

# Impact of the European Society of Gastrointestinal Endoscopy 2020 guidelines on the number of scheduled post-polypectomy surveillance colonoscopies

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## ABSTRACT

**Background and study aims** In contrast with the European Society of Gastrointestinal Endoscopy (ESGE) 2013 and the US Multi-society Task Force (USMSTF) 2020 guidelines, the ESGE 2020 guideline considers patients with three to four adenomas < 10 mm or an adenoma with villous histology as low risk. The aim of this study was to quantify the influence of the application of the new ESGE 2020 guidelines, as opposed to the ESGE 2013 and USMSTF 2020 guidelines, on the number of scheduled colonoscopies, and to describe the main causes for changes in the surveillance intervals.

**Patients and methods** A retrospective evaluation was conducted of a prospectively maintained fecal immunochemical test (FIT)-based regional colorectal cancer screening program database. Surveillance regimens following ESGE 2020, ESGE 2013, and USMSTF 2020 guidelines were compared.

**Results** Overall, 1284 individuals with a positive FIT and undergoing colonoscopy were consecutively included. When applying the ESGE 2020 guidelines, 10.8% of patients changed to a “no-surveillance” group (relative reduction in colonoscopies of 82.5%). The main reason for these changes was considering three to four adenomas as low risk. The proportion of patients from the “3-year surveillance” group who moved to the “no-surveillance” group was lower when a sessile serrated lesion (SSL) was present (ESGE 2013, 32.0% vs 16.3%; USMSTF 2020 17.2% vs 6.8%). Analyzing the 41 patients with SSLs who remained unchanged in the “no-surveillance” group, only in 15 (36.6%) the cause was the presence of an SSL.

**Conclusions** applying the new ESGE 2020 guidelines could reduce by 11% the proportion of individuals being offered surveillance. SSLs have not a major influence on the change of surveillance intervals.

## Introduction

The implementation of population-based colorectal cancer (CRC) screening programs has led to a significant increase in the number of annual colonoscopies [1,2]. Surveillance after polypectomy is currently one of the main indications for colonoscopy and represents the majority of the burden on the endoscopy units [3].

The allocation of surveillance intervals after polypectomy is based on stratification of patients according to their assumed risk of developing advanced neoplasia or CRC during follow-up. Although initial follow-ups were rather narrow [4], in recent years, there has been a trend toward widen surveillance intervals [5]. Recent data show that some patients considered by the European guidelines for quality assurance in CRC [6] to be at high risk of advanced neoplasia during surveillance have the same outcomes as those at intermediate risk [7] and that some patients considered to be at intermediate risk may have outcomes similar to those at low risk [8]. The recently published European Society of Gastrointestinal Endoscopy (ESGE) guidelines address this new evidence and recommend not performing endoscopic surveillance in patients with complete excision of up to four adenomas < 10 mm regardless of the presence of a villous component. In contrast, a 3-year surveillance colonoscopy should be scheduled for those patients with five or more adenomas [9].

These changes are of practical importance because the villous component may be present in about 80% of advanced adenomas [10], and patients with three to four adenomas account for about 15% of patients included in a FIT-based CRC population screening program [11]. However, the influence of these criteria change on the burden of the endoscopy units is unknown.

On the other hand, ESGE and USMSTF guidelines treat sessile serrated lesions (SSLs) differently, USMSTF guidelines considering specifically the number and size of SSLs [9,12,13]. These differences could have also an influence on surveillance intervals, but the evidence on the importance of SSLs in the planning of post-polypectomy follow-up is scarce [14].

Our objective was to estimate the influence of the application of the new ESGE 2020 guidelines, as opposed to the ESGE 2013 and USMSTF 2020 guidelines, on the number of scheduled colonoscopies, and to describe the main causes for changes in the surveillance intervals. Secondary objectives were to evaluate the influence of SSLs on the modification of surveillance intervals and to assess changes in the number of 3-year surveillance intervals in a particular year when using the new ESGE 2020 guidelines.

