

Does the “Polyp Paradox” Really Exist?

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“Whatever logic is good enough to tell me is worth writing down.” This verse is also known as the Carroll’s paradox, written by Lewis Carroll in 1895 for the philosophical journal *Mind*.

Although Basil I. Hirschowitz invented the flexible fiber-optic endoscope in 1957, an innovation that radically revolutionized the practice of gastroenterology, its value for preventing colorectal cancer was not supported until 2013, when, based on a large-scale, long-term study, total colonoscopy was reported to reduce the incidence of colorectal cancer [1]. Importantly, that study also highlighted the limited effectiveness of colonoscopy in reducing the incidence of proximal (i.e., right sided) colorectal cancer after endoscopic polypectomy. Recently, Corley and co-workers, in another massive study, evaluated the adenoma detection rate (ADR) in relation to the risk of colorectal cancer and death [2]. The ADR, which ranged from 7 to 53 %, was inversely associated with the risk of interval cancer, advanced-stage interval cancer, and fatal cancer, with each 1 % increase in the ADR associated with a 3 % decrease in cancer risk. The ADR in turn is dependent on the endoscopic technology used, the completeness of bowel preparation, patient positioning during withdrawal, the total withdrawal time, and the experience of the endoscopist [3–7].

Since currently recommended surveillance intervals are based on detected adenomas and not on the true adenoma

prevalence, it is possible that surveillance frequency may not be appropriate for the actual pathology present. Since endoscopists with high ADRs presumably leave in fewer polyps, the risk of interval neoplasia is likely lower following a procedure by a high-ADR endoscopist even though the polyp yield, which dictates more frequent surveillance intervals, is higher, thus creating the “polyp paradox” in which lower-risk patients are inappropriately subjected to more frequent surveillance intervals.

In this issue of *Digestive Diseases and Sciences*, Gómez et al. [8] in the Michael Wallace group further investigated the “polyp paradox.” Among a cohort of patients with adenoma(s) detected at index colonoscopy, the authors evaluated whether the endoscopic technology (high-definition white-light vs. standard-definition white-light endoscopy) or the endoscopist-associated ADR was associated with an increased likelihood of neoplasia detection at subsequent colonoscopy. The study was designed as a longitudinal follow-up of a prior cross-sectional cohort study in which 288 patients were eligible for inclusion. Eighteen endoscopists were classified as high or low adenoma detectors: the median ADR was 23 and 32 % for the low detectors and for the high detectors, respectively. According to general recommendations, withdrawal times were greater than 6 min in both groups. No statistically significant differences in interval adenoma or polyp detection end points were identified according to the type of index colonoscopy (high-definition vs. standard-definition endoscopes) or according to the technical abilities of the endoscopist (high vs. low adenoma detectors). The only statistically significant finding was a lower ADR for left-sided hyperplastic polyps following initial high-definition endoscopy. Accordingly, the results of this study do not support adjusting surveillance guidelines based on the type of colonoscopy performed or the endoscopist’s individual

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ADR and thus do not support the concept of the “polyp paradox.”

The results of the study sharply contrast with the studies reporting that the ADR is inversely correlated with the incidence of interval cancers. Importantly, since the study was performed at an endoscopic center of excellence, it is possible that the ADRs were above a certain threshold, thus obscuring their relation to the discovery of pathology during repeat procedures. According to some, the ADR should be at least 20 % in order to decrease the risk of subsequently detected colorectal cancer [9]. In the discussed study, the ADR of low detectors was ~23 %. In comparison with the study published in the *New England Journal of Medicine* [2], even the low adenoma detectors were highly skilled endoscopists, which might have potentially biased that study. Therefore, future studies evaluating a potential “polyp paradox” should also include endoscopists with ADRs < 20 %.

The overall incidence of interval cancers was exceptionally low in the discussed study, thus indirectly suggesting that a high ADR does reduce the risk of interval cancers. Moreover, the Gómez et al. study did not attribute any benefit to high-definition white-light endoscopy when compared to standard-definition white-light endoscopy. Although one recent retrospective study from the same group had reported higher ADRs for high-definition versus standard-definition endoscopy (29 vs. 24 %, $P = 0.026$), those results had not been confirmed by retrospective cohort studies [10, 11]. Moreover, a meta-analysis of 5 (3 retrospective) studies involving 4,422 patients reported no differences between high-definition and standard-definition endoscopy in the detection of high-risk adenomas [12]. The incremental yield of high-definition colonoscopy for the detection of any polyp was 3.8 % with a number needed to treat of 26, with similar data for the detection of adenomatous polyps. Therefore, prospective, randomized, multicenter trials evaluating the efficacy of high-definition versus standard or *versus* high-resolution endoscopy are highly warranted in order to finally clarify this issue.

Taken together, this well-presented study by Victoria Gómez et al. did not report any significant differences between high-definition and standard-definition endoscopy and high vs. low adenoma detectors in relation to the number of polyps or adenomas detected at follow-up

colonoscopy. The study introduced the term of a potential “polyp paradox” to the literature. Although this “polyp paradox” could not be confirmed in this retrospective analysis, the study paves the way to acquire further scientific evidence to validate its findings in a prospective randomized controlled trial.

Therefore, to return to the Carroll’s paradox, “Whatever logic is good enough to tell is worth writing down” indeed.

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