XXI CONGRESSO NAZIONALE AIRO

Genova, 19-22 novembre 2011
Porto Antico di Genova
Centro Congressi

Associazione Italiana Radioterapia Oncologica

Grand'angolo in radioterapia oncologica Gastro-Intestinale

Maria Antonietta Gambacorta

Università Cattolica del Sacro Cuore
Roma

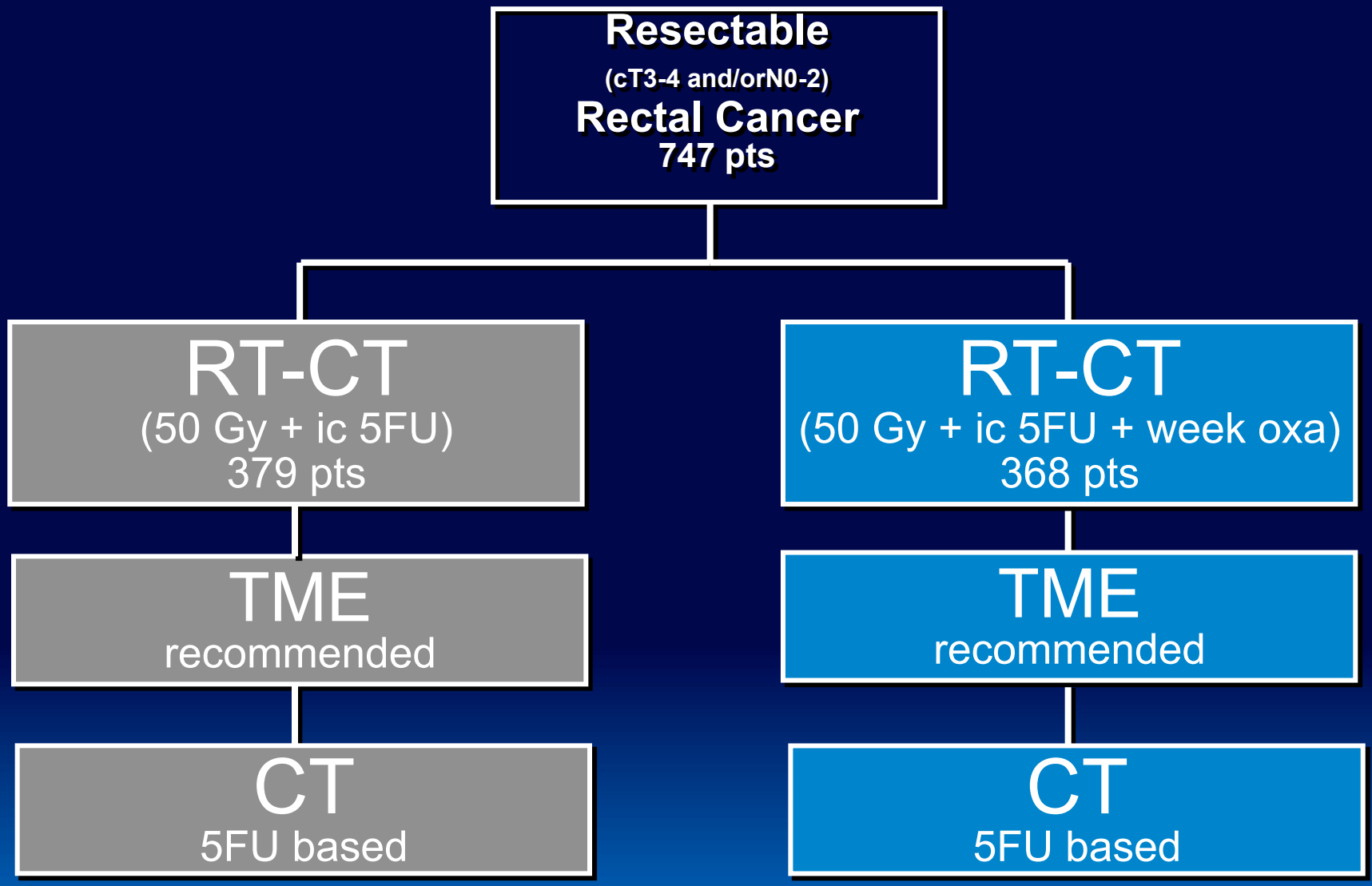
RECTAL CANCER

Oxaliplatin in preop RT-CT

Yes or Not?

STAR Trial

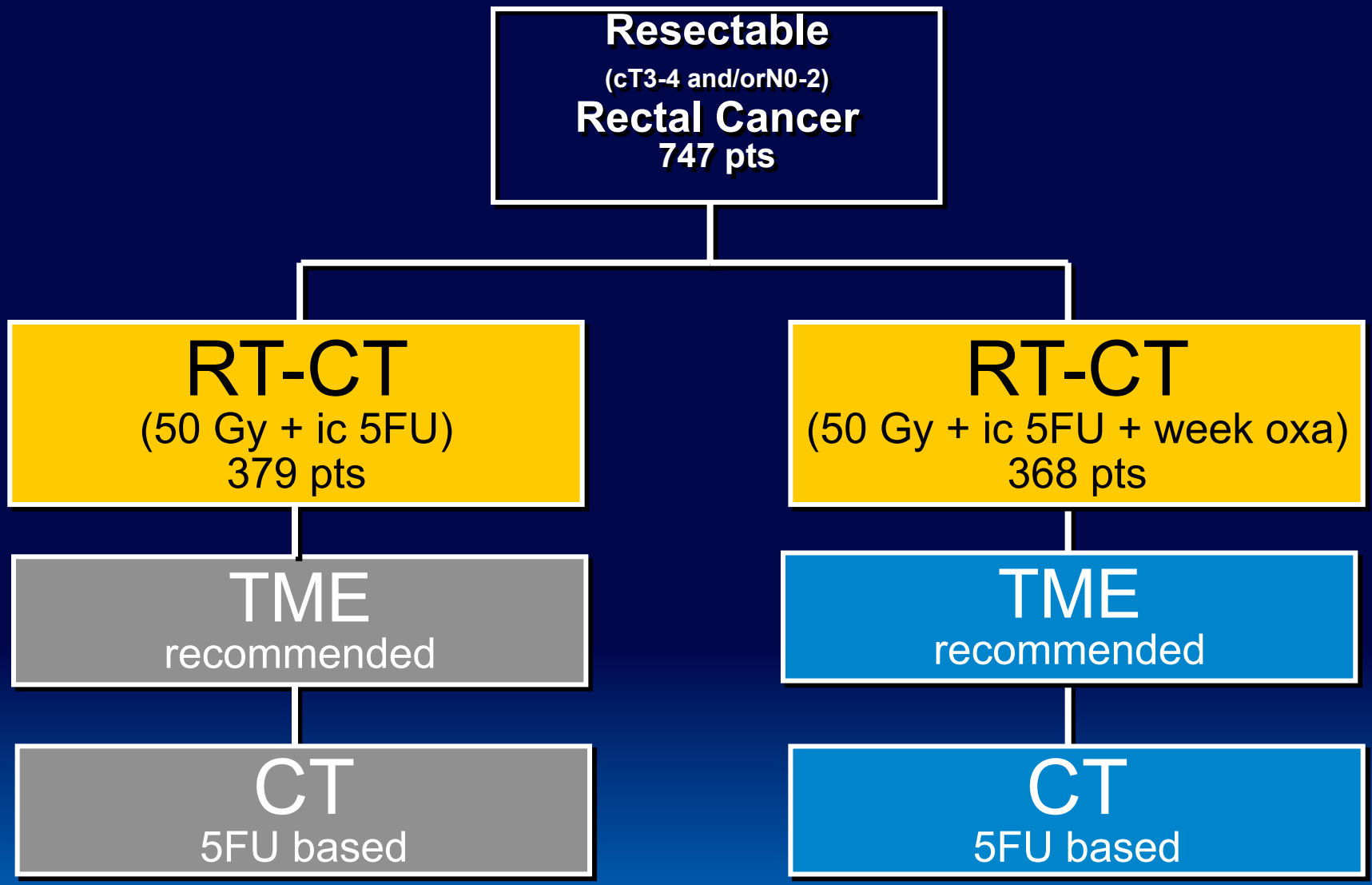
Studio **A**diuvante **T**erapia **R**etto



Aschele C et al, JCO 2011

STAR Trial

Studio **A**diuvante **T**erapia **R**etto



Aschele C et al, JCO 2011

STAR Trial

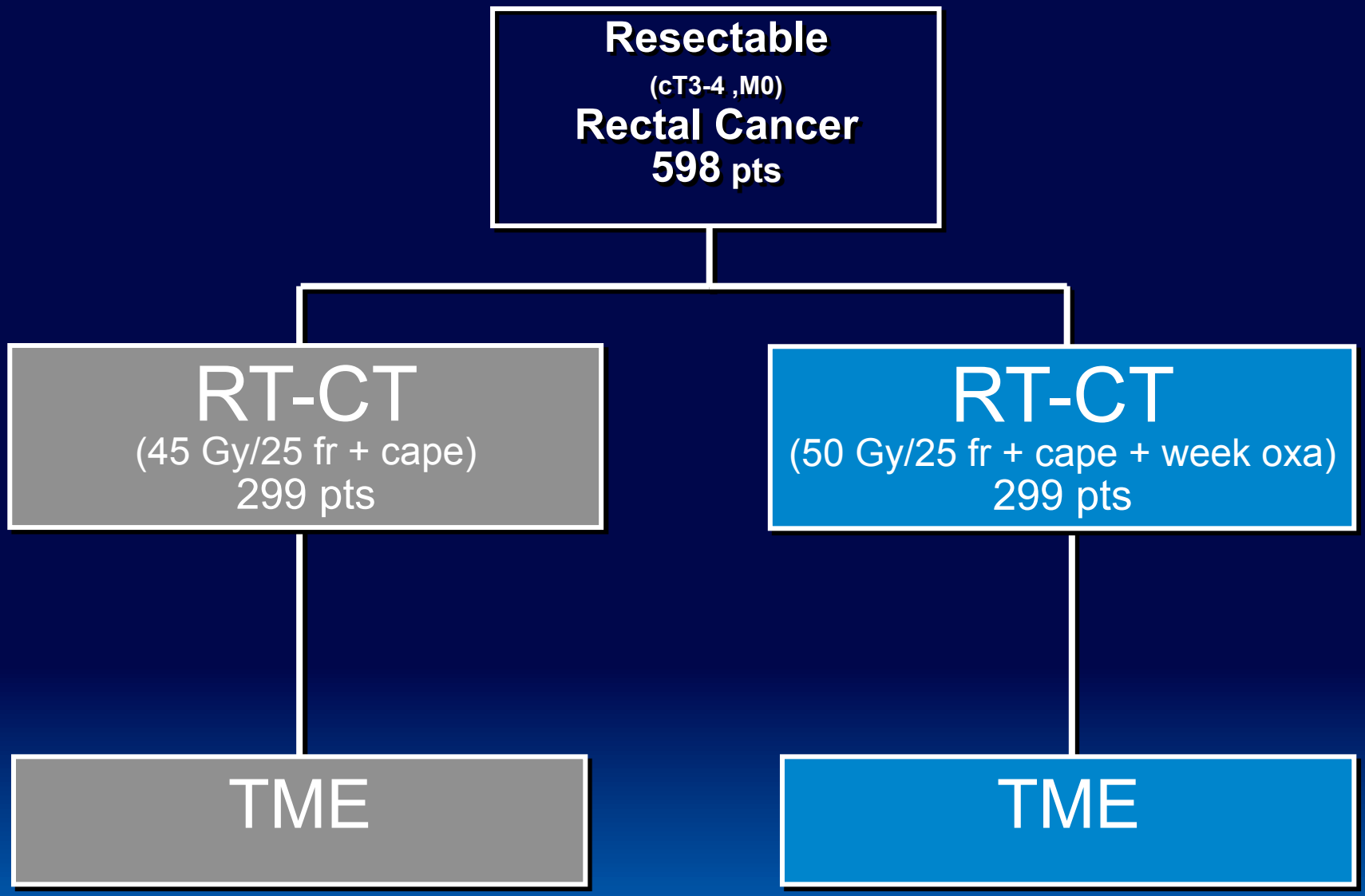
Studio **A**diuvante **T**erapia **R**etto

	RT - 5FU	RT-5FU-oxa
pCR	16 %	16 %

p = 0.904

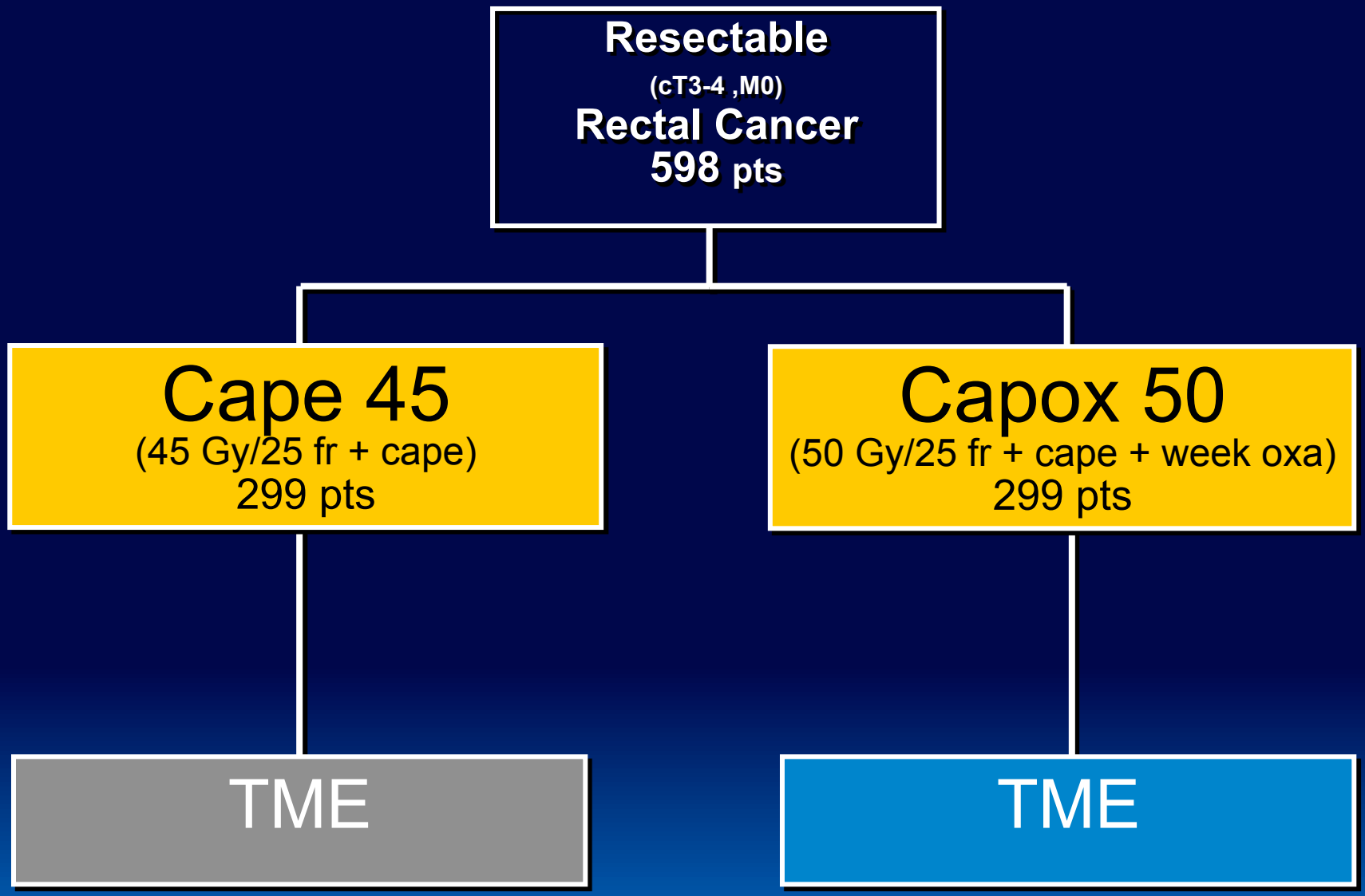
Aschele C et al, JCO 2011

ACCORD Trial



Gérard JP et al, JCO 2010

ACCORD Trial



Gérard JP et al, JCO 2010

ACCORD trial

	CAPE 45	CAPOX 50
pCR	13.9 %	19.2 %

p = 0.09

Gérard JP et al, JCO 2010

ACCORD trial

Acute toxicity	Cape 45	Capox 50	p
all	**10.9**	**25.4**	**< 0.001**
diarrhea	**3.2**	**12.6**	**< 0.001**
haematologic	3.7	4.8	ns
fatigue	**0.8**	**5.1**	**0.004**
dermatitis	0.4	1.4	ns
peripheal neuropaty	**0.4**	**5.1**	**0.002**
H & F syndrom	0.8	0	ns

Gérard JP et al, JCO 2010

ACCORD trial

Acute toxicity	Cape 45	Capox 50	p
all	**10.9**	**25.4**	**< 0.001**
diarrhea	**3.2**	**12.6**	**< 0.001**
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H & F syndrom	0.8	0	ns

Gérard JP et al, JCO 2010

STAR trial: acute tox

Acute toxicity	RT-5 FU	RT – 5FUoxa	p
all	8	24	< 0.001
diarrhea	4	15	< 0.001
anemia	0.5	0	ns
fatigue	0	3	< 0.001
dermatitis	2	5	0.037
neurosensory	0	1	0.026

Aschele C et al, JCO 2011

STAR trial: acute tox

Acute toxicity	RT-5 FU	RT – 5FUoxa	p
all	8	24	< 0.001
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dermatitis	2	5	0.037
neurosensory	0	1	0.026

Aschele C et al, JCO 2011

STAR trial: compliance

Treatment	RT-5 FU	RT – 5FUoxa	p
RT 50 Gy	92	84	< 0.001
RT 45 Gy	97	91	< 0.001
5FU 80% dose	90	80	< 0.001
Oxaliplatin 6 wks		69	

Aschele C et al, JCO 2011

STAR trial: compliance

Treatment	RT-5 FU	RT – 5FUoxa	p
RT 50 Gy	92	84	< 0.001
RT 45 Gy	97	91	< 0.001
5FU 80% dose	90	80	< 0.001
Oxaliplatin 6 wks		69	

Aschele C et al, JCO 2011

NSABP R04 TRIAL

Stratify:
Participating center
Clinical Tumor Staging (stage II vs III)
Surgical Intent
(sphincter-saving vs non-sphincter-saving)

RANDOMIZE
1608 pts

Arm I:
225mg/m²/d 5-FU + RT (d1-5)

Arm III:
825 mg/m² PO bid C + RT (d1-5)

RT5-FU /cape

Arm II:
225 mg/m²/d 5-FU + RT (d1-5) +
50 mg/m² Ox (d1)

Arm IV:
825 mg/m² PO bid C + RT (d1-5)
+ 50 mg/m² Ox (d1)

RT-oxa-5FU/cape

SURGERY

RT = radiotherapy; Ox = oxaliplatin; C = capecitabine.

