

PHARMACOLOGICAL INNOVATIONS AND INTEGRATION WITH RADIOTHERAPY IN THIRD STAGE NSCLC

Sara Ramella
Radiation Oncology
Campus Bio-Medico University
s.ramella@unicampus.it





Conflict of interest

Name of Ineligible Nature of the Relationship(s) with

Companies Ineligible Companies

Astra Zeneca

Other

Roche Other

Amgen Other

Merck (MSD) Speakers Bureau

Genetec Speakers Bureau

Gentili Speakers Bureau

If "Other" relationship, please describe.

Advisory Board, Speakers Bureau,

Research Funding

Speakers Bureau, Research Funding

Speakers Bureau, Research Funding









Abstract number: 8511

5-YEAR SURVIVAL OUTCOMES WITH DURVALUMAB AFTER CHEMORADIOTHERAPY IN UNRESECTABLE STAGE III NSCLC – AN UPDATE FROM THE PACIFIC TRIAL

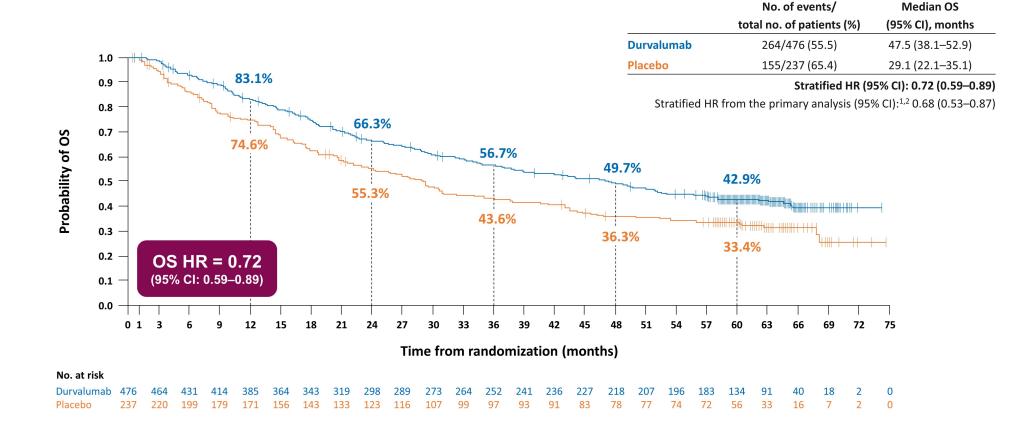
David R. Spigel,¹ Corinne Faivre-Finn,² Jhanelle E. Gray,³ David Vicente,⁴ David Planchard,⁵ Luis Paz-Ares,⁶ Johan F. Vansteenkiste,⁷ Marina C. Garassino,^{8,9} Rina Hui,¹⁰ Xavier Quantin,¹¹ Andreas Rimner,¹² Yi-Long Wu,¹³ Mustafa Özgüroğlu,¹⁴ Ki H. Lee,¹⁵ Terufumi Kato,¹⁶ Maike de Wit,¹⁷ Euan Macpherson,¹⁸ Michael Newton,¹⁹ Piruntha Thiyagarajah,²⁰ Scott J. Antonia³

¹Sarah Cannon Research Institute/Tennessee Oncology, Nashville, Tennessee, USA; ²The University of Manchester and The Christie NHS Foundation Trust, Manchester, UK; ³H. Lee Moffitt Cancer Center and Research Institute, Tampa, Florida, USA; ⁴Hospital Universitario Virgen Macarena, Seville, Spain; ⁵Department of Medical Oncology, Thoracic Unit, Gustave Roussy, Villejuif, France; ⁶Universidad Complutense, CiberOnc, CNIO and Hospital Universitario 12 de Octubre, Madrid, Spain; ⁷University Hospitals KU Leuven, Leuven, Belgium; ⁸Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy; ⁹Department of Hematology/Oncology, The University of Chicago, Chicago, Illinois, USA; ¹⁰Westmead Hospital and the University of Sydney, Sydney, NSW, Australia; ¹¹Montpellier Cancer Institute (ICM)





Updated OS (ITT)



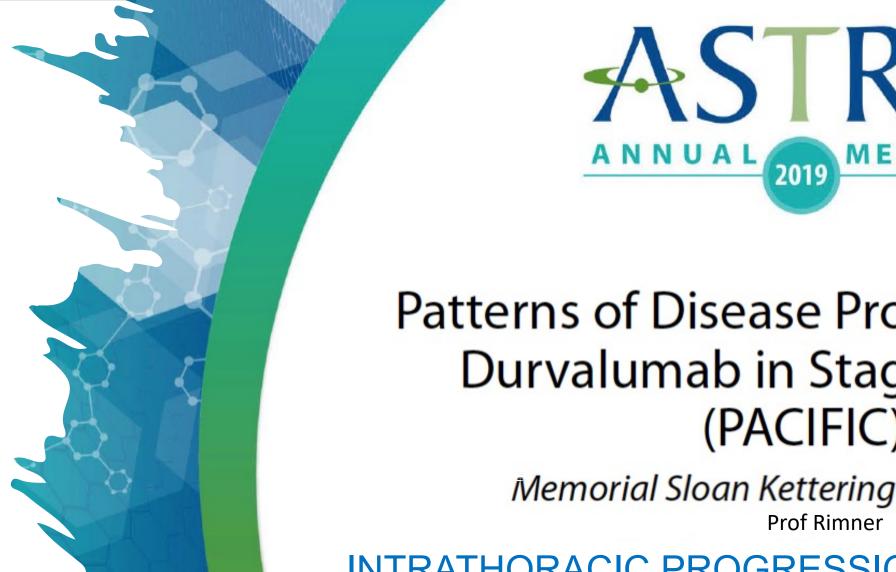
CI, confidence interval; HR, hazard ratio; ITT, intent-to-treat; OS, overall survival

