

# Comparing Right Colon Adenoma Miss Rates of Water Exchange and Carbon Dioxide Insufflation: A Prospective Randomized Controlled Trail

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# Disclosure

**All authors disclosed no potential conflicts of interest.**



# Background

- **Post-colonoscopy colorectal cancers (PCCRC) are presumed to arise from miss lesions and frequently occur in the right colon.<sup>1</sup>**
- **A meta-analysis of tandem colonoscopy studies reported the pooled miss rate for all adenomas at 26%.<sup>2</sup>**
- **Observational data have shown water exchange (WE) significantly decreased right colon adenoma miss rate (AMR).<sup>3</sup>**

<sup>1</sup> le Clercq CM, et al. Gut 2014; <sup>2</sup> Zhao S, et al. Gastroenterology 2019;

<sup>3</sup> Cheng CL, et al. BMC Gastroenterol 2019.



# Aims of Study

- We hypothesized that WE could reduce right colon AMR compared with CO2 insufflation.
- **Primary outcome:**  
Right colon AMR determined by tandem inspection of the right colon by blinded observers.
- **Secondary outcomes:**  
Right colon serrated polyp miss rate (SPMR), right colon serrated polyp detection rate (SPDR), and overall adenoma detection rate (ADR).



# Inclusion and Exclusion Criteria

- **Inclusion criteria:**

Patients aged  $\geq 45$  years who were able to give informed consent were eligible for enrollment.

