Appendix 7. Outline of evidence for recommendations

▣ KQ 01

Is the size of tubular adenoma a risk factor to be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	Adenoma size ≥10 mm or 20 mm	Patients with adenoma size <10 mm or those without polyps	CRC incidence and mortality

▣ Comparison of recommendations of the selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	1. Risk for incident and fatal CRC after baseline adenoma removal is uncertain. 2.Surveillance colonoscopy after baseline removal of adenoma with high-risk features (e.g., size >10 mm) may reduce risk for incident CRC, but impact on fatal CRC is uncertain. 3. Incremental impact of surveillance colonoscopy after baseline removal of adenoma with low-risk features (such as 1–2 adenomas <10 mm) on risk for incident and fatal CRC is uncertain.	ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥ 10 mm or with dysplasia.	1. We recommend that the high-risk criteria for future CRC comprise either: ▸▸ two or more premalignant polyps including at least one advanced colorectal polyp (defined as a serrated polyp of at least 10 mm in size or containing any grade of dysplasia, or an adenoma of at least 10 mm in size or containing high-grade dysplasia); or ▸▸ five or more premalignant polyps. 2. We suggest that where histological completeness of excision cannot be determined in patients with non-pedunculated polyps of 10–19 mm in size, or an adenoma containing high-grade dysplasia, or a serrated polyp containing any dysplasia, then a site-check should be considered within 2–6 months.
Level of Evidence, Strength of Recommendation	1. Low quality of evidence 2. Low quality of evidence 3. Low quality of evidence)	Strong recommendation, moderate quality evidence.	1. Strength of recommendation: Strong 2. GRADE of evidence: Low Strength of recommendation: Weak

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- References

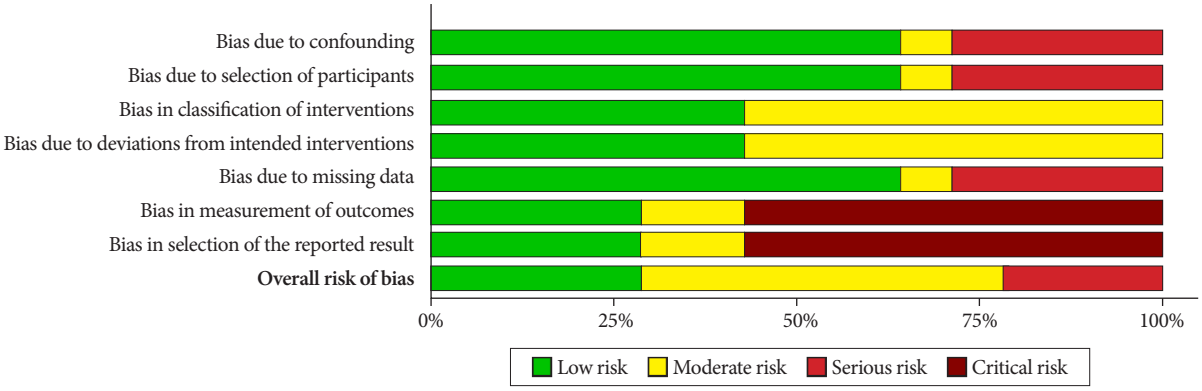
	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
15	Coleman HG, Loughrey MB, Murray LJ, et al. Colorectal Cancer Risk Following Adenoma Removal: A Large Prospective Population-Based Cohort Study. Cancer Epidemiol Biomarkers Prev 2015;24:1373–1380.	Nested case-control study	148/148
16	Cottet V, Jooste V, Fournel I, et al. Long-term risk of colorectal cancer after adenoma removal: a population-based cohort study. Gut 2012;61:1180–1186.	Cohort study	5 779
17	Løberg M, Kalager M, Holme Ø, et al. Long-term colorectal-cancer mortality after adenoma removal. N Engl J Med 2014;371:799–807.	Cohort study	40 826
18	Click B, Pinsky PF, Hickey T, et al. Association of Colonoscopy Adenoma Findings With Long-term Colorectal Cancer Incidence. JAMA 2018;319:2021–2031.	Multicenter, prospective cohort study	154 900
19	Atkin W, Wooldrage K, Brenner A, et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834.	Retrospective, multicenter, cohort study	11 944

[Guideline 2] ESGE 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
22	Pohl H, Srivastava A, Bensen SP, et al. Incomplete polyp resection during colonoscopy--results of the Complete Adenoma Resection (CARE) study. Gastroenterology 2013;144:74–80.	Prospective study	1 427
133	Nishihara R, Wu K, Lochhead P, et al. Long-term	Prospective cohort study	88 902
34	Adler J, Toy D, Anderson JC, et al. Metachronous Neoplasias Arise in a Higher Proportion of Colon Segments From Which Large Polyps Were Previously Removed, and Can be Used to Estimate Incomplete Resection of 10–20 mm Colorectal Polyps. Clin Gastroenterol Hepatol 2019;17:2277–2284.	Retrospective study	1 031

- Evidence table of the first-round reference articles (Ref. Excel file)



Risk of bias domains

Study	D1	D2	D3	D4	D5	D6	D7	Overall
Burnett-Hartman et al. 2019	×	×	−	−	×	−	−	×
Cross et al. 2020	+	+	+	+	+	!	!	−
Chang et al. 2020	×	×	−	−	×	+	+	−
Grunwald et al. 2019	×	×	−	−	×	!	!	×
D. L. Li et al 2020	+	+	−	−	+	!	!	−
T. A. J. Tollivoro et al. 2019	+	+	+	+	+	−	−	+
Vleugels et al. 2019	+	+	−	−	+	+	+	+
X. H. He et al. 2020	+	+	+	+	+	+	+	+
Anderson et al. 2019	+	+	+	+	+	+	+	+
Hartstein et al. 2020	+	+	−	−	+	!	!	−
Jin et al. 2019	×	×	−	−	×	!	!	×
Park et al. 2019	−	−	+	+	−	!	!	−
Waldmann et al. 2020	+	+	+	+	+	!	!	−
Wieszczy et al. 2020	+	+	−	−	+	!	!	−

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended intercentions.
D5: Bias due to missing of data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
! Criticla
× Serious
− Moderate
+ Low

▣ KQ 02

Is the number of colorectal adenomas a risk factor that should be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	1. ≥3 adenomas 2. ≥5 adenomas	1–2 adenomas	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines (Example)

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	1. Surveillance colonoscopy after baseline removal of adenoma with high-risk features (e.g., size ‡ 10 mm) may reduce risk for incident CRC, but impact on fatal CRC is uncertain. (Low quality of evidence) 2.Incremental impact of surveillance colonoscopy after baseline removal of adenoma with low-risk features (such as 1–2 adenomas < 10 mm) on risk for incident and fatal CRC is uncertain. (Low quality of evidence)	1. ESGE recommends that patients with complete removal of 1–4 adenomas (< 10 mm) with low grade dysplasia, irrespective of villous components, or any serrated polyp < 10 mm without dysplasia, do not require endoscopic surveillance and should be returned to screening. (Strong recommendation, moderate quality evidence) 2. ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥ 10 mm or with dysplasia. (Strong recommendation, moderate quality evidence)	1. We recommend that the high-risk criteria for future CRC comprise five or more premalignant polyps. (GRADE of evidence: See later evidence section Strength of recommendation: Strong) 2. There is consistent evidence that multiplicity of adenomas at index colonoscopy is associated with an increased risk of advanced adenoma (AA) and advanced neoplasia (AN) at first surveillance. There is inconsistent, evidence regarding an association with an increased risk of CRC at first surveillance. (GRADE of evidence: Moderate)
Level of Evidence, Strength of Recommendation	Low quality of evidence	Strong recommendation, moderate quality evidence	GRADE of evidence: Moderate Strength of recommendation: Strong

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Atkin W, Wooldrage K, Brenner A, et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834.[1]	Retrospective cohort, multicenter	11 944 (number of adenomas 3–4: n=1 029)

