
**Thank you for joining us.
The program will commence momentarily.**

Recent Advances in Medical Oncology: Targeted Therapy for Lung Cancer

Wednesday, July 15, 2020

5:00 PM – 6:30 PM ET

Faculty

Alexander E Drilon, MD

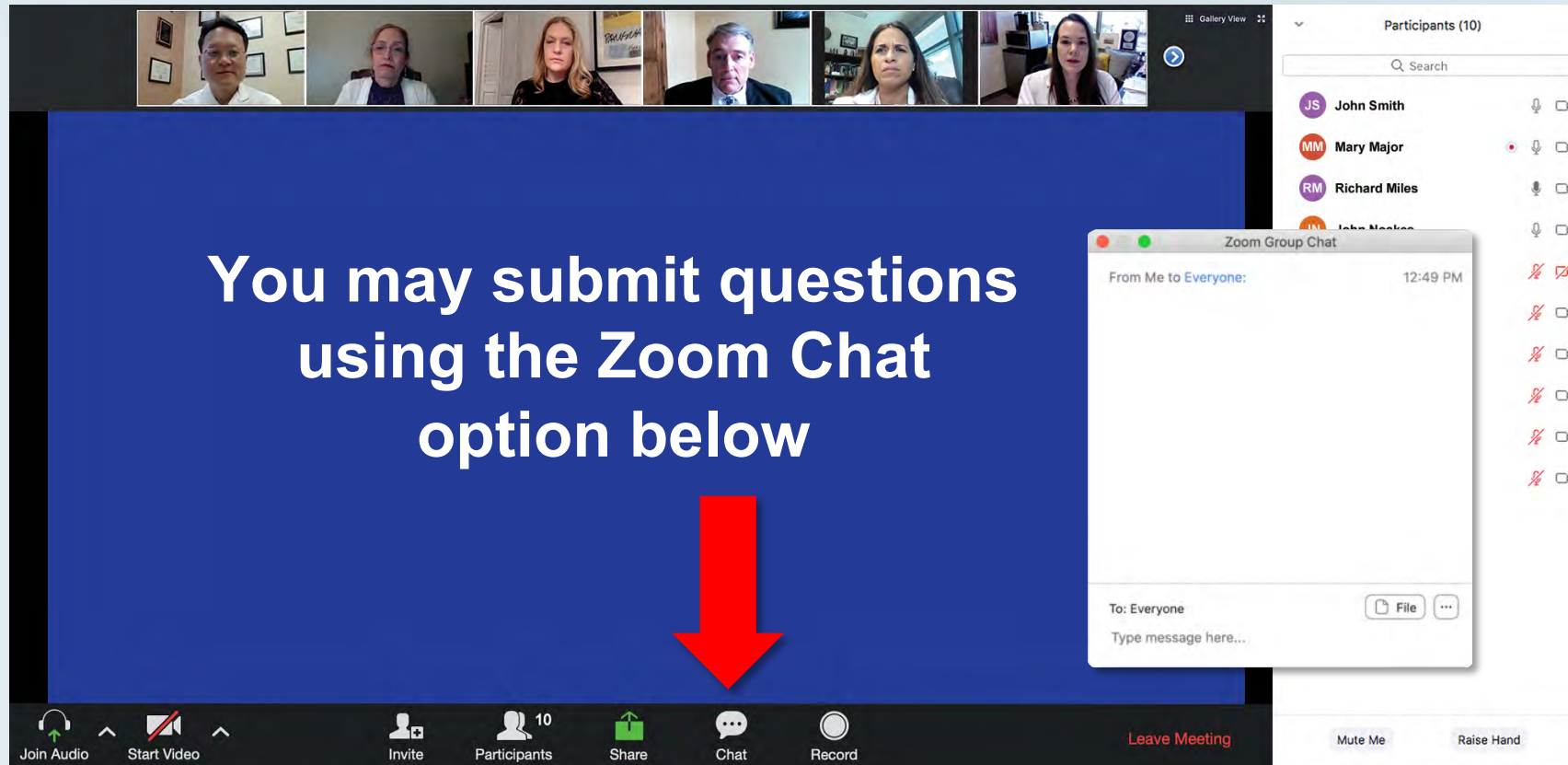
Professor Solange Peters, MD, PhD

Suresh S Ramalingam, MD

Moderator

Neil Love, MD

Dr Love and Faculty Encourage You to Ask Questions



The screenshot displays a Zoom meeting interface. At the top, a gallery view shows six participants. The main area features a blue presentation slide with the text: "You may submit questions using the Zoom Chat option below". A large red arrow points from this text to the "Chat" icon in the bottom toolbar. On the right side, the "Participants (10)" list is visible, showing names like John Smith, Mary Major, and Richard Miles. Below the participants list, a "Zoom Group Chat" window is open, showing a message from "Me to Everyone" at 12:49 PM. The bottom toolbar includes icons for "Join Audio", "Start Video", "Invite", "Participants" (showing 10), "Share", "Chat", and "Record". A "Leave Meeting" button is also present.

Feel free to submit questions **now before** the program commences and **throughout the program**.

Familiarizing yourself with the Zoom interface

How to answer poll questions

The screenshot displays a Zoom meeting interface. At the top, a gallery view shows six participants. The main screen displays a poll question: "What is your usual treatment recommendation for a patient with MM who has been followed by ASCT for 1-2 years who then experiences an asplenic relapse?". Below the question is a "Quick Poll" form with a list of treatment options. A "Submit" button is visible at the bottom of the form. To the right, a "Participants (10)" list shows the names of the participants, each with a status icon (microphone and video). The bottom toolbar includes icons for "Join Audio", "Start Video", "Invite", "Participants" (showing 10), "Share", "Chat", "Record", and "Leave Meeting".

Quick Poll

What is your usual treatment recommendation for a patient with MM who has been followed by ASCT for 1-2 years who then experiences an asplenic relapse?

1. Carfilzomib +/- dexamethasone
2. Pomalidomide +/- dexamethasone
3. Carfilzomib + pomalidomide +/- dexamethasone
4. Elotuzumab + pomalidomide +/- dexamethasone
5. Elotuzumab + daratumumab +/- dexamethasone
6. Daratumumab + pomalidomide +/- dexamethasone
7. Daratumumab + bortezomib +/- dexamethasone
8. Daratumumab + pomalidomide +/- dexamethasone
9. Ixazomib + Rd
10. Other

Submit

Participants (10)

Name	Microphone	Video
JS John Smith	On	On
MM Mary Major	On	On
RM Richard Miles	On	On
JN John Noakes	On	On
AS Alice Suarez	Off	Off
JP Jane Perez	Off	Off
RS Robert Stiles	Off	Off
JF Juan Fernandez	Off	Off
AK Ashok Kumar	Off	Off
JS Jeremy Smith	Off	Off

Co-provided by USF Health Research To Practice®

When a poll question pops up, click your answer choice from the available options. Results will be shown after everyone has answered.

Commercial Support

This activity is supported by education grants from AstraZeneca Pharmaceuticals LP, Bayer HealthCare Pharmaceuticals, Blueprint Medicines, Genentech, a member of the Roche Group, Jazz Pharmaceuticals Inc, Lilly and Merck.

Dr Love — Disclosures

Dr Love is president and CEO of Research To Practice. Research To Practice receives funds in the form of educational grants to develop CME activities from the following commercial interests: AbbVie Inc, Acerta Pharma — A member of the AstraZeneca Group, Adaptive Biotechnologies, Agendia Inc, Agios Pharmaceuticals Inc, Amgen Inc, Array BioPharma Inc, a subsidiary of Pfizer Inc, Astellas, AstraZeneca Pharmaceuticals LP, Bayer HealthCare Pharmaceuticals, Biodesix Inc, bioTheranostics Inc, Blueprint Medicines, Boehringer Ingelheim Pharmaceuticals Inc, Boston Biomedical Inc, Bristol-Myers Squibb Company, Celgene Corporation, Clovis Oncology, Daiichi Sankyo Inc, Dendreon Pharmaceuticals Inc, Eisai Inc, EMD Serono Inc, Exelixis Inc, Foundation Medicine, Genentech, a member of the Roche Group, Genmab, Genomic Health Inc, Gilead Sciences Inc, GlaxoSmithKline, Grail Inc, Guardant Health, Halozyme Inc, Helsinn Healthcare SA, ImmunoGen Inc, Incyte Corporation, Infinity Pharmaceuticals Inc, Ipsen Biopharmaceuticals Inc, Janssen Biotech Inc, administered by Janssen Scientific Affairs LLC, Jazz Pharmaceuticals Inc, Kite, A Gilead Company, Lexicon Pharmaceuticals Inc, Lilly, Loxo Oncology Inc, a wholly owned subsidiary of Eli Lilly & Company, Merck, Merrimack Pharmaceuticals Inc, Myriad Genetic Laboratories Inc, Natera Inc, Novartis, Oncopeptides, Pfizer Inc, Pharmacyclics LLC, an AbbVie Company, Prometheus Laboratories Inc, Puma Biotechnology Inc, Regeneron Pharmaceuticals Inc, Sandoz Inc, a Novartis Division, Sanofi Genzyme, Seattle Genetics, Sirtex Medical Ltd, Spectrum Pharmaceuticals Inc, Taiho Oncology Inc, Takeda Oncology, Tesaro, A GSK Company, Teva Oncology, Tokai Pharmaceuticals Inc, Tolero Pharmaceuticals and Verastem Inc.

RESEARCH TO PRACTICE CME PLANNING COMMITTEE MEMBERS, STAFF AND REVIEWERS

Planners, scientific staff and independent reviewers for Research To Practice have no relevant conflicts of interest to disclose.

Dr Drilon — Disclosures

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Food and Beverage	Merck, Puma Biotechnology Inc
Royalties	Wolters Kluwer
Other	Boehringer Ingelheim Pharmaceuticals Inc, Merus BV

Prof Peters — Disclosures

Advisory Committee and Consulting Agreements	AbbVie Inc, Amgen Inc, AstraZeneca Pharmaceuticals LP, Bayer HealthCare Pharmaceuticals, Biocartis, BioInvent International AB, Blueprint Medicines, Boehringer Ingelheim Pharmaceuticals Inc, Bristol-Myers Squibb Company, Clovis Oncology, Daiichi Sankyo Inc, Debiopharm Group, F Hoffmann-La Roche Ltd, Foundation Medicine, Illumina Inc, Janssen Biotech Inc, Lilly, Merck Serono, Merck Sharp & Dohme Corp, Merrimack Pharmaceuticals Inc, Novartis, Pfizer Inc, PharmaMar, Regeneron Pharmaceuticals Inc, Sanofi Genzyme, Seattle Genetics, Takeda Oncology
Contracted Research	Amgen Inc, AstraZeneca Pharmaceuticals LP, Bristol-Myers Squibb Company, F Hoffmann-La Roche Ltd, Illumina Inc, Merck Serono, Merck Sharp & Dohme Corp, Novartis, Pfizer Inc
Data and Safety Monitoring Board/Committee	Academic trials

Dr Ramalingam — Disclosures

Consulting Agreements	AbbVie Inc, Amgen Inc, AstraZeneca Pharmaceuticals LP, Bristol-Myers Squibb Company, Genentech, a member of the Roche Group, Merck, Takeda Oncology
Contracted Research	Advaxis Inc, Amgen Inc, AstraZeneca Pharmaceuticals LP, Bristol-Myers Squibb Company, Merck, Takeda Oncology, Tesaro, A GSK Company

Upcoming Live Webinars

**Thursday, July 16, 2020
8:00 AM – 9:00 AM ET**

**Clinical Investigator
Perspectives on
the Current and Future
Management of Multiple
Myeloma**

Faculty

Sagar Lonial, MD

Moderator

Neil Love, MD

**Monday, July 20, 2020
5:00 PM – 6:00 PM ET**

**Recent Advances in Medical
Oncology: Triple-Negative Breast
Cancer**

Faculty

Joyce O'Shaughnessy, MD

Hope S Rugo, MD

Moderator

Neil Love, MD

Upcoming Live Webinars

**Tuesday, July 21, 2020
12:00 PM – 1:00 PM ET**

MEET THE PROFESSORS
Clinical Investigators Discuss
Existing and Emerging Treatment
Strategies for Patients with Ovarian,
Cervical and Endometrial Cancer

Faculty

Joyce F Liu, MD, MPH
David M O'Malley, MD

Moderator

Neil Love, MD

**Wednesday, July 22, 2020
5:00 PM – 6:00 PM ET**

Recent Advances in Medical
Oncology: Melanoma

Faculty

Michael B Atkins, MD
Professor Georgina Long, BSc, PhD, MBBS
Jason J Luke, MD

Moderator

Neil Love, MD

Upcoming Live Webinars

**Thursday, July 23, 2020
12:00 PM – 1:00 PM ET**

**MEET THE PROFESSOR
Current Questions and
Controversies in the
Management of Lung Cancer**

Faculty

Joel W Neal, MD, PhD

Moderator

Neil Love, MD

ONCOLOGY TODAY

WITH DR NEIL LOVE



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Faculty



Alexander E Drilon, MD

Chief, Early Drug Development Service
Associate Attending Physician
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Memorial Sloan Kettering Cancer Center
New York, New York



Suresh S Ramalingam, MD

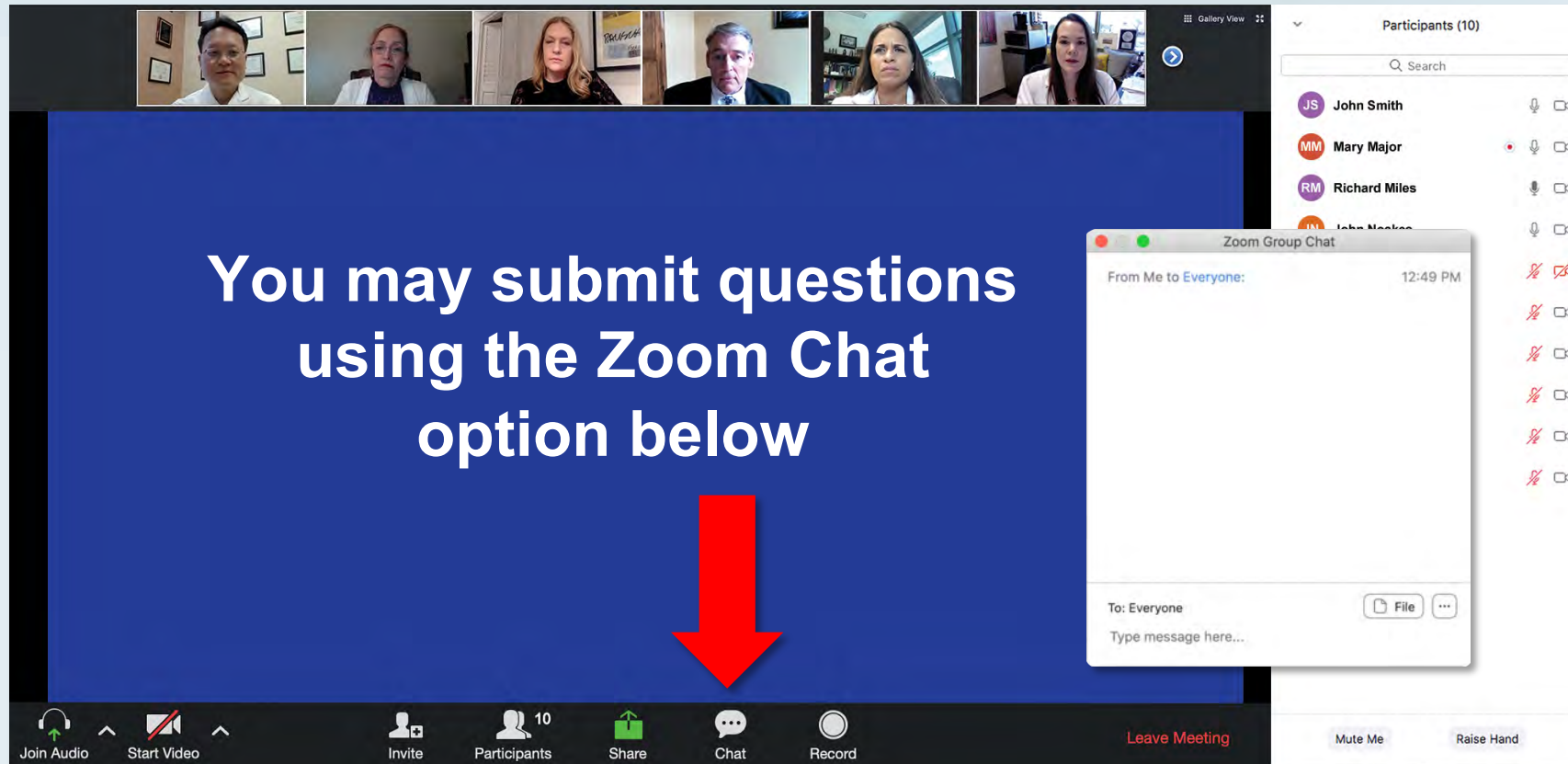
Professor of Hematology and Medical Oncology
Roberto C Goizueta Chair for Cancer Research
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Emory University School of Medicine
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Professor Solange Peters, MD, PhD

Head, Medical Oncology
Chair, Thoracic Malignancies
Oncology Department
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Lausanne, Switzerland

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ONCOLOGY TODAY

WITH DR NEIL LOVE



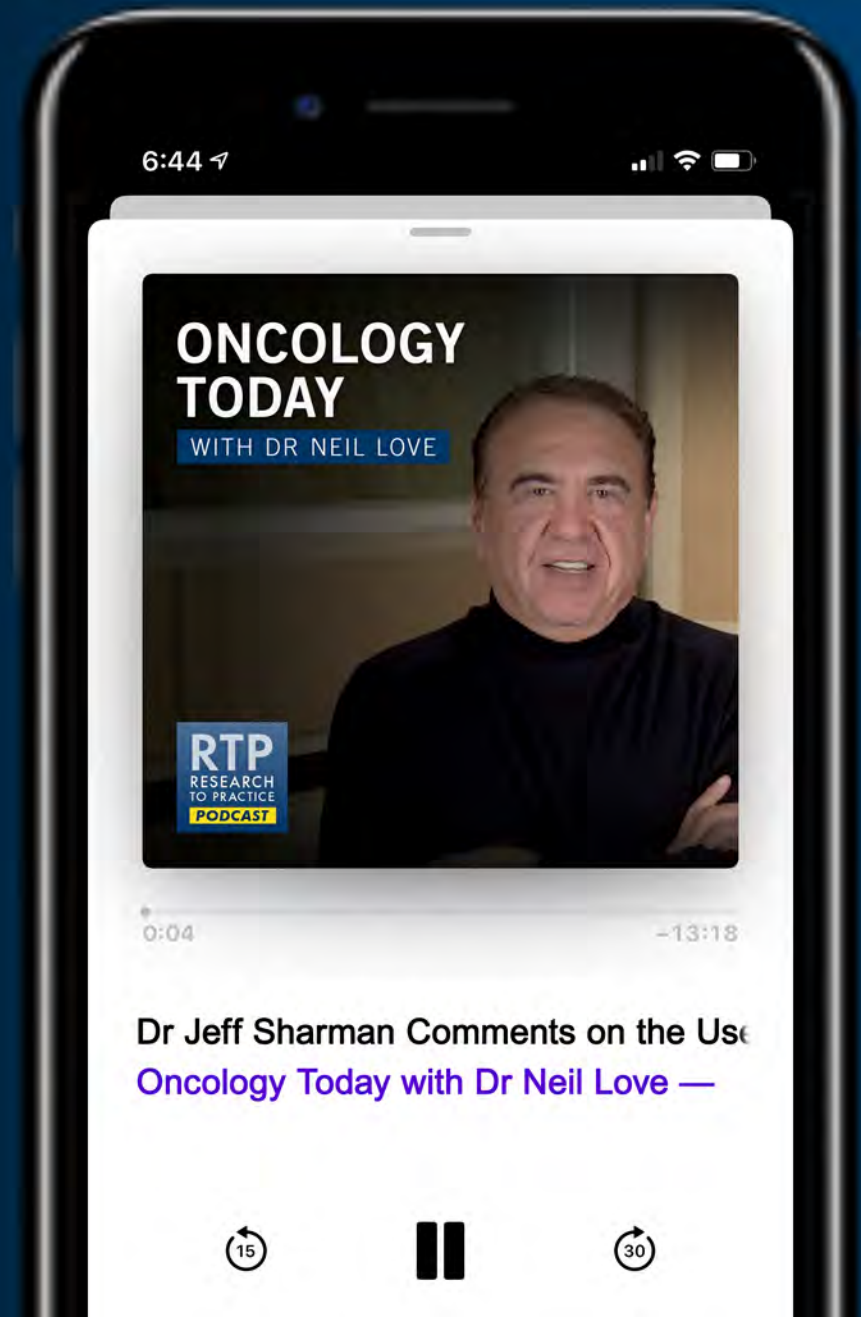
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Clinical Investigator Perspectives on the Current and Future Management of Multiple Myeloma

A Meet The Professor Series

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Sagar Lonial, MD

Chair and Professor

Department of Hematology and Medical Oncology

Anne and Bernard Gray Family Chair in Cancer

Chief Medical Officer

Winship Cancer Institute

Emory University School of Medicine

Atlanta, Georgia

Co-provided by **USFHealth**



Recent Advances in Medical Oncology: Triple-Negative Breast Cancer

**Monday, July 20, 2020
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**Joyce O'Shaughnessy, MD
Hope S Rugo, MD**

Moderator

Neil Love, MD

Meet The Professors

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About the Enduring Program

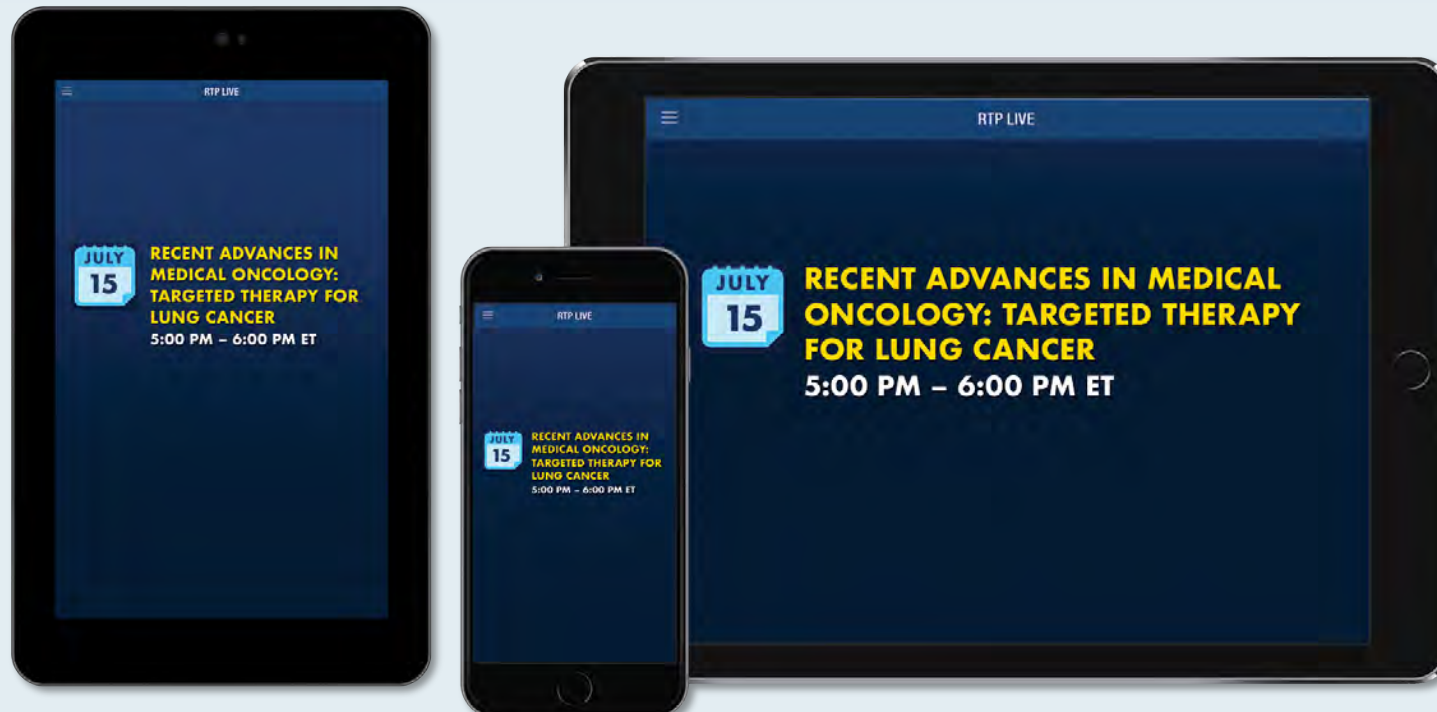
- This webinar is being video and audio recorded.
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An email will be sent to all attendees when the activity is available.
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Suresh S Ramalingam, MD

Moderator

Neil Love, MD

Consulting Investigators



Matthew Gubens, MD, MS

Associate Professor, Thoracic Medical Oncology
University of California, San Francisco
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Nasser H Hanna, MD

Professor of Medicine
Tom and Julie Wood Family Foundation
Professor of Lung Cancer Clinical Research
Indiana University
Indianapolis, Indiana



Corey J Langer, MD

Director of Thoracic Oncology
Abramson Cancer Center
Professor of Medicine
Perelman School of Medicine
University of Pennsylvania
Philadelphia, Pennsylvania