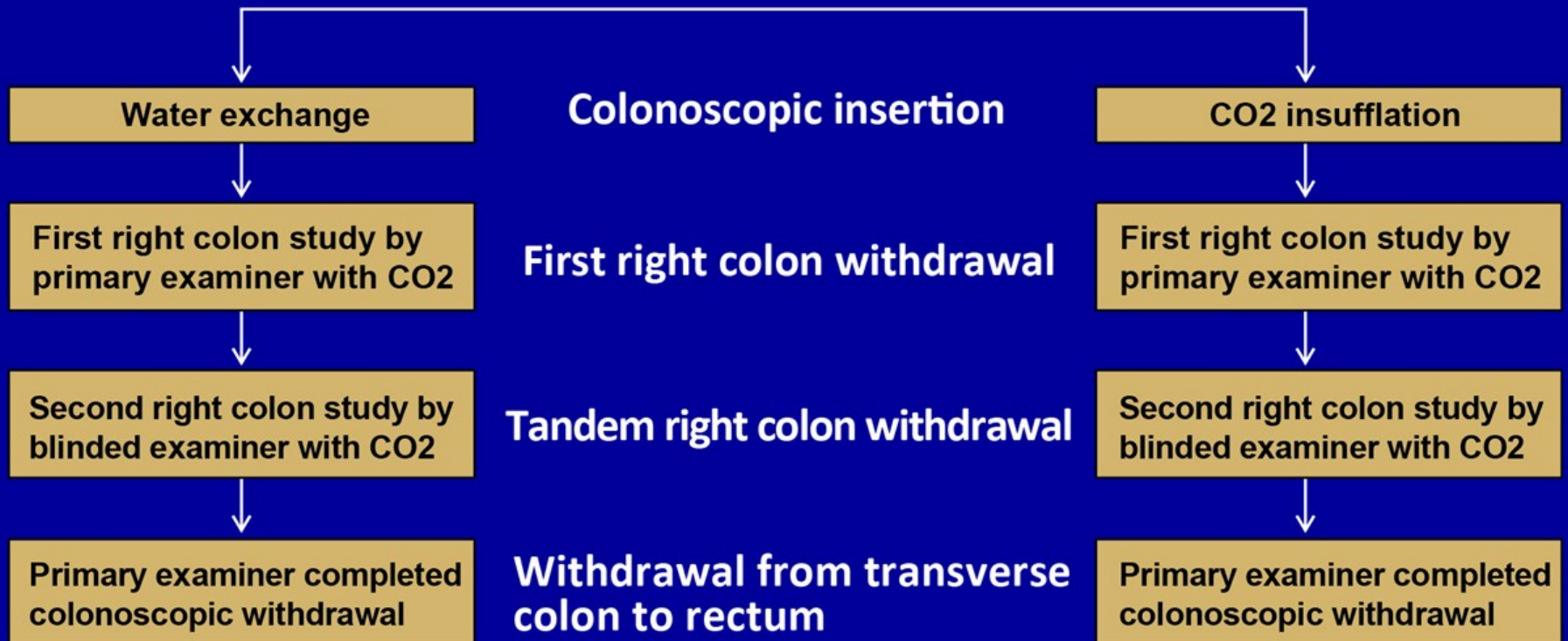
- **Exclusion criteria:**

- Previous surgical resection of the colon
- Inflammatory bowel disease
- Polyposis syndrome
- Known obstructive lesion of the colon
- Gastrointestinal bleeding
- ASA classification of physical status  $\geq 3$
- Refusal to provide written informed consent

