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Benefits and limitations of using CADx in colonoscopy: learning from the first comparative clinical trial

Dr Sophie Williams

Kings College Hospital
London, UK

Contributors

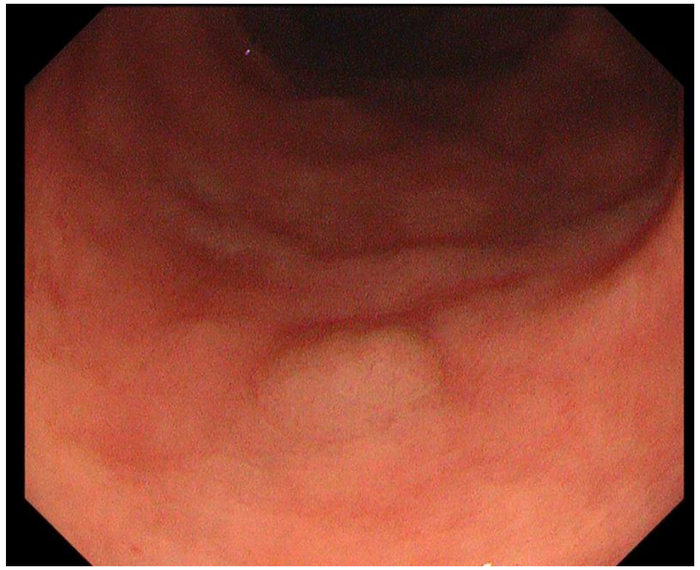
Artificial Intelligence for Real-Time Optical Diagnosis of Neoplastic Polyps during Colonoscopy

Barua I[1,2*], Wieszczy P[1,2,3*], Kudo SE[4*], Misawa M[4], Holme Ø[1,2,5], Gulati S[6], Williams S[6], Mori K[7], Itoh H[7], Takishima K[4], Mochizuki K[4], Miyata Y[4], Mochida K[4], Akimoto Y[4], Kuroki T[4], Morita Y[4], Shiina O[4], Kato S[4], Nemoto T[8], Hayee B[6], Patel M[6], Gunasingam N[6], Kent A[6], Emmanuel A[6], Munck C[9], Nilsen JA[9], Hvattum SA[9], Frigstad SO[9], Tandberg P[9], Løberg M[1,2], Kalager M[1,2], Haji A[6#], Bretthauer M[1,2#] and Mori Y[1,2,4#].
*Contributed equally as co-first authors. #Contributed equally as co-last authors.

[1]Clinical Effectiveness Research Group, Institute of Health and Society, University of Oslo, Oslo, Norway. [2]Clinical Effectiveness Research Group, Department of Transplantation Medicine, Oslo University Hospital, Oslo, Norway. [3]The Maria Sklodowska-Curie National Research Institute of Oncology, Department of Cancer Prevention, Warsaw, Poland. [4]Digestive Disease Center, Showa University Northern Yokohama Hospital, Yokohama, Japan. [5]Department of Medicine, Sørlandet Hospital Kristiansand, Kristiansand, Norway. [6]King's Institute of Therapeutic Endoscopy, King's College Hospital NHS Foundation Trust, London, UK. [7]Graduate School of Informatics, Nagoya University, Nagoya, Japan. [8]Department of Diagnostic Pathology, School of Medicine, Showa University, Yokohama Northern Hospital, Kanagawa, Japan. [9]Department of Medicine, Baerum Hospital, Vestre Viken Hospital Trust, Gjettum, Norway.

Background

- Current practice: Removal of precancerous polyps during colorectal cancer screening
  - Optical diagnosis - remove or not remove?
- Artificial intelligence (AI) or computer-aided diagnosis for classification (CADx)
  - AI-based systems may reduce costs, resources, overtreatment
  - Lack of high-quality clinical trials



