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Disparities in the Way Radiologists, Referring Physicians, and Patients See the Language Used to Report Incidental Findings

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Abstract

Incidental findings on cross-sectional imaging are common, often causing concern due to the possibility, however remote, that they could indicate malignancy. While radiologists aim to document these findings thoroughly, the language used may lead to varying interpretations by referring physicians and patients, potentially resulting in unnecessary follow-up tests, increased costs, and patient anxiety. The language radiologists use to describe low-risk incidental findings, especially those with minimal clinical significance, is underexplored, particularly from the perspectives of radiologists, referring physicians, and patients.This study involved three anonymous surveys administered to radiologists, referring physicians, and patients at a large academic medical center. The surveys assessed how each group interprets 10 expressions used to describe a 5-mm incidental liver lesion, based on its perceived likelihood of malignancy. Radiologists, referring physicians, and patients rated their perceived likelihood of malignancy for these expressions and provided feedback on whether follow-up imaging was warranted. Data were analyzed using median responses for malignancy likelihood, follow-up imaging decisions, and descriptive statistics.A total of 13 radiologists (93%), 59 referring physicians (6% response rate), and 51 patients participated. Referring physicians and patients consistently rated the likelihood of malignancy higher than radiologists, particularly for phrases like "tumor not excluded," which were associated with the highest perceived likelihood of malignancy. Regarding follow-up imaging, 75-83% of referring physicians indicated they would order follow-up for phrases with uncertainty about malignancy, while only 2-46% chose to do so for phrases indicating benign findings. Radiologists favored "cyst" to describe the lesion, while referring physicians favored "benign cyst." Radiologists unanimously agreed that no follow-up was necessary for the benign lesion.Both referring physicians and patients expressed greater concern than radiologists regarding incidental findings, especially when the language used suggested uncertainty about malignancy. Ambiguous terms such as "tumor not excluded" increased anxiety and the likelihood of follow-up tests. This highlights the need for radiologists to refine their terminology to improve communication clarity and reduce unnecessary patient anxiety and healthcare costs.

Keywords: *Radiologists, Physicians, Incidental Findings.*

Introduction

Incidental findings on cross-sectional imaging are frequently encountered (1) and present a significant clinical challenge. These findings often lack a definitive diagnosis, such as a small, low-attenuation liver lesion on CT that could represent a benign cyst or hemangioma. While such abnormalities are generally harmless and unlikely to have clinical relevance (1, 2), radiologists routinely document them in their reports to ensure thoroughness and caution. This practice arises from the slight possibility that an incidental finding could indicate a malignancy.

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The inclusion of potentially inconsequential incidental findings in radiology reports can lead to unintended consequences. Mentioning these findings may cause undue anxiety for patients (3), who might not fully grasp the minimal likelihood of the lesion being harmful. Similarly, referring physicians may face uncertainty when interpreting the significance of the finding. This situation can trigger a series of follow-up tests, including additional imaging or invasive procedures, aimed at definitively confirming the benign nature of the lesion (1, 2). Such actions can result in significant financial costs, patient inconvenience, radiation exposure, and even procedural risks (4).

Effective communication by radiologists regarding their level of concern for low-risk incidental findings is essential to mitigate these issues. Previous studies have revealed discrepancies in how referring physicians interpret radiologists' language when describing diagnostic confidence (5, 6). A single term or phrase can be understood differently by various referrers, creating potential ambiguity in radiology reports (5, 6). However, earlier research has not specifically addressed language used to describe lesions with a low probability of clinical significance. This aspect warrants attention, given the frequency of such findings and the high risk of their importance being misinterpreted. Additionally, these studies did not explore how patients perceive the language used, which is increasingly relevant as more patients gain access to their radiology reports (7). Insights into this area could aid in improving comprehension for both referring physicians and patients regarding the level of concern radiologists assign to low-risk incidental lesions.

This study aimed to investigate how radiologists, referring physicians, and patients interpret expressions commonly used in radiology reports to describe findings that are likely to have minimal clinical importance.

Subjects and Methods

This study, conducted in accordance with HIPAA guidelines, . Participation in the survey was considered as consent to join the study. The surveys were administered electronically through a web-based platform.

