A review on the use of non-magnifying narrow band imaging (NBI) to predict the histology of colonic polyp ≤5 mm

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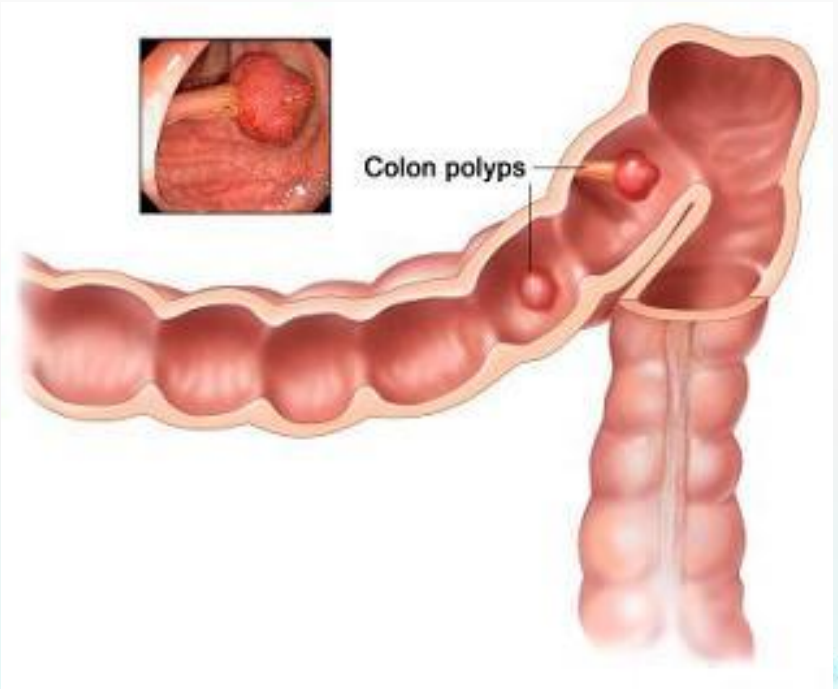
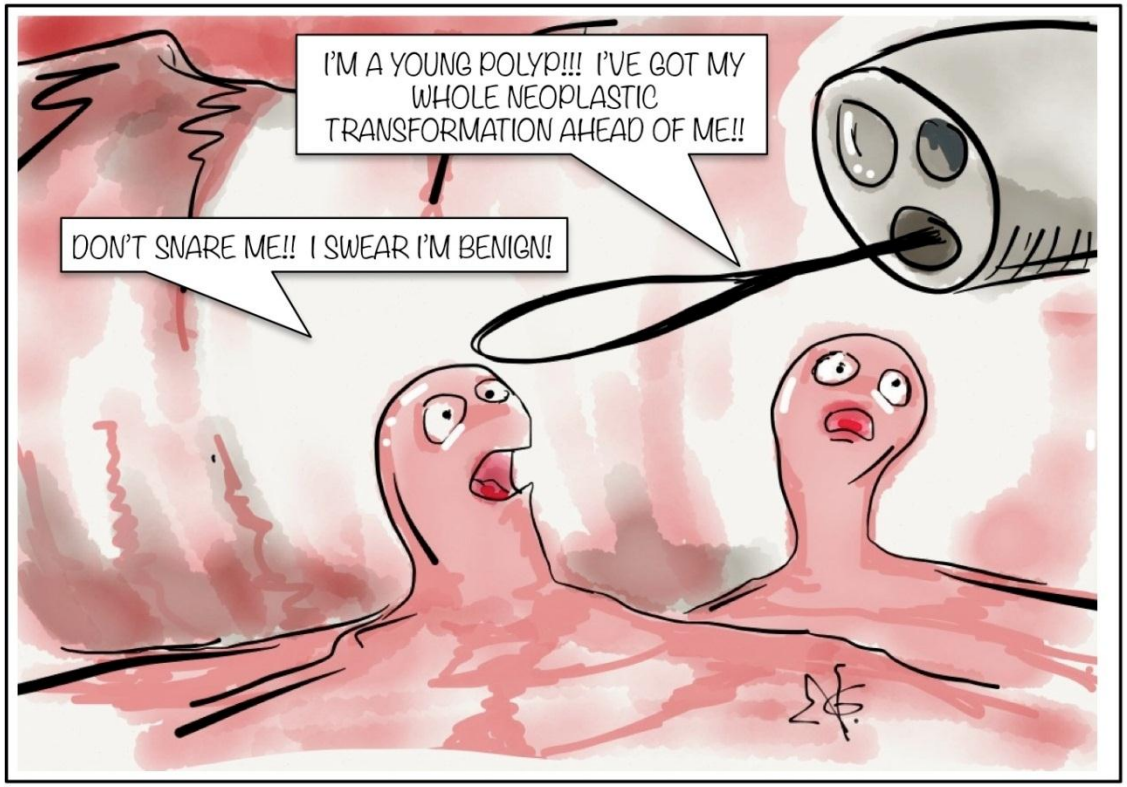
Introduction