[Guideline 2] ESGE 2020

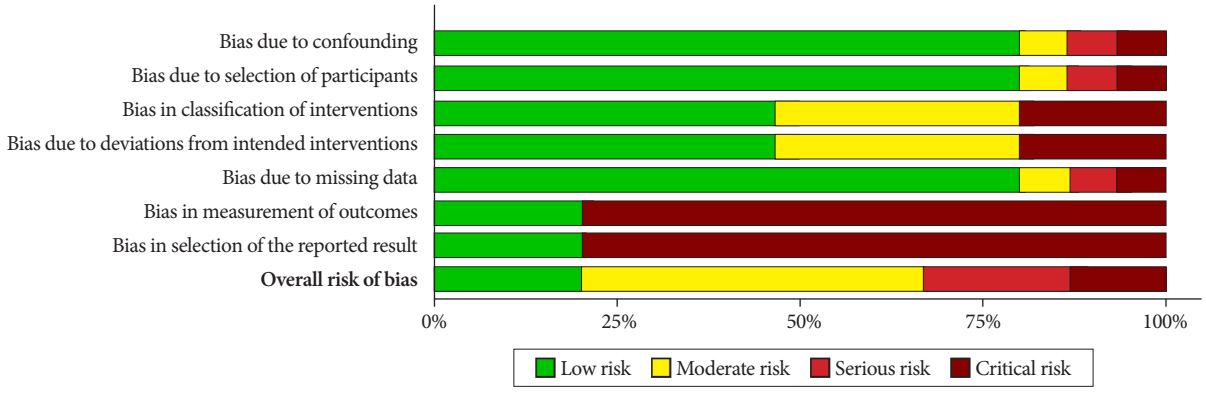
- References

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Atkin W, Wooldrage K, Brenner A, et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834.[1]	Retrospective cohort, multicenter	11 944 (number of adenomas 3–4: n=1 029)
2	Moon CM, Jung S-A, Eun CS, et al. The effect of small or diminutive adenomas at baseline colonoscopy on the risk of developing meta-chronous advanced colorectal neoplasia: KASID multicenter study. Dig Liver Dis 2018; 50: 847–852.[2]	Multicenter cohort, retrospective	1 707 of 2 252 patients: 3–10 TAs, including small adenoma (n=206) vs. 3–10 diminutive TAs (n=117) vs. LAR (n=1384)
3	Kim NH, Jung YS, Lee MY, et al. Risk of Developing Metachronous Advanced Colorectal Neoplasia After Polypectomy in Patients With Multiple Diminutive or Small Adenomas. Am J Gastroenterol 2019; 114: 1657–1664.[3]	Single center cohort, retrospective	9733 patients; group1: 1–2 NAA (n=8 051); group 2 & 3: ≥ 3 NAA (n=551): group 3: AA (n=1131)
4	Vemulapalli KC, Rex DK. Risk of advanced lesions at first follow-up colonoscopy in high-risk groups as defined by the United Kingdom post-polypectomy surveillance guideline: data from a single U.S. center. Gastrointest Endosc 2014;80:299–306.[4]	Single center cohort, retrospective	1 198 of 1 414 patients: at least 5 adenomas all < 10 mm (n=161) vs. 3–4 adenomas all < 10 mm (n=275) vs. 1–2 adenomas both < 10 mm (n=762)
5	Park SK, Yang HJ, Jung YS, et al. Risk of advanced colorectal neoplasm by the proposed combined United States and United Kingdom risk stratification guidelines. Gastrointest Endosc 2018;87:800–808.[5]	Single center cohort, retrospective	1 523 of 2 570 patients: ≥ 5 adenomas, all non-AA (n=173) vs. 3–4 adenomas, all non-AA (n=351) vs. 1–2 adenomas, all non-AA (n=999)
6	Shono T, Oyama S, Oda Y, et al. Risk stratification of advanced colorectal neoplasia after baseline colonoscopy: Cohort study of 17 Japanese community practices. Dig Endosc Dig Endosc 2020;32:106–113.[6]	Multicenter cohort, retrospective	1 147 of 3 115 patients: ≥3 small adenoma (n=218) vs. 1–2 small adenoma (n=929)
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.[7]	Multicenter cohort, retrospective	3 535 of 5 401 patients: 5–9 adenomas (n=657) vs. 3–4 adenomas n=1118) vs. 1–2 adenomas (n=1760)

[Guideline 3] BSG 2020

- References

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Atkin W, Wooldrage K, Brenner A et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834.[1]	Retrospective cohort, multicenter	11 944 (number of adenomas 3–4: n=1029)
2	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.[7]	Multicenter cohort, retrospective	3 535 of 5 401 patients: 5–9 adenomas (n=657) vs. 3–4 adenomas n=1 118) vs. 1–2 adenomas (n=1 760)
3	Laish I, Seregeev I, Naftali T, et al. Surveillance after positive colonoscopy based on adenoma characteristics. Dig Liver Dis 2017;49:1115–1120.[9]	Multicenter cohort, retrospective	544 of 1 165 patients: ≥3 NAAs (n=74) vs. 1–2 NAAs (n=80)
4	Vemulapalli KC, Rex DK. Risk of advanced lesions at first follow-up colonoscopy in high-risk groups as defined by the United Kingdom post-polypectomy surveillance guideline: data from a single U.S. center. Gastrointest Endosc 2014;80:299–306.[4]	Single center cohort, retrospective	1 198 of 1 414 patients: at least 5 adenomas all < 10 mm (n=161) vs. 3–4 adenomas all < 10 mm (n=275) vs. 1–2 adenomas both < 10 mm (n=762)




Risk of bias domains
Study
D1
D2
D3
D4
D5
D6
D7
Overall
Elkhouly et al. 2019
Anderson et al. 2019
Ha et al. 2020
Massod et al. 2019
Pinsky et al 2020
Kim et al. 2019
Lieberman et al. 2020
Atkin et al. 2017
Park et al. 2018
Vemulapalli et al. 2014
Kim et al. 2018
Moon et al. 2018
Shono et al. 2020
Cubiella et al. 22016
Laish et al. 2017
Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended intercentions.
D5: Bias due to missing of data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.
Judgement
Criticla
Serious
Moderate
Low

▣ KQ 03

Is a tubulovillous adenoma or a villous adenoma a more influential risk factor that should be considered when shortening the colonoscopic surveillance interval compared to a tubular adenoma?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	Tubulovillous adenoma or villous adenoma	Tubular adenoma	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	For patients with adenoma containing villous histology completely removed at high-quality examination, repeat colonoscopy in 3 years. (Strong recommendation, moderate quality of evidence)	ESGE recommends that patients with complete removal of 1–4 <10mm adenomas with low grade dysplasia, **irrespective of villous** components, or any serrated polyp <10mm without dysplasia, do not require endoscopic surveillance and should be returned to screening. (Strong recommendation, moderate quality of evidence)	Although there is evidence to suggest that index colonoscopy findings of adenoma with tubulovillous/villous histology is associated with an increased risk of advanced adenomas (AA), advanced neoplasia (AN) and CRC at first surveillance, **tubulovillous/villous histology has not been included in the algorithm. Tubulovillous/villous histology has never been included in previous UK post-polypectomy guidelines, due to the well documented lack of inter-observer agreement among histopathologists in the assessment of villous architecture.** The GDG felt the inclusion of tubulovillous/villous histology in the guidelines was not justified, given the additional surveillance workload that would be generated; this view is supported by the recent large study by Atkin et al. of individuals undergoing surveillance for intermediate grade adenomas detected in the symptomatic service, where tubulovillous/villous histology was not a risk factor for long-term CRC risk.
Level of Evidence, Strength of Recommendation	Strong recommendation, moderate quality of evidence	Strong recommendation, moderate quality of evidence	

[Guideline 2] ESGE 2020

- References: **References that provided evidence excluding villous component**

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Atkin W, Wooldrage K, Brenner A, et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834. [4]	Retrospective, multicentre, cohort study (17 hospitals), UK	253 798 patient =>11 944 patients
	Wieszczy P, Kaminski MF, Franczyk R, et al. Colorectal Cancer Incidence and Mortality After Removal of Adenomas During Screening Colonoscopies. Gastroenterology 2020;158:875–883.e5 [5]	Observational cohort (132 multicenter population based), Poland	236 089 individuals
	Saini SD, Kim HM, Schoenfeld P. Incidence of advanced adenomas at surveillance colonoscopy in patients with a personal history of colon adenomas: a meta-analysis and systematic review. Gastrointest Endosc 2006;64:614–626. [6]	Meta-analysis	For patients with a villous adenoma versus no villous component, the pooled RR was 1.26 (95% CI 0.95–1.66), and the pooled absolute risk difference was 2% (95% CI 1–4%). The test of heterogeneity for the pooled RR was not significant (P > .2), indicating that the individual studies did not demonstrate significant differences in the RR of recurrent advanced adenomas. The RRs are 1.51 (95% CI 0.77–2.98) for Bonithon-Kopp et al, 1.22 (95% CI 0.88–1.68) for Martinez et al, and 1.17 (95% CI 0.47–2.89) for van Stolk et al.
	de Jonge V, Sint Nicolaas J, van Leerdam ME, et al. Systematic literature review and pooled analyses of risk factors for finding adenomas at surveillance colonoscopy. Endoscopy 2011;43:560–574. [7]	Meta-analysis	The pooled RR in the six high quality studies for adenoma recurrence in patients with adenomas with ≥ 25 % villous component at index colonoscopy compared with tubular adenomas was 1.46 (95 %CI 1.06–1.86), with high heterogeneity (I2: 51.0 %) The evidence for the presence of (tubulo-)villous adenomas at index colonoscopy as a risk factor for adenoma recurrence is less convincing. Nine of the 13 included studies did not report significantly increased RRs. A possible explanation could be the use of different cut-off points for the percentage of villous component in polyps and the fact that there may be considerable interobserver variability between pathologists [60]. Only six studies mentioned a specific cut-off of villous component to consider an adenoma to be advanced, and all except one used a cut-off of 25

