

# Leveraging Novel Treatment Options for **SMALL-CELL LUNG CANCER** in the Second Line



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## AGENDA

### **I. Response to Primary Therapy and Tumorigenesis of Small Cell Lung Cancer: Subsequent Lines of Therapy and Pathophysiology Primer**

- a. Time from initial therapy to relapse - determining subsequent therapy
- b. Dose attenuation in the second-line: an appropriate option?
- c. Tumorigenesis

### **II. Efficacy and Safety Review: Second-Line Regimens for Extensive Stage SCLC**

- a. Clinical trials findings
  - i. Topotecan – efficacy, safety, and tolerability
  - ii. Lurbinectedin – efficacy, safety, and tolerability
  - iii. Patient population – comorbidities
- b. Clinical trials findings – developing compounds in the second-line
  - i. Anlotinib
  - ii. Veliparib

### **III. Applying National Cancer Center Network (NCCN) Guidelines to Practice**

- a. Second-line regimens in patients with extensive disease
  - i. Preferred regimens with relapse  $\leq$  6 months
    - a. Topotecan
    - b. Lurbinectedin
  - ii. Clinical trials data – efficacy and safety in the second-line
- b. Current recommendations for relapse  $>$  6 months
  - i. Original regimen
  - ii. Lurbinectedin – efficacy, safety, and tolerability
- c. Patient management in the population that has progressed

### **IV. Conclusions**

### **V. Questions and Answers**

## ***Leveraging Novel Treatment Options for Small-Cell Lung Cancer in the Second Line***

### **FACULTY**

#### **Jacob Sands, MD**

Physician, Dana-Farber Cancer Institute  
Instructor of Medicine  
Harvard Medical School  
Boston, MA

### **PROGRAM OVERVIEW**

This live virtual TeleECHO program will explore the management of small cell lung cancer (SCLC) in the second-line setting. A brief didactic presentation will discuss treatment options after relapse of SCLC and clinical trial data of the efficacy and safety of second-line treatment regimens. Interactive case studies will illustrate the application of guideline recommendations for treatments approved for managing extensive-stage SCLC.

### **TARGET AUDIENCE**

This activity is intended for community-based oncologists, pulmonologists, oncology nurses, nurse practitioners and other healthcare professionals who treat patients with small cell lung cancer.

### **LEARNING OBJECTIVES**

Upon the completion of this program, attendees should be able to:

- Review the efficacy and safety data of systemic regimens in the second-line treatment of patients with extensive-stage SCLC
- Discuss the clinical trial data supporting the NCCN guidelines in the second-line treatment of patients with extensive-stage SCLC
- Describe how to apply the second-line efficacy and safety data to the management of small-cell lung cancer in the patient care setting

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Douglas Cox, MSN, MHA, RN

Ultimate Medical Academy/CCM – Lead Nurse Planner

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# *Leveraging Novel Treatment Options for Small-Cell Lung Cancer in the Second Line*

**Jacob Sands, MD**  
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Instructor of Medicine  
Harvard Medical School  
Boston, MA

## **Disclosures**

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This activity is supported by an educational grant from Jazz Pharmaceuticals, Inc.

## Learning Objectives

- Discuss biological insights that drive the tumorigenesis of small-cell lung cancer (SCLC)
- Describe the clinical trial findings of combination regimens in the second-line treatment of patients with extensive-stage SCLC
- Apply National Comprehensive Cancer Network (NCCN) clinical practice guidelines in the second-line management of patients with extensive-stage SCLC

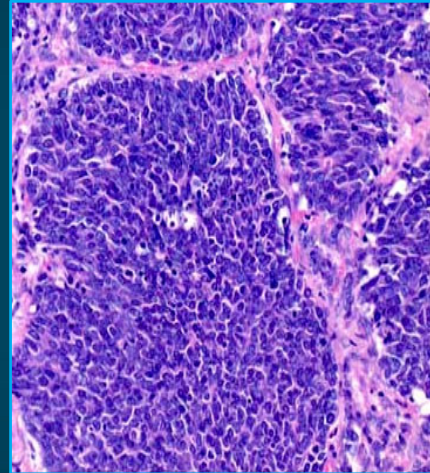
## Response to Primary Therapy and Tumorigenesis of Small-Cell lung Cancer

### Subsequent Lines of Therapy and Pathophysiology Primer



## Small-Cell Lung Cancer Diagnosis

- Standard immunohistochemical markers for lung/neuroendocrine tumors
  - Majority express TTF-1
  - ~75% express neuroendocrine differentiation
    - Synaptophysin, chromogranin, and CD56
- SCLC has a high mitotic rate as a transcriptionally active cancer

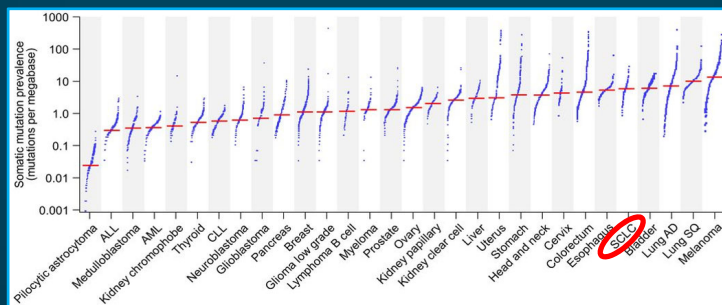


SCLC = small-cell lung cancer; TTF-1 = thyroid transcription factor 1.

George J, et al. *Nature*. 2015;524:47-53. Misch D, et al. *Diagn Pathol*. 2015;10:21. Karachaliou N, et al. *Transl Lung Cancer Res*. 2016;5:2-15.

## Common Genomic Alterations in Small-Cell Lung Cancer

- Vast majority of individuals with SCLC have a significant smoking history and are without any targeted-therapy options despite having a significant mutational burden
- SCLC is extremely rare in individuals without a smoking history. In a never smoker, molecular profiling may help clarify the diagnosis and demonstrate a target

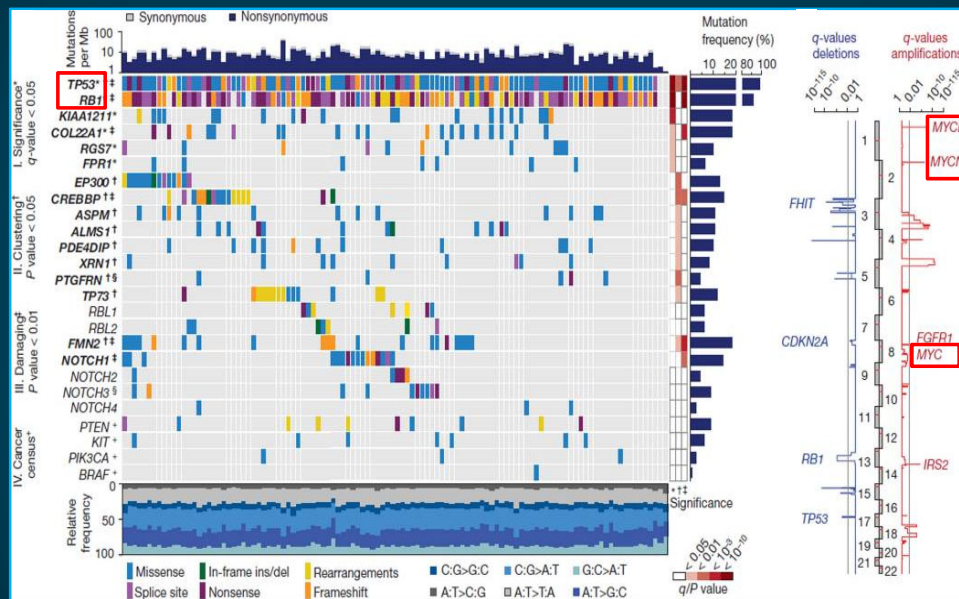


Pesch B, Kendzia B, Gustavsson P, Jockel KH, Johnen G, et al. Cigarette smoking and lung cancer--relative risk estimates for the major histological types from a pooled analysis of case-control studies. *Int J Cancer*. 2012 Sep 1. 131(5):1210-9.

Sabari JK, et al. *Nat Rev Clin Oncol*. 2017;14:549-561. Büttner R, et al. *ESMO Open*. 2019;4:e000442. Pesch B, et al. *Int J Cancer*. 2012;131:1210-1219.



## Genomic Alterations in SCLC



George J, et al. *Nature*. 2015;524:47-53.

## Common Genomic Alterations in Small-Cell Lung Cancer

### P53—"Guardian of the Genome"

- Activates DNA-repair proteins
- Arrests the cell cycle at G1/S to allow for DNA repair
- Can initiate apoptosis in cell with significant DNA damage
- Mutation impacts cellular response to DNA damage
- Mutations present in the majority of SCLCs

P53 = tumor protein P53 (tumor suppressor); DNA = deoxyribonucleic acid; G1 = gap 1 phase; S = synthesis phase.