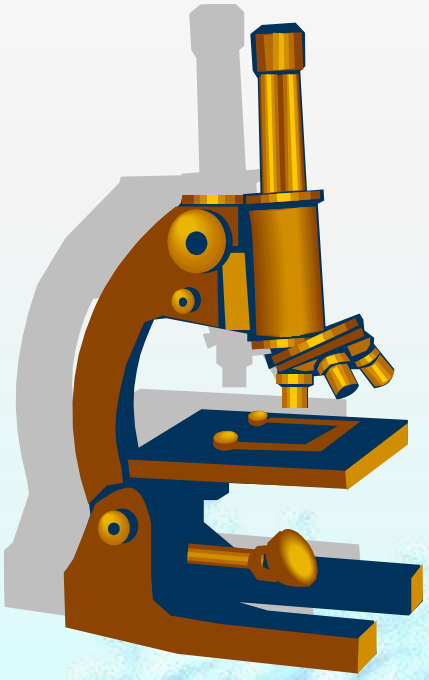
- Colonic polyp is a common finding during colonoscopy
- NTWC: Around 1400 polypectomy done in 2013.



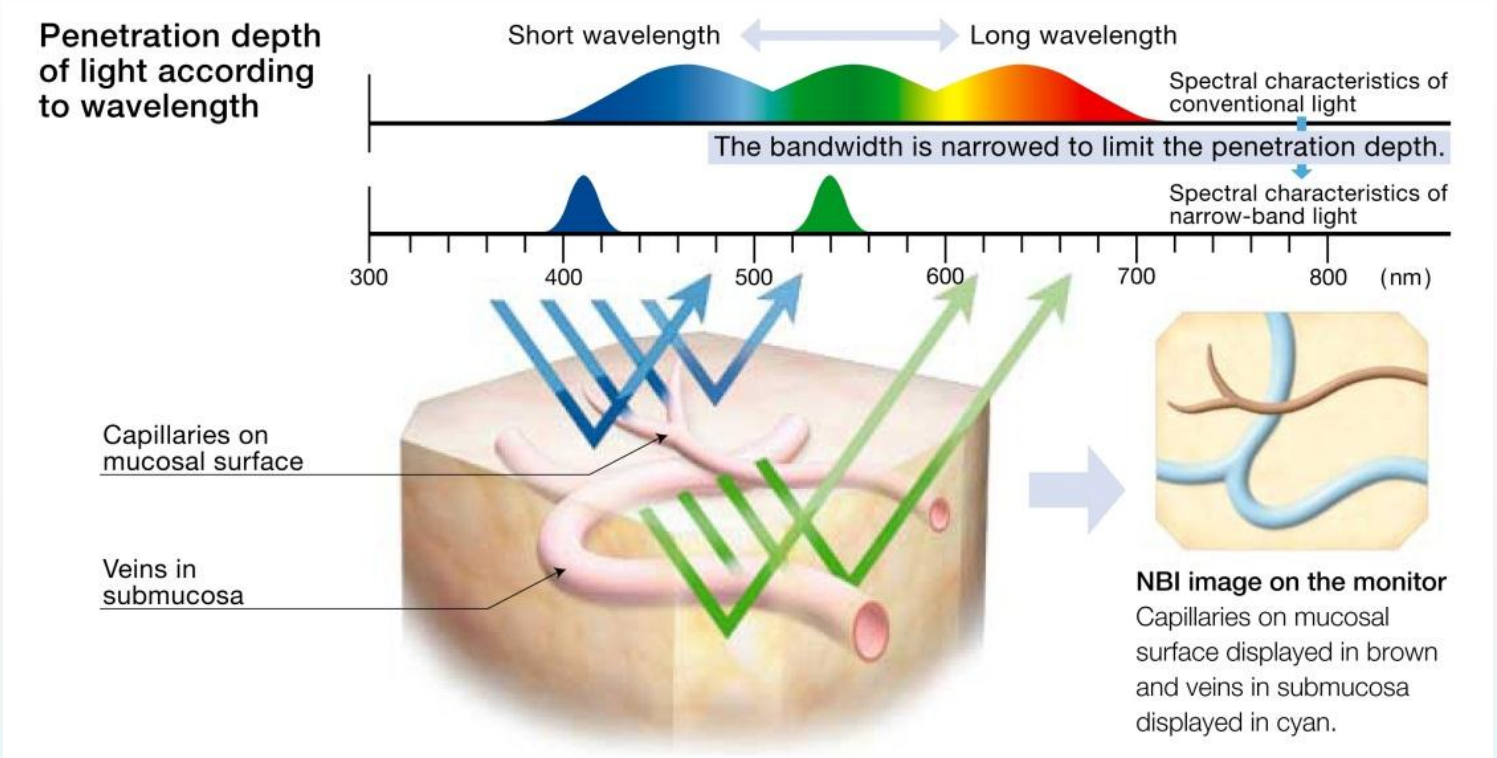
Introduction

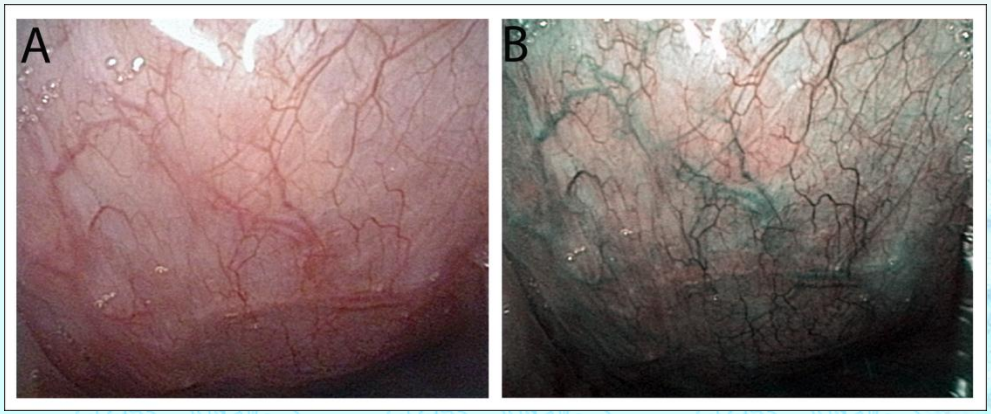
- Traditional approach: remove + histology





Narrow band imaging





Typical endoscopic findings of NICE classification

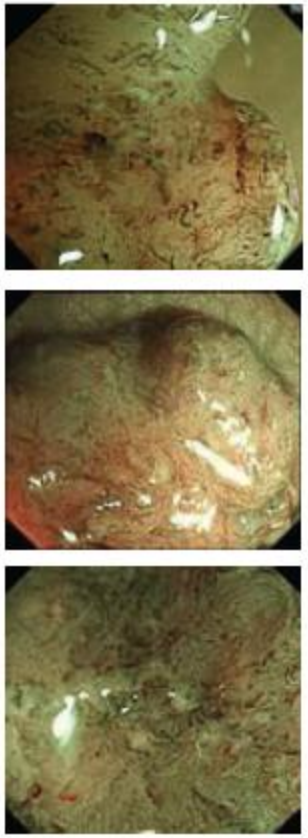
	Type 1	Type 2	Type 3
Endoscopic findings			

FIGURE 8: Figures to illustrate the NBI International Colorectal Endoscopic (NICE) classification.