[Guideline 3] BSG 2020

- Reference: **References that provided evidence excluding villous component**

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Foss FA, Milkins S, McGregor AH. Inter-observer variability in the histological assessment of colorectal polyps detected through the NHS Bowel Cancer Screening Programme. Histopathology 2012;61:47–52. [8]	Retrospective series	1 329 screen-detected polyps
2	Mahajan D, Downs-Kelly E, Liu X, et al. Reproducibility of the villous component and high-grade dysplasia in colorectal adenomas<1cm: Implications for endoscopic surveillance. Am J Surg Pathol 2013;37;427–33. [9]		Five GI pathologists independently evaluated 107 colorectal adenomas
3	Atkin W, Brenner A, Martin J, et al. The clinical effectiveness of different surveillance strategies to prevent colorectal cancer in people with intermediate-grade colorectal adenomas: A retrospective cohort analysis, and psychological and economic evaluations. Health Technol Assess 2017;21:1–536. [10]	Retrospective cohort analysis	For patients with a villous adenoma versus no villous component, the pooled RR was 1.26 (95% CI 0.95–1.66), and the pooled absolute risk difference was 2% (95% CI 1–4%). The test of heterogeneity for the pooled RR was not significant (P > .2), indicating that the individual studies did not demonstrate significant differences in the RR of recurrent advanced adenomas. The RRs are 1.51 (95% CI 0.77–2.98) for Bonithon-Kopp et al, 1.22 (95% CI 0.88–1.68) for Martinez et al, and 1.17 (95% CI 0.47–2.89) for van Stolk et al.
4			

- Evidence table of the first-round reference articles (Ref. Excel file)

▣ KQ 04

Is a serrated polyp a risk factor that should be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	Serrated polyps (or serrated polyp size ≥1 cm)	Conventional adenomas	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	1. Risk for incident and fatal CRC among individuals with baseline SSP is uncertain. 2. For patients with SSP containing dysplasia at a high-quality examination, repeat colonoscopy in 3 years.	1. ESGE recommends that patients with complete removal of 1–4 < 10 mm adenomas with low grade dysplasia, irrespective of villous components, or any serrated polyp < 10 mm without dysplasia, do not require endoscopic surveillance and should be returned to screening 2. If organized screening is not available, repetition of colonoscopy 10 years after the index examination is recommended. 3. ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥ 10 mm or with dysplasia.	1. There is evidence to suggest that advanced serrated polyps are risk equivalent to AAs for future CRC risk, and surveillance should be as for AAs 2. There is evidence to suggest that the future CRC risk may be additive between serrated and adenomatous polyps and their numbers should be summated when determining surveillance intervals 3. There is evidence to suggest that serrated polyps <10 mm in size, except for rectal hyperplastic polyps, are risk equivalent to adenomas < 10 mm in size for future CRC risk, and surveillance should be as for adenomas < 10 mm in size
Level of Evidence, Strength of Recommendation	1. Very low quality of evidence / NA 2. Moderate quality of evidence / Strong recommendation	1. Moderate quality evidence / Strong recommendation 2. Moderate quality evidence / Strong recommendation 3. Moderate quality evidence / Strong recommendation	1. GRADE of evidence: Low / NA 2. GRADE of evidence: Low / NA 3. GRADE of evidence: Low / NA

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- References

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
20	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5.	Population-based, case-control study	2 494 (2 364/130) Control: conventional adenoma Comparator: serrated polyp
21	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–936.	Population-based randomized controlled trial	1 569 (1 488/81)

[Guideline 2] ESGE 2020

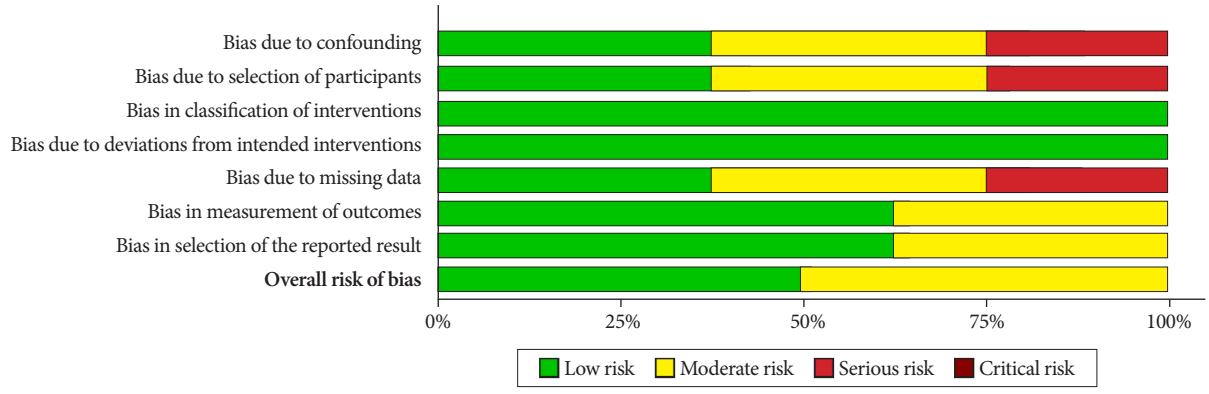
- References

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
9	He X, Hang D, Wu K et al. Long-term Risk of Colorectal Cancer After Removal of Conventional Adenomas and Serrated Polyps. Gastroenterology 2020;158:852–861.e4.	Retrospective study	12 079 (6 161/5 918)
10	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–936.	Population-based randomized controlled trial	1 569 (1 488/81)
11	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5.	Population-based, case-control study	2 494 (2 364/130)
66	Macaron C, Vu HT, Lopez R et al. Risk of Metachronous Polyps in Individuals with Serrated Polyps. Dis Colon Rectum 2015;58:762–768.	Prospective cohort study	180 (69/111)
68	Pereyra L, Zamora R, Gómez EJ et al. Risk of Metachronous Advanced Neoplastic Lesions in Patients with Sporadic Sessile Serrated Adenomas Undergoing Colonoscopic Surveillance. Am J Gastroenterol 2016;111:871–878.	Prospective cohort study	215 (140/75)
69	Symonds E, Anwar S, Young G et al. Sessile Serrated Polyps with Synchronous Conventional Adenomas Increase Risk of Future Advanced Neoplasia. Dig Dis Sci 2019; 64:1680–1685.	Case control, comparative cohort study	940 (892/48)
73	Anderson JC, Butterly LF, Robinson CM, et al. Risk of Metachronous High-Risk Adenomas and Large Serrated Polyps in Individuals With Serrated Polyps on Index Colonoscopy: Data from the New Hampshire Colonoscopy Registry. Gastroenterology 2018;154:117–127. e2.		

[Guideline 3] BSG 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
124	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–36.	Population-based randomized controlled trial	1569 (1488/81)
125	He X, Hang D, Wu K, et al. Long-term Risk of Colorectal Cancer After Removal of Conventional Adenomas and Serrated Polyps. Gastroenterology 2020;158:852–861.e4	Retrospective study	12079 (6161/5918)
126	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5.	Population-based, case-control study	2494 (2364/130)
127	Anderson JC, Butterly LF, Robinson CM, et al. Risk of Metachronous High-Risk Adenomas and Large Serrated Polyps in Individuals With Serrated Polyps on Index Colonoscopy: Data from the New Hampshire Colonoscopy Registry. Gastroenterology 2018;154:117–127.e2.	Case control, comparative cohort study	707 (603/104)
128	Symonds E, Anwar S, Young G et al. Sessile Serrated Polyps with Synchronous Conventional Adenomas Increase Risk of Future Advanced Neoplasia. Dig Dis Sci 2019;64:1680–1685.	Case control, comparative cohort study	940 (892/48)
130	Lu FI, van Niekerk de W, Owen D, et al. Longitudinal outcome study of sessile serrated adenomas of the colorectum: an increased risk for subsequent right-sided colorectal carcinoma. Am J Surg Pathol 2010;34:927–934.	Prospective cohort study	110 (55/55)



Risk of bias domains

Study	D1	D2	D3	D4	D5	D6	D7	Overall
Rune Erichsen et al. 2016	+	+	+	+	+	−	−	+
Øyvind Holme et al. 2015	+	+	+	+	+	+	+	+
Carole Macaron et al. 2015	×	×	+	+	×	+	+	−
Lisandeo Pereyra et al. 2019	−	−	+	+	−	+	+	+
Erin Symonds et al 2019	−	−	+	+	−	−	−	−
Joseph C Anderson et al. 2018	−	−	+	+	−	−	−	−
Fang-I Lu et al. 2010	×	×	+	+	×	+	+	−
Xiaosheng He et al. 2020	+	+	+	+	+	+	+	+

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended intercentions.
D5: Bias due to missing of data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
× Serious
− Moderate
+ Low