Data cutoff: 11 January 2021 (median follow-up: all patients, 34.2 months [range, 0.2-74.7]; censored patients, 61.6 months [range, 0.4-74.7]). 1. Antonia SJ, et al. New Engl J Med 2018;379:2342-50; 2. European Medicines Agency. Durvalumab (Imfinzi). Summary of product characteristics 2020. Available from: https://www.ema.europa.eu/en/documents/product-information/imfinzi-epar-product-information_en.pdf 5. [Accessed April 2021]



RANDOMIZED TRIALS ON CHEMORADIATION IN LOCALLY-ADVANCED NSCLC

Endpoints	PACIFIC ¹ Durvalumab	PACIFIC¹ (Placebo)	RTOG 0617 60Gy	PROCLAIM standard	PROCLAIM Pem/Plat	PET-Plan standard	PET-Plan IF
Median Follow- up	34.2 months	34.2 months	5.1 years	22.6	22.2	29m	29m
No	476	237	217	301	297	99	106
IMAGING	TC mdc		PET 91% RM brain	PET 83%		PET	100%
Progression Free Survival							
Median	16.9 m	5.6 m	11.8	9.8	11.4	10.2	11
5 years	33.1%	19%	18.3%				
Overall Survival							
Median	47.5m	29.1m	28.7m	25m	26.8m	36m	30m
12-month	83.1%	75.3%	80.0%	77%	76%	80%	75%
3 years	56.7%	43.6%	45%	37%	40%	50%	40%
5 years	42.9%	33.4%	32.1%	-	-	33%	33%





Patterns of Disease Progression with Durvalumab in Stage III NSCLC (PACIFIC)

Memorial Sloan Kettering Cancer Center

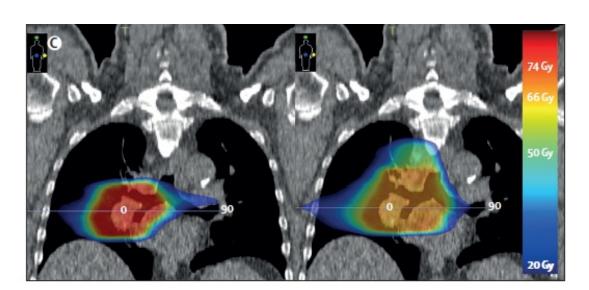
INTRATHORACIC PROGRESSION WAS THE MOST COMMON PROGRESSION (80.6% VS 74.5% OF PROGRESSORS, 36.6% vs 48.1 of ITT population)

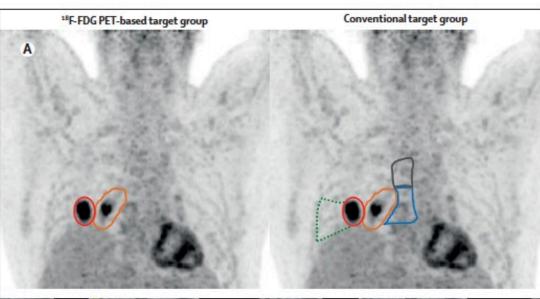


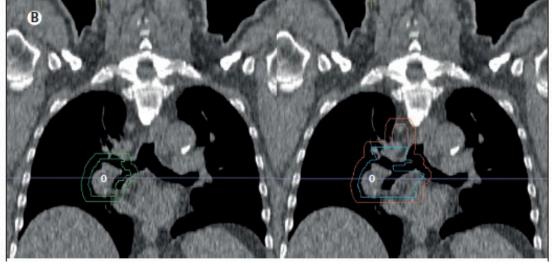
Imaging-based target volume reduction in chemoradiotherapy for locally advanced non-small-cell lung cancer (PET-Plan): a multicentre, open-label, randomised, controlled trial



Ursula Nestle, Tanja Schimek-Jasch, Stephanie Kremp, Andrea Schaefer-Schuler, Michael Mix, Andreas Küsters, Marco Tosch, Thomas Hehr, Susanne Martina Eschmann, Yves-Pierre Bultel, Peter Hass, Jochen Fleckenstein, Alexander Thiome Marcus Stockinger Varin Dischmann Matthias Miederer, Gabriele Holl, H Christian Rischke, Eleni Gkika, Sonja Adebahr, J











PET-Plan target volumes

All PET-based CTV primary tumour (PET-GTV + 3 mm to CTV) pathologically and/or FDG-positive LN-stations (anatomical, Chapet)