Diagnostic and Therapeutic Endoscopy. 2012;2012:1–11

PRESERVATION AND INCORPORATION OF VALUABLE ENDOSCOPIC INNOVATIONS

The American Society for Gastrointestinal Endoscopy PIVI (Preservation and Incorporation of Valuable Endoscopic Innovations) on real-time endoscopic assessment of the histology of diminutive colorectal polyps

- Resect and discard
- <= 5mm
- > 90% Negative predictive value
- > 90% agreement with the surveillance interval determined by histology alone

GASTROINTESTINAL ENDOSCOPY Volume 73, No. 3 : 2011

175. 由於人口老化和生活習慣改變，大腸癌的發病率持續上升，在2011年成為本港最常見的癌症。因此，政府將資助較高風險的群組接受大腸癌篩檢。衞生署聯同醫管局正進行研究，並於今年展開先導計劃的籌備工作。

Benefit

- Cost saving
  - Histology exam
  - From specimen collection to pathology report and review
- Logistics
  - Surveillance and follow-up can be recommended immediately after colonoscopy

Method

- From 1/9/2012 to 31/3/2014
- Single trained gastroenterologist using NBI
- Olympus CF 260/290 series, non-capped, non-magnified
- Adenomatous or non-adenomatous (high or low confidence)
- Histology for confirmation

Method

- The feasibility rate (the percentage of colonic polyp that could be classified with high confidence by NBI) was described.
- The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) using NBI were calculated.
- The degree of agreement of postpolypectomy surveillance interval between NBI and histology standard were expressed using Keppa statistics

Result (update till 3/2014)

Patient characteristics	
Patient number	49
Mean age	55.8 (range: 44-87)
Indication of colonoscopy	
CRC screening (High risk with family history of CRC)	15 (30.6%)
Anemia	12 (24.5%)
Surveillance colonoscopy (colonic polyp)	6 (12.2%)
PR bleeding	5 (10.2%)
Altered bowel habit	5 (10.2%)
Diarrhea	3 (6.1%)
FOB +ve	1 (2.0%)
Constipation	1 (2.0%)
Followup for colitis	1 (2.0%)

Result (update till 3/2014)

Colonic polyp charactistics	
Number of colonic polyp < 5mm	94
Site	
Right sided colon (From descending colon to sigmoid colon)	50/94 (53%)
Left sided colon (From caecum up to splenic flexure)	38/94 (40%)
Rectum	6/94 (6.4%)
Feasibility rate	88/94 (94%)
Endoscopic features (High confident group)	
Adenomatous	58/88 (66.0%)
Non- adenomatous	30/88 (34.0%)
Histology (High confident group)	
Adenomatous	61/88 (69.3%)
Non- adenomatous	27/88 (30.7%)

Result (update till 3/2014)

High confident group		NBI (adenomatous)		
		Yes	No	Total
Histology (Adenomatous)	Yes	58	2	60
	No	0	28	28
	Total	58	30	88

Result(update till 3/2014)

Sensitivity (high confident group)	96.7%
Specificity (high confident group)	100%
Positive predictive value (PPV) (high confident group)	100%
Negative predictive value (NPV) (high confident group)	93.3%
The agreement of postpolypectomy surveillance interval by NBI and histology (high confident group)	The Kappa with linear weighting is 0.95, 95% CI [0.90-0.99]

The NBI technique can accurately predict histology of polyp (≤5 mm) in high confident group.

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NBI

ID No. :
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D. O. Birth:

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14:33:43

SCV: 2

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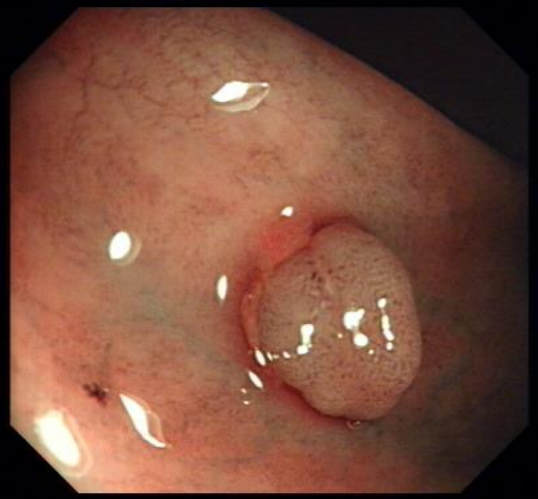
CE:2 Z:1.0

Name:



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Comment:

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D. O. Birth:

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Name:

Physician:
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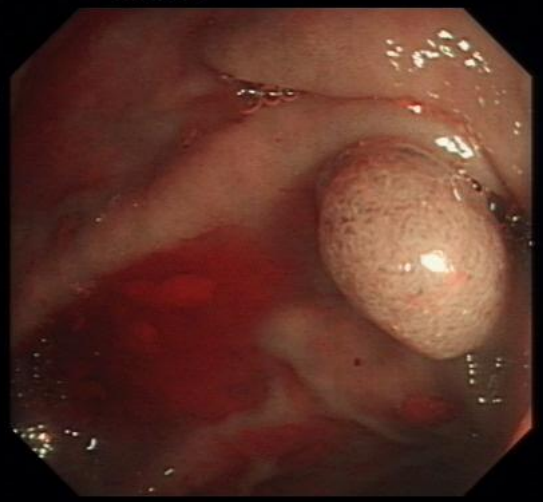

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Name:

Physician:
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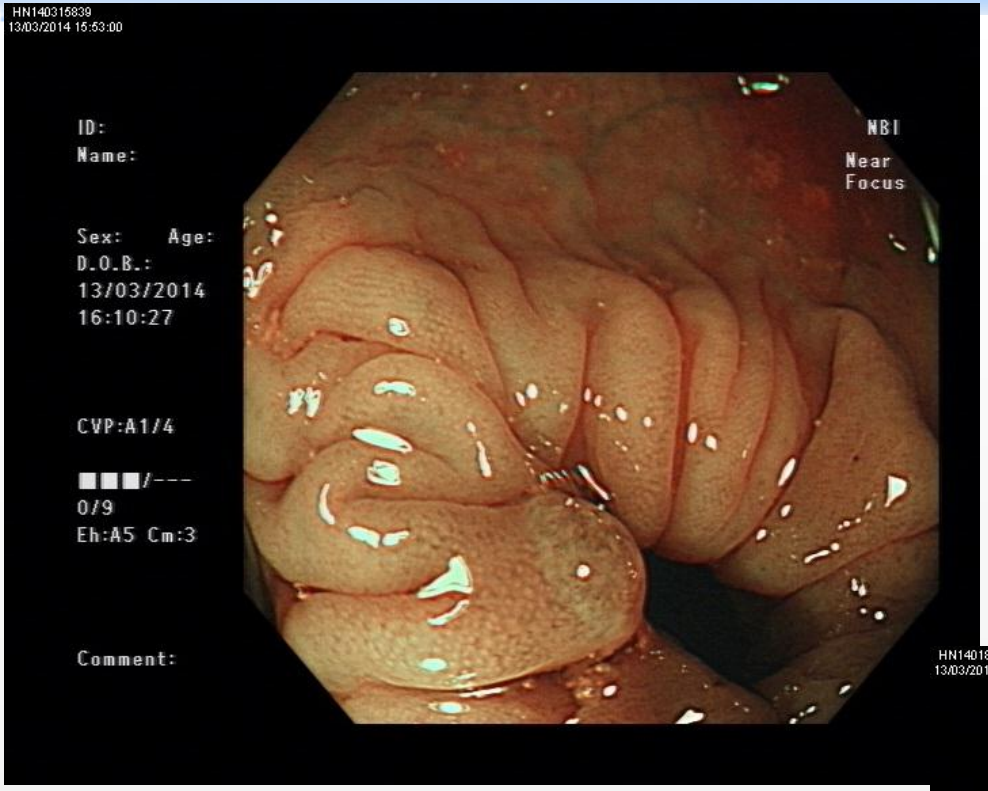
