



QUALITY IN ENDOSCOPY

ESGE / ESDO SYMPOSIUM

COLONOSCOPY &  
COLONIC NEOPLASMS

Prague, Czech Republic April 17-18, 2015

# THE NEW COLONOSCOPES: LATEST DEVELOPMENTS

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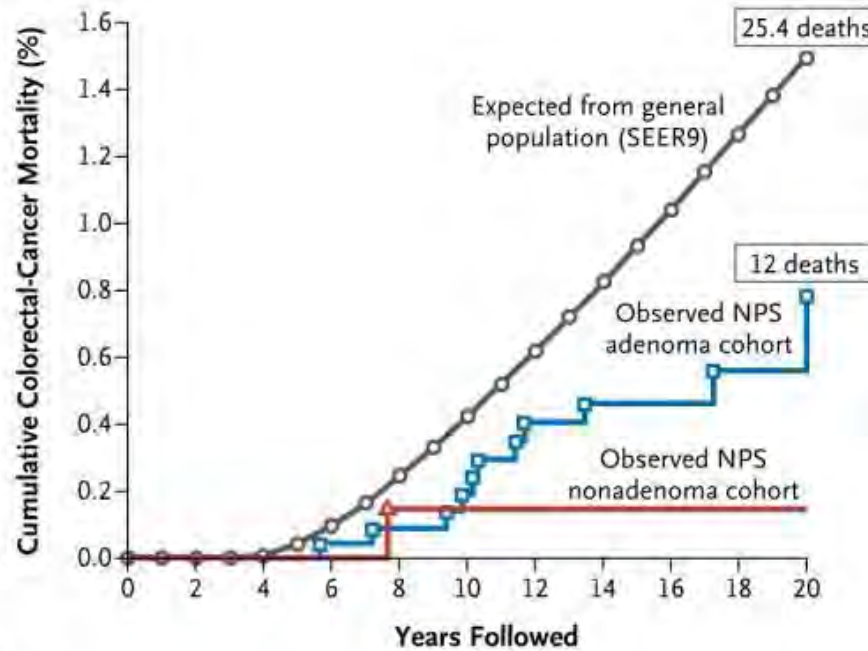
# COLONOSCOPY

The standard procedure for detecting colorectal adenomas and cancer

Polypectomy decreases incidence and mortality of CRC

# COLONOSCOPY

2602 patients from NPS underwent EP, 15.8 y follow up, 1246 died, 12 died from CRC



0.47 (0.26-0.8)

No. at Risk						
Adenoma	2602	2358	2100	1808	1246	461
Nonadenoma	773	733	678	632	420	164