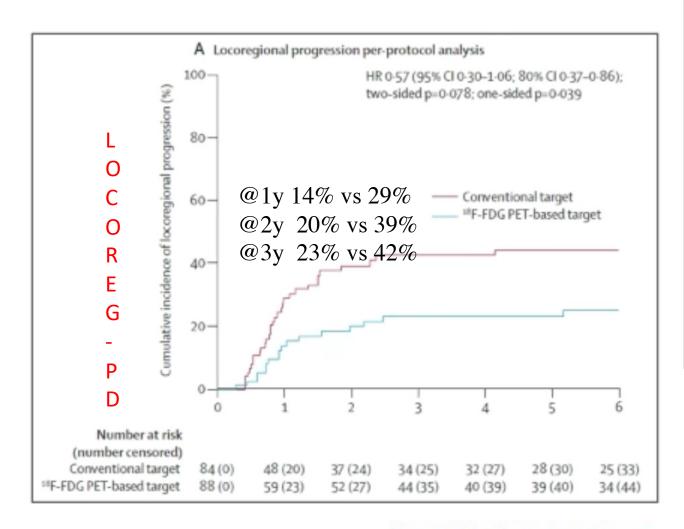
Arm A conventional target group expanded PET-CTV

- + atelectasis (3cm), + CT positive LNS)
- -> isotoxic dose escalation 60- 74 Gy / 2 Gy

elective LN volumes (10%-risk involvement) 50 Gy / 2 Gy

Arm B experimental purely PET-based target group PET-CTV

-> isotoxic dose escalation 60- 74 Gy / 2 Gy



Lancet Oncol 2020; 21: 581-92



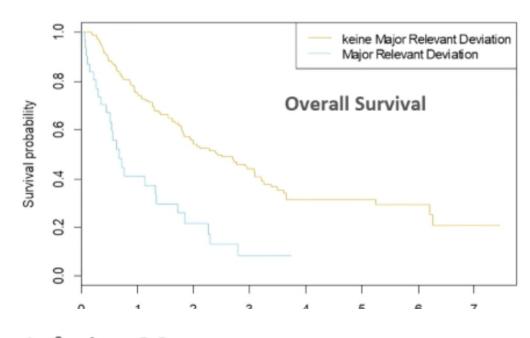


RT Plan data RTQA: A24, B20 items

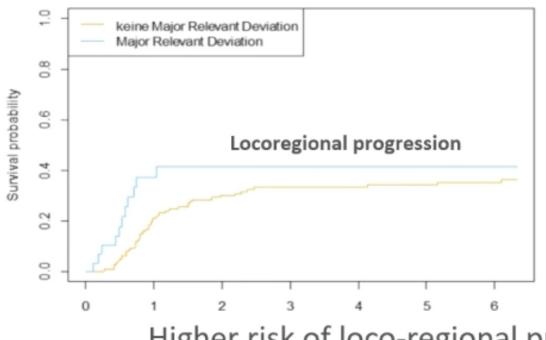
No at risk

173 31

PP No deviation per protocol MI Minor deviation MA-Major deviation nonrelevant (treatment) MA+
Major deviation relevant
(treatment change)