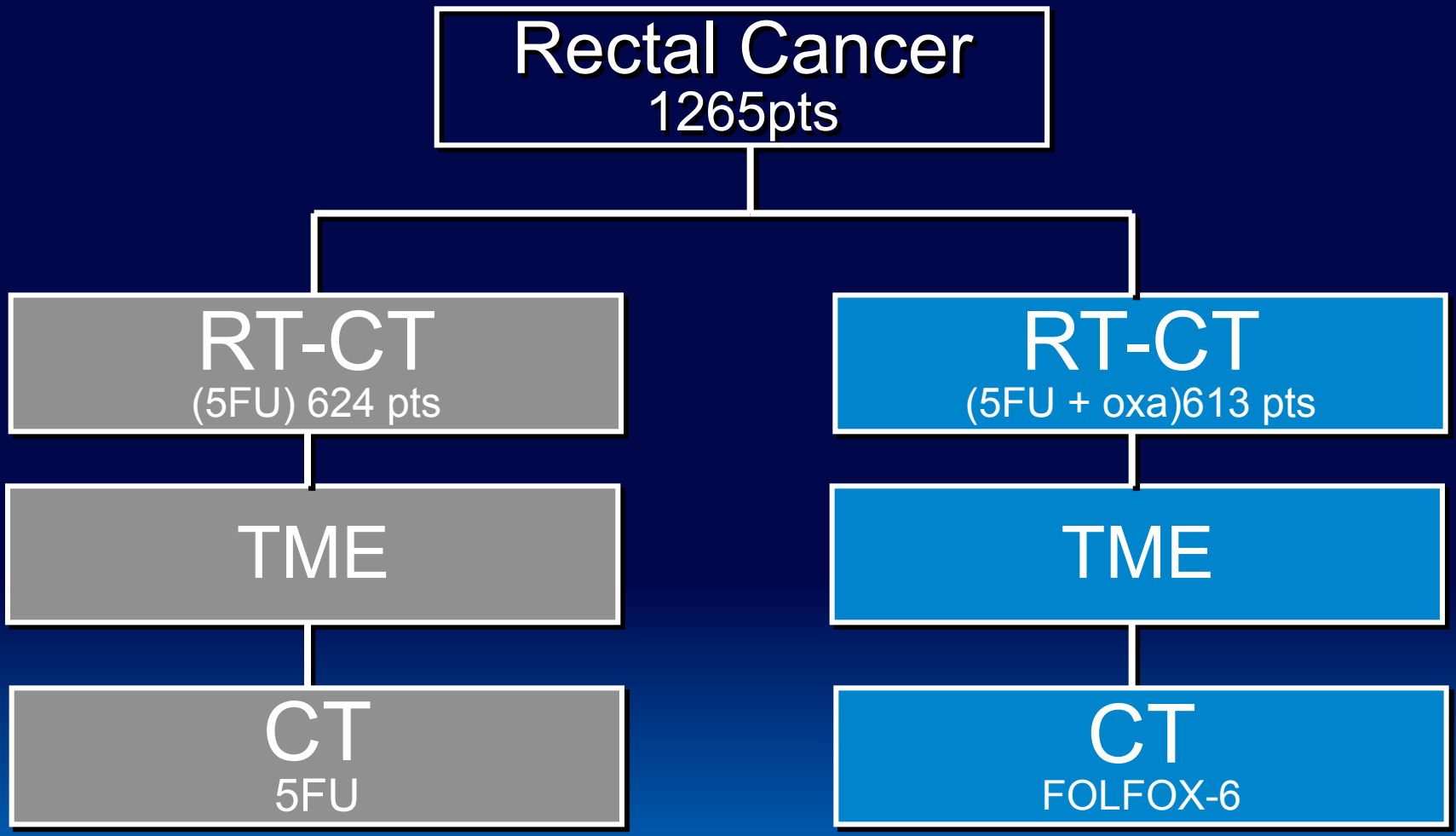
Roh MS et al ASCO 2010

NSABP R04 TRIAL

Endpoint	(FU or CAPE) No OX	(FU or CAPE) + OX	P value
pCR	111/580 = 19.1%	121/578 = 20.9%	0.46
SSS	370/582 = 63.6%	353/584 = 60.4%	0.28
SD	35/152 = 23.0%	29/151 = 19.2%	0.48
Grade 3/4 diarrhea	41/622 = 6.6%	97/631 = 15.4%	< 0.0001

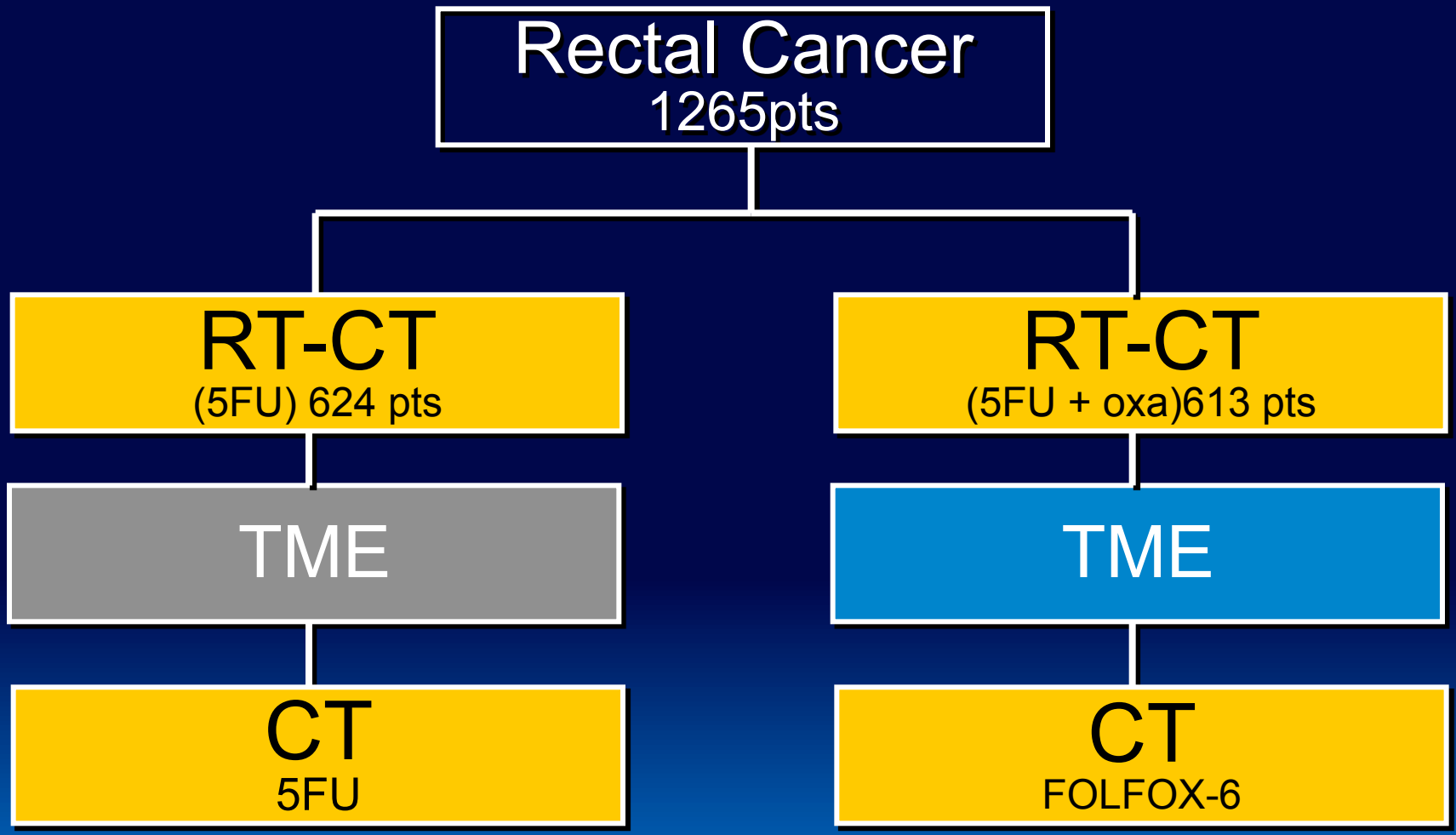
Roh MS et al ASCO 2010

German Trial
(CAO-ARO-AIO-04)



Rodel C et al. ASCO 2010

German Trial
(CAO-ARO-AIO-04)



Rodel C et al. ASCO 2010

German Trial (CAO-ARO-AIO-04)

	RT-5FU	RT-5FU-oxa	p
pCR	**12.8%**	**16.5%**	**0.045**
Full RT dose	95%	94%	n.s.
Full CT dose	80%	85%	n.s.

Rodel C et al. ASCO 2010

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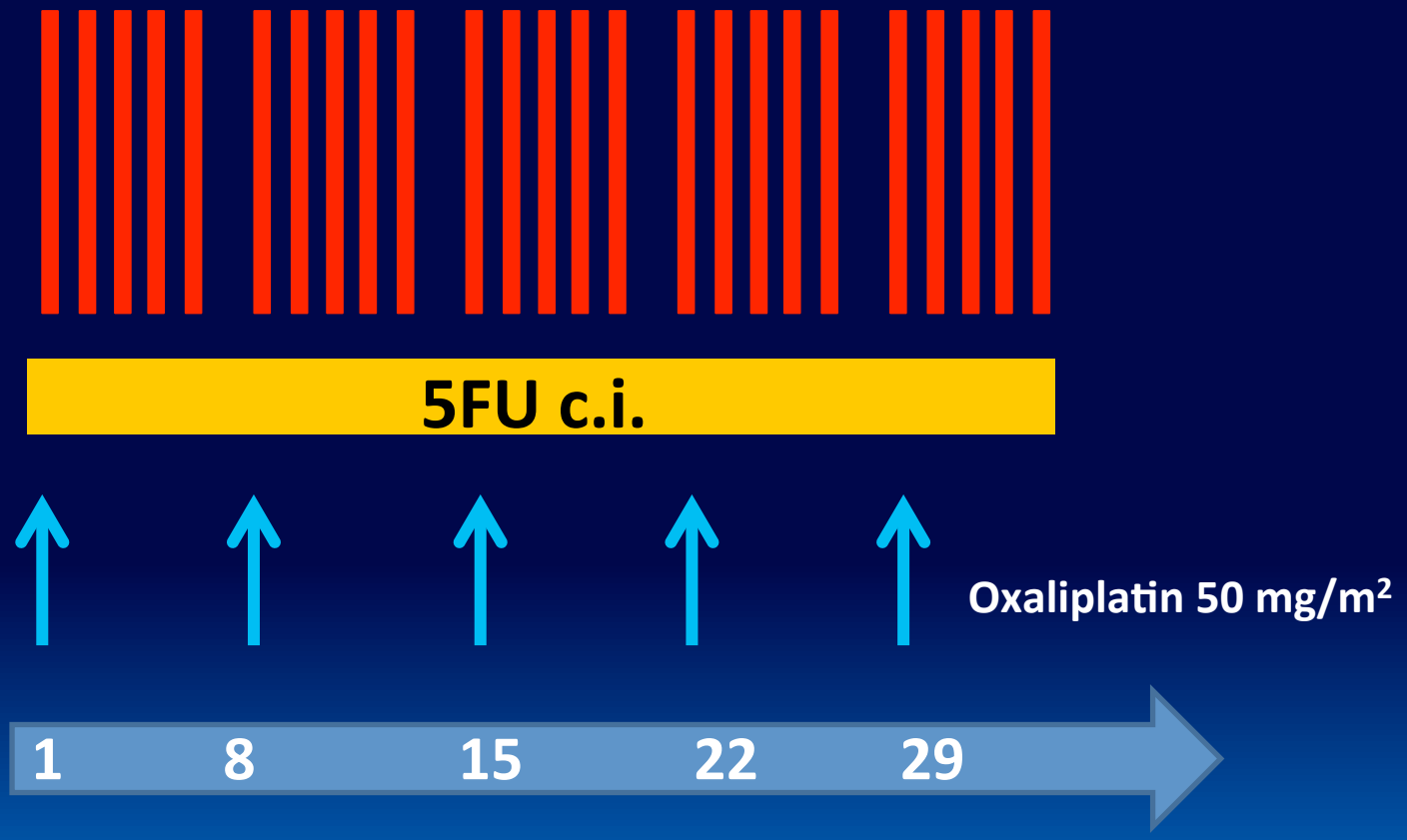

Rodel C et al. ASCO 2010

OXALIPLATIN ARMs

	pCR	Acute G3+ GI tox	RT compliance	5FUCT compliance
STAR	16	15	84	69
ACCORD	19.2	12.6	87	41
NASBP R04	20.9	15.4	na	na
CAO-ARO-AIO 04	16.5	na	94	85

