Supplementary material

Procedures indications

"Primary screening" included asymptomatic patients over 40 years of age, FOBT negative or non-performed, familial history of CRC or evaluation for organ transplantation and without negative colonoscopy within five years. In the "secondary screening" group were included patients over 50 years of age with positive FOBT and without negative colonoscopy within five years. In the group of "post-polypectomy surveillance" are included all patients who underwent a polypectomy in the past regardless of the timing. The group "diagnostic" comprised patients undergoing a colonoscopy for symptoms like anemia, blood in stools, melena, hemorrhoids, diarrhea, constipation, abdominal pain, weight loss, diverticulosis and diverticulitis and suspected lesion at cross-sectional imaging. For sub-analyses, we divided the patients into two main categories: screening colonoscopies (i.e., primary screening, secondary screening and surveillance) and diagnostic colonoscopies.

Randomization was performed 1:1 via REDCap, with no constraint (i.e., without stratified randomization by site or by endoscopist or by indication).

The procedure report

The procedure report documented the polyp classification (e.g., Kudo, Paris), size, location, and resection technique. Resected polyps were sent for histopathological analysis regardless of their endoscopic appearance. Polyp size was measured using either an open biopsy forceps or the polypectomy snare employed. Complex polypectomies could be rescheduled for a subsequent endoscopic session as per the standard protocol of each institution. The classification characteristics of the polyp were documented in the index colonoscopy report, and histological results were retrieved after the polypectomy.

The investigator also recorded the following parameters in the endoscopy report:
- Bowel preparation quality using the Boston Bowel Preparation Scale (BBPS) (35)
- Intubation time, defined as the duration from the insertion of the colonoscope at the anal margin to its arrival at the cecum
- Withdrawal time, defined as the time from the start of cecal inspection to the complete withdrawal of the colonoscope from the anus, excluding cleaning, biopsy, or polypectomy maneuvers
- Total procedure time

Timings were measured using the time displayed on the monitor, a wall clock, or a watch. Any pauses during the procedure were noted and excluded from intubation and withdrawal time calculations. Per clinical practice and European guidelines, withdrawal times should aim for a minimum of 6 minutes.

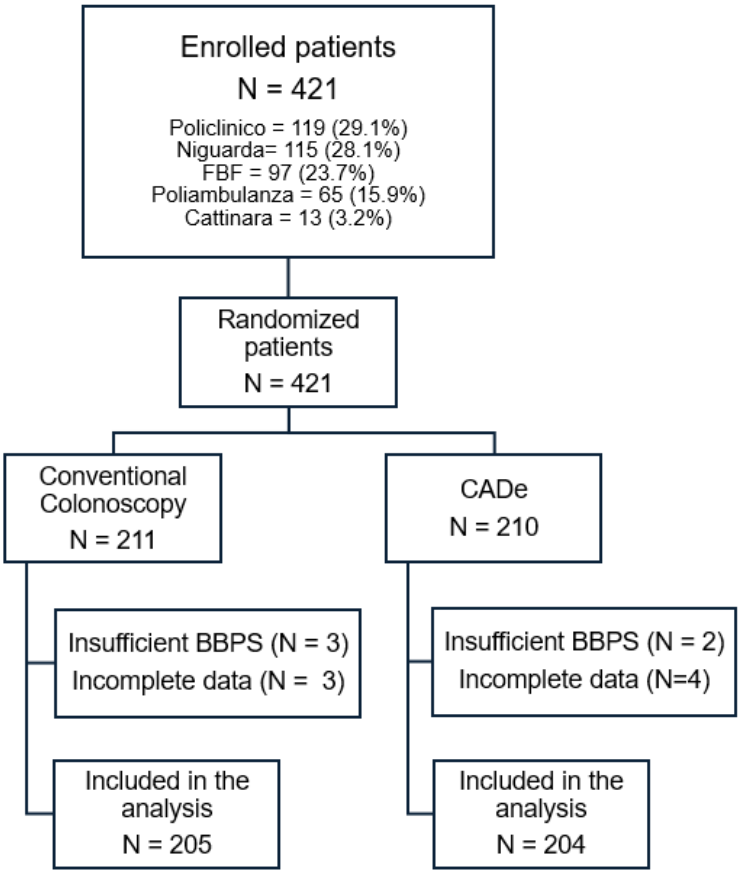
The ADR was calculated as the rate of colonoscopies with at least one histologically confirmed detected adenoma; the polyp detection rate (PDR), representing the proportion of colonoscopies with at least one histologically confirmed polyp; the SSL detection rate, defined as the proportion of colonoscopies with at least one histologically confirmed SSL. We calculated additional metrics including the adenoma per colonoscopy (APC), defined as the total number of histologically confirmed adenomas divided by the total number of colonoscopies, and the sessile serrated lesion (SSL) per colonoscopy rate, calculated as the number of histologically confirmed SSLs divided by the total number of colonoscopies.