8 prospective studies

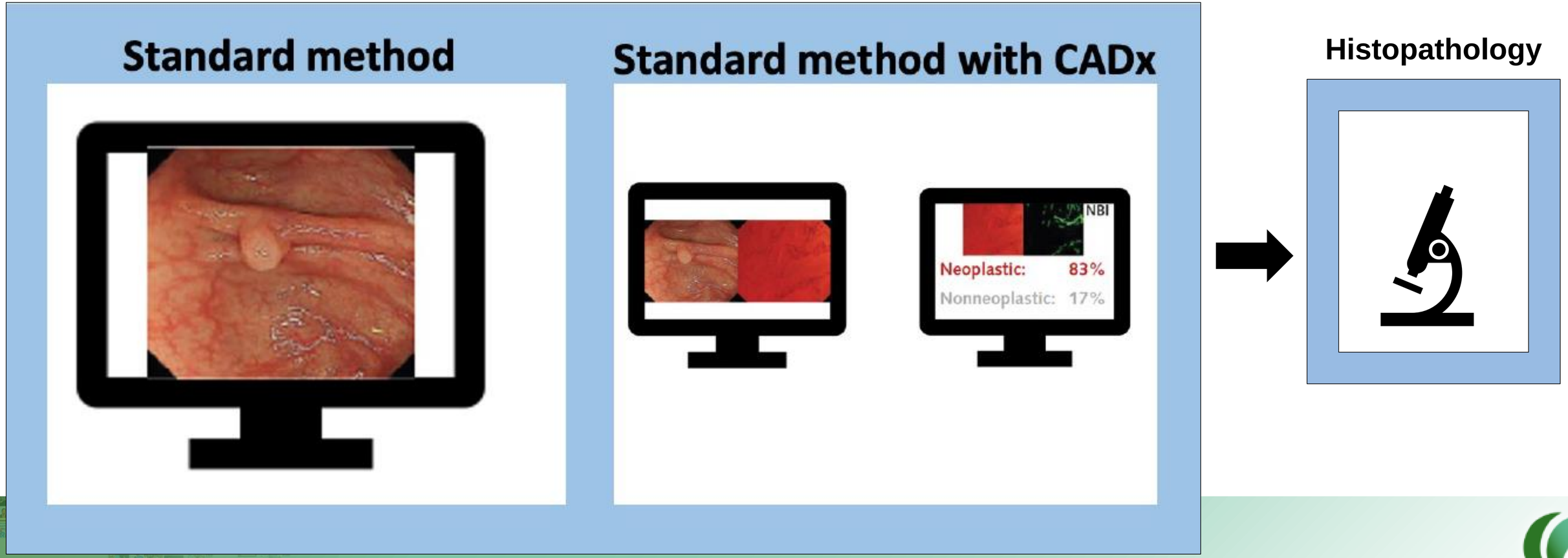
Authors	Year	Modality	No. of Subjects
Aihara et al.[1]	2013	AFI	32
Kuiper et al.[2]	2015	WavStat4	87
Rath et al.[3]	2016	WavStat4	27
Kominami et al.[4]	2016	Magnifying NBI	41
Mori et al.[5]	2018	Endocytoscopy	791
Horiuchi et al.[6]	2019	AFI	95
Barua et al.[7]	2022	Endocytoscopy	1,289
Minegishi et al.[8]	2022	NBI	186

Only comparative study

*1. ***Eur J Gastroenterol Hepatol*** 2013; 2. ***Endoscopy*** 2015; 3. ***Endoscopy*** 2016; 4. ***GIE*** 2016; 5. ***Ann Intern Med*** 2018; 6. ***Scand J Gastroenterol*** 2019; 7. ***NEJM Evidence*** 2022; 8. ***Gastroenterology*** 2022

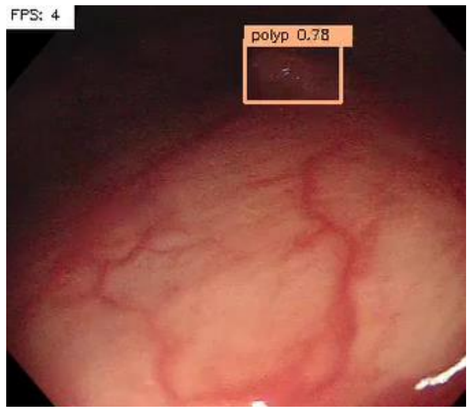
Methods

- Multicenter, prospective clinical trial
- Interventions: Standard method vs. Standard method with CADx
- Primary endpoint: Sensitivity for small (≤5mm) neoplastic rectosigmoid polyps during colonoscopy
- Secondary endpoints: Specificity and rate of high-confidence