## Patients and methods

We performed a retrospective evaluation (May 2017 to March 2020) of a prospectively maintained database, integrated into the population-based CRC screening program of the Valencian Community in Spain. This program, in which people aged 50 to 69 years are invited to participate, is based on the performance of an initial fecal immunochemical test (FIT), followed by a co-

lonoscopy when a positive FIT is obtained (cut-off point 100 ng/ml). The FIT test is scheduled every other year and has an average positivity rate in our population of 6.2% [15]. Our health-care area is currently at its seventh FIT round. All endoscopic examinations are registered in a database including demographic, colonoscopy, and lesion characteristics.

Only individuals with a complete colonoscopy with at least adequate bowel cleansing (Boston scale  $\geq 6$  and  $\geq 2$  in every segment) were included in the study. Patients with a diagnosis of CRC at the index colonoscopy and those lacking histologic evaluation of polyps (e.g., coagulopathy precluding taking biopsies) were excluded. The study was developed in a large tertiary referral center in which five experienced endoscopists performed all the colonoscopies (mean [range] adenoma detection rate: 62.9% [57.6%–71.8%]; SSL detection rate: 7.8% [6.3%–9.9]).

The polyps were classified into adenomas, hyperplastic polyps (HPs), SSLs, and traditional serrated adenomas (TSAs) by three pathologists with expertise in gastrointestinal pathology. The presence of one unequivocally abnormal crypt was enough to diagnose an SSL [16]. TSA was considered a dysplastic lesion. Some previous diagnostic rounds were performed to unify the histologic criteria for serrated lesions, aiming to reach at least moderate concordance among pathologists (kappa index >0.6), as previously described [17].

Surveillance intervals were established following the ESGE 2020 guidelines [9] compared to the ESGE 2013 guidelines [12] and the US Multi-society Task Force (USMSTF) 2020 guidelines [13]. For the analysis, the USMSTF 2020 intervals were grouped taking into account the highest interval cut-off (e.g., the 3- to 5-year interval was unified into the 5-year group, and the 5–10 years and 7–10 years were unified into the 10-year group). Therefore, the groups of surveillance regimens considered were: No surveillance (return to population screening or colonoscopy in 10 years depending on the guideline considered); 3-year surveillance; 5-year surveillance; and 1-year surveillance (colonoscopy in 1 year or genetic counseling consultation depending on the guideline considered). The guideline's recommendations are summarized in ► **Table 1**.

The primary outcome was the percentage of patients assigned to a "no-surveillance" group depending on the guideline applied. The relative reduction in the number of colonoscopies was also calculated [(% patients assigned to the "no-surveillance" group if ESGE 2013 or USMSTF 2020 / % patients assigned to the "no-surveillance" group if ESGE 2020)  $\times$  100]. Secondary outcomes were the proportion of patients reassigned to a "no-surveillance" group for considering four or fewer <10-mm adenomas as low risk, for disregarding the villous component as a risk factor, or for both reasons; and the proportion of patients assigned to the "no-surveillance" group depending on the presence or absence of SSLs.

Finally, we aimed to evaluate the proportion of 3-year surveillance colonoscopies that could have been avoided in 2019, and the subsequent reduction in costs, if the ESGE 2020 guidelines had been applied. For that purpose, we evaluated all 2016 CRC screening program patients who were scheduled for their 3-yr surveillance colonoscopy in 2019 (pre-pandemic year)

► **Table 1** Recommendations for surveillance after polypectomy from the ESGE 2020, ESGE 2013, and USMSTF 2020 guidelines.

