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Introduction

The incidence of colorectal cancer (CRC) in Asia has been markedly increasing in recent years. Colonoscopy is highly effective in reducing the incidence and mortality of CRC. Colonoscopy is the gold standard screening method for CRC, however, it has an Achilles’ heel in its miss rate demonstrated in studies with tandem colonoscopy and CT colonography. World Endoscopy Organization defines an interval cancer as a CRC diagnosed after a colonoscopy in which no cancer is detected, and before the date of the next recommended colonoscopy. Recent studies reported the prevalence of interval cancers ranged from 4% up to 8%. Assuming that proximately 27,618 new cases of CRC were diagnosed based on the Korea National Cancer Incidence Database 2013, approximately 1,104-2,208 interval cancers might be expected to occur in Korea. For most cases of interval cancer, it is difficult to determine the precise “cause”. It is difficult to determine the precise case of interval cancer. Generally, however, there are three explanations for these events: missed neoplasia, incomplete resection, and new lesions. As majority of interval cancers arise from missed lesions or incomplete resection, most interval cancers may be prevented by improving colonoscopy quality. In this issue, we will discuss how to monitor colonoscopy quality indicators to prevent development of interval cancer.

What are the key quality indicators to monitor?

1. Bowel preparation

Poor bowel preparation likely accounts for a significant proportion of missed lesions and incomplete examinations. In addition, it can also contribute to incomplete resection if the borders of identified polyps cannot be clearly visualized. In ACG guideline, we should monitor the quality of preparation in almost all cases, and the frequency with adequate preparation not below 85% of outpatient examinations. If bowel preparation is inadequate, non-polypoid or depressed lesions rather than polypoid lesions may be more easily missed. In a multicenter observational study from Italy, non-polypoid lesions were more frequently detected in the right colon, where interval cancers are more frequently detected. The single best way to improve bowel preparation is to adopt split dose preparation. The right side of the colon is particularly affected. The next is the time interval between the end of preparation and the start of colonoscopy. The quality of preparation diminishes as the time
interval between preparation and colonoscopy increases.\textsuperscript{14} Another consideration to improve bowel preparation is education.\textsuperscript{15} Not surprisingly, education improves the quality of preparation.

2. Cecal intubation

Unarguably, cecal intubation failure may contribute to interval cancer because of missed lesions. The reasons for intubation failure are well recognized and include looping of the scope and patient discomfort. Cecal intubation should be documented by identification of appendiceal orifice and ileocecal valve, and sometimes intubation of the terminal ileum. Low cecal intubation rate was associated with higher rate of proximal interval cancer.\textsuperscript{16} Guidelines recommend a cecal intubation target of 90\% for all examinations and 95\% for routine screening examinations.\textsuperscript{11} In case of prior incomplete colonoscopy, reattempt may be successful in most cases in tertiary referral centers or with experienced endoscopists.\textsuperscript{17}

3. Adenoma detection rate (ADR)

With respect to interval cancer prevention, adenoma detection rate (ADR) is likely the single most important quality metric. Kaminski \textit{et al.}\textsuperscript{18} demonstrated that endoscopist’s ADR was significantly associated with the risk of interval cancer ($P = 0.008$). Endoscopists with ADR below 11\% were associated with a 10 times higher risk of interval cancer than those with ADR of 20\% or more. This work was extended by a large health-care delivery organization.\textsuperscript{19} There was a wide range in the reported ADRs across providers (7.4-52.5\%). As compared with endoscopists in the lowest ADR quintile, endoscopists with highest ADR quintile had 48\% less risk of interval cancer, 57\% less risk of advanced stage interval cancers, and 62\% less risk of fatal interval cancers. There was a 3\% reduction in CRC incidence and a 5\% reduction in cancer mortality for each 1\% increase in ADR. Based on this new evidence, ACG guideline recommends target of 25\% for overall ADR in screening colonoscopies, and a gender-specific target of 30\% for male and 20\% for female.\textsuperscript{11} Although ADR is currently the most important quality metric, it has some limitations. First, ADR does require manual entry of pathology data in most cases, which requires additional work for the endoscopists or endoscopy unit. In this regard, polyp detection rate has been proposed as alternative to ADR. Second, ADR may rewards a “one and done” approach to colonoscopy, i.e., the endoscopists may stop examining the remaining mucosa carefully after identifying one adenoma. In this regard, adenoma per colonoscopy (APC) has been proposed as alternative to ADR. Currently, APC is considered to be the most promising alternative to ADR. Finally, ADR is an only surrogate measures and not a direct measure of interval cancers.

Currently, ADR was targeted for conventional adenomas and do not apply to serrated lesions. However, recent evidence has shown that there is more variation in the detection rate of sessile serrated lesions than is seen for conventional adenoma.\textsuperscript{20} It means that missing polyps are a greater problem for these lesions than for conventional adenomas. Sessile serrated lesions likely contribute to the development of interval cancers for three chief reasons: 1) they are difficult to detect and commonly missed, 2) they have the potential for rapid progression, and 3) incomplete resection is common with sessile serrated lesions.\textsuperscript{21}

4. Optimal surveillance

For colonoscopy to be effective and to minimize risk, the surveillance interval should be optimized. Overutilization of colonoscopy can increase the risks and cost of colonoscopy, however, underutilization of co-
Colonoscopy can increase the risk of “new” CRC. Currently, colonoscopy is both overutilized and underutilized. ACG guideline recommends optimal surveillance target of 90% in average-risk patients.11

5. Complete resection

CARE study22 showed that the rate of incomplete resection for neoplastic polyps varies among endoscopists. Incomplete resection might contribute to the development of interval cancers. In fact, Robertson et al.23 showed that 26% of interval cancers developed in the same anatomic segment as those of a previous polypectomy, which suggests a causal role for incomplete resection. In a dietary Polyp Prevention Trial,25 13 interval cancers were detected over 5,810 person years of observation, and about 31% of them were developed because of incomplete resection. Therefore, we should attention more to increase complete resection. The first step may be a better recognition of risk polyp to be incompletely removed. According to CARE study,22 large, flat, and sessile serrated polyps would fall into this category. Then, how to improve complete resection? First, colonoscopists should know their limits for difficult polypectomies. Second, tattooing lesions for subsequent removal by a more experienced endoscopist may help. Finally, there is some role of high magnification endoscopy to detect residual tissue and argon plasma coagulation to reduce recurrence in case of piecemeal polypectomy.

Conclusions

To reduce the burden of interval cancer, we should focus on the monitoring of quality indicators, improvement of colonoscopy training and quality assurance program. The importance of training of the colonoscopy will be talked on next session. In addition, a real culture of quality improvement and assurance may be more important than individual metrics. Developing system to continuously monitor quality indicators may be critical to preventing interval cancers.

References