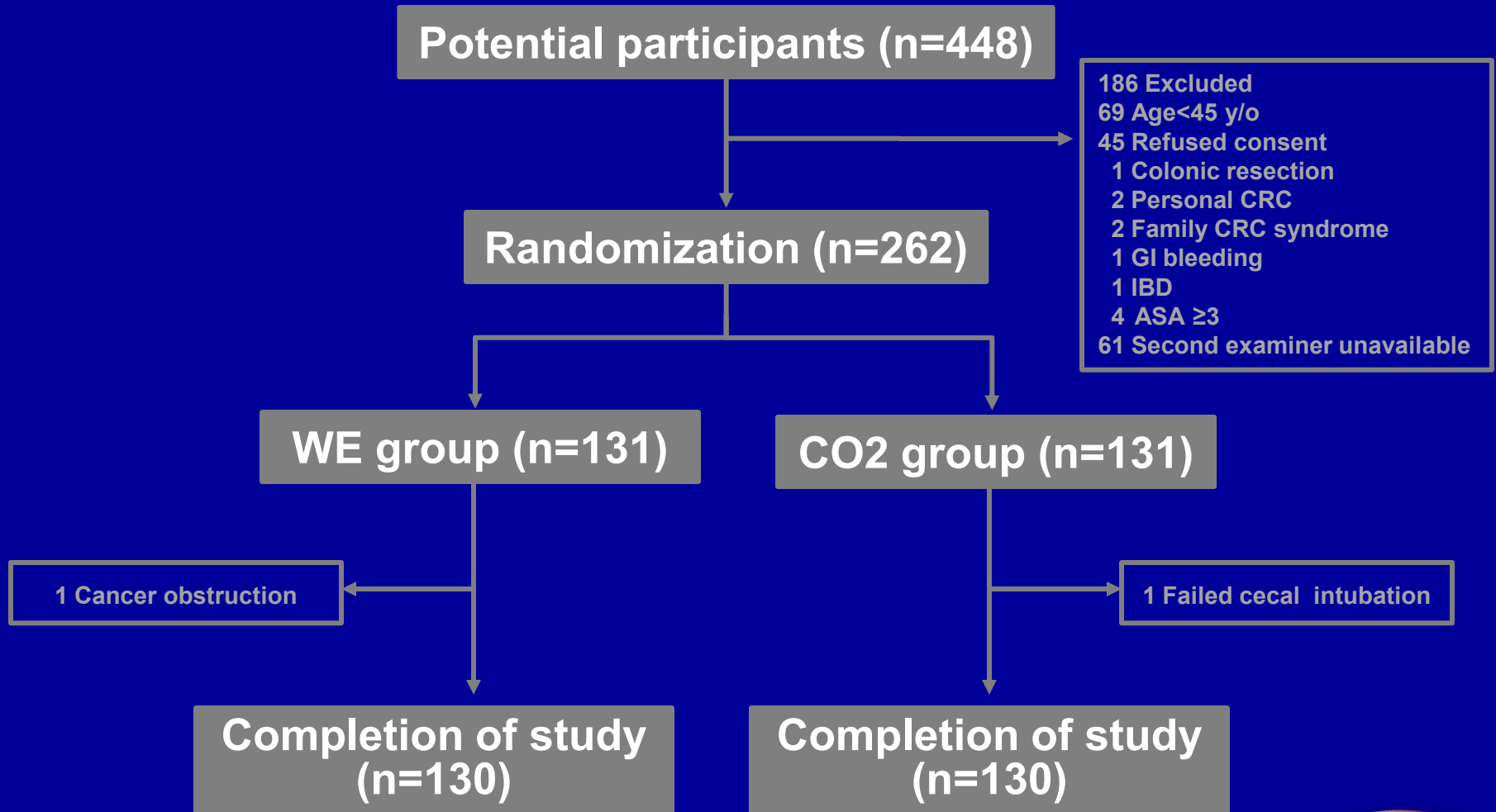


# Randomization and Intervention

## Randomization



# Study Flowchart



# Results: Demographics and Indications

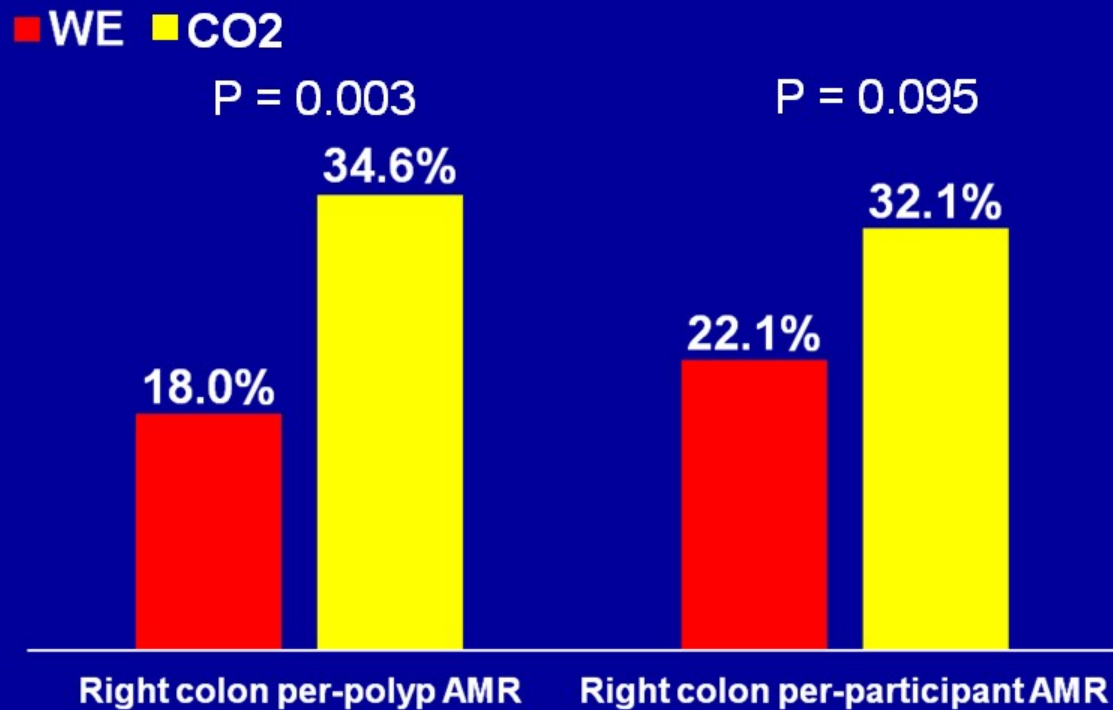
	WE group (N=131)	CO2 group (N=131)	<i>P</i> value
Male, n (%)	61 (46.6)	67 (51.1)	0.537
Age, mean (SD), years	56.7 (8.8)	57.3 (8.3)	0.529
Body mass index (BMI), mean (SD), kg/m <sup>2</sup>	25.4 (3.4)	24.3 (3.5)	0.010
Family history of CRC*, n (%)	4 (3.1)	7 (5.3)	0.540
Active smoker, n (%)	23 (17.6)	20 (15.3)	0.739
Screening indication, n (%)	53 (40.5)	54 (41.2)	0.968
Surveillance indication n, (%)	62 (47.3)	63 (48.1)	
Positive FIT indication, n (%)	16 (12.2)	14 (10.7)	

\*Family history in first degree relative < 60 years.