	ESGE 2020 [9]	ESGE 2013 [12]	USMSTF 2020 <sup>1</sup> [13]
No surveillance (10-year surveillance/return to population screening)	1–4 adenomas < 10 mm with LGD <sup>2</sup> Any serrated polyp <sup>3</sup> < 10 mm without dysplasia	1–2 adenomas < 10 mm with LGD Any serrated polyp <sup>3</sup> < 10 mm without dysplasia	Normal colonoscopy ≥ 20 HP in the rectum or sigmoid colon ≤ 20 HP proximal to the sigmoid colon 1–2 tubular adenomas < 10 mm
5 years			3–4 tubular adenomas < 10 mm SSLs < 10 mm Any HP ≥ 10 mm
3 years	1 adenoma ≥ 10 mm or 1 adenoma with HGD ≥ 5 adenomas Any serrated polyp ≥ 10 mm or with dysplasia Any TSA	≥ 3 adenomas Any adenoma ≥ 10 mm Any adenoma with HGD Any adenoma with a villous component Any serrated polyp ≥ 10 mm Any serrated polyp with dysplasia	5–10 tubular adenomas < 10 mm ≥ 1 tubular adenoma > 10 mm Adenoma with villous component Adenoma with HGD Any TSA 5–10 SSLs < 10 mm Any SSL ≥ 10 mm Any SSL with dysplasia
Genetic counseling/1-year surveillance <sup>4</sup>	≥ 10 adenomas	≥ 10 adenomas ≥ 5 serrated polyps proximal to the sigmoid colon, 2 of them ≥ 10 mm ≥ 20 serrated lesions along the whole colon	> 10 adenomas

LGD, low-grade dysplasia; TSA, traditional serrated adenoma; HP, hyperplastic polyp; HGD, high-grade dysplasia; SSL, sessile serrated lesion.

<sup>1</sup> The 5–10 year and 7– to 10-year intervals have been grouped into the 10-year group, and the 3– to 5-year interval has been grouped into the 5-year group.

<sup>2</sup> Regardless of the villous component.

<sup>3</sup> Serrated polyp in the ESGE guidelines refer to any lesion with serrated characteristics (hyperplastic polyps, SSLs and TSA).

<sup>4</sup> For analysis purposes these two categories (1-year surveillance group in the USMSTF guidelines and genetic counseling in the ESGE guidelines) were considered as equivalent.

using the ESGE 2013 guidelines. Only direct costs (e.g. cost associated with colonoscopy, including sedation and procedures performed, costs of doctor's visits, and cost due to colonoscopy-related complications and resource use) were considered, using a cost analysis adapted to our background, which establishes a cost per-colonoscopy of 577€ on average [18].

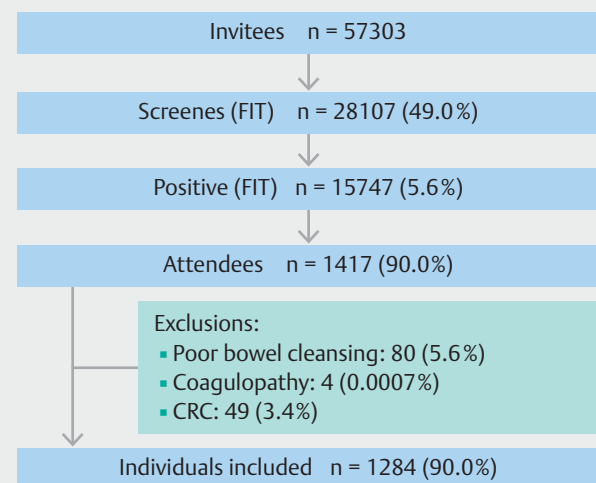
Data for discrete variables are expressed using percentages and for continuous variables using median (range). STATA v. 14.0 (Stata Corp., College Station, Texas, United States) was used for data analysis. As the study was a review from a database, an evaluation from the Institutional Review Board was deemed as not necessary.

## Results

During the period of study, 11071 colonoscopies were performed in our unit, 1417 (12.8%) belonging to the CRC screening program. A total of 1284 individuals were included, 90.6% of whom underwent colonoscopy (► **Fig. 1**), 624 women (48.6%), with a median (range) age of 63.4 years (52–70). The median number of polyps per patient (range) was one (0–26), 809 patients (63.0%) had at least one adenoma and 75 (5.8%) had at least one SSL (► **Table 2**).

