



How “consistent” is “consistent”? A clinician-based assessment of the reliability of expressions used by radiologists to communicate diagnostic confidence



A.B. Rosenkrantz*, M. Kiritsy, S. Kim^a

Department of Radiology, NYU Langone Medical Center, New York, NY, USA

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AIM: To evaluate the degree of variability in clinicians' interpretation of expressions used by radiologists to communicate their level of diagnostic confidence within radiological reports.

MATERIALS AND METHODS: Clinicians were solicited to complete a prospective survey asking them to select the approximate perceived level of certainty, expressed as a percentage, associated with 20 expressions used by radiologists to communicate their level of diagnostic confidence within radiological reports. The median and inter-decile range (IDR) were computed for each expression, with a smaller IDR indicating greater reproducibility. Clinicians were also asked questions regarding their attitudes about radiologists' communication of diagnostic confidence.

RESULTS: Forty-nine surveys were completed. Median confidence associated with the expressions ranged from 10–90%. Reproducibility of the expressions was variable, as IDR ranged from 15–53%, although a median IDR of 40% indicated overall poor reproducibility. Expressions with relatively higher reproducibility included “most likely”, “likely”, and “unlikely” (IDR 15–20%), whereas expressions with relatively lower reproducibility included “compatible with”, “suspicious for”, “possibly,” and “can be seen in the setting of” (IDR \geq 45%). Only 20% of clinicians agreed or strongly agreed that radiologists consistently use such expressions within their reports. Fifty-five percent of clinicians preferred that diagnostic confidence be communicated as a percentage rather than as a textual expression.

CONCLUSION: There was poor reproducibility in clinicians' interpretations of many expressions used by radiologists to communicate their level of diagnostic confidence. Use of percentages to convey diagnostic confidence within reports may mitigate this source of ambiguity in radiologists' communication with clinicians.

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* Guarantor and correspondent: A.B. Rosenkrantz, Department of Radiology, Center for Biomedical Imaging, NYU Langone Medical Center, 660 First Avenue, 3rd Floor, New York, NY 10016, USA. Tel.: +1 212 263 0232; fax: +1 212 263 6634.

E-mail address: Andrew.Rosenkrantz@nyumc.org (A.B. Rosenkrantz).

^a Present address: Department of Radiology, University of Washington Medical Center, 1959 N.E. Pacific St., Seattle, WA 98195, USA.

Introduction

The radiological report serves as the primary means of communication between radiologists and referring clinicians and is a key factor in driving clinical management.^{1,2} Thus, it is essential that reports not only accurately convey the presence of detected abnormalities, but also the

radiologist's opinion regarding the significance of such abnormalities and the likelihood of suggested diagnoses.^{3,4} Indeed, vagueness and ambiguity within radiological reports concerning the potential significance of described findings, even in the context of overall accurate reports, has been identified as a source of patient harm and the basis of numerous large malpractice settlements.⁵ In addition, clarity has been identified by referring clinicians as one of the most critical qualities of radiological reports.⁶ The importance of precise communication within radiological reports is also substantiated by the American College of Radiology having stressed the need for precision within reports,⁷ as well as by this topic serving repetitively as the basis of studies and editorials within the radiological literature from the 1920s through to the present time.^{8–12}

One source of potential miscommunication in radiological reporting is the tendency of radiologists to use textual-based expressions to convey their level of confidence in suggested diagnoses.^{5,9} For instance, a spectrum of terms, such as “most likely,” “possibly”, “suggestive of,” and “cannot exclude,” frequently accompany differential diagnoses within reports. By using such terms, the radiologist intends to express a particular level of certainty in the suggested entities. However, it is such expressions that can introduce ambiguity into reports given the possibility of the referring physician perceiving the expression as associated with a different level of diagnostic confidence than is intended by the radiologist.⁵ These differences in meaning associated with common expressions can lead to misunderstandings resulting in inadequate or excessive further intervention for incidental findings.⁵

Such differences in interpretation among clinicians and radiologists have been suggested by one past study in which eight musculoskeletal clinicians were presented with individual expressions relating to diagnostic confidence.¹³ However, the potential optimal expressions to be used, as well as clinicians' attitudes regarding this particular aspect of radiological reporting, remain unknown. Thus, the aim of the present study was to evaluate the degree of variability in clinicians' interpretation of expressions used to communicate diagnostic confidence within radiological reports, as well as to assess clinicians' perspectives regarding the use of such phrases.

Materials and methods

This prospective study was Health Insurance Portability and Accountability Act (HIPAA)-compliant and approved by the institutional review board. Clinicians attending multidisciplinary conferences at NYU Langone Medical Center were solicited to complete a three-part survey relating to expressions of diagnostic confidence used within radiological reports. In the first portion of the survey, 20 different sentences were provided, each using a different expression to convey the likelihood of a liver lesion to represent a metastasis. These expressions were selected based on a review of expressions appearing within radiological reports at NYU Langone Medical Center, which was performed in consensus

by the study's authors. For each sentence, the clinician was asked to select the conveyed likelihood from one of six choices (10%, 25%, 50%, 75%, 90%, and 100%). In the second portion of the survey, clinicians were asked to select the term that they preferred that radiologists use to convey varying levels of diagnostic confidence (10%, 25%, 50%, 75%, and 90%). For each of these percentages, three choices were provided; these choices were selected based on a subjective review of expressions most commonly used within reports at NYU Langone Medical Center. The clinicians were not asked to select a preferred term to convey 100% confidence given the ability to communicate such findings without any modifier or expression of diagnostic certainty. In the third portion of the survey, clinicians were asked: to indicate whether they prefer that radiologists express their level of diagnostic confidence for indeterminate findings via a textual description or via a percentage; to indicate the extent to which they agree that textual descriptions provided by radiologists to convey level of diagnostic confidence for a suggested diagnosis of an indeterminate lesion are used consistently between radiologists; and to record their specialty.

Non-parametric statistics were used for data from the first part of the survey given the ordinal nature of these data. Specifically, for each expression of diagnostic confidence, the median, 10% decile, 90% decile, and interdecile range (IDR; computed as difference between 90% and 10% decile) of the level of diagnostic confidence provided by clinicians were determined, with a lower value in terms of IDR indicating greater reproducibility. Median IDR among all expressions was computed. Spearman's correlation coefficient between median diagnostic confidence and IDR was calculated among all expressions. Data from the second and third portions of the survey were tabulated using standard summary statistics. Data were analysed using software (MedCalc for Windows, version 12.7; MedCalc Software, Ostend, Belgium).

Results

Forty-nine clinicians completed the survey. The distribution of specialties represented by respondents was surgery ($n = 10$), urology ($n = 8$), internal medicine ($n = 7$), gastroenterology ($n = 5$), medical oncology ($n = 5$), pulmonary ($n = 4$), radiation oncology ($n = 2$), OB/GYN ($n = 2$), neurology ($n = 1$), and unspecified ($n = 5$).

Table 1 presents the results of the first portion of the survey regarding level of diagnostic confidence associated by clinicians with expressions used within radiological reports. Seven terms had a median diagnostic confidence of 90%, seven had a median confidence of 75%, two had a median confidence of 50%, and four had a median confidence of <50%.

The reproducibility of confidence levels associated with the expressions was highly variable between terms, as the IDR ranged from 15–53%. The median IDR for the 20 terms was 40%, indicating the poor reproducibility among clinicians in terms of the level of diagnostic confidence associated with most of the terms. There was a weak inverse

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