▣ KQ5

Is a traditional serrated adenoma a risk factor that should be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients who underwent index colonoscopy	Traditional serrated adenoma	No polyps	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	1. If polypectomy… not recommended…. 2. ….should be…. 3. We recommend…. 1) Risk for incident and fatal CRC among individuals with baseline SSP is uncertain 2) For patients with TSA completely removed at a high-quality examination, repeat colonoscopy in 3 years. (Not completely matching with KQ)	ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥ 10 mm or with dysplasia (Not completely matching with KQ)	There is evidence to suggest that advanced serrated polyps are risk equivalent to AAs for future CRC risk, and surveillance should be as for AAs (Not completely matching with KQ)
Level of Evidence, Strength of Recommendation	II / B 1) very low quality of evidence 2) Weak recommendation, very low quality of evidence)	Strong recommendation, moderate quality evidence.	GRADE of evidence: Low

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Yoon JY, Kim HT, Hong SP, et al. High-risk metachronous polyps are more frequent in patients with traditional serrated adenomas than in patients with conventional adenomas: a multicenter prospective study. Gastrointest Endosc 2015;82:1087–1093 [1]	Case-control study	420/372 (TSA vs adenoma, Not matching with KQ)

[Guideline 2] ESGE 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)

[Guideline 3] BSG 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5. [2]	Case-control study	For TSA, 14 cases vs. 17 controls (79 cases and 142 controls for SSA/Ps)

- Evidence table of the first-round reference articles **(Ref. Excel file)**

▣ KQ06

Is histology of sessile serrated lesion with dysplasia a risk factor that should be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients who underwent index colonoscopy	Serrated polyp with dysplasia	No polyps	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	For patients with SSP containing dysplasia at a high-quality examination, repeat colonoscopy in 3 years	ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥ 10 mm or with dysplasia.	There is evidence to suggest that advanced serrated polyps are risk equivalent to AAs for future CRC risk, and surveillance should be as for AAs.
Level of Evidence, Strength of Recommendation	Weak recommendation, very low quality of evidence	Strong recommendation, moderate quality evidence	GRADE of evidence: Low

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	NA		

[Guideline 2] ESGE 2020

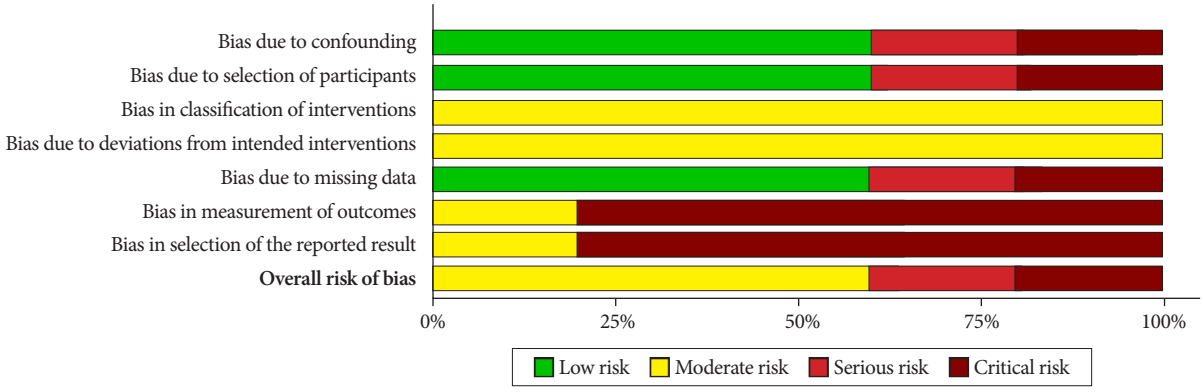
- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5		
	Case-control study	10 150 (8 105 / 2 045)	
2	Symonds E, Anwar S, Young G, et al. Sessile Serrated Polyps with Synchronous Conventional Adenomas Increase Risk of Future Advanced Neoplasia. Dig Dis Sci. 2019;64:1680–1685.	Retrospective observatory	919 (892 / 27)

[Guideline 3] BSG 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5.	case-control study	10 150 (8 105 / 2 045)



Risk of bias domains

Study	D1	D2	D3	D4	D5	D6	D7	Overall
Shahzaib et al. 2020	×	×	–	–	×	!	!	×
Daniel Rodriguez et al. 2018	!	!	–	–	!	!	!	!
Rune Erichsen et al. 2016	+	+	–	–	+	–	–	–
Erin Symonds et al. 2019	+	+	–	–	+	!	!	–
Lisandeo Pereyra et al. 2016	+	+	–	–	+	!	!	–

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended intercentions.
D5: Bias due to missing of data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
! Criticla
× Serious
– Moderate
+ Low

▣ KQ07

Is the size of a serrated polyp a risk factor that should be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	Serrated polyp size ≥ 1 cm	Serrated polyp size <1 cm	CRC incidence and mortality

▣ Comparison of recommendations between different guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	For patients with SSP ≥10 mm at a high-quality examination, repeat colonoscopy in 3 years. (Weak recommendation, very low quality of evidence)	ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥ 10 mm or with dysplasia. (Strong recommendation, moderate quality evidence)	There is evidence to suggest that advanced serrated polyps are risk equivalent to AAs for future CRC risk, and surveillance should be as for AAs. (GRADE of evidence: Low)
Level of Evidence, Strength of Recommendation	II / D	I / B	NA / C

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Anderson JC, Butterly LF, Robinson CM, et al. Risk of Metachronous High-Risk Adenomas and Large Serrated Polyps in Individuals With Serrated Polyps on Index Colonoscopy: Data from the New Hampshire Colonoscopy Registry. Gastroenterology 2018;154:117–127.e2. [1]	Cohort study	5 433 (2 396/65)

[Guideline 2] ESGE 2020

- Reference

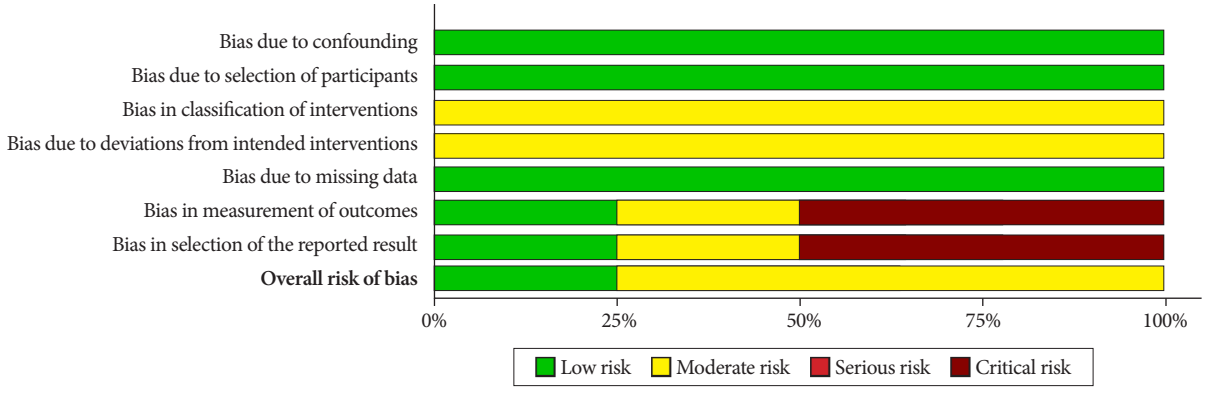
	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–936. [2]	RCT (population-based randomized trial)	100 210 (78 220/81)
2	He X, Hang D, Wu K, et al. Long-term Risk of Colorectal Cancer After Removal of Conventional Adenomas and Serrated Polyps. Gastroenterology 2020;158:852–861.e4. [3]	Cohort study	122 899 (112 107/566)

[Guideline 3] BSG 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–936. [2]	RCT (population-based randomizeded trial)	100 210 (78 220/81)
2	He X, Hang D, Wu K, et al. Long-term Risk of Colorectal Cancer After Removal of Conventional Adenomas and Serrated Polyps. Gastroenterology 2020;158:852–861.e4 [3]	Cohort study	122 899 (112 107/566)

- Evidence table of the first-round reference articles **(Ref. Excel file)**



Risk of bias domains

Study	D1	D2	D3	D4	D5	D6	D7	Overall
Anderson et al. 2018	+	+	−	−	+	!	!	−
Holme Ø et al. 2015	+	+	−	−	+	+	+	+
He X et al. 2020	+	+	−	−	+	!	!	−
Burmett-Hartman AN et al. 2019	+	+	−	−	+	−	−	−

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended intercentions.
D5: Bias due to missing of data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
! Criticla
− Moderate
+ Low

Is the number of sessile serrated lesions a risk factor that should be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	1) ≥ 3 serrated polyps 2) ≥ 5 serrated polyps	1–2 serrated polyps	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	For patients with ≤20 HPs <10 mm in size in the rectum or sigmoid colon removed at a high quality examination, repeat CRC screening in 10 years (Strong recommendation, moderate quality of evidence) For patients with ≤20 HPs <10 mm in size proximal to the sigmoid colon removed at a high quality examination, repeat colonoscopy in 10 years. (weak recommendation, very low quality of evidence) For patients with 1-2 SSPs<10 mm in size completely removed at high quality examination, repeat colonoscopy in 5-10 years (weak recommendation, very low quality of evidence) For patients with 3–4 SSPs <10 m at high quality examination, repeat colonoscopy in 3–5 years (weak recommendation, very low quality of evidence) For patients with any combinations of 5–10 SSPs<10 mm at high quality examination, repeat colonoscopy in 3 years (weak recommendation, very low quality of evidence)	ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥ 10 mm or with dysplasia	Throughout the guideline development processes, the GDG identified some of the key unanswered research questions and needs, which are listed below: Evidence of the effectiveness of surveillance using a combined serrated plus adenomatous polyp count. More robust evidence of the effectiveness of surveillance in people with serrated polyps
Level of Evidence, Strength of Recommendation		Strong recommendation, moderate quality evidence	

