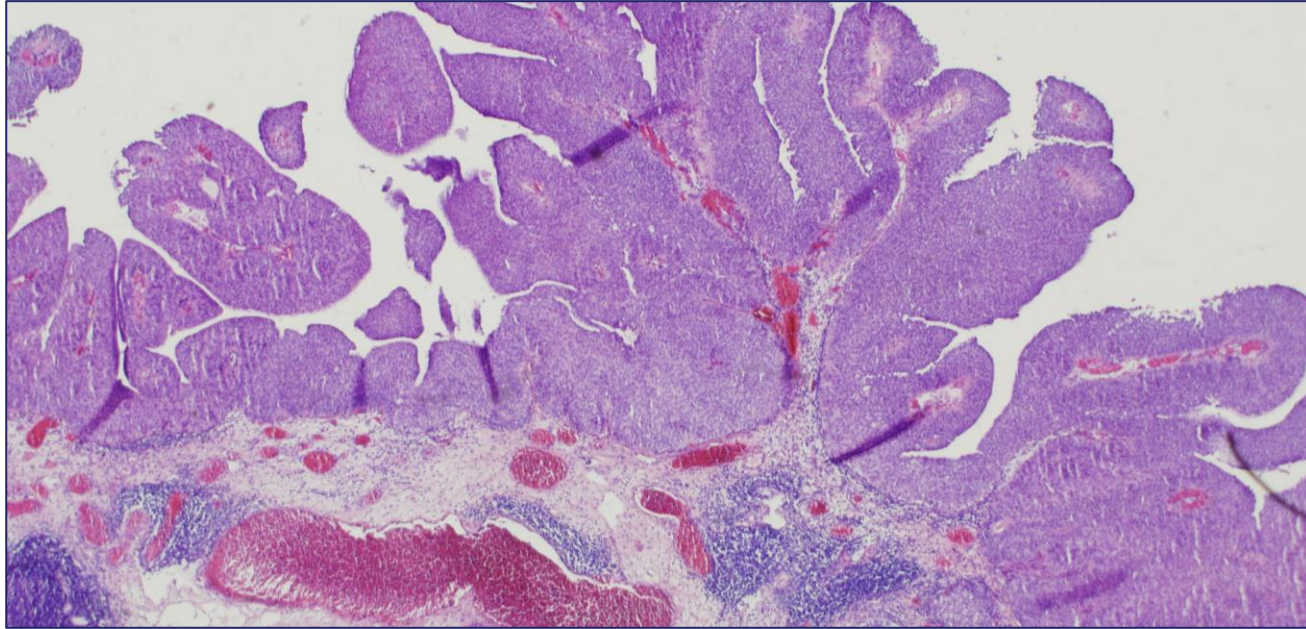


Enhanced Imaging Improves TURBT Outcomes



Improving the Quality of Transurethral Resection of Bladder Tumor: Urologist, Audit Thyself



*Harry Herr**

Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY, USA

“TURBT is a focal, targeting, personalized, single port, natural-orifice, Minimally invasive and repeatable procedure”

- Obtaining information for accurate stage and risk-classification (& treatment)
- Assessment of bladder integrity after the procedure
- Complete resection of all visible tumors and suspicious areas

Improvement in TURBT

- Better technology/technique



- Instruments and Energy sources
- Changes in TURBT technique
- Enhancing endoscopic imaging

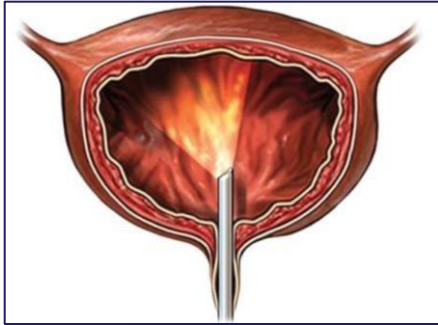
- Advancement in Histopathological Evaluation

- Quality control

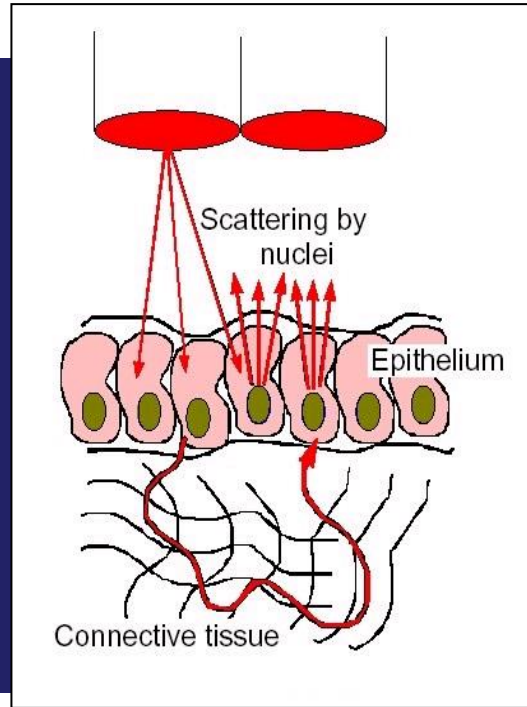


- Awareness
- Training
- Audit

When white light “hits” tissue it is:

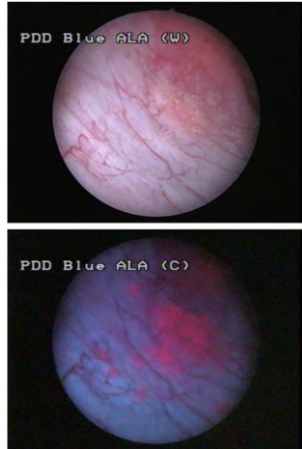


- Reflected
- Absorbed
- Scattered



Enhancing endoscopic imaging

Photodynamic diagnosis



NBI

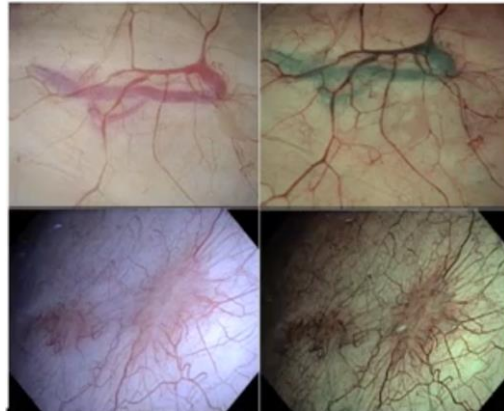
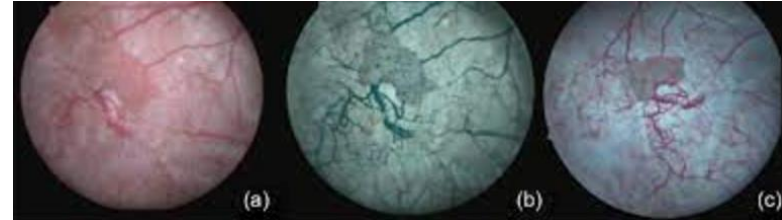
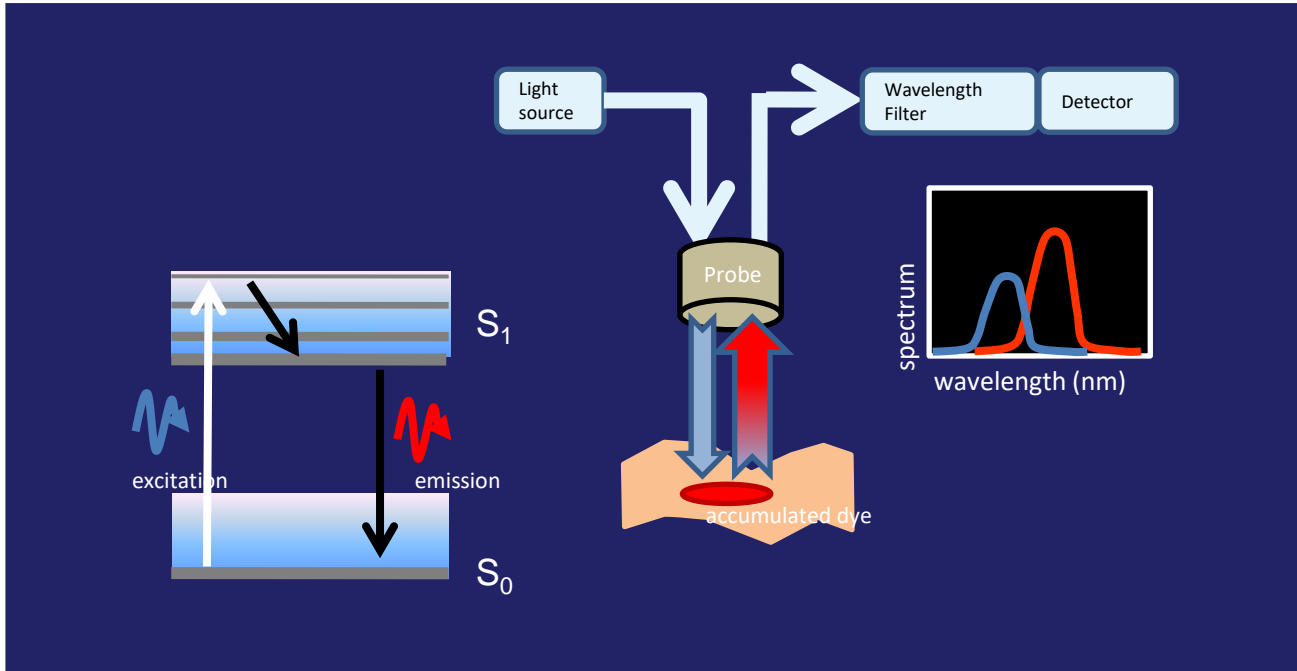
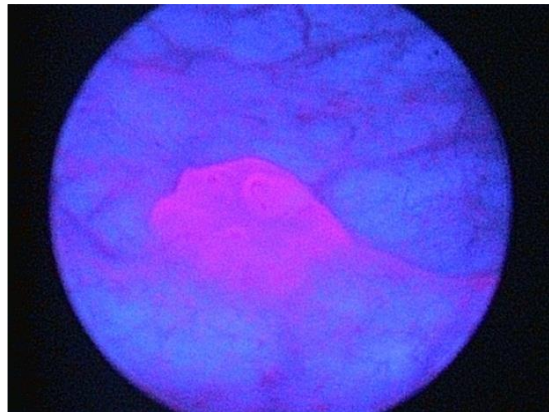
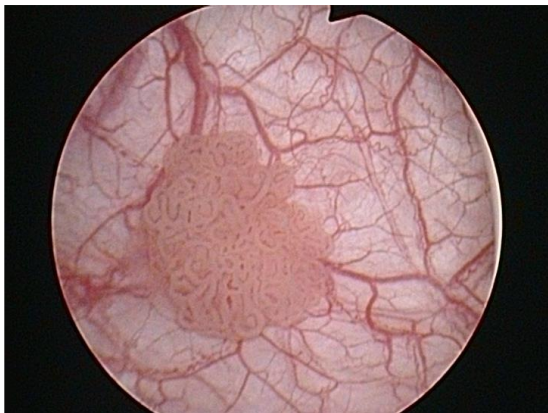
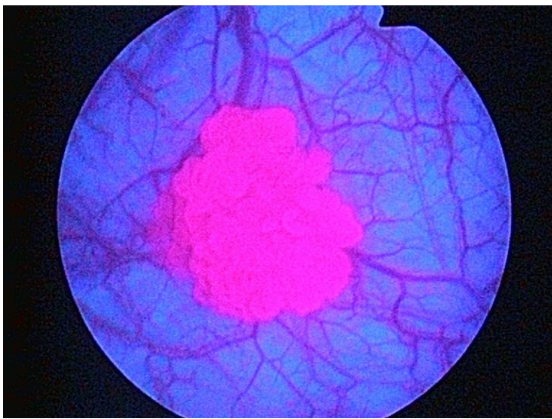