Agenda

MODULE 1: EGFR Mutation-Positive NSCLC

MODULE 2: NSCLC with ALK Rearrangements

MODULE 3: RET Fusion-Positive Disease

MODULE 4: Targeting MET in MET Exon 14-Altered Disease

MODULE 5: HER2-Mutant NSCLC

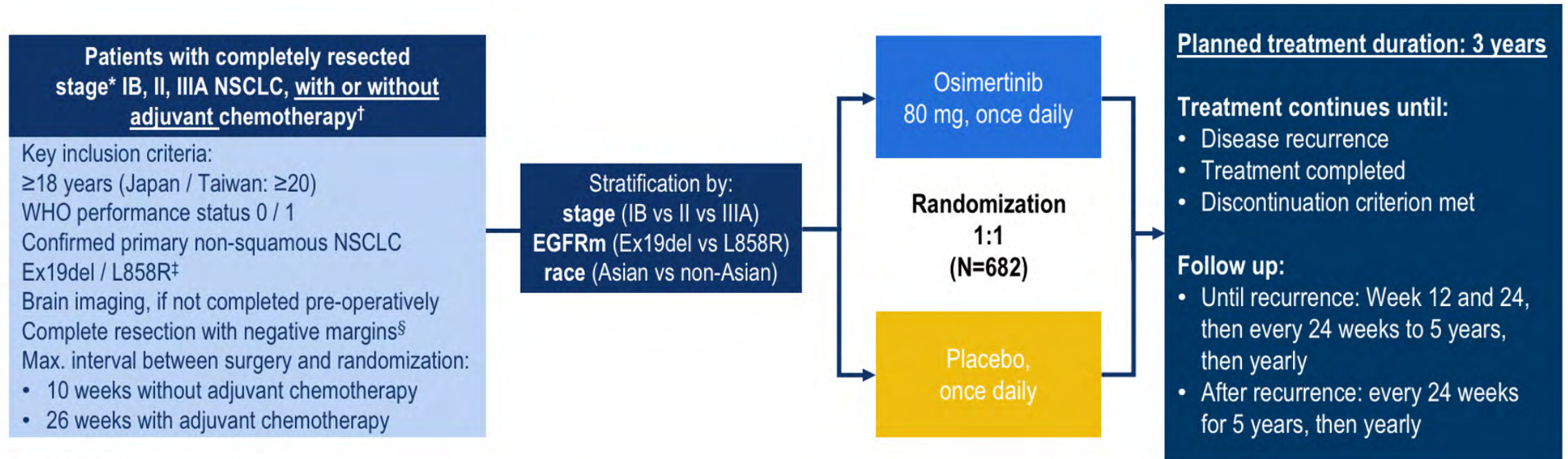
MODULE 6: NSCLC with ROS1 Rearrangements

MODULE 7: Other Targetable Genetic Abnormalities

MODULE 1: Management of EGFR Mutation-Positive NSCLC

- **Key Relevant Data Sets**
- **Questions and Cases from Investigators**
- **Faculty Cases – Dr Ramalingam**
 - 71-year-old woman with metastatic adenocarcinoma of the lung and an EGFR L858R mutation
 - 62-year-old man with metastatic adenocarcinoma of the lung and an EGFR Exon 20 insertion mutation

ADAURA: Design

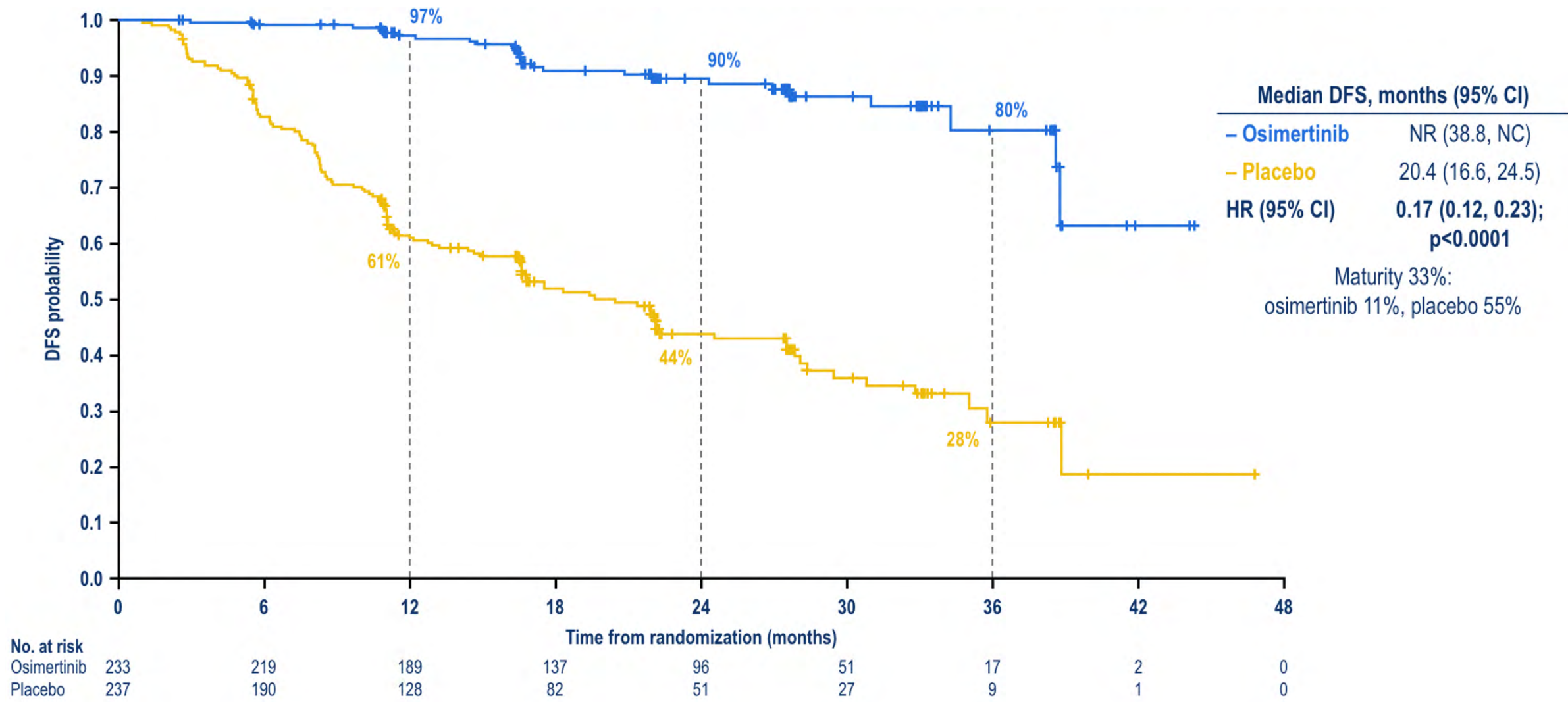


Endpoints

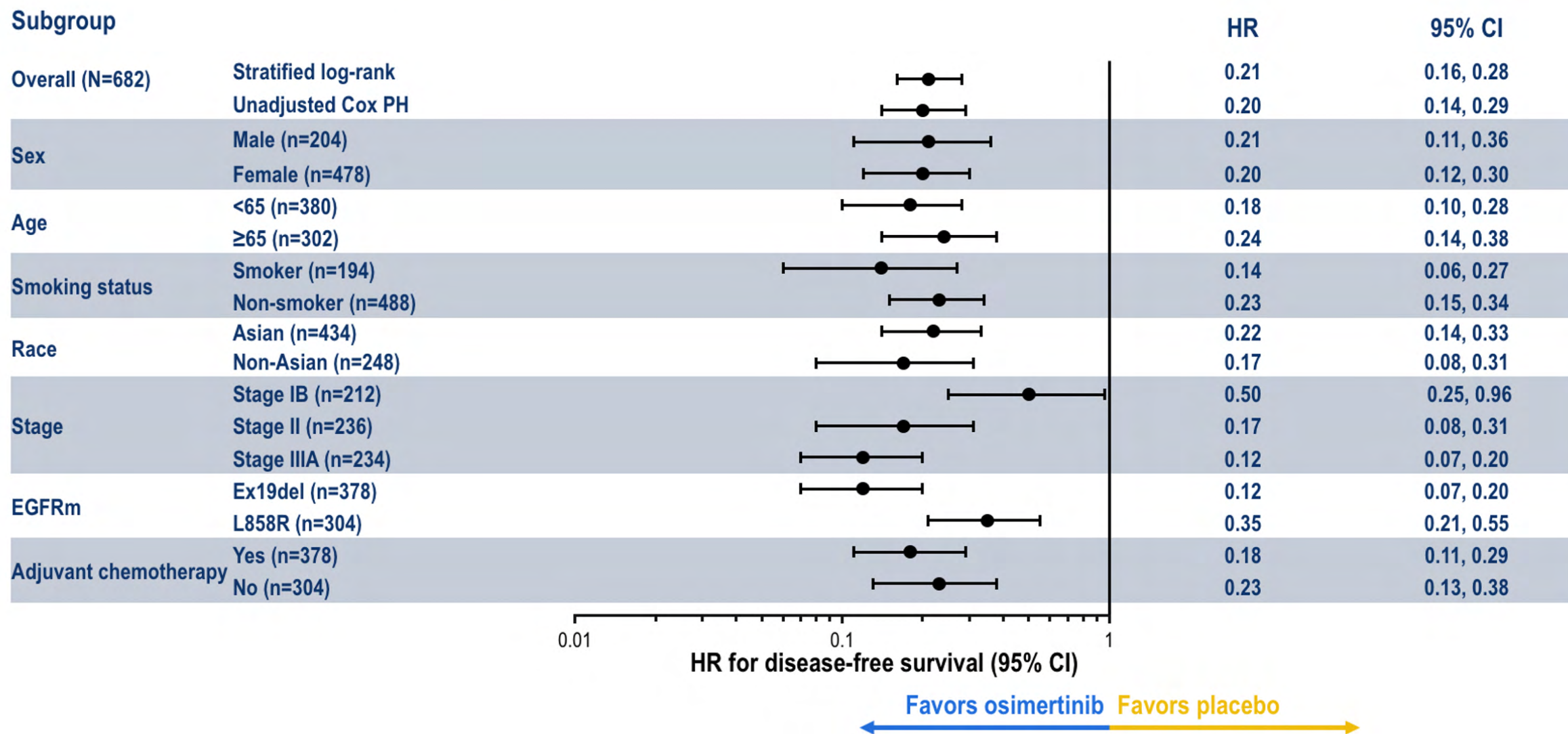
- **Primary:** DFS, by investigator assessment, in stage II/IIIA patients; designed for superiority under the assumed DFS HR of 0.70
- **Secondary:** DFS in the overall population¶, DFS at 2, 3, 4, and 5 years, OS, safety, health-related quality of life

- **Following IDMC recommendation, the study was unblinded early due to efficacy; here we report an unplanned interim analysis**
- **At the time of unblinding the study had completed enrollment and all patients were followed up for at least 1 year**

ADAURA Primary endpoint: DFS in patients with stage II/IIIA disease



ADAURA DFS across subgroups in the overall population



RELAY: Study Design^{1,2}

Key inclusion criteria

- Stage IV NSCLC
- *EGFR* mutation-positive (Ex19del or Ex 21 L858R)
- ECOG PS 0-1

Key exclusion criteria

- Known *EGFR* T790M mutation
- Prior treatment with *EGFR* TKI or chemotherapy
- Brain metastases

Phase 3^a
N=449

R
A
N
D
O
M
I
Z
E
1:1

Ramucirumab 10 mg/kg Q2W
+
Erlotinib 150 mg/day

Placebo Q2W
+
Erlotinib 150 mg/day

Treatment until
progression or
unacceptable
toxicity

Primary end point:
Progression-Free
Survival

Stratification factors

- ♦ *EGFR* status (exon 19 deletion vs. exon 21 L858R)
- ♦ Sex
- ♦ Region (East Asia vs. other)
- ♦ *EGFR* testing method (therascreen®/cobas® vs. other)

^aPhase 3 enrollment began after confirmation of dose and schedule in Phase 1b²

1. Garon EB et al. *Clin Lung Cancer* 2017; 2. Reck M et al. *Clin Lung Cancer* 2018

Clinicaltrials.gov NCT02411448

PRESENTED AT: **2019 ASCO**
ANNUAL MEETING

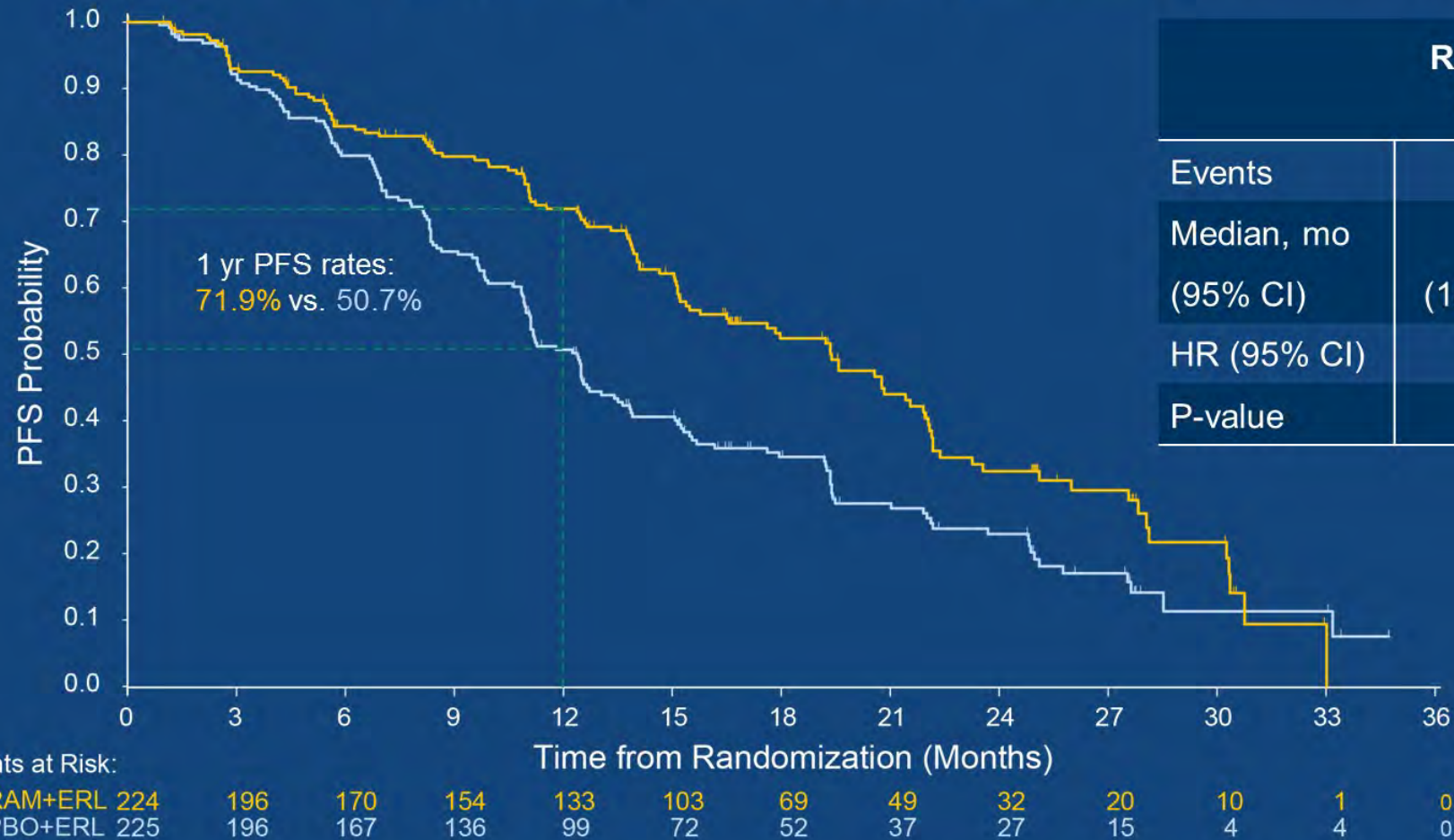
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PRESENTED BY: Prof. Kazuhiko Nakagawa, MD, PhD
Kindai University Faculty of Medicine, Osaka, Japan

Courtesy of Suresh Ramalingam, MD

Winship Cancer Institute | Emory University

RELAY Primary Endpoint: PFS (Investigator-Assessed)



Consistent PFS benefit by independent, blinded central review (HR 0.671, 95% CI 0.518 – 0.869; p=0.0022)

PRESENTED AT: **2019 ASCO**
ANNUAL MEETING

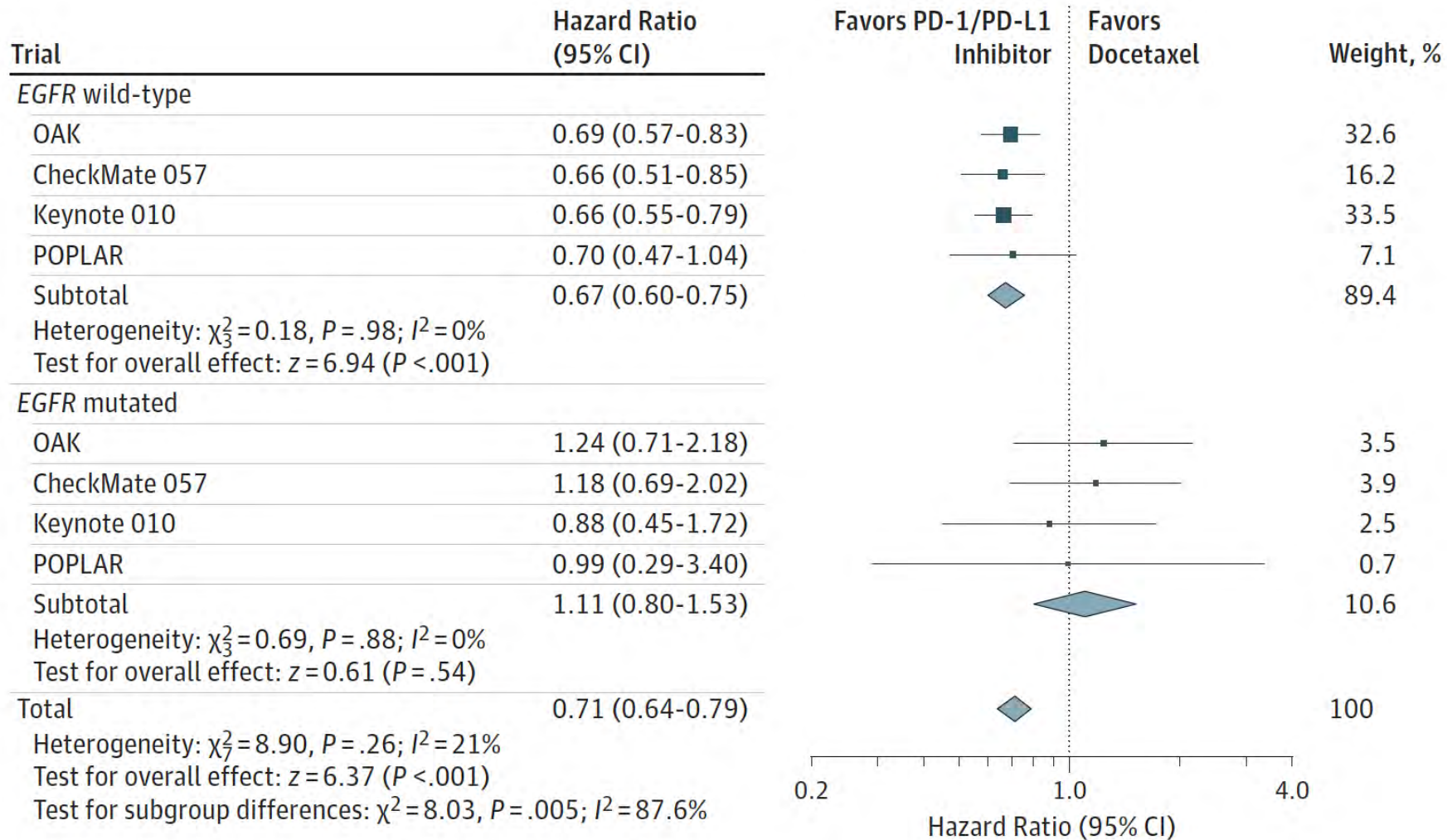
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PRESENTED BY: Prof. Kazuhiko Nakagawa, MD; Kindai University Faculty of Medicine, Osaka, Japan

Courtesy of Suresh Ramalingam, MD

Winship Cancer Institute | Emory University

Meta-Analysis Comparing Overall Survival: Efficacy of PD-1/PD-L1 Inhibitors vs Docetaxel in EGFR^{MT} and EGFR wild-type NSCLC

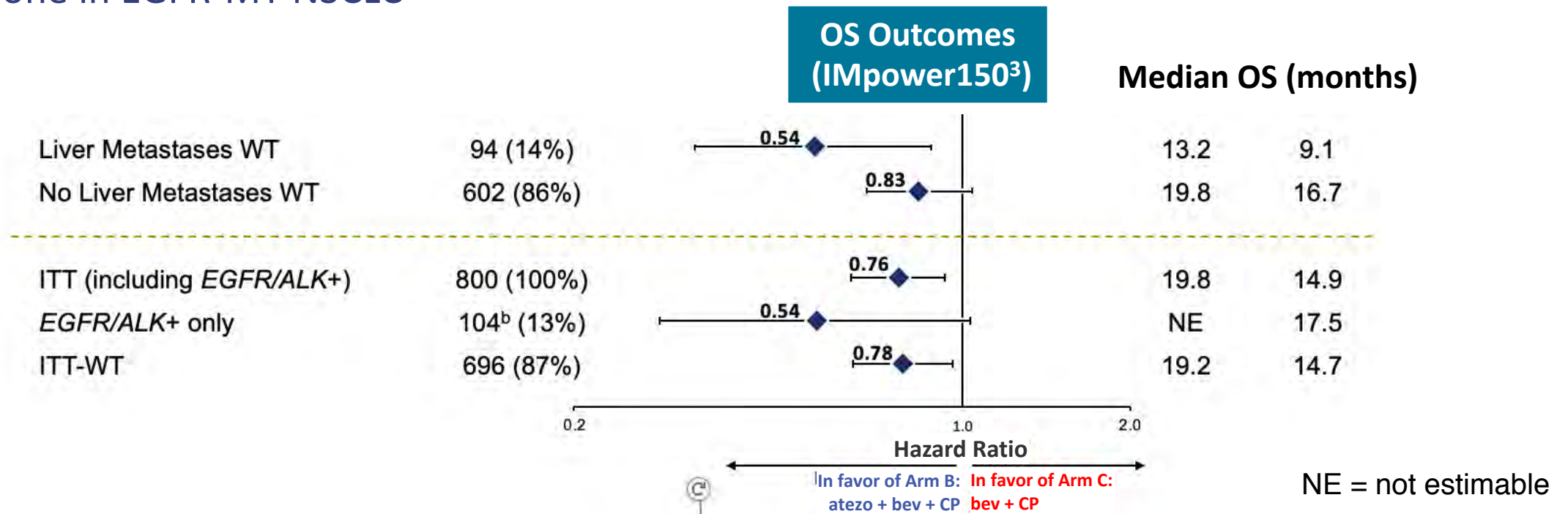


Courtesy of Suresh Ramalingam, MD

Winship Cancer Institute | Emory University

What About Chemo + IO for EGFR-MT NSCLC?

- Post-hoc analysis from IMpower150¹
 - Suggestion of improved efficacy with chemo + Bevacizumab + Atezolizumab
- Results from IMpower130 failed to demonstrate benefit with chemo + Atezo versus chemo alone in EGFR-MT NSCLC²

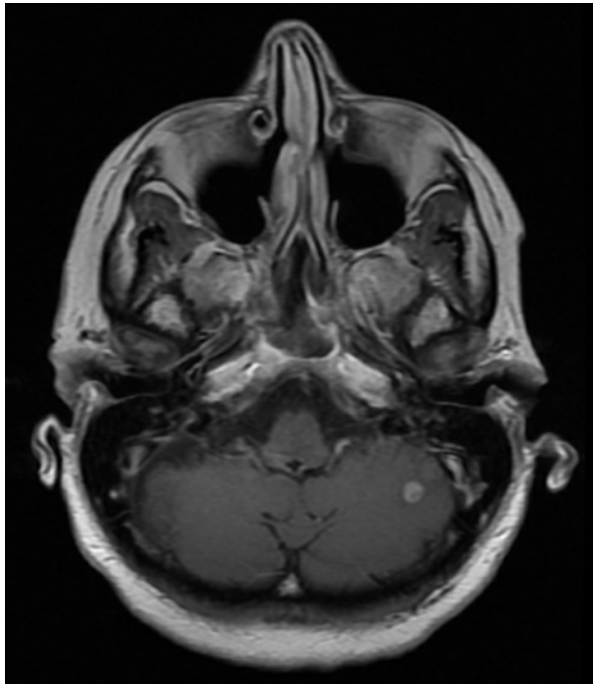
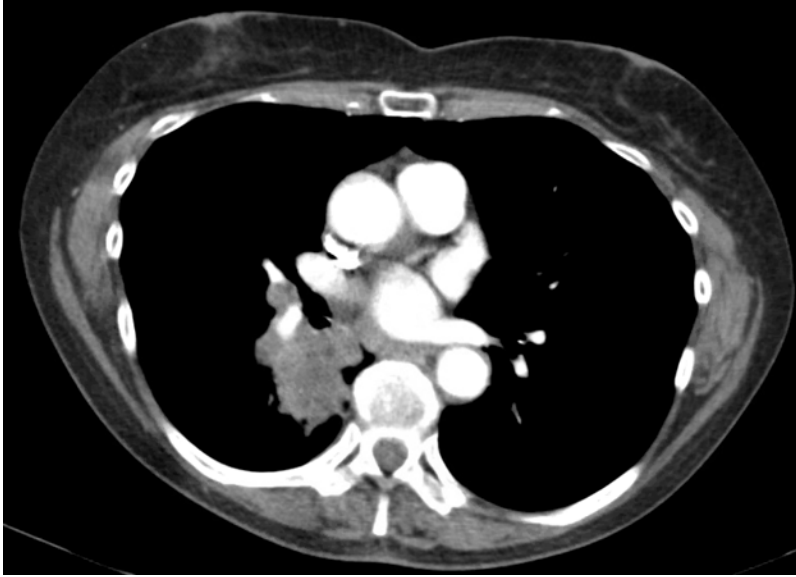


¹ Socinski et al, NEJM, 2018;378(24):2288-2301; ² West H et al. Lancet Oncol 2019;20(7):924-937; ³ Socinski MA et al. ASCO 2018;Abstract 9002.