OXALIPLATIN ARMs

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RECTAL CANCER

Oxaliplatin in preop RT-CT

increased pCR controversial

50 Gy pCR > 16%

oxa: acute tox ↓ dose RT ↓ dose CT

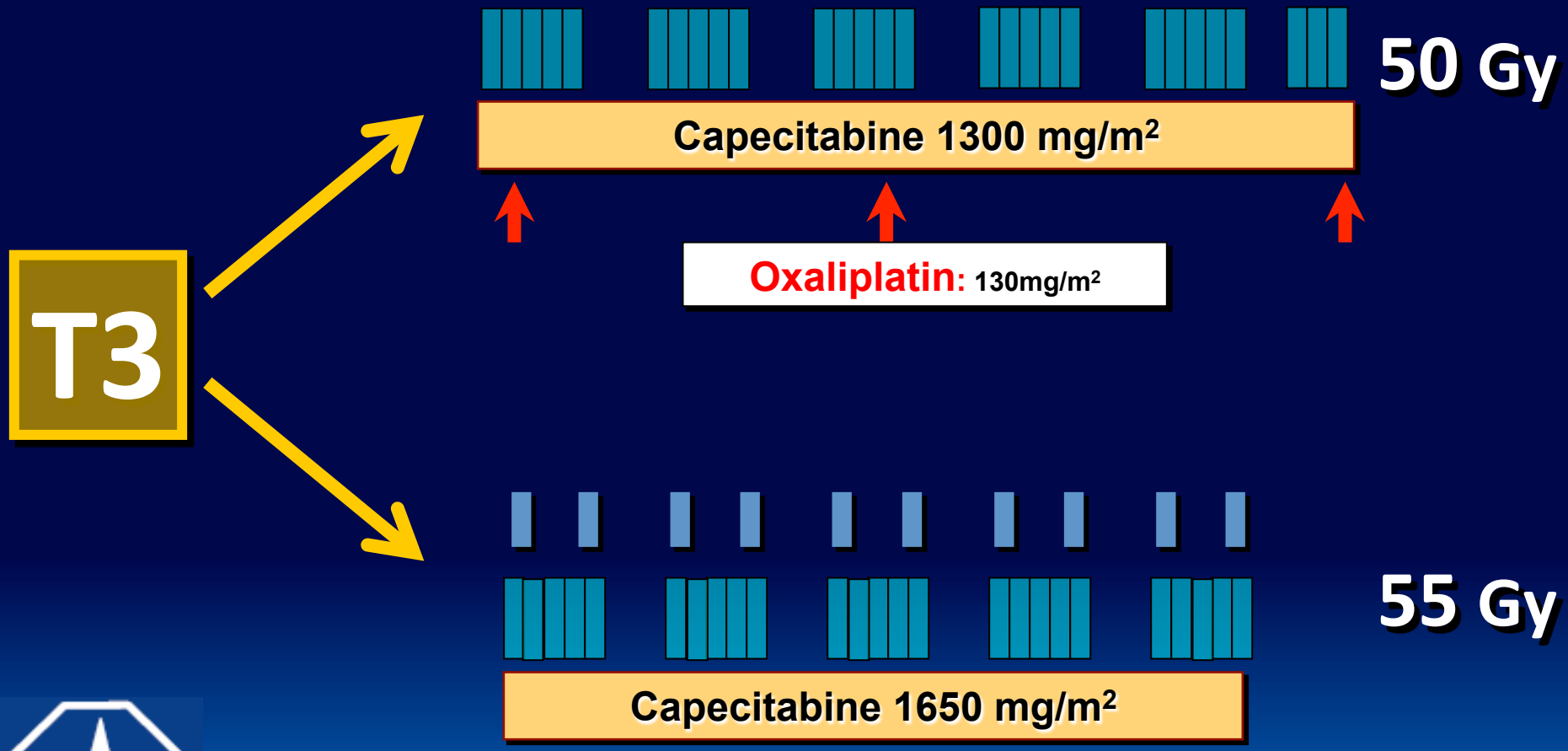
Awaited LC, MFS, DFS, OS

pCRM -, M+ @ surgery

INTEnsification Radiotherapy with Accelerated fractionation or ChemoTherapy

INTE.R.A.CT

250/616 enrolled



Gruppo AIRO GI

RECTAL CANCER

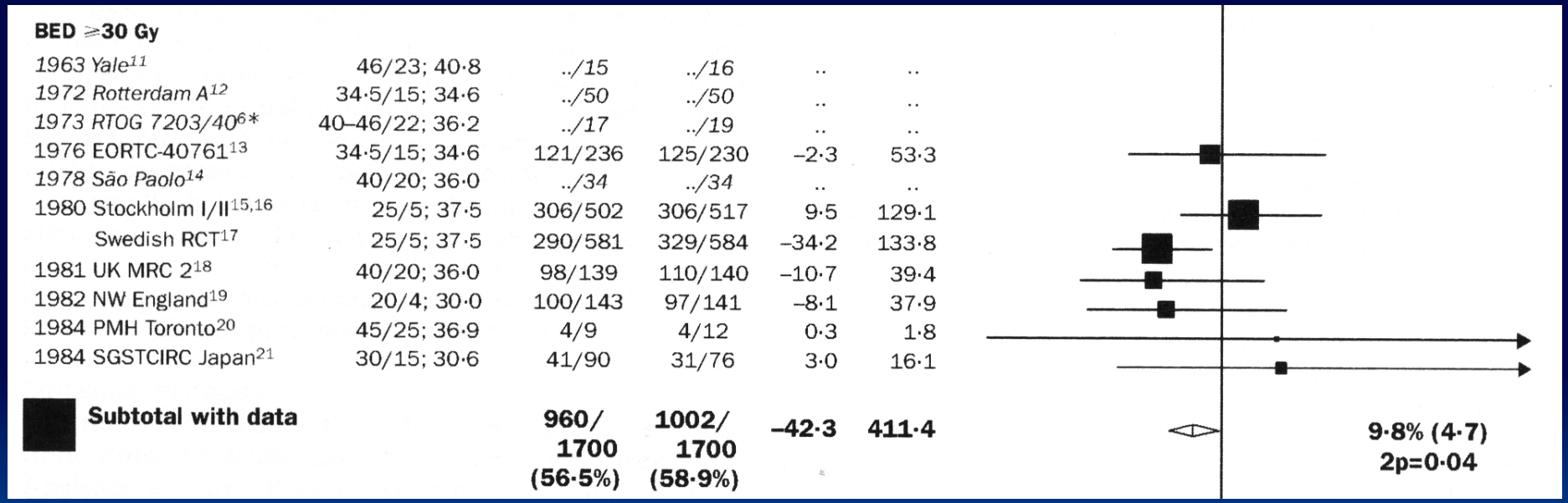
SURVIVAL

Pre-op RT alone: pre TME

3 Meta-analysis

SBU – systematic overview

Biologically effective dose > 30 Gy



BED ≥30 Gy					
1963 Yale[11]	46/23; 40·8	../15	../16	..	..
1972 Rotterdam A[12]	34·5/15; 34·6	../50	../50	..	..
1973 RTOG 7203/40[6]*	40–46/22; 36·2	../17	../19	..	..
1976 EORTC-40761[13]	34·5/15; 34·6	121/236	125/230	−2·3	53·3
1978 São Paolo[14]	40/20; 36·0	../34	../34	..	..
1980 Stockholm I/II[15,16]	25/5; 37·5	306/502	306/517	9·5	129·1
Swedish RCT[17]	25/5; 37·5	290/581	329/584	−34·2	133·8
1981 UK MRC 2[18]	40/20; 36·0	98/139	110/140	−10·7	39·4
1982 NW England[19]	20/4; 30·0	100/143	97/141	−8·1	37·9
1984 PMH Toronto[20]	45/25; 36·9	4/9	4/12	0·3	1·8
1984 SGSTCIRC Japan[21]	30/15; 30·6	41/90	31/76	3·0	16·1
Subtotal with data		**960/1700 (56·5%)**	**1002/1700 (58·9%)**	**−42·3**	**411·4**

Cammà C et al. Jama 2000

Colorectal CC Group, *Lancet* 2001

Glimelius B et al, *Acta Oncol* 2002

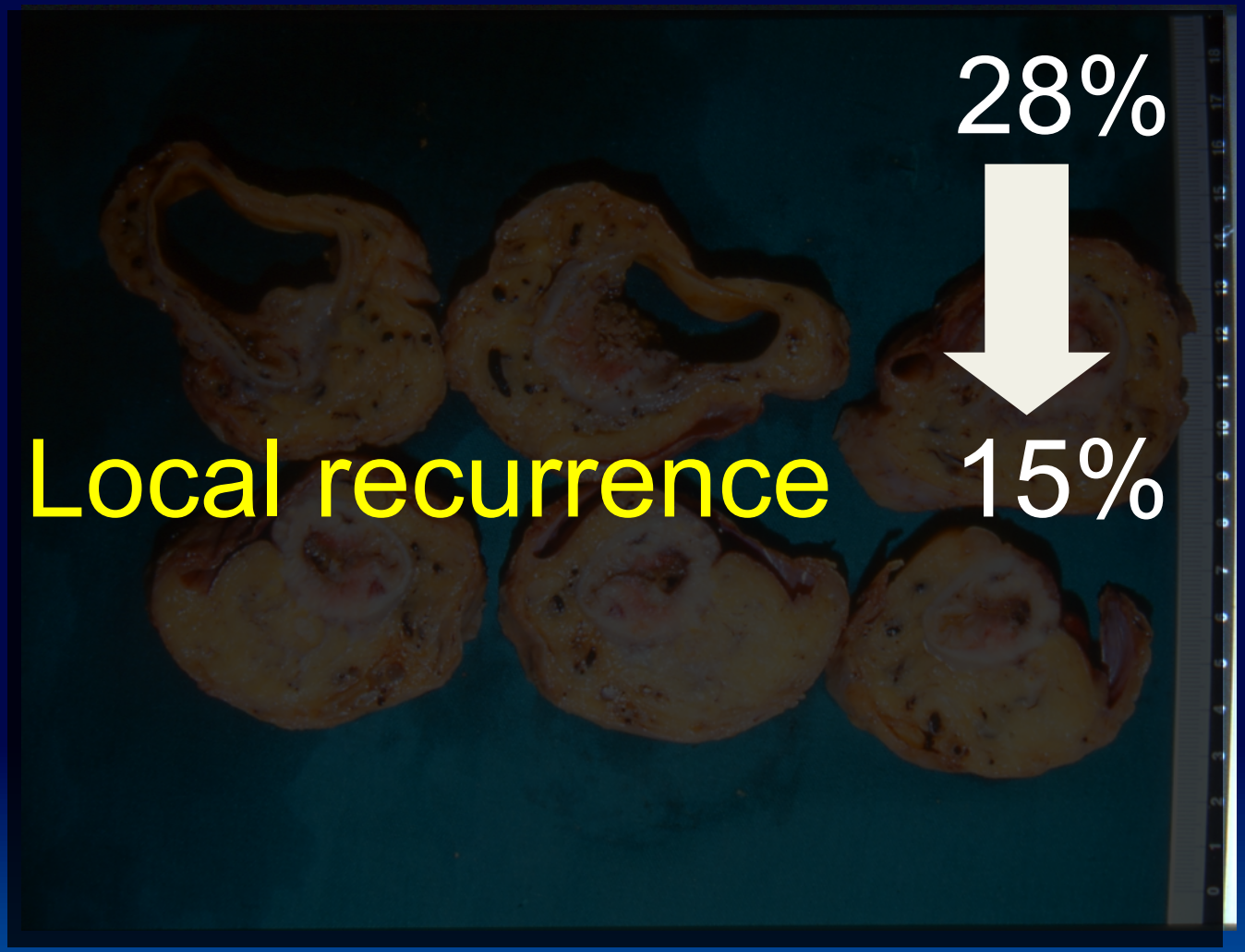
Pre-operative RT pre TME: Local Control & SURVIVAL

Sweden trial: 1168 pts

Local rel. gain	27 % ➔ 11%	16%
Survival gain	58 % ➔48%	10%

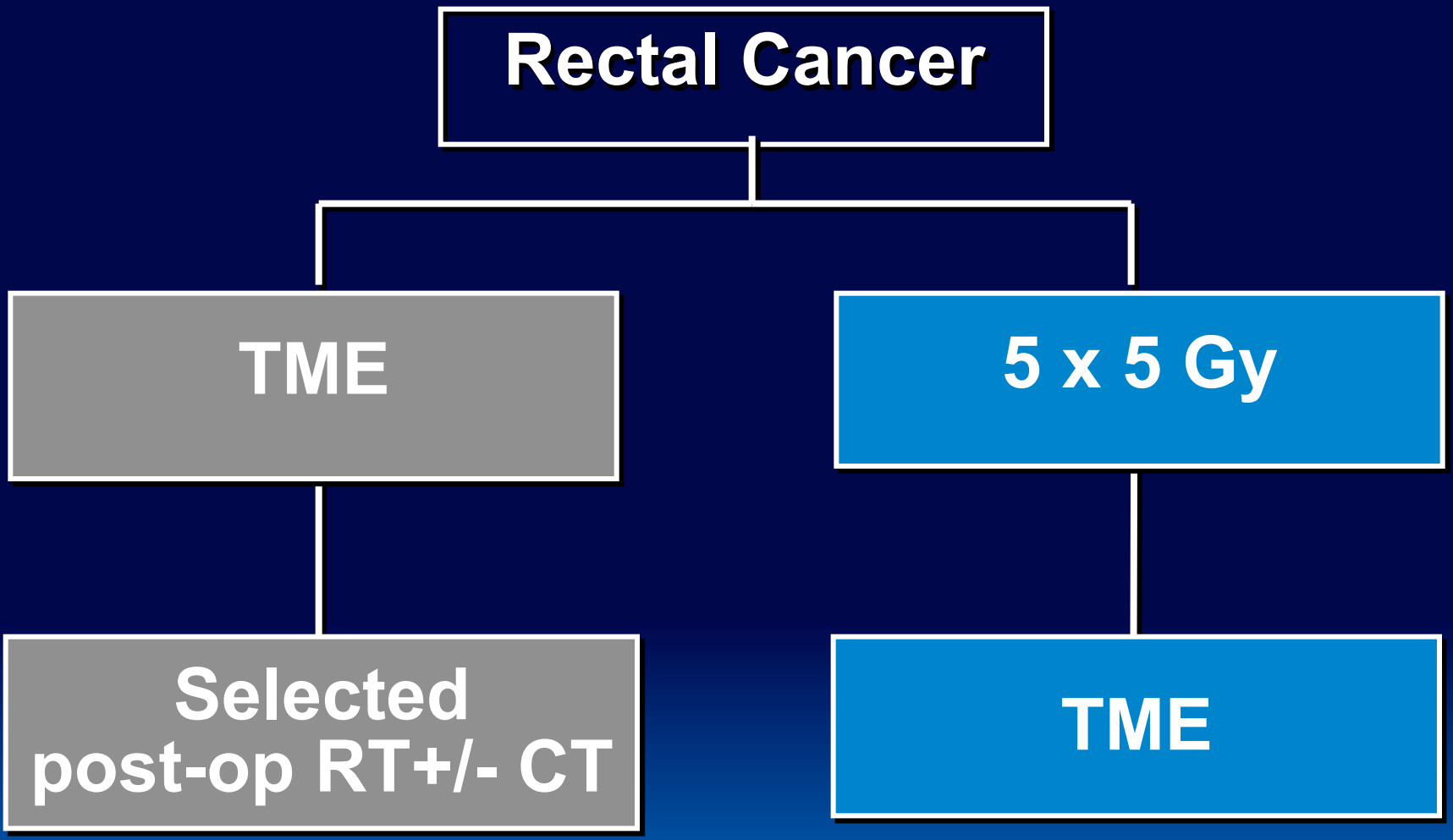
Swedish Rectal Cancer Trial, *N Engl J Med 1997*

Total Mesorectum Excision



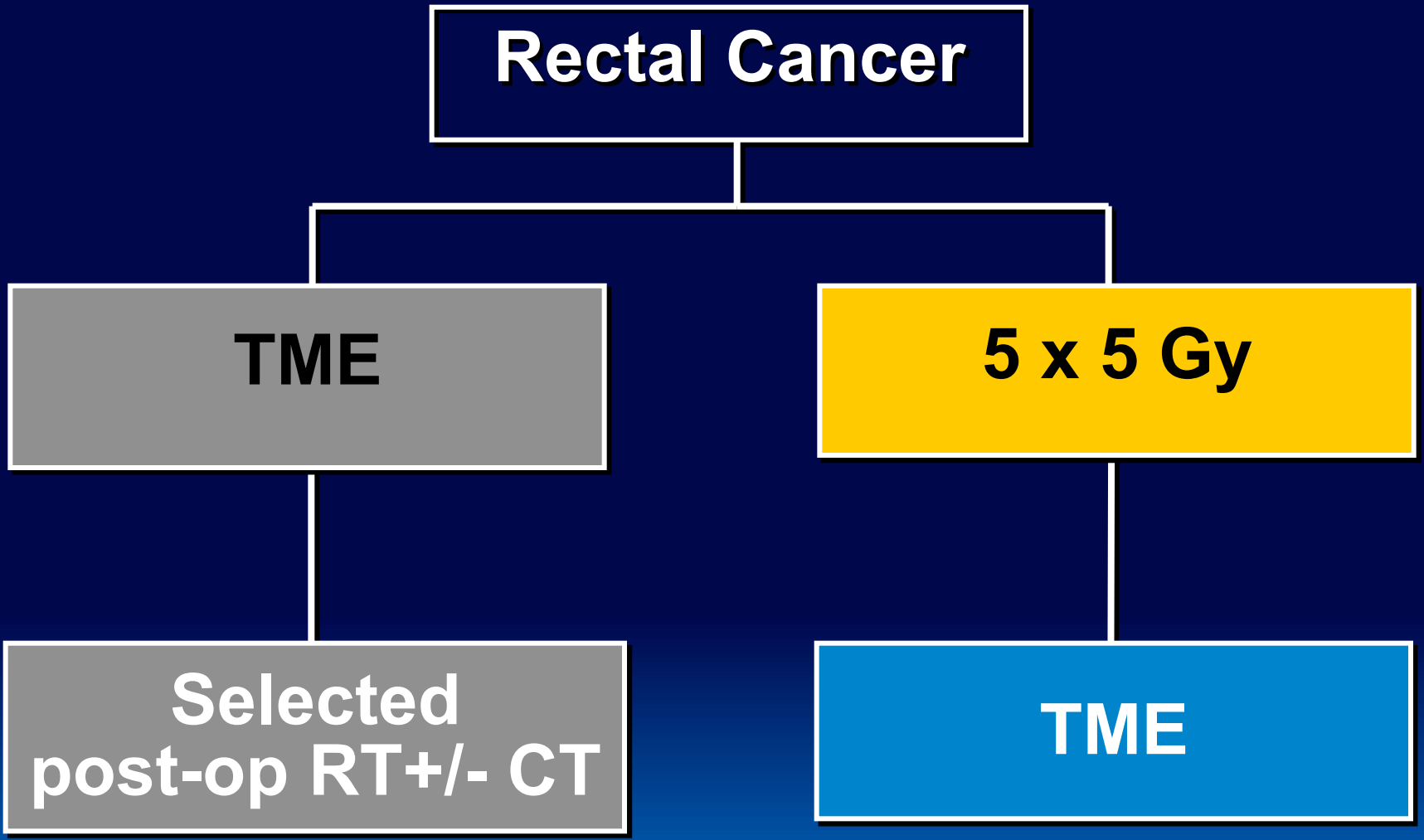
Heald RJ, Lancet 1986
Glimelius B, *Eur J Onc* 2005