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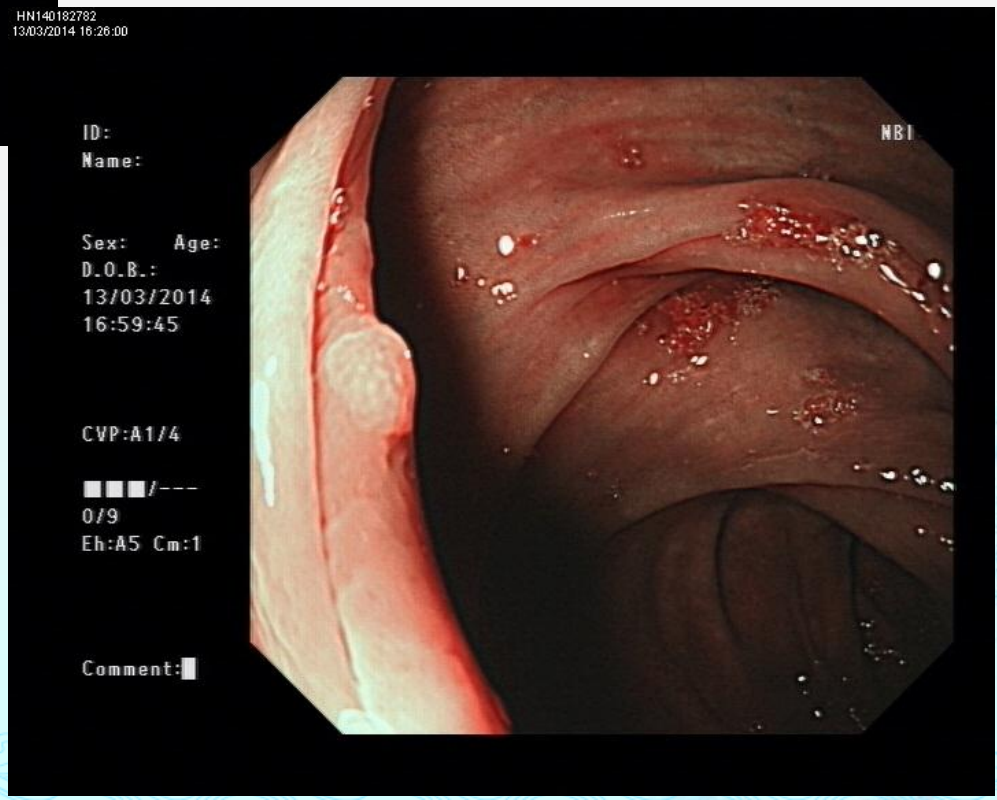
NBI
Near
Focus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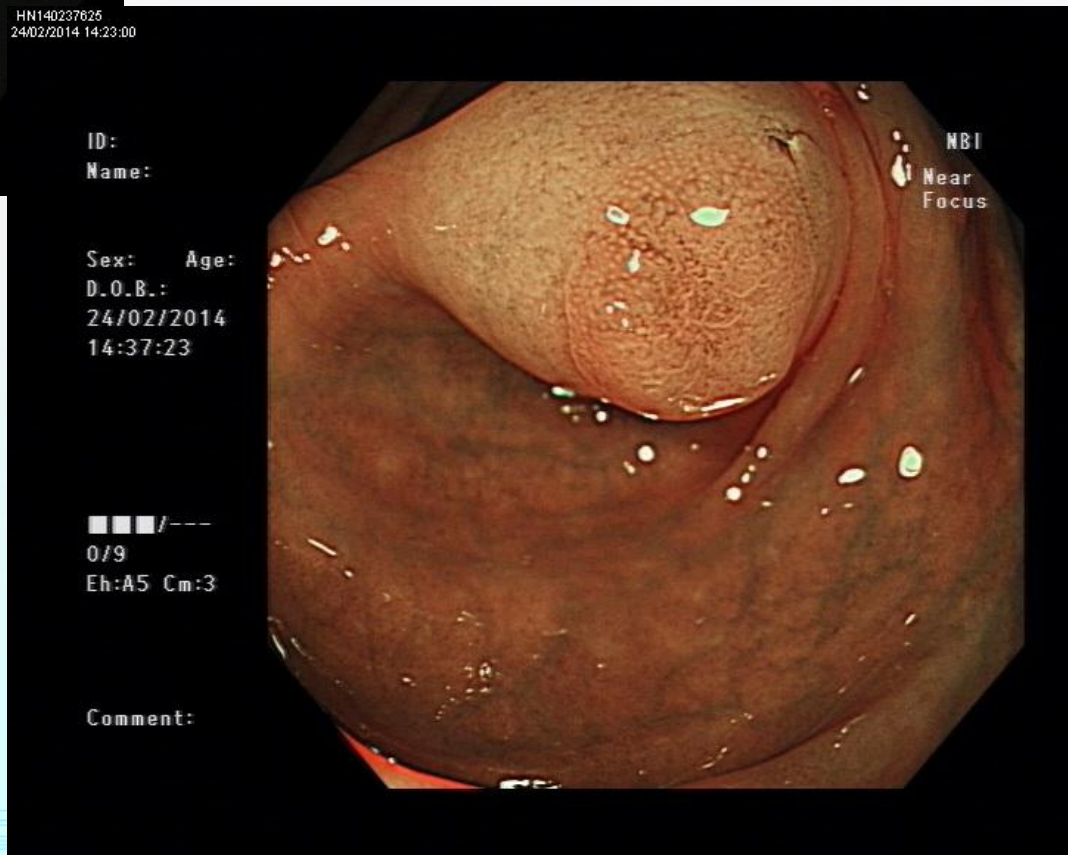
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Within international standard

