious finding in the algorithm generates a red-colored recommendation—such as “Surgery” for a Bosniak III or IV cystic renal mass in a patient in the general population (i.e., not a patient with limited life expectancy). An intermediate suspicion incidentaloma such as a probably benign-appearing but 3–5 cm adnexal

cyst in an early post-menopausal women would generate a yellow-colored recommendation, in this case: “prompt (not follow-up) ultrasound.”

Good

There are a number of excellent features regarding the app:

The design is very user friendly and the clickable incidentaloma algorithms can be easily accessed and navigated right from one’s iPhone or iPad (Apple, Cupertino, CA), which makes it convenient for use on the fly while reading cases in the reading room or while teaching residents and medical students.

The app is easy to download and is quite functional for a free product.

Internal links to referenced white papers are conveniently provided from the app home screen.

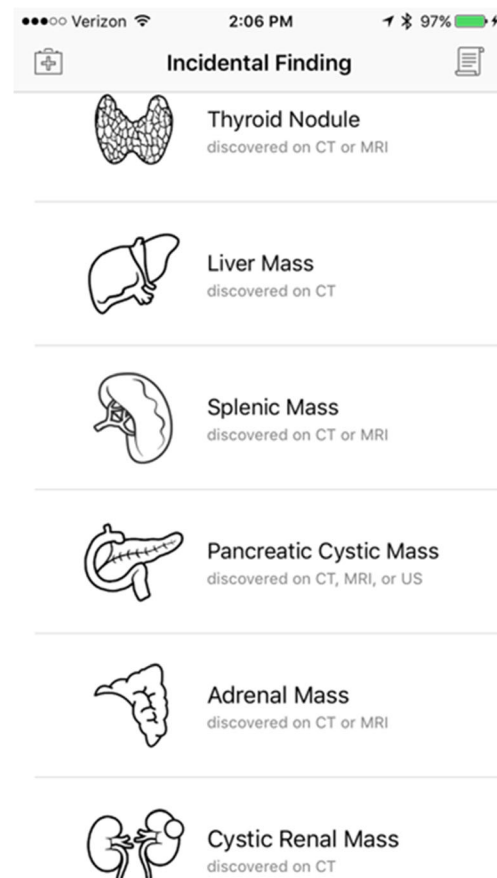
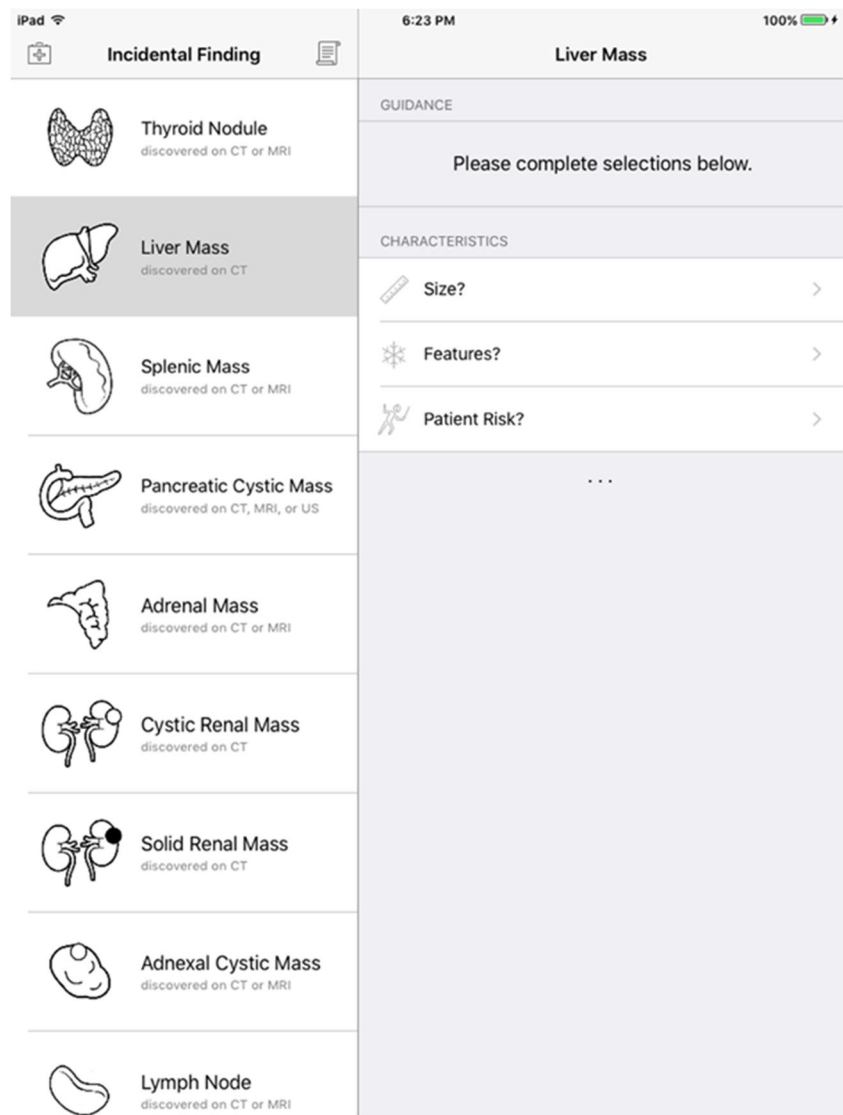