Pre-op ERT vs TME: Dutch & MRC



Kapitejn E et al, N Engl J Med 2001
Sebag-Montefiore D et al, Lancet 2009

Pre-op RT vs TME: Dutch & MRC

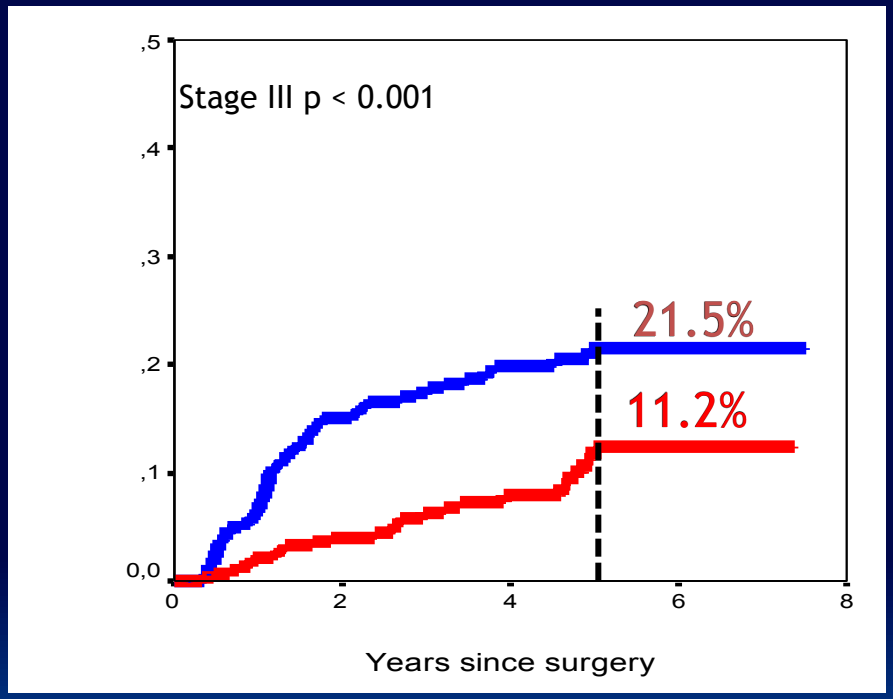


Kapitejn E et al, N Engl J Med 2001
Sebag-Montefiore D et al, Lancet 2009

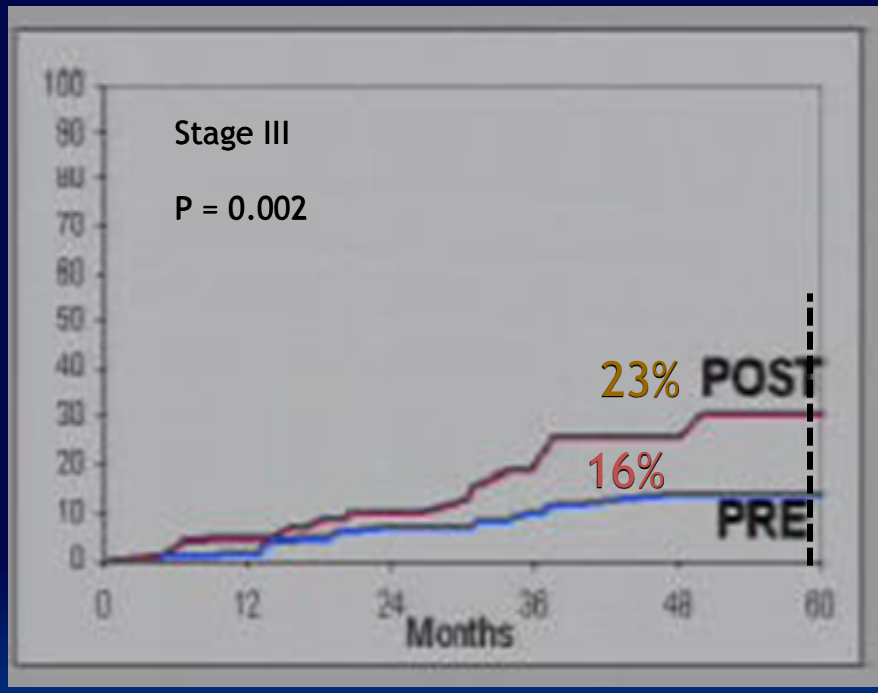
Pre-op RT alone vs TME

Local Recurrence

Short ERT



Duch Trial



MRC CR07

Peeters KC et AL – Ann Surg – 2007

Sebag-Montefiore D et Al – ASTRO - 2008

Preop RT vs Preop Chemo-RT

Local Recurrence

Long course RT

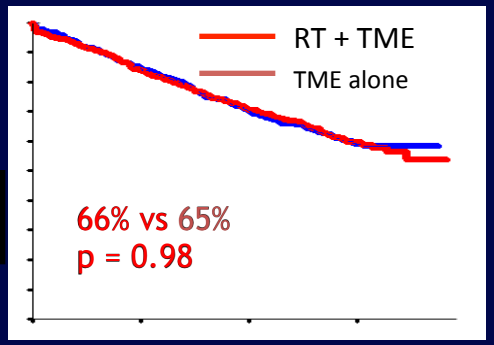
	RT LC-RTCh %	p
EORTC 22921	17 - 8	< 0.05
FFCD 9203	17 - 8	< 0.05

Bosset JF et al, N Engl J Med 2006

Gerard JP et al, JCO 2006

Preoperative trials

Survival



Short ERT

Duch Trial

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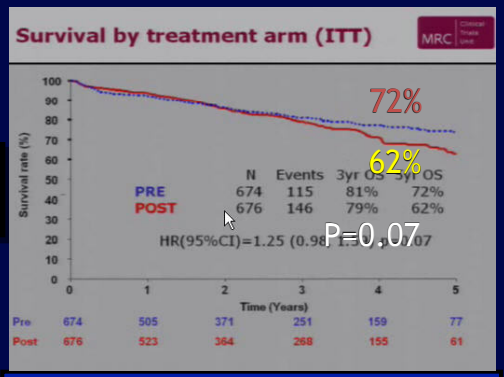
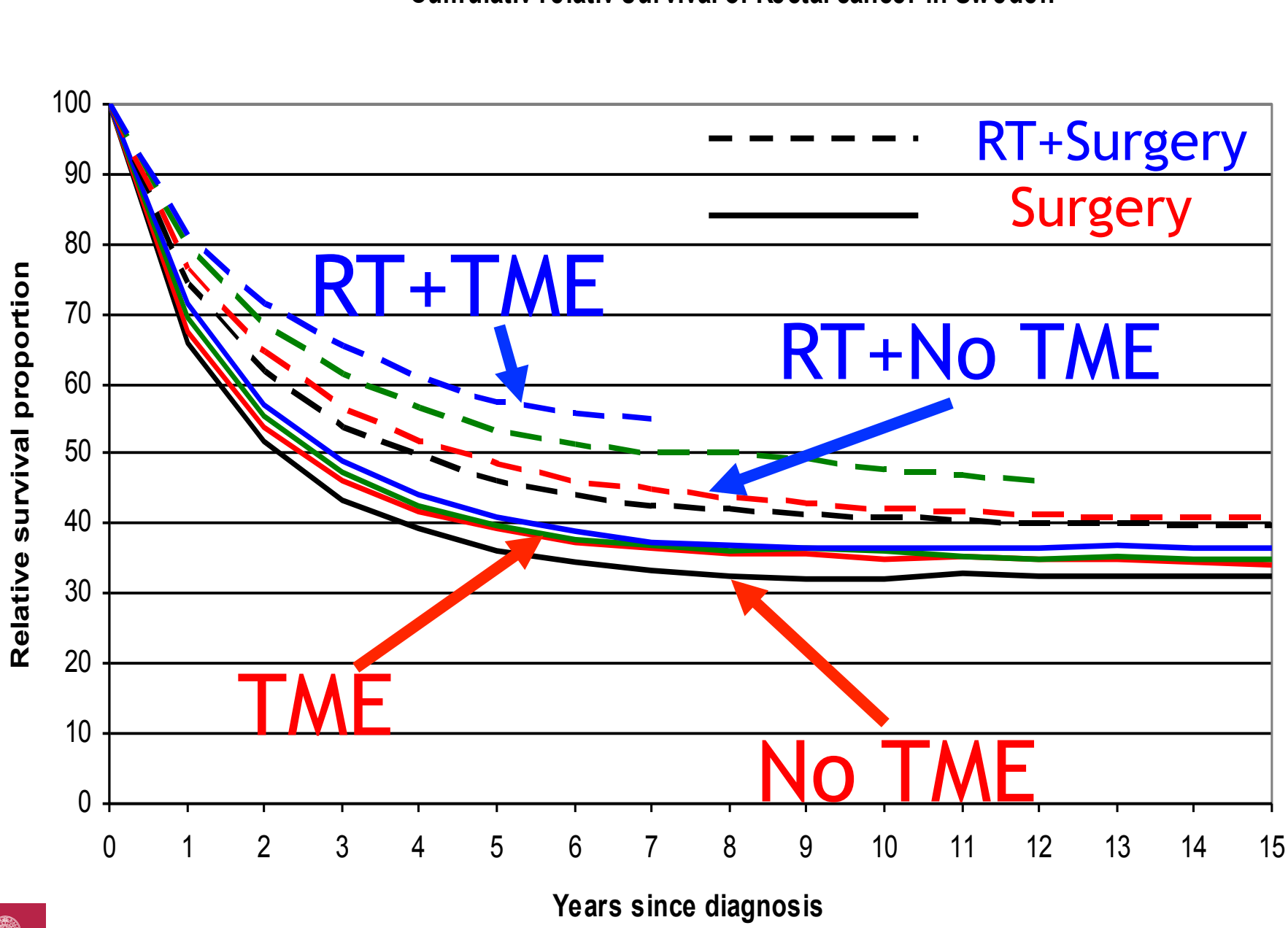


Long ERT

	Survival RT – RTCh %	
EORTC 22921	65 - 65	ns
FFCD 9203	67 - 68	ns
Polish Trial	67 - 66	ns

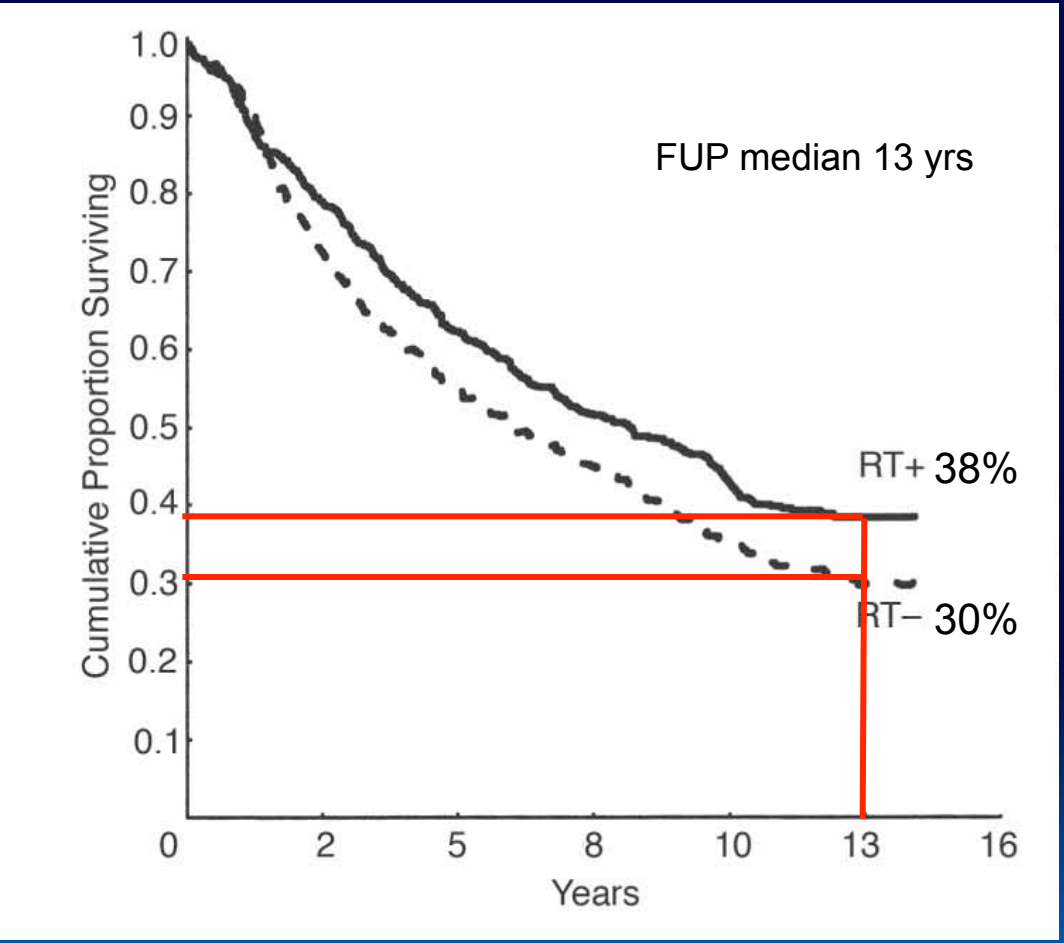


By the courtesy of L.Pahlman – ESTRO/ESSO/ESMO Course - 2009

Preoperative trials & survival

Sweden trial: 908 R0/1168 pts

Long-term updated outcomes



p = 0.008

Folkesson J et al, *JCO* 2005

Cause of death

Dutch Trial: 1382 R0 (pCRM-) / 1681pts

12 years Update of Dutch Trial

	RT + TME (691)	TME (691)
Rectal cancer	38%	48%
Other	2%	52%

p = 0.01

Van Gijn w et Al , Lancet Oncol 2011

Cause of death, R0 patients

12 years Update of Dutch Trial

	RT+TME (n=315)	TME alone (n=319)
Rectal cancer	119 (38%)	152 (48%)
Radiotherapy complications	2 (<1%)	0 (0%)
Surgery complications	20 (6%)	16 (5%)
Secondary malignancy	43 (14%)	30 (9%)
Cardiovascular cause	46 (15%)	45 (14%)
Pulmonary cause	16 (5%)	15 (5%)
Infectious cause	3 (1%)	2 (<1%)
Neurological cause	4 (1%)	4 (1%)
Ileus	3 (1%)	2 (<1%)
Other	39 (12%)	32 (10%)
Unknown	20 (6%)	21 (7%)

Data are number (%). Pearson χ^2 test between all causes of death p=0·448.
RT=radiotherapy. TME=total mesorectal excision.