Sen T, et al. *Transl Lung Cancer Res*. 2018;7:50-68. Sabari JK, et al. *Nat Rev Clin Oncol*. 2017;14:549-561.

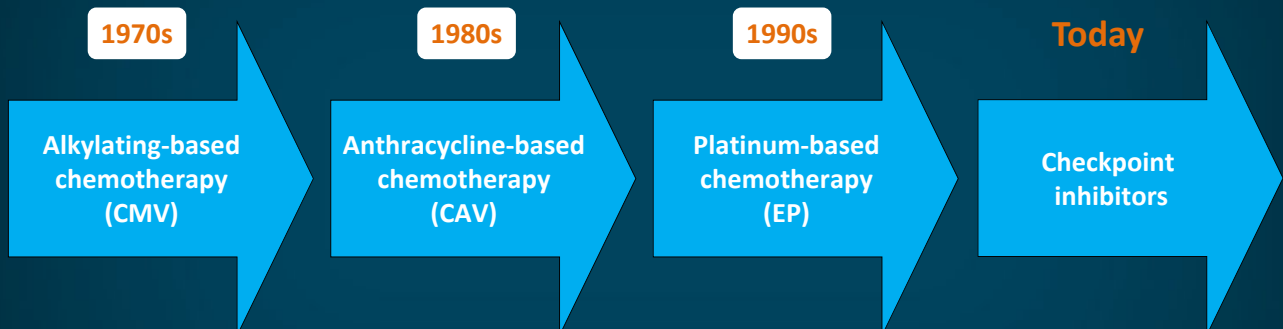
## Common Genomic Alterations in Small-Cell Lung Cancer (continued)

- RB1—Inhibits cell-cycle progression by binding transcription factors in cells with damaged DNA, arresting replication in S-phase
  - Loss of function is almost always noted in SCLC
- MYC—MYC proteins activate expression of genes that enable proliferation
  - Amplified in about 20% of SCLCs

RB = retinoblastoma; MYC = MYC proto-oncogene.

Sen T, et al. *Transl Lung Cancer Res.* 2018;7:50-68. Sabari JK, et al. *Nat Rev Clin Oncol.* 2017;14:549-561.

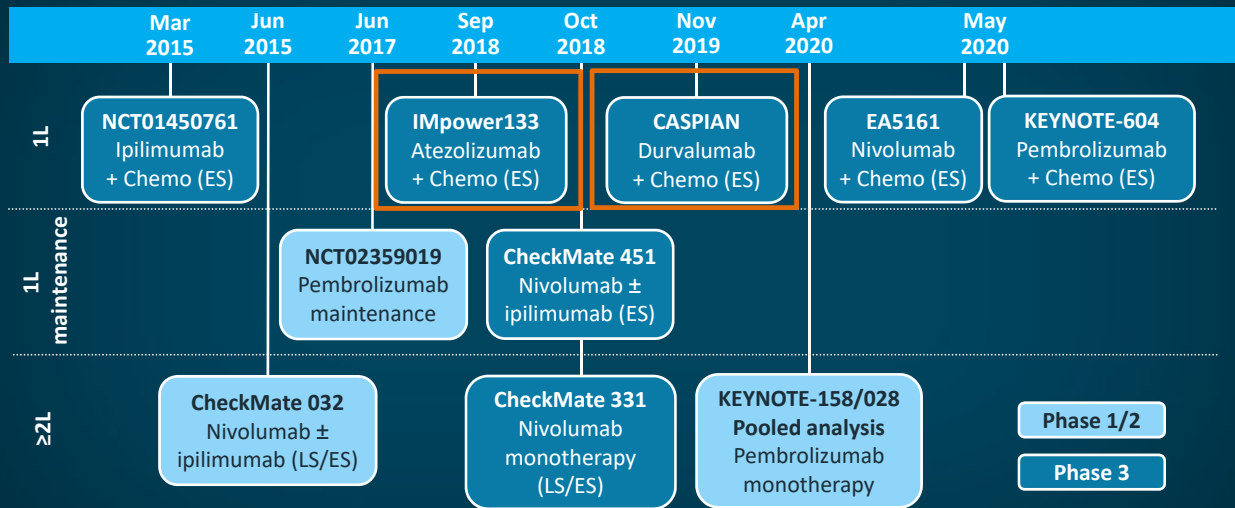
## Evolution of Systemic Therapy in Small-Cell Lung Cancer



CMV = cytomegalovirus; CAV = cyclophosphamide, doxorubicin, and vincristine; EP = etoposide and cisplatin.

Modified from Sabari JK, et al. *Nat Rev Clin Oncol.* 2017;14:549-561. Saleh K, et al. *Immunotherapy.* 2019;11:457-460.

# Overview of Key Studies of Immune Checkpoint Inhibitors in SCLC



1L = first line; 2L = second line; Chemo = chemotherapy; ES = extensive stage; LS = limited stage.

## Efficacy and Safety Review

### Second-Line Regimens for Extensive-Stage SCLC

## What Are the Key Questions in 2L SCLC?

SCLC Subsequent Systemic Therapy	
Relapse ≤6 Months, PS 0–2	
<b>Preferred regimens</b> <ul style="list-style-type: none"> <li>• Topotecan PO or IV</li> <li>• Lurbinectedin</li> <li>• Clinical trial</li> </ul>	
<b>Other recommended regimens</b> <ul style="list-style-type: none"> <li>• Paclitaxel</li> <li>• Docetaxel</li> <li>• Irinotecan</li> <li>• Temozolomide</li> <li>• Cyclophosphamide/doxorubicin/vincristine (CAV)</li> </ul>	<ul style="list-style-type: none"> <li>• Oral etoposide</li> <li>• Vinorelbine</li> <li>• Gemcitabine</li> <li>• Bendamustine (category 2B)</li> <li>• Nivolumab</li> <li>• Pembrolizumab</li> </ul>
Relapse >6 Months	
<b>Preferred regimens</b> <ul style="list-style-type: none"> <li>• Original regimen, with omission of checkpoint inhibitor if relapse on IO maintenance</li> </ul>	<b>Other recommended regimens</b> <ul style="list-style-type: none"> <li>• As above</li> </ul>

PO = by mouth (oral); IV = intravenous.

National Comprehensive Cancer Network (NCCN) version 1.2022 ([https://www.nccn.org/professionals/physician\\_gls/pdf/sclc.pdf](https://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf)). Accessed 9/24/2021.

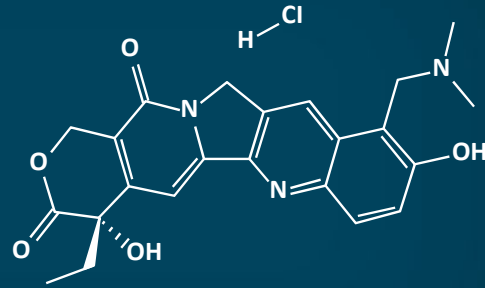
## Current NCCN Guidelines

SCLC Subsequent Systemic Therapy	
Relapse ≤6 Months, PS 0–2	
<b>Preferred regimens</b> <ul style="list-style-type: none"> <li>• Topotecan PO or IV</li> <li>• Lurbinectedin</li> <li>• Clinical trial</li> </ul>	
<b>Other recommended regimens</b> <ul style="list-style-type: none"> <li>• Paclitaxel</li> <li>• Docetaxel</li> <li>• Irinotecan</li> <li>• Temozolomide</li> <li>• Cyclophosphamide/doxorubicin/vincristine (CAV)</li> </ul>	<ul style="list-style-type: none"> <li>• Oral etoposide</li> <li>• Vinorelbine</li> <li>• Gemcitabine</li> <li>• Bendamustine (category 2B)</li> <li>• Nivolumab</li> <li>• Pembrolizumab</li> </ul>
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NCCN version 1.2022 ([https://www.nccn.org/professionals/physician\\_gls/pdf/sclc.pdf](https://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf)). Accessed 6/20/2021.

