Variation in polyp size estimation among endoscopists and impact on surveillance intervals

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Background: Accurate estimation of polyp size is important because it is used to determine the surveillance interval after polypectomy.

Objective: To evaluate the variation and accuracy in polyp size estimation among endoscopists and the impact on surveillance intervals after polypectomy.

Design: Web-based survey.

Participants: A total of 873 members of the American Society for Gastrointestinal Endoscopy.

Interventions: Participants watched video recordings of 4 polypectomies and were asked to estimate the polyp sizes.

Main Outcome Measurements: Proportion of participants with polyp size estimates within 20% of the correct measurement and the frequency of incorrect surveillance intervals based on inaccurate size estimates.

Results: Polyp size estimates were within 20% of the correct value for 1362 (48%) of 2812 estimates (range 39%-59% for the 4 polyps). Polyp size was overestimated by >20% in 889 estimates (32%, range 15%-49%) and underestimated by >20% in 561 (20%, range 4%-46%) estimates. Incorrect surveillance intervals because of overestimation or underestimation occurred in 272 (10%) of the 2812 estimates (range 5%-14%). Participants in a private practice setting overestimated the size of 3 or of all 4 polyps by >20% more often than participants in an academic setting (difference = 7%; 95% confidence interval, 1%-11%).

Limitations: Survey design with the use of video clips.

Conclusion: Substantial overestimation and underestimation of polyp size occurs with visual estimation leading to incorrect surveillance intervals in 10% of cases. Our findings support routine use of measurement tools to improve polyp size estimates. (Gastrointest Endosc 2014;80:652-9.)

Colonoscopy has become a widely used screening test for colorectal cancer in the United States. The current guidelines for surveillance after colonoscopy with polypectomy rely on the number, size, and histologic characteristics of the excised polyps.[1] When one or more adenomas 10 mm or larger are found on a baseline colonoscopy, a

Abbreviation: ASGE, American Society for Gastrointestinal Endoscopy.

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surveillance interval of 3 years is recommended. Inaccurate size estimation may lead to the performance of unnecessary procedures when polyp size is overestimated and to delayed diagnosis when underestimated. Hence, accurate estimation of polyp size is essential during colonoscopy performance.

In clinical practice, a high degree of subjectivity exists in polyp size estimation. Only rarely are objects of fixed size, such as an open biopsy forceps, placed adjacent to the lesion for measurement. Other methods such as linear probe and ruler measurement ex vivo immediately after excision are rarely used because they are time consuming when compared with visual estimation. In addition, ex vivo measurements may provide inaccurate estimates: additional tissue may be removed together with the polyp, the polyp may be incompletely removed, or the polyp may be removed in piecemeal fashion.

The aim of this study was to evaluate the variation and accuracy in polyp size estimation among endoscopists and the impact on the surveillance interval recommendation.

Take-home Message

- A substantial number of endoscopists overestimate or underestimate polyp size when estimation is done visually.
- Inaccurate polyp size estimation has a major impact on surveillance interval in patients undergoing polypectomy.

MATERIAL AND METHODS

Video recordings and measurements

Video recordings of endoscopic removal of 4 polyps (A, B, C, and D) performed during screening colonoscopies were obtained (links to videos: http://www.youtube.com/watch?v=JOpT4Ycbsmw; http://www.youtube.com/watch?v=2Y14nhVtiaU; http://www.youtube.com/watch?v=Vvwq132cHRE; http://www.youtube.com/watch?v=87ZUc_3o7Q4). The recordings were edited to include the initial inspection of the polyp about to be removed and the actual removal with a snare. The duration of the edited recordings ranged from 27 seconds to 49 seconds. For polyps A, B, and D, a still photograph of an 8-mm biopsy forceps opened immediately adjacent to the polyps was taken and printed. The size was determined by measuring the size of the open forceps in the printed photograph and using this measurement as a conversion scale (length of open forceps in photograph = 8 mm) when the largest diameter of the polyp on the photograph was measured (Fig. 1 A, B, and D). The edited recordings shown in the survey did not include the portion in which the biopsy forceps was used to measure the polyp. For polyp C, it was difficult to identify the largest diameter and align it with the biopsy forceps. For this reason, it was decided to obtain the measurement after snare excision of the polyp in one piece, retrieval with a net, and placement next to a ruler (Fig. 1C). Based on these measurement methods, the sizes of polyps A, B, C, and D were 7 mm, 10 mm, 15 mm, and 5 mm, respectively. These measurements were considered as "correct" and were used as reference in the results analysis. We sought to include a sample of polyps balanced for size around the 10-mm size that is critical for surveillance recommendations. The use of 4 recordings allowed us to assess 2 polyps <10 mm and 2 that were ≥ 10 mm. In addition, we believed that it was crucial to choose a number of recordings that would not discourage endoscopists from participating in the survey. Before settling on 4 recordings, we consulted a number of endoscopist colleagues and asked for feedback regarding the length of the survey and the likelihood of their participation based on number of recordings used. Based on their feedback, we concluded that the use of more than 4 recordings would markedly decrease the chance of participation.

Survey

An e-mail survey was sent to 9263 members of the American Society for Gastrointestinal Endoscopy (ASGE), of whom 7372 had a valid e-mail address. The first part of the survey included 4 demographic questions about practice (academic or private), years of experience, specialty, and number of colonoscopies performed each year. The second part included the 4 video recordings, each followed by a question to estimate the size of the polyp observed in the recording. All recordings could be played and replayed if needed by clicking on the appropriate link for each polyp.

Endpoints

The primary endpoints of the study were accuracy of polyp size estimation (comparing the participants' estimated sizes with the correct measurements) and its impact on surveillance intervals. We considered values falling within 20% of the correct size as acceptable accuracy. We chose $>20\%$ as our definition for inaccurate estimates rather than 10% because we anticipated that most respondents would provide their millimeter estimates of polyp size in whole numbers without providing tenths of a millimeter. Use of 10% as a threshold for our smaller polyps (5 mm and 7 mm) would have required a level of precision for the estimates that we would not have (tenths of a millimeter), and any participant whose estimate was 1 mm off from the reference measurement would be considered inaccurate. Use of $>20\%$ allowed us to assess the whole number millimeter estimates provided by participants (because $>20\%$ translated to >1 mm for all polyps) and also prevented the assessment that estimates only 1 mm off from the reference were inaccurate. In addition, because even our measured reference estimates might