### Comparison between guidelines

► **Table 3** shows the proportion of patients assigned to each surveillance regimen following the ESGE 2020 guidelines compared to the ESGE 2013 and USMSTF 2020 guidelines. When comparing the ESGE 2013 with the ESGE 2020 guidelines, the



► **Fig. 1** Flowchart of study design.

proportion of patients assigned to the “no-surveillance” group increased by 10.8% (from 62.3% to 73.1%), due to the move to the “no-surveillance group” of 139 patients. These 139 patients represented 30.3% of those in the “3-year” surveillance colonoscopy group. Also, a 10.8% increase in patients in the “no-surveillance” group was observed when using the ESGE 2020 guidelines compared to the USMSTF 2020 guidelines. In this case, all 78 patients (100%) previously in the “5-year surveil-

► **Table 2** Baseline characteristics of patients and polyps.

Patients (n = 1284)			
Age (yr), median (range)	63.4 (52–70)	Patients with at least one advanced adenoma, n (%)	317 (24.7)
Sex (woman), n (%)	624 (48.6)	Patients with at least one SSL, n (%)	75 (5.8)
Patients with at least one polyp, n (%)	962 (75.0)	Patients with at least one SSL with dysplasia, n (%)	16 (1.2)
Patients with at least one adenoma, n (%)	809 (63.0)	Patients with at least one SSL ≥ 10 mm, n (%)	15 (1.2)
Polyps (n = 3097)			
Adenomas, n (%)	1908 (61.6)	SSL, n (%)	97 (3.1)
AA, n (%)	333 (10.7)	SSL ≥ 10 mm, n (%)	13 (0.4)
Adenomas with a villous component, n (%)	272 (21.2)	SSL with dysplasia, n (%)	16 (0.5)
Adenomas with HGD	83 (6.5)	HP ≥ 10 mm, n (%)	59 (1.9)
		TSA, n (%)	12 (0.4)

AA, advanced adenoma (≥ 10 mm or with high-grade dysplasia or a villous component); SSL, sessile serrated lesion; TSA, traditional serrated adenoma; HP, hyperplastic polyp; HGD, high-grade dysplasia.

► **Table 3** Comparison of surveillance intervals from ESGE 2020 versus ESGE 2013 and USMSTF 2020 guidelines.

ESGE 2020		ESGE 2013			USMSTF 2020			
	n (%)	No surveillance <sup>1</sup> n (%)	3 years n (%)	GC <sup>2</sup> n (%)	10 years <sup>3,1</sup> n (%)	5 years <sup>4</sup> n (%)	3 years n (%)	1 year n (%)
No surveillance <sup>1</sup>	939 (73.1)	800 (100)	139 (30.3)	0	800 (100)	78 (100)	61 (16.0)	0
3 years	319 (24.8)	0	319 (69.6)	0	0	0	319 (83.7)	0
GC <sup>2</sup>	26 (2.0)	0	0	26 (100)	0		1 (0.3) <sup>5</sup>	25 (100)
Total	1284	800 (62.3)	458 (35.7)	26 (2.0)	800 (62.3)	78 (6.1)	381 (29.7)	25 (1.9)

ESGE, European Society of Gastrointestinal Endoscopy; USMSTF, US Multi-Society Task Force; GC, genetic counseling.

<sup>1</sup> For analysis purposes these two categories (No surveillance and 10-year surveillance interval) were considered as equivalent.

<sup>2</sup> For analysis purposes these two categories (1-year surveillance group in the USMSTF guidelines and genetic counseling in the ESGE guidelines) were considered as equivalent.

<sup>3</sup> Includes 10 years, 7–10 years, and 5–10 years.

<sup>4</sup> Includes 5 years and 3–5 years.

<sup>5</sup> This patient had 10 adenomas.