Fig. 1 Initial user interface as viewed from an iPhone

Fig. 2 Initial user interface as viewed from an iPhone, with liver mass clickable algorithm selected as example



Room for Improvement

The color coding scheme for recommendations in the app is intuitive, but does not match the color coding used in ACR white paper flow charts. This is not necessarily a problem but the user does need to be aware of this. Color coding of recommendations in the app is described above in [Usability](#). The color coding for the ACR white paper flowcharts is green for action steps, red for no further action required, and yellow indicates further data is needed (such as lesion characterization, demographics, history) in order to make a decision regarding management.

While most of the clickable algorithms are very easy to navigate and understand, the solid renal mass algorithm is

a little confusing as a stand-alone tool. For example, for solid renal mass measuring 1–3 cm in the general population, the user is prompted to address whether the lesion is hyperattenuating and homogeneously enhancing. If “yes” then recommendation in red is “Consider MRI. Consider biopsy” (Fig. 4). The small text below the recommendation is less obvious but lists possible diagnosis as renal cell carcinoma, and describes the surgical options which might be used primarily at many institutions instead of proceeding with MRI and/or biopsy. Also, there is no provided definition of what represents a cystic vs. solid renal mass. Thus the app is not truly stand-alone, and requires background knowledge regarding the incidentalomas and assumes that the user has thoroughly

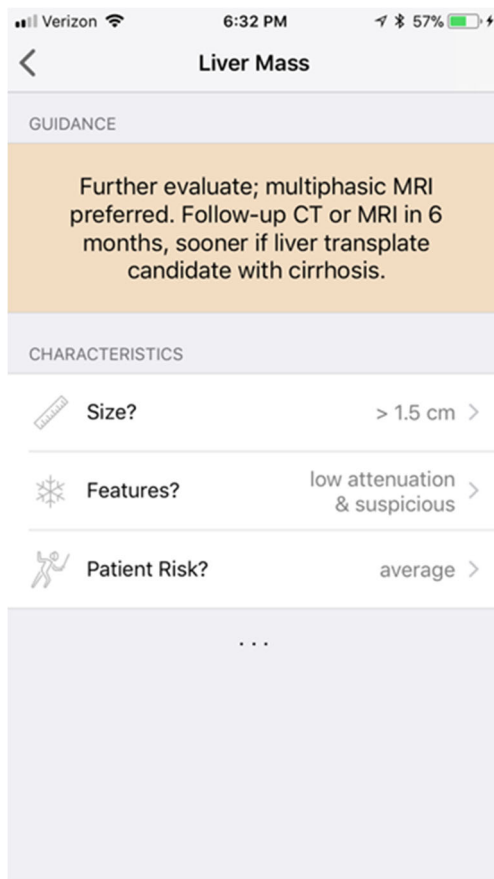


Fig. 3 Liver mass algorithm as viewed from an iPhone, with clickable characteristics selected

