

Performance of Computer-Aided Polyp Detection Using Water Exchange Colonoscopy: A Preliminary Pilot Study

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Background

- Computer-aided detection (CADE) increases adenoma detection rate (ADR) in randomized controlled trials (RCTs) using gas insufflation.
- Pragmatic implementation studies fail to find significant improvement.
- Water exchange (WE) outperforms gas insufflation in enhancing ADR.
- WE (salvage cleaning to reduce false positives) and CADe (reduction of human omissions) complemented each other in optimizing polyp detection by analysis of pre-recorded video in a RCT.

Tang et al. GIE 2022;95:1198-206.

Hypothesis and Study Aim

- Hypothesis:** WE/CADe detected more adenomas than WE alone.
- Study aim:**
 - To assess if using WE might confirm CADe performance improvement in pragmatic clinical observation.
 - We collected data with WE/CADe and compared the results with previously acquired WE data.

Methods

- Study design:** A prospective study with a historical control group.
- Study groups:** WE + CADe vs. WE control (1:1)
- Study Sites and CADe systems:**
 - Evergreen General Hospital, Taoyuan, Taiwan (CAD-EYE, Fujifilm)
 - CTO Hospital, Iglesias, Italy (Endo-AID, Olympus)
- Study Periods:**
 - WE + CADe group: February – June 2023
 - WE control group (Taiwan): November 2022 – January 2023
 - WE control group (Italy): January – May 2023

Inclusion and Exclusion

- Eligibility:** patients ≥45 y/o undergoing WE for screening, surveillance, diagnostic and positive fecal immunochemical test (FIT+) colonoscopy.
- Exclusion:**
 - Previous surgical resection of the colon
 - Inflammatory bowel disease
 - Hereditary colorectal cancer syndrome
 - Incomplete colonoscopy or polypectomy
 - Last colonoscopy within 3 years
 - Poor bowel preparation

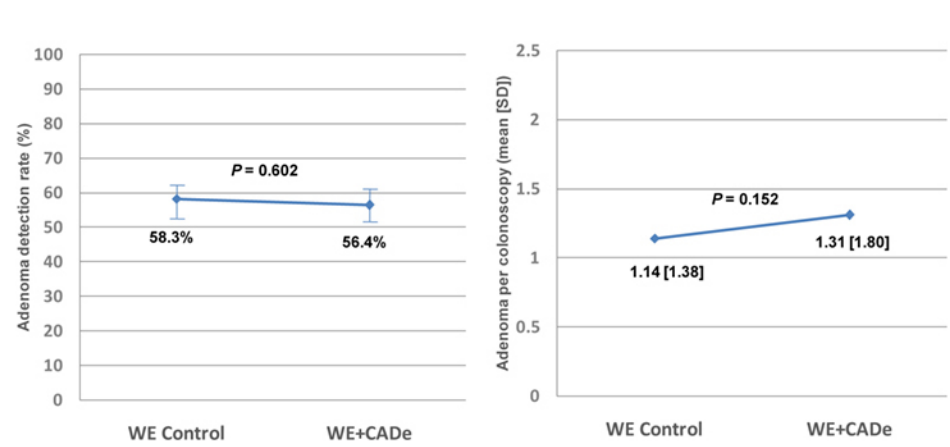
Outcomes

- Primary outcomes:**
 - ADR
 - Mean number of adenomas per colonoscopy (APC)
- Secondary outcomes:**
 - Sessile serrated lesion (SSL) detection rate (SSLDR)
 - Mean number of SSLs per colonoscopy

Results: Demographics

Enrolled patients (N=715)	WE control (N=348)	WE + CADe (N=367)	P value
Male, n (%)	175 (50.3)	193 (52.6)	0.538
Age, mean (SD), years	59.4 (7.7)	59.7 (7.9)	0.589
Indications of colonoscopy			0.999
Screening, n (%)	102 (29.3)	108 (29.4)	
Surveillance, n (%)	75 (21.6)	78 (21.2)	
Diagnostic, n (%)	12 (3.4)	12 (3.3)	
Positive FIT, n (%)	159 (45.7)	169 (46.1)	

