Narrow Band versus Conventional Endoscopic Imaging for Screening Colonoscopy in a Private Practice Setting- A Large Prospective Randomized Trial

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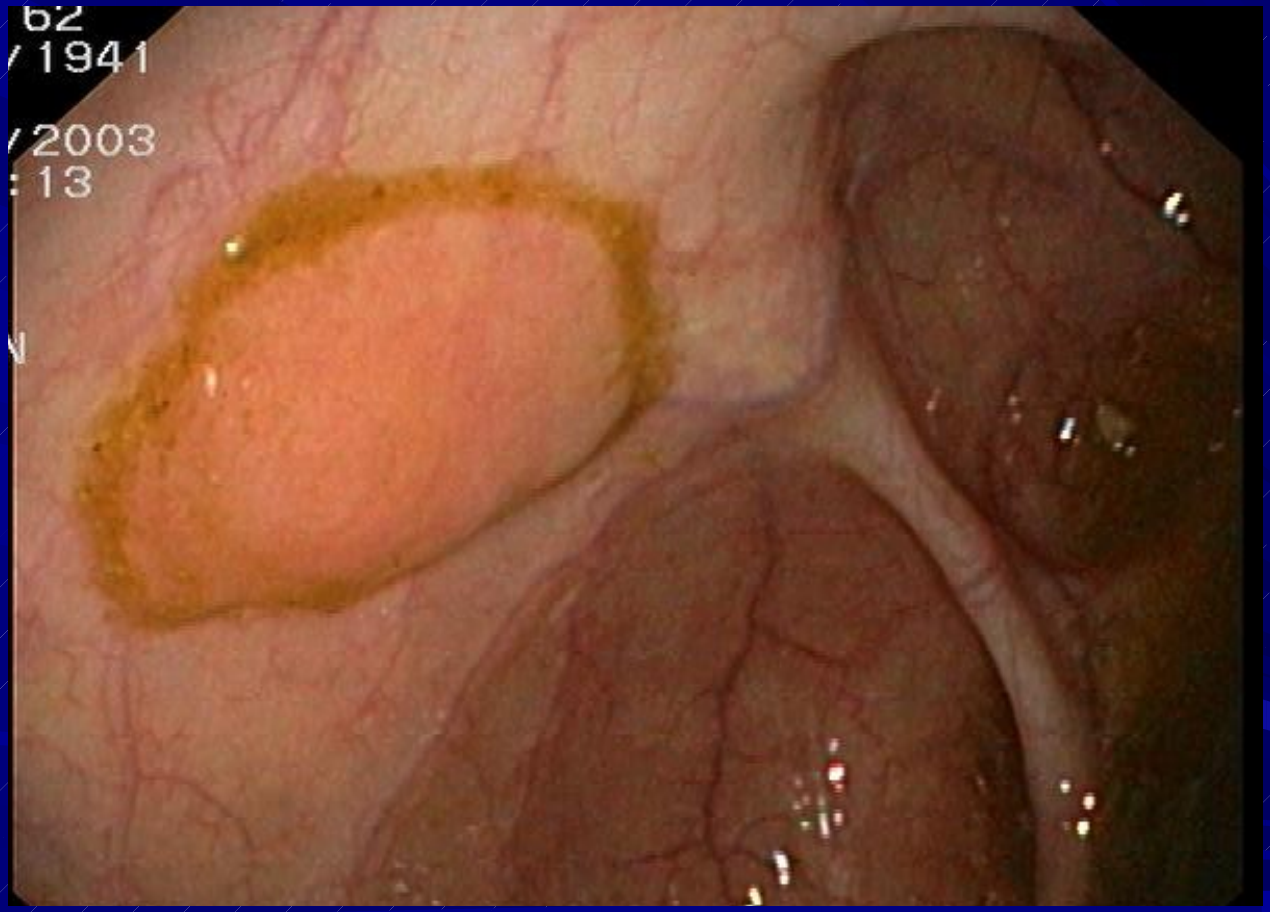
Missed Adenomas



15-25% (Tandem-Colonoscopy-Studies)

Improvement of the Adenoma Detection Rate:

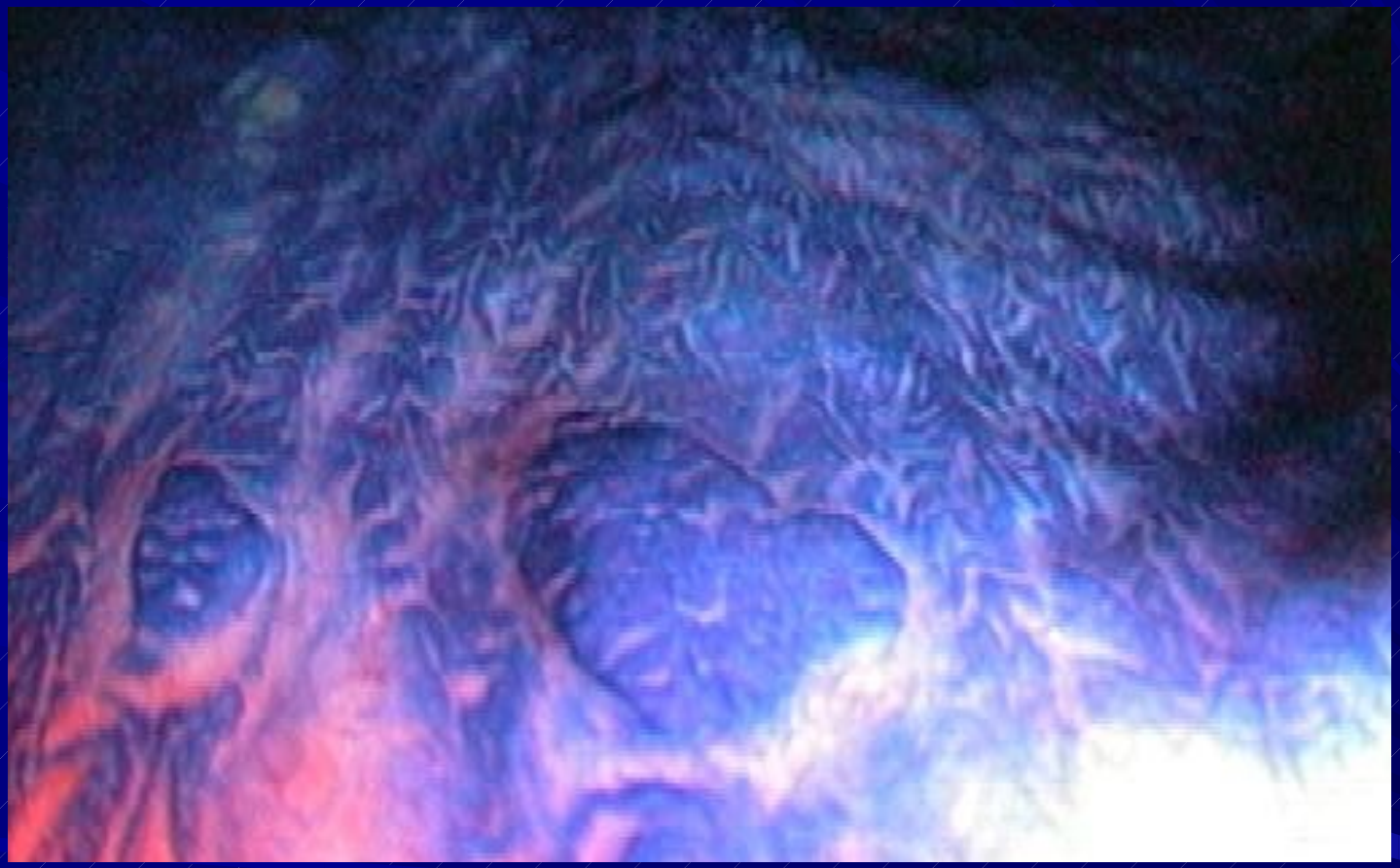
Instrument modification of the colonoscopes