Inferior OS HR 2.9 [95% CI 1.8–4.4], p<.001

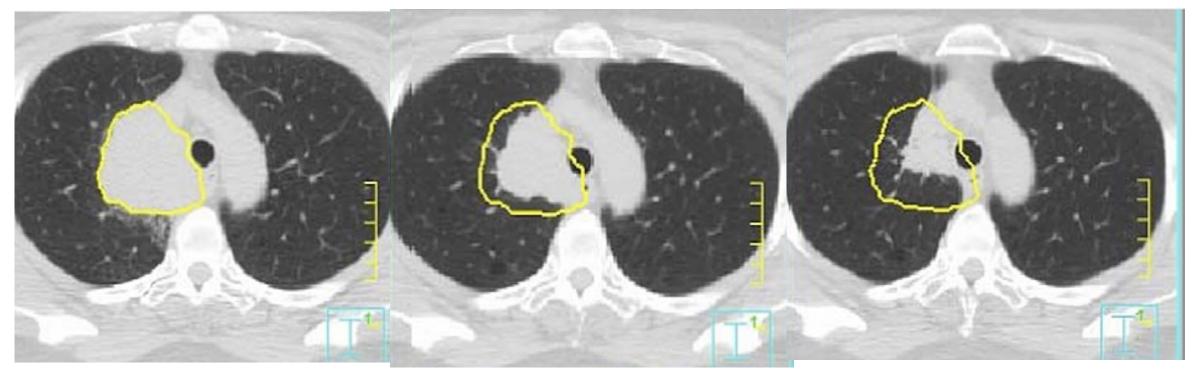


Higher risk of loco-regional progression HR 5.7 [95% CI 2.7–11.1], p<.001

RANDOMIZED TRIALS ON CHEMORADIATION IN LOCALLY-ADVANCED NSCLC

Endpoints	PACIFIC ¹ Durvalumab	PACIFIC ¹ (Placebo)	RTOG 0617 60Gy	PROCLAIM standard	PROCLAIM Pem/Plat	PET- Plan Stand	PET-Plan PET-based IF	PET boost Whole T	PET boost PET subvol	RTOG 1106 Stand	RTOG 1106 PET based Adaptation
Median Follow- up	34.2 m	34.2 m	5.1years	22.6m	22.2m	29m	29m	61m	61m	3.6years	3.6years
N°	476	237	217	301	297	99	106	54	53	43	84
IMAGING	TC m	dc	PET 91% RM brain	PET 83% PET 100%		PET 100% Local Failure is PET-based redu		e is low	PET 100% is low with educed volume		
Progression Free	Survival										
Median	16.9 m	5.6 m	11.8	9.8	11.4	10.2	11	-	-	-	-
5 years	33.1%	19%	18.3%								
Local Failure/ LRP Freedom	-	-	2y: 30.7%	37.3%	45.8%	2y: 39%	2y: 20%	FFLF 2y: 89%	FFLF 2y: 82%	LRPF 2y:59.5 %	LRPF 2y:54.6%
Overall Survival											
Median	47.5m	29.1m	28.7m	25m	26.8m	36m	30m	18m*	17m*		
3 years	56.7%	43.6%	45%	37%	40%	50%	40%	-	-	49.1%	47.5%
5 years	42.9%	33.4%	32.1%	-	-	33%	33%	30%	20%	-	-

ADAPTIVE RADIOTHERAPY









Fox J, IJROBP, 2009

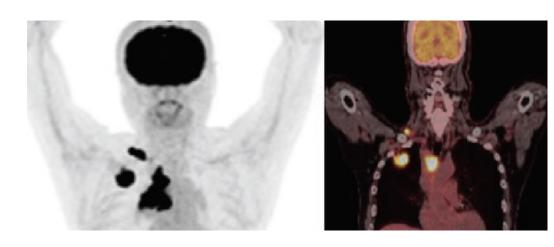




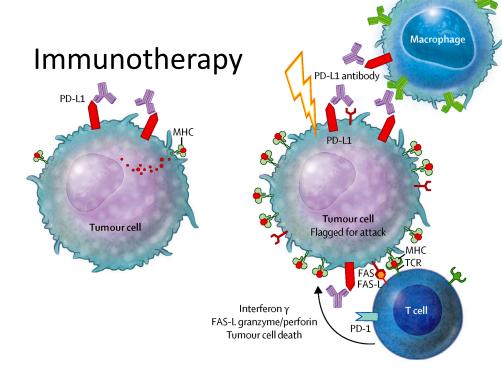
«ONE NEVER NOTICE WHAT HAS BEEN DONE; ONE CAN ONLY SEE WHAT REMAINS TO BE DONE»

FUTURE TRIALS....

NEW Radiotherapy Volumes*

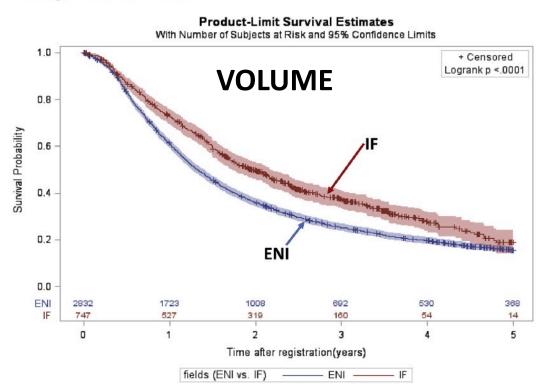




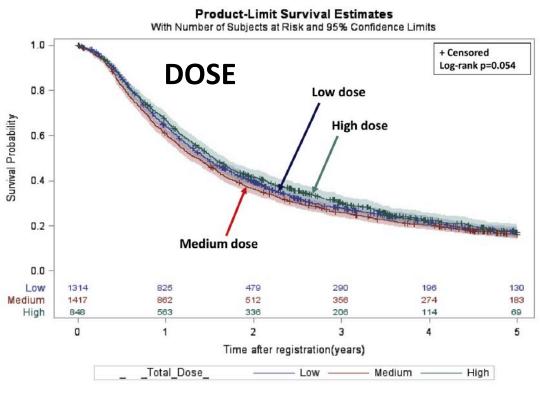


^{*}not the same of PACIFIC trial

Exploring Radiotherapy Targeting Strategy and Dose: A Pooled Analysis of Cooperative Group Trials of Combined Modality Therapy for Stage III NSCLC



3600 LA-NSCLC, 16 coop group trials of cCRT *Schild JTO 2018; 13(8): 1171-1189*



«Schild e al showed IMPROVED LOCAL CONTROL in REDUCED TARGET VOLUMES not necessarly related to dose......One may speculate that a reduction of CTVs could contribute to optimum RT-induced immune stimulation by omitting the irradiation of draining lymph nodes»

Nestle U et al, Trans Lung Cancer Res 2021; 10(4): 1999-2010

Lymphocytes Rich Organs (LRO)

- a) The organs or structure rich in *circulating* lymphocytes sensitive to the dose rate (DR) of irradiation and Beam-On-Time (BOT)
- b) The organs or structure rich in *non*-circulating lymphocytes or its precursor such as the nodes, the spleen and the bone marrow less or not sensitive to DR or BOT

Lymphocytes Sparing Radiotherapy: next step...