Survey of Radiologists

Radiologists from the abdominal imaging section, who regularly interpret abdominopelvic CT scans (n = 14), were invited to participate in the electronic survey. The survey included 10 phrases that might be used in radiology reports to describe a 5-mm incidental liver lesion (see Table 1). Respondents were asked to rate the likelihood that each described lesion represented malignancy, selecting from the following options: 0%, > 0% to 1%, > 1% to 2%, > 2% to 5%, > 5% to 10%, > 10% to 20%, and > 20%. Additionally, radiologists were asked to evaluate a hypothetical case involving a 5-mm sharply defined homogeneous low-attenuation lesion (less than approximately 20 HU) in the liver, found during a routine CT scan of a 50-year-old patient with generalized abdominal pain but no prior history of malignancy or liver disease. These characteristics were chosen based on the "benign imaging features" described in the American College of Radiology's white paper on managing incidental findings in abdominal CT scans (1), which suggests that such a lesion, regardless of the patient's risk profile, does not warrant further follow-up. Radiologists were asked to identify the most suitable phrase for describing this lesion and whether they felt follow-up imaging was necessary.

Survey of Referring Physicians

A database search was conducted to identify the 1000 physicians who had recently ordered an abdominopelvic CT for adult patients. These physicians were then invited by email to participate in the survey. After excluding 24 individuals due to duplicate entries or incorrect contact information, 976 physicians were successfully invited. These referrers were asked to assess the 10 expressions used to describe the incidental lesion and select their perceived likelihood of malignancy from the same options provided in the radiologist survey. They were also asked if they would order follow-up imaging for each expression, with a simple "yes" or "no" answer. Additionally, referrers were asked to choose the best expression for describing the lesion in the previously mentioned scenario and to rate their level of agreement (on a 1–5 scale, with 5 being the highest) on whether the radiology report should explicitly recommend follow-up imaging for such a lesion. Referring physicians were also asked to specify their medical specialty.

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Survey of Patients

A survey was distributed to adult outpatients waiting for cross-sectional imaging exams. Patients had the option to complete the survey manually by using printed copies available in the waiting areas or electronically via a link posted in the same areas. Participants were asked to provide demographic information, including age, sex, highest level of education, and whether they worked in healthcare. Similar to the other groups, patients were asked to assess the likelihood of malignancy for the 10 expressions used to describe the incidental lesion, choosing from the same set of options.

Statistics

For each of the seven categories assessing the likelihood of malignancy, the median response was calculated for each of the 10 expressions across the three groups surveyed. In the case scenario presented to radiologists and referring physicians, the most commonly selected phrase for describing the lesion was identified. Other survey items were summarized descriptively using percentages. Statistical analysis was carried out using Excel for Mac (version 15.20, Microsoft).

TABLE 1. Responses by Radiologists, Referring Physicians, and Patients Regarding Perceptions of 10 Potential Expressions to Describe an Incidental 5-mm Liver Lesion

Expression	**Median Perceived Likelihood of Malignancy (%)**			**Referring Physicians Who Would Order Follow-Up Imaging (%)**
	Radiologists	**Referrers**	**Patients**	
Cyst	0	> 0-1	> 0-1	22
Benign cyst	0	0	0	2
Most likely a cyst	> 0-1	> 0-1	> 1-2	46
Most likely a cyst, although tumor not excluded	> 2-5	> 2-5	> 5-10	75
Tumor not excluded	> 10-20	> 5-10	> 5-10	75
Tumor not entirely excluded	> 5-10	> 5-10	> 5-10	83
Too small to characterize	> 0-1	1-2	> 2-5	36
Too small to characterize but most likely a cyst	> 0-1	> 0-1	> 2-5	29
Statistically likely to represent a cyst	> 0-1	> 0-1	> 2-5	31
Tumor considered unlikely	> 0-1	> 1-2	> 1-2	25

