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A Laser Ruler To Hit The Mark On Polyp Size

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This summary reviews Taghiakbari M, Djinbachian R, Haumesser C, et al. Measuring size of colorectal polyps using a virtual scale endoscope or visual assessment: A randomized controlled trial. Am J Gastroenterol. 2024 Jul 1;119(7):1309-1317.

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STRUCTURED ABSTRACT

Question: Is a laser-based measurement tool more accurate than endoscopists' visual assessment in measuring polyp size during colonoscopy?

Design: Prospective randomized controlled trial with 1:1 allocation.

Setting: Single academic medical center in Montreal, Canada from 9/2022-1/2023 with high-definition colonoscopies performed by 4 gastroenterologists plus 1 trainee.

Patients: Patients aged 45-80 years old who were undergoing outpatient screening, surveillance or diagnostic colonoscopies with at least 1 colorectal polyp with *en bloc* polypectomy. Patients with coagulopathy/significant thrombocytopenia, inflammatory bowel disease, inpatients, or ASA classification > 3 were excluded.

Interventions: They evaluated a laser-based measurement system, or virtual scale endoscopy (VSE), integrated into a high-definition endoscope/

colonoscope with options for both linear ruler and circular scale (ELUXEO system; Fujifilm, Tokyo, Japan) **(Figure 1).** The control was standard visual assessment (VA). Colonoscopists were instructed not to use any other tools (biopsy forceps, snare, etc.) to estimate size of a polyp, and were asked to report the measure before use of any such tools. Polyps were then removed *en bloc* only using snare (no forceps) and measured manually using a digital caliper *ex vivo* after removal as the gold standard (Figure 1). Research personnel manually measuring polyp diameter with digital calipers were not blinded to intra-procedure assessment of polyp size by VSE or endoscopist visual assessment. If the polyp was fractured or damaged during suctioning, which may have altered polyp diameter, then it was excluded.

Outcomes: The primary outcome was relative accuracy of measurement of virtual scale endoscopy vs endoscopists' visual assessment. Secondary outcomes included over- vs under-measurement of size by a variety of metrics (mean normalized difference, discrepancy percent) and effect of the size of the polyp on accuracy.

Data Analysis: Descriptive statistics of mean, median, frequency, X^2 or Fisher exact test were used. T-tests were used to determine whether size measurements were accurate compared to gold standard. Relative accuracy (% of true polyp size) and generalized estimating equation methods were used to measure accuracy of the methods.

Funding: The study was supported by a research grant from Fujifilm.

Results: Among 230 study patients undergoing colonoscopy**,** mean age was 64; male sex 51%-54%; indication for colonoscopy was screening in 25%-28% and surveillance in 48%-50%. In the VSE group, 204 polyps were identified. In the endoscopist' visual assessment, 166 polyps were identified. However, only 6%-8% of these polyps were $\geq$ 10 mm based on caliper measurement, and 38%-42% of polyps in both groups were excluded from digital caliper assessment for various reasons and were not included in data analysis.

Overall, relative accuracy in size measurement was 84.0% with VSE compared to 68.4% with endoscopists' visual assessment alone ($P < 0.001$). Relative accuracy significantly increased with polyp size with visual assessment alone but not with VSE. Under-sizing of small (6-9 mm) polyps as diminutive (1-5) polyps was less frequent with VSE than with visual assessment (13.5% vs 57.1%, $P = 0.0005$). There was no oversizing of diminutive/small polyps (1-9mm) as large polyps (≥10 mm), and no statistically significant under-sizing of large polyps, although sample size was quite limited. Both arms showed >90% agreement with USMSTF guidelines. In terms of exact size estimation, VSE was more accurate than visual assessment alone by a variety of metrics.