Case Presentation -- Dr Ramalingam: 71-year-old woman with metastatic adenocarcinoma of the lung and an EGFR mutation

- 71 year old woman
- Never-smoker, no other medical illnesses
- Presented with persistent cough
- CT chest demonstrated right lower lobe lung mass
- Biopsy- adenocarcinoma
- EGFR L858R mutation
- Staging revealed multiple bilateral pulmonary nodules and brain metastasis (sub-cm)
- Started on osimertinib in October 2019

Case Presentation -- Dr Ramalingam: 71-year-old woman (cont)



Sept 2019



Jan 2020

Courtesy of Suresh Ramalingam, MD

Regulatory and reimbursement issues aside, what would be your likely systemic treatment for a high-functioning physician who presents with nonsquamous NSCLC with bone metastases, 25 brain metastases and an exon 21 L858R mutation?

- a. Osimertinib
- b. Osimertinib/chemotherapy
- c. Osimertinib/bevacizumab
- d. Osimertinib/ramucirumab
- e. Other

Challenging Questions and Cases



Challenging Questions and Cases



Case Presentation – Dr Ramalingam: 62-year-old man with metastatic adenocarcinoma of the lung and an EGFR Exon 20 insertion mutation

- 62/M
- Diagnosed with stage 4 adenocarcinoma in 2017
- No extra-thoracic disease
- EGFR Exon 20 insertion mutation
- Carboplatin-pemetrexed- 13 months (Stable disease)
- Enrolled to ECOG-ACRIN 5162
 - Osimertinib 160 mg/d
 - Best response stable disease
 - Duration of benefit- 20 months



Regulatory and reimbursement issues aside, what adjuvant systemic therapy would you recommend for a 59-year-old nonsmoker with a 2.9-cm Stage IB nonsquamous NSCLC with lymphovascular invasion and an EGFR exon 19 deletion?

- a. Osimertinib
- b. Chemotherapy
- c. Chemotherapy followed by osimertinib
- d. Other
- e. None

Challenging Questions and Cases



Challenging Questions and Cases



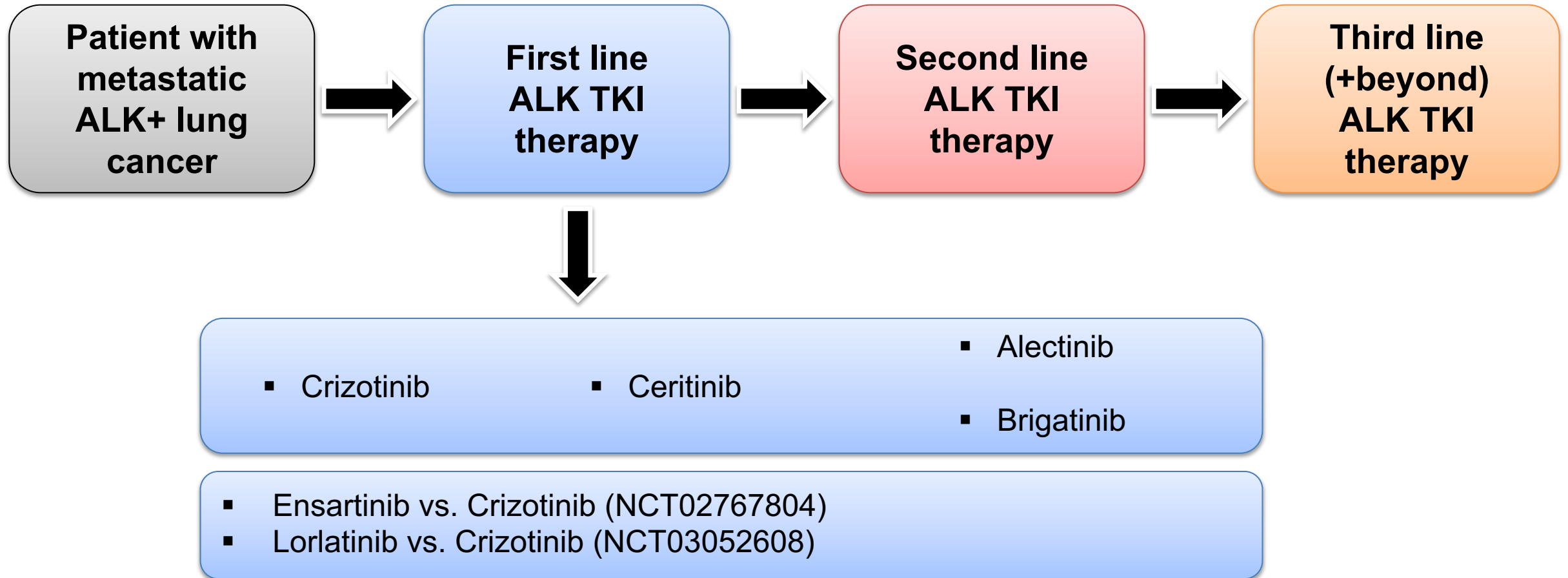
Challenging Questions and Cases



MODULE 2: Management of ALK Rearrangements

- **Key Relevant Data Sets**
- **Questions and Cases from Investigators**
- **Faculty Case – Professor Peters**
 - A 59-year-old patient with adenocarcinoma of the lung and an ALK rearrangement

First line therapy for ALK+ lung cancer in 2018

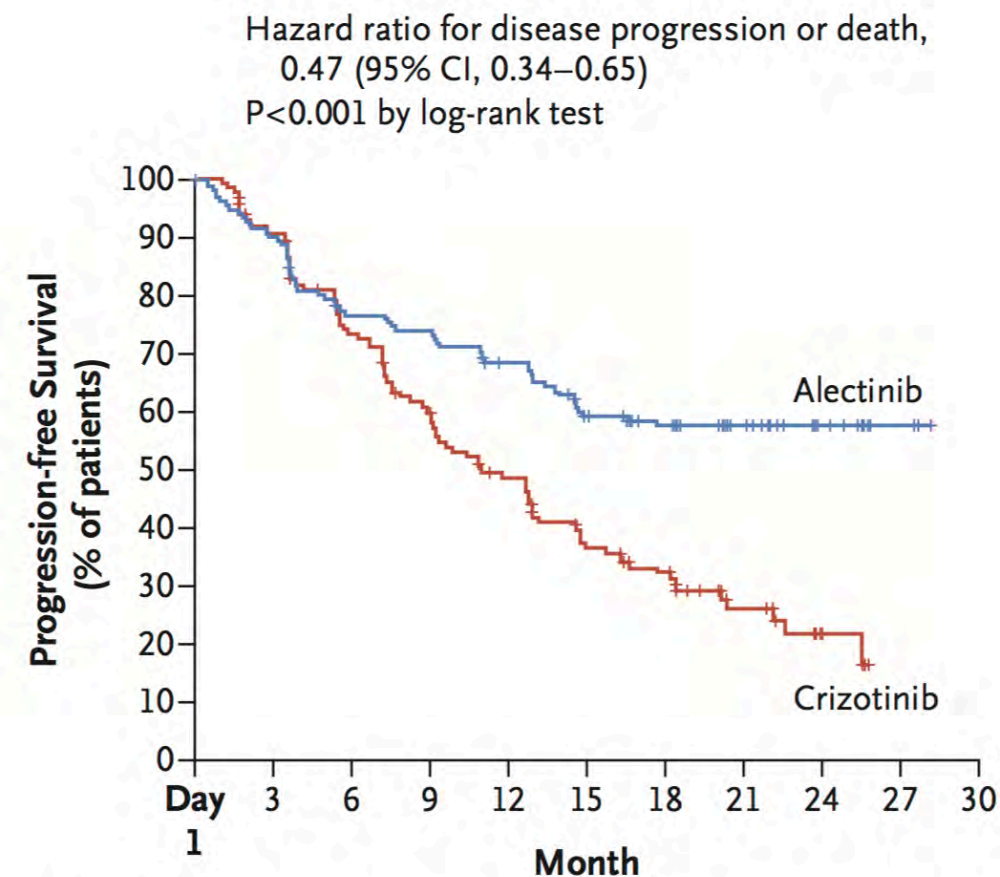


ALEX trial: alectinib frontline against crizotinib

ORIGINAL ARTICLE

Alectinib versus Crizotinib in Untreated *ALK*-Positive Non-Small-Cell Lung Cancer

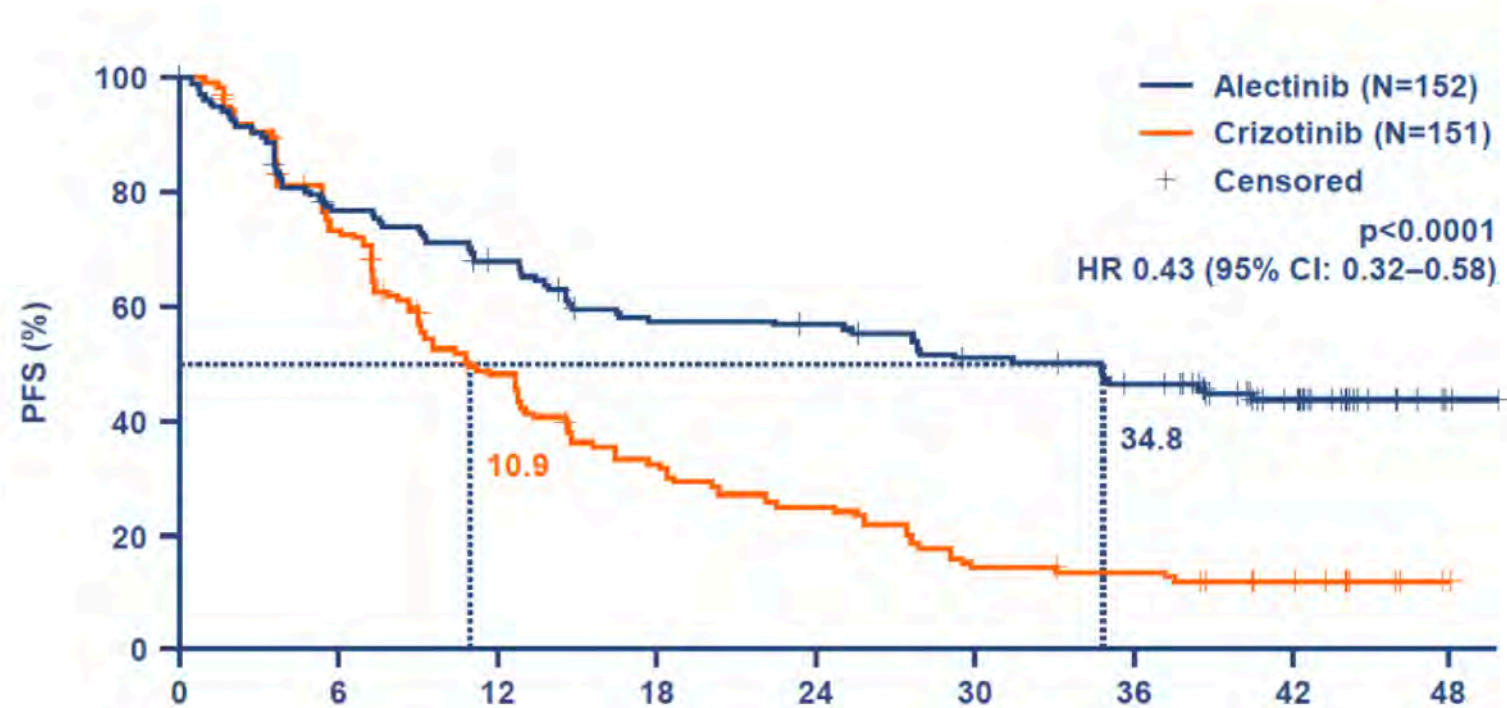
Solange Peters, M.D., Ph.D., D. Ross Camidge, M.D., Ph.D.,
Alice T. Shaw, M.D., Ph.D., Shirish Gadgeel, M.D., Jin S. Ahn, M.D.,
Dong-Wan Kim, M.D., Ph.D., Sai-Hong I. Ou, M.D., Ph.D., Maurice Pérol, M.D.,
Rafal Dziadziuszko, M.D., Rafael Rosell, M.D., Ph.D., Ali Zeaiter, M.D.,
Emmanuel Mitry, M.D., Ph.D., Sophie Golding, M.Sc., Bogdana Balas, M.D.,
Johannes Noe, Ph.D., Peter N. Morcos, Pharm.D., and Tony Mok, M.D.,
for the ALEX Trial Investigators*



No. at Risk

Alectinib	152	135	113	109	97	81	67	35	15	3
Crizotinib	151	132	104	84	65	46	35	16	5	

ALEX trial: Final PFS alectinib frontline against crizotinib



	Alectinib	Crizotinib
mPFS, mo	34.8	10.9
HR (95% CI)	0.43 (0.32–0.68)	
ORR, %	72.4	60.9

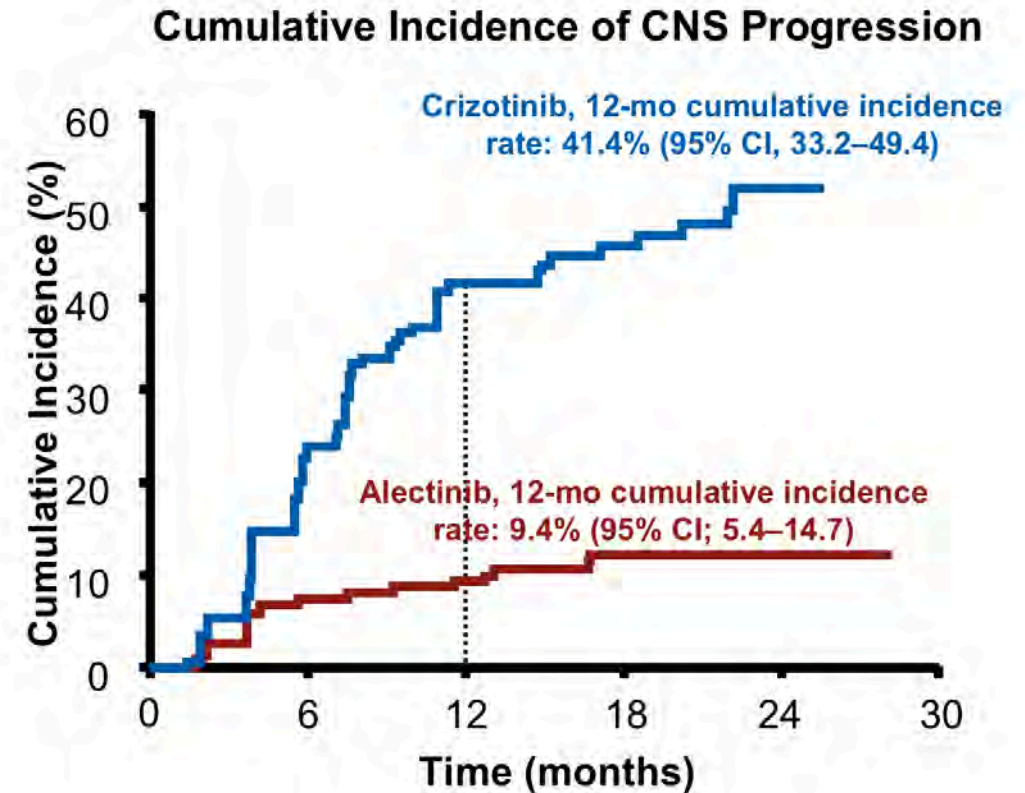
Peters S, et al. *N Engl J Med* 2017;377:829-38
Mok, ESMO 2019

Courtesy of Solange Peters, MD, PhD

ALEX: CNS Activity

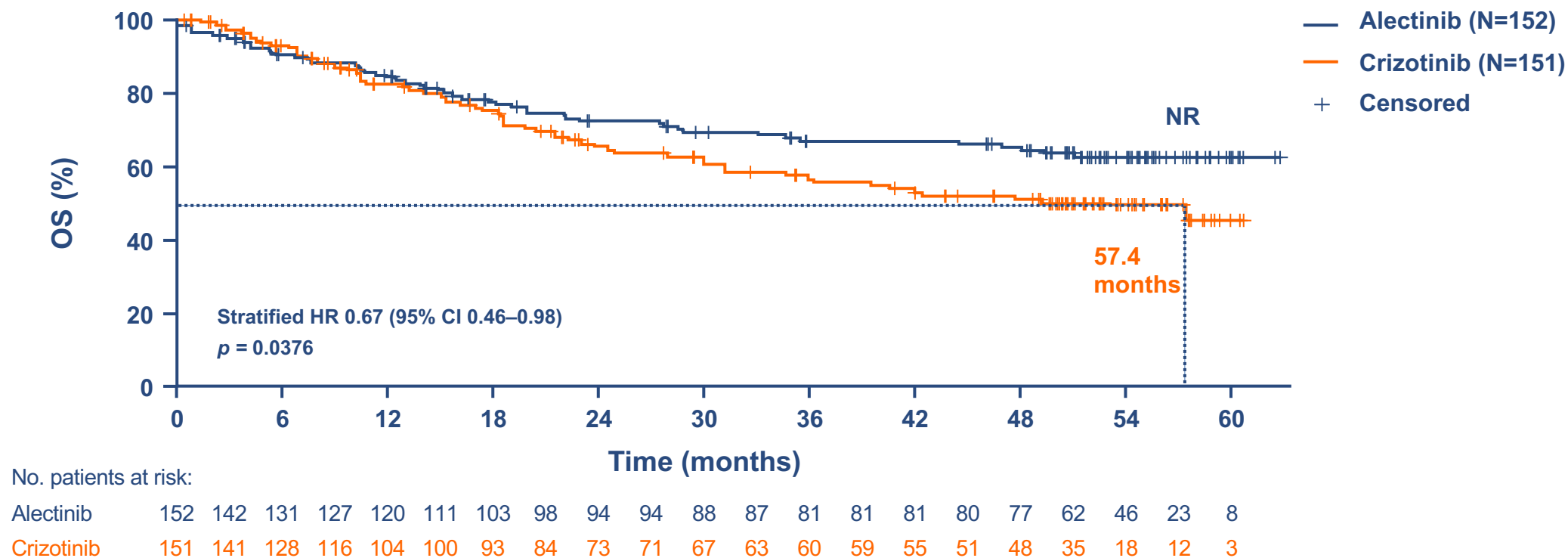
- Competing risk of CNS progression, non-CNS progression, and death based on first event was analyzed

CNS Progression, no Previous Systemic PD	Alectinib (n = 152)	Crizotinib (n = 151)
Pts with event, n (%)	18 (12)	68 (45)
Cause-specific HR (95% CI)	0.16 (0.10–0.28)	
P value	< .0001	



ALEX: 5-year Overall survival data

OS in the ITT population



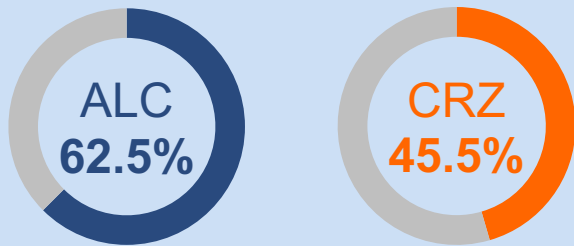
OS data remain immature, with 37% of events recorded (stratified HR 0.67, 95% CI 0.46–0.98)

Median OS was not reached with alectinib vs 57.4 months with crizotinib (95% CI 34.6–NR)

NR = not reached

Summary: updated OS and safety findings from the global ALEX study

5-year survival rate:
62.5% with alectinib (ALC) vs
45.5% with crizotinib (CRZ):



OS data remain immature
at this updated analysis:

37% of events recorded
in the ITT population
(stratified **HR 0.67**
95% CI 0.46–0.98)

No new safety signals were
observed with alectinib
with almost 3 times longer
median treatment duration
than crizotinib



Patients that had access to other
ALK TKIs after first-line alectinib
or crizotinib:

38.1%
after first-line
alectinib

53.5%
after first-line
crizotinib

This is the first global randomized
study of a next-generation ALK TKI
to demonstrate a clinically
meaningful improvement in OS
vs crizotinib in treatment-naïve
ALK+ NSCLC

ALTA-1L trial: PFS by independent review

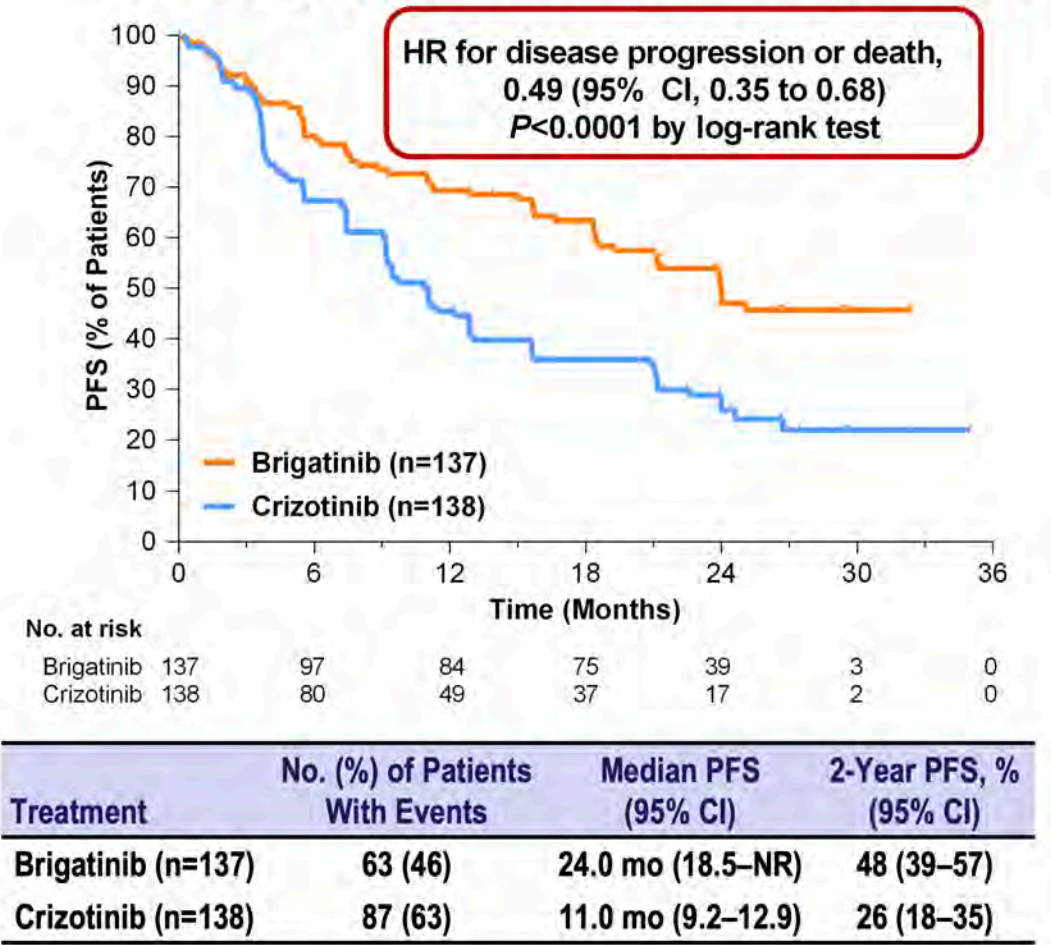
ORIGINAL ARTICLE

Brigatinib versus Crizotinib in ALK-Positive Non-Small-Cell Lung Cancer

D.R. Camidge, H.-R. Kim, M.-J. Ahn, J.C.-H. Yang, J.-Y. Han, J.-S. Lee, M.J. Hochmair, J.Y.-C. Li, G.-C. Chang, K.H. Lee, C. Gridelli, A. Delmonte, M.R.G. Campelo, D.-W. Kim, A. Bearz, F. Griesinger, A. Morabito, E. Felip, R. Califano, S. Ghosh, A. Spira, S.N. Gettinger, M. Tiseo, N. Gupta, J. Haney, D. Kerstein, and S. Popat