# LIMITATIONS OF COLONOSCOPY

Need for colon preparation

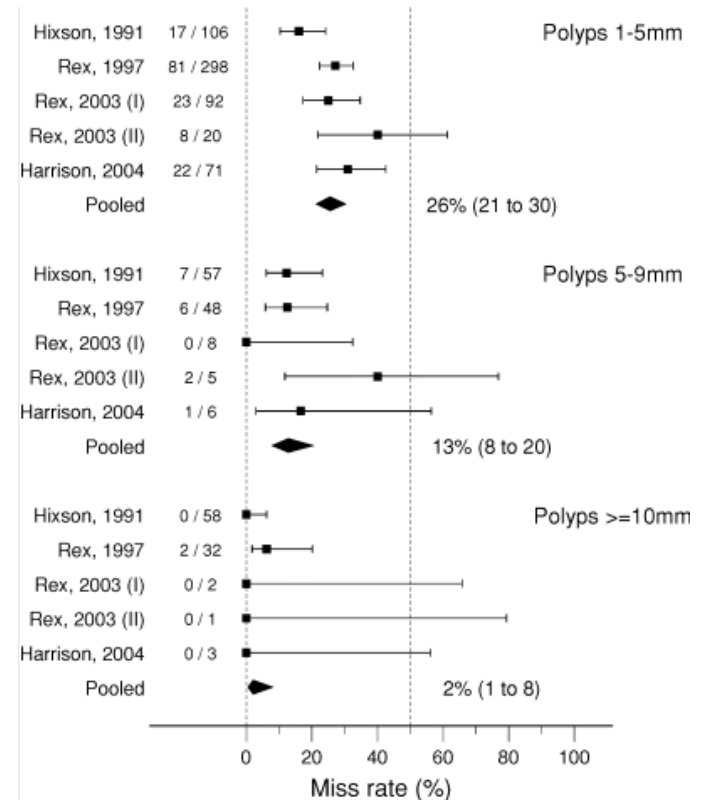
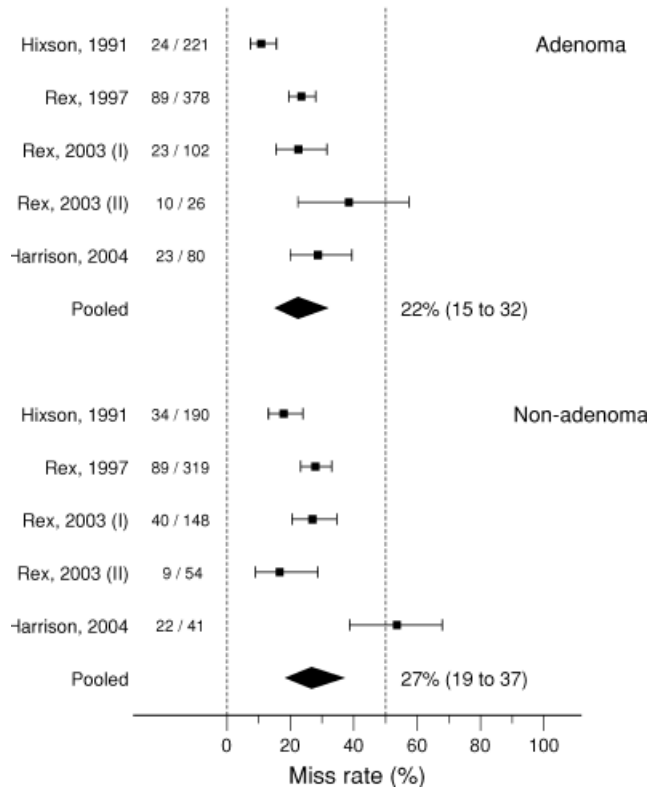
Comfort/pain

Efficiency (complete colonoscopy, mucosal inspection)

Characterization of polyps

# MISS RATE

Adenoma/polyp miss rate 20-25% tandem studies  
 Metaanalysis, 6 studies, 465 patients



# INTERVAL CANCERS

5107 patients with CRC, South-Limburk, 2001-2010  
Post-colonoscopy CRC (PCCRC, 5y after colonoscopy)  
2.9% PC-CRC, average 26m post colonoscopy  
More often proximal OR 3.92, small OR 0.78 and flat  
OR 1.7  
57.8% missed lesions, 19.8% inadequate  
examination/surveillance, 8.8% incomplete  
resection, 13.6% new lesions

# MEANS OF IMPROVEMENT

## Non-technology means

Preparations, anesthesia, water, CO<sub>2</sub>,  
colonoscopy technique, withdrawal time,...

## Technology means

Accessories

Colonoscopes

Add-on technologies of current endoscopes

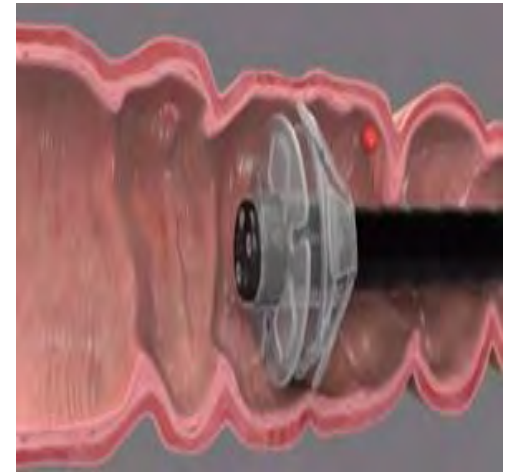
New colonoscopes (visualization of proximal  
aspect of folds)