- Wide angle
- Magnifying glass cap

Image Improvement

- Chromoendoscopy
- NBI with HDTV
- Autofluorescence

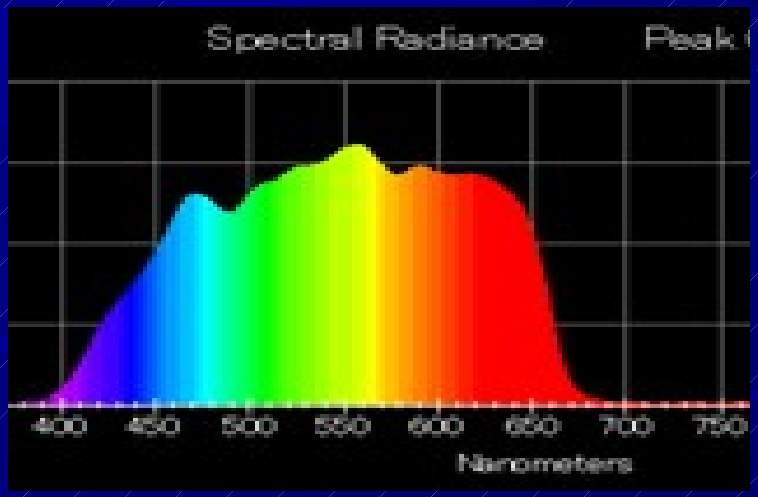
Total colonic dye staining

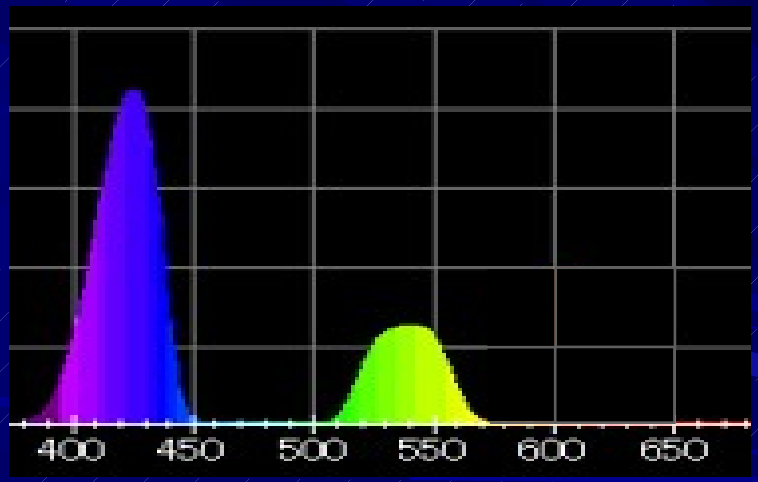


No overall success, but subgroups of adenomas were found more frequently.

Narrow Band Imaging

Technology for the Visualization of superficial structures of the mucosa by contrast enhancement.