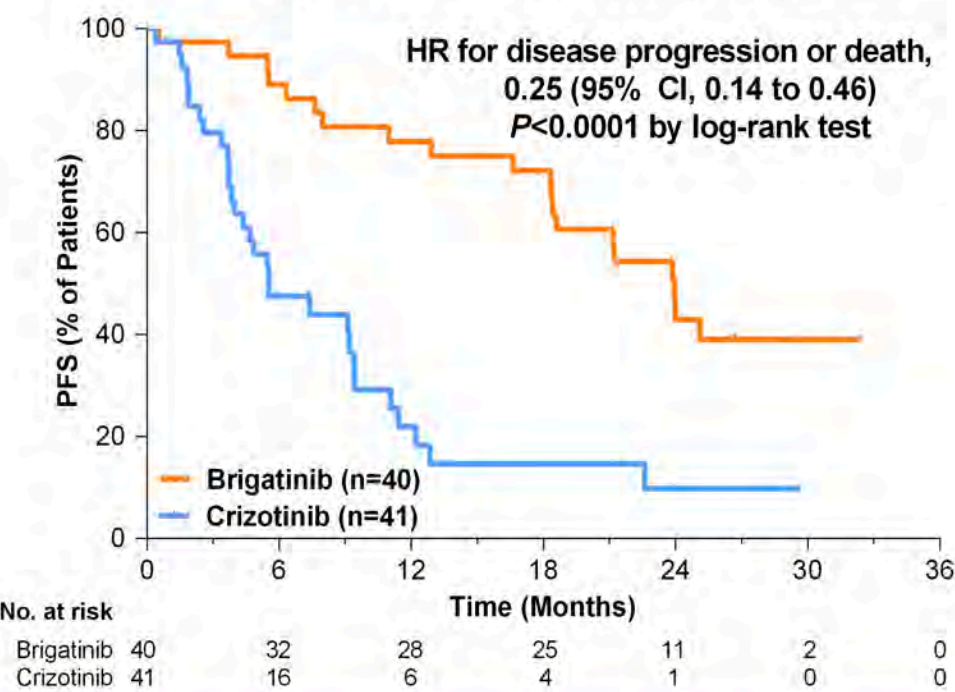
- Same benefit in patients with or without prior chemotherapy
- Independent radiological review
- Interim analysis

Primary Endpoint: BIRC-Assessed PFS



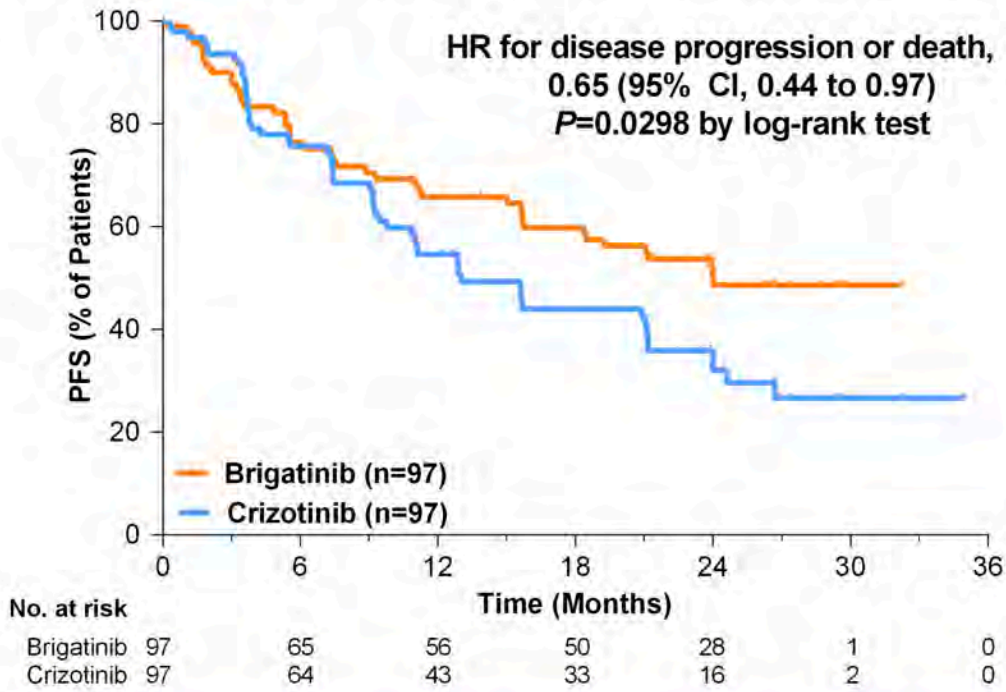
ALTA-1L: PFS with/without brain metastasis

Patients With Any Brain Metastases at Baseline



Treatment	No. (%) Patients With Events	Median PFS (95% CI)	2-Year PFS, % (95% CI)
Brigatinib (n=40) ^a	20 (50)	24.0 mo (18.4–NR)	43 (25–59)
Crizotinib (n=41) ^a	30 (73)	5.6 mo (3.8–9.4)	10 (2–25)

Patients Without Brain Metastases at Baseline



Treatment	No. (%) Patients With Events	Median PFS (95% CI)	2-Year PFS, % (95% CI)
Brigatinib (n=97) ^a	43 (44)	24.0 mo (15.7–NR)	50 (39–61)
Crizotinib (n=97) ^a	57 (59)	13.0 mo (9.5–21.1)	32 (22–43)

^a Per investigator assessment

The obvious competition

Intracranial activity alectinib vs brigatinib

Intracranial Efficacy	ALTA-1L		ALEX	
	Brigatinib	Crizotinib	Alectinib	Crizotinib
Measurable Brain Metastases (N)	18	21	21	22
ORR % (95% CI)	78 (52,94)	26 (10,48)	81 (58,95)	50 (28,72)
Any brain metastases (N)	47	49	64	58
HR (95% CI) for PFS with any BM	0.25 (0.14–0.46)		0.40 (0.25–0.64)	

Courtesy of Solange Peters, MD, PhD

Caution should be exercised when making cross-trial comparisons due to differences in study design and patient baseline characteristics.
Adapted from Blackhall F. WCLC 2018; Camidge DR, et al. *N Engl J Med* 2018;379(21):2027-39. Peters S, et al. *N Engl J Med* 2017;377:829-38.

ALKi TOXICITIES

CERITINIB

NAUSEA
DIARRHEA
VOMITING
ALT, AST, GAMMA-GT
ALP

ALECTINIB

ALT, AST, GAMMA-GT
OEDEMA
FATIGUE
MYALGIA
LUNG TOXICITY
(LATE ONSET)

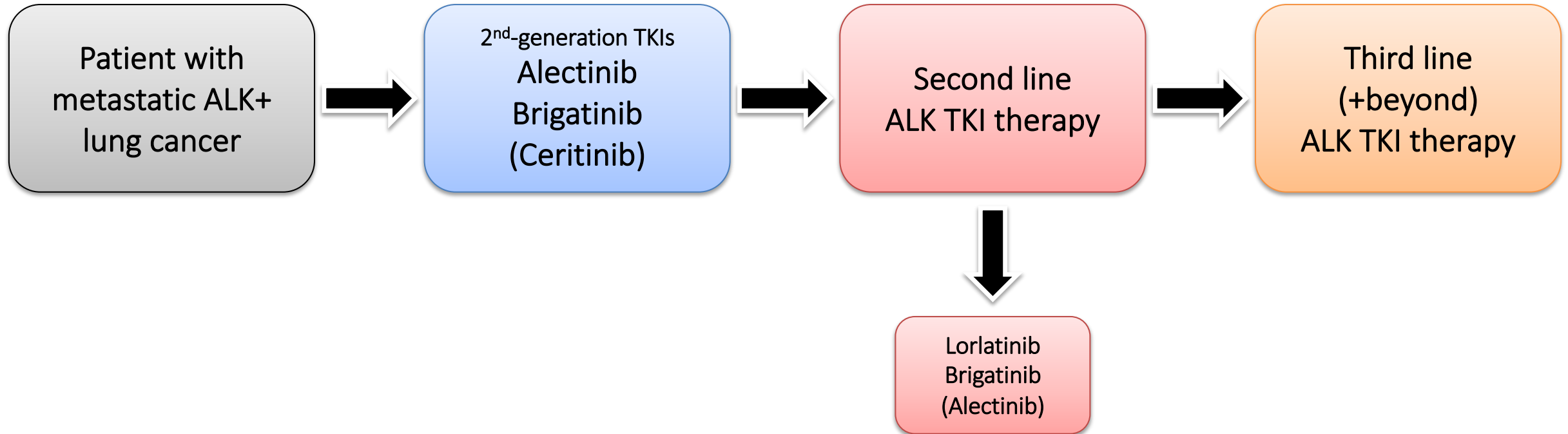
BRIGATINIB

CPK
HYPERTENSION
LIPASE
AMYLASE
DIARRHEA

LUNG TOXICITY
(EARLY ONSET)

Second line therapy for ALK+ lung cancer, after a 2nd-generation ALK TKI

Much less data in this scenario...



Can we bring resistance biomarker selection into the sequence of ALK TKIs in lung cancer?

Challenging Questions and Cases



Which of the following ALK inhibitors is likely to be the most efficacious and tolerable as first-line treatment for a patient with metastatic nonsquamous NSCLC with an ALK rearrangement?

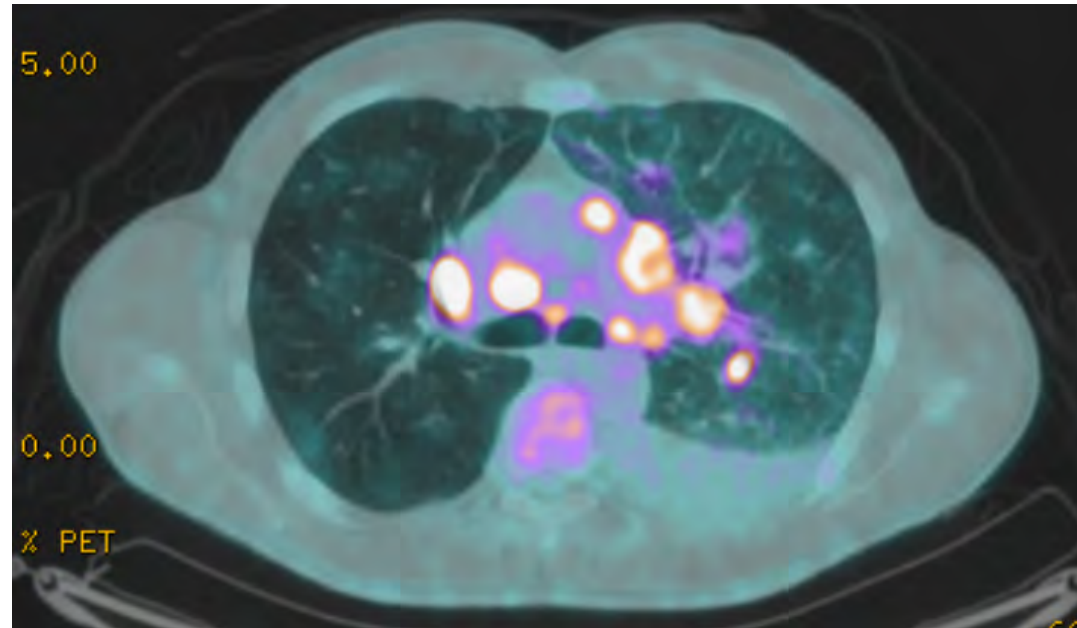
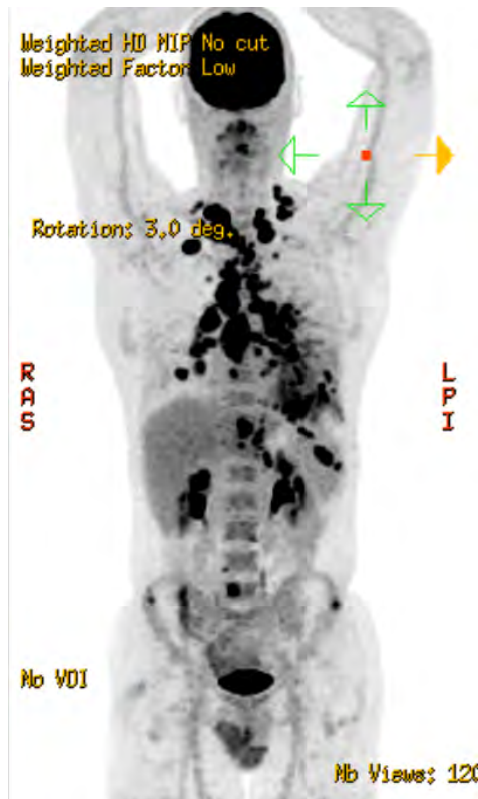
- a. Alectinib
- b. Brigatinib
- c. Ceritinib
- d. Any of the above — it is a coin-flip
- e. I don't know

Challenging Questions and Cases



Case Presentation – Professor Peters: A 59-year-old patient with adenocarcinoma of the lung and an ALK rearrangement

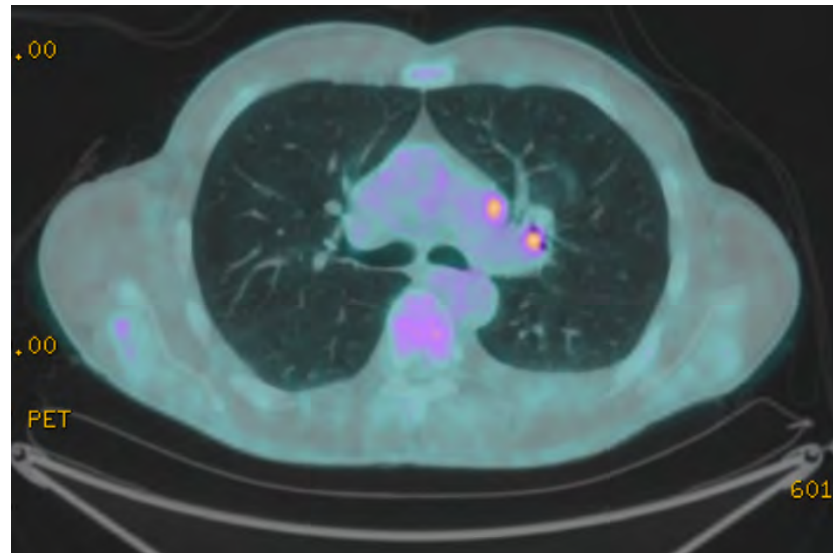
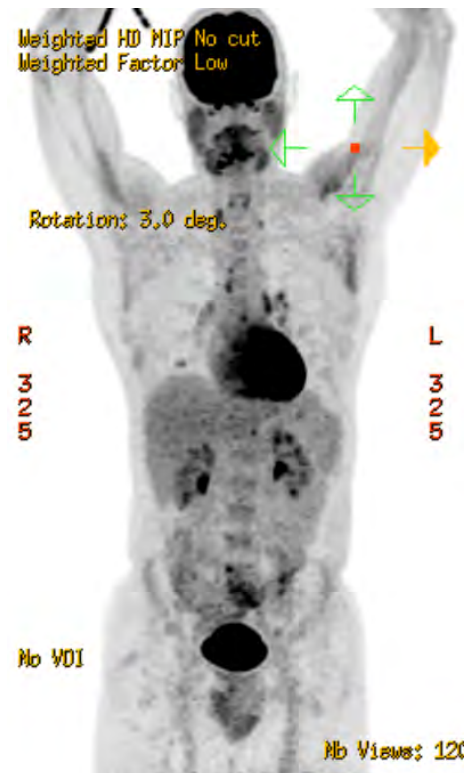
- Patient was born in 1971, excellent general state, never smoker
- Very sportive – progressive limitations in running performances
- Progressive cough and fatigue
- Family doctor asks for a CT scan, then a PET/CT, early 2015



Case Presentation – Professor Peters: A 59-year-old patient

-- Supraclavical node biopsy

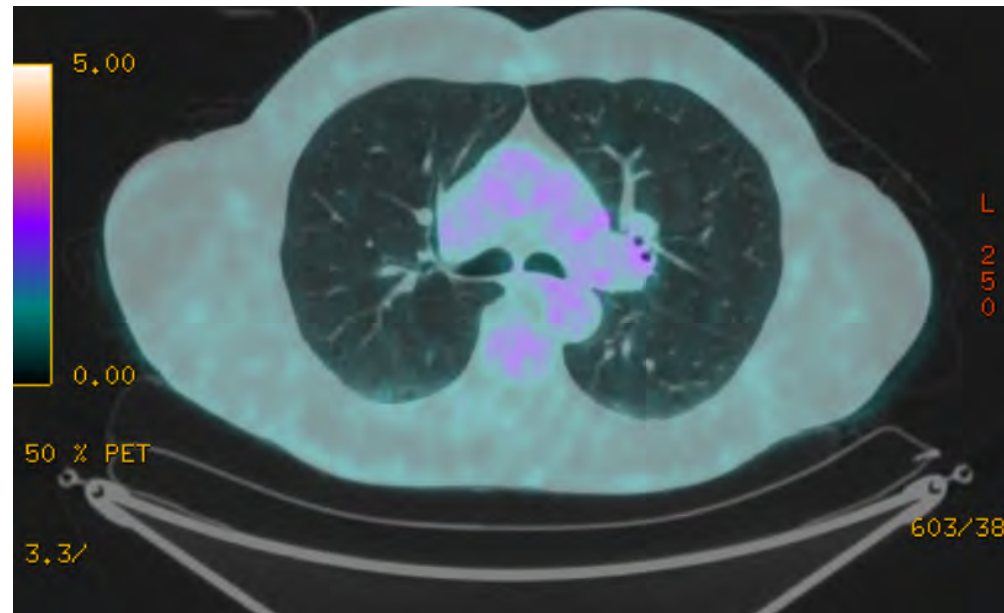
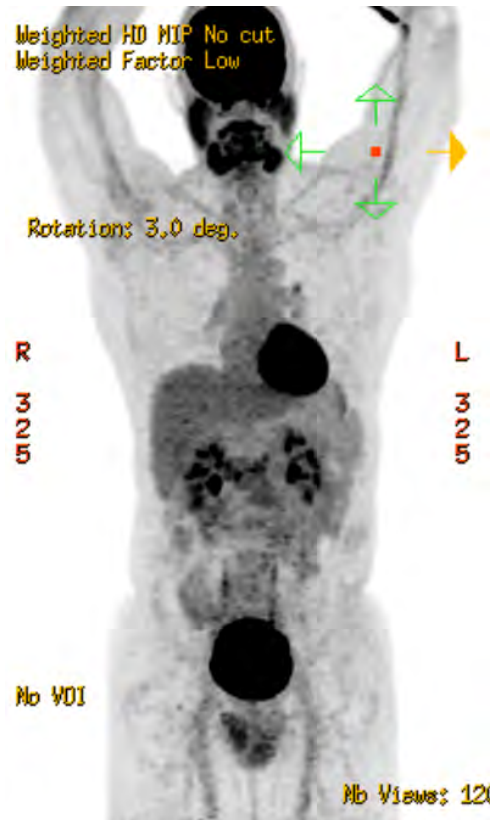
- Adenocarcinoma, solid & acinar, TTF-1 positive, EGFR WT
 - IHC positive for ALK
 - No brain lesions at MRI
 - Emergency crizotinib introduction for rapidly worsening general symptoms.
- PET-CT after 6 weeks



Case Presentation – Professor Peters: A 59-year-old patient

-- After 9 months

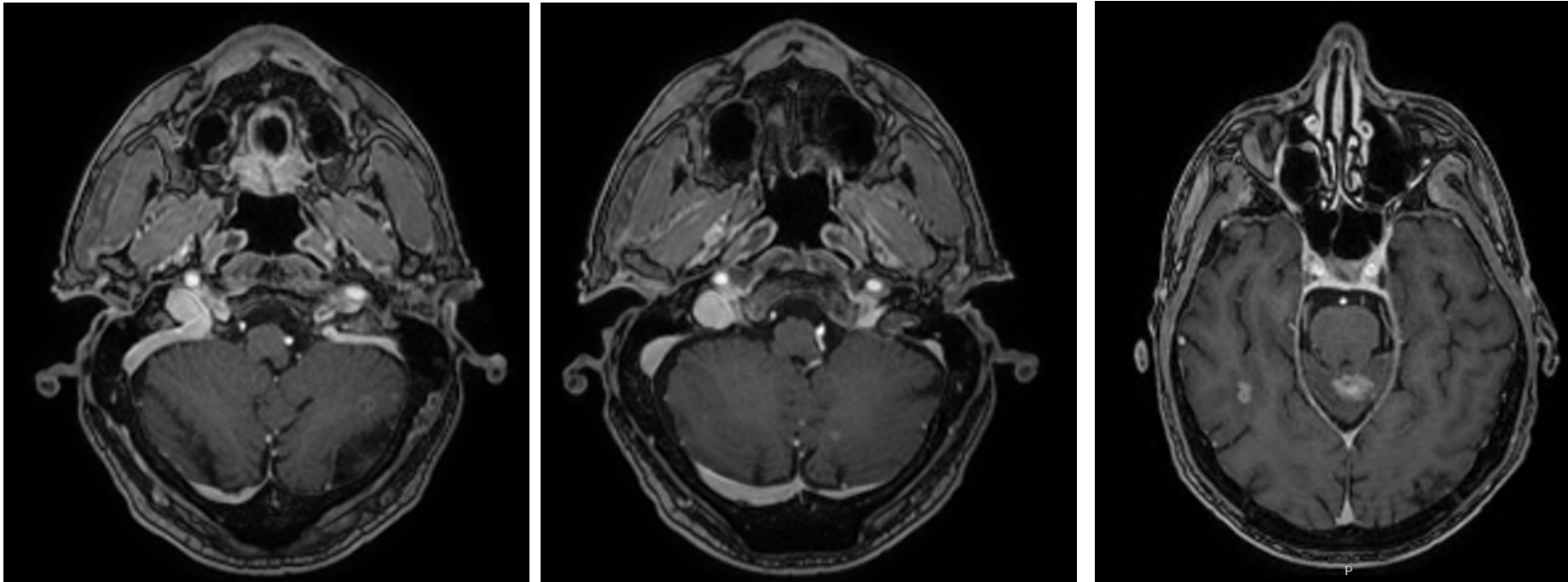
- CR, no brain lesion at MRI
- Resuming a normal life, despite some nausea grade 1 and visual disturbances, running, and working 100%



Case Presentation – Professor Peters: A 59-year-old patient

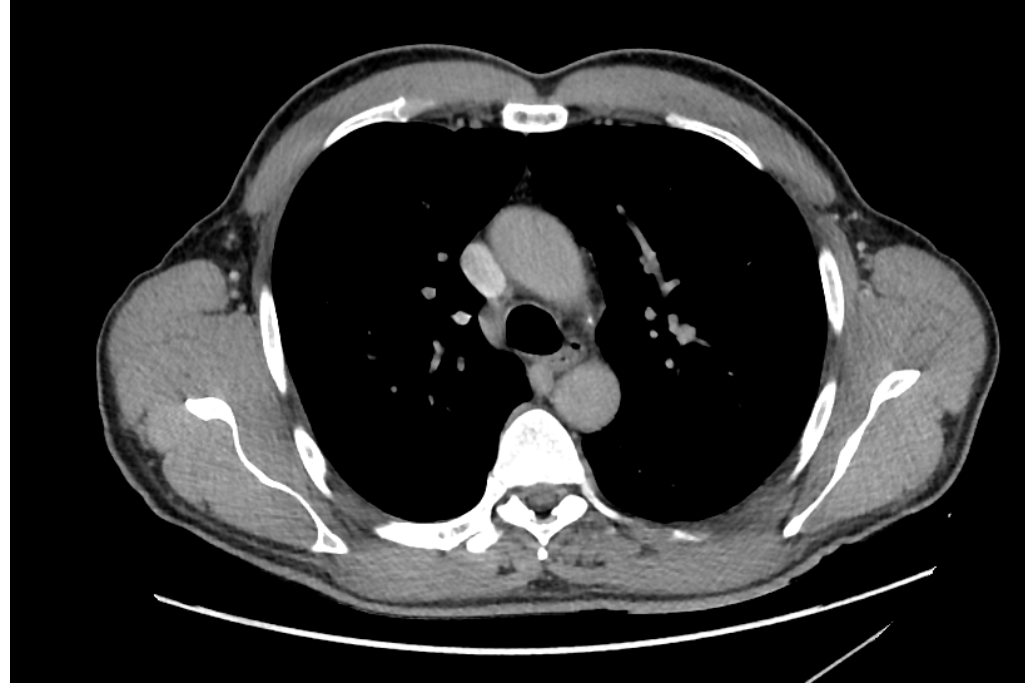
-- After 18 months

- No significant general symptoms
- Experiences some episodes of dizziness after running
- PET/CT: persistence of a CR.
- But...