SOC (60 Gy/2 Gy + Chemo) followed by adjuvant I.O. (Pacific trial schedule)

VS

LSRT + chemo followed by adjuvant I.O. (SOC)

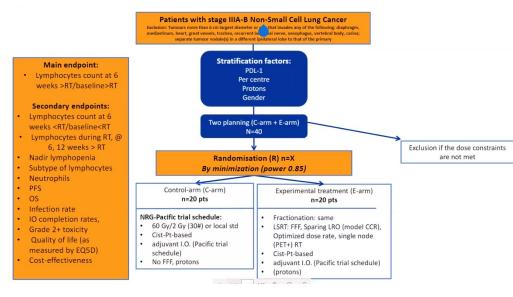
Main endpoint = Lymphopenia at baseline/ 6 weeks (= short trial & feasible, validated biomarker...)

Sec endpoints: acute & chronic Lymphopenia, PFS....

The new paradim



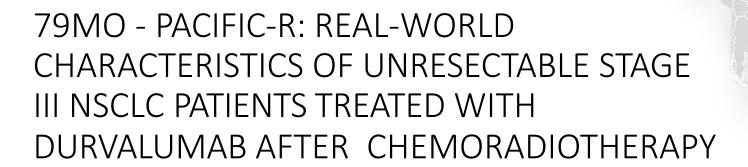




Lambin P, EORTC Lung
Cancer Group 2021







<u>Fiona McDonald</u>,¹ Francoise Mornex,² Marina Garassino,³ Andrea Riccardo Filippi,⁴ Daniel Christoph,⁵ Vilde Drageset Haakensen,⁶ Abed Agbarya,⁷ Michel van den Heuvel,⁸ Piet Vercauter,⁹ Christos Chouaid,¹⁰ Eric Pichon,¹¹ Shankar Siva,¹² Laurie Steinbusch,⁸ Idit Peretz,¹³ Ben Solomon,¹² Lore Decoster,¹⁴ William Sawyer,¹⁵ Allison Allen,¹⁶ Muriel Licour,¹⁷ Nicolas Girard¹⁸

1193 patients enrolled in 254 active sites in 10 participating countries







17:30 - 18:30 Mini oral session - Non-metastatic NSCLC and other thoracic malignancies

CHAIRS: ALFREDO ADDEO, LIZZA HENDRIKS, MICHAEL THOMAS

Real-world PFS (FAS) – Median Follow-up Duration = 23.0 Months*

- Median rwPFS in PACIFIC-R was higher than the median PFS reported for the durva. arm of the PACIFIC trial^{1†}
- Challenges with collecting rwPFS data limit comparisons between PACIFIC-R and PACIFIC
- RwPFS is likely overestimated as:
 - Germany and UK sites did not collect deaths that occurred prior to study enrolment[‡] (50 early deaths not counted)
 - RECIST criteria for tumour assessments is used heterogeneously across countries
 - Assessments for progression in the real world may not occur as frequently or consistently as in clinical trials; the COVID-19 pandemic may also have resulted in fewer hospital visits

	PACIFIC-R FAS	PACIFIC trial (durva. arm) ¹
PFS	N=1,399	N=476
Total events, N (%)	737 (52.7)	268 (56.3)†
Progression per RECIST	456 (32.6)	
Progression per physician assessment	170 (12.2)	
Progression, assessment unknown	30 (2.1)	
Deaths in absence of progression	81 (5.8)	
Median PFS, months	21.7	16.9
95% CI	19.2–24.5	13.0-23.9
PFS rate, %		
12 months	62.4	55.7
24 months	48.2	45.0



Nicolas Girard

PACIFIC-R Real-World Study: Treatment
Duration and Interim Analysis of ProgressionFree Survival in Unresectable Stage III NSCLC
Patients Treated with Durvalumab After
Chemoradiotherapy



17:30 - 18:30 Mini oral session - Non-metastatic NSCLC and other thoracic malignancies

CHAIRS: ALFREDO ADDEO, LIZZA HENDRIKS, MICHAEL THOMAS

Durvalumab Treatment Discontinuation

FAS (N=1,399)	Discontinuation reason, n (%)*	Median time from durva start to discontinuation		
Patient decision	20 (1.4)	6.1 months		
AE	233 (16.7)	2.8 months		
Completed treatment [†]	659 (47.1)	12.0 months		
Disease progression	377 (26.9)	5.1 months		
Death	21 (1.5)	1.9 months		

 Pneumonitis/interstitial lung disease (ILD) was the most common AE leading to (% of FAS):

- Permanent discontinuation: 133 (9.5%)‡

Temporary interruption: 73 (5.2%)[‡]

Pneumonitis/ILD

	FAS (N=1,399)
Patients with any pneumonitis/ILD, n (%)§	250 (17.9)
Mild event [¶]	56 (4.0)
Moderate event¶	118 (8.4)
Severe event¶	41 (2.9)
Life-threatening or fatal event¶	5 (0.4)

- Median time to onset of pneumonitis/ILD from durvalumab initiation: 2.5 months
- Corticosteroid administration was required in 71.3% of events#



Nicolas Girard

PACIFIC-R Real-World Study: Treatment
Duration and Interim Analysis of ProgressionFree Survival in Unresectable Stage III NSCLC
Patients Treated with Durvalumab After
Chemoradiotherapy