# ACCESSORIES

Cap (Olympus)

Endoscuff (ARC Medical Design)

EndoRing (EndoEid)



*Lee YT, Am J Gastroenterol 2009, Ng SC, Am J Gastroenterol 2012  
Takano N, GIIE 2008, Floer M, PLOS One 2014, Biecker E, J Clin  
Gastroenterol 2015*



# CURRENT ENDOSCOPES

Pediatric/thin endoscopes

Variable stiffness

High-definition

Narrow-band imaging/I-SCAN, FICE

Autofluorescence

Confocal endomicroscopy

# HIGH-DEFINITION ENDOSCOPY

Heterogenous results

MA, 5 studies, 4422 patients, ADR rise by 3.5% compared to SD

Small lesion in right colon



# NARROW BAND IMAGING

Polyp detection

Heterogenous results

ME of 6 RCT, 2284 patients, no difference  
vs HDWL

Classification of polyps



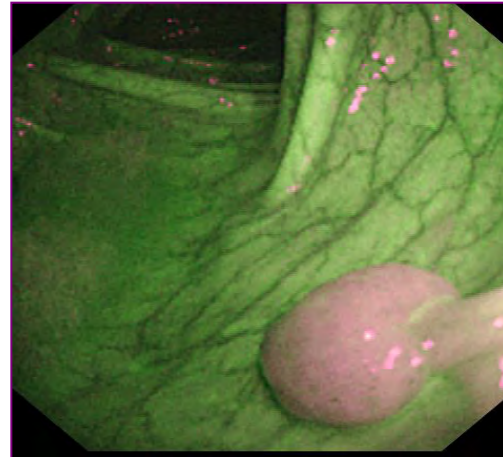
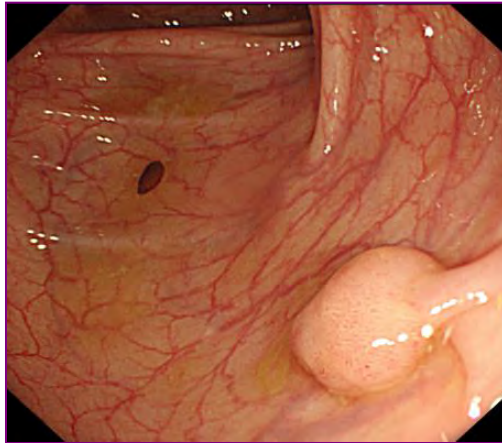
*Pasha SF, Am J Gastroenterol 2012, Gross SA, Endoscopy 2011*

*Adler A, Gastroenterology 2009, van den Broek JF, Gastrointest Endosc 2009*

# AUTOFLUORESCENCE

Tandem study, 167 patients, right colon,  
AFI vs WL

Miss rate **30% vs 49%, P=0.01**



*Matsuda T, Am J Gastroenterol 2008  
Curvers WL, Gut 2008*

# PROTOTYPES

CathCam



Aer-O-Scope



Endotics



NeoGuide



# THIRD-EYE RETROSCOPE

Auxillary, through-the-scope, optical , 3.5mm

Retroflex 180%, camera at tip

Working channel of standard endoscope



Avantis Medical system



# THIRD-EYE RETROSCOPE

Simulated polyps in models, TER vs SE

**131/162 vs 20/162** hidden polyps found

RCT, TERRACE, back-to-back, 349 patients,  
**29.8%** additional detection rate of polyps and  
additional detection of adenomas

Extraction time increase by 2 min, 50%  
reduction of suction capacity

# THIRD-EYE PANORAMATIC

Single use video cap, two side viewing lenses, thin flexible plastic cable, processor, water pump





# THIRD-EYE PANORAMATIC

## Feasibility study

17 subjects, 100% cecal intubation, no dislodgement, no restriction of endoscope mobility, no adverse events