ORIGINAL ARTICLE

Narrow band imaging to differentiate neoplastic and non-neoplastic colorectal polyps in real time: a meta-analysis of diagnostic operating characteristics

Sarah K McGill,[1] Evangelos Evangelou,[2] John P A Ioannidis,[3] Roy M Soetikno,[1] Tonya Kaltenbach[1]

Table 3 Diagnostic accuracy of endoscopic diagnosis with NBI to distinguish between neoplastic and non-neoplastic colorectal neoplasms

		Summary estimates (95% CI)		Likelihood ratio (95% CI)		
Study characteristics	No. of studies (no. of polyps)	Sens	Spec	LR+	LR−	Area under HSROC curve (95% CI)
All	28 (6280)	91.0 (87.6 to 93.5)	82.6 (79.0 to 85.7)	5.2 (4.3 to 6.4)	0.11 (0.08 to 0.15)	0.92 (0.90 to 0.94)
Published manuscripts	18 (3212)	91.7 (87.1 to 97.4)	84.5 (80.4 to 87.9)	5.9 (4.6 to 7.6)	0.10 (0.06–0.16)	0.93 (0.90–0.95)
High-confidence predictions[20–22 31 38–41]	8 (2146)	93.8 (90.1 to 96.2)	83.3 (77.1 to 88.1)	5.6 (4.0 to 7.8)	0.07 (0.05 to 0.12)	0.95 (0.93 to 0.97)
Polyps ≤5 mm[19 21 22 30 38 39]	7 (1942)	86.3 (78.4 to 91.7)	84.1 (75.5 to 90.1)	5.4 (3.6 to 8.2)	0.16 (0.11 to 0.25)	0.92 (0.89 to 0.94)
High-confidence predictions for polyps ≤5 mm[21 22 38–40]	5 (1350)	93.4 (87.4 to 96.7)	84.0 (76.6 to 89.3)	5.8 (4.0 to 8.6)	0.08 (0.04 to 0.15)	0.94 (0.92 to 0.96)
Exera	20 (5148)	89.4 (85.0 to 92.6)	81.6 (77.3 to 85.2)	4.9 (3.9 to 6.0)	0.13 (0.09 to 0.18)	0.91 (0.89 to 0.94)
Lucera	8 (1132)	94.0 (88.7 to 96.9)	86.0 (81.1 to 89.8)	6.7 (4.9 to 9.2)	0.07 (0.04 to 0.13)	0.95 (0.93 to 0.97)
Highest-quality studies[17 29 32 38 39]	5 (826)	91.5 (86.0 to 94.8)	87.2 (74.7 to 94.1)	7.2 (3.4 to 15.0)	0.10 (0.06 to 0.16)	0.95 (0.93 to 0.97)
High-quality studies[17 21 24 26 29 31–33 38 39 41 43]	12 (2428)	88.3 (83.6 to 91.8)	85.3 (80.3 to 89.2)	6.0 (4.3 to 8.4)	0.14 (0.09 to 0.20)	0.93 (0.91 to 0.95)

HSROC, hierarchical summary receiver-operating characteristic; NBI, narrow band imaging.