## Topotecan

- Topoisomerase I inhibitor
- Prevents re-ligation of the cleaved DNA strand, leading to DNA damage and cell death

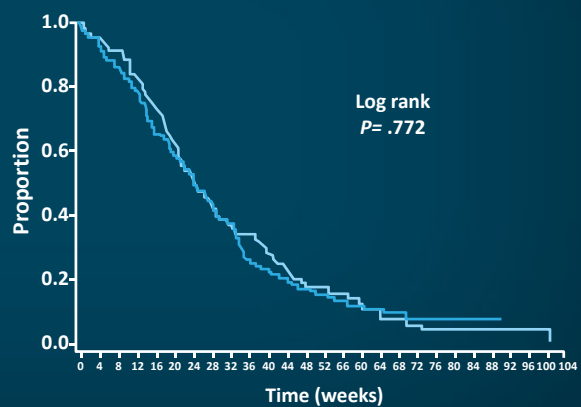
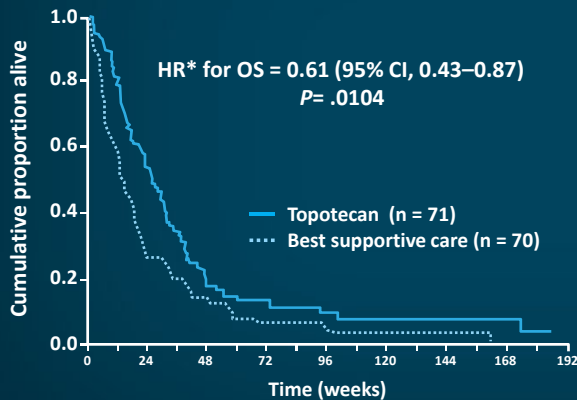


Topotecan hydrochloride

O'Brien MER, et al. *J Clin Oncol*. 2006;24:5441-5447. Topotecan PI, 2019 ([www.accessdata.fda.gov/drugsatfda\\_docs/label/2019/022453s011lbl.pdf](http://www.accessdata.fda.gov/drugsatfda_docs/label/2019/022453s011lbl.pdf)). Accessed 6/20/2021.

## Topotecan Efficacy

- Topotecan 2.3 mg/m<sup>2</sup>/day PO for days 1–5 every 21 days<sup>1</sup>
  - Eligibility include chemotherapy-free interval of at least 45 days after 1L therapy
- Topotecan 1.5 mg/m<sup>2</sup>/day IV for days 1–5 every 21 days vs CAV<sup>2</sup>
  - Eligibility included chemotherapy-free interval of at least 60 days after 1L therapy



\*adjusted for stratification factors.

HR = hazard ratio; OS = overall survival; CI = confidence interval.

O'Brien MER, et al. *J Clin Oncol*. 2006;24:5441-5447. von Pawel J, et al. *J Clin Oncol*. 1999;17:658-667.

## Topotecan Toxicities

### Hematologic and Nonhematologic Toxicities by Treatment Group

Topotecan 2.3 mg/m<sup>2</sup>/day PO for days 1–5 every 21 days

Hematologic AEs	Oral Topotecan		IV Topotecan	
	n (%)		n (%)	
	Grade 3	Grade 4	Grade 3	Grade 4
Leukopenia	64 (42.7)	34 (22.7)	74 (49.3)	39 (26.0)
Neutropenia	39 (26.2)	70 (47.0)	35 (23.6)	95 (64.2)
Thrombocytopenia	30 (20.0)	43 (28.7)	38 (25.3)	27 (18.0)
Anemia	28 (17.3)	8 (5.3)	42 (28.0)	4 (2.7)

Non-hematologic AEs	Oral Topotecan		IV Topotecan	
	No. of Patients (%)		No. of Patients (%)	
	Grade 3	Grade 4	Grade 3	Grade 4
Diarrhea	11 (7.2)	1 (0.7)	3 (2.0)	1 (0.7)
Fatigue	10 (6.5)	0 (0.0)	10 (6.6)	2 (1.3)
Dyspnea	9 (5.9)	3 (2.0)	10 (6.6)	5 (3.3)
Anorexia	8 (5.2)	0 (0.0)	3 (2.0)	1 (0.7)
Nausea	6 (3.0)	0 (0.0)	3 (2.0)	1 (0.7)
Asthenia	4 (2.6)	3 (2.0)	7 (4.6)	3 (2.0)
Fever	3 (2.0)	3 (2.0)	4 (2.6)	6 (4.0)

AE = adverse event.

O'Brien MER, et al. *J Clin Oncol.* 2006;24:5441-5441.

## Topotecan Toxicities

### Hematologic and Nonhematologic Toxicities

Topotecan 1.5 mg/m<sup>2</sup>/d IV for days 1–5 every 21 days

Hematologic Toxicities in 107 Patients				
AE	Patients (N = 107)		Courses (N = 446)	
	AE/No. of Patients (%)		AE/No. of Patients (%)	
	Grade 3	Grade 4	Grade 3	Grade 4
Leukopenia	57/104 (54.8%)	33/104 (31.7%)	196/441 (44.4%)	68/441 (15.4%)
Neutropenia	19/104 (18.3%)	73/104 (70.2%)	137/439 (31.2%)	166/439 (37.8%)
Thrombocytopenia	30/104 (28.8%)	30/104 (28.8%)	83/441 (18.8%)	43/441 (9.8%)
Anemia	41/104 (39.4%)	3/104 (2.9%)	73/440 (16.6%)	5/440 (1.1%)

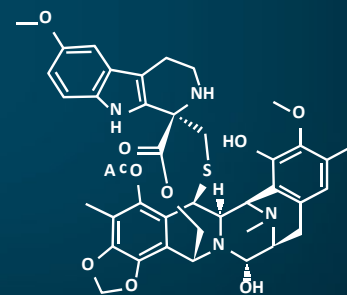
Nonhematologic Toxicities in >10% of 107 Patients			
AE, n (%)	Toxicity criteria grade		Total
	1/2	3/4	
Nausea	38 (35.5%)	4 (3.7%)	42 (39.3%)
Alopecia	38 (35.5%)	0 (0.0%)	38 (35.5%)
Fatigue	23 (21.5%)	5 (4.7%)	28 (26.2%)
Vomiting	24 (22.4%)	2 (1.9%)	26 (24.3%)
Anorexia	19 (17.7%)	1 (0.9%)	20 (18.7%)
Stomatitis	13 (12.2%)	2 (1.8%)	15 (14.0%)
Diarrhea	12 (11.2%)	1 (0.9%)	13 (12.1%)
Fever	11 (10.3%)	2 (1.9%)	13 (12.1%)

von Pawel J, et al. *J Clin Oncol.* 1999;17:658-667.



## Lurbinectedin

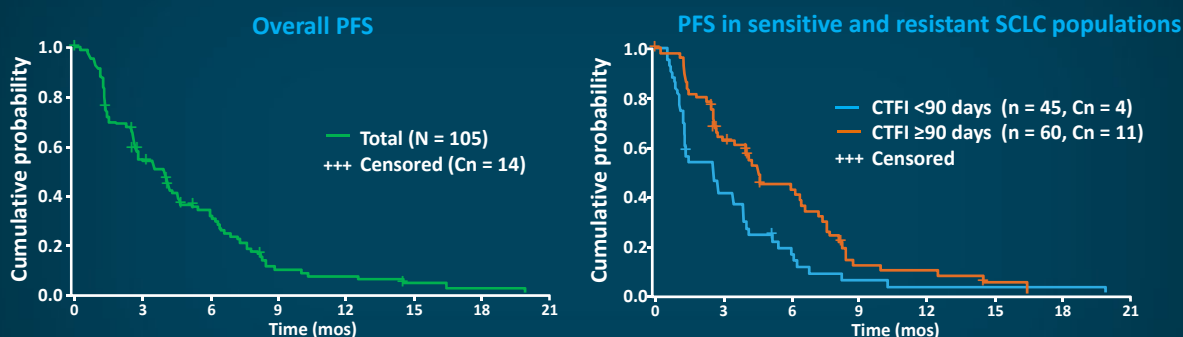
- Synthetically produced agent, originally derived from *Ecteinascidia turbinata* (sea squirt)
- Binds to DNA gene promoters, preventing binding of transcription factors
  - Inhibits oncogenic transcription leading to apoptosis
  - Induces apoptosis of monocytes and tumor associated macrophages in the tumor microenvironment, inhibits cell migration, and limits production of inflammatory mediators (CCL2 and CXCL8) and angiogenic factors (VEGF)
- FDA-approved in adults with metastatic SCLC whose disease progressed on or after platinum-based chemotherapy



Trigo J, et al. *Lancet Oncol.* 2020;21:645-654. Santamaria Nuñez G, et al. *Mol Cancer Ther.* 2016;15:2399-2412. Cruz C, et al. *J Clin Oncol.* 2018;36:3134-3143. Lurbinectedin (Zepzelca™) PI, 2020 (<https://pp.jazzpharma.com/pi/zepzelca.en.USPI.pdf>). Lurbinectedin. Drug Approvals International (<http://drugapprovalsint.com/lurbinectedin/>). Accessed 6/20/2021.

## Lurbinectedin Efficacy

- Single-arm phase 2 trial in second-line SCLC
- ORR of 35.2% with stable disease in 33.3% of patients



	Overall (n = 105)	Resistant, CTFI <90 days (n = 45)	Sensitive, CTFI ≥90 days (n = 60)
PFS mos, median, (95% CI)	3.5 (2.6–4.3)	2.6 (1.3–3.9)	4.6 (2.8–6.5)
PFS at 6 mos, %, (95% CI)	32.9 (23.3–42.5)	18.8 (6.8–30.9)	43.5 (30.1–56.9)

ORR = overall/objective response rate; PFS = progression-free survival; Cn = censored number; mo(s) = month(s); CTFI = chemotherapy-free interval.