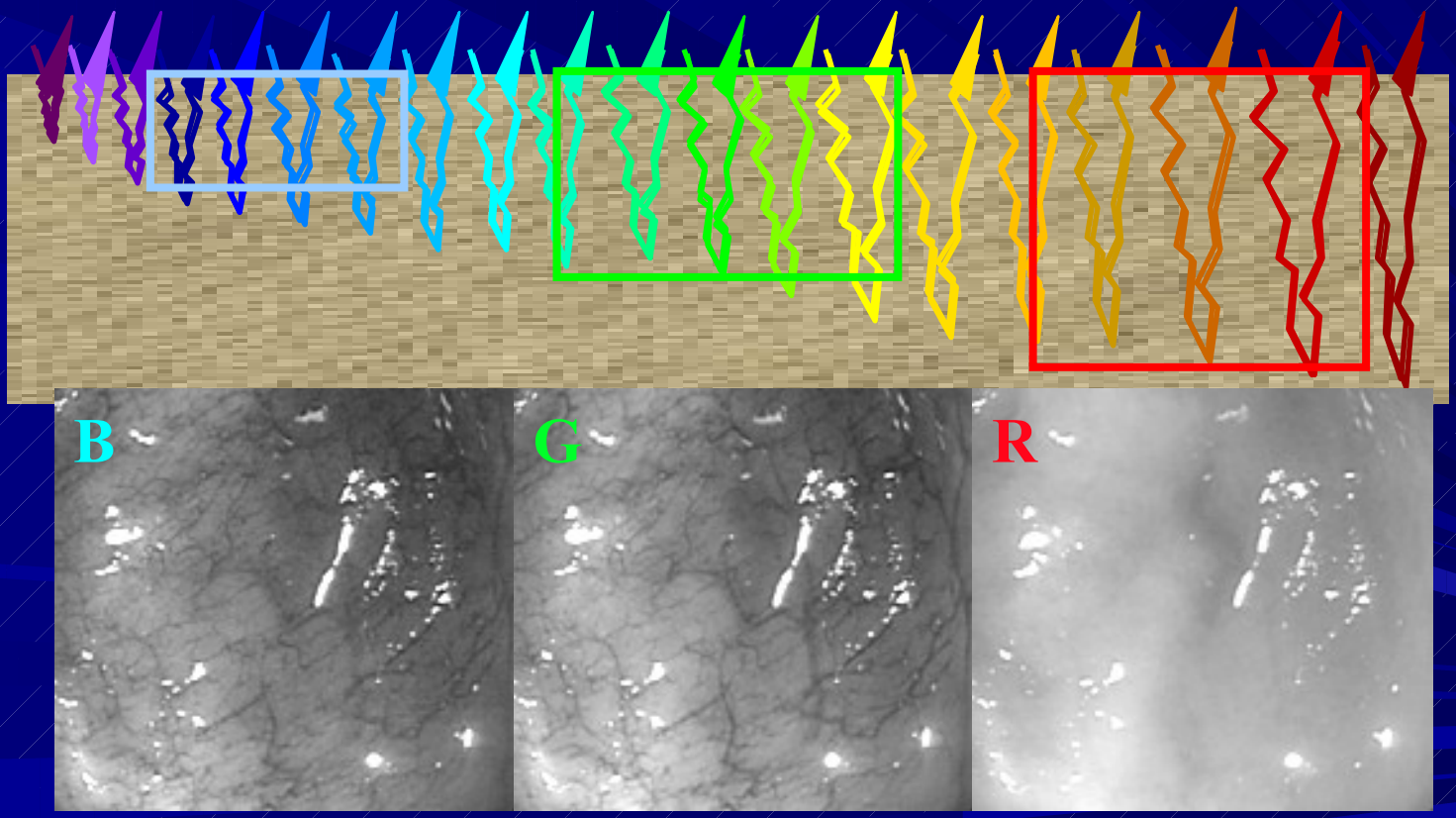


Conventional

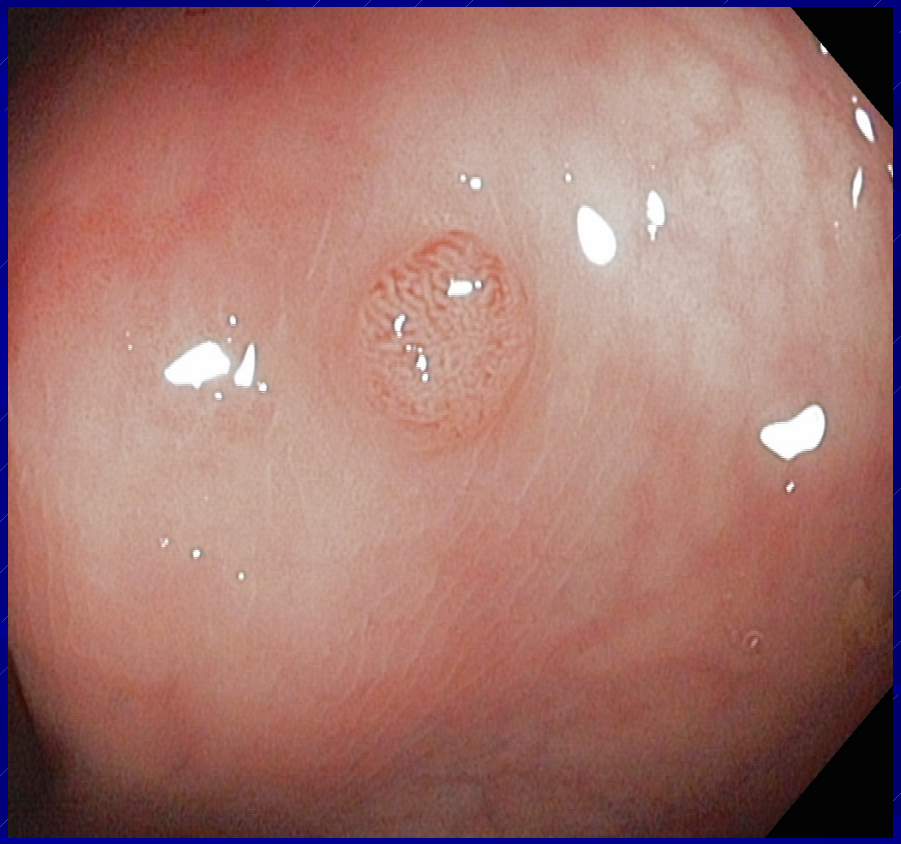
NBI

Narrow Band Imaging

Infiltration depth und Imaging-Information

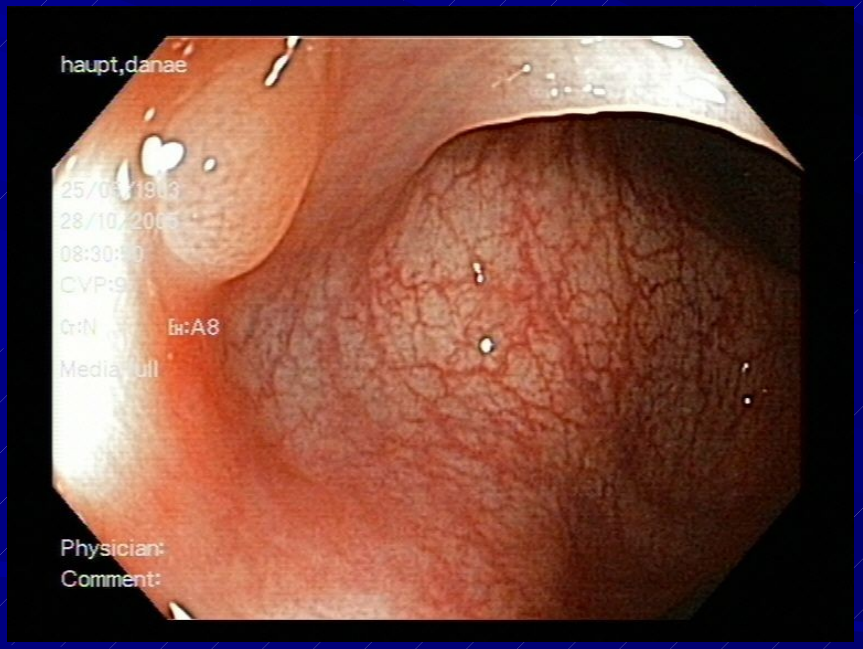


NBI: Flat adenoma 1



NBI: Flat adenoma 2

NBI: Flat adenoma 3



NBI-Colonoscopy-Study

Background

Three randomized trials from referral centers
with a mixed patient population and conflicting results:

1. Rex, Gastroenterology 2007: ADR very high,
   further increase unlikely

2. Adler, Gut 2008: Not statistically significant difference,
   learning effect for conventional colonoscopy

3. Inoue, J. Gastroenterol. 2008: Significantly higher ADR

NBI-Study- Aims

- A much larger randomized study in a more homogeneous and realistic setting:
- a) focusing on screening colonoscopy only,
- b) involving only very experienced colonoscopists in a private practice setting.

NBI-Study- Outcome Parameter

- The *main outcome parameter* was the adenoma detection rate (ADR, number of polyps/number of patients examined) in the two groups.

- *Secondary outcome measures* included analysis of the total number of polyps, of flat adenomas (which have been shown repeatedly to have a higher risk of neoplastic development), of small adenomas (<1 cm), hyperplastic polyps with size determination, and of right-sided versus left-sided polyp location, in both groups.

NBI-Study: Patients and Methods

- Inclusion of **all consecutive asymptomatic persons** willing to undergo screening colonoscopy (reimbursed in Germany for those >55 years)
- Five private gastroenterology practices and **six experienced examiners** with a lifetime experience of a mean of 19 800 colonoscopies (range 13 000-28 000) over a mean of 19.4 years (range 15-28)
- After introduction of the colonoscope into the cecum, patients were **randomly allocated to withdrawal of the instrument either using the NBI mode or conventional imaging**, using wide-angle colonoscopes with HDTV imaging in both groups.