Case Presentation – Professor Peters: A 59-year-old patient

-- At Disease Progression

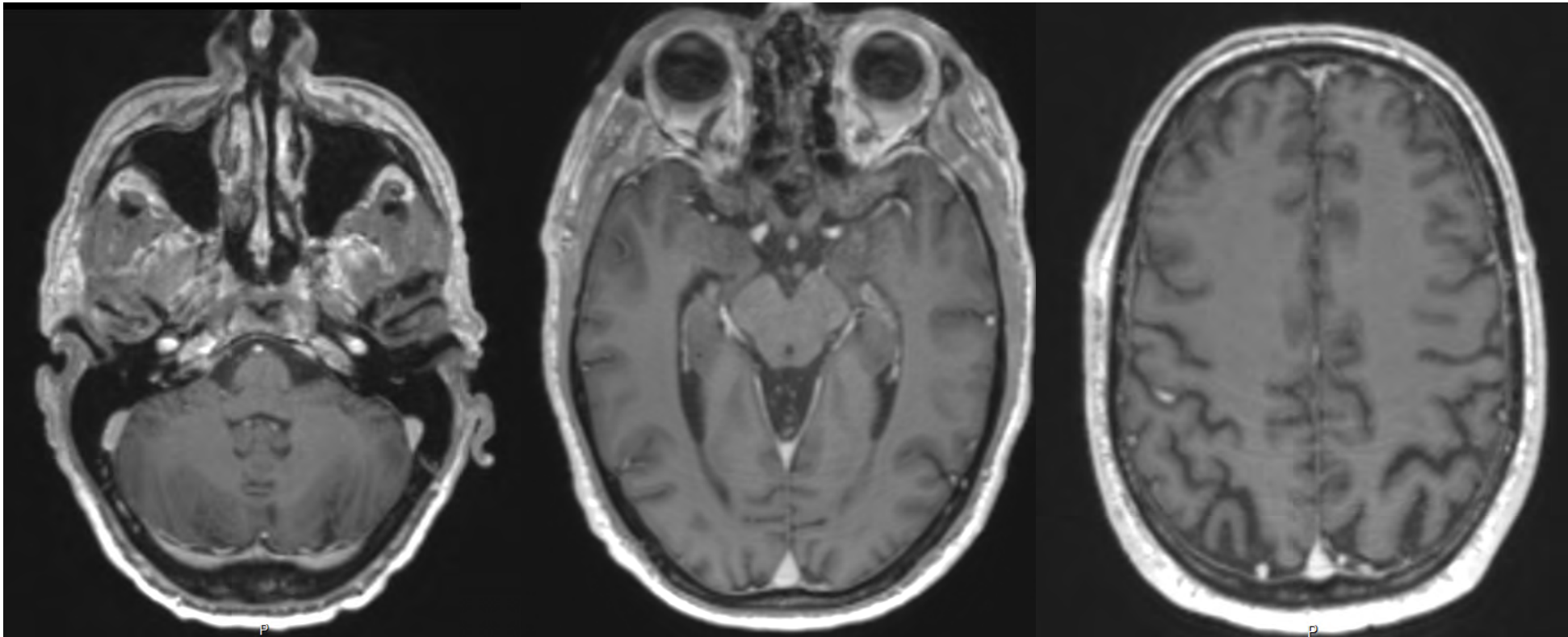


- No systemic relapse
- Introduction of Alectinib 600 mg bid
- Complete disappearance of dizziness and fatigue in 4 weeks

Case Presentation – Professor Peters: A 59-year-old patient

-- Today, > 5 years later

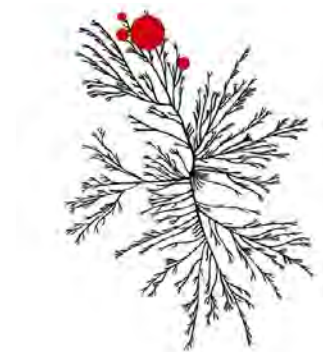
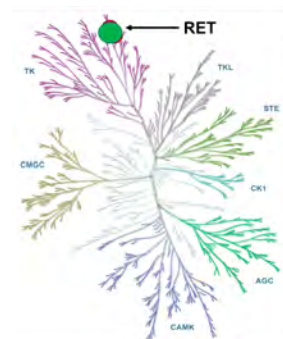
- Complete remission, working 100%
- Teaching sport again, despite some fluctuating myalgia and significant photosensitivity



MODULE 3: RET Fusion-Positive Disease

- **Key Relevant Data Sets**
- **Questions and Cases from Investigators**
- **Faculty Case – Dr Drilon**
 - 33-year-old woman with adenocarcinoma of the lung and an EML4-RET fusion mutation and a TP53 frameshift mutation

Selective RET inhibitors are active in *RET* fusion-positive NSCLC



	Selpercatinib (LIBRETTO-001)	Pralsetinib (ARROW)
ORR Treatment naïve Platinum pretreated -Intracranial ORR	85% (70-94, n=39) 64% (54-73, n=105) 91% (59-100, n=11)	66% (46-82, n=29) 55% (45-66, n=92) (not reported)
Median PFS Treatment naïve Platinum pretreated	not reached (14-NE) (not reported)	17 months (14-NE) (not reported)

*both by independent review and in intent-to-treat population; NE – not evaluable

Courtesy of Alexander E Drilon, MD



Memorial Sloan Kettering
Cancer Center

Selective RET inhibitors are well tolerated

	Selpercatinib (n=531)	Pralsetinib (n=354)
Treatment-related AEs, any grade		
AST/ALT Increase	26%	31%
Anemia/Leukopenia/Neutropenia	-	22%
Hypertension	24%	20%
Dry mouth	33%	11%
Diarrhea	22%	14%
Fatigue	18%	12%

Case Presentation – Dr Drilon: 33-year-old woman with adenocarcinoma of the lung and an EML4-RET fusion mutation

- Patient presented with cough and dyspnea. Computed and positron-emission tomography imaging revealed a hypermetabolic 4.8-cm right lower lobe mass, mediastinal and hilar adenopathy, and osseous metastases involving L1, the sacrum, and the left anterolateral sixth rib.
- MRI of the brain showed three sub-centimeter enhancing foci in the right precentral gyrus, right parietal lobe, and left temporal lobe. Endobronchial biopsy of an R4 lymph node revealed adenocarcinoma with signet ring cell features
- Tumor cells were positive for TTF-1 and negative for p40 by immunohistochemistry
- NGS identified an EML4-RET fusion in addition to a TP53 frameshift mutation.
- Patient was treated with the investigational anti-RET multikinase inhibitor agerafenib (RXDX-105).
- Although a confirmed PR was initially achieved (a near-complete response in her brain metastases), her course was marked by isolated asymptomatic intracranial progression requiring multiple radiation treatments.

Case Presentation – Dr Drilon: 33-year-old woman (cont)

- A year after initiating therapy, she underwent stereotactic radiosurgery (21 Gy) to five new enhancing sub-centimeter parenchymal metastases.
- Seven months later, she developed further intracranial progression requiring 42 Gy of stereotactic radiosurgery to seven additional lesions. Given absence of extracranial disease progression, agerafenib (RXDX-105) was continued.
- Four months later, the patient developed symptomatic progression of brain metastases and new leptomeningeal disease.
- She presented with left facial, tongue, and upper extremity tingling and worsening neck pain. These symptoms were deemed to be secondary to leptomeningeal disease that was identified radiologically in the right hemisphere, predominantly in the right parietal lobe, recognizing that nonradiologically apparent disease was likely present in other areas
- Multiple brain metastases had also increased. The total volume of radiologically significant intracranial metastases was 20.1 cm³
- Patient declined lumbar puncture; a brain biopsy to potentially determine the mechanism of resistance to agerafenib (RXDX-105) was not deemed safe. Extracranial imaging again showed no evidence of disease

Case Presentation – Dr Drilon: 33-year-old woman (cont)

- Given that the patient was highly symptomatic with progressive symptoms, a single-patient use protocol of selpercatinib was approved by the FDA and institutional review board
- Imaging assessments were performed every 8 weeks
- A clinical response to therapy was achieved within the first week of therapy, with improvement and subsequent resolution of the patient's neurologic symptoms. This was accompanied by a confirmed radiologic response to therapy.
- A partial response in the brain was achieved at follow-up imaging assessment at 16 weeks and confirmed by subsequent imaging
- In addition, selpercatinib therapy achieved complete resolution of leptomeningeal enhancement. Volumetric assessment revealed a continued decrease in the total volume of significant intracranial disease, with a maximal shrinkage of 65% at 5 months
- The patient continues to receive selpercatinib at 10.8 months, with ongoing radiologic disease control and no neurologic symptoms. She reports only grade 1 fatigue. There continues to be no evidence of extracranial disease

For a patient with metastatic nonsquamous NSCLC with a RET rearrangement and a TPS of 10%, in what line of therapy should targeted treatment (eg, selpercatinib, pralsetinib) be used?

- a. First line
- b. Second line
- c. Third line
- d. Fourth line and beyond

Challenging Questions and Cases



MODULE 4: Targeting MET in MET Exon 14-Altered Disease

- **Key Relevant Data Sets**
- **Faculty Case – Dr Drilon**
 - 72-year-old woman with adenocarcinoma of the lung and a MET exon 14 alteration

Targeting MET in *MET* exon 14-altered lung cancers

Type Ia Multikinase



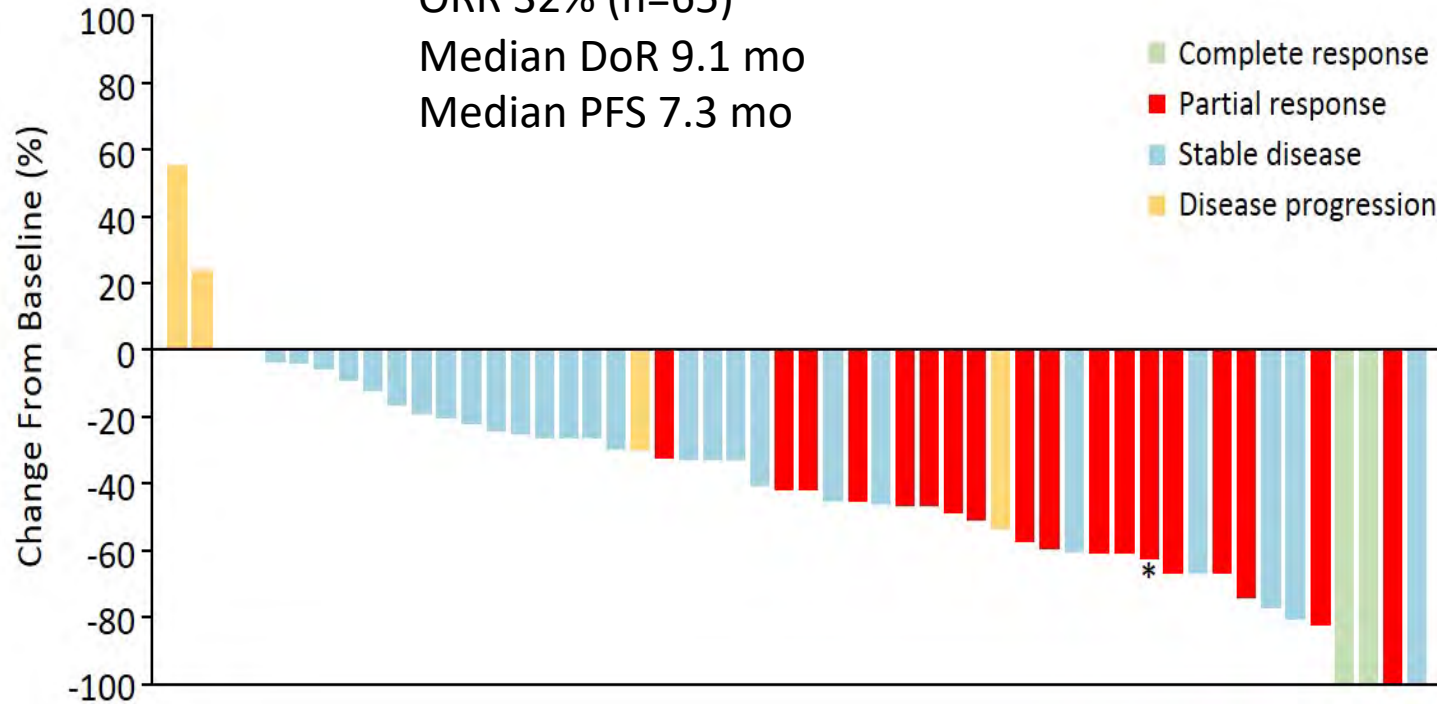
Type Ib Selective
and More Potent

Crizotinib

ORR 32% (n=65)

Median DoR 9.1 mo

Median PFS 7.3 mo



Capmatinib
Tepotinib
Savolitinib

Activity and safety of selective MET inhibitors

	Capmatinib (GEOMETRY)	Tepotinib (VISION)
ORR		
Overall	(not reported)	46% (36-57, n=99)
Treatment naïve	67% (48-84, n=28)	44% (29-60, n=43)
Second line	48% (30-67, n=31)	48% (30-66, n=33)
Median PFS		
Overall	(not reported)	8.6 months
Treatment naïve	9.7 months	(not reported)
Second line	8.1 months	(not reported)
Adverse events		
Peripheral edema	84%	63%

Groen et al ASCO 2020 (second-line), Wolf et al ASCO 2019 (treatment-naïve), Paik et al NEJM 2020



Courtesy of Alexander E Drilon, MD
Memorial Sloan Kettering
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For a patient with metastatic nonsquamous NSCLC with a MET exon 14 skipping mutation and a TPS of 10%, in what line of therapy should targeted treatment (eg, capmatinib, tepotinib) be used?

- a. First line
- b. Second line
- c. Third line
- d. Fourth line and beyond

Case Presentation – Dr Drilon: 72-year-old woman with adenocarcinoma of the lung and a MET exon 14 alteration

- 72 year-old woman who was diagnosed with a stage 1A T1N0M0 adenocarcinoma 8 years ago (started with an incidental nodule in the LUL on CXR). Recurred in the ipsilateral hilar and mediastinal nodes the next year – treated with concurrent chemoradiation.
- Two years later was found to have new hepatic and abdominal lymph nodes on surveillance imaging. A liver biopsy showed recurrent adenocarcinoma. Carbo/pem x 5 given, but remarkable for substantial fatigue and pancytopenia requiring transfusion. During this time, sequencing returned with a MET exon 14 alteration.
- The patient was treated on PROFILE 1001 with crizotinib. She had a confirmed complete response with therapy that lasts up to today (5 years into therapy). No major tolerability issues except for mild fatigue.

MODULE 5: HER2-Mutant NSCLC

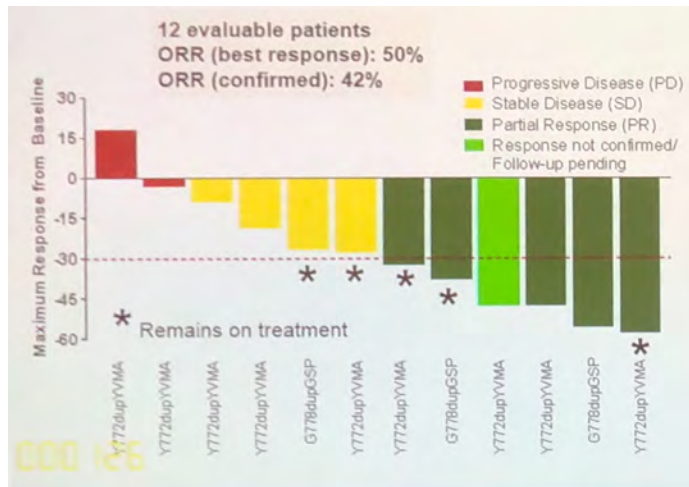
- **Key Relevant Data Sets**
- **Questions and Cases from Investigators**

Targeted therapy is active in *HER2*-mutant NSCLC

HER2 TKIs

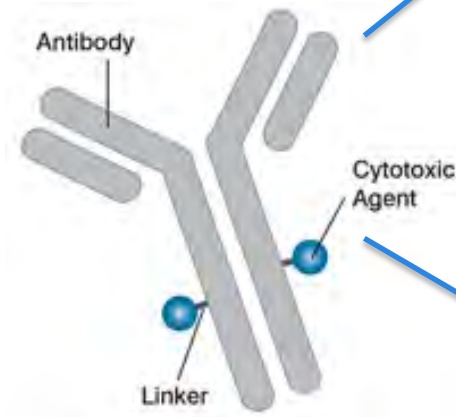
**Afatinib, Neratinib,
Dacomitinib, Lapatinib:** ORR 0-13%

Poziotinib: ORR 42%
median PFS 5 mo

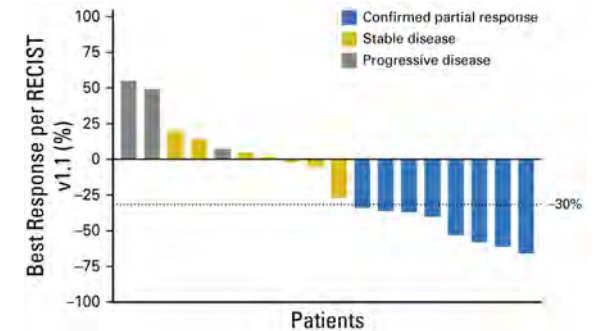


HER2 ADCs

**Ado trastuzumab
Emtansine (T-DM1)**
ORR 44%
median PFS 5 mo
NCCN guidelines



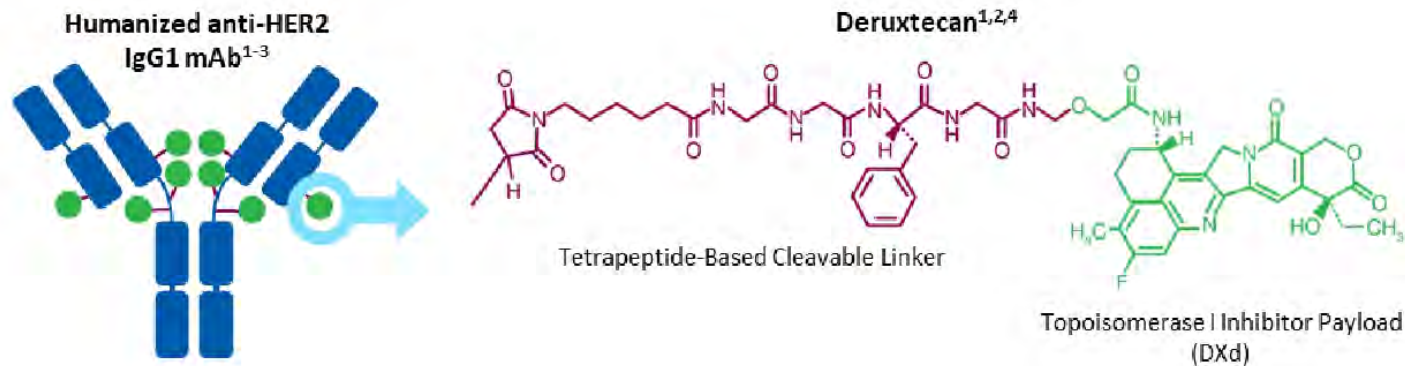
**Trastuzumab
deruxtecan**



Trastuzumab deruxtecan: DESTINY-Lung01 phase 2 study

T-DXd is an ADC with 3 components:

- A humanized anti-HER2 IgG1 mAb with the same amino acid sequence as trastuzumab
- A topoisomerase I inhibitor payload, an exatecan derivative
- A tetrapeptide-based cleavable linker



	Patients (N = 42)
Age, median (range), years	63.0 (34-83)
< 65 years, %	59.5
Female, %	64.3
Region, %	35.7 / 31.0 / 33.3
Asia / North America / Europe	
ECOG performance status 0 / 1, %	23.8 / 76.2
HER2 mutation, %	
Kinase domain	90.5
Extracellular domain	4.8
Not reported	4.8
Presence of CNS metastases, %	45.2

Median prior lines of treatment: 2 (range, 1-6)

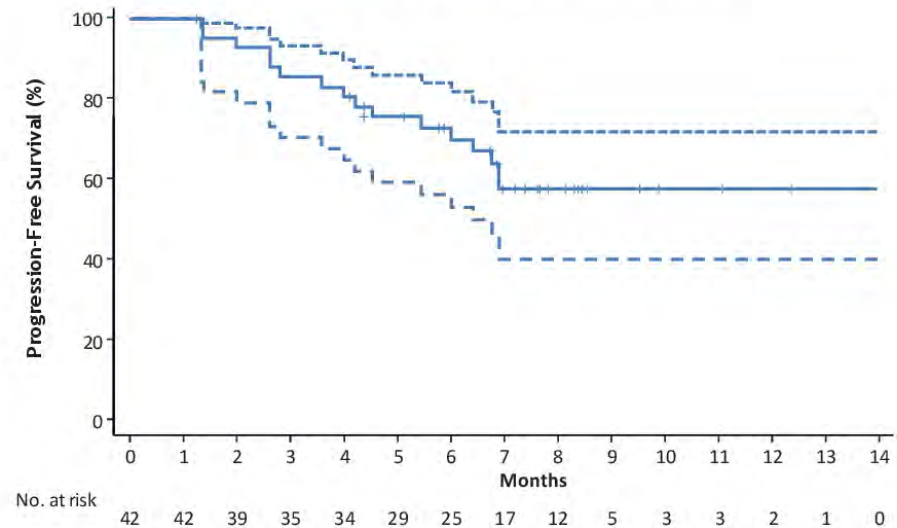
	Patients (N = 42)
Prior Treatment, %	
Platinum-based therapy	90.5
Anti-PD-1 or -PD-L1 inhibitor	54.8
Docetaxel	19.0

3 patients received prior poziotinib, 2 received afatinib, and 1 received mobocertinib

Trastuzumab deruxtecan is active in *HER2*-mutant NSCLCs

Progression-Free Survival (N = 42)^a

Median: 14.0 months (95% CI, 6.4-14.0)

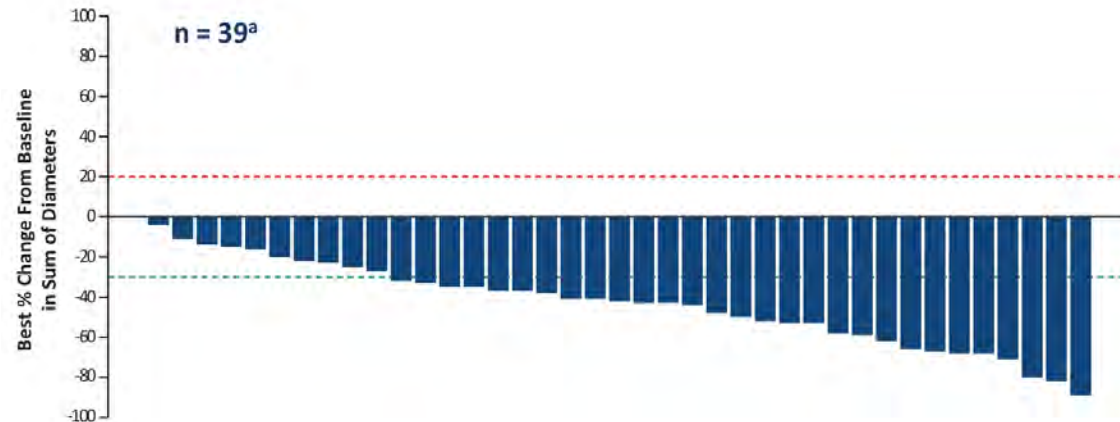


Most common AEs: nausea (>70%),
alopecia/anemia/neutropenia (>40%)

All Patients (N = 42)

n (%)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Any Grade/Total
Interstitial lung disease	0 ^a	5 (11.9)	0	0	0	5 (11.9)

- Median time to onset of investigator-reported ILD was at 86 days (range, 41-255 days)
- 4 patients had drug withdrawn and 1 had drug interrupted
- All patients received steroid treatment
- 2 patients recovered, 1 recovered with sequelae, 1 was recovering, and 1 had not recovered by data-cutoff
- No grade 5 ILD was observed in this cohort



Confirmed ORR by ICR

Patients (N = 42)	
Confirmed ORR by ICR	61.9% (n = 26) (95% CI, 45.6%-76.4%)
CR	2.4% (n = 1)
PR	59.5% (n = 25)
SD	28.6% (n = 12)
PD	4.8% (n = 2)
Not evaluable	4.8% (n = 2)
Disease control rate	90.5% (95% CI, 77.4%-97.3%)
Duration of response, median	Not reached (95% CI, 5.3 months-NE)
PFS, median	14.0 mo (95% CI, 6.4-14.0 months)

Courtesy of Alexander E Drilon, MD



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Regulatory and reimbursement issues aside, what would be your preferred first-line treatment for a patient with metastatic nonsquamous NSCLC with a HER2 mutation and a TPS of 10%?