Trigo J, et al. *Lancet Oncol.* 2020;21:645-654 and supplement. Paz-Ares LG, et al. *J Clin Oncol.* 2019;37(suppl 15): abstract 8506.



## Lurbinectedin Has Efficacy in SCLC

Outcome	All Patients (N = 105)
ORR, %	<b>35.2</b>
DCR, %	68.6
Median DoR, mos	5.3
Median PFS, mos 6-mo PFS, %	3.5 32.9
Median OS, mos 12-mo OS, %	<b>9.3</b> <b>34.2</b>

DCR = disease control rate; DoR = duration of response; OS = overall survival.

Trigo J, et al. *Lancet Oncol.* 2020;21:645-654.

## Lurbinectedin Has Efficacy in Sensitive and Resistant SCLC

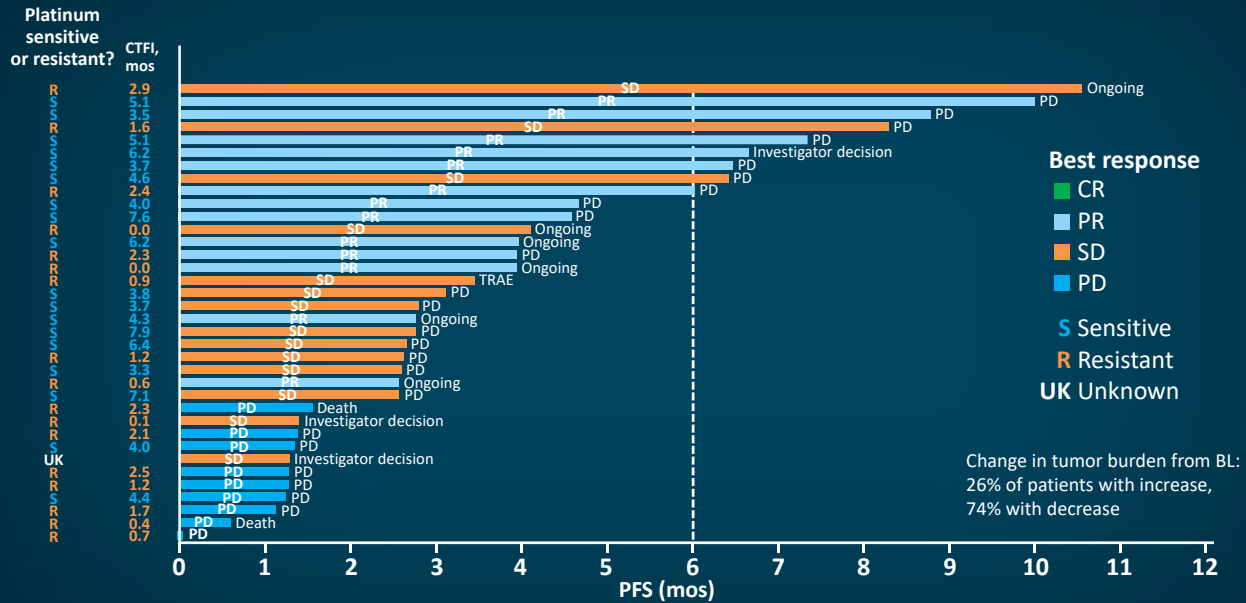
Outcome	All Patients (N = 105)	Platinum Sensitive* (n = 60)	Platinum Resistant† (n = 45)
ORR, %	<b>35.2</b>	<b>45.0</b>	<b>22.2</b>
DCR, %	68.6	81.7	51.1
mDoR, mos	5.3	6.2	4.7
mPFS, mos 6-mo PFS, %	3.5 32.9	4.6 43.5	2.6 18.8
mOS, mos 12-mo OS, %	<b>9.3</b> <b>34.2</b>	<b>11.9</b> <b>48.3</b>	<b>5.0</b> <b>15.9</b>

\* platinum sensitive = CTFI ≥90 days; † platinum resistant = CTFI <90 days.

mDoR = median DoR; mPFS = median PFS; mOS = median OS.

Trigo J, et al. *Lancet Oncol.* 2020;21:645-654.

## Lurbinectedin Has Efficacy in Sensitive and Resistant SCLC: Response



CR = complete response; PR = partial response; SC = stable disease; PD = progressive disease.  
Trigo J, et al. *Lancet Oncol.* 2020;21:645-654.

## Efficacy Is Comparable, if Not Superior To Historical Trials

Outcome	Lurbinectedin	Topotecan	Amrubicin
ORR	35.2%	16.9%	31.1%
ORR Sens	45.0%	23.1%	40.9%
ORR Res	22.2%	9.4%	20.1%
Median PFS, mos	3.5	3.5	4.1
Median PFS, Sens, mos	4.6	4.3	5.5
Median PFS, Res, mos	2.6	2.6	2.8
Median OS, mos	9.3	7.8	7.5
Median OS, Sens, mos	11.9	9.9	9.2
Median OS, Res, mos	5.0	6.2	5.7

Sens = sensitive; Res = resistant.

Trigo J, et al. *Lancet Oncol.* 2020;21:645-654. von Pawel J, et al. *J Clin Oncol.* 2014;32:4012-4019.

## Lurbinectedin Is FDA Approved For SCLC after progression on or after a platinum doublet

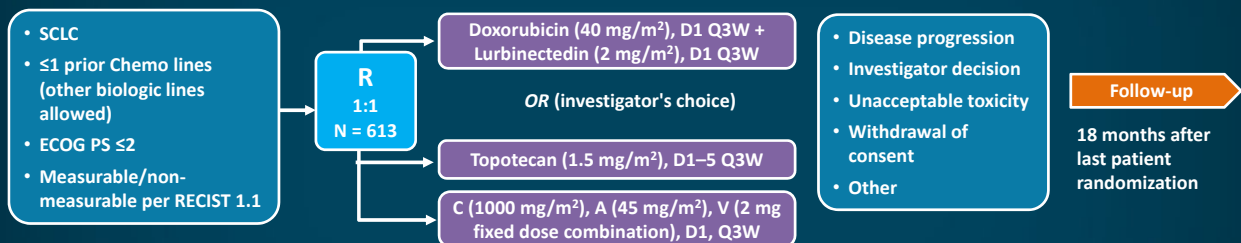
- Confirmed ORR of 35.2% with 2L lurbinectedin surpassed  $\geq 30\%$  statistical cutoff for a positive trial
  - Follow-up: 17.1 months (IQR: 6.5–25.3),
- Outcomes with 2L lurbinectedin numerically higher than historical outcomes with 2L topotecan
- Results from phase 3 ATLANTIS trial of second-line lurbinectedin plus doxorubicin versus investigator's choice of topotecan or CAV are awaited, however per press communications the primary endpoint of improved OS was not met

IQR = interquartile range.

Trigo J, et al. *Lancet Oncol.* 2020;21:645-654. Farago AF, et al. *Future Oncol.* 2019;15:231-239.

## Lurbinectedin + Doxorubicin: ATLANTIS

- Lurbinectedin is an RNA polymerase II inhibitor that targets active transcription
- Has direct cytotoxic effect inducing apoptosis and may impact TME targeting TAM
- Phase 2 study of single-agent lurbinectedin (N = 105): ORR = 35%. mPFS = 3.5 mos, and mOS = 9.3 mos
- Lurbinectedin + doxorubicin has ORR of 92% with mPFS of 5.8 mos in platinum-sensitive SCLC



**Primary endpoint:** OS\*

**Key secondary endpoints:** PFS, DoR, best tumor response

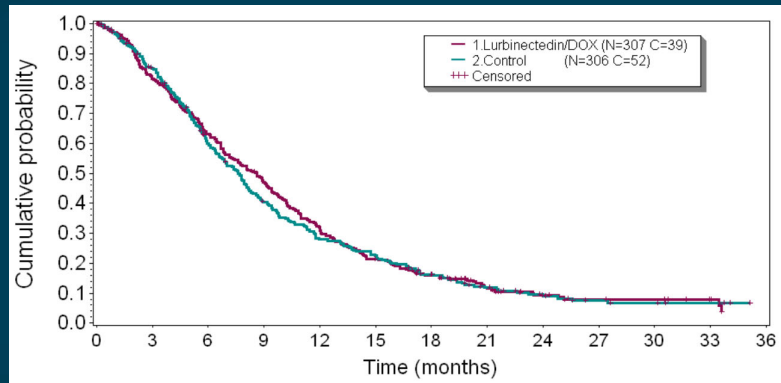
**Stratified by** ECOG PS (0 vs 2-1), CTFI ( $\geq 180$ , 180–90, <90), CNS involvement (Yes/No), prior PD-L1/PD-1 (Yes/No), investigator's preference for control arm

\*Study failed to meet its primary endpoint.