*Rubin M, DDW 2014*

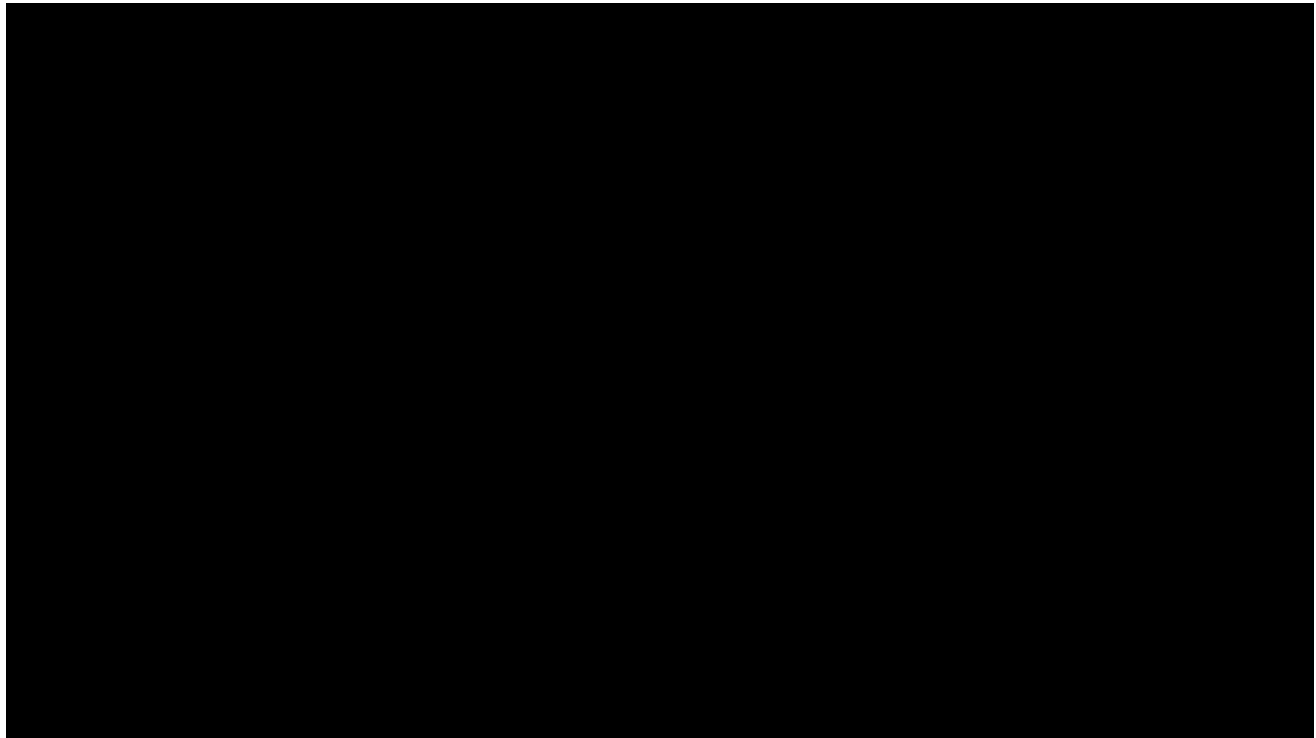
# NAVIAID G-EYE BALLOON

Permanent integration of inflatable  
reprocessable balloon at tip of endoscope  
Standard endoscope can be converted  
Three sizes (60mm) or set pressure (70mbar)