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- References

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Sapienza PE, Levine GM, Pomerantz S, et al. Impact of a quality assurance program on gastrointestinal endoscopy. Gastroenterology. 1992;102:387–393. [1]	Randomized controlled trial (RCT)	477 (318/159)
2	Corley DA, Jensen CD, Marks AR et al. Adenoma detection rate and risk of colorectal cancer and death. N Engl J Med. 2014;370:1298–1306. [2]	Comparative studies	200 (100/100)

[Guideline 2] ESGE 2020

- Reference

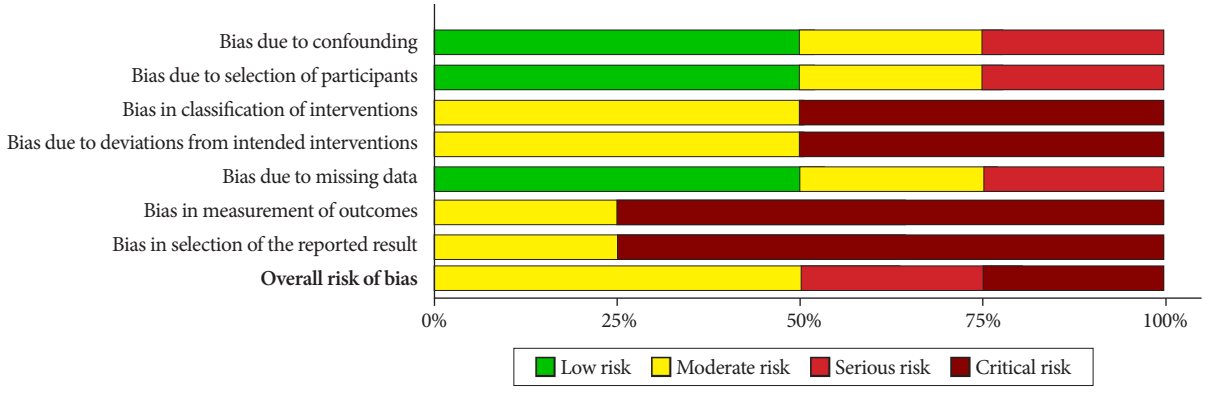
	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Raftopoulos SC, Segarajasingam DS, Burke V, et al. A cohort study of missed and new cancers after esophagogastroduodenoscopy. Am J Gastroenterol. 2010;105:1292–1297. [3]	RCT	477 (318/159)

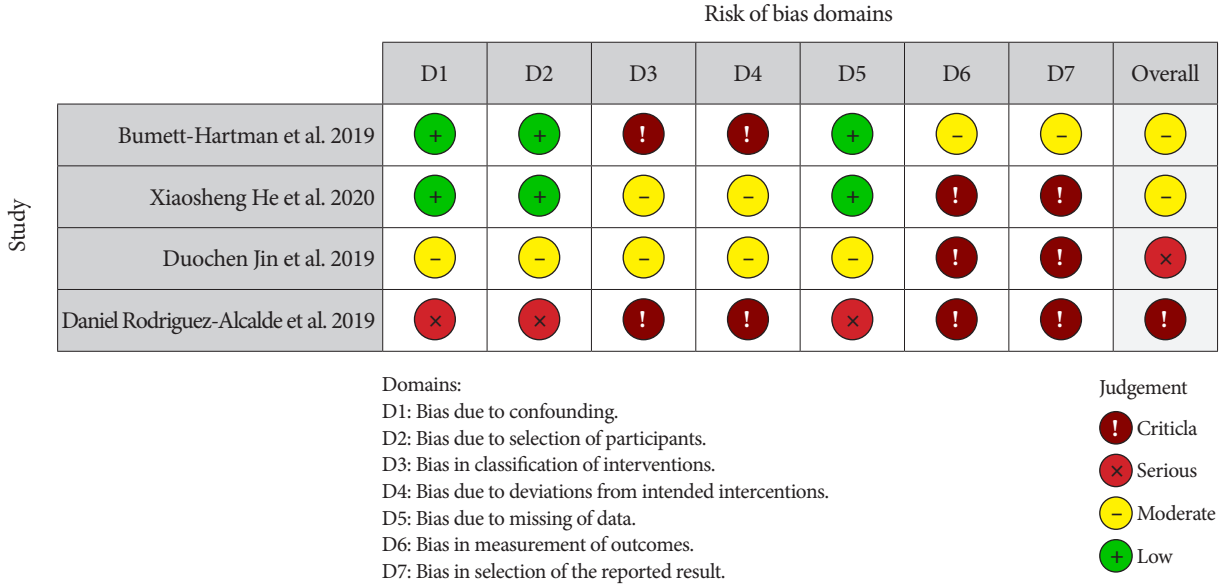
[Guideline 3] BSG 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Enochsson L, Swahn F, Arnelo U, et al. Nationwide, population-based data from 11,074 ERCP procedures from the Swedish Registry for Gallstone Surgery and ERCP. Gastrointest Endosc. 2010;72:1175–1184. [4]	RCT	477 (318/159)

- Evidence table of the first-round reference articles **(Ref. Excel file)**





▣ KQ 9: Is piecemeal resection of colorectal polyps ≥ 20 mm in size a more influential risk factor that should be considered when shortening the colonoscopic surveillance interval than en bloc resection of the polyps?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	Piecemeal resection of colorectal polyps ≥20 mm in size	En bloc resection of colorectal polyps ≥20 mm in size	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	For patients with piecemeal resection of adenoma or SSP >20 mm, repeat colonoscopy in 6 months	ESGE recommends a 3–6-month early repeat colonoscopy following piecemeal endoscopic resection of polyps ≥ 20 mm	We recommend a site check is performed 2–6 months after piecemeal EMR or ESD of LNPCPs (at least 20 mm in size), in line with BSG/ACPGBI LNPCP guidelines. A further site check at 18 months from the original resection is recommended to detect late recurrence. Once no recurrence is confirmed patients should undergo post-polypectomy surveillance after an interval of 3 years. The need for further surveillance should then be determined in accordance with the post-polypectomy high-risk criteria
Level of Evidence, Strength of Recommendation	Strong recommendation, moderate quality of evidence	Strong recommendation, moderate quality evidence.	GRADE of evidence: Low Strength of recommendation: Strong

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Pohl H, Srivastava A, Bensen SP, et al. Incomplete polyp resection during colonoscopy-results of the complete adenoma resection (CARE) study. Gastroenterology 2013;144:74–80.e1. [1]	Prospective study	1 427
2	Belderbos TDG, Leenders M, Moons LMG, et al. Local recurrence after endoscopic mucosal resection of nonpedunculated colorectal lesions: systematic review and meta-analysis. Endoscopy 2014;46:388–402. [2]	Systematic review and meta-analysis	
3	Pellise M, Burgess NG, Tutticci N, et al. Endoscopic mucosal resection for large serrated lesions in comparison with adenomas: a prospective multicentre study of 2000 lesions. Gut 2017;66:644–653. [3]	Observational study	1 671
4	Rex KD, Vemulapalli KC, Rex DK. Recurrence rates after EMR of large sessile serrated polyps. Gastrointest Endosc 2015;82:538–541. [4]	Retrospective cohort study	362

