Qualitative Reporting of Lesion Number: Do Radiologists and Referring Physicians Understand Each Other?

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DESCRIPTION OF THE PROBLEM

Recently, there has been growing interest in how well referring physicians understand the radiology reports they read. Specific topics that have been addressed in the literature include radiologist communication of diagnostic certainty, oncologic measurements, fracture classifications, and incidental findings [1-4]. Another topic that is vitally important, especially in oncologic imaging, is the communication of lesion number. Radiologists often use qualitative descriptors of number, such as "few," "several," "multiple," or "numerous," to give an overall impression of how many lesions a particular organ contains. It is unclear how consistently these words are used by radiologists or how well these words are understood by referring physicians. Anecdotally, we know of at least two episodes in our tumor board when referring physicians were confused by these words and were considering aggressive surgical resection of presumed oligometastatic disease for patients with greater than 50 metastatic lesions. The surgeons were confused because the lesions were described as "multiple" in the radiology reports, a word they believed conveyed fewer lesions than the radiologists who authored the reports. This lack of precision in describing number will likely be increasingly problematic as more treatments for multifocal primary or metastatic neoplasms are developed. In this article, we describe our preliminary study to compare oncologist and radiologist interpretation of qualitative number descriptors and to discover how these words are actually used in radiology reports at our own institution.

WHAT WAS DONE

This investigation was approved by our institutional review board. No funding was used. The data have not been previously published in part or in whole.

Survey of Oncologists and Radiologists

We conducted a prospective online survey from August 17, 2017, to October 2, 2017. The survey was developed using Qualtrics software (Provo, Utah, USA, and Seattle, Washington, USA) and administered by e-mail to attending physicians and fellows in medical oncology, gynecologic oncology, cardiothoracic imaging, and abdominal imaging.

The questionnaire (Table 1) was developed to assess understanding of liver lesion number as described in radiology reports. Subjects were first asked how often they are confused by the number of lesions reported in CT reports and then to specify a range of lesion numbers that they would expect to be present if the number was described with one of the words, "few," "several," "multiple," or "numerous." The upper limit of the allowed range was set at 20, and respondents were instructed to choose 20 if they believed the upper limit of a range to be greater than or equal to 20.

For question 1, on how often the respondent is confused by the number of lesions reported, answers were scored on a 5-point Likert-type scale. Comparison between oncologist and radiologist responses was performed using independent two-group t test on the ordinal score distributions.

For questions 2 to 5, on the range of lesion numbers expected for each number descriptor, each range was treated as a "yes" vote for every number in that range being appropriately described by the number descriptor. Vote distributions for each number descriptor were compiled separately for oncologists and radiologists. Comparison across the four number descriptor categories was performed using one-way analysis of variance with single-step

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Table 1. Questionnaire to assess understanding of liver lesion number as described in radiology reports

Question No.	Question Text
1	In CT reports that you read, how often are you confused by the number of lesions being reported? ▪ Almost never (<10%) ▪ Occasionally (~25%) ▪ Sometimes (~50%) ▪ Often (~75%) ▪ Almost always (>90%)
2	If a report states that "numerous" liver lesions are seen, what is the range of lesions you would expect to be present? (Select 20 for greater than or equal to 20.)
3	If a report states that "multiple" liver lesions are seen, what is the range of lesions you would expect to be present? (Select 20 for greater than or equal to 20.)
4	If a report states that "few" liver lesions are seen, what is the range of lesions you would expect to be present? (Select 20 for greater than or equal to 20.)
5	If a report states that "several" liver lesions are seen, what is the range of lesions you would expect to be present? (Select 20 for greater than or equal to 20.)

multiple comparisons using Tukey's honestly significant difference test. Comparison between oncologist and radiologist distributions for each number descriptor was performed using independent two-group t test.

Retrospective Evaluation of Number Descriptors Used by Radiologists

A search was conducted of our imaging database for all CT reports from January 1, 2015, to December 31, 2016, that contained one of the words, "few," "several," "multiple," or "numerous," in the same sentence and within 10 words of the words "hepatic" or "liver." Studies were sampled consecutively and included if the number descriptor specifically referred to liver lesions. The CT images from each study were viewed on our PACS, and the number of liver lesions were counted by a radiology resident (postgraduate year 5). For each of the number descriptors "few," "several," "multiple," and "numerous," 50 reports were examined, yielding a total sample size of 200 reports. Studies were excluded if the lesions formed confluent masses without individually countable lesions. Note was made of which staff radiologist authored each report, and no more than 10 reports from the same attending physician was included for each number descriptor.

Comparison across the four number descriptor categories was performed using one-way analysis of variance with single-step multiple comparisons using Tukey's honestly significant difference test.

OUTCOMES

Survey of Oncologists and Radiologists

Survey response rate was 15 of 38 (39%) for oncologists and 14 of 21 (67%) for radiologists (two of the radiologist respondents did not answer the first question).

Results for question 1, on how often the respondent is confused by the number of lesions reported, are presented in Table 2. On average, surveyed oncologists reported experiencing confusion significantly more often than surveyed radiologists ($P = .02$).

Results for questions 2 to 5, on the range of lesion numbers expected for each number descriptor, are presented in Figure 1. In both groups, responses yielded vote distributions that ascended in number for the words "few," "several," "multiple," and "numerous." In both groups, the ranges for all four categories overlapped.

For radiologists, "numerous" (mean = 13.3) was significantly greater than "multiple," "several," and "few" ($P < .001$ in all three comparisons), "multiple" (mean = 10.5) was significantly greater than "several" and "few" ($P < .001$ in both comparisons), and "several" (mean = 5.5) and "few" (mean = 3.8) were not significantly different ($P = .183$). Interquartile range was 7 for "numerous," 7.5 for "multiple," 3 for "several," and 1 for "few."

For oncologists, "numerous" (mean = 13.5) was significantly greater than "multiple," "several," and "few" ($P < .001$ in all three comparisons), "multiple" (mean = 8.9) was significantly greater than "several" and "few" ($P = .03$ and $P < .001$, respectively), and "several" (mean = 7.0) and "few" (mean = 5.9) were not significantly different ($P = .606$). Interquartile range was 7 for "numerous," 7 for "multiple," 5 for "several," and 2.75 for "few."

When compared against each other, oncologist and radiologist responses differed for the words "few," "several," and "multiple." For the word "few," radiologists interpreted a smaller number of lesions than oncologists ($P = .02$). For the word "several," radiologists interpreted a