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Original Article

Communicating diagnostic uncertainty in surgical pathology reports: Disparities between sender and receiver

Q1 Sarah W. Lindley, Elizabeth M. Gillies, Lewis A. Hassell*

Q2 *Department of Pathology, The University of Oklahoma Health Sciences Center, BMSB 451, 940 Stanton L. Young Blvd, Oklahoma City, OK 73104, United States*

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ABSTRACT

Surgical pathologists use a variety of phrases to communicate varying degrees of diagnostic certainty which have the potential to be interpreted differently than intended. This study sought to: (1) assess the setting, varieties and frequency of use of phrases of diagnostic uncertainty in the diagnostic line of surgical pathology reports, (2) evaluate use of uncertainty expressions by experience and gender, (3) determine how these phrases are interpreted by clinicians and pathologists, and (4) assess solutions to this communication problem. We evaluated 1500 surgical pathology reports to determine frequency of use of uncertainty terms, identified those most commonly used, and looked for variations in usage rates on the basis of case type, experience and gender. We surveyed 76 physicians at tumor boards who were asked to assign a percentage of certainty to diagnoses containing expressions of uncertainty. We found expressions of uncertainty in 35% of diagnostic reports, with no statistically significant difference in usage based on age or gender. We found wide variation in the percentage of certainty clinicians assigned to the phrases studied. We conclude that non-standardized language used in the communication of diagnostic uncertainty is a significant source of miscommunication, both amongst pathologists and between pathologists and clinicians.

Background

Communicating diagnostic uncertainty is an inherent part of all aspects of medicine. Pathology is presumed to be the final line in diagnosis, so when the pathologist expresses uncertainty in their diagnosis it could potentially lead to delayed treatment, repeat biopsy, and other interventions which increase medical expenditures and may negatively impact patient care.

It is common practice in the pathology community to use phrases of uncertainty in the diagnostic line, most commonly when dealing with biopsy specimens. This may understandably be due to inadequate tissue, or extensive artifact that makes definite interpretation impossible. Other cited reasons for uncertainty include nonstandard histomorphology, ambiguous immunohistochemical stains, lack of clinical information, uncertain criteria in the literature, lack of experience with the diagnosis, and hope (however unsubstantiated) to avoid legal liability for misdiagnosis.

As pathologists we take pride in our linguistic acumen. When it comes to expression of uncertainty, pathologists are both very particular and very inventive in the phrases that they use. A 2004 survey of sign-out practices of 96 veterinary pathologists found they were using at least 68 unique terms to describe uncertainty [1]. No comparable study has been published in the human pathology literature.

Unsurprisingly, clinicians and others in the health professions interpret and act upon these phrases in different ways based on their understanding (or misunderstanding) of the intent of the pathologist. To the pathologist "consistent with" and "worrisome for" may be intended to mean different things and direct different courses of action, perhaps expressing a graded continuum of diagnostic certainty corresponding to an internal scale on the behalf of the observer; however if this difference is not being clearly perceived by the clinicians, then we are doing a disservice, both to ourselves and to our patients. This study sought to clarify and quantify this potential gap between intent and perception and diagnostic language, and to begin to seek means to narrow this chasm.

Methods

We determined the incidence of usage of phrases of diagnostic uncertainty in our institution by reviewing 1500 sequential surgical pathology reports and tallying both the occurrence of phrases of

Q3 * Corresponding author. Tel.: +1 405 271 5653; fax: +1 4052712524.
E-mail addresses: Lewis-Hassel@ouhsc.edu, sachmacmon@gmail.com (L.A. Hassell).

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uncertainty in the diagnostic line and the frequency of use of each term. These sequential reports were completed between August and October of 2011 (1000 reports) and April and May of 2009 (500 reports.) For the latter series of 500 cases, specifics of case type (biopsy, resection, etc.) category of question (neoplastic, medical) as well as additional determination as to gravity of issue was determined. Cases where use of the uncertainty phrase centered around a peripheral or subclassification rather than the core (malignant/not-malignant) were also noted and quantitated.

In order to investigate the trends of usage of uncertainty terms by practitioner, a separate series of 200 sequential reported cases for each of the 14 actively practicing surgical pathologists at our institution were evaluated. The incidence of use of uncertainty terms for each pathologist was calculated. This data was then used to assess the effect of age and gender.

To assess how various phrases were interpreted by clinicians, we administered an anonymous survey of attendees at multi-disciplinary tumor boards. The survey asked respondents to estimate the degree of certainty associated with eight diagnostic scenarios (Fig. 1). One diagnosis contained no expression of uncertainty while the other seven contained the following phrases: "cannot rule out", "consistent with", "highly suspicious", "favor", "indefinite for", "suggestive of", and "worrisome for". The order of presentation of each phrase and the specific content or specimen type associated therewith was randomized between surveys. The clinical context of the diagnoses was also customized according to the specialty of the tumor board where the evaluation was performed. A total of 76 responses were received. Statistical analysis was by Student's *t*-test and ANOVA. Subgroup analyses were performed based on level of training and clinical specialty (medical students, residents, fellows, attendings, medicine/medical subspecialists, pathologists/radiologists, and surgeons).