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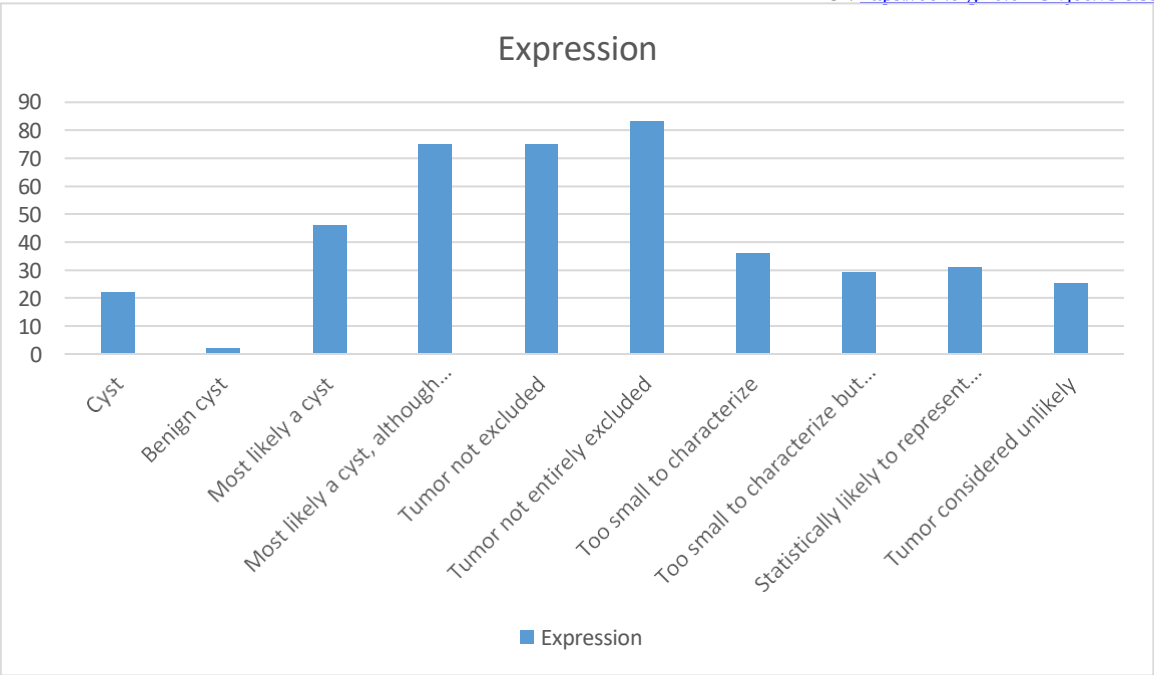

Results

The survey received responses from 13 out of 14 radiologists (93%), 59 out of 976 referring physicians (6%), and 51 patients (response rate undetermined). Among the referrers, 61% (36/59) were from medical specialties or subspecialties, 24% (14/59) were from surgical fields, and 15% (9/59) were from emergency medicine. The patients had an average age of 54 ± 15 years (median age 57; age range 24–88), with 51% (26/51) identifying as male and 49% (25/51) as female. The highest level of education completed by the patients included 16% (8/51) with a high school diploma, 33% (17/51) with an undergraduate degree, 33% (17/51) with a master's degree, 14% (7/51) with a doctorate or similar professional qualification, and 4% (2/51) with other forms of education. Additionally, 12% (6/51) of patients reported being employed in the healthcare field.

Table 1 outlines the median responses from each group regarding the likelihood that the described lesion was malignant, based on the 10 possible expressions. For the phrase "benign cyst," the median response for all groups was 0%. However, for four of the other nine phrases, referrers' median responses indicated a higher likelihood of malignancy compared to radiologists, while seven out of the nine phrases had higher perceived malignancy likelihoods among patients than radiologists. For example, for the terms "most likely a cyst" and "too small to characterize," the median responses were 0% for radiologists, > 0% to 1% for referrers, and > 2% to 5% for patients. Across all three groups, expressions containing "tumor not excluded" or "tumor not entirely excluded" were associated with the highest perceived likelihood of malignancy.

Responses from referring physicians about whether they would order follow-up imaging for the described lesion showed considerable variation. For the phrase "benign cyst," only 2% of referrers indicated they would order follow-up. Between 25% and 36% indicated they would order follow-up for four other phrases, while 46% chose to do so for "most likely a cyst," and 75% to 83% expressed the intent to order follow-up for expressions containing "tumor not excluded" or "tumor not entirely excluded."