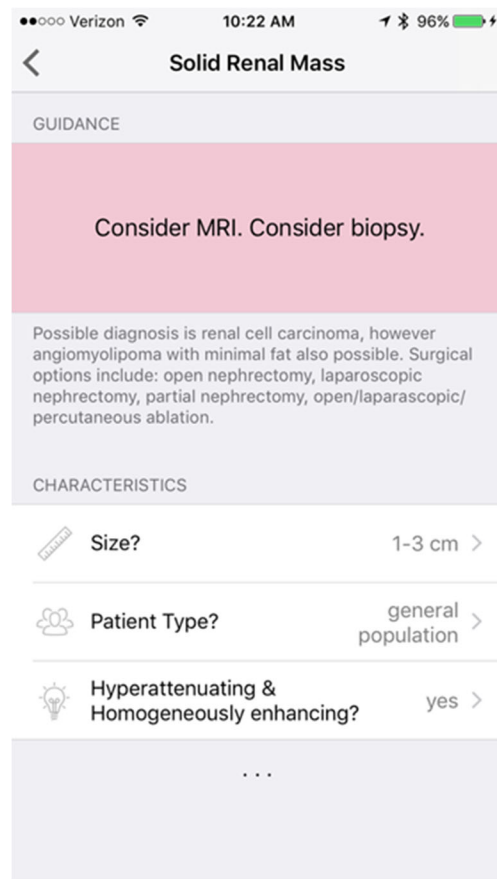


Fig. 4 Solid renal mass algorithm showing guidance (recommendation) for 1–3 cm solid renal mass in a patient of the general population, where the lesion is hyperattenuating and homogeneously enhancing, as viewed from an iPhone

read through the white papers on their own (though this is obviously a good idea).

Concerning the adrenal mass algorithm, the first step leaves the user “hanging” somewhat by asking if “diagnostic features present” without defining the features (Fig. 5). The remainder of the algorithm steps is intuitive however.

One additional area of improvement would be to list on the home screen next to each topic the date of the most recent referenced ACR white paper. This is important if the clickable incidentaloma algorithm is based on an old paper if a newer update has been published. For example, at the time of writing the app (Version 3.2.1) bases the pancreatic cystic mass clickable algorithm on the 2010 ACR white paper [1]; however, an updated ACR white paper on “Management of Incidental Pancreatic Cysts” was published in July 2017. Additional incidentaloma topics with either recently published or ahead of print updated ACR white papers at time of writing include:

Adrenal Masses [7], Renal Mass on CT [8], and Liver Lesions on CT [9].

Finally, iOS is the only offered operating system. Since Android captures an estimated 88% of the smartphone global market (~ 65% in the US) [10], a large set of users are currently unable to access the software.

Summary

While the user should read and understand the relevant ACR white papers thoroughly, so that subtleties are not lost, the app is an efficient, easy to use, and free resource for managing a wide variety of incidental findings encountered on CT or MRI.

Screenshots

See Figs. 1, 2,3, 4 and 5.

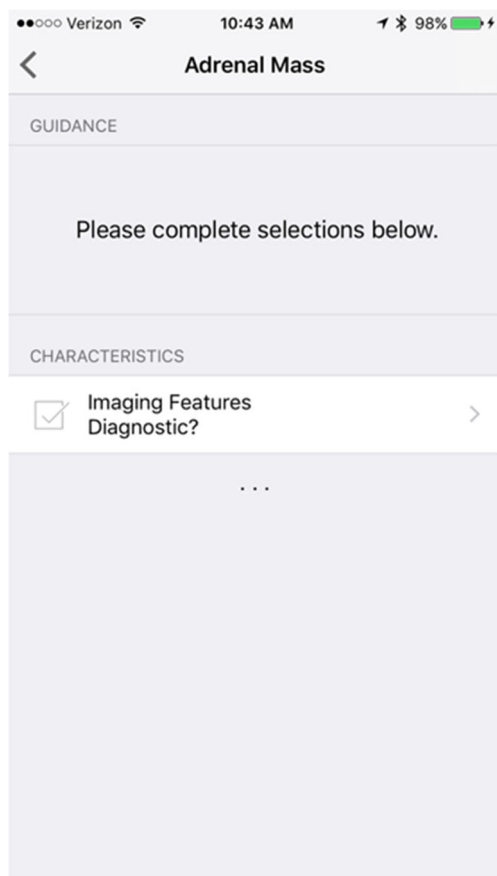


Fig. 5 Initial (opening) screen of adrenal mass algorithm, as viewed from an iPhone

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