Withdrawal time

The median time to cecum is equal to 10 minutes (IQR 7 – 14 minutes) with a difference among the centers ($p < 0.01$): the shortest median time is recorded at Poliambulanza (7 minutes, IQR 5 – 10 minutes) and the longest median time at Policlinico (12 minutes, IQR 8 – 17 minutes). The median overall procedure time

was 22 minutes (IQR 18 – 30 minutes), with a difference among the centers ($p < 0.01$); specifically, the shortest median time was recorded at Poliambulanza (19 minutes, IQR 15 – 22 minutes) and the longest median time at Cattinara (28 minutes, IQR 18 – 36 minutes). The withdrawal time estimation as per standard and per protocol definition (i.e., net of cleaning, biopsy, and resection maneuvers) showed remarkable difference among endoscopists, hereby disclosing a variable adherence on how this parameter has been reported. For this reason, the withdrawal time was not considered for comparative analysis.

Supplementary Figure 1 Study flow-chart



PDR and ADR: CC vs. CADe at every center

Center N (%)	PDR N (%)		p-value	ADR N (%)		p-value
	CC	CADe		CC	CADe	
Policlinico 119 (29.1)	23 (38.3)	26 (44.1)	0.53	13 (21.7)	17 (28.8)	0.37
Niguarda 115 (28.1)	24 (42.9)	20 (34)	0.32	17 (30.4)	15 (25.4)	0.56
FBF 97 (23.7)	26 (52)	19 (40.4)	0.25	19 (38)	13 (27.7)	0.28
Poliambulanza 65 (15.9)	17 (51.5)	15 (46.9)	0.71	15 (45.5)	12 (37.5)	0.52
Cattinara 13 (3.2)	3 (50)	4 (57.1)	0.80	2 (33.3)	3 (42.9)	0.73

Supplementary Table 1 Polyp detection rate and adenoma detection rate: conventional colonoscopy vs. computer-aided detection at every center

Supplementary Table 2 performance of computer-aided detection systems on adenoma detection rate: evidence from randomized controlled trials in the last 5 years

Author, year	Population size	CAD	HVE/LVE	Equipment	Fatigue	ADR with CADe	Other metrics of interest
Spada C et al., 2026	1009 patients	GI Genius, Medtronic	Expert endoscopists only (>2000 colonoscopies)	Olympus	Not evaluated	+7.8% (p = 0.01)	AADR was comparable between CADe and control groups
Jeon HJ et al., 2026	998 patients	ENAD-DET-01, Ainex	Expert endoscopists only (>500 colonoscopies)	Olympus	Not evaluated	+16.2% (p <0.001)	Increased hyperplastic polyps detection rate and APC
Xu X et al., 2025	390 patients	YOLOv5-based system	N/A	N/A	Not evaluated	+0.5% (p = 0.888)	