When asked to identify the best phrase for describing a 5-mm liver lesion with benign imaging features in a patient with no additional risk factors for malignancy, the most frequently chosen phrase by radiologists was "cyst" (46%) and by referrers was "benign cyst" (33%). Regarding the need for follow-up imaging for such a lesion, all radiologists (100%) agreed it was unnecessary. When asked whether the radiology report

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should explicitly state whether follow-up imaging was recommended, referrers gave a mean response of 3.9 ± 1.2 on a 1–5 scale (median score of 4), with 76% rating this as 4 or 5.

Discussion

The terminology used by radiologists to describe low-risk lesions often leads to higher levels of concern among referring physicians and even more so among patients, compared to the perceptions of radiologists themselves. This difference in interpretation poses a problem, especially considering the frequency of incidental findings in radiology reports. Only when a lesion is definitively described as benign do all groups report a 0% concern. For all other descriptions, ranging from "statistically likely to be a cyst" to "too small to characterize," there was greater concern expressed by referring physicians and patients, even if radiologists believed the lesion was most likely benign. Consequently, patients might perceive a more alarming message than the radiologist intended, resulting in heightened anxiety.

These findings underscore the significant impact that radiologists' choice of language has on the decision-making process regarding follow-up imaging. While radiologists universally agreed that lesions with benign imaging features do not necessitate further imaging, referring physicians' likelihood of requesting follow-up imaging varied considerably depending on the phrasing. Phrases that included qualifiers like "tumor not excluded" triggered a strong tendency toward follow-up imaging. Referring physicians showed a clear preference for radiology reports to offer guidance on the need for further imaging. This highlights the critical role that language plays in shaping the follow-up actions taken by referring physicians.

Comparing these results to previous literature, studies have indicated inconsistency in how referring physicians interpret certain terms in radiology reports (5, 6). Some expressions, such as "absent" or "certain," are widely understood, while others like "compatible with" or "suspicious for" lead to more varied interpretations. Unlike these earlier studies, which primarily focused on referrers, this research also incorporates patients' perceptions and compares the responses of radiologists, referring physicians, and patients, offering a deeper understanding of how language in radiology reports influences follow-up decisions.

The findings suggest the need for strategies to minimize miscommunication between radiologists, referring physicians, and patients. Radiologists may need to adopt alternative methods to express their confidence in their findings. This could include providing quantitative percentages to accompany their descriptions, rather than relying solely on qualitative terms that can be open to misinterpretation (5, 6). Additionally, adopting a standard set of terms across practices could reduce confusion. Other innovations, such as integrating radiologists into clinical areas or using technology-assisted consultations with referring physicians and patients, could improve communication and minimize misunderstandings about incidental findings.

One key issue raised in the literature is the ambiguity created by terms that express uncertainty. While terms like "not excluded" might seem harmless, they can create significant concern and lead to unnecessary follow-up. Several editorials have recommended that radiologists use clearer language to describe insignificant findings (16, 17), stressing that vague or defensive language should be avoided. The current study confirms these recommendations, as referring physicians indicated they would be more likely to order follow-up imaging in response to expressions like "not excluded," even when accompanied by reassuring phrases suggesting the lesion is benign.

There are, however, some limitations to this study. It only surveyed radiologists, referring physicians, and patients from a single institution, meaning that the results might not be generalizable to other settings. Additionally, the low response rate from referring physicians and the inability to calculate a response rate for patients due to the survey distribution method may limit the representativeness of the sample. Also, the study focused on a specific case of a small incidental liver lesion, and the results may differ for lesions in other body parts. Lastly, the survey was hypothetical and did not involve actual clinical reports, limiting its real-world applicability.

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In conclusion, both referring physicians and patients expressed greater concern than radiologists regarding the language used to describe incidental findings. The phrase "benign cyst" was the only one unanimously interpreted as benign, leading to no concern across all groups. Phrases that indicated uncertainty, particularly those suggesting a "tumor not excluded," were associated with the highest levels of concern and the greatest likelihood of follow-up imaging. Given that such ambiguity in language can lead to increased patient anxiety and unnecessary follow-up, it is crucial for radiologists to refine their use of terminology and consider adopting new strategies to improve clarity in their reports.

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