RNA = ribonucleic acid; TME = tumor microenvironment; TAM = tumor-associated macrophages; RECIST = Response Evaluation Criteria in Solid Tumors; R = randomization; D = day; Q3W = every 3 weeks; C = cyclophosphamide; A = doxorubicin; V = vincristine; CNS = central nervous system; PD-1 = programmed (cell) death 1; PD-L1 = PD-1 ligand.

Trigo J et al. *Lancet Oncol* 2020;21:645-645. Farago AF, et al *Future Oncol.* 2019;15:231-239. NCT02566993 (<https://clinicaltrials.gov/ct2/show/NCT02566993>). Rosa K. *OncLive.* 2020 ([www.onclive.com/view/lurbinectedin-doxorubicin-combo-misses-os-end-point-in-phase-3-sclc-trial](http://www.onclive.com/view/lurbinectedin-doxorubicin-combo-misses-os-end-point-in-phase-3-sclc-trial)). Accessed 6/20/2021.

## Overall Survival Equivalent Lurbinectedin/Doxorubicine vs Control



Overall Survival: 8.6 vs 7.6 months  
(HR 0.967, 95% CI 0.815-1.148)

Ares P, et al. IASLC 2021 World Conference on Lung Cancer: Abstract PL02.03. Presented September 10, 2021.

## Managing Adverse Events with Lurbinectedin

- Consider administering premedications for antiemetic prophylaxis
  - Dexamethasone 8 mg IV or equivalent
  - Ondansetron 8 mg IV or equivalent
- Administer lurbinectedin only to patients with baseline neutrophil count  $>1500$  cells/ $\text{mm}^3$  and platelet counts  $>100,000/\text{mm}^3$ 
  - Monitor blood counts prior to each administration
  - G-CSF recommended if neutrophil count  $<500$  cells/ $\text{mm}^3$  or less than lower limit of normal
- Withhold, reduce dose, or permanently discontinue based on severity of hepatotoxicity or myelosuppression
- Lurbinectedin can cause fetal harm; advise use of contraception

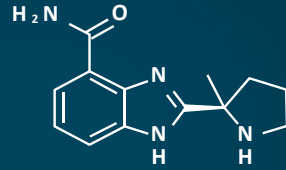
G-CSF = granulocyte colony-stimulating factor.

Lurbinectedin (Zepzelca™) PI 2020 (<https://pp.jazzpharma.com/pi/zepzelca.en.USPI.pdf>). Accessed 6/20/2021.

## PARP Inhibitors

- Poly-ADP-ribose polymerase (PARP) inhibitors (eg, olaparib and veliparib) prevent repair of single-strand DNA breaks, leading to multiple double-strand DNA breaks
- Trapping of PARP proteins on DNA interferes with replication, causing cell death

### Veliparib



### Olaparib

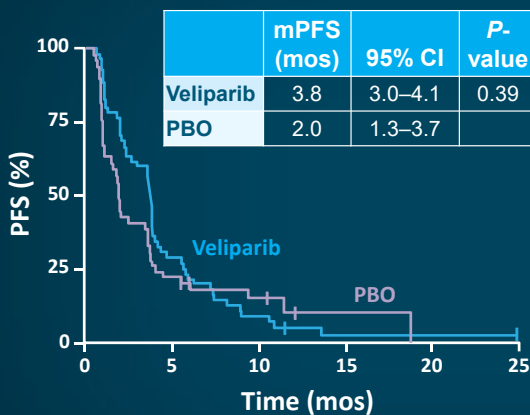


ADP = adenosine diphosphate.

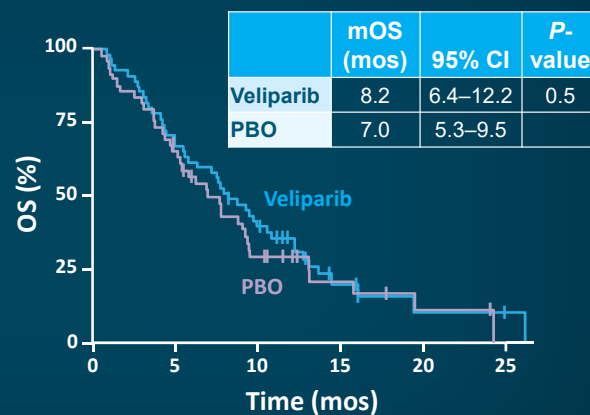
Sen T, et al. *Transl Lung Cancer Res*. 2018;7:50-68. Sabari JK, et al. *Nat Rev Clin Oncol*. 2017;14:549-561.

## Veliparib + Temozolomide for Recurrent ES-SCLC

No significant difference between veliparib + temozolomide and PBO + temozolomide



No. at risk:	0	5	10	15	20	25
Veliparib	55	16	5	1	1	0
Placebo	49	11	6	1	0	0



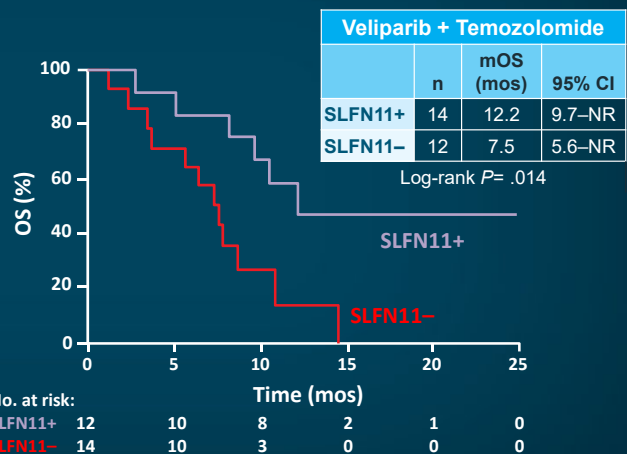
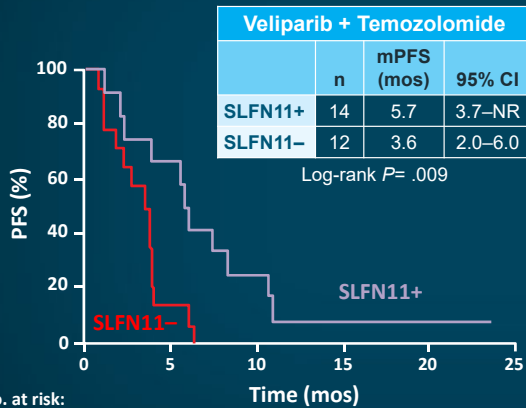
No. at risk:	0	5	10	15	20	25
Veliparib	55	37	21	6	2	1
Placebo	49	31	13	5	2	0

PBO = placebo.

Pietanza MC, et al. *J Clin Oncol*. 2018;36:2386-2394.

## Veliparib + Temozolomide: Biomarker Analysis

- SLFN11-positive tumors had significantly prolonged PFS and OS
- SLFN11 has potential to serve as a biomarker, but further study is needed

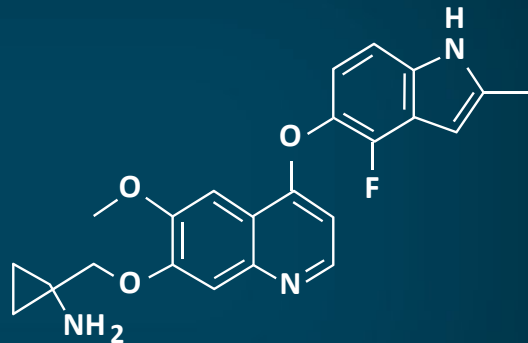


SLN11 = Schlafen-11; NR = not reached.

Pietanza MC, et al. *J Clin Oncol*. 2018;36:2386-2394.

## Anlotinib

- Multi-targeted tyrosine kinase inhibitor
- Selective inhibitor of VEGFR-1, VEGFR-2, VEGFR-3, PDGFR, cKIT
  - Receptors mediate proangiogenic pathways and tumor proliferation
- Randomized trial: anlotinib vs placebo in 3rd-line small-cell lung cancer

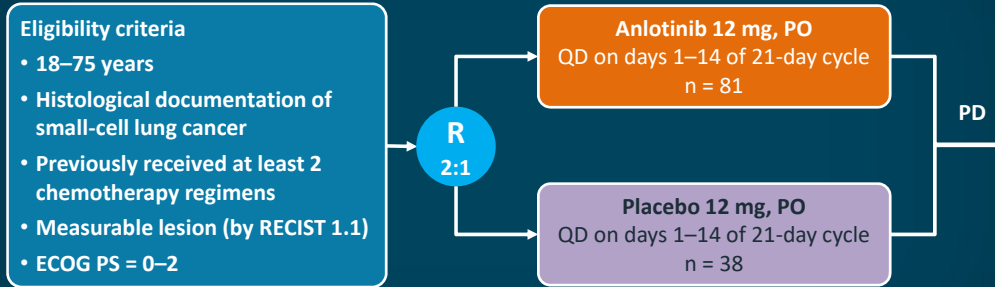


VEGFR = vascular endothelial growth factor receptor; PDGFR = platelet-derived growth factor receptor, KIT = stem cell factor receptor.