[&]quot;Other discontinuation reason: missing (n=2), 'other' reasons (n=68), lost to follow-up (n=3), and ongoing durvalumab at time of data extraction (n=16), 'Investigator's decision per country protocol and, where applicable, was after >12 months' treatment; 'Categories are not mutually exclusive (i.e. a single patient could both interrupt and permanently discontinue durvalumab due to pneumonitis/ILD); \$371,399 patients (2.6%) had pneumonitis/ILD events of unknown severity, 'Categories are not mutually exclusive – patients experiencing ≥2 events of different severity can be counted under both categories. "A total of 279 pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events were reported among the 250 patients who experienced pneumonitis/ILD events who experienced pneumoni

PACIFIC: is it real enough? (5y OS: 42.9%)

- 1. Impact of EGFR mutations on efficacy of consolidation IO
- 2. Role of consolidation durvalumab in patients not receiving cCRT
- 3. Role of concurrent durvalumab in patients receiving cCRT

4. Identification of new bio-markers for selection

Modified by R. Soo





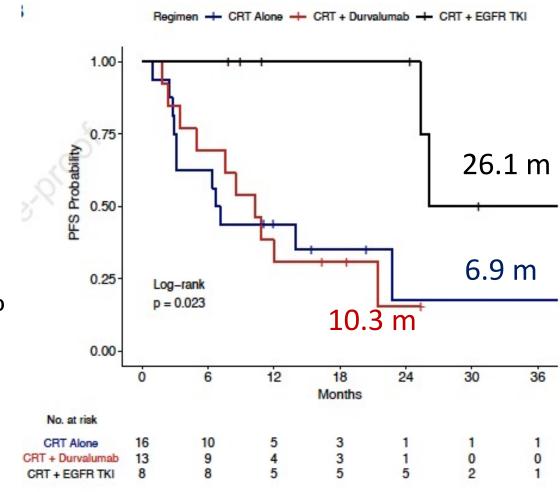
Durvalumab for Stage III EGFR-Mutated NSCLC After Definitive Chemoradiotherapy IASLC

Aredo JTO 2021

EGFR+= N=37,

RT alone=43%durva= 35%, EGFR TKI 22%

PFS: 6.9m v 10.3m v 26.1m







ONGOING TRIAL in unresectable LA NSCLC EGFR-mutated

LOGIK0902/OLCSG0905	phase II	8-week gefitinib followed by docetaxel-cisplatin concurrent radiotherapy (60 Gy/30 F)
RTOG 1306 (NCT01822496)	phase II randomized	erlotinib induction for 3 months followed by CCRT or CCRT only
LAURA trial (NCT03521154)	phase III	CCRT followed by osimertinib consolidation vs placebo
NCT04304638 trial	observational	3 treatment strategies (CRT, radiation plus EGFR-TKI, and EGFR-TKI only) based on the real-world data.





PACIFIC: is it real enough? (5y OS: 42.9%)

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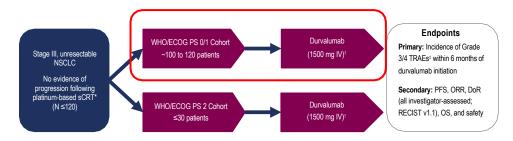
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78MO Early safety assessment of durvalumab after sCRT in patients with Stage III, unresectable NSCLC (PACIFIC-6): Early safety assessment in WHO/ ECOG PS 0-1

PACIFIC-6: Phase 2, Open-label, Multicentre, International Trial



- A pre-specified early safety assessment was planned after ≥50 patients in the PS 0/1 cohort had the opportunity
 to receive durvalumab for ≥6 months
 - We summarised AEs overall and by causality, severity, and seriousness (CTCAE version 4.03)

AE, selverse event, CRT, chemoradioherapy, CT, chemotherapy, CTCAE, Common Terminology Circline for Adverse Events, DoR, cursion of response; VI, interneurou, ORR, objective response rate, OS, overall surviva; PFS, progression-free surviva; PFEA, AE possibly related to study tertainent, PS, performance status; CAM, every 4 weeks; RECIOI, Response Evaluation Crieria in Solid Tumors; scRT, esquential chemoradioherapy; TRAE, Irestment-related AE; WHO/ECOG, World Health Organizacion/Esstern Ooscopatrie Ooccology Group. "Defined as ≥2 cycles of platinum-based CT before RT with ≤6 weeks interval between the last dose of CT and the start of RT. Patients who received no more than 1 cycle of overlapping platinum-based CT and RT were also eligible. 1Q4W for 24 cycles or until disease progression, alternative anticancer therapy, unacceptable toxicity, withdrawal of consent, or another discontinuation criterion is met.

*As reported by the investigator and alternatively referred to as PRAEs in the case report form.