Van Gijn w et Al , Lancet Oncol 2011

Survival in RT-Chem

5 randomized European trials

3253 patients

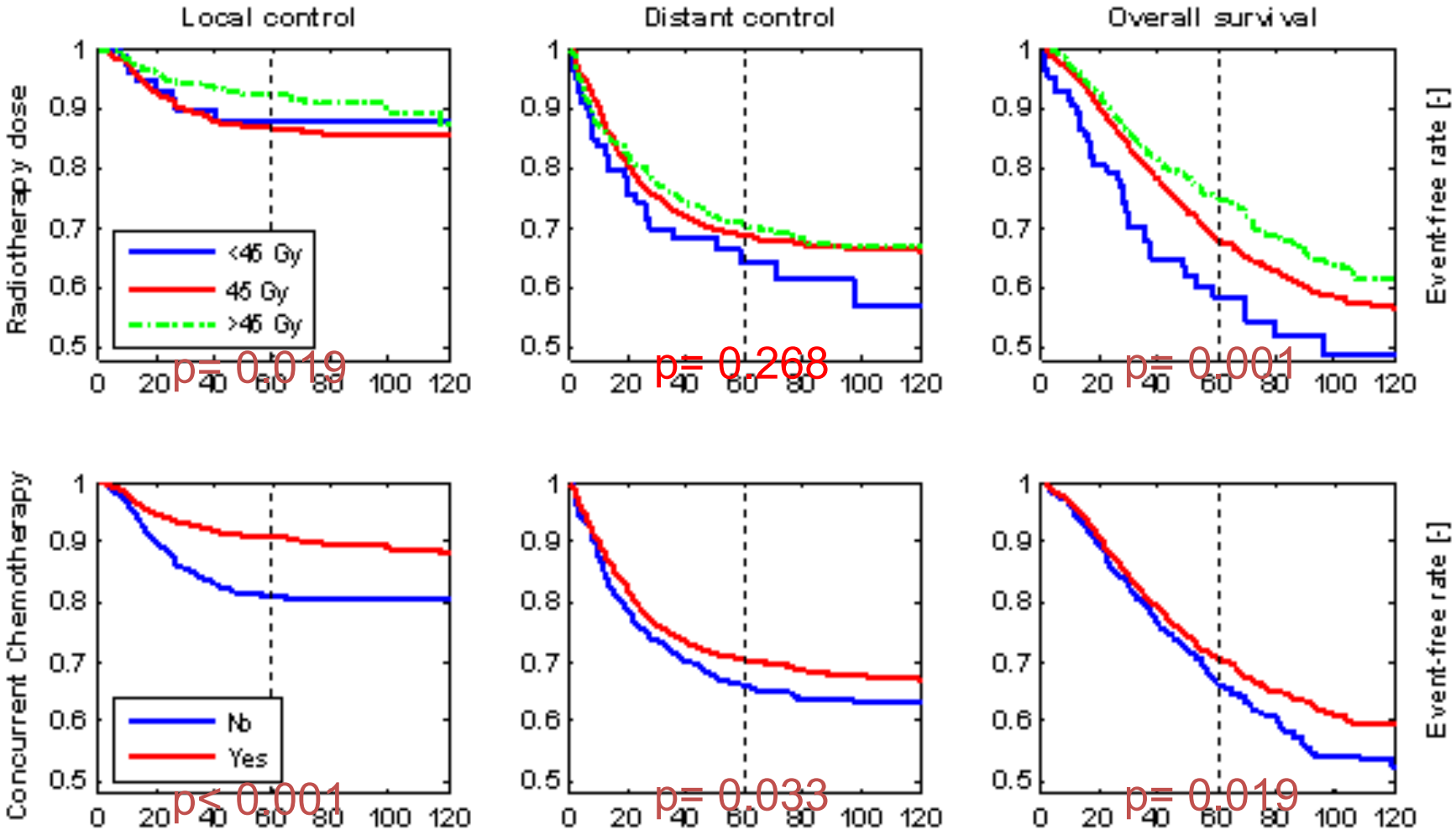
- EORTC trial (Bosset et al, 2006)
- French trial (Gerard et al. 2006)
- German trial (Sauer et al. 2004)
- Polish trial (Bujko et al. 2006)
- Italian CNR trial (Cionini L. et al. in press)

UNIVERSITÀ CATTOLICA del Sacro Cuore

MAASTRO CLINIC

Valentini V et al. JCO 2011

RTCHEM monovariate analysis

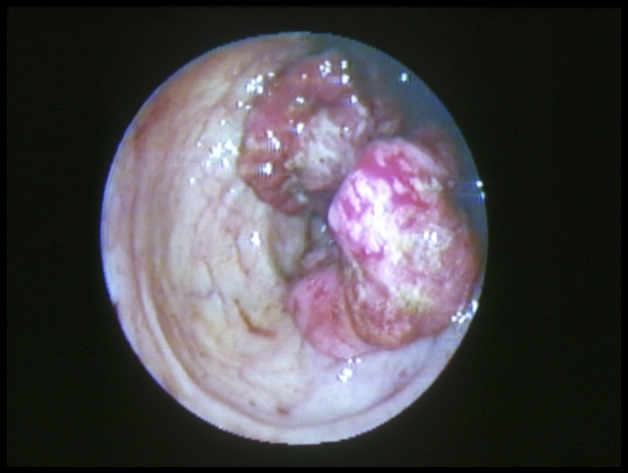


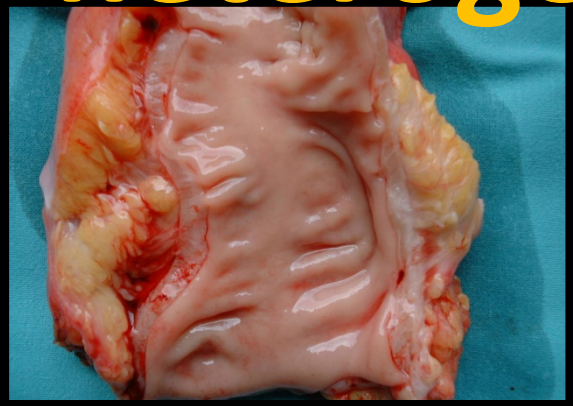
Valentini V et al. JCO 2011

RECTAL CANCER

From prescription by consensus

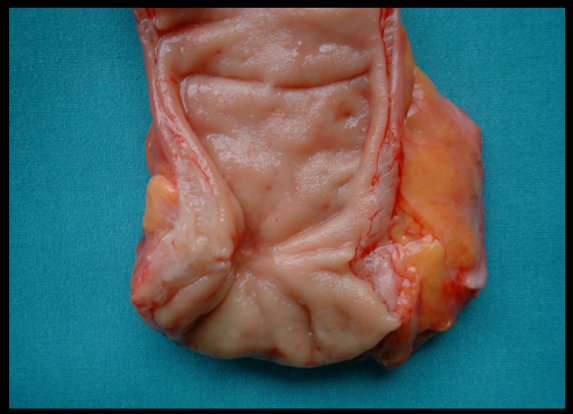
Tumor heterogeneity





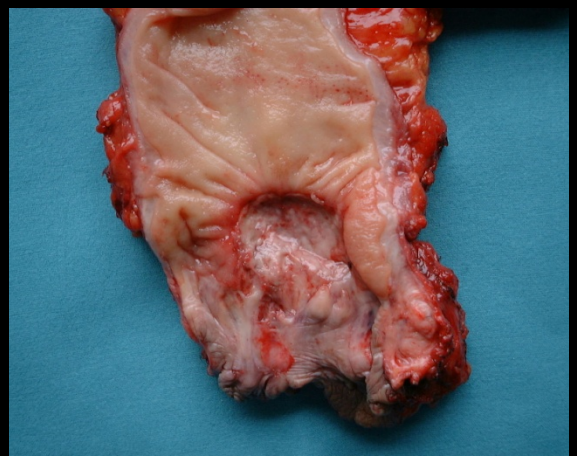
GOOD

Complete



BAD

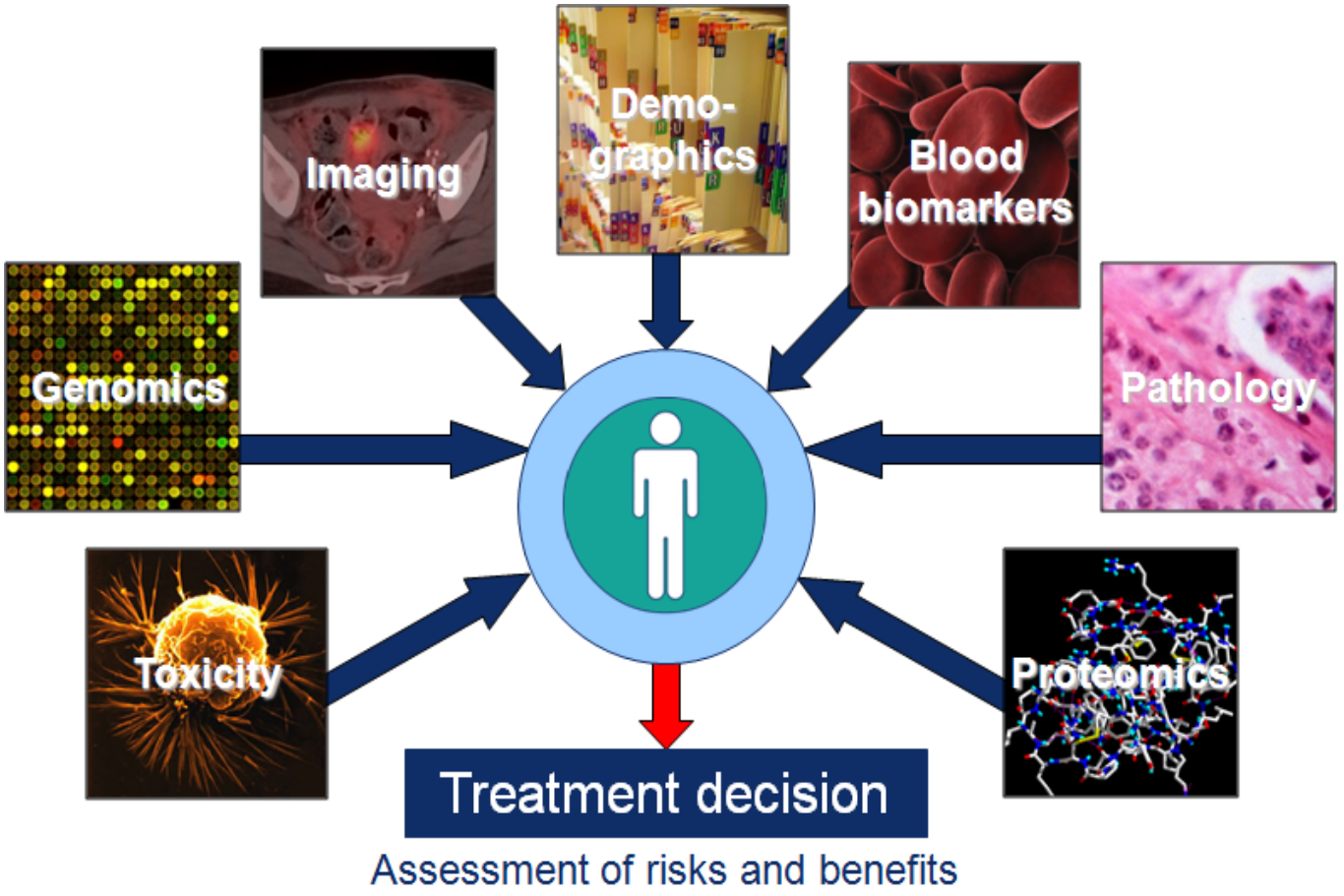
Partial



UGLY

No

How to handle heterogeneous evidences



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The latest version is at http://jco.ascopubs.org/cgi/doi/10.1200/JCO.2010.33.1595

JOURNAL OF CLINICAL ONCOLOGY ORIGINAL REPORT

Nomograms for Predicting Local Recurrence, Distant Metastases, and Overall Survival for Patients With Locally Advanced Rectal Cancer on the Basis of European Randomized Clinical Trials

Vincenzo Valentini, Ruud G.P.M. van Stiphout, Guido Lammering, Maria Antonietta Gambacorta, Maria Cristina Barba, Marek Bebenek, Franck Bonnetain, Jean-Francois Bosset, Krzysztof Bujko, Luca Cionini, Jean-Pierre Gerard, Claus Rödel, Aldo Sainato, Rolf Sauer, Bruce D. Minsky, Laurence Collette, and Philippe Lambin

MAASTRO CLINIC
CANCER PREDICTION MODELS

Input

Gender:
(•) Male ( ) Female

Age (years):
57

Clinical tumor stage (cT):
3

Radiotherapy dose [Gy]:
>45

Concomittant chemotherapy:
( ) no (•) yes

Surgery procedure:
(•) LAR ( ) APR

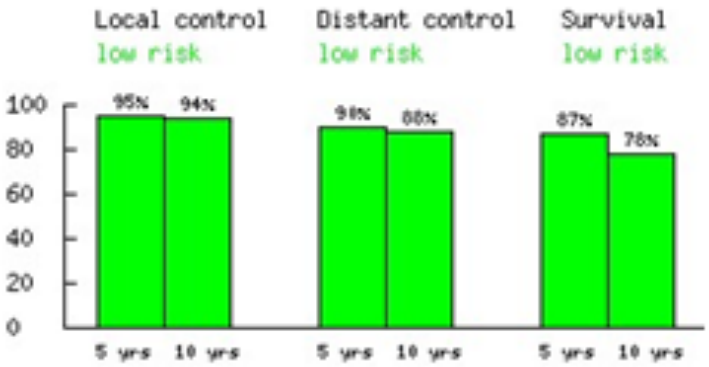
Pathological tumor stage (pT):
0

Pathological nodal stage (pN):
0

Adjuvant chemotherapy:
(•) no ( ) yes

Output

The estimated probabilities for local control, distant control, overall survival for this particular rectal cancer patient are:



Interpretation: If there would be a group of 100 patients with the same characteristics as this individual patient, 95 patients would have no local recurrence, 90 patients would have no distant metastases, 87 patients would be alive 5 years after the treatment. Due to the fact that a model can never be completely the same as the "real world", these numbers could be lower or higher, but these are the most likely values. This particular patient has a low risk to develop a local recurrence, low risk to develop distant metastases, low risk to die within 5 years after treatment.

Valentini V et al. JCO 2011

MAASTRO CLINIC

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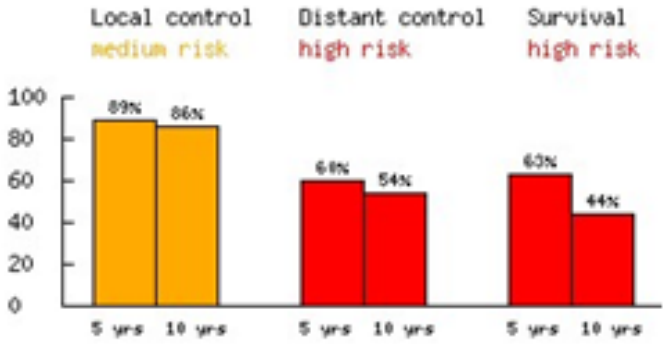
Output

The estimated probabilities for local control, distant control, overall survival for this particular rectal cancer patient are:



Valentini V et al. JCO 2011

MAASTRO CLINIC
CANCER PREDICTION MODELS

Input

Gender:
(•) Male ( ) Female

Age (years):
57

Clinical tumor stage (cT):
3

Radiotherapy dose [Gy]:
>45

Concomittant chemotherapy:
( ) no (•) yes

Surgery procedure:
( ) LAR (•) APR

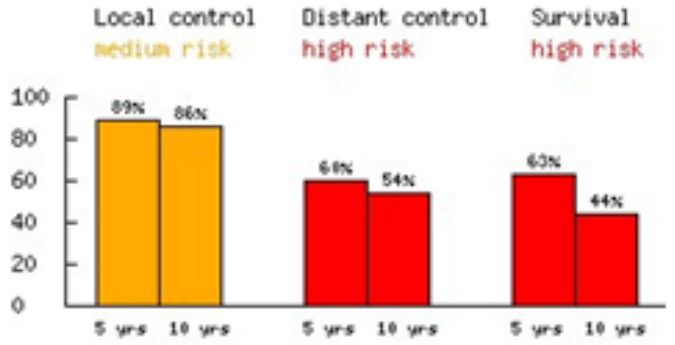
Pathological tumor stage (pT):
3

Pathological nodal stage (pN):
0

Adjuvant chemotherapy:
( ) no (•) yes

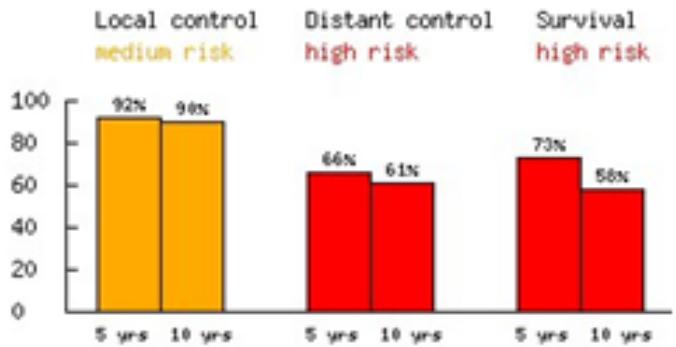
Output

The estimated probabilities for local control, distant control, overall survival for this particular rectal cancer patient are:



Output

The estimated probabilities for local control, distant control, overall survival for this particular rectal cancer patient are:



MAASTRO CLINIC

CANCER PREDICTION MODELS

Home | Lung | Rectum | Head & Neck | Links | Contact

Welcome to the MAASTRO prediction website

Last update: 13-07-2011

Response Model Input

Tumour length (2.0 - 15.0 cm):
4

$SUV_{max\text{-}pre}$ (1.0 - 25.0):
18

$SUV_{max\text{-}post}$ (1.0 - 25.0):
5

Calculate | Clear all | print

Output Response Model

The response index of SUVmax between pre- and the post-treatment scan is **72%**

The probability that the patient will have a pathological complete response after surgery is **39%**

Interpretation: If there would be a group of 100 patients with the same characteristics as this individual patient, 39 patients would have a pathological complete response after the chemoradiotherapy treatment. Due to the fact that a model can never be completely the same as the "real world", the number 39 could be lower or higher, but 39 is the most likely value.