Image 1S







Photodynamic Diagnosis in Urology: State-of-the-Art

Dieter Jocham ^{a,*}, Herbert Stepp ^b, Raphaela Waidelich ^c

^a Department of Urology, University of Lübeck, Lübeck, Germany

^b Laser Research Laboratory, LIFE-Centre, University of Munich, Munich, Germany

^c Department of Urology, University of Munich, Munich, Germany

EUROPEAN UROLOGY 53 (2008) 1138–1150



- Bladder tumour detection PDD superior to WLC
– Sens 82-97% (PDD) vs. 62-84% (WLC)

Table 1 – PDD of urothelial carcinoma of the bladder versus WLC: sensitivity and specificity

Author, year of publication	No. of patients	Agent	Sensitivity, %		Specificity, %	
			PDD	WLC	PDD	WLC
Kriegmair, 1996 [73]	104	ALA	96.9	72.7	66.6	68.5
Koenig, 1999 [52]	55	ALA	87	84	59	—
Riedl, 1999 [74]	52	ALA	94.6	76	43	—
Filbeck, 1999 [75]	120	ALA	96	67.5	35	66.4
Zaak, 2002 [76]	713	ALA	97	—	65	—
Grimbergen, 2003 [42]	160	ALA	97	69	49	78
Hungerhuber, 2007 [77]	875	ALA	92	76.3	41.4	—
Jichlinski, 2003 [78]	52	HAL	96	73	43	43
D'Hallewin, 2000 [48]	40 (CIS)	Hypericin	93	—	98.5	—
D'Hallewin, 2002 [79]	87	Hypericin	94	—	95	—
Sim, 2005 [50]	41	Hypericin	82	62	91	98

The em dash indicates missing data.

PDD = photodynamic diagnosis; WLC = white light cystoscopy; ALA = 5-aminolevulinic acid; HAL = hexaminolevulinate; CIS = carcinoma in situ.

Photodynamic Diagnosis in Non-Muscle-Invasive Bladder Cancer: A Systematic Review and Cumulative Analysis of Prospective Studies

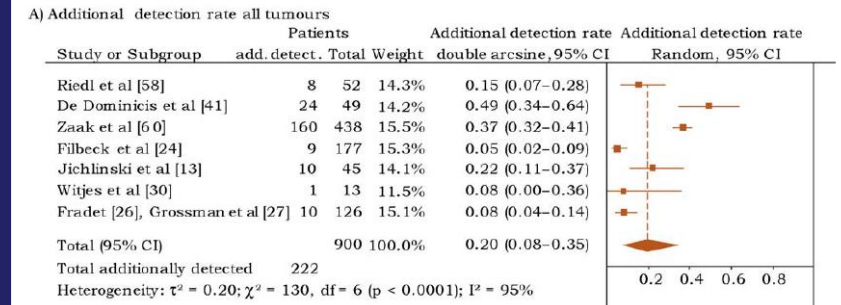
Ingo Kausch^{a,*}, Martin Sommerauer^a, Francesco Montorsi^b, Arnulf Stenzl^c, Didier Jacqmin^d, Patrice Jichlinski^e, Dieter Jocham^a, Andreas Ziegler^f, Reinhard Vonthein^f

EUROPEAN UROLOGY 57 (2010) 595–606

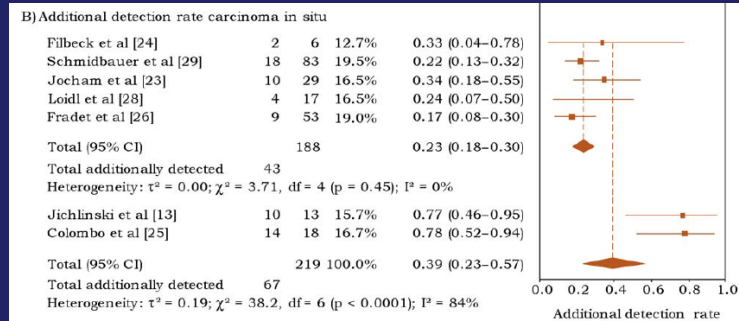


Meta analyses of 12 diagnostic trials:

- All tumours



- CIS only

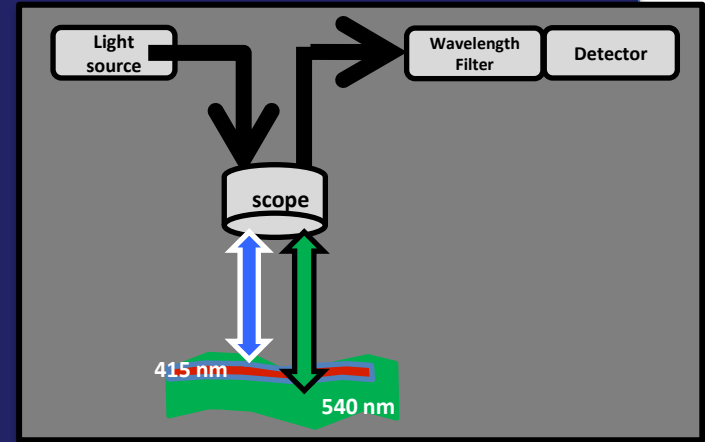
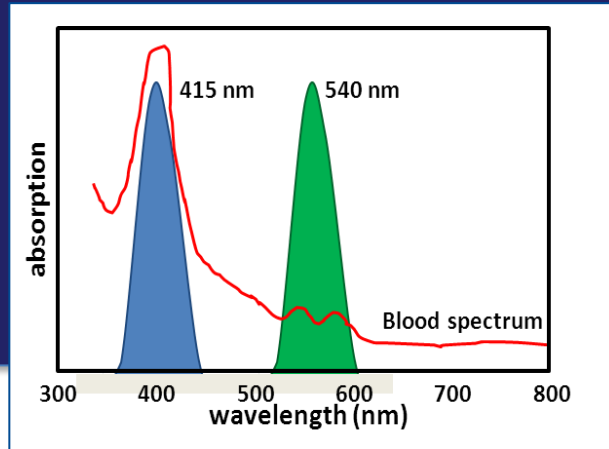


- PDD has set the standard for bladder cancer identification
- There are limitations:
 - PDD requires a “high cost” drug
 - The drug is not reimbursed in every country
 - PDD requires time consuming preparatory measures
 - PDD is typically not available for follow-up cystoscopy

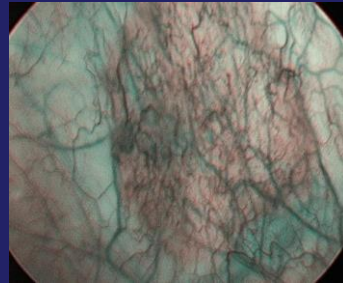
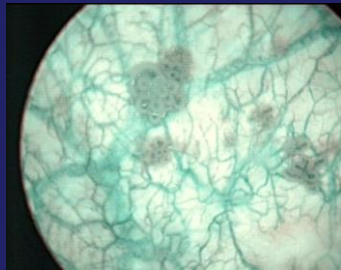
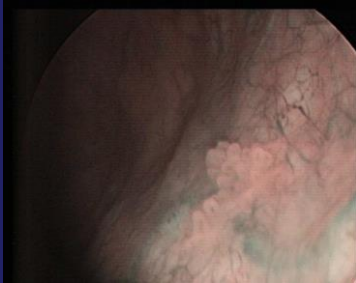
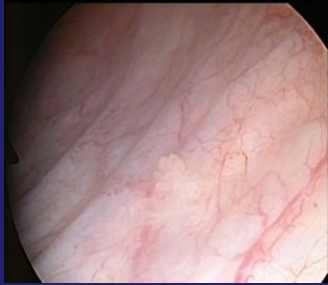
Is there a purely optical way of enhancing endoscopic image information?

Narrow Band Imaging

Enhances contrast
between mucosa and
microvascular structures



Some examples

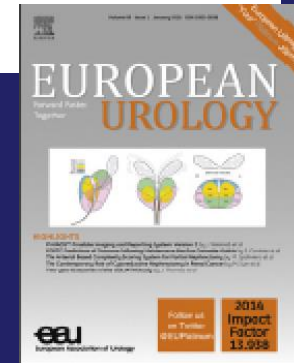


NBI Endoscopic Imaging



The Clinical Research Office of the Endourological Society (CROES) Multicentre Randomised Trial of Narrow Band Imaging–Assisted Transurethral Resection of Bladder Tumour (TURBT) Versus Conventional White Light Imaging–Assisted TURBT in Primary Non–Muscle-invasive Bladder Cancer Patients: Trial Protocol and 1-year Results

Seiji Naito^a, Ferran Algaba^b, Marko Babjuk^c, Richard T. Bryan^d, Ying-Hao Sun^e,
Luc Valiquette^f, Jean de la Rosette^{g,*},
on behalf of the CROES Narrow Band Imaging Global Study Group