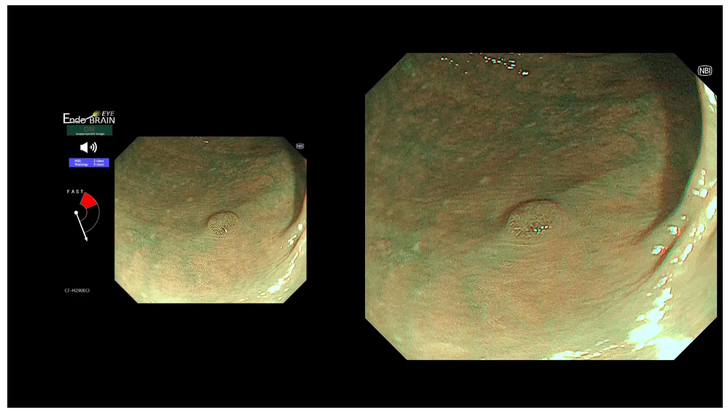


Two roles of AI in colonoscopy

1. Computer-aided detection (CADe)



2. Computer-aided diagnosis (CADx)



Results

NEJM Evidence

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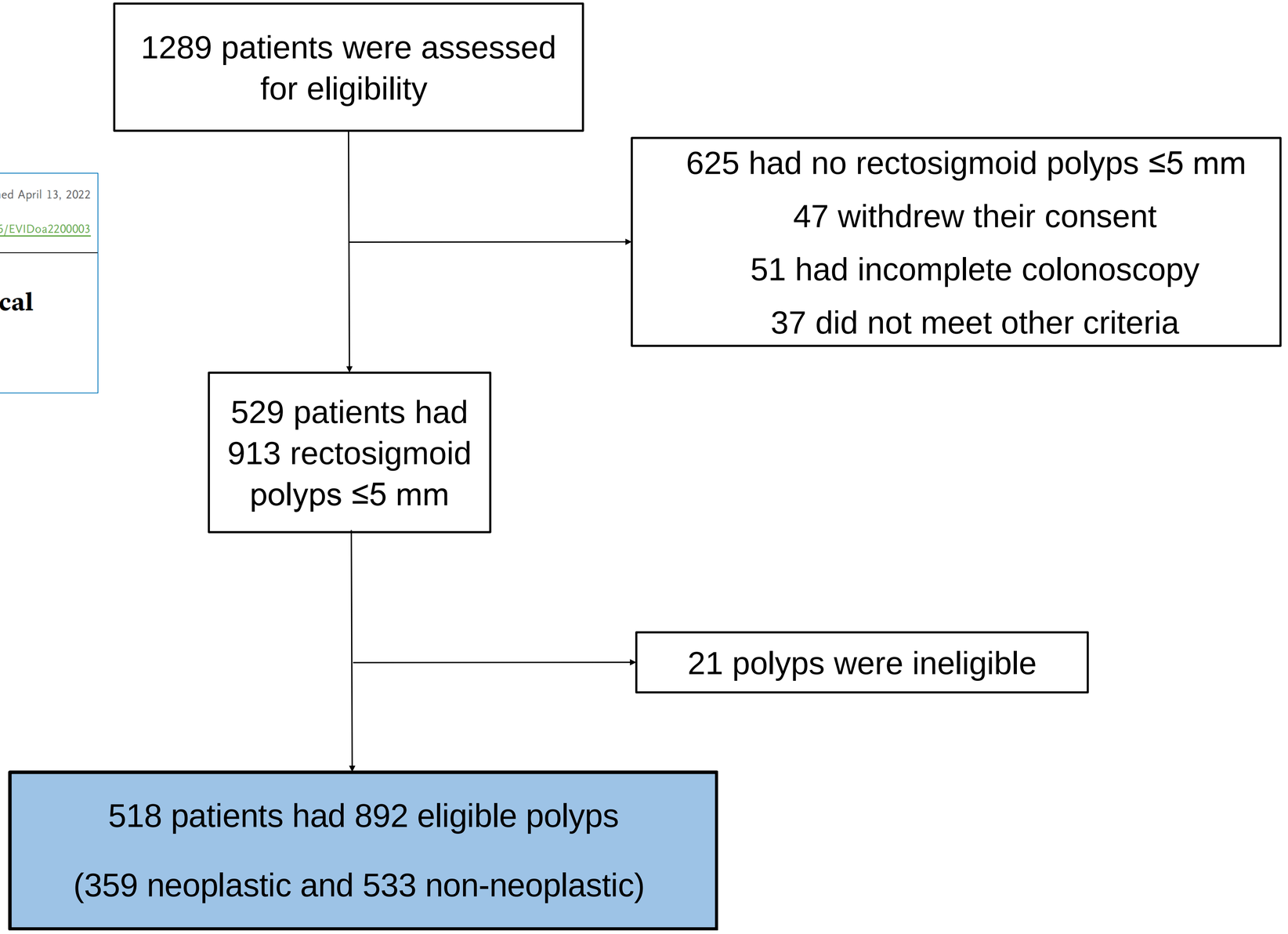
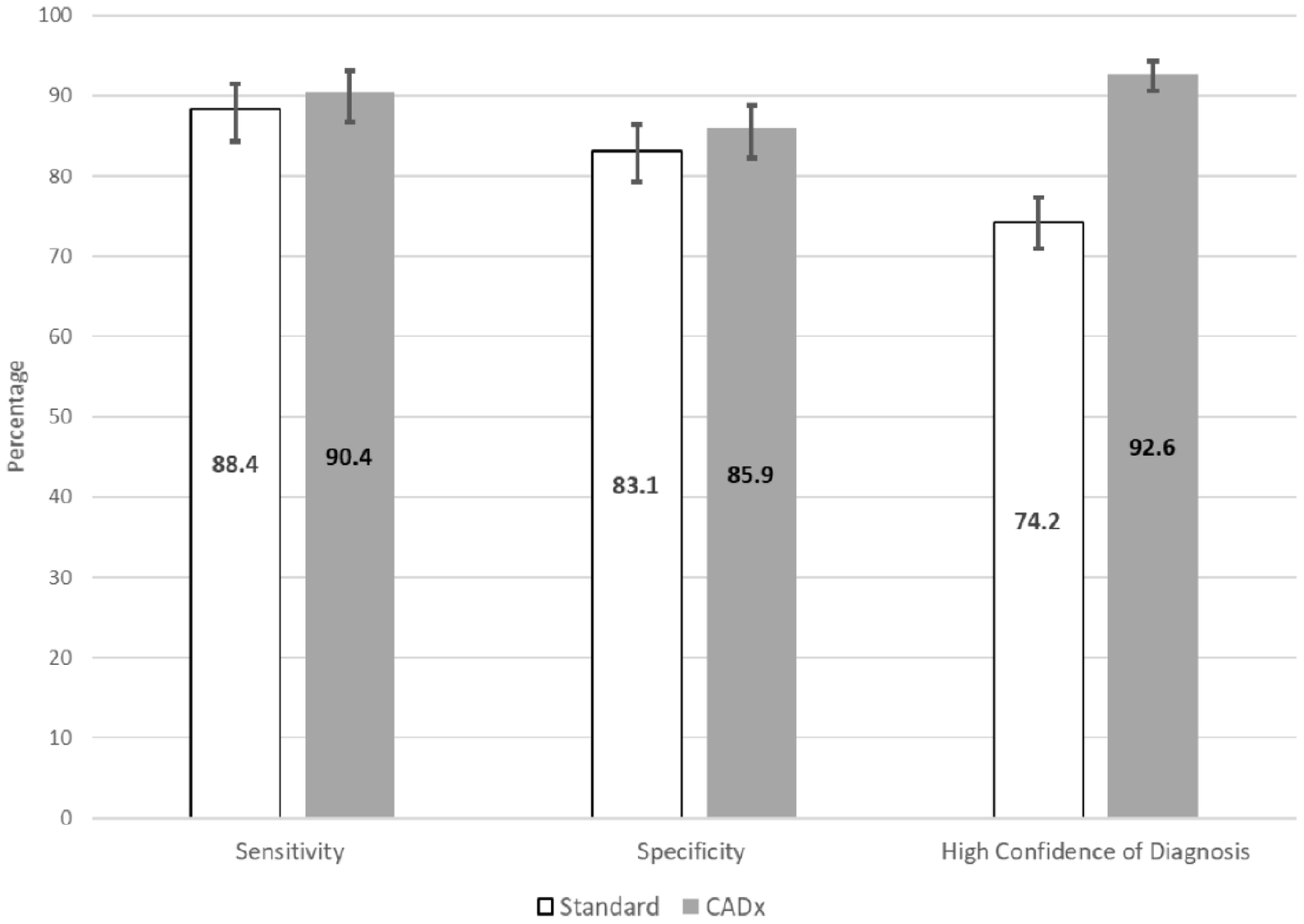
ORIGINAL ARTICLE

Real-Time Artificial Intelligence–Based Optical Diagnosis of Neoplastic Polyps during Colonoscopy



Results



	Standard diagnosis	CADx diagnosis
Sensitivity - % (95% CI)	88.4 (84.3-91.5)	90.4 (86.8-93.1)

p = 0.33

Conclusions

- CADx may not reduce overlooking adenomas during visual inspection of polyps. However, our study showed a potential improvement in specificity for neoplastic polyps, and there was also a trend toward improved confidence in optical diagnosis of polyps.

- Our study suggests that use of CADx helped the provider have higher confidence in optical diagnosis. If this can be replicated, it could contribute to cost reduction because more polyps could be left in situ.

- Barua, P. Wieszczy, S.-e. Kudo, et al. NEJM Evidence, published on April 13. 2022

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