[Guideline 2] ESGE 2020

- Reference

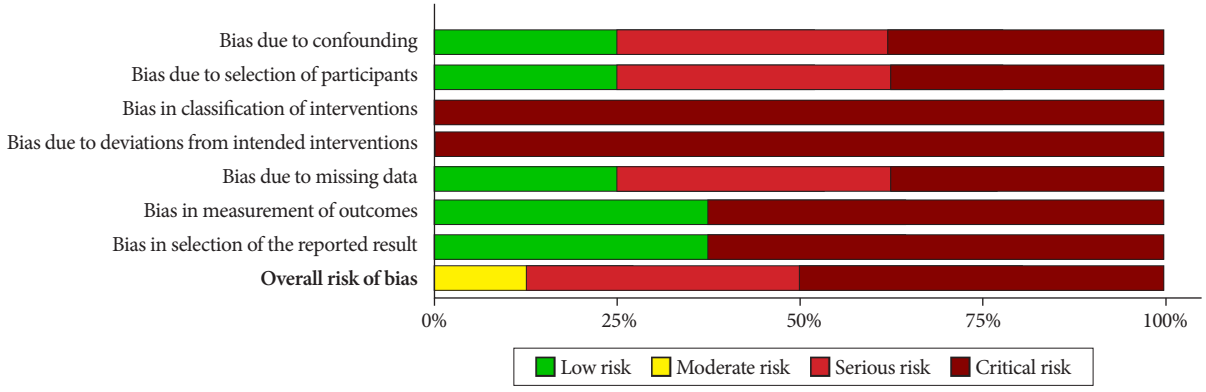
	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Belderbos TDG, Leenders M, Moons LMG, et al. Local recurrence after endoscopic mucosal resection of nonpedunculated colorectal lesions: systematic review and meta-analysis. Endoscopy 2014;46:388–402. [5]	Systematic review and meta-analysis.	
2	Pohl H, Srivastava A, Bensen SP, et al. Incomplete polyp resection during colonoscopy-results of the complete adenoma resection (CARE) study. Gastroenterology 2013;144:74–80.e1. [1]	Prospective study	1 427
3	Moss A, Williams SJ, Hourigan LF, et al. Long-term adenoma recurrence following wide-field endoscopic mucosal resection (WF-EMR) for advanced colonic mucosal neoplasia is infrequent: results and risk factors in 1000 cases from the Australian Colonic EMR (ACE) study. Gut 2015;64:57–65. [6]	Prospective study	1 134
4	Pellise M, Burgess NG, Tutticci N, et al. Endoscopic mucosal resection for large serrated lesions in comparison with adenomas: a prospective multicentre study of 2000 lesions. Gut 2017;66:644–653. [3]	Observational study	1 671
5	Tate DJ, Desomer L, Klein A, et al. Adenoma recurrence after piecemeal colonic EMR is predictable: the Sydney EMR recurrence tool. Gastrointest Endosc 2017;85:647–656.e6. [7]	Prospective study	1 178
6	Komeda Y, Watanabe T, Sakurai T, et al. Risk factors for local recurrence and appropriate surveillance interval after endoscopic resection. World J Gastroenterol 2019;25:1502–1512. [8]	Retrospective study	360

[Guideline 3] BSG 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Belderbos TDG, Leenders M, Moons LMG, et al. Local recurrence after endoscopic mucosal resection of nonpedunculated colorectal lesions: systematic review and meta-analysis. Endoscopy 2014;46:388–402. [2]	Systematic review and meta-analysis	
2	Tate DJ, Desomer L, Klein A, et al. Adenoma recurrence after piecemeal colonic EMR is predictable: the Sydney EMR recurrence tool. Gastrointest Endosc 2017;85:647–656.e6 [7]	Prospective study	1178
3	Oka S, Tanaka S, Saito Y, et al. Local recurrence after endoscopic resection for large colorectal neoplasia: a multicenter prospective study in Japan. Am J Gastroenterol 2015;110:697–707. [8]	Prospective study	1524
4	Akintoye E, Kumar N, Aihara H, et al. Colorectal endoscopic submucosal dissection: a systematic review and meta-analysis. Endosc Int Open 2016;04:E1030–E1044. [9]	Systematic review and meta-analysis	

- Evidence table of the first-round reference articles **(Ref. Excel file)**



Risk of bias domains

Study	D1	D2	D3	D4	D5	D6	D7	Overall
Jeffery Adier et al. 2019	+	+	!	!	+	!	!	×
Alanna Alexandre Silva de Azevedo et al. 2019	!	!	!	!	!	!	!	!
Maria Fragaki et al. 2019	!	!	!	!	!	!	!	!
Yoshiaki kimoto et al. 2021	×	×	!	!	×	+	+	×
Yoriaki Komeda et al. 2019	×	×	!	!		!	!	!
Alan Moss et al. 2015	+	+	!	!	+	+	+	−
David J. Tate et al. 2018	!	!	!	!	!	+	+	×
Park et al. 2020	×	×	!	!	×	!	!	!

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended intercentions.
D5: Bias due to missing of data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
! Criticla
× Serious
− Moderate
+ Low

▣ KQ10

Is a family history of colorectal cancer a risk factor that should be considered when shortening the colonoscopic surveillance interval?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients who underwent index colonoscopy	Family history of CRC	No family history of CRC	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	N/A	ESGE suggests against shortened surveillance intervals after polypectomy in patients with a family history of CRC.	There is consistent evidence that a family history of CRC (which falls short of warranting family history surveillance in its own right) is not associated with an increased risk of AA, AN or CRC at first surveillance
Level of Evidence, Strength of Recommendation		Weak recommendation, low quality evidence.	GRADE of evidence: Moderate

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)

[Guideline 2] ESGE 2020

- REferences

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Lee JY, Park HW, Kim M-J, et al. Prediction of the Risk of a Metachronous Advanced Colorectal Neoplasm Using a Novel Scoring System. Dig Dis Sci 2016;61:3016–3025.	Comparative studies	11 042 (7 730/3 312)
2	Gupta S, Jacobs ET, Baron JA, et al. Risk stratification of individuals with low-risk colorectal adenomas using clinical characteristics: a pooled analysis. Gut 2017;66:446–453.	Meta-analysis	
3…	Moon CM, Jung SA, Eun CS, et al. The effect of small or diminutive adenomas at baseline colonoscopy on the risk of developing metachronous advanced colorectal neoplasia: KASID multicenter study. Dig Liver Dis 2018;50:847–852.	Multicenter retrospective cohort study	2 252 (5 groups)
4	Baik SJ, Park H, Park JJ, et al. Advanced Colonic Neoplasia at Follow-up Colonoscopy According to Risk Components and Adenoma Location at Index Colonoscopy: A Retrospective Study of 1,974 Asymptomatic Koreans. Gut Liver 2017;11:667–673.	Multicenter retrospective cohort study	1 974
5	Kim HG, Cho YS, Cha JM, et al. Risk of metachronous neoplasia on surveillance colonoscopy in young patients with colorectal neoplasia. Gastrointest Endosc 2018;87:666–673	Multicenter retrospective cohort study	9 722
6	Park SK, Yang HJ, Jung YS, et al. Number of advanced adenomas on index colonoscopy: Important risk factor for metachronous advanced colorectal neoplasia. Dig Liver Dis 2018; 50:568–572.	Comparative studies	2 250 (1 371/879)
7	Kim NH, Jung YS, Lee MY, et al. Risk of Developing Metachronous Advanced Colorectal Neoplasia After Polypectomy in Patients With Multiple Diminutive or Small Adenomas. Am J Gastroenterol 2019;114:1657–1664.	Comparative studies	9 733 (8 051/293/258/1 131)
9	Kim NH, Jung YS, Park JH, et al. Association between family history of colorectal cancer and the risk of metachronous colorectal neoplasia following polypectomy in patients aged < 50 years. J Gastroenterol Hepatol 2019;34:383–389.	Comparative studies	9 866(7 787/2 097)
10	Jacobs ET, Gupta S, Baron JA, et al. Family history of colorectal cancer in first-degree relatives and metachronous colorectal adenoma. Am J Gastroenterol 2018;113:899–905.	Meta-analysis	

[Guideline 3] BSG 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Martínez ME, Baron JA, Lieberman DA, et al. A pooled analysis of advanced colorectal neoplasia diagnoses after colonoscopic polypectomy. Gastroenterology 2009;136:832–841.	Meta-analysis	
2	Park SK, Kim NH, Jung YS, et al. Risk of developing advanced colorectal neoplasia after removing high- risk adenoma detected at index colonoscopy in young patients: A KASID study. J Gastroenterol Hepatol 2016;31:138–144.	Multicenter retrospective cohort study	1 479 (233/1 000/246)
…	Laiyemo AO, Murphy G, Albert PS, et al. Postpolypectomy colonoscopy surveillance guidelines: predictive accuracy for advanced adenoma at 4 years. Ann Intern Med 2008;148:419–426.	RCT	2 079 (1 037/1 042)
	Jang HW, Park SJ, Hong SP, et al. Risk Factors for Recurrent High-Risk Polyps after the Removal of High-Risk Polyps at Initial Colonoscopy. Yonsei Med J 2015;56:1559–1565.	Retrospective cohort study	434 (383/51)
	Jung YS, Park DI, Kim WH, et al. Risk of Advanced Colorectal Neoplasia According to the Number of High-Risk Findings at Index Colonoscopy: a Korean Association for the Study of Intestinal Disease (KASID) Study. Dig Dis Sci 2016;61:1661–1668.	Retrospective cohort study	1 646 (463/1 183)
	Tae CH, Moon CM, Jung SA, et al. Higher body mass index is associated with an increased risk of multiplicity in surveillance colonoscopy within 5 years. Sci Rep 2017;7:14239.	Retrospective cohort study	2 904 (1 769/1 040/95)

- Evidence table of the first-round reference articles (Ref. Excel 1)

▣ KQ12

:For patients with colorectal cancer-related high-risk findings after resection of polyps, what is the appropriate timing and interval for colonoscopic surveillance?