- a. Carboplatin/pemetrexed/pembrolizumab
- b. Atezolizumab/carboplatin/*nab* paclitaxel
- c. Atezolizumab/carboplatin/paclitaxel
- d. Ipilimumab/nivolumab
- e. Trastuzumab deruxtecan
- f. T-DM1
- g. Neratinib
- h. Other

Challenging Questions and Cases

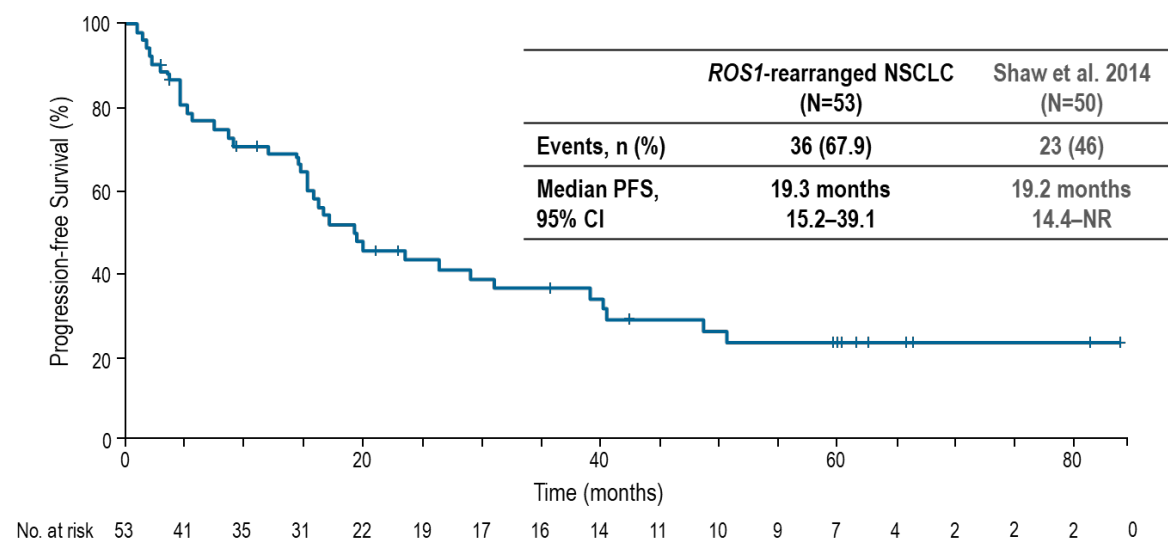


MODULE 6: Management of ROS1 Rearrangements

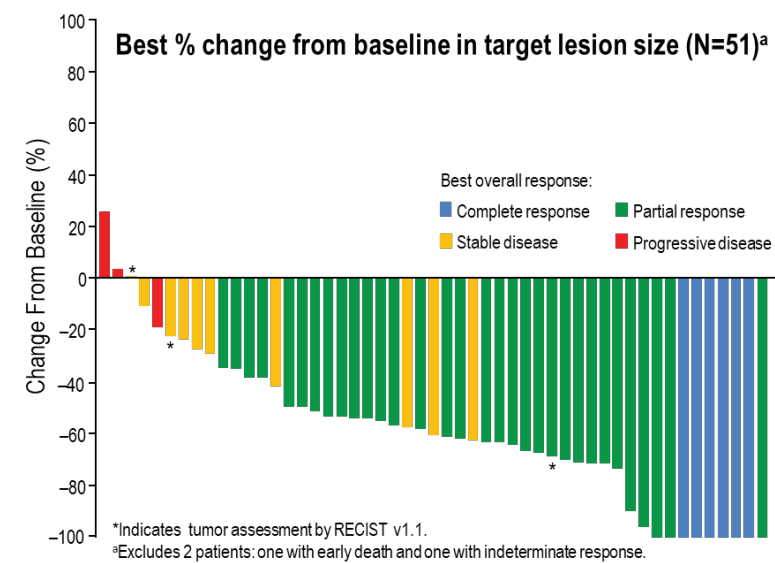
- **Key Relevant Data Sets**
- **Questions and Cases from Investigators**
- **Faculty Case – Professor Peters**
 - 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

Focusing on ROS-1: Crizotinib

UPDATED PROGRESSION-FREE SURVIVAL



UPDATED ANTITUMOR ACTIVITY

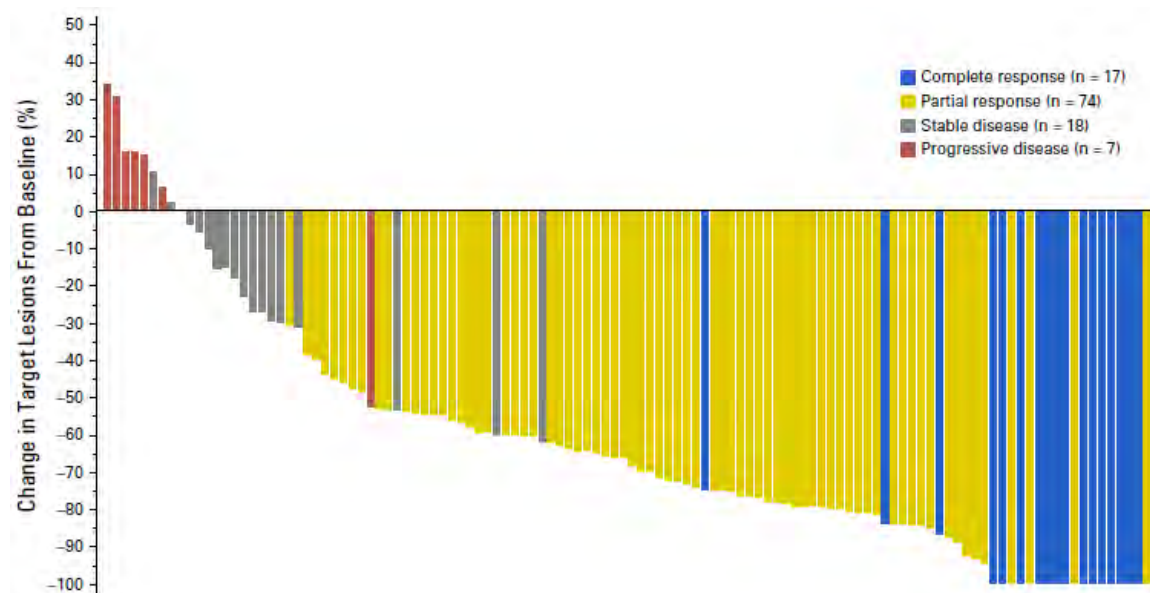


	ROS1-rearranged NSCLC (N=53)	Shaw et al. 2014 (N=50)
BOR, n (%)		
CR	6 (11.3)	3 (6)
PR	32 (60.4)	33 (66)
SD	10 (18.9)	9 (18)
PD	3 (5.7)	3 (6)
NE ^a	2 (3.8)	2 (4)
ORR, %	71.7	72
95% CI	57.7–83.2	58–84
Median TTR, wks	7.9	7.9
Range	4.3–103.6	4.3–32.0
Median DOR^b, mos	24.7	17.6
95% CI	15.2–45.3	14.5–NR

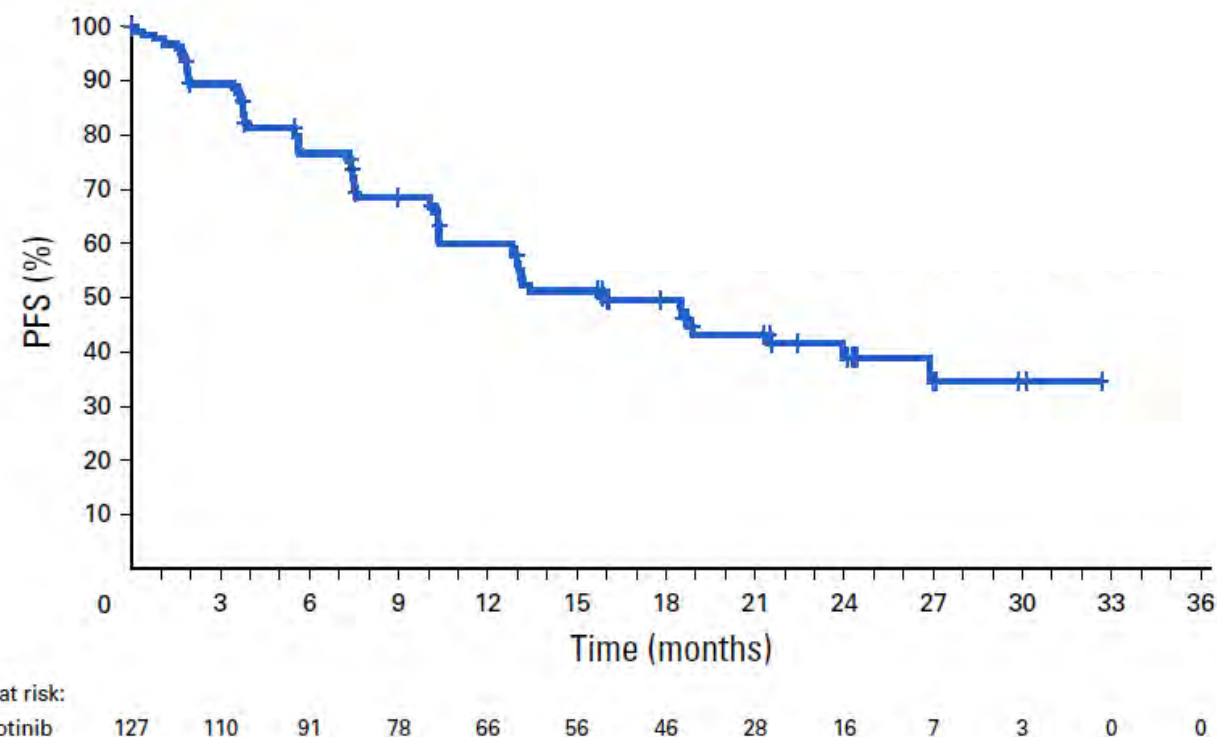
^aResponses could not be evaluated in 2 patients because of early death or indeterminate response.
^bEstimated using the Kaplan-Meier method.

Courtesy of Solange Peters, MD, PhD

ORR: 71.7 %



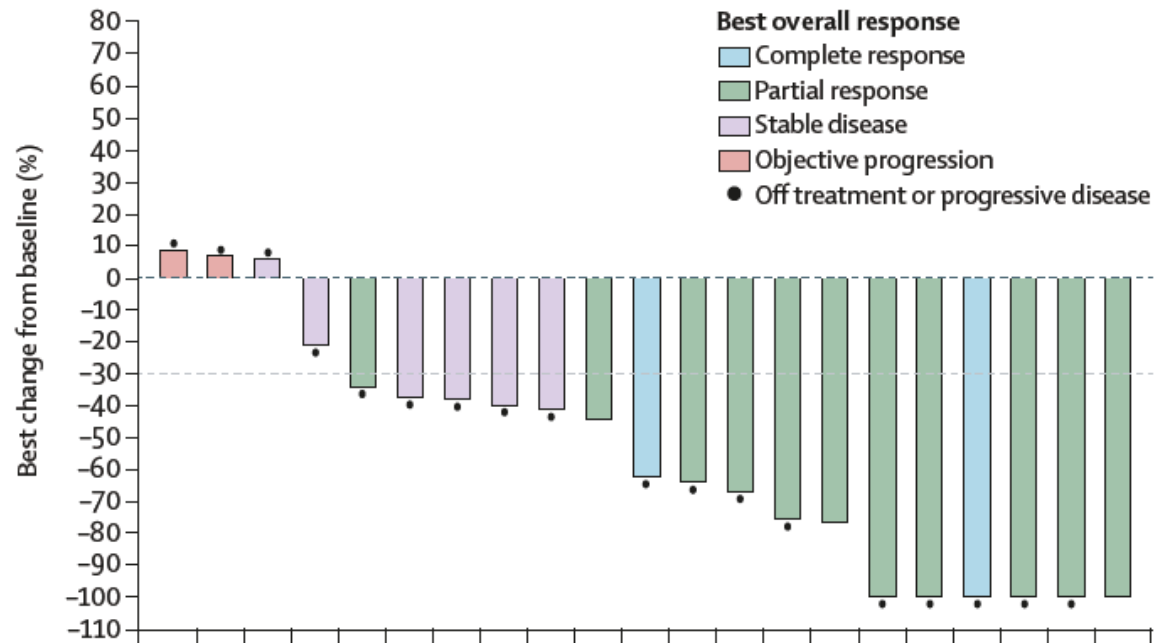
Median PFS, 15.9 months
(95% CI, 12.9 to 24.0 months)



Courtesy of Solange Peters, MD, PhD

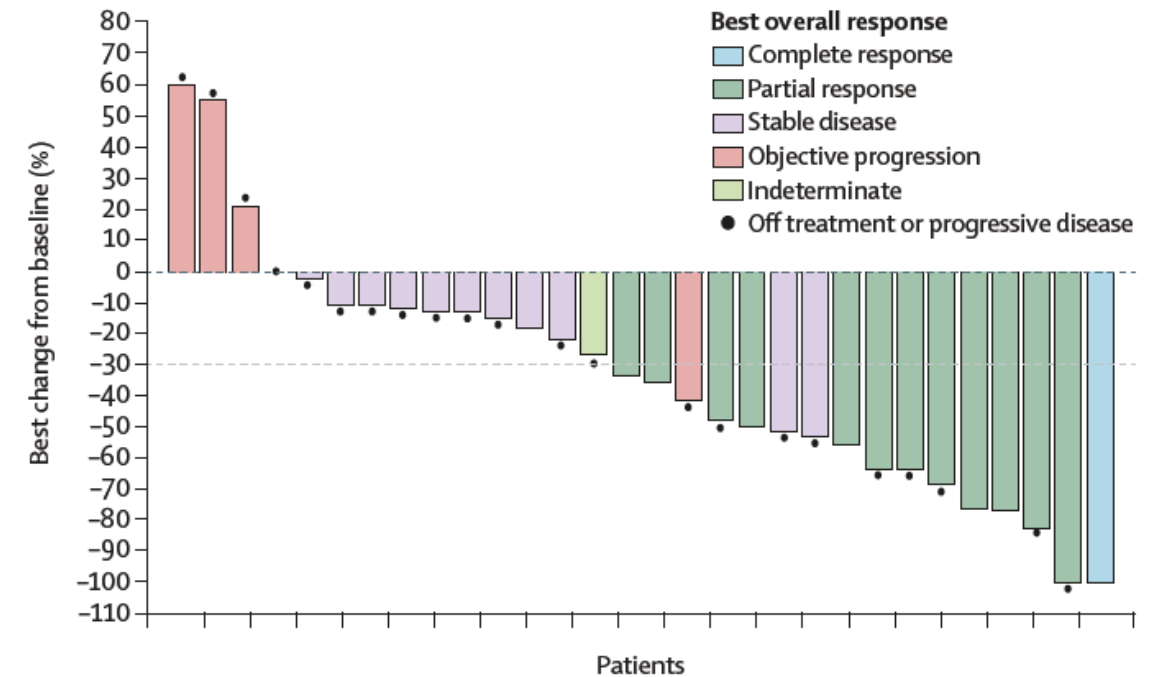
Lorlatinib multicenter, open-label, single-arm, phase 1–2 trial

ROS1-TKI naïve pts (n=21)



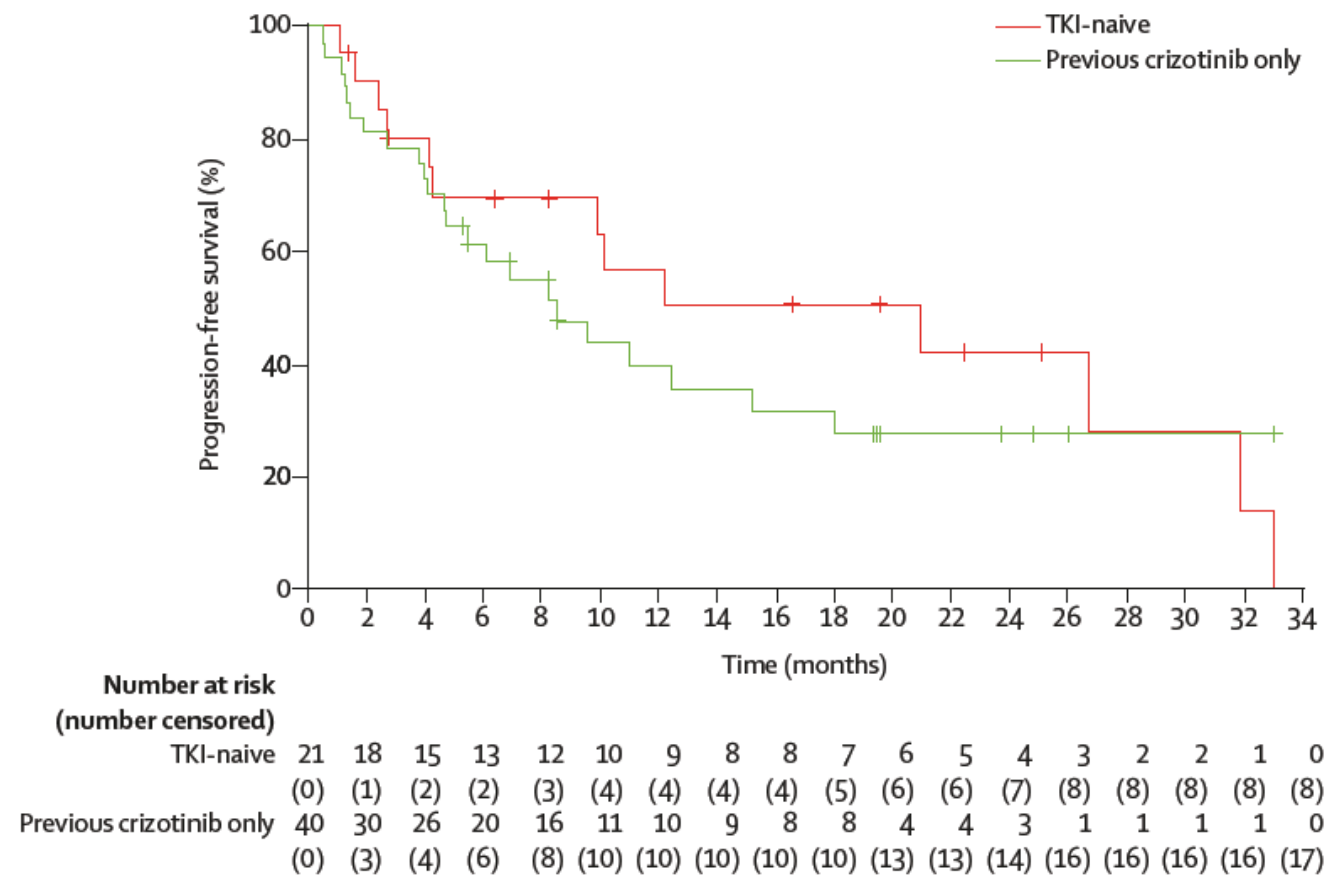
ORR, %: 62 (38–82)
mDoR, month: 25.3 (7.5–31.9)

Crizotinib pretreated pts (n=40)



ORR: 35% (21–52)
mDoR, month: 13.8 (9.7–NR)

Overall efficacy of Lorlatinib



	TKI-naïve (n=21)	Prior crizotinib only (n=40)
Events, n (%)	13 (62)	23 (58)
mPFS, months (95% CI)	21.0 (4.2–31.9)	8.5 (4.7–15.2)

Shaw et al 2020 Lorlatinib in advanced ROS1-positive non-small-cell lung cancer: a multicentre, open-label, single-arm, phase 1–2 trial Lancet Oncol. 2019 Dec;20(12):1691-1701. doi: 10.1016/S1470-2045(19)30655-2. Epub 2019 Oct 25.

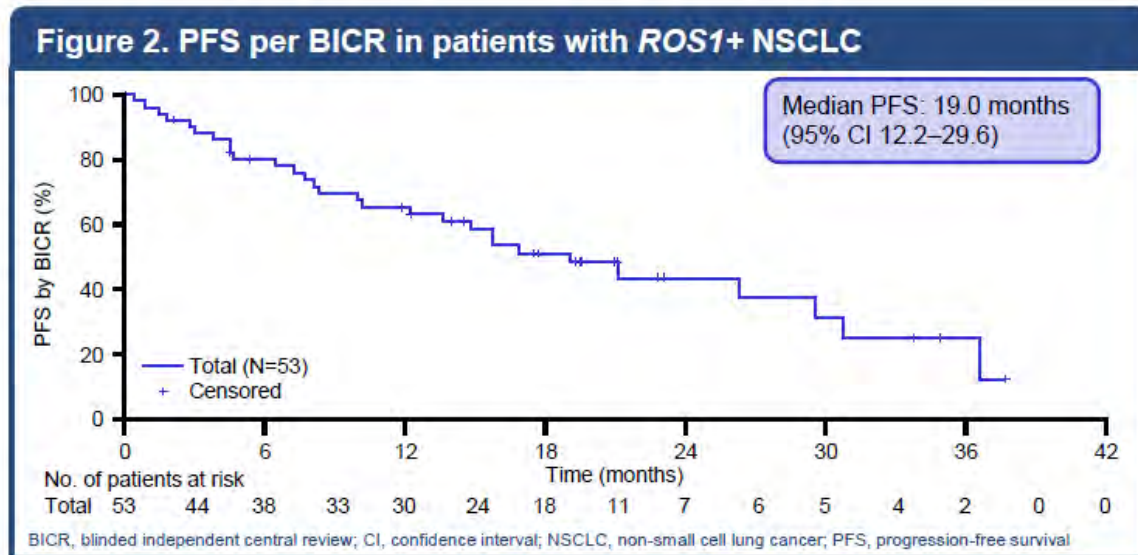
Intracranial efficacy of Lorlatinib

CNS metastases were present at baseline in 39 (57%) of 69 patients;
19 (49%) of whom had received previous brain-directed radiotherapy

	TKI-naïve	Prior crizotinib only
INTRACRANIAL	CNS metastases were measurable and non-measurable	
No. of patients with baseline CNS metastases	11	24
Best overall intracranial response, n		
Complete response	5 (45%)	9 (38)
Partial response	2 (18%)	3 (13)
Stable disease	2 (18%)	6 (25)
Objective progression	2 (18%)	2 (8)
Indeterminate	0	4 (17)
Confirmed intracranial ORR, n	7 (64%)	12 (50)
95% CI	31–89	29–71
Duration of intracranial response, months		
Median (95% CI)	NR (5.7–NR)	NR (11.0–NR)

- 6 TKI-naïve patients had measurable BL CNS metastases and 4 (67%) achieved intracranial responses

Integrated analysis of STARTRK-2, STARTRK-1 and ALKA-372-001: Entrectinib in ROS1-fusion positive NSCLC (TKI-naïve)



Responders, n (%)	ROS1+ NSCLC (n=53)
ORR, % (95% CI)	79.2 (65.9–89.2)
Complete response	5 (9.4)
Partial response	37 (69.8)
Stable disease	1 (1.9)
Progressive disease	4 (7.5)
Non complete/partial response	2 (3.8)
Missing/unevaluable	4 (7.5)

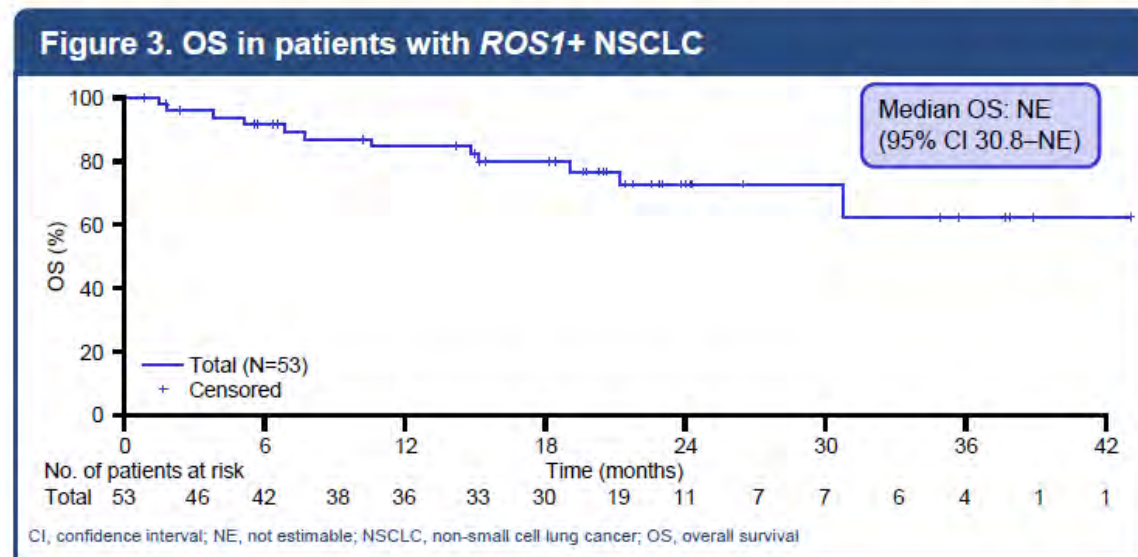


Table 3. IC ORR per BICR in ROS1+ NSCLC with baseline CNS disease

Responders, n (%)	ROS1+ NSCLC with baseline CNS disease (n=20)
ORR, % (95% CI)	55.0 (31.5–76.9)
Complete response	4 (20.0)
Partial response	7 (35.0)
Stable disease	0
Progressive disease	3 (15.0)
Non complete/partial response	4 (20.0)
Missing/unevaluable	2 (10.0)

CNS disease status determined by BICR
BICR, blinded independent central review; CI, confidence interval; CNS, central nervous system; NSCLC, non-small cell lung cancer
ORR, objective response rate

Entrectinib in ROS1-fusion positive NSCLC (TKI-naive)

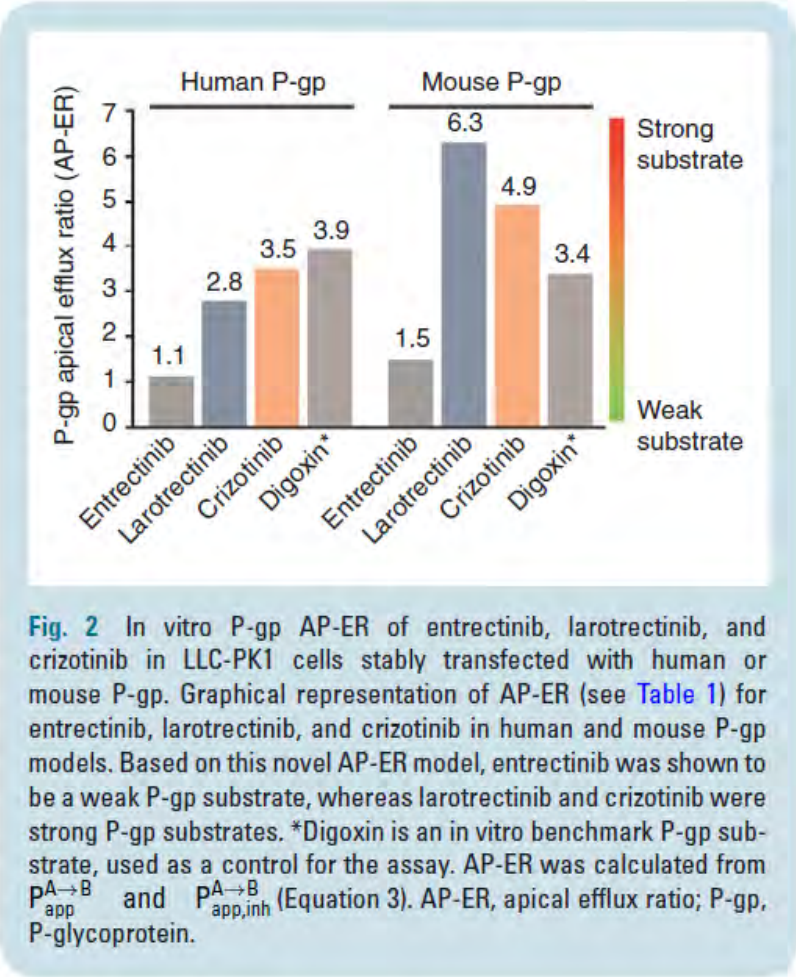


Table 2 Mean concentrations ($n = 4$) of entrectinib, crizotinib and larotrectinib in plasma, CSF and brain from rats after single i.v. bolus followed by i.v. infusion

Parameters	Entrectinib		Crizotinib		Larotrectinib	
	5 h	6 h	5 h	6 h	4 h	5 h
Plasma concentration, nM \pm SD	1260 \pm 430	1400 \pm 109	477 \pm 53.7	489 \pm 47.9	330 \pm 46.3	332 \pm 82.2
δ plasma concentration at SS, nM (SD)	140 (109–430)		12 (47.9–53.7)		2 (46.3–82.2)	
Brain concentration, nM \pm SD	567 \pm 71.2	843 \pm 186	390 \pm 12.1	477 \pm 131	21.4 \pm 3.74	23.0 \pm 5.60
δ brain concentration at SS, nM (SD)	276 (71.2–186)		87 (12.1–131)		1.6 (3.74–5.60)	
CSF concentration, nM \pm SD	0.99 \pm 0.2	0.81 \pm 0.2	1.1 \pm 0.36	0.78 \pm 0.18	3.16 \pm 0.76	3.56 \pm 0.87
Unbound plasma concentration ($C_{u,p}$), nM ^a	4.0	4.5	27	28	115	116
Unbound brain concentration ($C_{u,b}$), nM ^b	0.28	0.42	0.94	1.1	9.9	11
Measured CSF/ $C_{u,p}$ ratio	0.25	0.18 ^c	0.041	0.028 ^d	0.027	0.031 ^e

^a $C_{u,p}$ value initially calculated as product of mean plasma concentration by plasma F_u , and later determined using equilibrium dialysis in vitro.