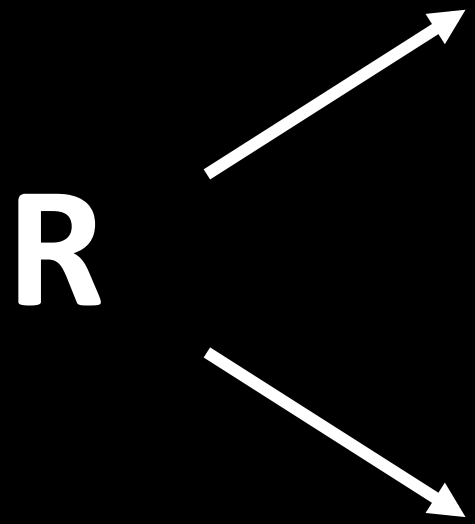
van Stiphout RG et al. R & O 2011

Modulation strategies

- **CONSENSUS & GUIDELINES**
  - multidisciplinary approach
- **NOMOGRAMS**
  - option selection from an menu
- **RESOURSES SPARING**
  - **Postoperative CHEMOTHERAPY**
  - **Follow-up:** frequencies/exams
- **RESEARCH**

Valentini V et al, in press

Conventional study design



ARM A
conventional
treatment

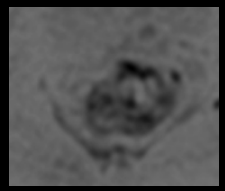
ARM B
experimental
treatment

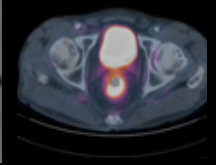
Adaptive study design

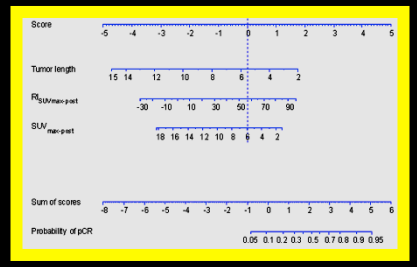
R

ARM A
RT + 1 drug

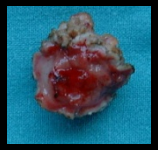
ARM B
Start with arm A



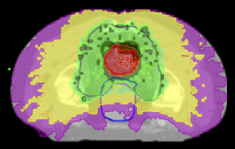




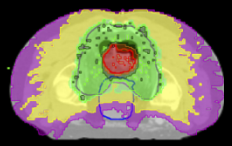
Surgery descalation



RT intesification



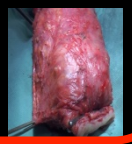
CT intesification



2 drugs

2 drugs

S



Low risk
Medium risk
High risk

RECTAL CANCER

From prescription by consensus

to prescription by numbers

DOMENICA 20 NOVEMBRE

SALA LEVANTE PONENTE

14.00 - 15.30 **WORKSHOP**

Integrazioni terapeutiche nel carcinoma gastrico

Moderatori: A. Grandinetti (Verona), S. Pergolizzi (Messina)

Stato dell'arte nel trattamento adiuvante del carcinoma gastrico:
evidenze e prospettive - **A. Morganti** (Campobasso)
La ricerca clinica nei trattamenti integrati adiuvanti - **A. De Paoli** (Aviano)
Le sedi di recidiva locale dopo trattamento chirurgico - **G.B. Doglietto** (Roma)
La definizione del target nella radioterapia adiuvante - **D. Genovesi** (Chieti)
Nuove tecnologie nell'irradiazione adiuvante: quali evidenze? - **M.F. Osti** (Roma)
La tossicità del trattamento integrato - **G.C. Mattiucci** (Roma)
Discussione

Gastric Cancer

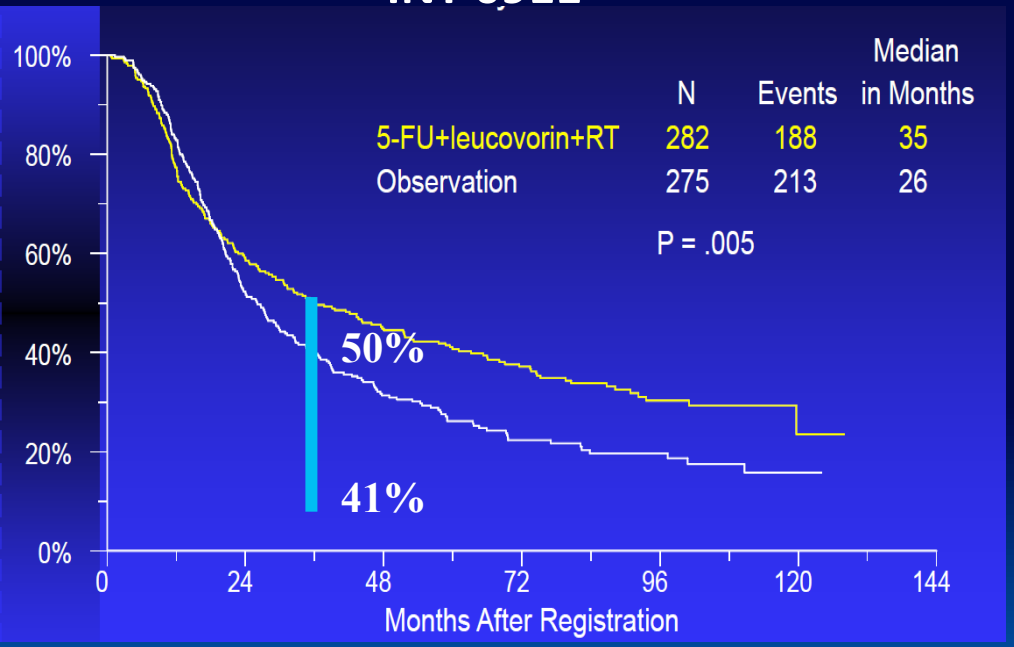
From one for all…

Survival

Post-op RTCT

S CT-RTCT-CT (5FU)

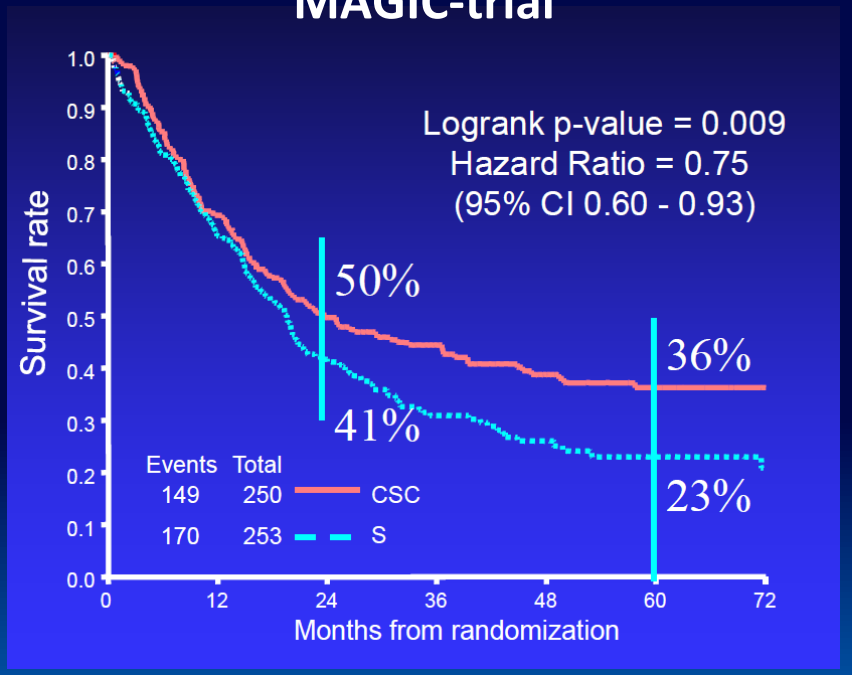
INT 0911



Peri-op RTCT

CT (ECF) - S –CT (ECF)

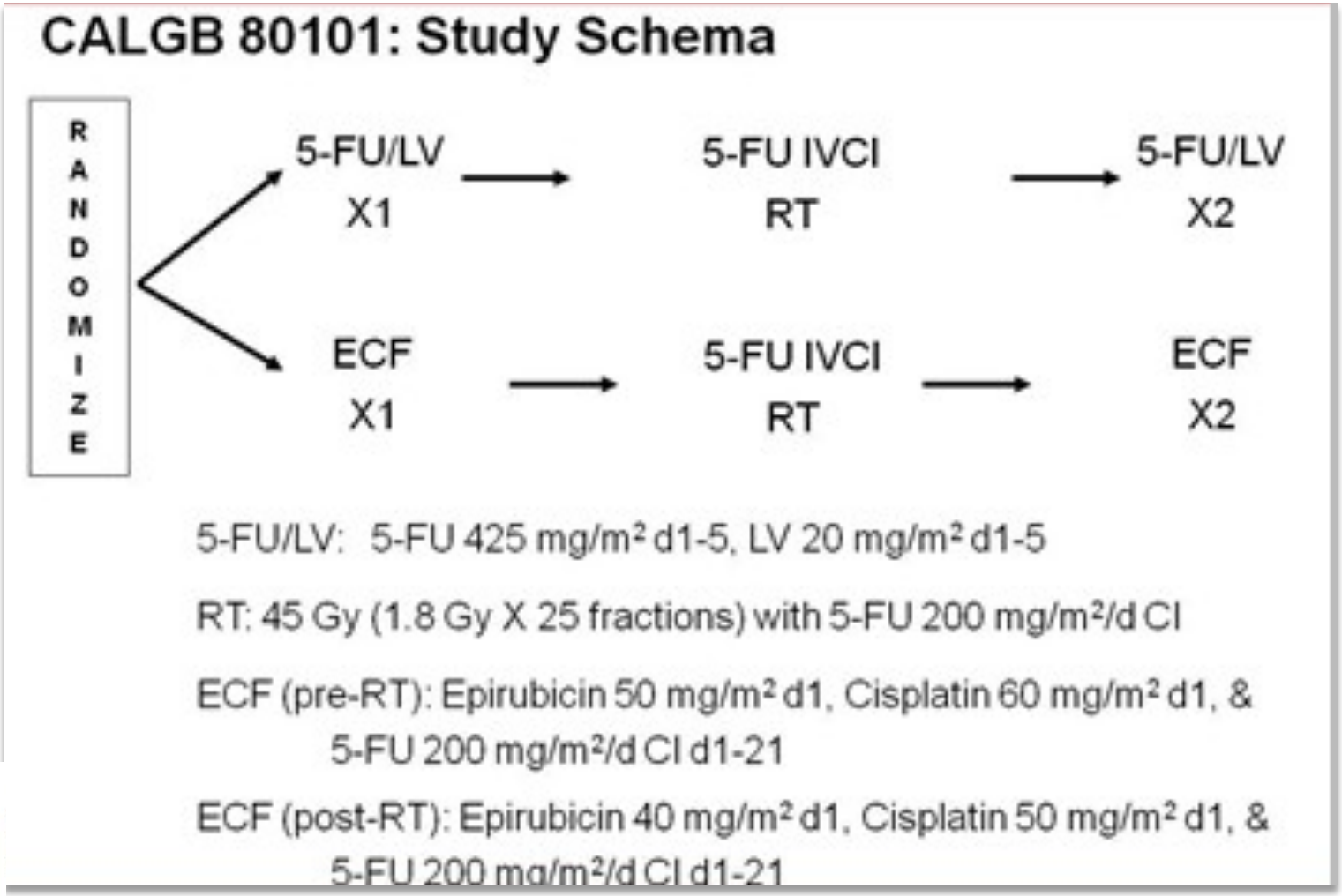
MAGIC-trial



Macdonald et al N Engl J Med 2001

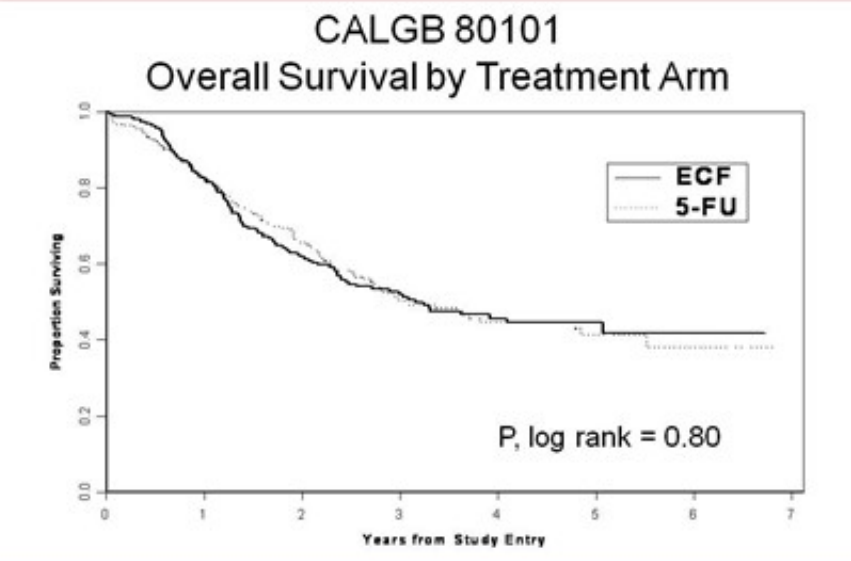
Cunningham et al N Engl J Med 2006

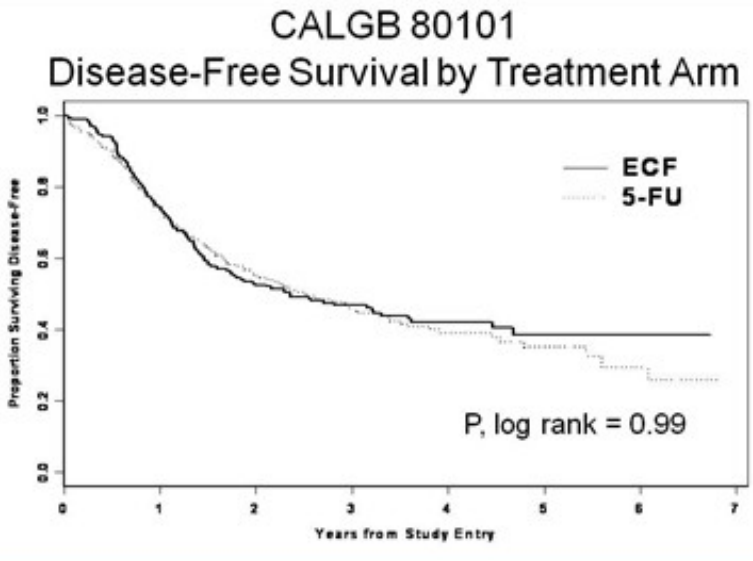
INT 0116 + MAGIC: CALGB 80101



Fuchs C, ASCO 2006

INT 0116 + MAGIC: CALGB 80101





CALGB 80101
Overall Survival by Treatment Arm

Arm	Median OS*	3-year OS	5-year OS	Hazard Ratio (95% CI)
5-FU/LV	36.6 mos	50%	41%	
ECF	37.8 mos	52%	44%	1.03 (0.80-1.34)

*P, log rank = 0.80

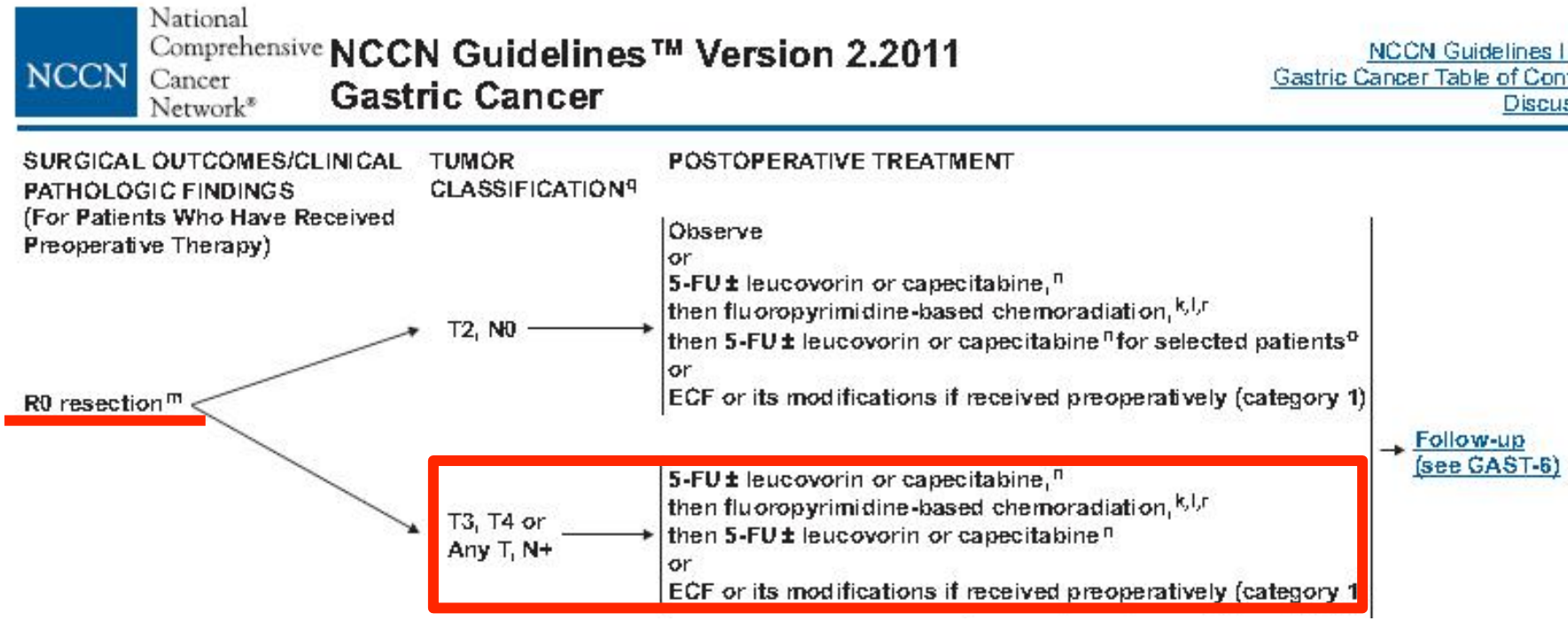
CALGB 80101
Disease-Free Survival by Treatment Arm