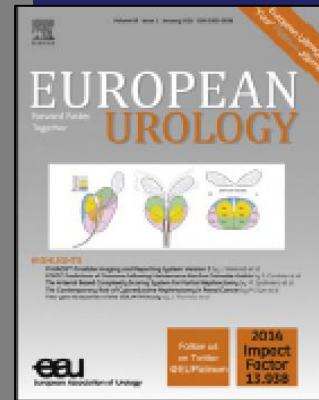
Enrolment

Allocation

Eligibility

Follow-Up at 3 months

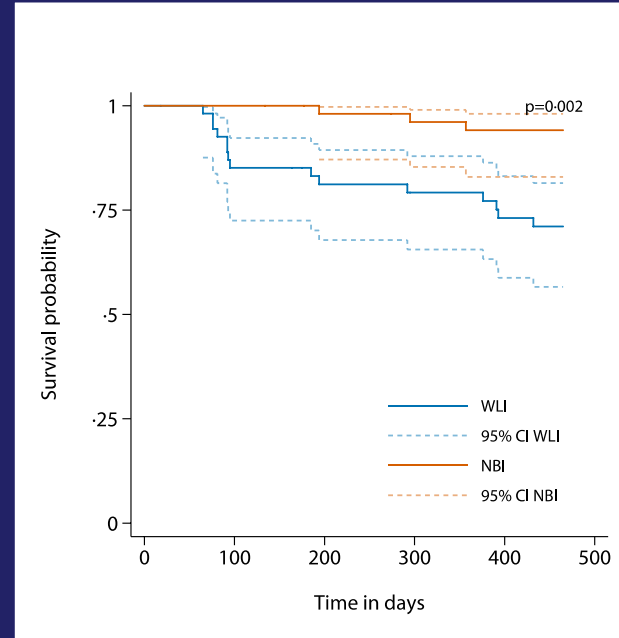
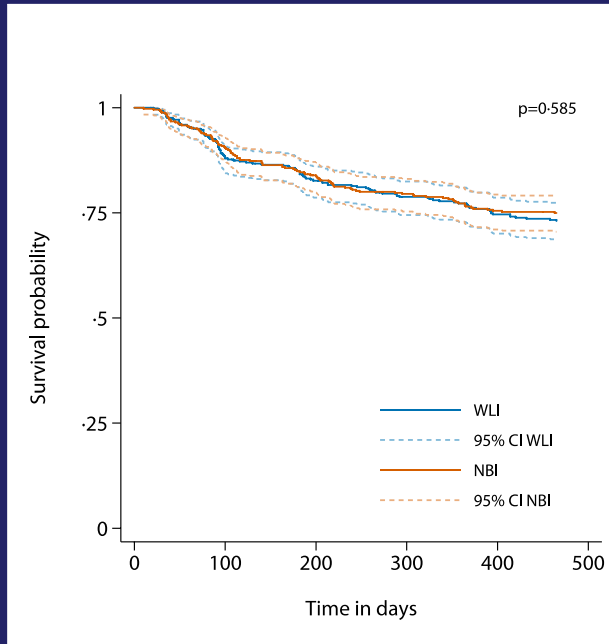
Follow-Up at 12 months



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NBI and Risk Classification



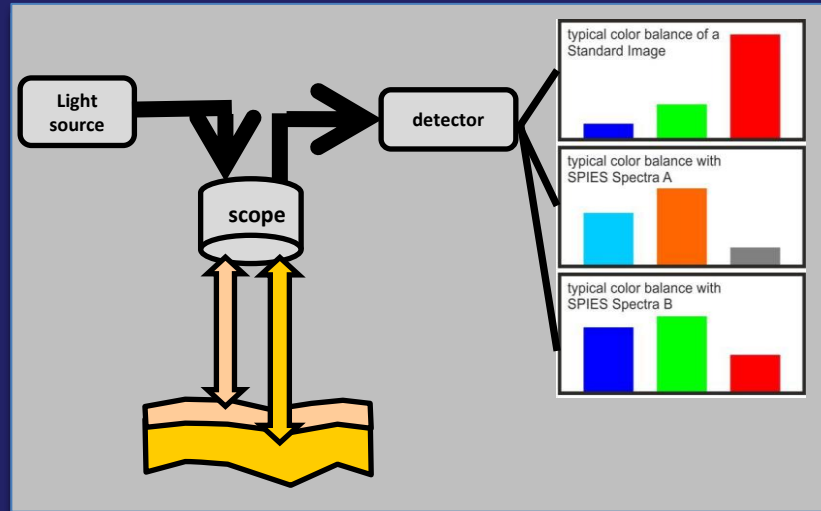


In summary, this large prospective multicentre randomised clinical trial in patients with primary NMIBC showed that although NBI and WL guidance achieved similar overall recurrence rates after TURBT at 12-mo follow-up, NBI-assisted TURBT significantly reduced disease recurrence in low-risk patients (pTa, grade 1, <30 mm, and no CIS). This finding supports the use of NBI guidance as an alternative to the current standard approach involving WL.