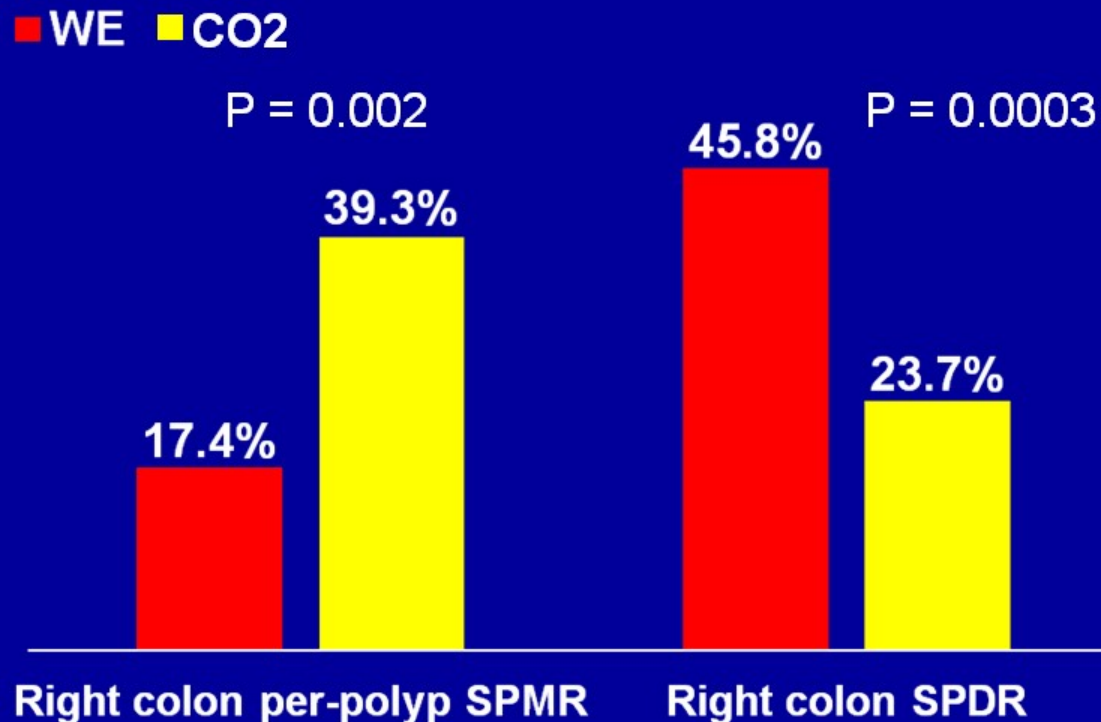




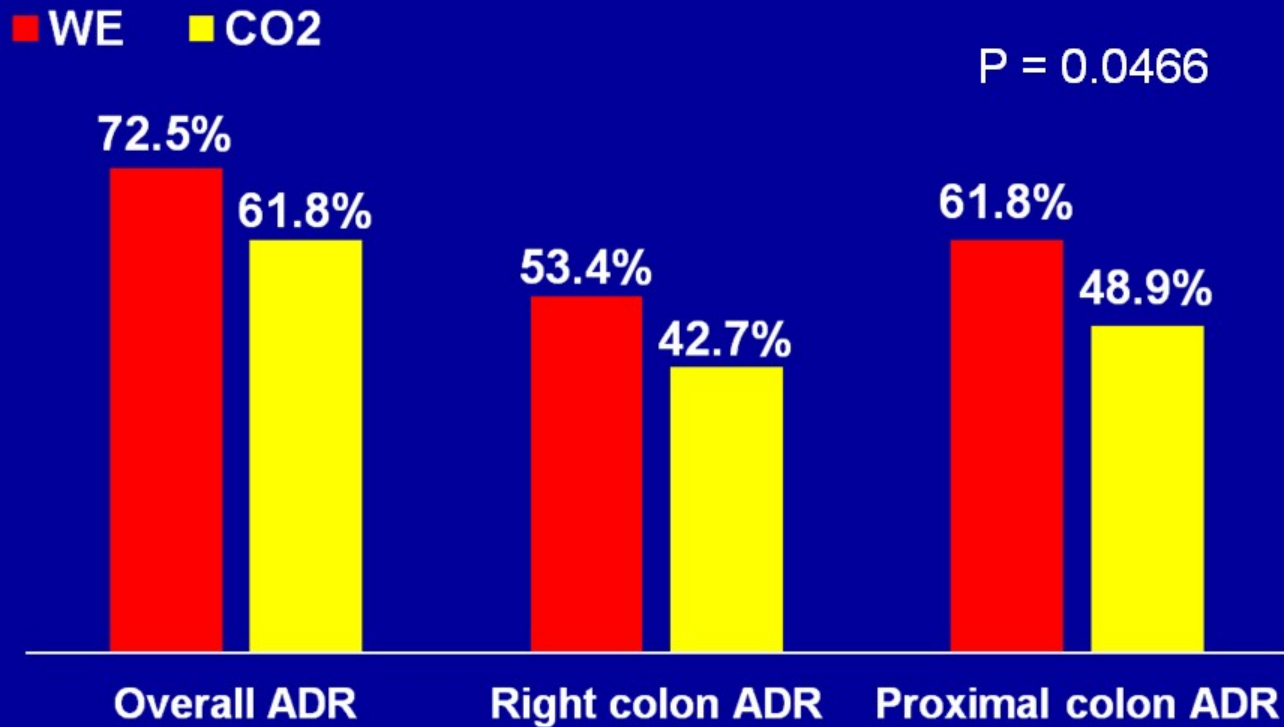
# Primary Outcome: Right colon AMR



# Secondary Outcomes: Right colon SPMR and SPDR



# Secondary Outcomes: ADRs



# Insertion and Withdrawal Inspection Times

Mean time interval (SD)	WE (N=131)	CO2 (N=131)	P value
Insertion, min	14.0 (6.5)	7.7 (5.6)	<0.0001
Inspection during overall withdrawal, min	17.3 (5.2)	17.4 (4.7)	0.798
Inspection during first right colon examination, min	6.6 (2.0)	6.1 (2.4)*	0.076
Inspection during tandem right colon examination, min	5.2 (1.8)	5.4 (1.8)*	0.295
Total withdrawal, min	24.6 (8.0)	26.0 (6.9)	0.118
Total procedure, min	38.5 (10.8)	33.7 (8.6)	<0.0001

\*Data for the 130 patients with complete tandem examination.



# Other Colonoscopic Parameters

	WE group (N=131)	CO2 group (N=131)	P value
Water infused during insertion, mean (SD), mL	1499.6 (665.4)	39.1 (236.7)	<0.0001
Water aspirated during insertion, mean (SD), mL	1460.9 (657.1)	136.8 (189.7)	<0.0001
BBPS score $\geq$ 8, n (%)	29 (22.1)	16 (12.3)*	0.0485
Right colon BBPS score, mean (SD)	2.0 (0.2)	2.0 (0.2)*	0.2071
Correct guess of insertion method by blinded examiner, n (%)	87 (66.4)	72 (55.0)*	0.0746

\*Data for the 130 patients with complete tandem examination.  
*BBPS*, Boston Bowel Preparation Scale