EUROPEAN LUNG CANCER VIRTUAL CONGRESS 2021

- Median age 64 years, 64% male, 64% adenocarcinoma, ECOG PS 0= 46%
- Most common doublets
 - Carboplatin/ VNR 36%
 - Carboplatin/ pemetrexed 18%
 - Cisplatin/pemetrexed 16%
 - Carboplatin/paclitaxel 14%
- Time from RT to durvalumab <14d: 100%
- Any grade pneumonitis: 32%
- Discontinuation due to pneumonitis: 18%
 (PACIFIC 6%)



PACIFIC: is it real enough? (5y OS: 42.9%)

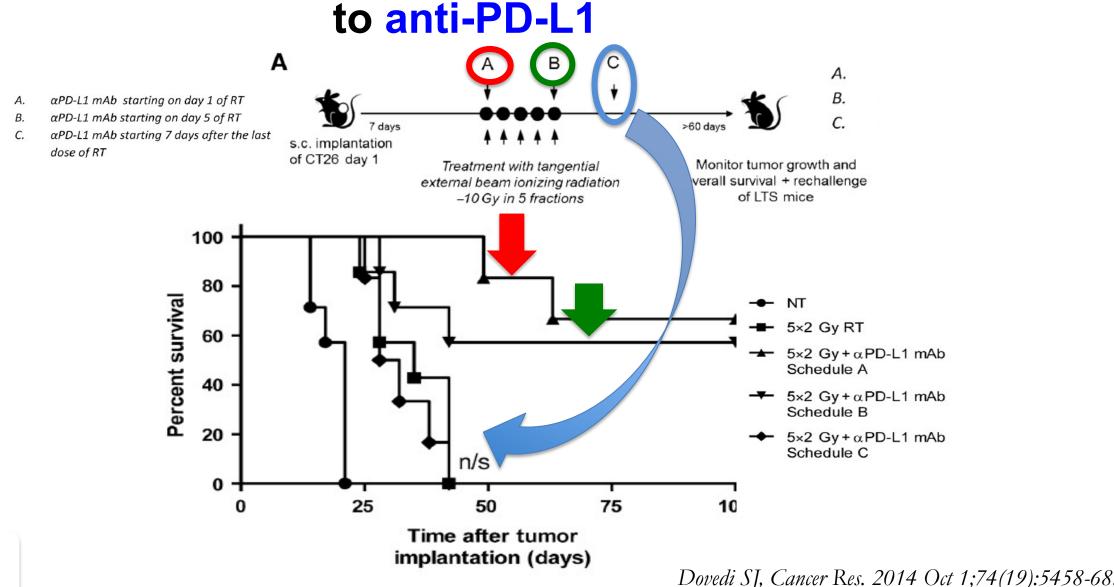
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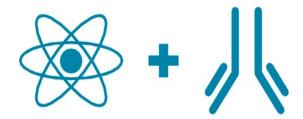




Preclinical evidence shows **SEQUENCING** of radiation was critical for anti-tumor response



RT+CT+IO



Endpoints	KEYNOTE 799 Pembro + Carbo Taxol RT	KEYNOTE 799 Pembro + Cisp Pem RT	NICOLAS TRIAL Nivo + CT+ RT	DETERRED Trial Atezo + Carbo Taxol + RT
Median Follow-up			32.6	
No	112	101 79		30
Progression Free Survival				
Median	NR	NR	12.7 months	NR
12-month	67.7%	65.2%	53.7%	66%
Overall Survival				
Median	NR	NR	38.8 months	NR
12-month	81.2%	88%	75.5%	77%
24-month			63.7%	
Pneumonitis ≧G3	8%	7.9%	11.7%	20%





PACIFIC: is it real enough? (5y OS: 42.9%)

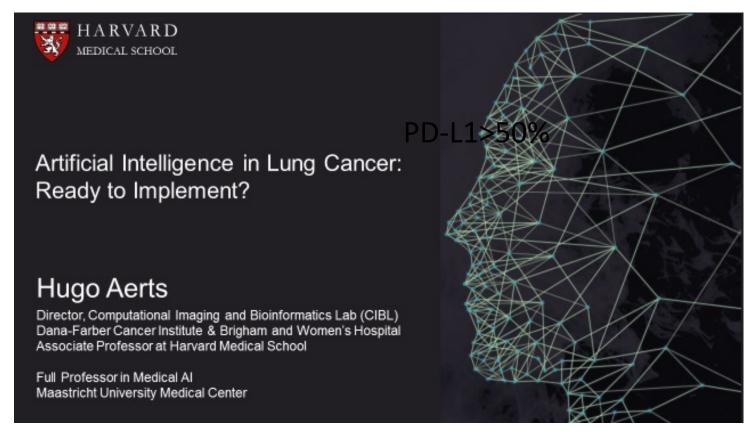
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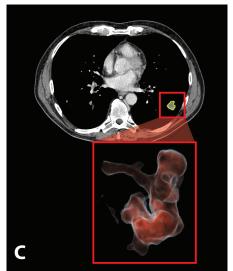
Modified by R. Soo