NBI-Study: Documented parameters

- Age and sex of the patient
- Type and dosage of sedation
- Examination time, both for instrument introduction and withdrawal
- Polyp characteristics: size (measured by open forceps or snare), shape (pedunculated/elevated, sessile and flat, the latter defined as maximal height of 1.3 mm), and location
- Histological findings after polyp removal, using snare polypectomy or forceps removal (for polyps <3 mm), or biopsy if there were contraindications
- Other lesions found, such as cancers, diverticula, inflammatory lesions etc.

Characteristics of patients, indications and colonoscopy performance in both groups

Parameter	NBI group (n = 625)	Control group (n = 631)	p
Patient data			
Age (mean ± SD, range)	64.8 ± 6.5 (50 – 83)	64.3 ± 7.1 (31 – 87)	0.14
Sex, % male	47.0%	47.9%	0.78
*Sedation **			
None	25.8%	25.7%	0.97
midazolam-based regimens	45.6%	44.4%	0.35
midazolam plus propofol	28.6%	29.9%	0.33
Mean examination time [min]			
Total	14.1 ± 4.4	13.3 ± 3.8	0.001
Introduction	5.6 ± 2.5	5.5 ± 2.4	0.3
Withdrawal	8.5 ± 3.7	7.9 ± 3.1	0.001
Cecal intubation rate	99%	99%	1.0

- midazolam-based regimens included the administration of tramadol in 23.5% (both groups), which was given in addition to the combination midazolam and propofol in 10.7% and 10.9% of the entire groups.

Results for polyp detection rates in the NBI group and control group

Polyp detection	NBI group (n = 625)	Control group (n = 631)	p
All polyps (n)	**346**	**332**	**n.s.**
Patients with polyps (%)	33.4	36.9	n.s.
Polyps per polyp carrier	1.65	1.42	n.s.
Polyps <10 mm	317	300	n.s.
Right-sided polyps	100	107	n.s.
Left-sided polyps	246	225	n.s.
Adenomas (n)	**200**	**216**	**n.s.**
Patients with adenomas	22,4%	21,7%	n.s.
Adenoma detection rate*	0.32	0.34	n.s.
Adenomas per adenoma carrier	1.43	1.58	n.s.
Adenomas < 10 mm	178	187	n.s.
Flat adenomas	18	42	0.02
Adenomas with HGIN	8	7	n.s.
Left-sided adenomas	138	146	n.s.
Right-sided adenomas	62	70	n.s.
Hyperplastic polyps (n)	**146**	**116**	**0.03**
Hyperplastic polyps < 10 mm	139	113	0.05
Carcinomas (n)	**4**	**5**	**n.s.**

* all adenomas / all participants

Adenoma detection rates (i.e. percentage of patients with one or more adenomas) in large-scale screening and colonoscopy studies in various countries

Author and year	n	Type of Colonoscopy*	Adenoma rate
USA			
Kanna 2007	4043	D, S	14.5%
Barclay 2007	2053	S	23.5%
Lieberman 2000	3121	S	37.5%
Germany			
Sieg 2006	109989	D	20%
Hüppe 2008	5066	S	10%
Adler 2007	1397	D, S	16%
Present study	1256	S	22%
Poland			
Regula	43042	S	9.4%
Israel			
Rainis	10866	D	5%
Asia			
Byeon	860	S	18.5%

* D=diagnostic colonoscopy, S=screening colonoscopy

NBI-Study: *Results*:

- There was no difference between the two groups in terms of general ADR (0.32 vs. 0.34), the total number of adenomas (200 vs. 216) or in detection in subgroups of adenomas.

- This was despite a minimal, but significant longer withdrawal time in the NBI group (8.5 vs. 7.9 min, $p<0.05$).

NBI-Study: *Conclusions*:

- This large randomized trial in a homogeneous private practice screening setting could not demonstrate any objective benefit of the NBI technique in terms of improved adenoma detection rate.
- Contrast enhancement in conventional imaging techniques will likely not contribute to a reduction in adenoma miss rates for experienced colonoscopists.