▣ PICO

Patients	Intervention	Comparators	Outcomes
Patients with polyps removed at index colonoscopy	CRC-related high-risk findings	No CRC-related high-risk findings	CRC incidence and mortality

▣ Comparison of recommendations of selected guidelines

	Guideline 1 (USMSTF)	Guideline 2 (ESGE)	Guideline 3 (BSG)
Year of publication	2020	2020	2020
AGREE appraisal score	100	87.5	87.5
Statement	1. For patients with 3–4 tubular adenomas <10 mm in size completely removed at a high-quality examination, repeat colonoscopy in 3–5 years. (IV/B) 2. For patients with 5–10 tubular adenomas <10 mm in size completely removed at a high-quality examination, repeat colonoscopy in 3 years. (I/A) 3. For patients with 1 or more adenomas ≥10 mm in size completely removed at high-quality examination, repeat colonoscopy in 3 years. (I/A) 4. For patients with adenoma containing villous histology completely removed at high-quality examination, repeat colonoscopy in 3 years. (II/A) 5. For patients with adenoma containing high-grade dysplasia completely removed at high-quality examination, repeat colonoscopy in 3 years. (II/A) 6. For patients with >10 adenomas completely removed at high-quality examination, repeat colonoscopy in 1 year. (IV/B) [Addition – information organized according to BSG Guidelines] 7. For patients with TSA completely removed at a high-quality examination, repeat colonoscopy in 3 years. (IV/B) 8. For patients with SSP ≥10 mm at a high-quality examination, repeat colonoscopy in 3 years. (IV/B) 9. For patients with HP ≥10 mm, repeat colonoscopy in 3–5 years. A 3-year follow-up interval is favored if concern about pathologist consistency in distinguishing SSPs from HPs, quality of bowel preparation, or complete polyp excision, whereas a 5-year interval is favored if low concerns for consistency in distinguishing between SSP and HP by the pathologist, adequate bowel preparation, and confident complete polyp excision. (IV/B)	1. ESGE recommends surveillance colonoscopy after 3 years for patients with complete removal of at least 1 adenoma ≥ 10 mm or with high grade dysplasia, or ≥ 5 adenomas, or any serrated polyp ≥10 mm or with dysplasia. (II/A)	1. We recommend that people with high-risk findings on index colonoscopy who are under the age of 75 years should have a surveillance colonoscopy performed after an interval of 3 years (note the one exception in the next statement). (III/A) 2. We suggest that due to the long timeline from a clearance colonoscopy through the potential development of new polyps to the possible development of a symptomatic cancer, surveillance should only be performed in people whose life-expectancy is greater than 10 years, and in general not in people older than about 75 years. (III/B) 3. We recommend that people with high-risk findings on a surveillance colonoscopy should undergo a further surveillance colonoscopy at an interval of 3 years (with the same age-related caveats applied again). (III/A)
Level of Evidence, Strength of Recommendation			

▣ Outline of evidence

[Guideline 1] USMSTF 2020

- References

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Bjerrum A, Milter MC, Andersen O, et al. Risk stratification and detection of new colorectal neoplasms after colorectal cancer screening with faecal occult blood test: experiences from a Danish screening cohort. Eur J Gastroenterol Hepatol 2015;27:1433–1437. [1]	Population-based cohort study	709 (507/202)
2	Fairley KJ, Li J, Komar M, et al. Predicting the risk of recurrent adenoma and incident colorectal cancer based on findings of the baseline colonoscopy. Clin Transl Gastroenterol 2014;5:e64. [2]	Prospective analyses of retrospectively collected clinical data from electronic health records.	905 (368/537)
3	Good NM, Macrae FA, Young GP, et al. Ideal colonoscopic surveillance intervals to reduce incidence of advanced adenoma and colorectal cancer. J Gastroenterol Hepatol 2015;30:1147–1154. [3]	Two centers, prospective(not comparative study (no arms))	5141
4	Jang HW, Park SJ, Hong SP, et al. Risk Factors for Recurrent High-Risk Polyps after the Removal of High-Risk Polyps at Initial Colonoscopy. Yonsei Med J 2015;56:1559–1565. [4]	Single center, retrospective (non comparative study (no arms))	434
5	Park SK, Song YS, Jung YS, et al. Do surveillance intervals in patients with more than five adenomas at index colonoscopy be shorter than those in patients with three to four adenomas? A Korean Association for the Study of Intestinal Disease study. J Gastroenterol Hepatol 2017;32:1026–1031. [5]	Multicenter, retrospective	1 394 (high risk group, ≥5 small adenomas or ≥3 at least one ≥ 10 mm = 626 / intermediate risk group, 3–4 small adenomas or at least one ≥10 mm, and high risk group = 768)
6	van Heijningen EM, Lansdorp-Vogelaar I, Kuipers EJ, et al. Features of adenoma and colonoscopy associated with recurrent colorectal neoplasia based on a large community-based study. Gastroenterology 2013;144:1410–1418. [6]	Multicenter, retrospective	2 990(1 304/1 686)
7	Brenner H, Chang-Claude J, Jansen L, et al. Role of colonoscopy and polyp characteristics in colorectal cancer after colonoscopic polyp detection: a population-based case-control study. Ann Intern Med 2012;157:225–232. [7]	Population-based case–control study	415 (155/260)
8	Pérez-Cuadrado-Robles E, Torrella-Cortés E, Bebia-Conesa P, et al. Intermediate-risk patients with three to four small adenomas should be considered low risk for colorectal cancer screening. Dig Endosc 2016;28:450–455. [8]	Single center, retrospective (non- comparative study (no arms))	561
9	Sneh Arbib O, Zemser V, Leibovici Weissman Y, et al. Risk of advanced lesions at the first follow-up colonoscopy after polypectomy of diminutive versus small adenomatous polyps of low-grade dysplasia. Gastrointest Endosc 2017;86:713–721.e2. [9]	Single center, retrospective	443 (130/313)
10	Vemulapalli KC, Rex DK. Risk of advanced lesions at first follow-up colonoscopy in high-risk groups as defined by the United Kingdom postpolypectomy surveillance guideline: data from a single U.S. center. Gastrointest Endosc 2014;80:299–306. [10]	Single center, retrospective	1 414 (652/762)
11	van Enckevort CC, de Graaf AP, Hollema H, et al. Predictors of colorectal neoplasia after polypectomy: based on initial and consecutive findings. Neth J Med 2014;72:139–145. [11]	Observational cohort study (no arms)	433
12	Park SK, Hwang SW, Kim KO, et al. Risk of advanced colorectal neoplasm in patients with more than 10 adenomas on index colonoscopy: A Korean Association for the Study of Intestinal Diseases (KASID) study. J Gastroenterol Hepatol 2017;32:803–808. [12]	multicenter, retrospective	1 189 (Adenoma > 10 (n=214) / Adenoma 3–10 (n=975))

13	Click B, Pinsky PF, Hickey T, et al. Association of Colonoscopy Adenoma Findings With Long-term Colorectal Cancer. JAMA 2018;319:2021–2031. [13]	Multicenter, prospective	15935 (2882/13053)
14	Cottet V, Jooste V, Fournel I, et al. Long-term risk of colorectal cancer after adenoma removal: a population-based cohort study. Gut 2012;61:1180–1186. [14]	Cohort study based on detailed data from a population-based registry	5 135 (1 899 / 3 236)
15	Atkin W, Wooldrage K, Brenner A, et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834. [15]	Multicenter, retrospective cohort	15 935 (2 882 / 13 053)
16	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–936. [16]	Population-based randomized trial	12 955 (782 / 12 173)
17	Anderson JC, Butterly LF, Robinson CM, et al. Risk of Metachronous High-Risk Adenomas and Large Serrated Polyps in Individuals With Serrated Polyps on Index Colonoscopy: Data from the New Hampshire Colonoscopy Registry. Gastroenterology 2018;154:117–127. e2. [17]	Retrospective cohort	5 433 (817 / 4 616)

[Guideline 2] ESGE 2020

- Reference

	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Atkin W, Wooldrage K, Brenner A et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834. [18]	Retrospective, multicentre, cohort study	11 944
2	Click B, Pinsky PF, Hickey T, et al. Association of Colonoscopy Adenoma Findings With Long-term Colorectal Cancer. JAMA 2018;319:2021–2031. [19]	Multicenter, prospective cohort	15 935 (2 882 / 13 053)
3	Wieszczy P, Kaminski MF, Franczyk R et al. Colorectal Cancer Incidence and Mortality After Removal of Adenomas During Screening Colonoscopies. Gastroenterology 2020;158:875–883.e5. [20]	Multicenter, population-based cohort	41 778 (3 908 / 37 798)
4	He X, Hang D, Wu K et al. Long-term Risk of Colorectal Cancer after Removal of Conventional Adenomas and Serrated Polyps. Gastroenterology 2020;158:852–861.e4 [21]	Prospective cohort	124 186 (6 161 / 5 918)
5	Cross AJ, Robbins EC, Pack K et al. Long-term colorectal cancer incidence after adenoma removal and the effects of surveillance on incidence: a multicentre, retrospective, cohort study. Gut 2020;69:1645–1658. [22]	Multicenter, retrospective cohort	28 972 (14 571 / 14 401)
6	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5. [23]	Population-based case-control study	10 246 (2 045 / 8 201)
7	Lee JY, Park HW, Kim M-J et al. Prediction of the Risk of a Metachronous Advanced Colorectal Neoplasm Using a Novel Scoring System. Dig Dis Sci 2016;61:3016–3025. [24]	Single center, retrospective cohort	7 730 (521 / 7 290)
8	Pereyra L, Zamora R, Gómez EJ et al. Risk of Metachronous Advanced Neoplastic Lesions in Patients with Sporadic Sessile Serrated Adenomas Undergoing Colonoscopic Surveillance. Am J Gastroenterol 2016; 111: 871–878 [25]	Single center, prospective cohort	639 (162 / 477)
9	Anderson JC, Butterly LF, Robinson CM, et al. Risk of Metachronous High-Risk Adenomas and Large Serrated Polyps in Individuals With Serrated Polyps on Index Colonoscopy: Data from the New Hampshire Colonoscopy Registry. Gastroenterology 2018;154:117–127.e2. [26]	Retrospective cohort	5 433 (817 / 4 616)
10	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–936. [27]	population-based randomized trial	12 955 (782 / 12 173)