“3-year surveillance” group and 61 of 381 patients (16.0%) previously in the “no-surveillance” group were moved to the “no-surveillance” group. Overall, the relative reduction in the number of colonoscopies would be 85.2% (95% CI 82.4–88.0). This 10.8% increase in patients in the “no-surveillance group” would represent a reduction in 49.4 colonoscopies% screenees.

In 77 patients (55.4%) of the 139 who switched to the “no-surveillance” group, it was due to the presence of three to four <10-mm adenomas, in 36 (25.9%) to the existence of a villous component, and 26 patients (18.7%) to both.

### Influence of SSLs

When dividing our sample of patients into those with at least one SSL and those without SSLs, the latter were more frequently assigned to the “no-surveillance” group when any of the three considered guidelines was applied (ESGE 2020: 39.1% vs 75.2%; ESGE 2013: 28.4% vs 68.4%; USMSTF 2020: 28.4% vs 64.3%). Overall, the proportion of patients moved to the “no-

surveillance” group was the same in patients with or without SSLs (10.8%). However, when considering the “3-year surveillance” group, the proportion of patients who moved to the “no-surveillance” group was higher in patients without SSLs (ESGE 2013: 32.0% vs 16.3%; USMSTF 17.2% vs 6.8% (► **Table 4**). Of note, the presence of SSLs did not affect the “5-year surveillance” group of the USMSTF 2020 guideline, in which all patients, regardless of the presence of an SSL, would have gone to the “no-surveillance” group if they were classified according to the new ESGE guideline.

Forty-one patients who had at least an SSL remained assigned to a 3-year or 5-year surveillance interval when applying the new ESGE 2020 guidelines. However, only in 15 (36.6%) the reason for such a surveillance interval assignment was the presence of a serrated lesion (5 SSL ≥ 10 mm; 6 SSL with dysplasia; 4 TSA).

► **Table 4** Comparison of surveillance intervals from ESGE 2020 versus ESGE 2013 and USMSTF 2020 guidelines depending on presence of SSLs.

ESGE 2020	ESGE 2013						USMSTF 2020						
	Patients without SSLs (n = 1210)			Patients with SSLs (n = 74)			Patients without SSLs (n = 1210)			Patients with SSLs (n = 74)			
	10 year <sup>1</sup> N (%)	3 year N (%)	GC <sup>2</sup> N (%)	10 year <sup>1</sup> N (%)	3 year N (%)	GC <sup>2</sup> N (%)	10 year <sup>1</sup> N (%)	5 year N (%)	3 year N (%)	1 year <sup>2</sup> N (%)	5 year N (%)	10 year <sup>1</sup> N (%)	3 year N (%)
No surveillance <sup>1</sup> (n = 939)	779 (100)	131 (32.0)	0	21 (100)	8 (16.3)	0	779 (100)	73 (100)	58 (17.2)	0	21 (100)	5 (6.8)	0
3 year (n = 319)	0	278 (68.0)	0	0	41 (83.7)	0	0	0	278 (82.5)	0	0	41 (93.2)	0
GC <sup>2</sup> (n = 26)	0	0	22 (100)	0	0	4 (100)	0	0	1 (0.3)	21 (100)	0	0	4 (100)
Total	779	409	22	21	49	4	779	73	337	21	21	44	4

SSL, sessile serrated lesion; GC, genetic counseling; ESGE, European Society of Gastrointestinal Endoscopy; USMSTF, US Multi-Society Task Force.

<sup>1</sup> For analysis purposes these two categories (No surveillance and 10-year surveillance interval) were considered as equivalent.

<sup>2</sup> For analysis purposes these two categories (1-year surveillance group in the USMSTF guidelines and genetic counseling in the ESGE guidelines) were considered as equivalent.