# Risk Factors for Miss of Adenomas

Variable	Odds Ratio	95% CI	P Value
WE group vs. CO2 group	0.47	0.23 - 0.94	0.034
Age (for a 5-year increment)	1.04	0.86 - 1.26	0.661
Female vs. male	1.34	0.67 - 2.69	0.412
BMI (for a 1-kg/m <sup>2</sup> increment)	1.06	0.97 - 1.16	0.218
Active smoker	0.68	0.28 - 1.68	0.405
Family history of CRC	1.07	0.25 - 4.48	0.932
Screening vs. positive FIT indication	0.46	0.17 - 1.22	0.119
Endoscopist	1.16	0.57 - 2.35	0.684
BBPS score (for a 1-point increment)	1.04	0.62 - 1.72	0.895
Insertion time (for a 1-min increment)	1.01	0.96 - 1.06	0.766
Withdrawal time (for a 1-min increment)	1.02	0.97 - 1.07	0.417
≥ 2 adenomas vs. ≤ 1 adenoma in right colon during index examination	2.57	1.29 - 5.13	0.007
Max. adenoma size ≤ 5 mm vs ≥ 6 mm	0.95	0.49 - 1.87	0.888



# Strength and Limitation

- **Strengths:**
  - Equivalent quality techniques were used during WE and CO2 withdrawal inspection.
  - Blinded examiner with adequate masking.
  - High ADRs attested to the high quality of study.
- **Limitations:**
  - Inability to mask the primary examiner of the insertion method used.
  - Single center study.



# Conclusions

The significant reductions of AMR and SPMR in the right colon add noteworthy attributes to WE. Use of WE for CRC prevention is justified to accumulate data on reduced missed lesions and PCCRC.