Smart Medical System

# NAVIAID G-EYE BALLOON



Smart Medical System

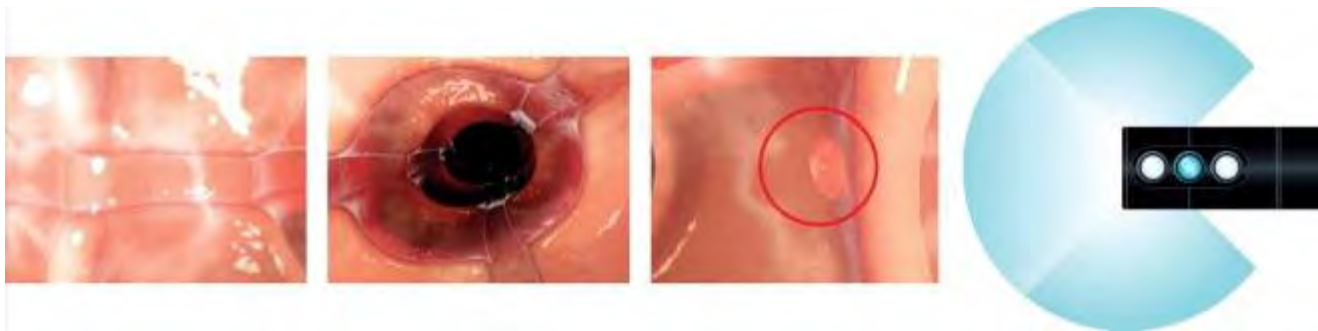
# NAVIAID G-EYE BALLOON

Prospective cohort study with 50 patients  
100% cecal intubation rate  
4.3, 7.4 a 16.5 min (cecum, withdrawal, total)  
**53.2%** polyp detection rate, **44.7%** ADR

Multicenter, randomized control tandem study  
126 patients  
Adenoma miss rate **7.5% vs 44.7%, p=0.0002**  
Additional adenoma detection **81%**

# FULL SPECTRUM ENDOSCOPY

Standard 12.8mm endoscope, flexible, 330°  
3 kamery/3LCD



EndoChoice

# FULL SPECTRUM ENDOSCOPY



# FULL SPECTRUM ENDOSCOPY

Multicenter, RCT, back-to-back

Fuse vs SFV colonoscope

185 patients

ADR, miss rate

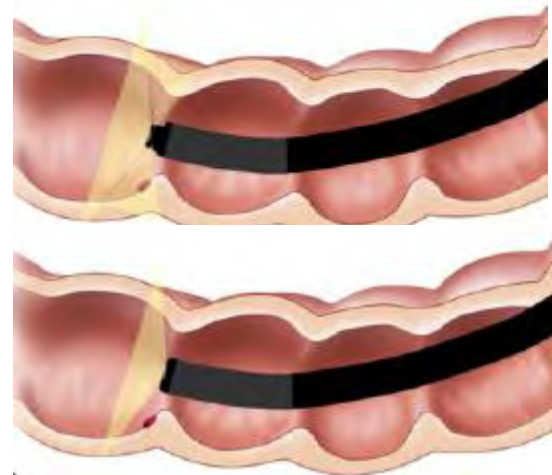
3 SVT missed adenomas advanced

	Adenomas detected with standard forward-viewing colonoscopy	Adenomas detected with full-spectrum colonoscopy	Total number of adenomas identified	Adenoma miss rate with standard forward-viewing colonoscopy	Adenoma miss rate with full-spectrum colonoscopy
Standard forward-viewing colonoscopy first (n=88)	29	20	49	20/49 (41%); -27-0-56-0	.
Full-spectrum colonoscopy first (n=97)	5	62	67	..	5/67 (7%); 2-5-16-6

# EXTRA-WIDE ANGLE

Prototype, Olympus

180, 13.9mm, standard front lens 140°, 144-232°  
side lens, simultaneous picture





# EXTRA-WIDE ANGLE

Two anatomical models with simulated polyps (16 polyps, 8 normal, 8 hidden)

Polyp detection **68% vs 51%, P 0.0001**

Hidden polyp detection **61.7% vs 46.9%, P 0.0009**

Randomized trial in 319 subjects

No significant differences in ADR

Higher ADR only in sigmoid colon

# CONCLUSION

Colonoscopy has key importance in detection of adenomas with impact on mortality

Limitations of current colonoscopy

Various means available to overcome limitations

New endoscope designed to reduce adenoma miss rate

First randomized studies performed with promising results

Excellent beginnings towards improvement, further studies needed