## Influence on daily practice

Of the 471 screenees examined in 2016, 82 (17.4%) were scheduled for a 3-year surveillance colonoscopy in 2019 (pre-pandemic year) using the ESGE 2013 guidelines. When using the ESGE 2020 guidelines, 44 (53.6%) of these 82 patients would have been moved to the “no-surveillance” group, representing a cost saving of 25.388 € per year. If these figures could be extended to all the Valencian Region CRC screening program, this could represent a cost saving of 44.471 €% screenees per year. Reviewing the diagnostic yield of these 3-year surveillance colonoscopies that would have been delayed to 10 years when using the new ESGE 2020 guidelines, 21 patients (47.7%) had no adenomas. Only four patients had at least one adenoma  $\geq 5$  mm, one of them harboring a 10-mm adenoma. No high-grade dysplasia or villous component was found in any lesion.

## Discussion

Our results suggest that the application of the new ESGE 2020 guidelines may reduce by 11% the proportion of individuals likely to be included in a post-polypectomy surveillance program, for a relative reduction in the number of colonoscopies of 85%. In the case of the ESGE guidelines, the proportion of patients moving from “3-year surveillance” to a “no-surveillance” group was 30.3%, whereas for the USMSTF 2020 guidelines all patients in the “5-year surveillance” group and 16.0% of those in the “3-year surveillance” group moved to “no-surveillance.” The influence of changing criteria for stratifying risk has been previously shown in a recent study performed in the Northern Ireland Bowel Cancer Screening program evaluating the potential impact of the new British Society of Gastroenterology (BSG) 2020 guideline on surveillance regimens, compared to the previous 2010 guideline. The authors showed a 50.3% reduction in the number of individuals scheduled for surveillance [19], higher than that detected in the present study. However, in the Irish study, the reduction is essentially attributable to the disappearance of the “intermediate-risk” group in the new BSG 2020 guideline [4], a group not existing neither in the ESGE 2013 nor in the USMSTF 2020 guidelines.

In our study, the most influential factor (55.4% of cases) in the change of patients from the “3-year surveillance” group to the “no-surveillance” group was not considering the presence of up to four <10-mm adenomas as a criterion for surveillance. These findings are significant because the percentage of patients in a FIT-based CRC screening program with three to four <10-mm adenomas is high [11] and it is expected to rise because of the use of high-definition endoscopes [20]. To our knowledge, no study has investigated the specific causes of the reduction of patients with an assigned surveillance interval yet.

We also wanted to evaluate the influence of SSLs on changes in follow-up intervals. In the Irish study [19], 2.5% of patients moved to a “high-risk” group when applying the BSG 2020 guidelines because of the presence of serrated lesions (SSLs or HP), lesions not considered in the previous BSG guideline. In our

study, when following the ESGE 2020 guidelines, no patient with SSLs moved to a shorter surveillance interval, because ESGE 2013 and USMSTF 2002 considered serrated lesions already. In contrast, although the overall proportion of patients moving to the “no-surveillance” group was the same (10.8%) regardless of the presence of SSLs, patients with SSLs moved in a lower proportion from the “3-year surveillance” group to the “no-surveillance” group (ESGE 2013: 32.0% vs 16.3%; USMSTF 2020: 17.2% vs 6.8%). Regarding ESGE guidelines, this reduction cannot be attributed to SSLs because these lesions are considered in the same way in all versions. USMSTF guidelines take into account the size and number of SSLs to set the surveillance intervals, but in our series of patients the prevalence of <10-mm SSLs was very low [84 (2.7%)], with no patient having more than two <10-mm SSLs. Moreover, in our series, the presence of SSLs was the sole cause for remaining in the “3-year surveillance” group in 36.6% of cases. Most patients with SSLs (75.7%) had synchronous adenomas or advanced adenomas, which allegedly are the main culprits in establishing surveillance intervals. This idea has been also shown by a study comparing the ESGE 2013 guideline [12] with the USMSTF 2012 [21] focusing on the influence of serrated lesions. The assignment to the “3-year surveillance” group was the same regardless of the existence of SSLs because of the concurrence of advanced adenomas or three or more non-advanced adenomas [14].