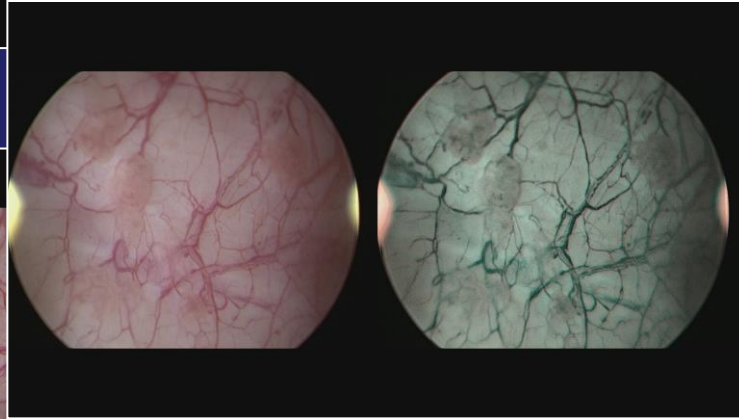
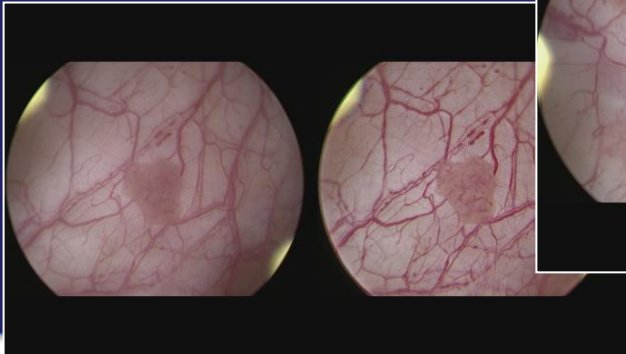
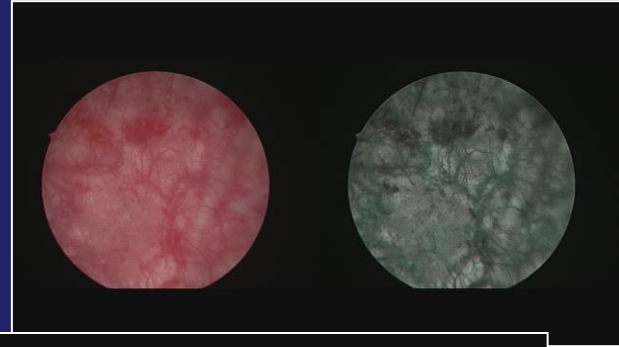
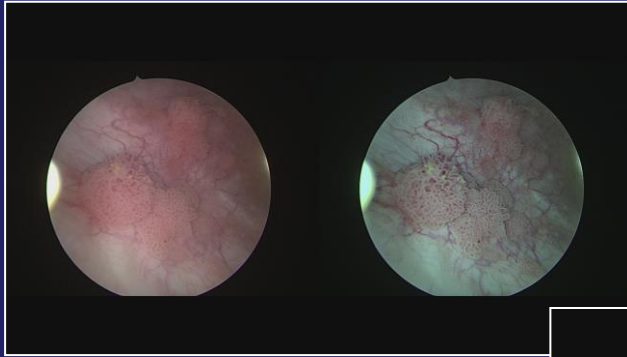
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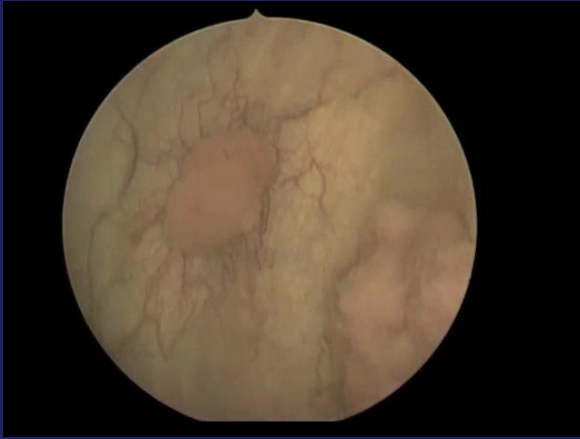
Image 1 S




Acquired white light image is digitally filtered to enhance contrast

Image 1S





Conventional white light imaging-assisted transurethral resection of bladder tumour (TURBT) versus IMAGE1S-assisted TURBT in non-muscle-invasive bladder cancer patients: trial protocol and 18 months results

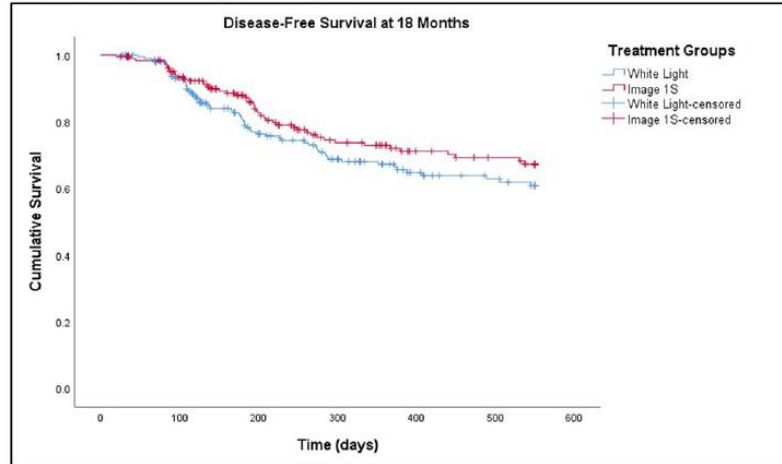
Jean de la Rosette¹  · Alexey Martov² · Rodolfo Hurle³ · Gabriel Favre⁴ · Charalampos Mamoulakis⁵ · Manuel Castanheira de Oliveira⁶ · Arnulf Stenzl⁷ · Estefania Linares-Espinós⁸ · Carlos R. Trelles Guzmán⁸ · Stavros Gravas^{9,10} · Thomas Knoll¹¹ · Mustafa Yucel Boz¹ · Thomas Herrmann^{12,13} · Pilar Laguna¹

Purpose White light (WL) is the traditional imaging modality for transurethral resection of bladder tumour (TURBT). IMAGE1S is a likely addition. We compare 18-mo recurrence rates following TURBT using IMAGE1S versus WL guidance.

Methods Twelve international centers conducted a single-blinded randomized controlled trial. Patients with primary and recurrent non-muscle-invasive bladder cancer (NMIBC) were randomly assigned 1:1 to TURBT guided by IMAGE1S or WL. Eighteen-month recurrence rates and subanalysis for primary/recurrent and risk groups were planned and compared by chi-square tests and survival analyses.