Arm	Median DFS	3-yr DFS	5-yr DFS	Hazard Ratio (95% CI)
5-FU/LV	30.1 mos	46%	35%	
ECF	28.2 mos*	47%	38%	1.00 (0.79-1.27)

*P, log rank = 0.99

Fuchs C, ASCO 2006

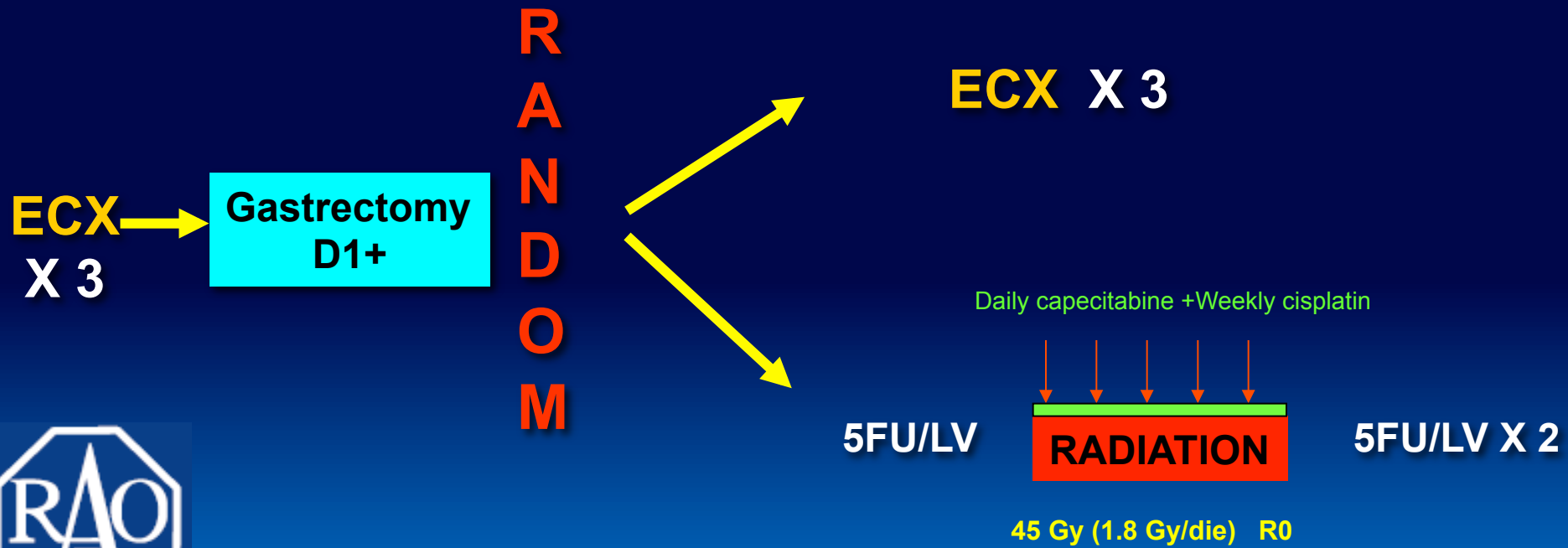
Gastric Cancer Guidelines



INT 0116 vs MAGIC : CRITICS Trial

ChemoRadiotherapy after InductionchemoTherapy In Cancer of the Stomach

788 patients;
May 2011:350 pts



Ongoing trial: ITACAS-2

Intergroup Trial in Adjuvant Chemotherapy for Adenocarcinoma of the Stomach

PERI-CT	POST-CT
PERI-CT +RT	POST-CT +RT

ITACAS-2 trial

Magic

post-CT

CRITIX
exp arm

INT 0116

Week -3 **0**

STAGING

RANDOMIZATIONS

1. Peri-operative vs. post-operative CHT

2. Post-operative RTX vs. no CHT-RTX

ARM A: Peri-operative chemotherapy

+1 (±3 days)	+10±1	+13±1	+18±1	+27±1
PERI-OPERATIVE CHT for 3 cycles	**RE-STAGING**	**SURGERY**	**PERI-OPERATIVE CHT** for 3 cycles	**FOLLOW-UP** → Follow-up ends at the occurrence of the targeted number of events

ARM B: Post-operative chemotherapy

+3±1	+8±1	+26±1
SURGERY	**POST-OPERATIVE CHT** for 6 cycles	**FOLLOW-UP** → Follow-up ends at the occurrence of the targeted number of events

TARGET POPULATION

Patients with histologically confirmed, localized, operable gastric adenocarcinoma

CHT

To be chosen among:

- **EOX:** epirubicin 50 mg/m² iv bolus day 1 every 3 weeks; oxaliplatin 130 mg/m² iv infusion in 2-3h day 1 every 3 weeks; capecitabine 625 mg/m² bid day 1 po continuously
- **ECF:** epirubicin 50 mg/m² iv bolus day 1 every 3 weeks; cisplatin 60 mg/m² iv with standard hydration day 1 every 3 weeks; fluorouracil 200 mg/m² daily by continuous infusion via central line.

CHT-RTX

RTX: 45 Gy delivered in daily fraction of 1.8 Gy
CHT: to be chosen between
- 5-FU 225 mg/m² given as a continuous iv infusion or
- capecitabine 825 mg/m² bid given as a continuous oral administration

during the entire course of RTX

ARM C: Peri-operative chemotherapy plus post-operative chemo-radiotherapy treatment

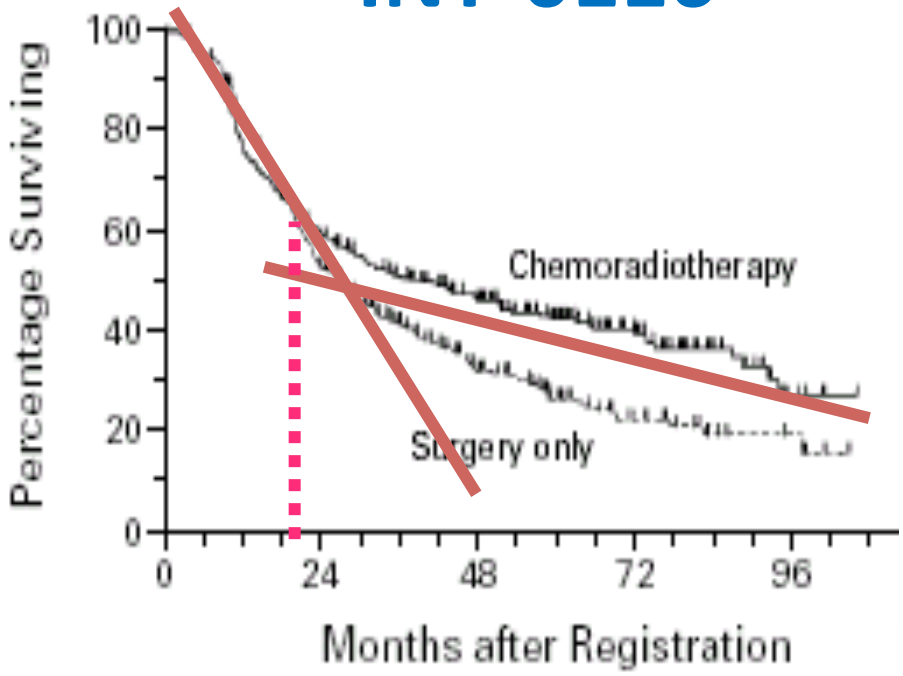
+1 (±3 days)	+10±1	+13±1	+18±1	+27±1	+33±1
PERI-OPERATIVE CHT for 3 cycles	**RE-STAGING**	**SURGERY**	**PERI-OPERATIVE CHT** for 3 cycles	**POST-OPERATIVE CHT-RTX** For 5 days per week for 6 weeks	**FOLLOW-UP** → Follow-up ends at the occurrence of the targeted number of events

ARM D: Post-operative chemotherapy plus post-operative chemo-radiotherapy treatment

+3±1	+8±1	+17±1	+23±1	+32±1
SURGERY	**POST-OPERATIVE CHT** for 3 cycles	**POST-OPERATIVE CHT-RTX** For 5 days per week for 6 weeks	**POST-OPERATIVE CHT** for up to 3 cycles	**FOLLOW-UP** → Follow-up ends at the occurrence of the targeted number of events

"L-SHAPE"

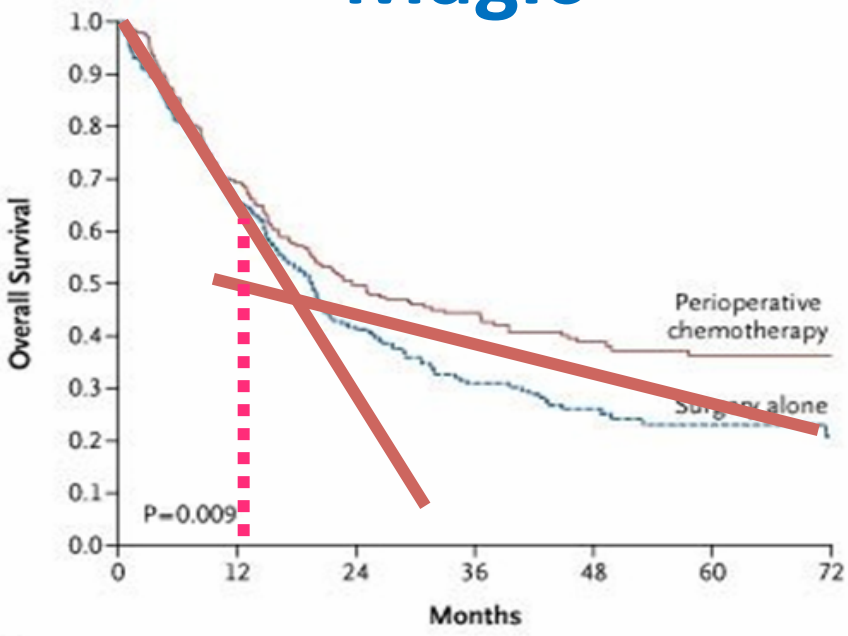
INT-0116



D2 = 10%

Macdonald et al N Engl J Med 2001

Magic



D2 = 41%

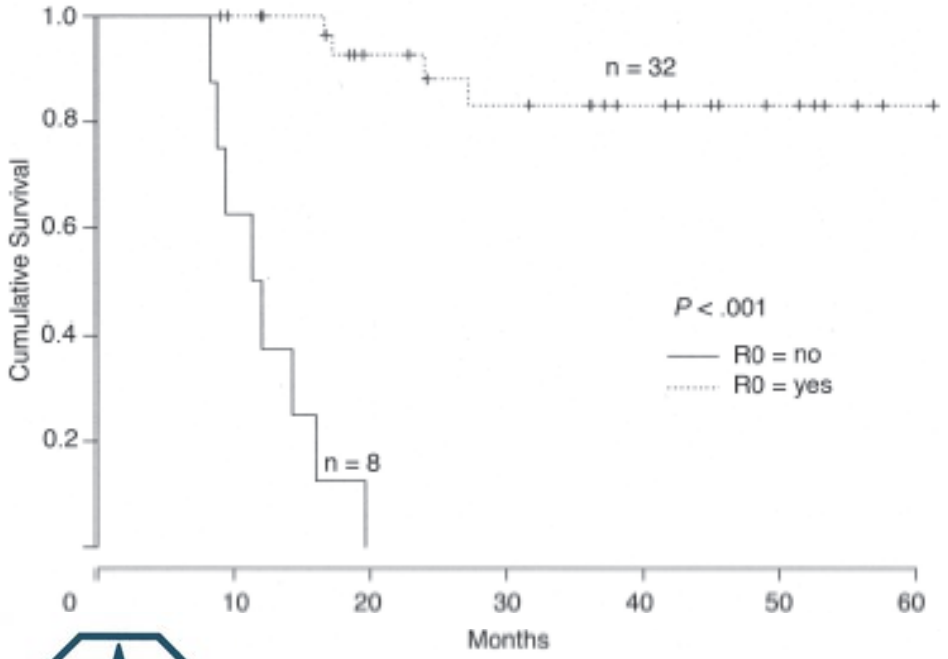
Cunningham et al N Engl J Med 2006

By courtesy of V. Valentini

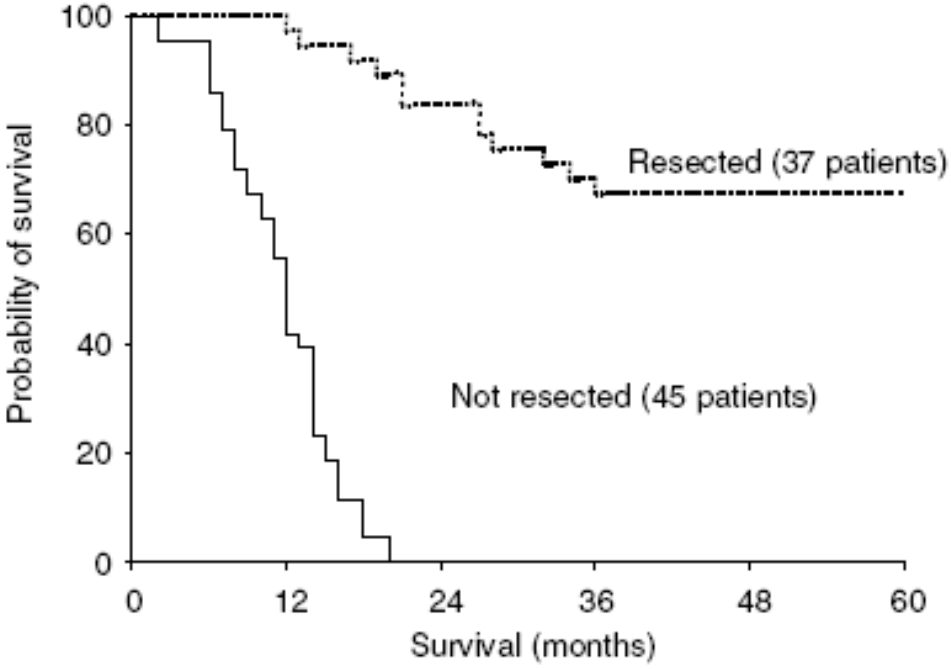
Primary Chemo±RT

Neoadjuvant

RT+Chemo



Chemo



Cascinu S et al, BJC 2004

Ajani JA et al, JCO 2005

Neoadjuv. Chemo +/-RT

The risk of tumour progressions

	MDACC	Magic trial
PD @surgery not resected	9/41 **(22%)**	37/209 **(18%)**

Ajani JA et al , JCO 2005
Cunningham et al, NEJM 2006

Adaptive therapy: NEOX-RT

uT3-4,N0 or any uT,N+M0 (LPS) potentially resectable

Induction chemotherapy

EOX x 3 cycles (q 3weeks)
for 9 weeks

Patients with **early metabolic disease progression** (CT-PET) will undergo to immediate surgery

Responding pts
CT-PET evaluation after 2 cycles EOX
Objective Response (Endoscopy/EUS) after 9 weeks

Chemoradiotherapy

RT 45 Gy
+ Oxaliplatin-Xeloda
for 5 weeks

Restaging
CT-PET
CT abdomen and chest
Objective Response (Endoscopy/EUS) after 4 weeks from CT-RT