Yabuuchi Y et al., 2025	998 patients	EndoBRAIN-EYE, Cybernet Systems	10 non-expert and 8 expert endoscopists (< or > 1000 colonoscopies)	Olympus	Not evaluated	-3.8% (95% CI 0.83–1.05)	Mean number of APC was lower in the CADe group
Spada C et al., 2025	1158 patients	ENDO-AID, Olympus	14 expert endoscopists only(>2000 colonoscopies)	Olympus	Not evaluated	+9.7% (p = 0.001)	PPC and APC significantly increased, while no differences where found for SSLDR
Djinbachian R et al., 2025	467 patients	CADEYE, Fujifilm	3 expert and 2 non-expert endoscopists	Fujifilm	Not evaluated	+ 11.1% (p = 0.016)	PDR and AADR also increased
Maas M et al., 2024	497 patients	DISCOVERY, Pentax	Expert endoscopists only	Pentax	Not evaluated	+0.7% (p = 0.43)	APC did not differ significantly

Thiruvengadam NR et al., 2024	1100 patients	GI Genius, Medtronic	6 expert endoscopists only (>1000 colonoscopies)	Olympus	Not evaluated	+7.1% (p = 0.05)	APC was significantly higher in the CADe group
Tiankanon K et al., 2024	1200 patients	Deep GI, Center of Excellence for Innovation and Endoscopy in Gastrointestinal Oncology; CADEYE, Fujifilm	18 expert and 13 non-expert endoscopists	Fujifilm	Not evaluated	+11.7% and +16.5% (p <0.05)	APC was significantly higher in the CADe group
Karsenti D et al., 2023	2015 patients	GI Genius, Medtronic	20 expert endoscopists only (>2000	Olympus and Fujifilm	Not evaluated	+ 3.8% (p = 0·051)	

			colonoscopies)			
Wei MT et al., 2023	769 patients	EndoVigilant	N/A	N/A	Not evaluated	
Nakashima H et al., 2023	415 patients	CADEYE, Fujifilm	3 expert endoscopists only	Fujiffilm	Not evaluated	+11.8 (p = 0.018)
Ahmad A et al., 2023	579 patients	GI Genius ± Endocuff	6 expert endoscopists only (>2000 colonoscopies)	Olympus	Not evaluated	+6.4 % (p = 0.09)
Gimeno-García AZ et al., 2023	370 patients (ITT analysis)	ENDO-AID, Olympus	8 expert endoscopists only (>2000 colonoscopies)	Olympus	Not evaluated	+11.3% (p = 0.029)	Nonadvanced and flat ADRs and APC were significantly

							higher in the CADe group
Shaukat A et al., 2022	759 patients	N/A	N/A	N/A	Not evaluated	+3.9% (p = 0.065)	APC was significantly higher in the CADe group
Rondonotti E et al., 2022	800 patients	CADEYE, Fujifilm	Expert endoscopists only	Fujifilm	Not evaluated	+8.3% (95%CI 1.03–1.36)	APC was significantly higher in the CADe group
Yao L et al., 2022	1076 patients	YOLOv3-based system, Wuhan EndoAngel Medical Technology Company	N/A	N/A	Not evaluated	+6.5% (p = 0.045)	ADR was significantly higher in the CADe + CAQ group compared with the CADe group

Repici A et al., 2022	660 patients	GI Genius, Medtronic	Non-expert endoscopists only (<2000 colonoscopies)	Fujifilm and Olympus	Not evaluated	+8.8% (95% CI: 1.04 to 1.40)	APC, small and distal lesions detection rate were significantly higher in the CADe group.
Luo Y et al., 2020	150 patients	Xiamen Innovision	Expert endoscopists only (>3000 colonoscopies)	Olympus	Not evaluated	+4.7% (p < 0.001)	Significant increase in detection of polyps < 6 mm

AADR – Advanced Adenoma Detection Rate; ADR – Adenoma Detection Rate; APC – Adenomas Per Colonoscopy; CADe – Computer-Aided Detection; CAQ – Computer-Aided Quality; CI – Confidence Interval; ENAD – Endoscopic Artificial Intelligence Detection; HVE – High-Volume Endoscopist; ITT – Intention-To-Treat; LVE – Low-Volume Endoscopist; N/A – Not Available; PDR – Polyp Detection Rate; PPC – Polyps Per Colonoscopy; SSLDR – Sessile Serrated Lesion Detection Rate