All patients – primary & recurrent cases

A. All patients ($p=0.199$)

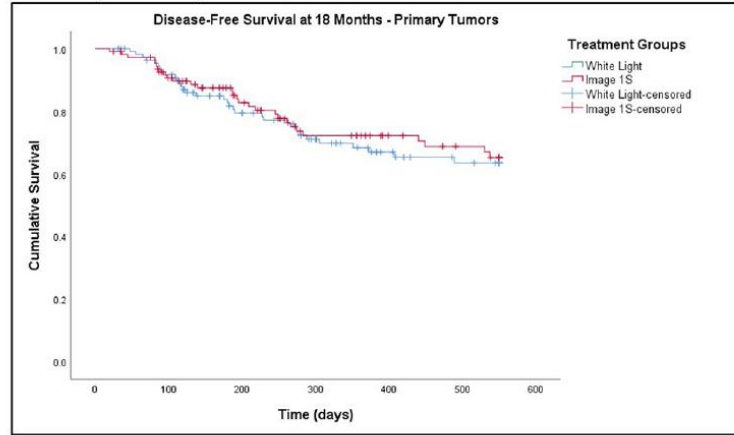


Number at Risk

Day	0	100	200	300	400	500	550
WLI	354	169	119	95	74	65	60
Image1S	335	165	120	93	76	70	65

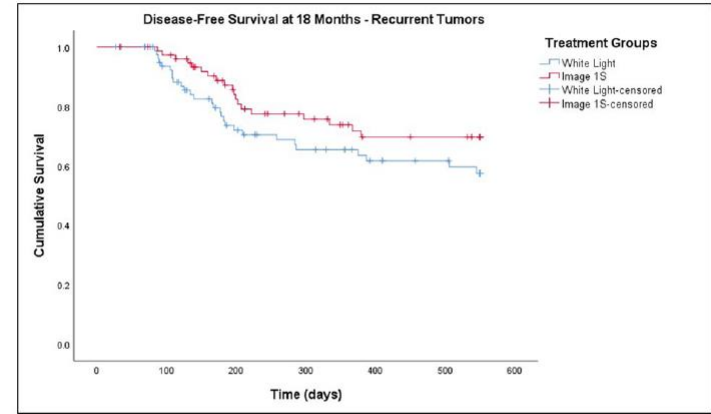
Primary cases only versus recurrent cases only

B Primary Tumors (p=0.715)



Number at Risk							
Day	0	100	200	300	400	500	550
WLI	230	99	72	56	42	35	33
Image1S	216	92	69	51	43	38	35

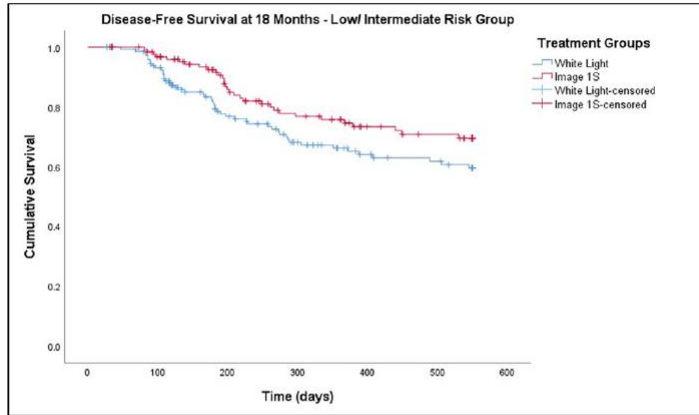
C Recurrent Tumors (p=0.117)



Number at Risk							
Day	0	100	200	300	400	500	550
WLI	124	70	47	39	32	30	27
Image1S	119	73	51	42	33	32	30

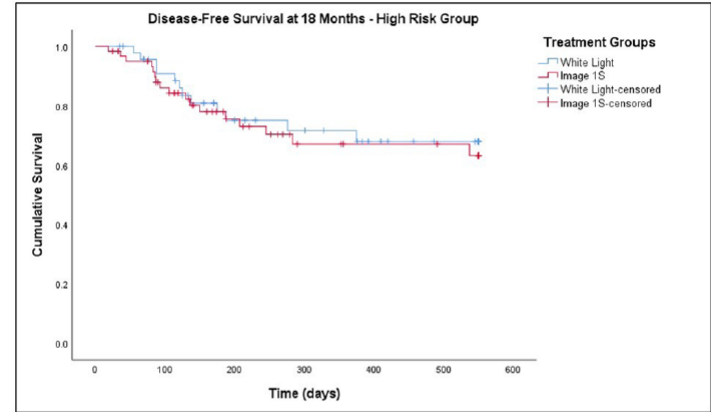
Low/Intermediate versus High-risk cases only

D Low/Intermediate Risk (p=0.068)



Number at Risk							
Day	0	100	200	300	400	500	550
WLI	270	131	93	74	59	54	50
Image1S	240	118	90	73	58	53	49

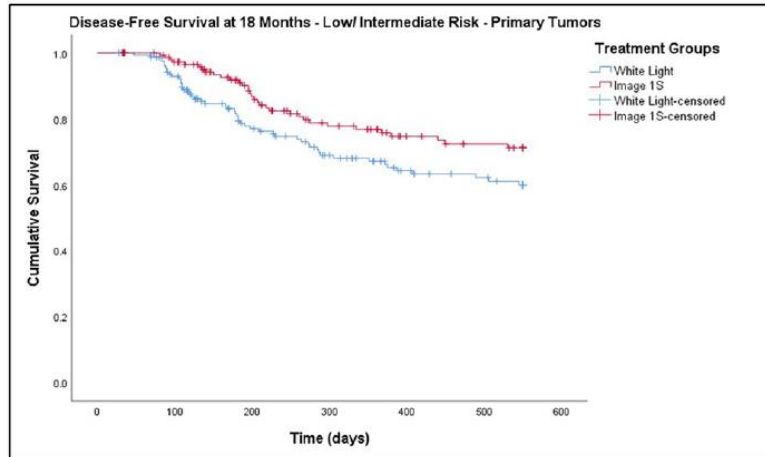
E High Risk (p=0.688)