^b $C_{u,b}$ value was initially calculated as the product of mean brain concentration by brain F_u , and later determined using kinetic LIMBA.

^cSS not reached after 6 hours.

^dNear SS after 6 hours.

^eNear SS after 5 hours.

δ , difference in concentrations between two different time points; CSF, cerebrospinal fluid; $C_{u,b}$, unbound drug concentration in brain; $C_{u,p}$, unbound drug concentration in plasma; F_u , unbound fraction; i.v., intravenous; LIMBA, lipid membrane binding assay; SD, standard deviation; SS, steady state.

Resistance on Crizotinib and ROS1 inhibitor in clinical trials

The activity of ROS1 inhibitors* against known crizotinib-resistant ROS1 mutations

	Gatekeeper L2026M	α C helix S1986Y/F	G2032R	Solvent front D2033N	L1951R
Crizotinib	No	No	No	No	No
Ceritinib	Yes	No	No	No	No
Brigatinib	Yes	Unknown	No	No	No
Lorlatinib	Yes	Yes	Yes/No	Yes	Unknown
Entrectinib	No	Unknown	No	Unknown	Unknown
Repotrectinib	Yes	Unknown	Yes	Yes	Unknown
Cabozantinib	Yes	Unknown	Yes	Yes	Yes

This table is based on the available preclinical data, not all of which have been validated in the clinic. Of note, preclinical data for the activity of lorlatinib against G2032R has been mixed (and thus indicated as 'Yes/No'); clinical activity remains to be determined

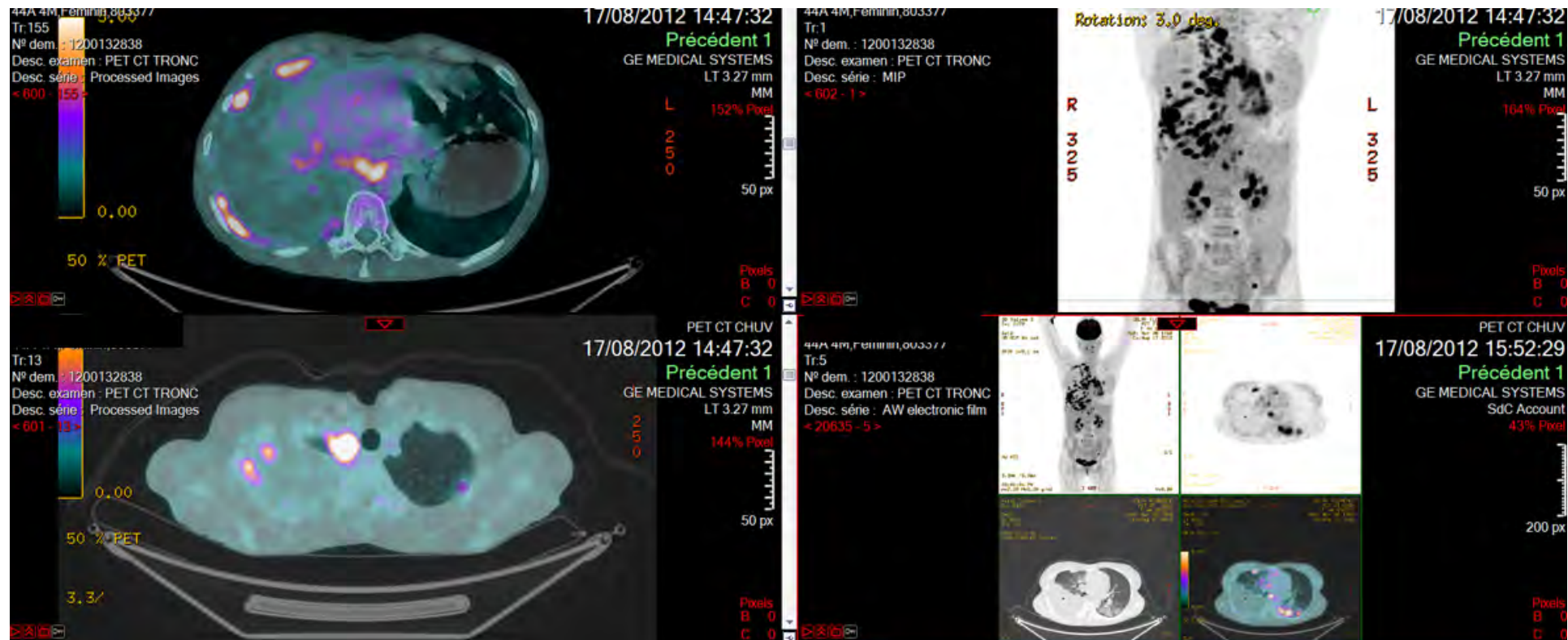
* Ceritinib, Brigatinib, Lorlatinib, Repotrectinib, and Cabozantinib are not approved for ROS1+NSCLC by any health authority and Entrectinib is only FDA approved.

Challenging Questions and Cases



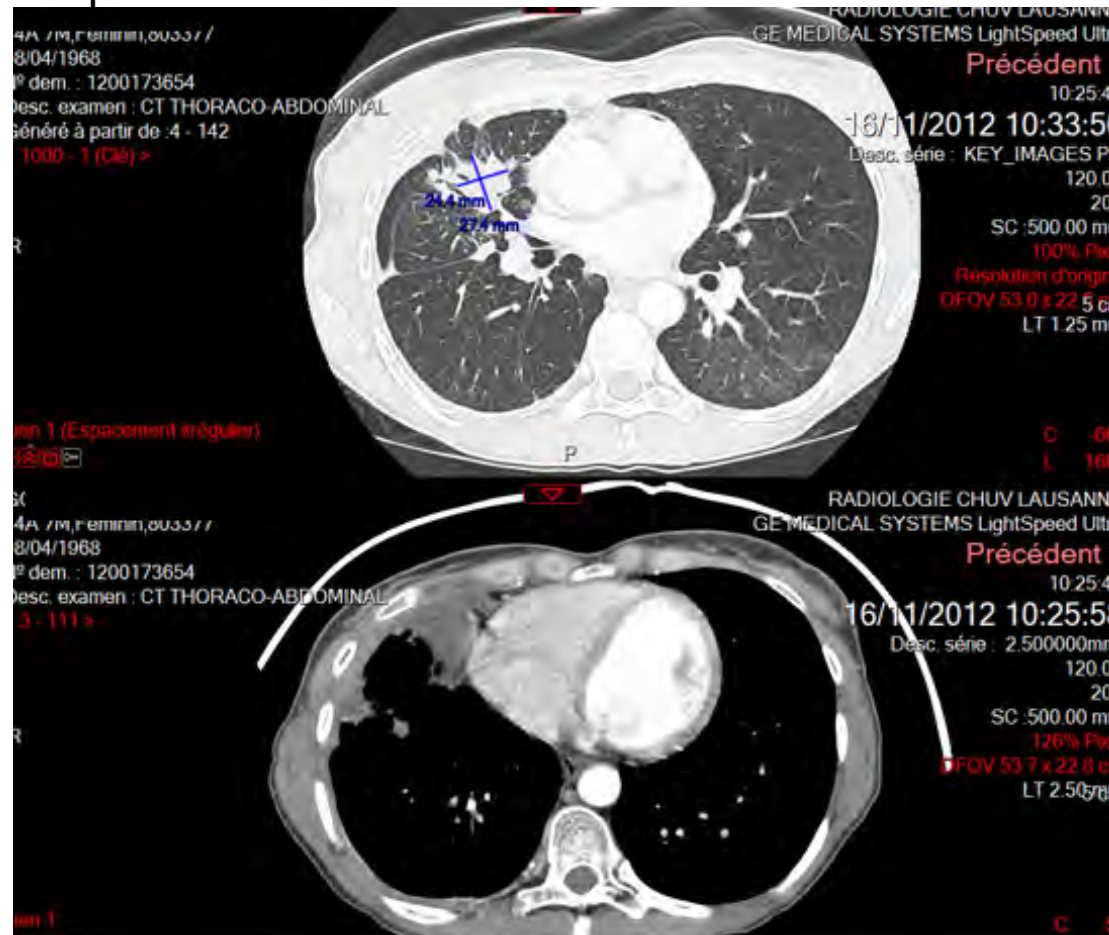
Case Presentation – Professor Peters: A 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

- 44 years old. Never smoker
- 08.2012: 1st diagnosis of stage IV right lung adenocarcinoma
- cT3 cN2 cM1b (pleural metastases and abdominal lymph nodes), 7th edition TNM
- Bronchoscopy and EBUS: No EGFR/HER2/KRAS mutations, no ALK rearrangement



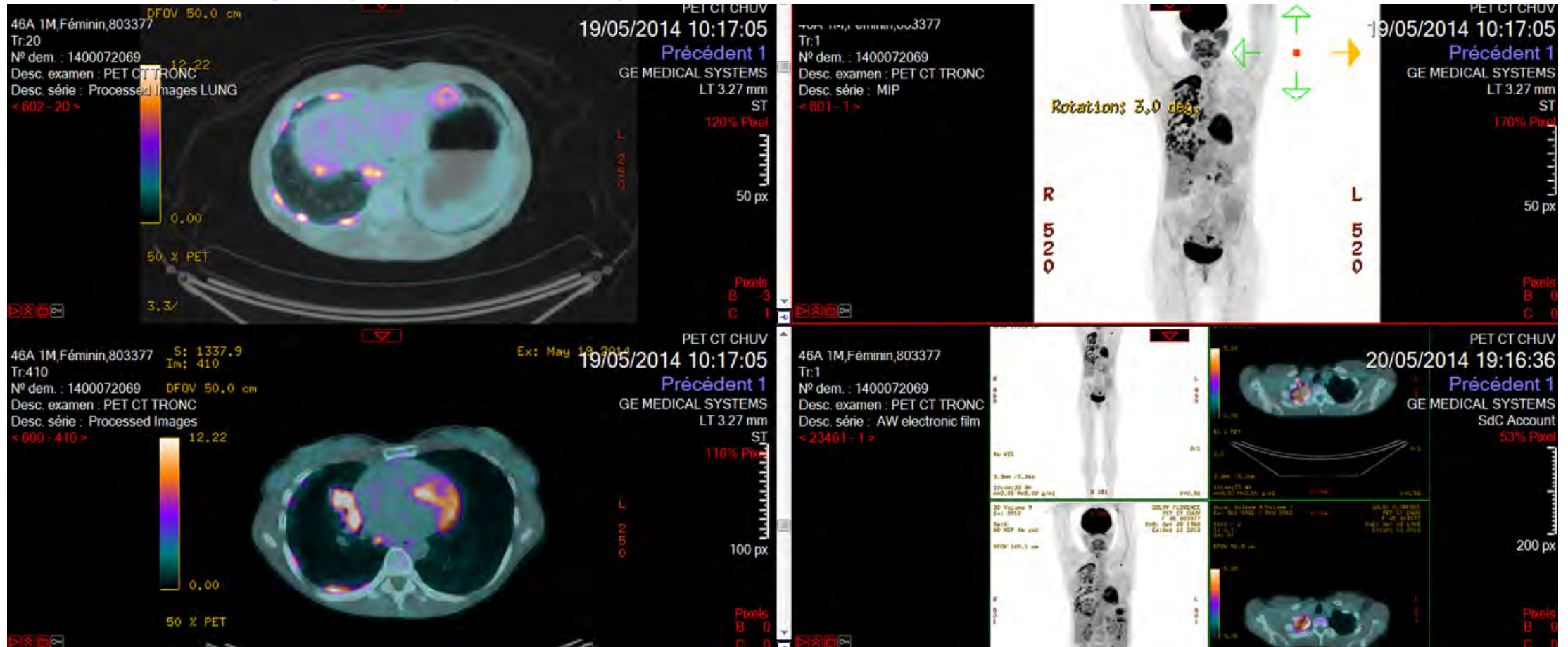
Case Presentation – Professor Peters: A 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

- 08.2012 to 2014: 1st line chemotherapy: 4 cycles of carboplatin/pemetrexed-bevacizumab followed by 23 cycles of maintenance with
- Pemetrexed/bevacizumab
- PR as best response



Case Presentation – Professor Peters: A 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

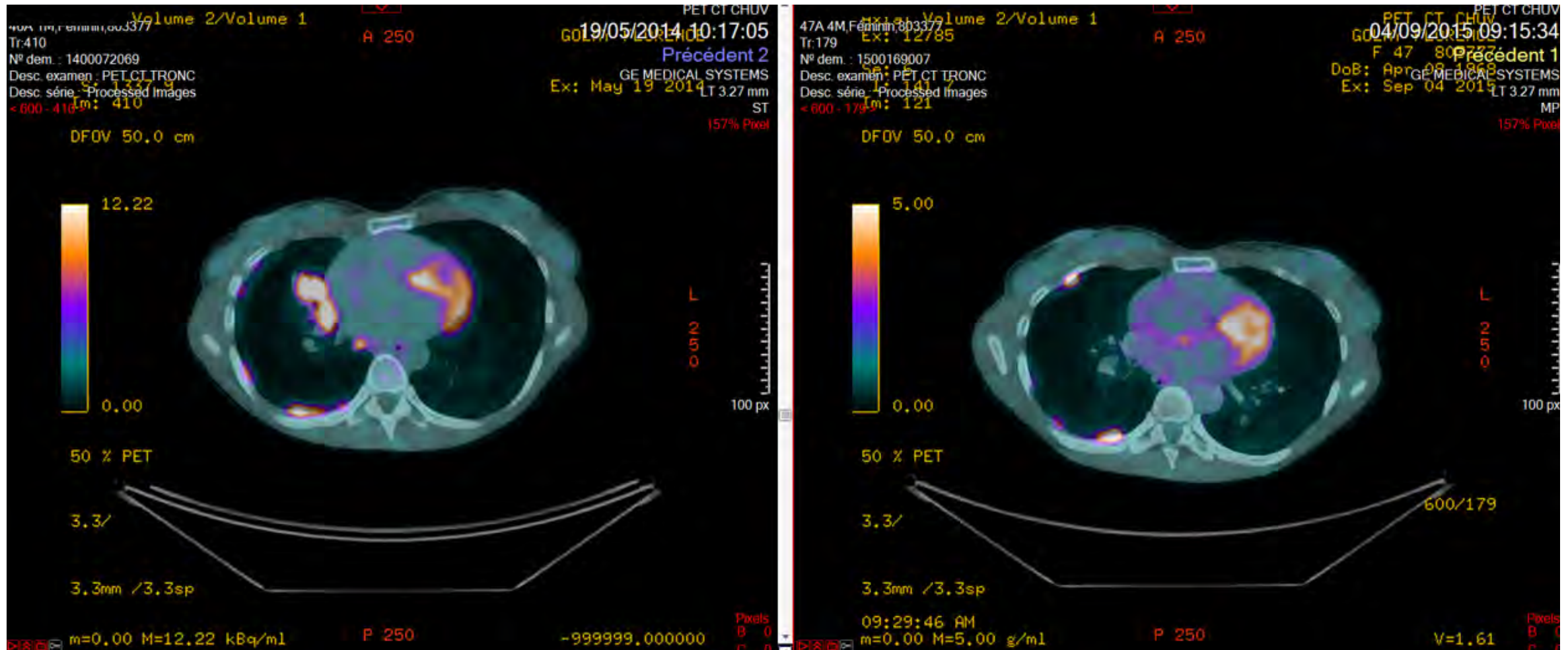
05.2014: PD (lung progression)



✓ ROS-1 rearrangement diagnosed by IHC (testing still in development then) confirmed by RT-PCR

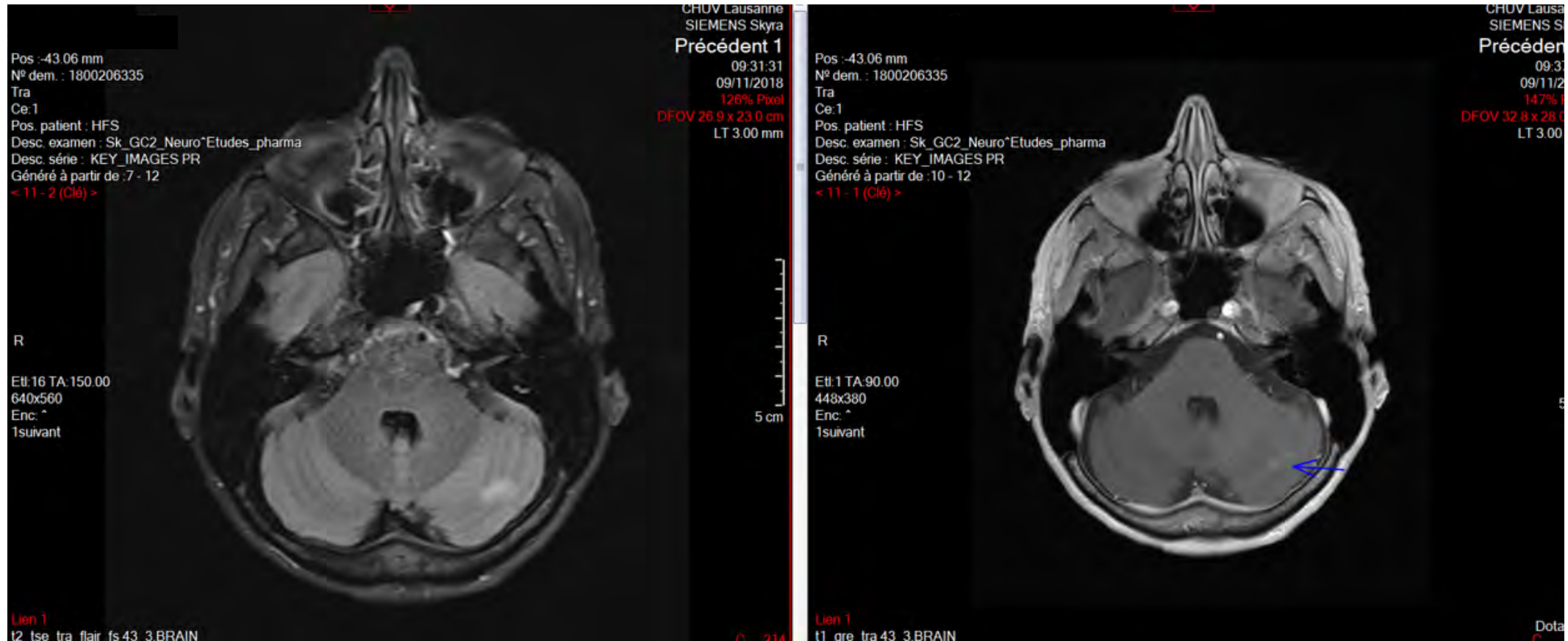
Case Presentation – Professor Peters: A 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

- 06.2014 to 05.2016: 2nd line with crizotinib 250 mg bid
- PR as best response



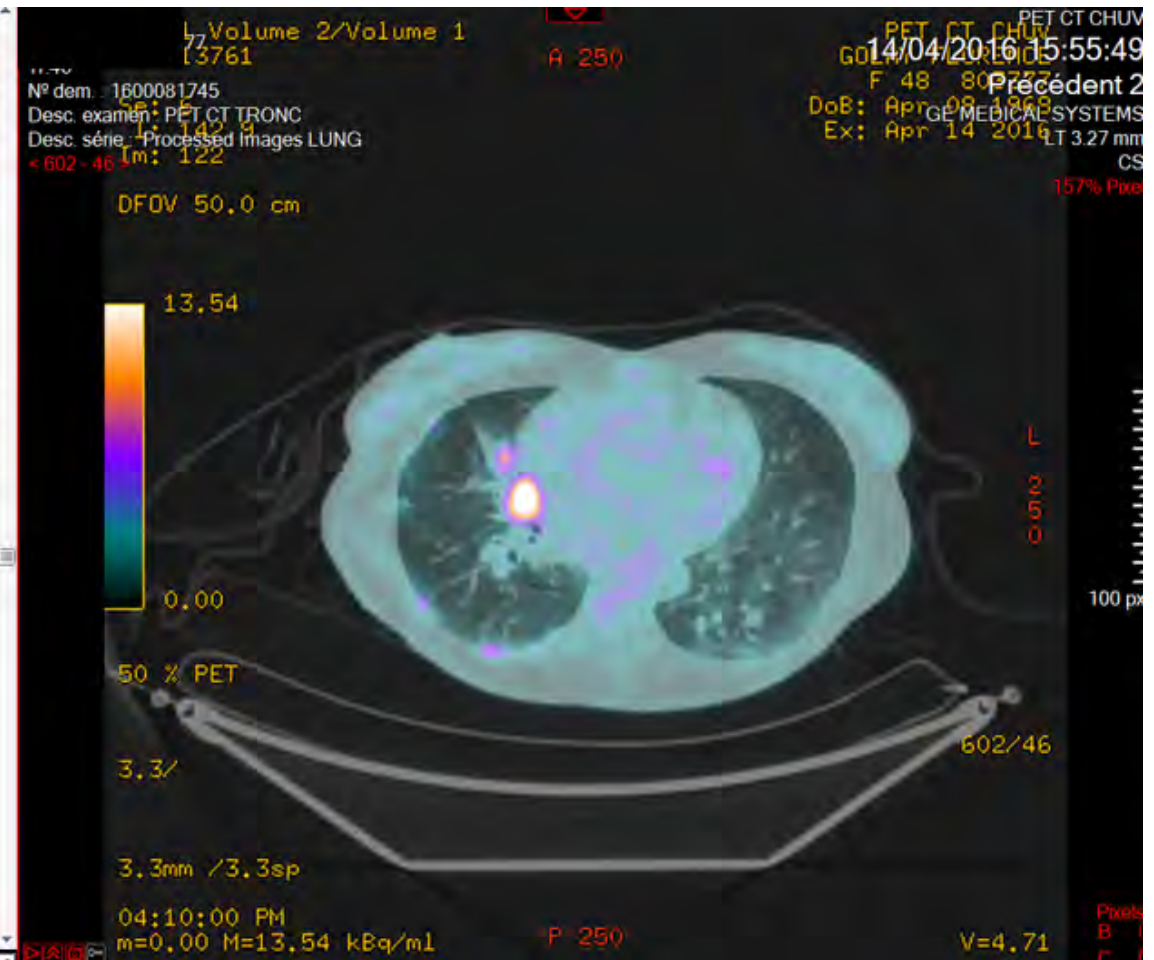
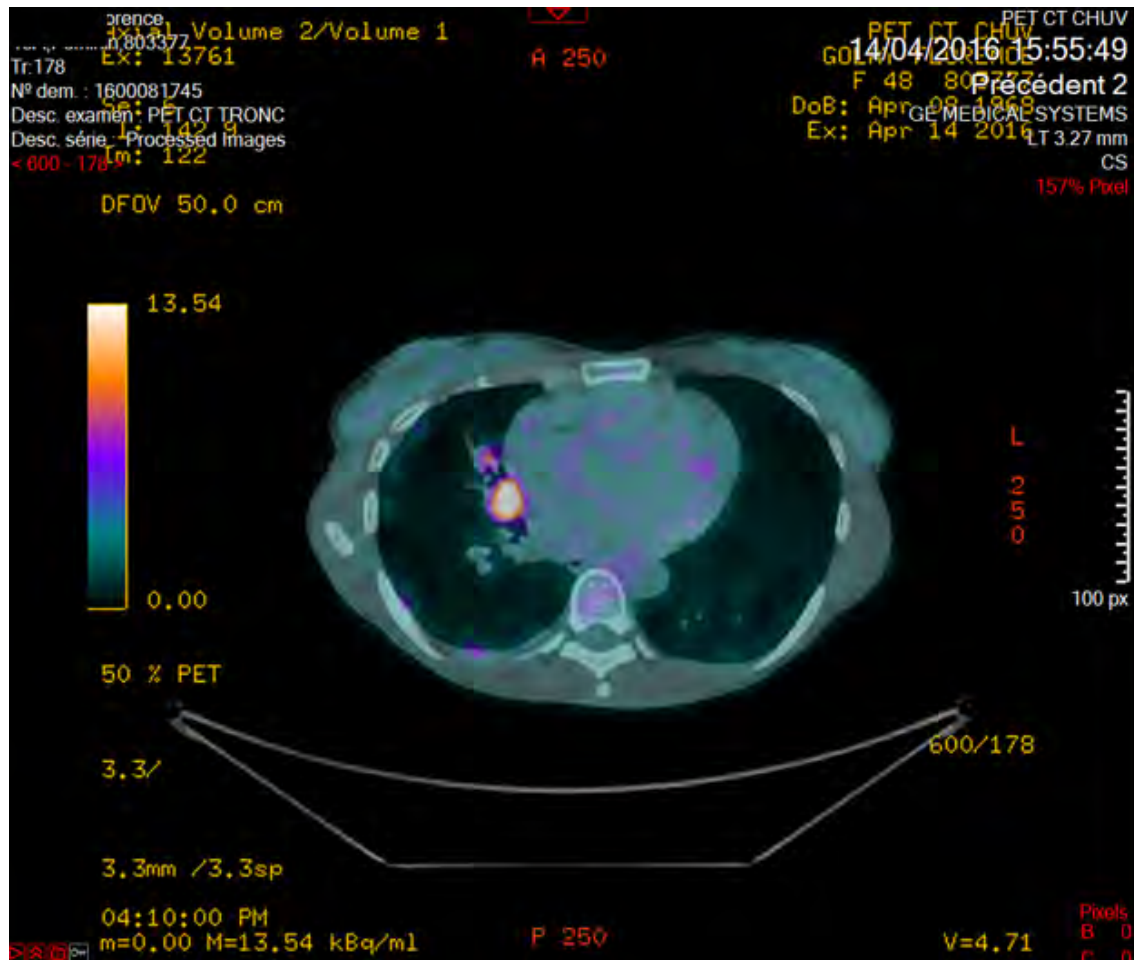
Case Presentation – Professor Peters: A 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