Si X, et al. *Thorac Cancer*. 2019;10:551-556. Zhao Y, Adjei AA. *Oncologist*. 2015;20:660-673.

## Antiangiogenic Agents: Anlotinib in Relapsed SCLC (ALTER1202)

- VEGF plays a central role in angiogenesis, and high VEGF levels are poor prognosis in SCLC
- Anlotinib is multi-kinase inhibitor with activity at VEGFR 2-3, FGFR1-4, PDGF a/B and c-kit



**Primary endpoint:** PFS

**Secondary endpoint:** OS, ORR, DCR, quality of life, safety/tolerability

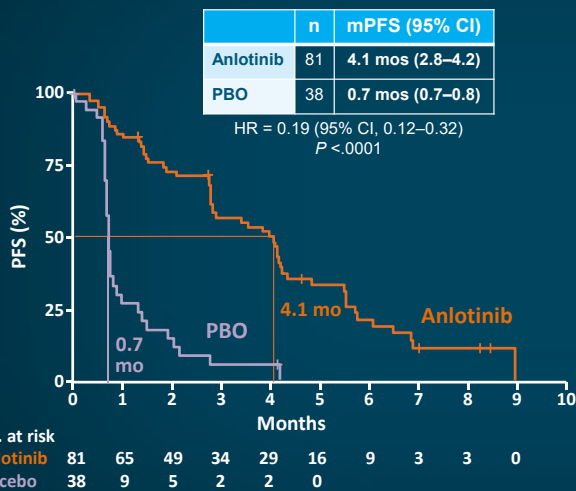
**Stratification:** stage (limited vs extensive, relapse (sensitive vs refractory))

QD = once daily, every day.

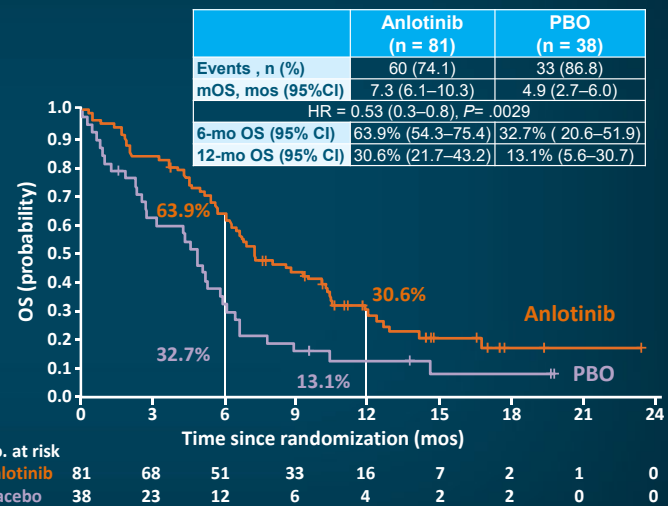
Cheng Y, et al. *Ann Oncol.* 2019;30(suppl 5):v711 (abstract 17380). Si X, et al. *Thorac Cancer.* 2019;10:551-556.

## Antiangiogenic Agents: Anlotinib in Relapsed SCLC (ALTER1202)

### Progression-free survival



### Overall survival

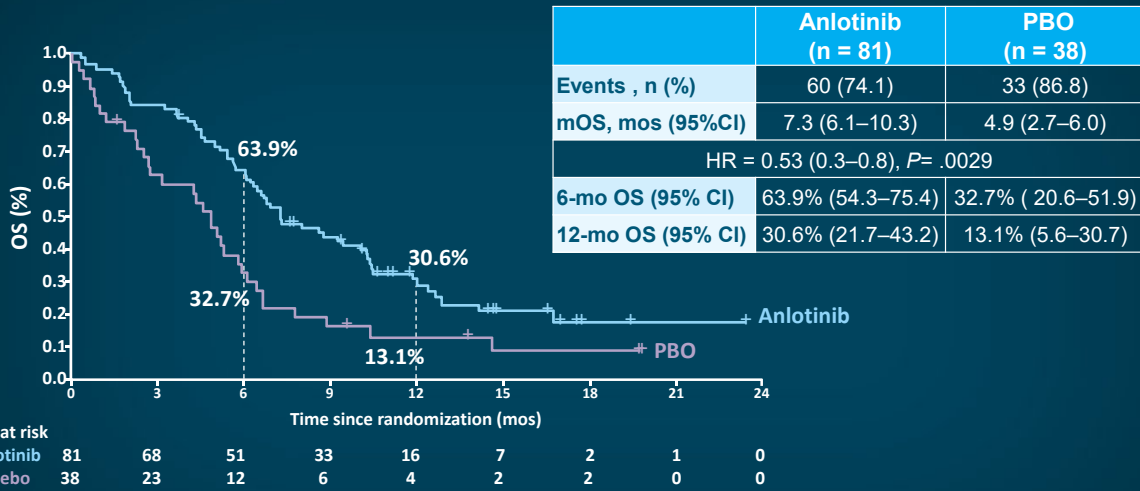


**ORR = 4.9% vs 2.6%, DCR = 71.6% vs 13.2%**

Cheng Y, et al. *Ann Oncol.* 2019;30(suppl 5):v711 (abstract 17380).



## Anlotinib vs Placebo

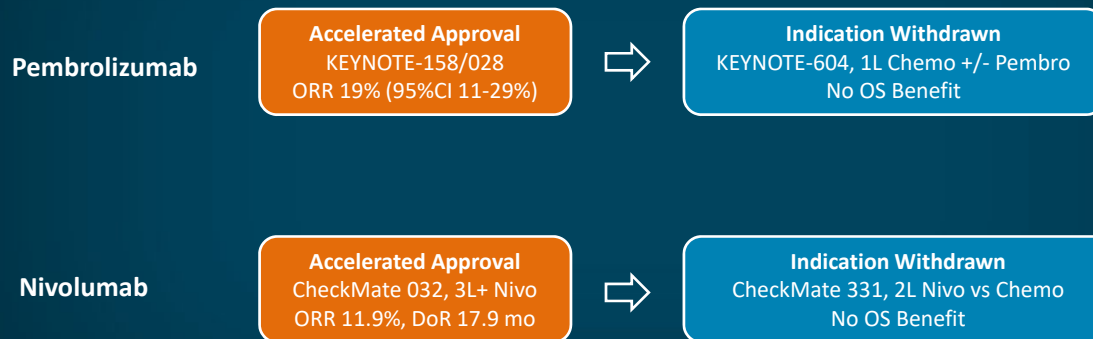


Grade 3 adverse events include hypertension and hyponatremia

Cheng Y, et al. *Ann Oncol.* 2019;30(suppl 5):v711 (abstract 17380).

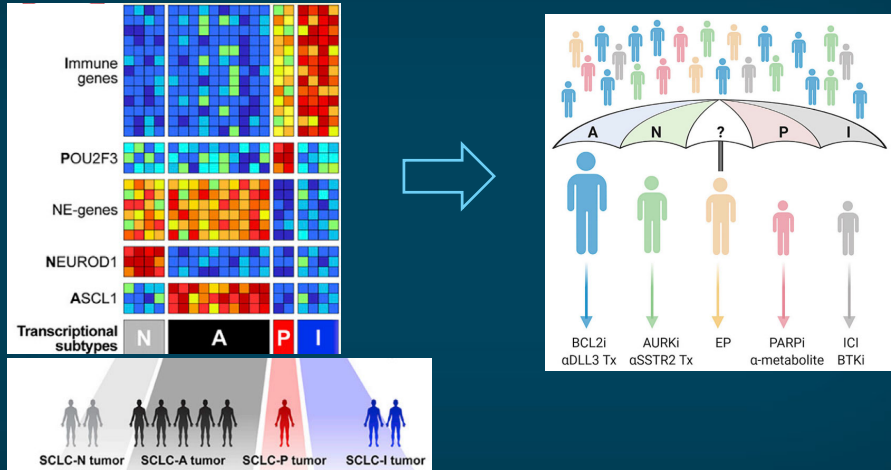
## Checkpoint Inhibitors for 2L+ in NSCLC

### FDA Approvals Withdrawn for Pembrolizumab and Nivolumab



Rudin CM, et al. *J Clin Oncol.* 2020;38(21):2369-2379. Ready N, et al. *J Thorac Oncol.* 2019;14(2):237-44. Spigel DR, et al. *Ann Oncol.* 2021;32(5):631-641.