We have also shown that more than half of the 2019 3-year surveillance colonoscopies would have not been performed if the ESGE 2020 guidelines had been followed when establishing the surveillance colonoscopy. This could be a relief for our busy endoscopy units, but cost savings are potentially important as well, especially when considering the entire population invited for screening every year.

Our study has some strengths. The participant endoscopists were high adenoma detectors, far beyond the 40% recommended benchmark for FIT-based CRC screening programs [22]. All the participant endoscopists had followed a standardized training session on SSL detection previously to the beginning of the study [17]. As a consequence, their clinically significant serrated polyp detection rate was also very high (13% against the suggested 7% benchmark [23]), making data on the influence of SSLs very reliable. Strict histological criteria for SSL diagnosis and mechanisms to increase concordance among pathologists were developed to minimize the misclassification of serrated lesions. However, it has also some limitations, like being a retrospective study. However, our prospectively maintained database, subject to quality evaluation within the framework of the CRC screening program, overcomes the usual problems of this type of study. Our background is that of a FIT-based CRC screening program. The influence of the new ESGE guidelines may be lower in a direct-colonoscopy program, where fewer adenomas and advanced adenomas are found [24]. Our program is in its seventh round, and this may affect the extrapolation of the results to other situations. It seems that the round number loses influence on the number and characteristics of polyps found after the first or second round [25]. The influence of the new guidelines may be lower in a CRC screening program in its first rounds. We do not know either if these results could

be fully extrapolated to patients with symptoms. Finally, our cost analysis is only applicable to our background, because costs in other health systems may be very different.

## Conclusions

In conclusion, the application of the new ESGE 2020 guidelines in CRC screening programs could reduce the number of patients included in post-polypectomy surveillance by approximately 11%, inducing a significant decrease in costs. The influence of SSLs in the reduction of surveillance intervals does not seem to be very relevant because the main reason for assigning a surveillance interval is the presence of adenomas.

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## Competing interests

The authors declare that they have no conflict of interest.

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## References

- [1] Joseph DA, Meester RG, Zauber AG et al. Colorectal cancer screening: Estimated future colonoscopy need and current volume and capacity. *Cancer* 2016; 122: 2479–2486
- [2] Cardoso R, Niedermaier T, Chen C et al. Colonoscopy and sigmoidoscopy use among the average-risk population for colorectal cancer: a systematic review and trend analysis. *Cancer Prev Res (Phila)* 2019; 12: 617–630
- [3] Calderwood AH, Holub JL, Greenwald DA et al. Yield and practice patterns of surveillance colonoscopy among older adults: an analysis of the GI Quality Improvement Consortium. *Am J Gastroenterol* 2019; 114: 1811–1819
- [4] Cairns SR, Scholefield JH, Steele RJ et al. Guidelines for colorectal cancer screening and surveillance in moderate and high risk groups (update from 2002). *Gut* 2010; 59: 666–689
- [5] Jover R, Bretthauer M, Dekker E et al. Rationale and design of the European Polyp Surveillance (EPoS) trials. *Endoscopy* 2016; 48: 571–578
- [6] Atkin WS, Valori R, Kuipers EJ et al. European guidelines for quality assurance in colorectal cancer screening and diagnosis. First Edition – Colonoscopic surveillance following adenoma removal. *Endoscopy* 2012; 44: SE151–SE163
- [7] Cubiella J, Carballo F, Portillo I et al. Incidence of advanced neoplasia during surveillance in high- and intermediate-risk groups of the European colorectal cancer screening guidelines. *Endoscopy* 2016; 48: 995–1002
- [8] Perez-Cuadrado-Robles E, Torrella-Cortes E, Bebia-Conesa P et al. Intermediate-risk patients with three to four small adenomas should be