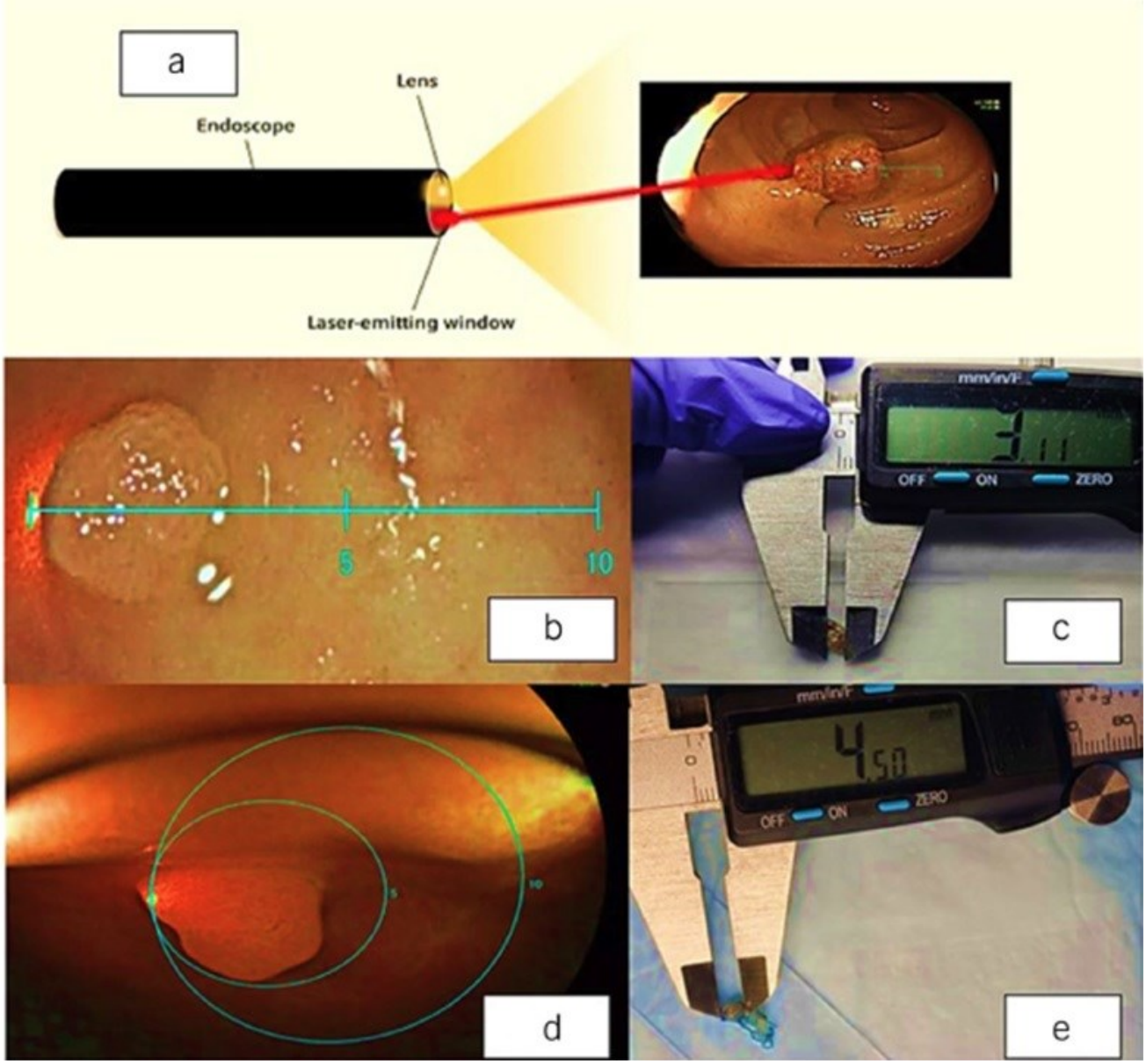

Figure 1. Visual laser endoscopy tool (images a, b, d) and measurement of polyp size with calipers after polypectomy and suctioning through colonoscope.

COMMENTARY

Why Is This Important?

Multiple studies demonstrate that endoscopists' visual assessment of polyp diameter is variable, suboptimal and subject to bias including overestimation of polyp size.[1-4] Interventions are needed to improve accuracy of polyp sizing for both individual patient care, as well as minimization of colonoscopy over- and under utilization. For example, removing a single 8-9 mm adenoma typically would warrant a 7-10 year interval, compared to 3 years for a 10-11 mm adenoma.

Multiple artificial intelligence (AI) tools can be used intra-procedure to facilitate polyp detection and have demonstrated particular benefit for helping trainees identify polyps. It seems possible or

even likely that new artificial intelligence (AI) tools will facilitate real-time measurement of polyp diameter during colonoscopy, although additional research is needed before widespread implementation.

Key Study Findings

Overall, the laser-based, Virtual Scale Endoscopy tool was more accurate than the endoscopists' visual assessment.

The endoscopists in this study tended to show more undersizing at baseline/control, although there was no significant difference between arms at the 10 mm threshold with the assistance of the VSE tool. Of note, 20% of polyps ≥10 mm were undersized as <10 mm in this study of 4 endoscopists.

Caution

Much of the variability in studies finding excess over- vs under- estimation of polyp size is likely influenced by practice, financial and legal contexts. In this study (and many others), endoscopists are fully aware that their practices are being studied and may inherently behave differently (i.e. Hawthorne effect).

This study was limited by lack of blinding. In the future, similar studies should insure that research personnel only enter the procedure room after polypectomy is completed, so that they are blinded from endoscopists' visual assessment or VSE measurement when doing digital caliper measurement of the specimen. Study results were also limited by the high percentage of polyps (38%-42%), which were not included in data analysis for various reasons, but primarily because the specimen was fractured or damaged during suctioning or because the polyp was removed piecemeal. In the future, similar studies might need to rely further on insuring *en bloc* resection with the time-consuming practice of basket extraction to minimize fracturing or damaging the specimen.

My Practice

The accuracy of the laser-based Virtual Scale Endoscopy tool has been recently studied in Europe with similar findings.[5] Of note, that study also measured duration required to make the VSE measurement (median 17 seconds, range 12-22 seconds), which may be difficult to use when short on time or if there are many polyps[5]. Until this technology becomes a standard feature of high definition colonoscopes, I attempt to optimize my visual assessment of polyp diameter by using the width of the snare catheter sheath (approximately 2.5 mm) at the base of the polyp. This is not as variable as the dimensions of an opened snare, useful for estimation for both diminutive vs small as well as at the 10 mm threshold (4 times the sheath width), and does not require special or additional tools. Our group utilized this concept in an education-focused intervention to improve polyp sizing accuracy.[6]

For Future Research

Although AI technologies such as the VSE may be superior to endoscopists' visual assessment of polyp size, its cost-effectiveness remains unclear. Future research should focus on the 10 mm (or larger) sizes of polyps, and its role as a quality metric in appropriate classification of advanced colorectal polyps.

Conflict of Interest

Dr. Yen has no financial conflicts of interest.

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