Looking for viable solutions to reporting of uncertainty, we conducted a focus group by sending a more detailed survey to seven senior physicians in various departments (surgery, oncology, radiation oncology, gynecologic oncology, and otolaryngology). In this survey, respondents rank ordered eight phrases from least to most certain. We also asked respondents what their opinion for moving forward to resolve this communication problem would be and assessed their response to examples of certain proposed solutions.

Finally, to gain further input into possible solutions to this problem, we held an open discussion with attendees at a short course at a national pathology meeting in fall 2012.

Results

Of 1500 surgical pathology reports, we found expressions of uncertainty in 529 (35%). The most commonly used phrase at our institution was "consistent with" (50%), while the other oft-used phrases included "suggestive of", "worrisome for", "cannot rule out", "highly suspicious for", "favor", and "indefinite for" (Fig. 2). We found no statistically significant difference in incidence of uncertainty phrase usage by either age or gender (Fig. 3).

Uncertainty phrases were used more often in biopsy cases (96 of 149 incidences, 64%) than in resection cases. Most often these involved a question of neoplasic or pre-neoplastic (83 of 149, 56%) rather than medical (66 of 149, 44%) disease. About one-fifth (22%) of incident usage dealt with a "trivial" matter (e.g. "consistent with lipoma", "favor ganglion cyst") and a similar number (29 of 149, 19%) dealt with a sub-classification issue (e.g. "serrated polyp, favor serrated adenoma" or "spindle cell sarcoma, consistent with undifferentiated pleomorphic sarcoma.") Interestingly, only a small number of reports containing uncertainty phrases included a comment or clarifying note (20 of 149, 13%) to either explain the cause of the uncertainty or further direct management, and few if any of these offered specific suggestions beyond "clinical correlation." Surprisingly, none of the 149 incident cases in our review of 500 sequential cases appeared to be due to ambiguous or inconclusive special stains.

Table 1
Standard deviation of percent of perceived certainty, as a measure of the degree of consensus regarding the level of certainty, for common uncertainty phrases in surgical pathology reports. Higher numbers indicate wider variability in the level of understood certainty.

(a) Deviation by specialty

	Medicine	Pathologist/radiologist	Surgeons
No phrase	30	6	13
Consistent with	16	25	13
Highly suspicious	26	19	27
Worrisome for	22	23	22
Favor	24	25	23
Suggestive of	26	23	29
Cannot rule out	31	21	30
Indefinite for	21	24	31

(b) Deviation by level of training

	Medical students	Residents	Fellows	Attendings
No phrase	8.3	8.1	30	15
Consistent with	16	21	8.9	24
Highly suspicious	27	23	27	18
Worrisome for	22	24	19	23
Favor	10	23	23	24
Suggestive of	22	26	23	25
Cannot rule out	18	25	25	27
Indefinite for	29	19	25	28

Clinical respondents demonstrated wide differences in the assigned level of certainty perceived to be associated with hedge words in the diagnosis, with overall certainty scores of 91% for no waffle phrase, 79% for "consistent with", 71% for "highly suspicious for", 61% for "worrisome for", 73% for "favor", 50% for "indefinite for", 62% for "suggestive of", and 48% for "cannot rule out". The variations within the level of perceived certainty (representing a measure of the clarity of the phrase) are quantified by the standard deviations from the means (Table 1). The average percent certainty of the various groups were compared, both by level of training (Fig. 4) and by specialty (Fig. 5). ANOVA analysis of the certainty per phrase yielded statistically significant differences between all phrases except "indefinite for", "suggestive of", and "worrisome for". When these phrases were compared to each other, the means were not statistically different ($p = 0.05$).

In our focused study of seven senior clinicians, we found marked variability in the way that the clinicians ranked the certainty associated with various phrases. We also found varied opinions as to how we should resolve this communication problem from the different clinicians surveyed. Many of the free text comments we received were illuminating, reflecting their own preferred manner for resolving such issues. For example, one surgeon emphasized the need to review the slide directly with the pathologist, or at a minimum have a direct phone conversation. Another emphasized that the issue was not so much grading the degree of uncertainty as it was determining the threshold to treat or pursue further diagnostic evidence. Our initial survey also sought to assess which phrases could be linked to various levels of action, but the data is not presented here. From the majority of comments in the focused survey, only an unqualified diagnosis or the phrase "consistent with" were deemed actionable for definitive therapy.

Discussion

In our review of surgical case reports we were surprised by the 35% incidence of expression of diagnostic uncertainty. Some

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