- considered low risk for colorectal cancer screening. *Digest Endosc* 2016; 28: 450–455
- [9] Hassan C, Antonelli G, Dumonceau JM et al. Post-polypectomy colonoscopy surveillance: European Society of Gastrointestinal Endoscopy (ESGE) Guideline – Update 2020. *Endoscopy* 2020; 52: 687–700
- [10] Click B, Pinsky PF, Hickey T et al. Association of Colonoscopy Adenoma Findings With Long-term Colorectal Cancer Incidence. *JAMA* 2018; 319: 2021–2031
- [11] Cubiella J, Castro I, Hernandez V et al. Characteristics of adenomas detected by fecal immunochemical test in colorectal cancer screening. *Cancer Epidemiol Biomarkers Prev* 2014; 23: 1884–1892
- [12] Hassan C, Quintero E, Dumonceau JM et al. Post-polypectomy colonoscopy surveillance: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. *Endoscopy* 2013; 45: 842–851
- [13] Gupta S, Lieberman D, Anderson JC et al. Recommendations for Follow-Up After Colonoscopy and Polypectomy: A Consensus Update by the US Multi-Society Task Force on Colorectal Cancer. *Gastrointest Endosc* 2020; 91: 463–485 e465
- [14] Bleijenberg A, Klotz D, Loberg M et al. Implications of different guidelines for surveillance after serrated polyp resection in United States of America and Europe. *Endoscopy* 2019; 51: 750–758
- [15] Beso Delgado M, Ibanez Cabanell J, Perez Sanz E et al. Results of 10 years of the Colorectal Cancer Prevention Program in the Valencian Community. *Rev Esp Salud Publica* 2021; 95: e202107100
- [16] Ahadi M, Sokolova A, Brown I et al. The 2019 World Health Organization Classification of appendiceal, colorectal and anal canal tumours: an update and critical assessment. *Pathology* 2021; 53: 454–461
- [17] Bustamante-Balen M, Satorres C, Ramos-Soler D et al. Evaluation of the optical criteria for sessile serrated lesions of the colon: A prospective study on a colorectal cancer screening population. *Endosc Int Open* 2021; 9: E14–E21
- [18] Lue A, Hijos G, Sostres C et al. The combination of quantitative faecal occult blood test and faecal calprotectin is a cost-effective strategy to avoid colonoscopies in symptomatic patients without relevant pathology. *Therap Adv Gastroenterol* 2020; 13: doi:10.1177/1756284820920786
- [19] Loughrey MB, Ings G, Dickey W et al. Evaluating the impact of 2020 post-polypectomy surveillance guidelines in the Northern Ireland bowel cancer screening programme. *Gut* 2021; 70: 226–228
- [20] Rouphael C, Lopez R, McMichael J et al.  $\geq 3$  Nonadvanced adenomas are more common in the era of contemporary colonoscopy and not associated with metachronous advanced neoplasia. *J Clin Gastroenterol* 2021; 55: 343–349
- [21] Lieberman DA, Rex DK, Winawer SJ et al. Guidelines for colonoscopy surveillance after screening and polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer. *Gastroenterology* 2012; 143: 844–857
- [22] Jover R, Herraiz M, Alarcon O et al. Clinical practice guidelines: quality of colonoscopy in colorectal cancer screening. *Endoscopy* 2012; 44: 444–451
- [23] Anderson JC, Butterly LF, Weiss JE et al. Providing data for serrated polyp detection rate benchmarks: an analysis of the New Hampshire Colonoscopy Registry. *Gastrointest Endosc* 2017; 85: 1188–1194
- [24] Waldmann E, Kammerlander A, Gessl I et al. New risk stratification after colorectal polypectomy reduces burden of surveillance without increasing mortality. *United Europ Gastroenterol J* 2021: doi:10.1002/ueg2.12119
- [25] Zorzi M, Hassan C, Capodaglio G et al. Long-term performance of colorectal cancerscreening programmes based on the faecal immunochemical test. *Gut* 2018; 67: 2124–2130