Surgery
Week 22

SURGERY +/- IORT
4-6 weeks after chemoradiotherapy

Path Response Rate
R0 Resection Rate
Treat Compliance

Gastric Cancer

From one for all…

to one for group

Pancreatic Cancer

VOLUME 29 · NUMBER 22 · AUGUST 1 2011

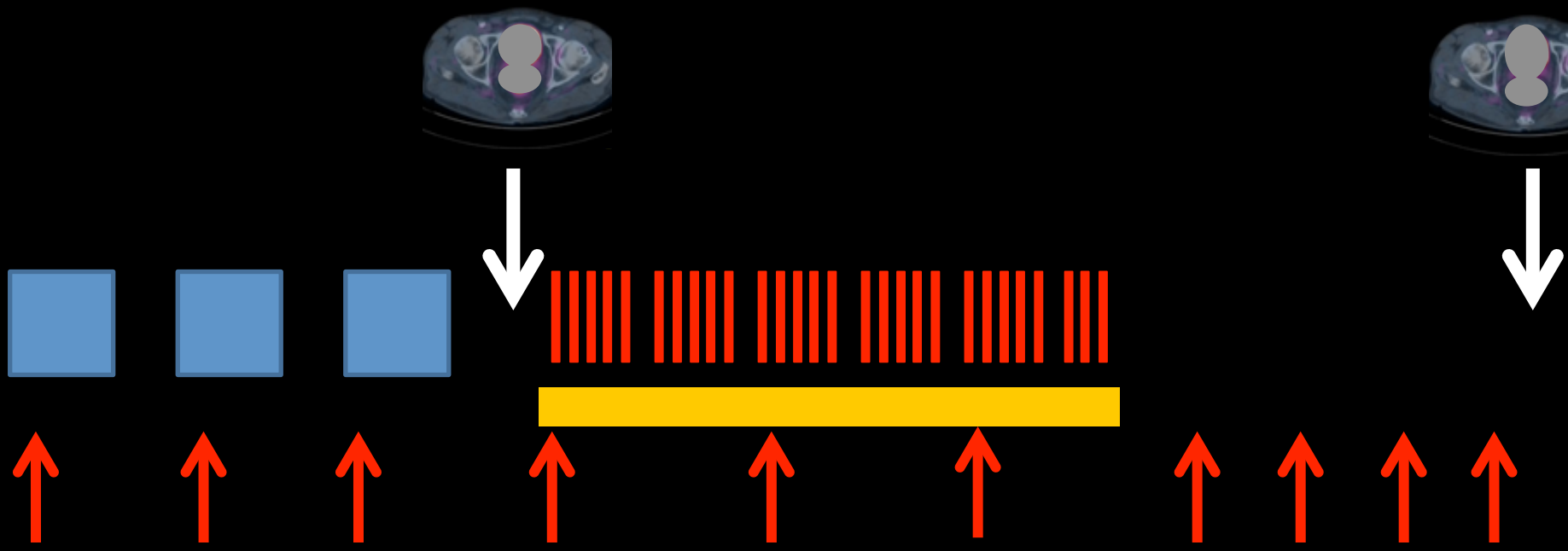
JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Phase II Trial of Cetuximab, Gemcitabine, and Oxaliplatin Followed by Chemoradiation With Cetuximab for Locally Advanced (T4) Pancreatic Adenocarcinoma: Correlation of *Smad4(Dpc4)* Immunostaining With Pattern of Disease Progression

Christopher H. Crane, Gauri R. Varadhachary, John S. Yordy, Gregg A. Staerkel, Milind M. Javle, Howard Safran, Waqar Haque, Bridgett D. Hobbs, Sunil Krishnan, Jason B. Fleming, Prajnan Das, Jeffrey E. Lee, James L. Abbruzzese, and Robert A. Wolff

Unresectable pancreatic cancer



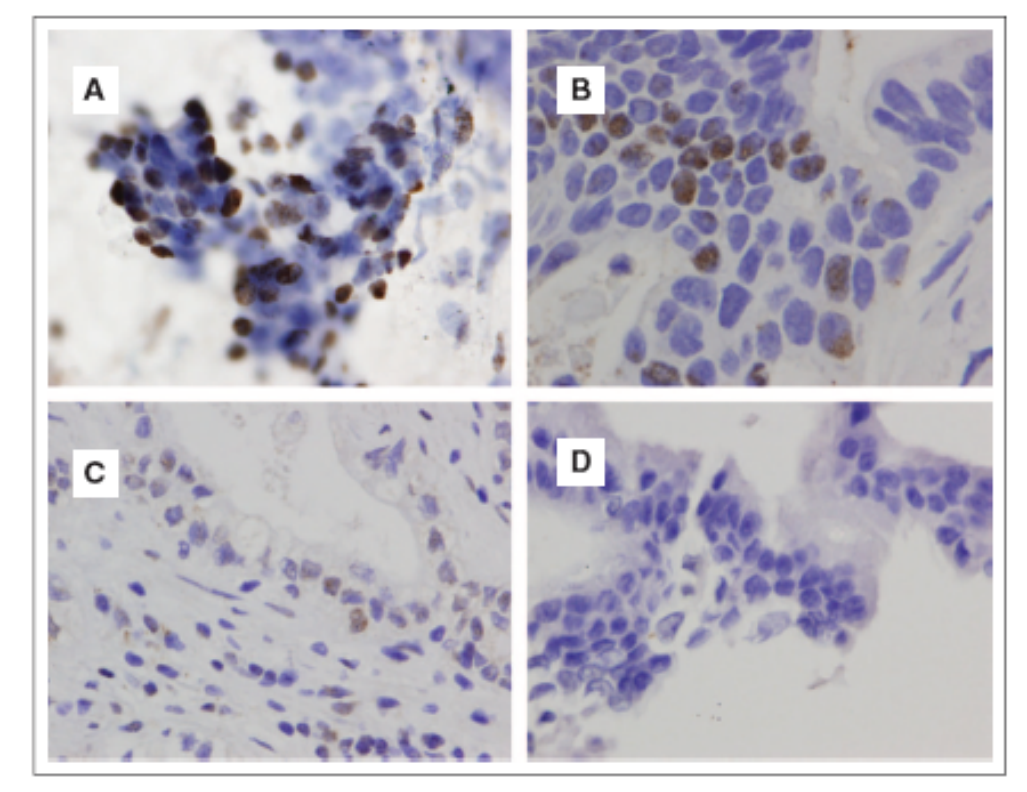
3 cycles Oxa-Gem - Cet

RT 50.4 Gy + cape+ cet

cetuximab

Crane CH et al, JCO 2001

Smad4(Dpc4)



tumor suppressor gene

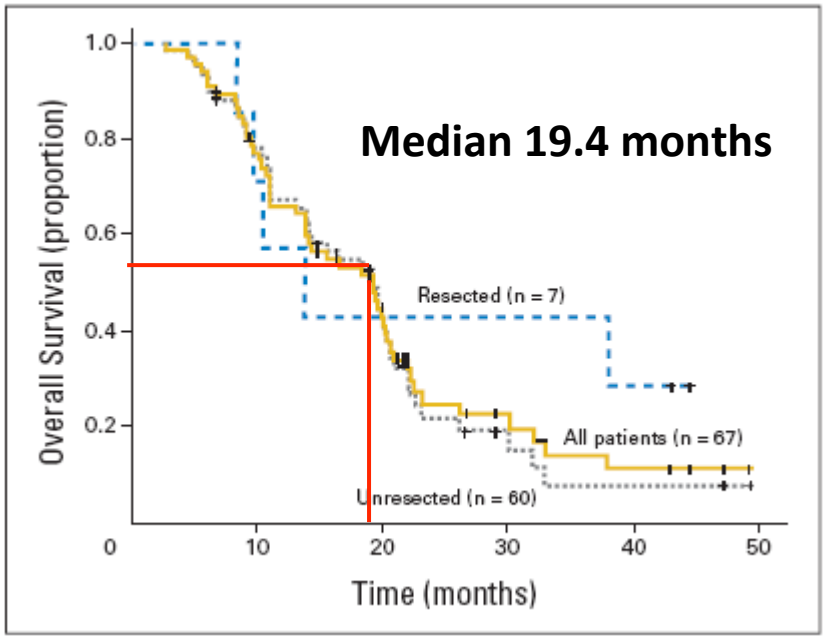
inactivated in 53%

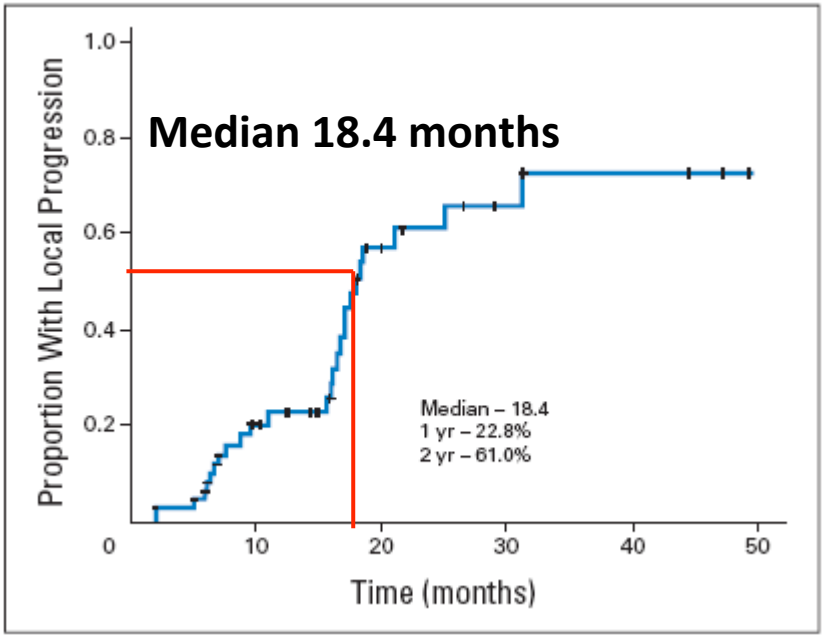
prognosis

pattern of disease spread

Crane CH et al, JCO 2001

Unresectable pancreatic cancer



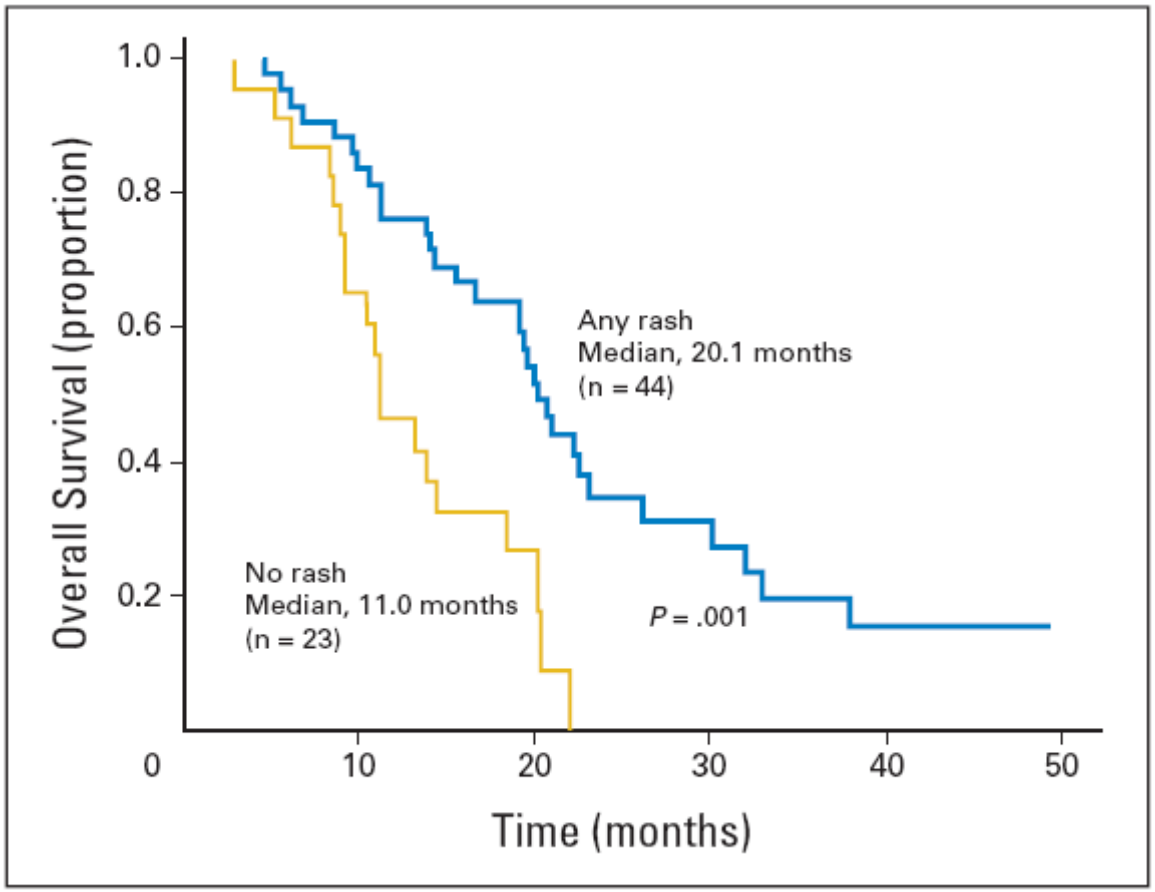


Local control and improve d survival

Cetuximab as radiosensitizer ?!

Crane CH et al, JCO 2001

Unresectable pancreatic cancer

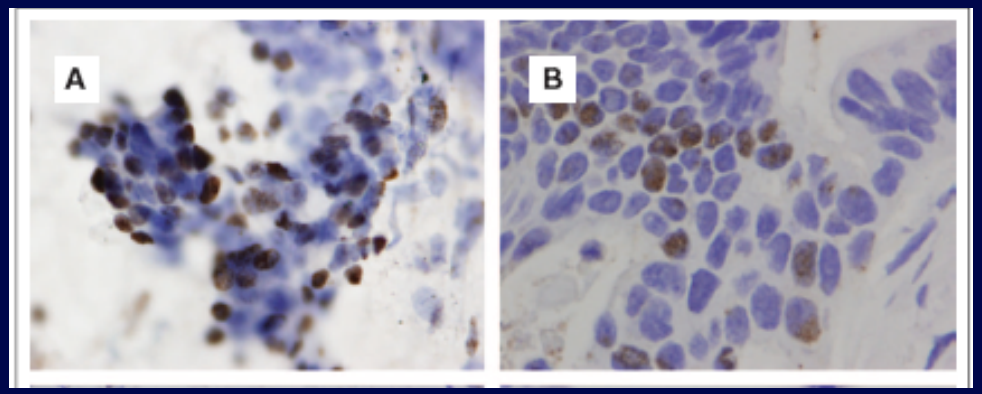


Crane CH et al, JCO 2001

Smad4(Dpc4) and progression

41 pts

Active Smad4 (Dpc4)

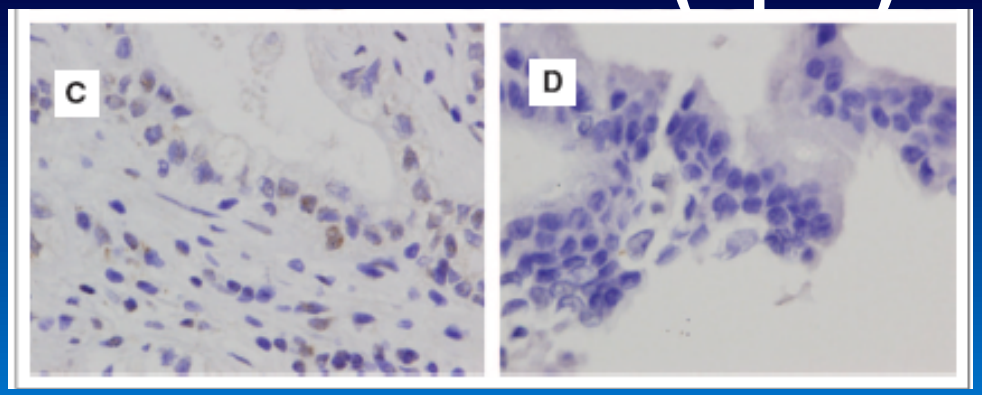


11/15 pts

73.3% LOCAL

p = 0.016

Inactive Smad4 (Dpc4)



10/14 pts

71.4% DISTANT

Crane CH et al, JCO 2001

Pancreatic Cancer

RADIATION

ONCOLOGIST

Zietman A., Radiat Oncol 2007

Pancreatic Cancer

RADIATION ONCOLOGIST

Zietman A., Radiat Oncol 2007

XXI CONGRESSO NAZIONALE AIRO

Genova, 19-22 novembre 2011
Porto Antico di Genova
Centro Congressi

Associazione Italiana Radioterapia Oncologica

- **Rectal cancer:**
  - Dose and response
  - Survival
  - Prescription by number
- **Gastric cancer:**
  - …to one for one
- **Pancreatic cancer:**
  - Room for advancement