[Guideline 3] BSG 2020

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	Basic information on the literature	Study design	Number of subjects (control group/comparator group)
1	Martinez ME, Baron JA, Lieberman DA, et al. A pooled analysis of advanced colorectal neoplasia diagnoses after colonoscopic polypectomy. Gastroenterology 2009;136:832–841. [28]	Pooled analyses	9 167 (4 523 / 4 644)
2	Atkin W, Brenner A, Martin J, et al. The clinical effectiveness of different surveillance strategies to prevent colorectal cancer in people with intermediate-grade colorectal adenomas: a retrospective cohort analysis, and psychological and economic evaluations. Health Technol Assess 2017;21:1–536. [29]	Retrospective multicentre cohort study.	4 608 (850 / 3 758)
3	Atkin W, Wooldrage K, Brenner A, et al. Adenoma surveillance and colorectal cancer incidence: a retrospective, multicentre, cohort study. Lancet Oncol 2017;18:823–834. [30]	Multicenter, retrospective cohort	15 935 (2 882 / 13 053)
4	van Enckevort CC, de Graaf AP, Hollema H, et al. Predictors of colorectal neoplasia after polypectomy: based on initial and consecutive findings. Netherlands J Med 2014;72:139–145. [31]	Observational cohort study	433 (156 / 277)
5	Fairley KJ, Li J, Komar M, et al. Predicting the risk of recurrent adenoma and incident colorectal cancer based on findings of the baseline colonoscopy. Clin Transl Gastroenterol 2014;5:e64. [32]	Retrospective cohort	3 300
6	Huang Y, Gong W, Su B, et al. Recurrence and surveillance of colorectal adenoma after polypectomy in a southern Chinese population. J Gastroenterol 2010;45:838–845. [33]	Single center, retrospective cohort	1 356 (206 / 1 150)
7	Facciorusso A, Di Maso M, Serviddio G, et al. Factors Associated With Recurrence of Advanced Colorectal Adenoma After Endoscopic Resection. Clin Gastroenterol Hepatol 2016;14:1148–1154. [34]	Single center, retrospective cohort	1 017 (244 / 773)
8	Park SK, Kim NH, Jung YS, et al. Risk of developing advanced colorectal neoplasia after removing high-risk adenoma detected at index colonoscopy in young patients: a KASID study. J Gastroenterol Hepatol 2016;31:138–144. [35]	Multicenter, retrospective cohort	1 479
9	Lee TJW, Nickerson C, Goddard AF, et al. Outcome of 12-month surveillance colonoscopy in high-risk patients in the National Health Service Bowel Cancer Screening Programme. Colorectal Dis 2013;15:e435–442. [36]	Retrospective cohort	1 760 (474 / 1 286)
10	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. [37]	Retrospective cohort	5 401 (2 022 / 3 379)
11	van Heijningen EM, Lansdorp-Vogelaar I, Kuipers EJ, et al. Features of adenoma and colonoscopy associated with recurrent colorectal neoplasia based on a large community-based study. Gastroenterology 2013;144:1410–1418. [38]	Multicenter, retrospective cohort	2 990 (1 304 / 1 686)
12	Huang Y, Gong W, Su B, et al. Risk and cause of interval colorectal cancer after colonoscopic polypectomy. Digestion 2012;86:148–154. [39]	Multicenter, retrospective cohort	1 794 (288 / 1 506)
13	Laiyemo AO, Murphy G, Albert PS, et al. Postpolypectomy colonoscopy surveillance guidelines: predictive accuracy for advanced adenoma at 4 years. Ann Intern Med 2008;148:419–426. [40]	Analysis of prospective data from the Polyp Prevention Trial	1 905 (855 / 1 050)
14	Nusko G, Hahn EG, Mansmann U. Risk of advanced metachronous colorectal adenoma during long-term follow-up. Int J Colorectal Dis 2008;23:1065–1071. [41]	Prospective, registry of colorectal polyps based	1 091 (81 / 1 010)
15	Laish I, Seregeev I, Naftali T, et al. Surveillance after positive colonoscopy based on adenoma characteristics. Dig Liver Dis 2017;49:1115–1120. [42]	Multicenter, retrospective cohort study	1 165 (695 / 470)
16	Solakoğlu T, Koseoğlu H, Ozer Sarı S, et al. Role of baseline adenoma characteristics for adenoma recurrence in patients with high-risk adenoma. Turk J Med Sci 2017;47:1416–1424. [43]	Prospective observational study(no arms)	47

17	Coleman HG, Loughrey MB, Murray LJ, et al. Colorectal Cancer Risk Following Adenoma Removal: A Large Prospective Population-Based Cohort Study. Cancer Epidemiol Biomarkers Prev 2015;24:1373–1380. [44]	Prospective population-based cohort study	6 972 (3 819 / 3 153)
18	Emilsson L, Loberg M, Bretthauer M, et al. Colorectal cancer death after adenoma removal in Scandinavia. Scand J Gastroenterol 2017;52:1377–1384. [45]	prospectively collected data from population-based cohorts.	40 660 (20 135 / 20 525)
19	Loberg M, Kalager M, Holme Ø, et al. Long-term colorectal-cancer mortality after adenoma removal. N Engl J Med 2014;371:799–807. [46]	Cancer Registry based cohort	40 826 (22 306 / 23 449)
20	Huang Y, Li X, Wang Z, et al. Five-year risk of colorectal neoplasia after normal baseline colonoscopy in asymptomatic Chinese Mongolian over 50 years of age. Int J Colorectal Dis 2012;27:1651–1656. [47]	single center, prospective	480 (89 / 391)
21	Jang HW, Park SJ, Hong SP, et al. Risk Factors for Recurrent High-Risk Polyps after the Removal of High-Risk Polyps at Initial Colonoscopy. Yonsei Med J 2015;56:1559–1565. [48]	Single center, retrospective	434 (51 / 383)
22	Lee JL, Cha JM, Lee HM, et al. Determining the optimal surveillance interval after a colonoscopic polypectomy for the Korean population? Intest Res 2017;15:109–117. [49]	Retrospective cohort study	895 (178 / 221)
23	Vemulapalli KC, Rex DK. Risk of advanced lesions at first follow-up colonoscopy in high-risk groups as defined by the United Kingdom post-polypectomy surveillance guideline: data from a single U.S. center. Gastrointest Endosc 2014;80:299–306. [50]	Single center, retrospective	1 414 (652 / 762)
24	Jung YS, Park DI, Kim WH, et al. Risk of Advanced Colorectal Neoplasia According to the Number of High-Risk Findings at Index Colonoscopy: A Korean Association for the Study of Intestinal Disease (KASID) study. Dig Dis Sci 2016;61:1661–1668. [51]	Multicenter, retrospective	1 646 (463 / 1183)
25	Cottet V, Jooste V, Fournel I, et al. Long-term risk of colorectal cancer after adenoma removal: a population-based cohort study. Gut 2012;61:1180–1186. [52]	Population-based registry cohort study	5 779 (1 899 / 3 880)
26	Holme Ø, Bretthauer M, Eide TJ, et al. Long-term risk of colorectal cancer in individuals with serrated polyps. Gut 2015;64:929–936. [53]	Population-based randomized trial	12 955 (782 / 12 173)
27	He X, Hang D, Wu K et al. Long-term Risk of Colorectal Cancer After Removal of Conventional Adenomas and Serrated Polyps. Gastroenterology 2020;158:852–861.e4 [54]	Prospective cohort	124 186 (6 161 / 5 918)
28	Erichsen R, Baron JA, Hamilton-Dutoit SJ, et al. Increased Risk of Colorectal Cancer Development Among Patients With Serrated Polyps. Gastroenterology 2016;150:895–902.e5. [55]	Population-based case-control study	10 246 (2 045 / 8 201)

- Evidence table of the first-round reference articles (Ref. Excel 1)