10.2015: CNS progression: SBRT
Continuation of crizotinib



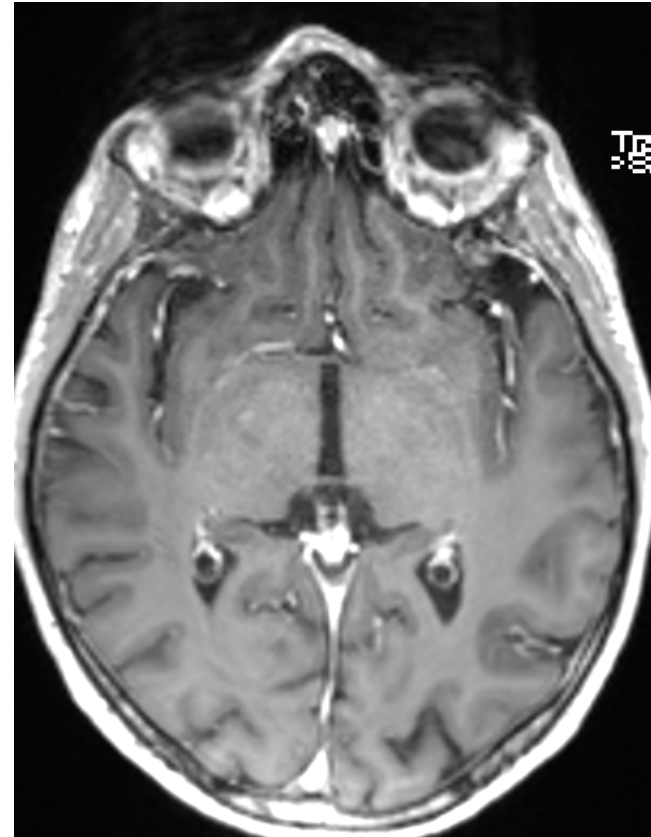
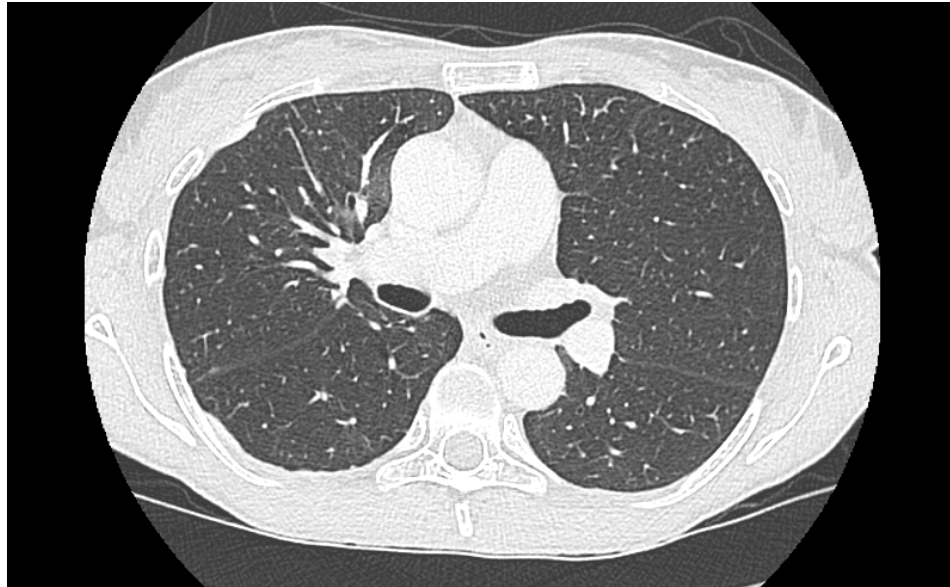
Case Presentation – Professor Peters: A 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

04.2016: PD (lung progression)



Case Presentation – Professor Peters: A 44-year-old with adenocarcinoma of the lung and a ROS1 rearrangement

- Since 08.2016: 3rd line lorlatinib and CR (best response)
 - Some mood changes (anxiety) and weight gain, severe hypercholesterolemia (grade 3)
 - Dose lowered to 75 mg/d
 - Improvement to grade 1



June 2020

Courtesy of Solange Peters, MD, PhD

MODULE 7: Other Targetable Genetic Abnormalities

- **Key Relevant Data Sets**

TRK inhibitors are active in TRK fusion-positive cancers

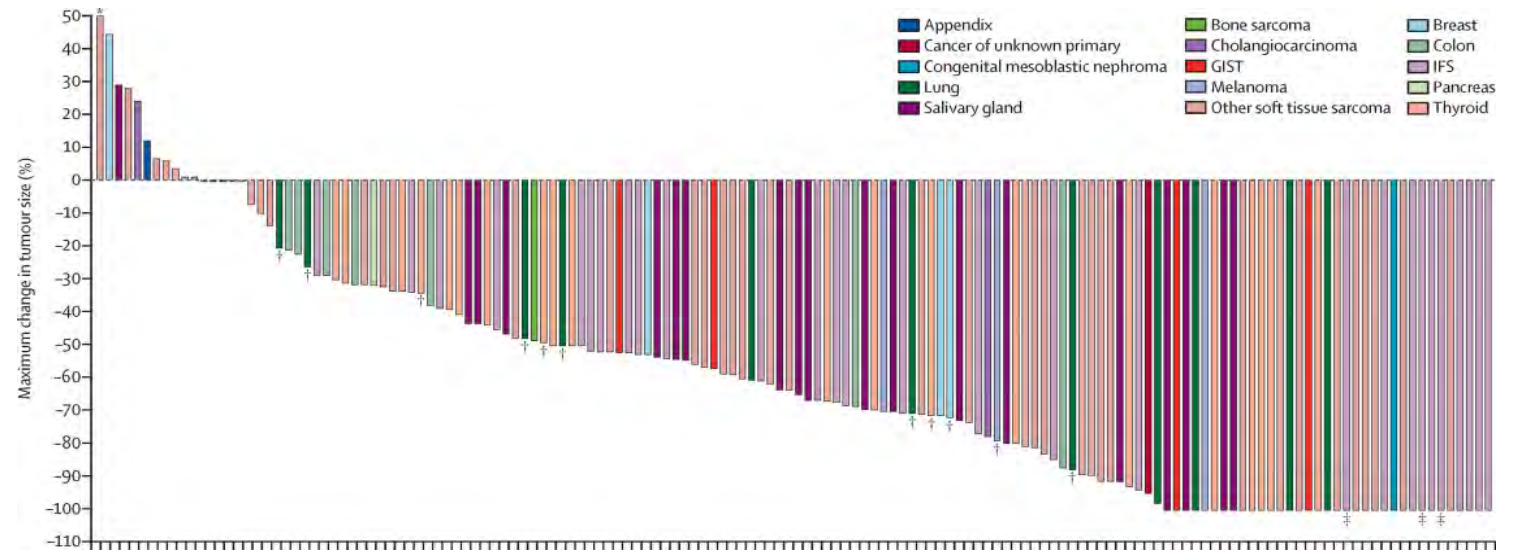
Larotrectinib

ORR 79%

(95% CI 72-85%, n=159)

Median DoR 35.2 months

Median PFS 28.3 months



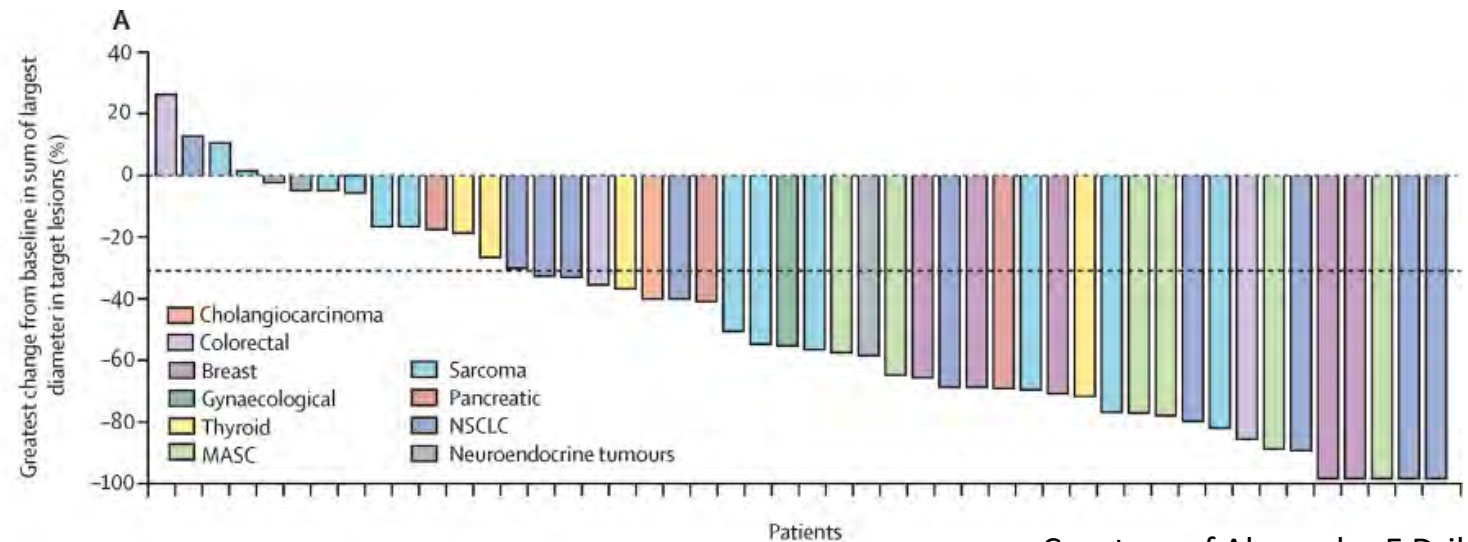
Entrectinib

ORR 57%

(95% CI 43-71%, n=54)

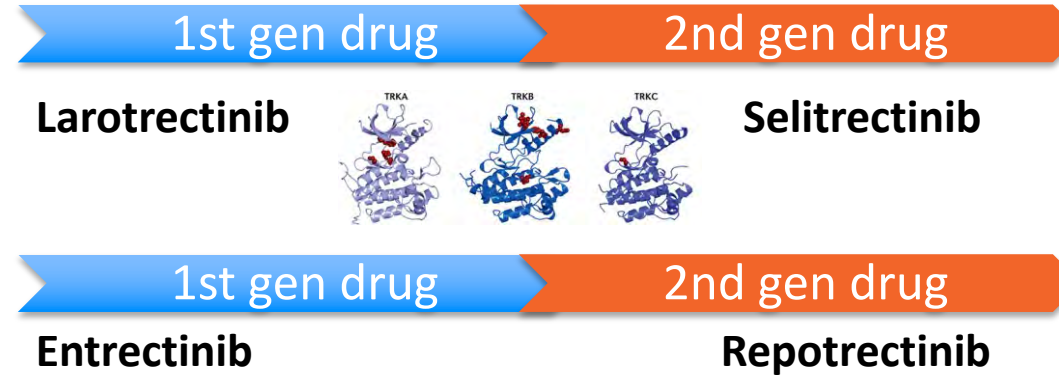
Median DoR 10 months

Median PFS 11 months



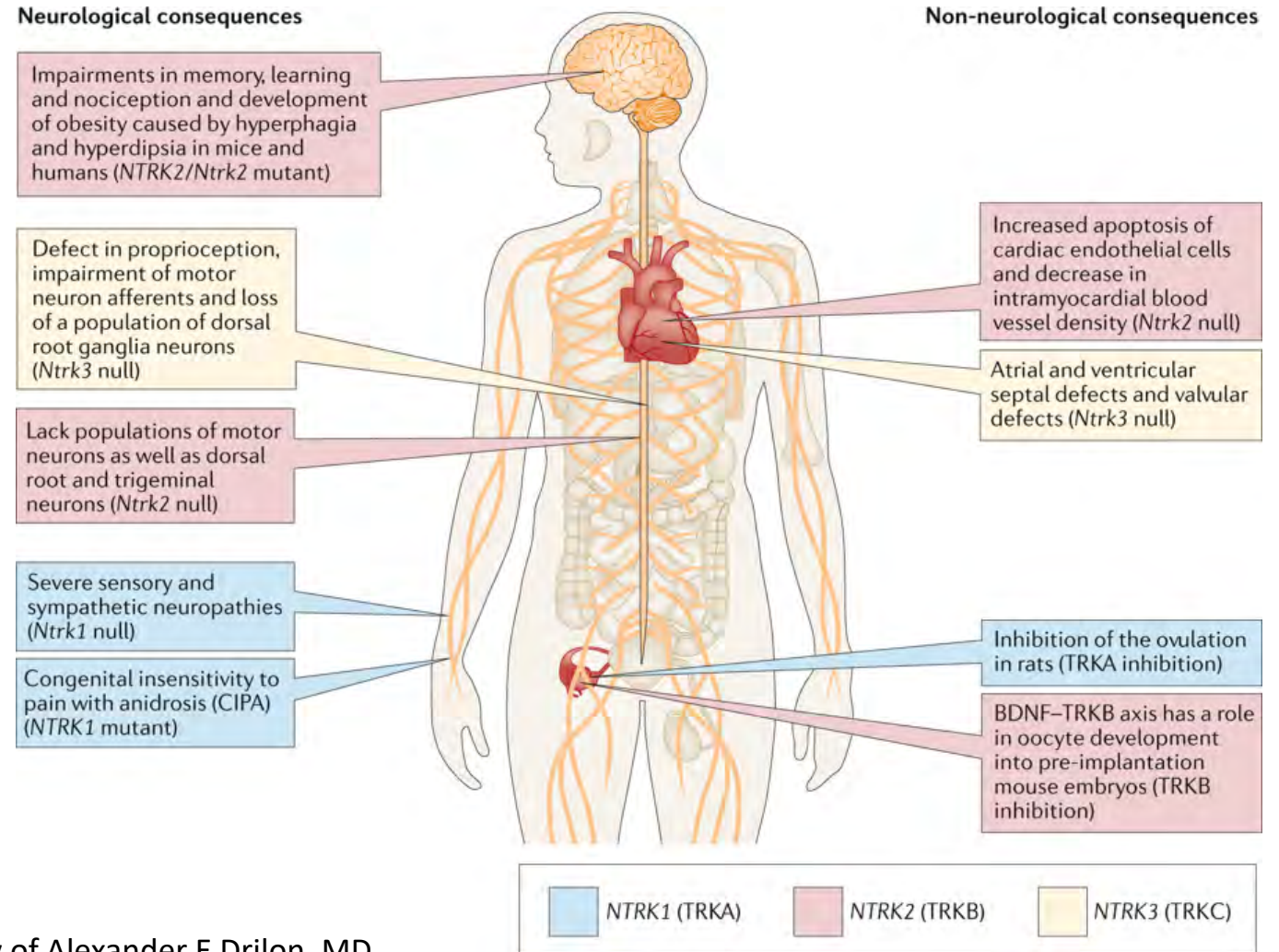
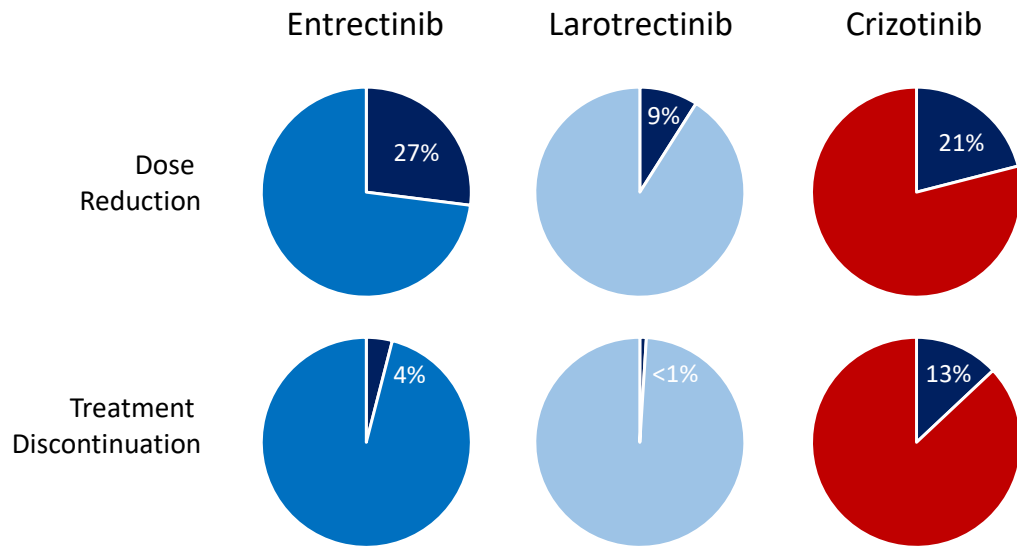
Courtesy of Alexander E Drilon, MD
Memorial Sloan Kettering
Cancer Center

Second-generation TRK inhibitors can address on-target resistance

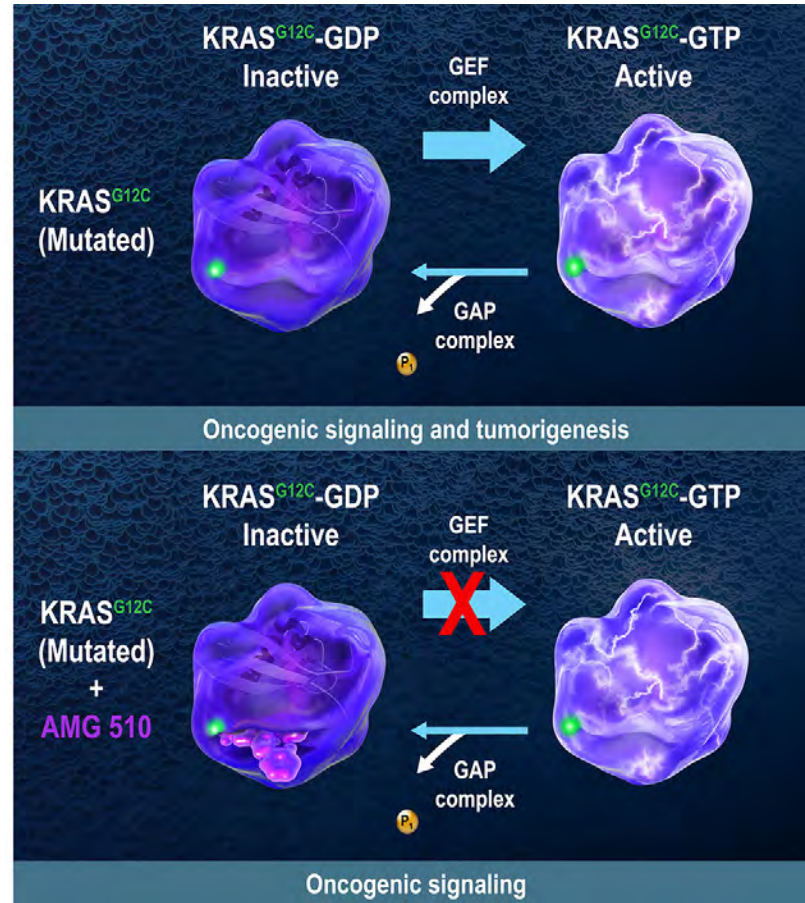


Courtesy of Alexander E Drilon, MD

TRK inhibitors have favorable overall safety profiles and occasional unique adverse events



Mutant-selective direct inhibitors: *KRAS* G12C-mutant NSCLC



Mutant-selective direct inhibitors: *KRAS* G12C-mutant NSCLC

Sotorasib
(AMG-510, n=23)

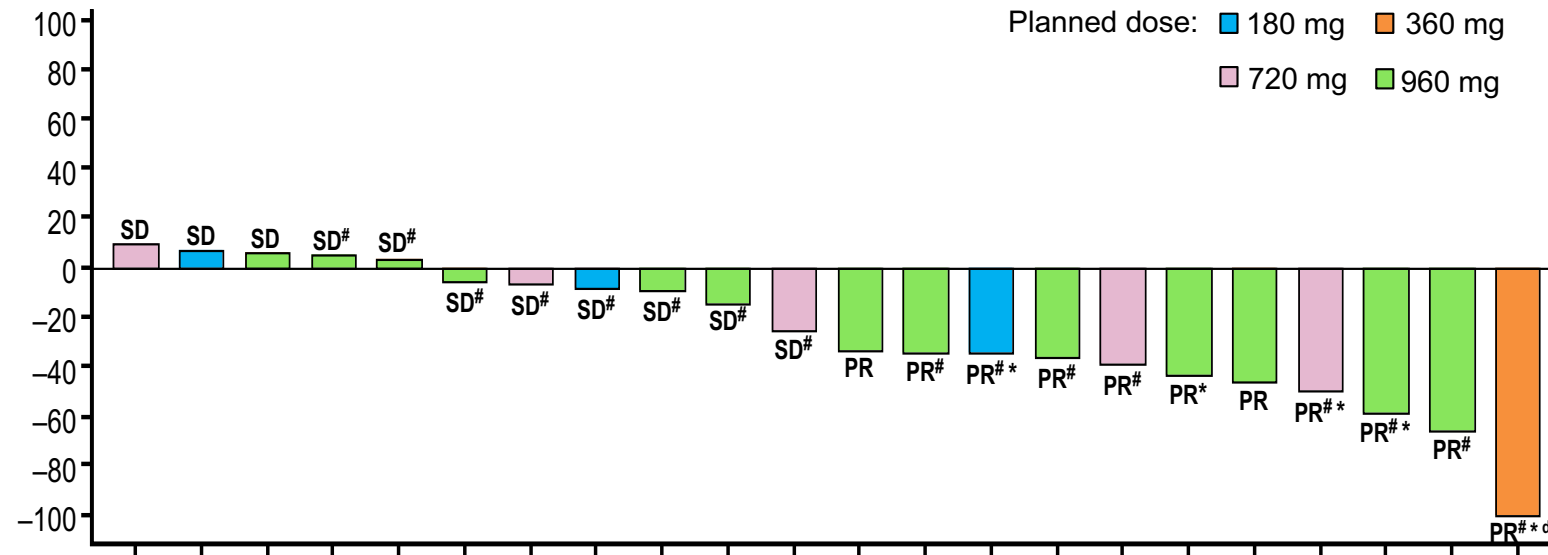
ORR 48%

PR 48%

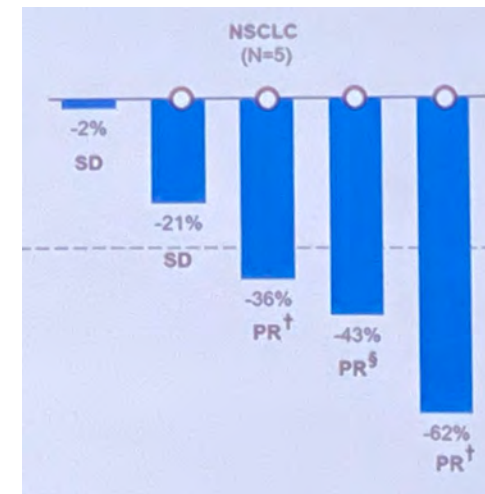
SD 48%

PD 4%

No DLTs or AEs leading
to Tx discontinuation



MRTX849
3/5 PRs
(n=5)



Clinical Investigator Perspectives on the Current and Future Management of Multiple Myeloma

A Meet The Professor Series

Thursday, July 16, 2020
8:00 AM – 9:00 AM ET

Sagar Lonial, MD

Chair and Professor

Department of Hematology and Medical Oncology

Anne and Bernard Gray Family Chair in Cancer

Chief Medical Officer

Winship Cancer Institute

Emory University School of Medicine

Atlanta, Georgia

Co-provided by **USFHealth**



Thank you for joining us!

**CME and MOC credit information will be
emailed to each participant within 5 days.**