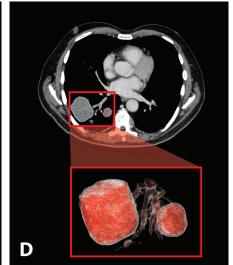




Imaging-Al Biomarkers for Immunotherapy Response





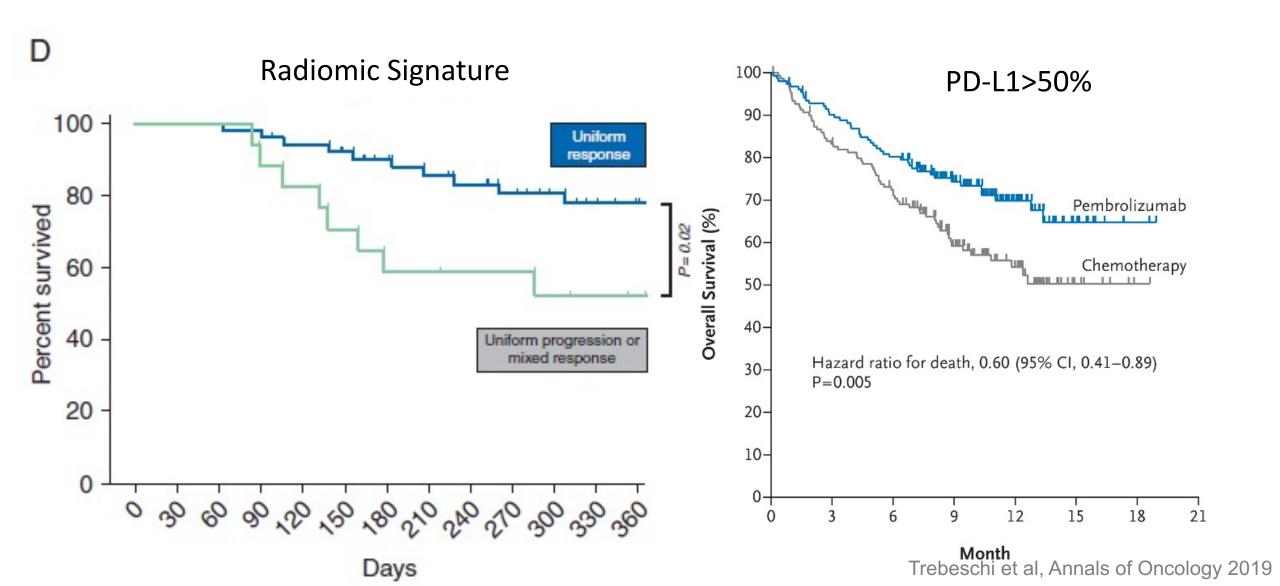






Trebeschi et al, Annals of Oncology, 2019

Imaging-Al Biomarkers for Immunotherapy Response CAN RADIOMICS PERSONALISE IMMUNOTHERAPY?





PHARMACOLOGICAL INNOVATIONS AND INTEGRATION WITH RADIOTHERAPY IN THIRD STAGE NSCLC

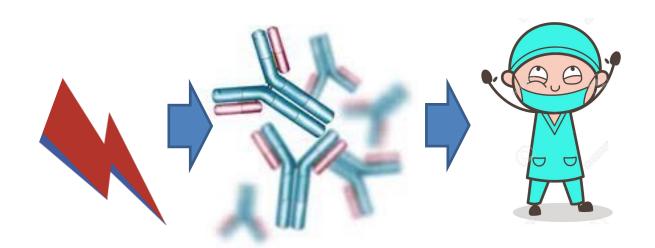
- 1. Inoperable patients
 - Target Volume definition
 - Lymphocytes Sparing Radiotherapy
 - Oncogene addicted, consolidation and concurrent ICI
 - New Biomarkers
- 2. Neoadiuvant strategies







Neoadjuvant durvalumab with or without stereotactic body radiotherapy in patients with early-stage non-small-cell lung cancer: a single-centre, randomised phase 2 trial



Methods

We did a single-centre, open-label, randomised, controlled, phase 2 trial, comparing in c-stages I–IIIA

- 1. neoadjuvant durvalumab alone
- 2. neoadjuvant durvalumab plus stereotactic radiotherapy (8 Gy × 3 fractions)

This trial is registered with ClinicalTrial.gov, NCT02904954, and is ongoing but closed to accrual.

Neoadjuvant durvalumab with or without stereotactic body radiotherapy in patients with early-stage non-small-cell lung cancer: a single-centre, randomised phase 2 trial

			_	Dorvaroniao monotinerapy (n=30)	Dorvaionnau pios 30k1 (n=50)
Findings	DURVA	SBRT+DURVA	EGFR status PD-L1-expressing cancer cells		100 100
Pts	30	30	- O		
Surgery	87%	87%	Tumour regression (,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	""
Major pathological	6.7% [95% CI 0·8–	53.3% [34·3–71·7]	-100-		
response	22·1]	(59% complete respons	se)		
	crude odds ratio 16.0 [9	95% CI 3·2-79·6]; p<0·000)1		
Grade 3-4	10%	10%			
	hyponatraemia	hyperlipasaemia			
SAE	6.7%	6.7%			

Neoadjuvant durvalumab combined with stereotactic body radiotherapy is well tolerated, safe, and associated with a high major pathological response rate. This neoadjuvant strategy should be validated in a larger trial.

Durvalumab plus SBRT ■ Mutant EGFR ■ PD-L1 expression ≥1%

Durvalumab plus SBRT (n=30



PHARMACOLOGICAL INNOVATIONS AND INTEGRATION WITH RADIOTHERAPY IN THIRD STAGE NSCLC

1. Inoperable patients

- Target Volume definition
- Lymphocytes Sparing Radiotherapy
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«Oggi ci resta la bellezza della vita fatta accanto a lei, per il