Number at Risk							
Day	0	100	200	300	400	500	550
WLI	84	38	26	21	15	11	10
Image1S	95	47	30	20	18	17	16

Low/Intermediate Risk Primary tumors only


F Low/Intermediate Risk - Primary tumors (p=0.035)



Number at Risk


Day	0	100	200	300	400	500	550
WLI	168	140	100	81	64	57	53
Image1S	151	136	102	81	66	61	57

Conventional white light imaging-assisted transurethral resection of bladder tumour (TURBT) versus IMAGE1S-assisted TURBT in non-muscle-invasive bladder cancer patients: trial protocol and 18 months results

Jean de la Rosette¹  · Alexey Martov² · Rodolfo Hurle³ · Gabriel Favre⁴ · Charalampos Mamoulakis⁵ · Manuel Castanheira de Oliveira⁶ · Arnulf Stenzl⁷ · Estefania Linares-Espinós⁸ · Carlos R. Trelles Guzmán⁸ · Stavros Gravas^{9,10} · Thomas Knoll¹¹ · Mustafa Yucel Boz¹ · Thomas Herrmann^{12,13} · Pilar Laguna¹

Conclusion There was not difference in the overall recurrence rates between IMAGE1S and WL assistance 18-mo after TURBT in patients with NMIBC. However, IMAGE1S-assisted TURBT considerably reduced the likelihood of disease recurrence in primary, low/intermediate risk patients.

Conventional white light imaging-assisted transurethral resection of bladder tumour (TURBT) versus IMAGE1S-assisted TURBT in non-muscle-invasive bladder cancer patients: trial protocol and 18 months results

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American
Urological
Association

Diagnosis and Treatment of Non-Muscle Invasive Bladder Cancer: AUA/SUO Joint Guideline (2020)

Enhanced Cystoscopy

30. In a patient with NMIBC, a clinician should offer blue light cystoscopy at the time of TURBT, if available, to increase detection and decrease recurrence. (Moderate Recommendation; Evidence Strength: Grade B)
31. In a patient with NMIBC, a clinician may consider use of NBI to increase detection and decrease recurrence. (Conditional Recommendation; Evidence Strength: Grade C)



European
Association
of Urology

EAU Guidelines on Non-muscle-invasive Bladder Cancer (TaT1 and CIS)

5.11.3 *Additional technologies*

Confocal laser micro-endoscopy is a high resolution imaging probe designed to provide endoscopic histological grading in real time but requires further validation [176]. The Storz professional image enhancement system (IMAGE1 S, formally called SPIES) is an image enhancement system using 4 different light spectra but prospective data using this system are still limited [177].

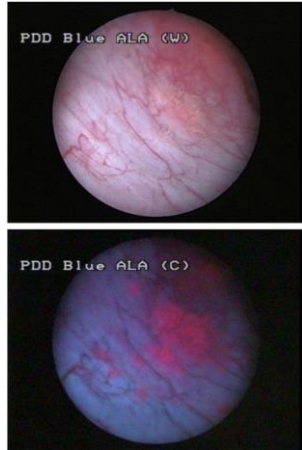


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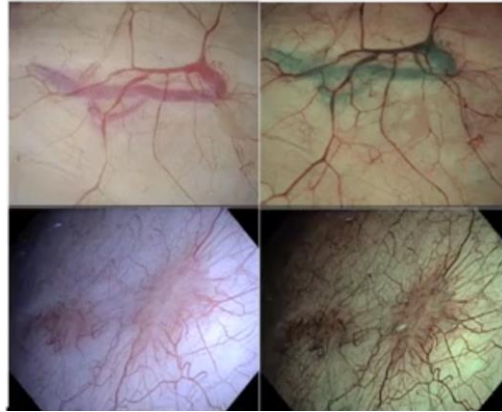
Enhancing endoscopic imaging

Photodynamic diagnosis



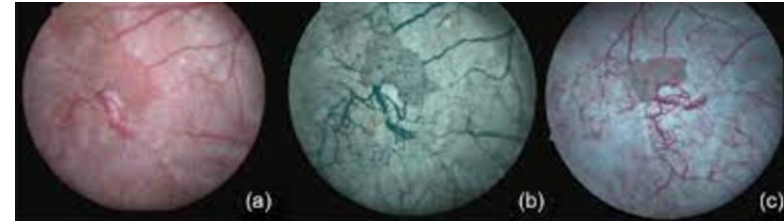
Higher sensitivity & lower specificity than WL

NBI



Benefit over WL in Low - risk primary tumors

Image 1S



Benefit over WL in Low/Intermediate - risk primary tumors

No "head to head" comparison

Enhanced Imaging in NMIBC Improves our performance



The logo is contained within a white circle. It features the text 'SIU' in a large, blue, serif font at the top. Below it, 'Around the' is written in a smaller, blue, sans-serif font. The word 'WORLD' is in a large, bold, blue, sans-serif font, with a blue globe icon integrated into the letter 'O'. Underneath 'WORLD' is 'EDINBURGH' in a bold, blue, sans-serif font, with '2025' in a smaller font to its right. At the bottom of the circle, the dates 'Oct. 29-Nov. 1' are written in a blue, sans-serif font.

SIU
Around the
WORLD
EDINBURGH 2025
Oct. 29-Nov. 1

SAVE THE DATE

Edinburgh International Conference Centre (EICC)



Thank you for your attention