# Will Molecular Profiling Guide SCLC Treatment in the Future?



Gay CM, et al. *Cancer Cell*. 2021;39(3):346-360. Frese KK, et al. *Cancer Cell*. 2021;39:297-299

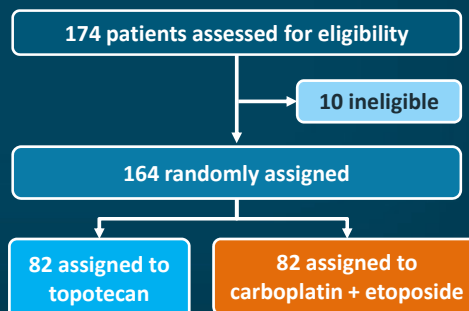
## Applying National Cancer Center Network Guidelines to Practice

## Role of Platinum Re-exposure?

- For platinum-sensitive disease, usual practice is to rechallenge with first-line platinum-based treatment
- However, this practice relies on studies older than 20 years with small sample sizes
- Two strategies are available for second-line treatment: rechallenge with the initial chemotherapy or treatment with topotecan

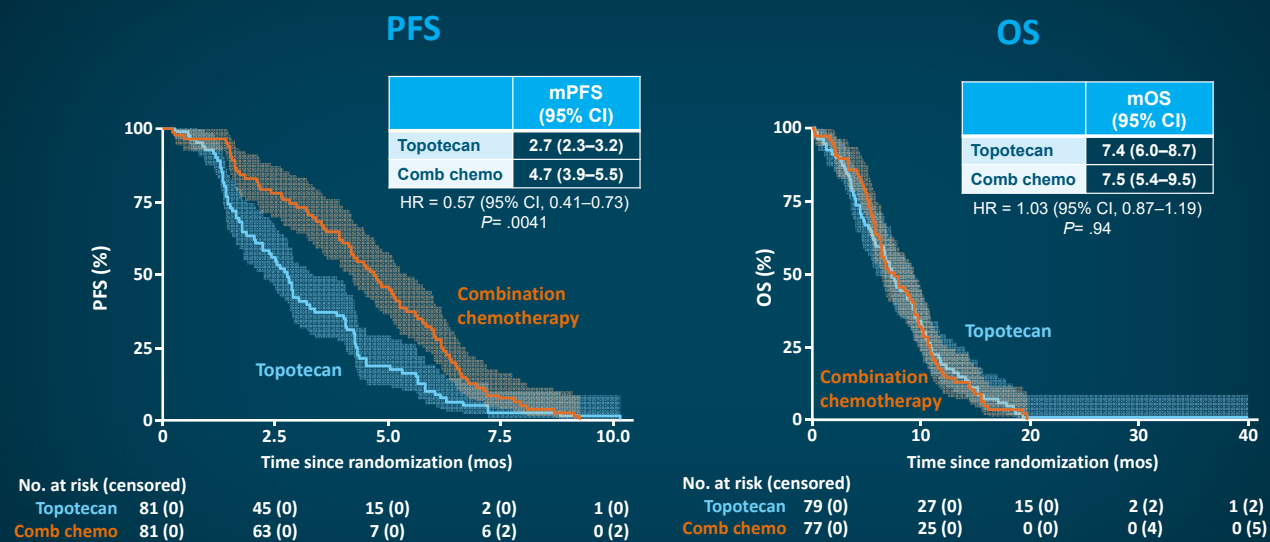
### Carboplatin plus etoposide versus topotecan as second-line treatment for patients with sensitive relapsed small-cell lung cancer: an open-label, multicentre, randomised, phase 3 trial

Nathalie Baize, Isabelle Monnet, Laurent Greillier, Margaux Geier, Hervé Lena, Henri Janicot, Alain Vergnenegre, Jacky Crequit, Regine Lamy, Jean-Bernard Auliac, Jacques Letreut, Hervé Le Caer, Radj Gervais, Eric Dansin, Anne Madroszyk, Patrick-Aldo Renault, Gwenaëlle Le Garff, Lionel Falchero, Henri Berard, Roland Schott, Patrick Saulnier, Christos Chouaid, on behalf of the Groupe Français de Pneumo-Cancérologie 01-13 investigators\*



Baize N, et al. *Lancet Oncol.* 2020;21:1224-1233.

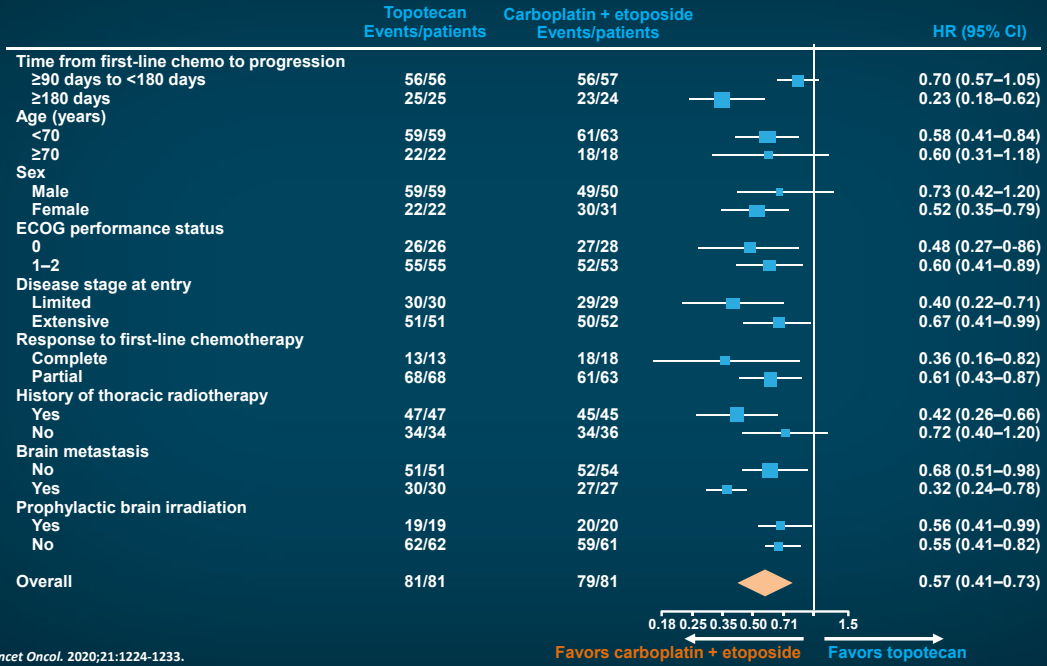
## Improved PFS with Platinum Re-exposure



Comb chemo = combination chemotherapy (carboplatin + etoposide).

Baize N, et al. *Lancet Oncol.* 2020;21:1224-1233.

## Improved PFS with Platinum Re-Exposure



Baize N, et al. *Lancet Oncol.* 2020;21:1224-1233.

## Case Study

Young, Non-smoker

## A 45-Year-Old Man: Non-smoker but With Occupational Exposures...

### Clinical Presentation

- Shortness of breath, cough, and a weight loss of 25 lbs over the last 6 months

### Imaging

- CT scan revealed a 4.5 x 3.5 cm hilar mass in the right lung with enlarged mediastinal lymph nodes

### Diagnosis and Clinical Course

- Diagnosed with SCLC
- Received 4 cycles of cisplatin and etoposide
- Concurrent thoracic radiation of 44 Gy

## A 45-Year-Old Man: Non-smoker but With Occupational Exposures (continued)...

### 3-month Follow-up

- CT scan showed several small lung nodules and enlarged right mandibular and right axillary lymph nodes
- Biopsies revealed metastasis of SCLC
- Brain MRI is negative for metastases

**What treatment options would you recommend for this patient?**

## A 45-Year-Old Man Who is a Non-smoker but With Occupational Exposures (continued)...

- SCLC is unusual in a young non-smoking patient, consider genomic testing and/or academic review of pathology findings
- Both lurbinectedin and topotecan are FDA-approved in the second-line setting; lurbinectedin may be preferred due to toxicity profile

## Case Study

Extensive-stage SCLC

## A 64-year-old Man With Extensive-stage SCLC...

### Clinical Presentation

- Multifocal disease involving the lungs, mediastinal LNs, bones, and brain

### Clinical Course

- 4 cycles carboplatin/etoposide
- Whole brain radiation therapy
- Surveillance imaging

### 4-month Follow-up

- CT scans
  - Multifocal disease progression with new hepatic lesions, progressive pulmonary involvement
- No new CNS disease

## A 64-year-old Man With Extensive-stage SCLC (continued)...

### Continued Follow-up

- Began on irinotecan therapy five months ago
  - Partial response to therapy
  - Most recent CT scans demonstrate disease progression
  - No new CNS lesions
  - ECOG PS 1

**What treatment option would you recommend for this patient?:**



## Case Study

Extensive-stage SCLC Treated With Lurbinectedin

### A 67-year-old Woman With Extensive-stage SCLC...

#### Clinical Presentation

- Multifocal disease involving the lungs, mediastinal LNs, bones, and brain

#### Clinical Course

- 4 cycles carboplatin/etoposide/atezolizumab
- Whole brain radiation
- Atezolizumab maintenance

#### 3-month Follow-up

- CT scans
  - Multifocal disease progression with new hepatic lesions
  - Progressive pulmonary involvement
- No new CNS disease

## A 67-year-old Woman With Extensive-stage SCLC...

### Continued Follow-up

- They began on lurbinectedin therapy five months ago with partial response to therapy
- However, most recent CT scans demonstrate disease progression
- No new CNS lesions
- ECOG PS 1

**What treatment option would you recommend for this patient?**

## Summary

- In considering 2L therapy for SCLC, many factors should be considered, including prior therapy and nature of the disease, ie, resistant vs sensitive disease
- ICI monotherapy is not recommended for those patients who progressed after chemo/IO
- Lurbinectedin is now approved for therapy for 2L disease and is a reasonable approach

ICI = immune-checkpoint inhibitor; IO = immuno-oncology.