McGill SK, *et al*. *Gut* 2013;**62**:1704–1713. doi:10.1136/gutjnl-2012-303965

Cost benefit depends on feasibility rate and pathology cost

A Resect and Discard Strategy Would Improve Cost-Effectiveness of Colorectal Cancer Screening

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*Digestive Endoscopy Unit, "Nuovo Regina Margherita" Hospital, Rome, Italy; ‡Department of Radiology, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin; §Department of Radiology, Uniformed Services University of the Health Sciences, Bethesda, Maryland; and ‖Division of Gastroenterology/Hepatology, Indiana University Medical Center, Indianapolis, Indiana

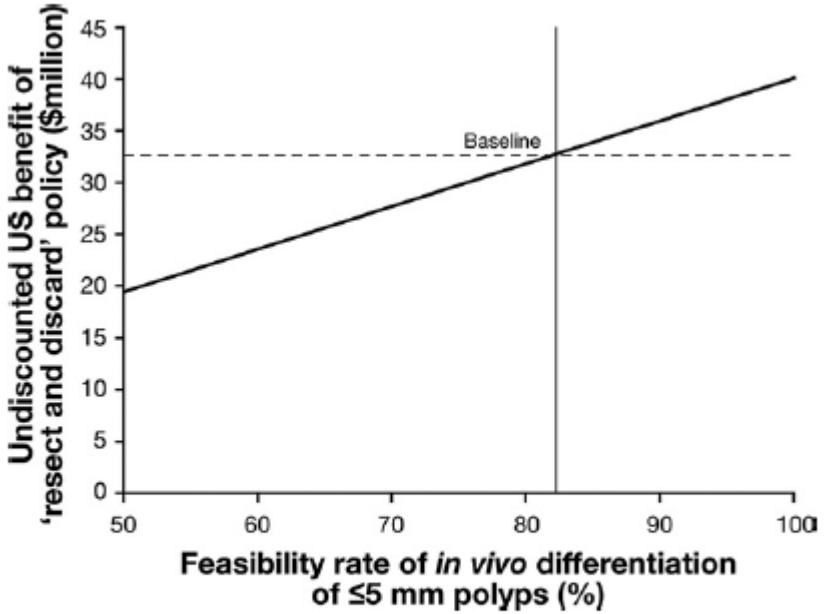

Figure 2. Simulated undiscounted annual benefit for the US population with the resect and discard policy compared with standard colonoscopy screening according to the feasibility rate of NBI for differentiating between hyperplastic and adenomatous diminutive lesions.

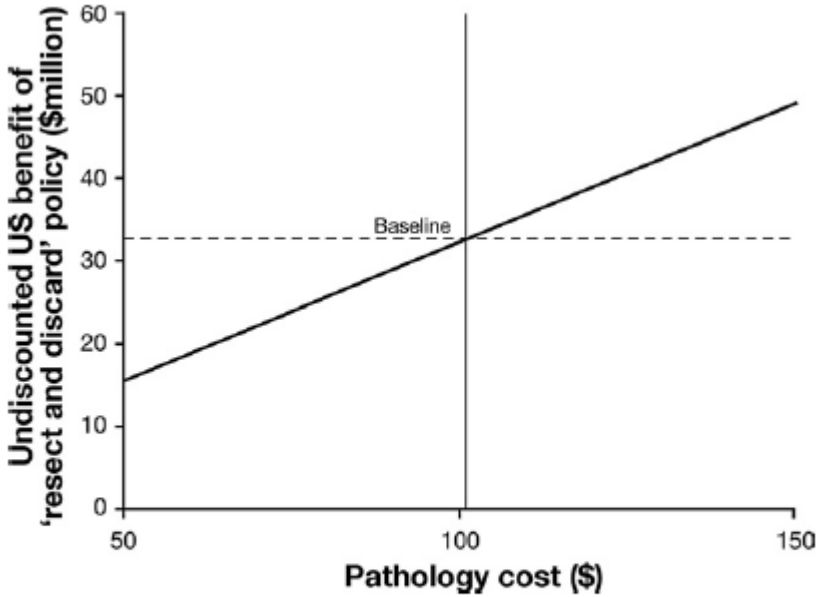

Figure 3. Simulated undiscounted benefit for the US population of the resect and discard policy compared with standard colonoscopy screening according to the cost of the post-polypectomy pathologic examination.

Conclusion

- **The NBI technique can accurately predict histology of polyp (≤5 mm) in high confident group**
- **Within international standard, cost saving, logistically friendly**
- **Drawback: training needed.**