Overall ADR and APC

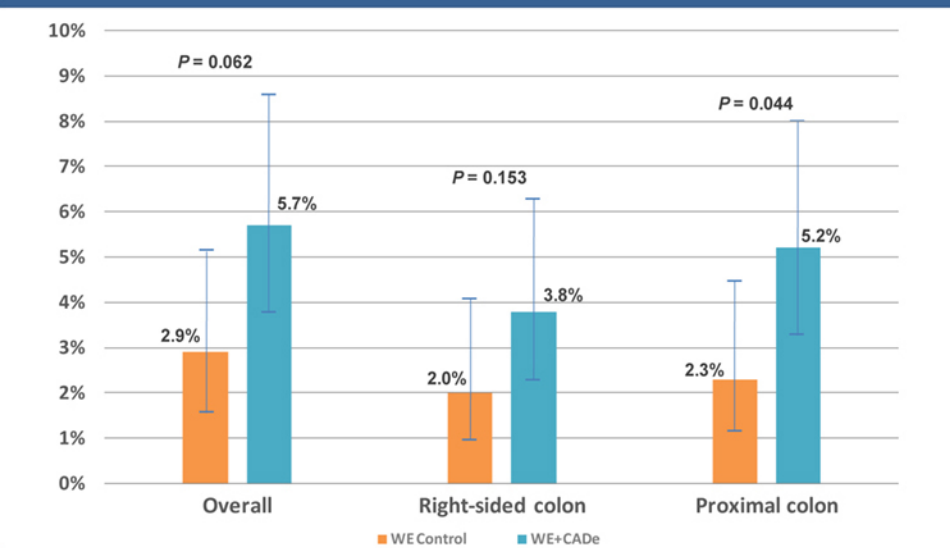


Overall and Segmental ADRs

ADR	WE control (N=348)	WE + CADe (N=367)	P value
Overall, n (%) [95% CI]	203 (58.3) [53.1-63.4]	207 (56.4) [51.3-61.4]	0.602
Right-sided colon, n (%) [95% CI]	106 (30.5) [25.9-35.5]	107 (29.2) [24.8-34.0]	0.703
Proximal colon, n (%) [95% CI]	132 (37.9) [33.0-43.1]	149 (40.6) [35.7-45.7]	0.465

Right-sided colon included cecum, ascending colon and hepatic flexure.
Proximal colon included right-sided colon, transverse colon and splenic flexure.

SSL Detection Rate



Detected SSLs Per Colonoscopy (SSLPC)

Mean SSLPC	WE control (N=348)	WE + CADe (N=367)	P value
Right-sided colon, mean (SD)	0.02 (0.17)	0.06 (0.36)	0.062
Proximal colon, mean (SD)	0.03 (0.22)	0.10 (0.58)	0.036

Colonoscopy Procedure Data

Variables	WE control (N=348)	WE + CADe (N=367)	P value
Cecal intubation rate, n (%)	346 (99.4)	365 (99.5)	0.957
Withdrawal time, mean (SD), min	18.9 (9.6)	19.2 (9.5)	0.682
Total BBPS score, mean (SD)	8.1 (1.0)	8.0 (1.1)	0.074
Right-sided colon BBPS score, mean (SD)	2.6 (0.5)	2.5 (5.0)	0.018

BBPS, Boston Bowel Preparation Scale

Discussion

- WE uniquely enhanced the performance of CADe in detecting proximal colon SSL.
- WE permitted CADe to detect a numerically increased APC.
- Use of CADe with WE did not improve ADR consistent with prior pragmatic implementation trials.
- Use of CADe did not prolong withdrawal time.

Conclusions

COMPARED WITH WATER EXCHANGE ALONE, THE COMBINATION OF **WATER EXCHANGE AND COMPUTER-AIDED DETECTION** NUMERICALLY INCREASED THE OVERALL **ADENOMAS PER COLONOSCOPY** AND SIGNIFICANTLY IMPROVED **SESSILE SERRATED LESION DETECTION RATE** AND THE MEAN NUMBER OF **SESSILE SERRATED LESIONS PER COLONOSCOPY** IN THE **PROXIMAL COLON**.