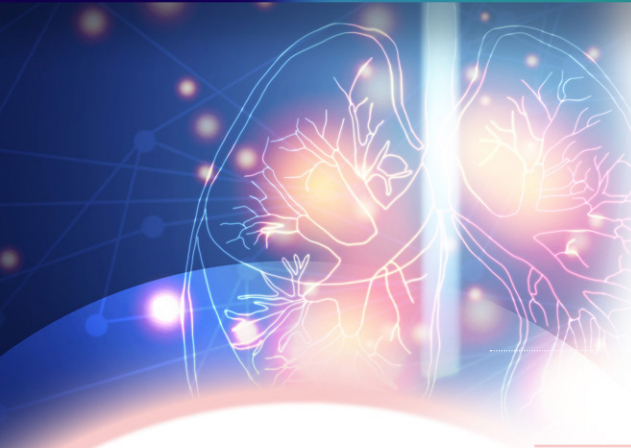
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Leveraging Novel Treatment Options for **SMALL-CELL LUNG CANCER** in the Second Line

PLEASE VISIT [sclc.posterprogram.com](http://sclc.posterprogram.com)

## Response to primary therapy and tumorigenesis of small-cell lung cancer: subsequent lines of therapy and pathophysiology primer

Resource	Address
Büttner R, et al. Implementing TMB measurement in clinical practice: considerations on assay requirements. <i>ESMO Open</i> . 2019;4:e000442.	<a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6350758/pdf/esmooopen-2018-000442.pdf">www.ncbi.nlm.nih.gov/pmc/articles/PMC6350758/pdf/esmooopen-2018-000442.pdf</a>
George J, et al. Comprehensive genomic profiles of small cell lung cancer. <i>Nature</i> . 2015;524:47-53.	<a href="https://pubmed.ncbi.nlm.nih.gov/26168399/">https://pubmed.ncbi.nlm.nih.gov/26168399/</a>
Misch D, et al. Value of thyroid transcription factor (TTF)-1 for diagnosis and prognosis of patients with locally advanced or metastatic small cell lung cancer. <i>Diagn Pathol</i> . 2015;10:21.	<a href="https://diagnosticpathology.biomedcentral.com/track/pdf/10.1186/s13000-015-0250-z.pdf">https://diagnosticpathology.biomedcentral.com/track/pdf/10.1186/s13000-015-0250-z.pdf</a>
Sabari JK, et al. Unravelling the biology of SCLC: implications for therapy. <i>Nat Rev Clin Oncol</i> . 2017;14:549-561.	<a href="https://pubmed.ncbi.nlm.nih.gov/28534531/">https://pubmed.ncbi.nlm.nih.gov/28534531/</a>
Sen T, Gay CM, Byers LA. Targeting DNA damage repair in small cell lung cancer and the biomarker landscape. <i>Transl Lung Cancer Res</i> . 2018;7:50-68.	<a href="https://tlcr.amegroups.com/article/view/19133/15089">https://tlcr.amegroups.com/article/view/19133/15089</a>

## Efficacy and safety review

Resource	Address
Cruz C, et al. Multicenter phase II study of lurbinectedin in BRCA-mutated and unselected metastatic advanced breast cancer and biomarker assessment substudy. <i>J Clin Oncol</i> . 2018;36:3134-3143.	<a href="https://ascopubs.org/doi/pdf/10.1200/JCO.2018.78.6558">https://ascopubs.org/doi/pdf/10.1200/JCO.2018.78.6558</a>
Farago AF, et al. ATLANTIS: a phase III study of lurbinectedin/doxorubicin versus topotecan or cyclophosphamide/doxorubicin/vincristine in patients with small-cell lung cancer who have failed one prior platinum-containing line. <i>Future Oncol</i> . 2019;15:231-239.	<a href="https://pubmed.ncbi.nlm.nih.gov/30362375/">https://pubmed.ncbi.nlm.nih.gov/30362375/</a>

<p>Santamaria Nuñez G, et al. Lurbinectedin specifically triggers the degradation of phosphorylated RNA polymerase II and the formation of DNA breaks in cancer cells. <i>Mol Cancer Ther.</i> 2016;15:2399-2412.</p>	<p><a href="https://pubmed.ncbi.nlm.nih.gov/27630271/">https://pubmed.ncbi.nlm.nih.gov/27630271/</a></p>
<p>O'Brien MER, et al. Phase III trial comparing supportive care alone with supportive care with oral topotecan in patients with relapsed small-cell lung cancer. <i>J Clin Oncol.</i> 2006;24:5441-5447.</p>	<p><a href="https://mct.aacrjournals.org/content/15/10/2399.full-text.pdf">https://mct.aacrjournals.org/content/15/10/2399.full-text.pdf</a></p>
<p>Paz-Ares LG, et al. Efficacy and safety profile of lurbinectedin in second-line SCLC patients: results from a phase II single-agent trial. <i>J Clin Oncol.</i> 2019;37(suppl 15): abstract 8506.</p>	<p><a href="https://ascopubs.org/doi/abs/10.1200/JCO.2019.37.15_suppl.8506">https://ascopubs.org/doi/abs/10.1200/JCO.2019.37.15_suppl.8506</a></p>
<p>Pietanza MC, et al. Randomized, double-blind, phase II study of temozolomide in combination with either veliparib or placebo in patients with relapsed-sensitive or refractory small-cell lung cancer. <i>J Clin Oncol.</i> 2018;36:2386-2394.</p>	<p><a href="https://ascopubs.org/doi/pdf/10.1200/JCO.2018.77.7672">https://ascopubs.org/doi/pdf/10.1200/JCO.2018.77.7672</a></p>
<p>Sabari JK, et al. Unravelling the biology of SCLC: implications for therapy. <i>Nat Rev Clin Oncol.</i> 2017;14:549-561.</p>	<p><a href="https://pubmed.ncbi.nlm.nih.gov/28534531/">https://pubmed.ncbi.nlm.nih.gov/28534531/</a></p>
<p>Sen T, Gay CM, Byers LA. Targeting DNA damage repair in small cell lung cancer and the biomarker landscape. <i>Transl Lung Cancer Res.</i> 2018;7:50-68.</p>	<p><a href="https://tlcr.amegroups.com/article/view/19133/15089">https://tlcr.amegroups.com/article/view/19133/15089</a></p>
<p>Si X, et al. Management of anlotinib-related adverse events in patients with advanced non-small cell lung cancer: experiences in ALTER-0303. <i>Thorac Cancer.</i> 2019;10:551-556.</p>	<p><a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6397894/">www.ncbi.nlm.nih.gov/pmc/articles/PMC6397894/</a></p>
<p>Trigo J, et al. Lurbinectedin as second-line treatment for patients with small-cell lung cancer: a single-arm, open-label, phase 2 basket trial. <i>Lancet Oncol.</i> 2020;21:645-654.</p>	<p><a href="https://pubmed.ncbi.nlm.nih.gov/32224306/">https://pubmed.ncbi.nlm.nih.gov/32224306/</a></p>
<p>von Pawel J, et al. Randomized phase III trial of amrubicin versus topotecan as second-line treatment for patients with small-cell</p>	<p><a href="https://ascopubs.org/doi/pdf/10.1200/JCO.2013.54.5392">https://ascopubs.org/doi/pdf/10.1200/JCO.2013.54.5392</a></p>

lung cancer. <i>J Clin Oncol</i> . 2014;32:4012-4019.	
von Pawel J, et al. Topotecan versus cyclophosphamide, doxorubicin, and vincristine for the treatment of recurrent small-cell lung cancer. <i>J Clin Oncol</i> . 1999;17:658-667.	<a href="https://pubmed.ncbi.nlm.nih.gov/10080612/">https://pubmed.ncbi.nlm.nih.gov/10080612/</a>

## Applying National Cancer Center Network guidelines to practice

Resource	Address
Baize N, et al. Carboplatin plus etoposide versus topotecan as second-line treatment for patients with sensitive relapsed small-cell lung cancer: an open-label, multicentre, randomised, phase 3 trial. <i>Lancet Oncol</i> . 2020;21:1224-1233.	<a href="https://pubmed.ncbi.nlm.nih.gov/32888454/">https://pubmed.ncbi.nlm.nih.gov/32888454/</a>