

# Use of a novel polyp “ruler snare” improves estimation of colon polyp size

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**Background and Aims:** Prior studies have demonstrated that endoscopists’ estimates of polyp size are imprecise. The aim of this study was to determine whether a modified polypectomy “ruler snare” improves the accuracy of assessment of polyp size in real time without the use of additional devices.

**Methods:** Ten artificial polyps of predetermined sizes (4 to 25 mm) were affixed to the inside of a colon model. A standard polypectomy snare was modified by adding 5-mm graduated markings to the distal end of the plastic sheath. Study participants estimated the sizes of the artificial polyps during simulated colonoscopies, first using a standard snare and then with the modified ruler snare.

**Results:** Thirty-four private practice and academic gastroenterologists participated in the study. Endoscopists’ ability to accurately classify polyps by size (diminutive, small, or large) improved from 48.5% to 60.3% with the ruler snare ( $P = .002$ ). The greatest improvement in precision was seen among the large polyps, where accuracy increased from 35.9% to 58.2% with use of the ruler snare ( $P < .0001$ ). Participants underestimated polyp size by a mean of 3.6 mm (interquartile range,  $-5$  to  $-2$  mm) with the standard snare and 1.8 mm (interquartile range,  $-3$  to 0 mm) with the ruler snare, which corresponded to a 44.2% improvement in accuracy with the ruler snare ( $P < .05$ ).

**Conclusions:** The modified ruler snare improved polyp size assessment compared with a standard snare, particularly with large polyps. Overall, although size estimation continues to be imprecise, the addition of calibrated markings to a polypectomy snare is a simple and likely low-cost means to improve neoplasia surveillance recommendations.

An accurate assessment of polyp size is important because this information is used to determine the appropriate colonoscopic surveillance interval.<sup>1-3</sup> However, estimation of polyp size during colonoscopy has been found to be highly unreliable in several studies.<sup>4-6</sup> Assessment of the size of larger polyps is associated with the highest degree of inaccuracy, which is particularly concerning because underestimation may lead to inappropriately long surveillance intervals and an increased risk of interval colon cancers.<sup>7</sup> Although open biopsy forceps of known size and endoscopic rulers have been advocated as a means to improve measurements, these

approaches are less practical when snare polypectomy is performed.<sup>8</sup>

Therefore, we developed a prototype “ruler snare” that included graduated markings on the distal end of the sheath to facilitate polyp measurement. The aim of our study was to determine if this ruler snare improved the accuracy of polyp size assessment.

## METHODS

### Ex vivo colon model and polyp ruler snare

An ex vivo artificial colon model (AO Scientific Instruments, Southbridge, Mass, USA) was modified by affixing 10 plastic spherical beads to the inside of the model to represent polyps (Fig. 1). The bead sizes were 4 mm, 5 mm (2 beads), 6 mm (2 beads), 10 mm (2 beads), 12 mm, 13 mm, and 25 mm. The polyp ruler snare consisted of a standard polypectomy snare (model 00711120; US Endoscopy, Mentor, Ohio, USA) that was modified only by adding linear markings to the distal 3 cm of the sheath in 5-mm increments (Fig. 2).

### Study participants and protocol

Endoscopists who performed colonoscopy procedures at 1 of several academic or private institutions in the

*DISCLOSURE: All authors disclosed no financial relationships relevant to this publication. Research support for this study was provided by resources from the VA Puget Sound Health Care System (A.M.K. and J.A.D.).*

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0016-5107/\$36.00

<http://dx.doi.org/10.1016/j.gie.2015.08.082>

Received April 8, 2015. Accepted August 26, 2015.

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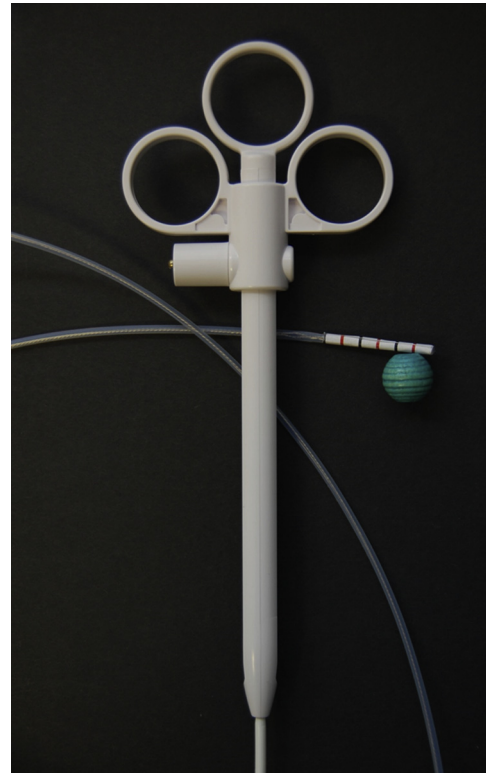
**Figure 1.** The ex vivo artificial colon model. Externally visible spherical beads mark the sites where identical beads were sewn inside the model. The model was covered to prevent the endoscopists from visualizing the external beads during the study procedure.

Seattle, Washington area were invited to participate in the study. Each endoscopist was asked to complete a questionnaire that included questions pertaining to training, experience, type of practice setting, and gender. Each study participant was blinded to the range of simulated polyp sizes and was asked to estimate the size of each of the 10 artificial polyps.

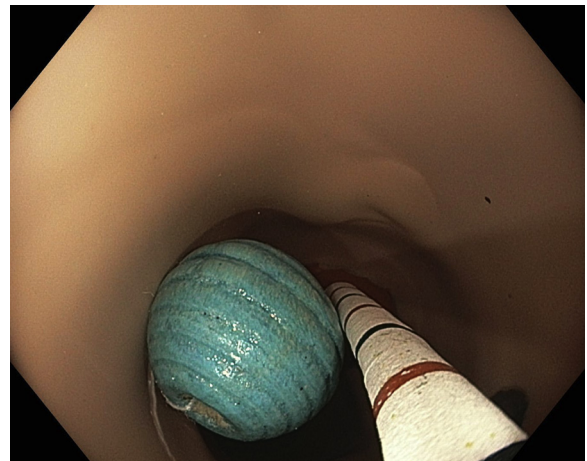
Polyp size was first estimated using an unmodified snare. Next, endoscopists repeated the colonoscopy and estimated the polyp sizes using the ruler snare (Fig. 3). Participants then rated the ruler snare on ease of use (“easy,” “neither easy nor difficult,” “difficult”) and their likelihood of using the ruler snare in practice (“very likely,” “likely,” “neither likely nor unlikely,” “unlikely”). Institutional Review Board approval was obtained from the VA Puget Sound Health Care System before initiating this study.

### Statistical analysis

Student *t* tests were used to compare differences between mean measurement errors between the 2 snare devices. Overall accuracy in classifying polyp size categories were compared using the  $\chi^2$  test. A significance level of  $P < .05$  (2-tailed) was used for all comparisons.



**Figure 2.** The “ruler snare” was created by adding linear markings at 5-mm intervals to the distal 3 cm of the plastic sheath of a standard polypectomy snare. It is shown here aligned next to a 13-mm simulated polyp.



**Figure 3.** Endoscopic image of the polyp “ruler snare” with markings at 5-mm intervals measuring a 13-mm simulated polyp in the colon model.

## RESULTS

### Characteristics of study participants

Thirty-four endoscopists participated in the study, including 24 attending-level gastroenterologists (11 in private practice, 8 university-affiliated, and 5 Veterans Administration-affiliated), 9 gastroenterology fellows, and 1 general surgery resident. The overall average years of

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