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# Thoracic Re-irradiation Using Hypofractionated Radiotherapy or Stereotactic Body Radiotherapy in Non-small Cell Lung Cancer

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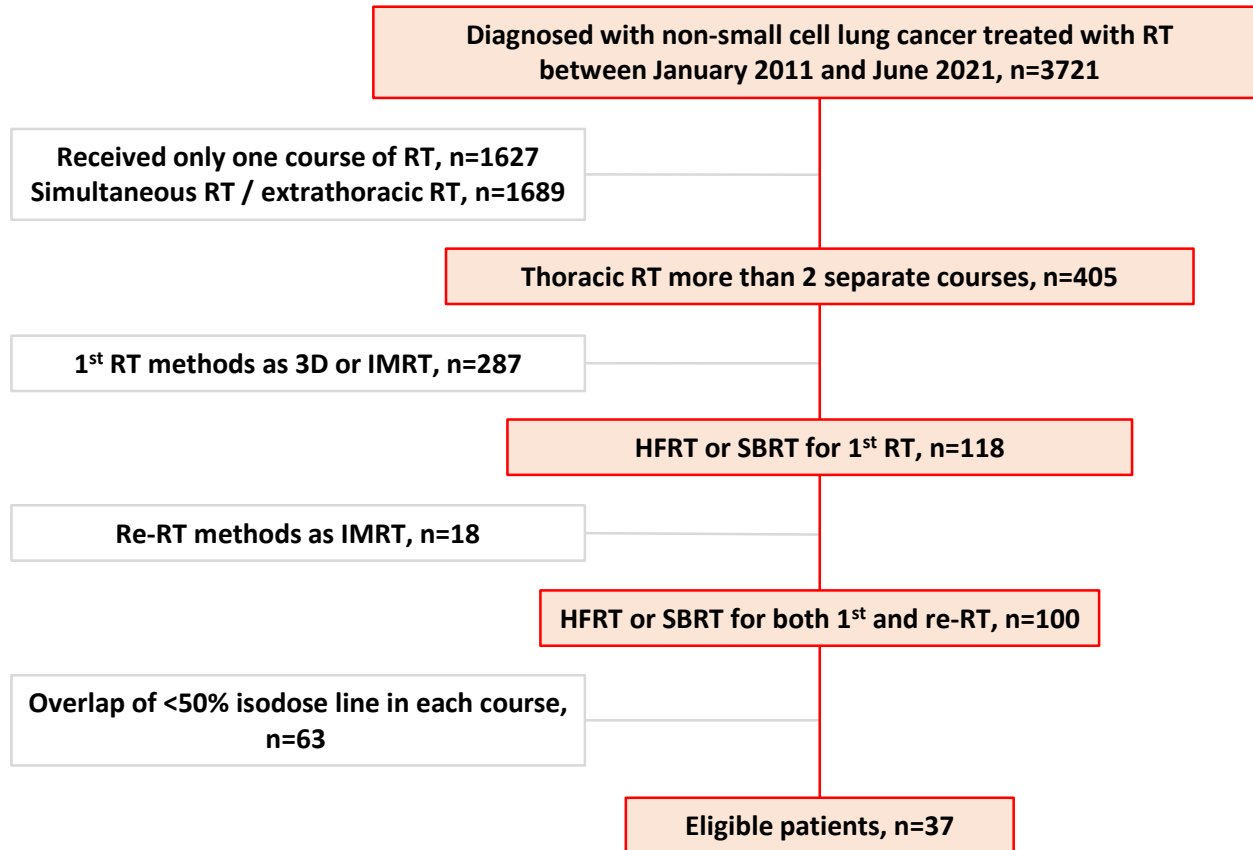
# Backgrounds

- Treatment for local recurrence after radiotherapy for lung cancer is limited because of adverse events or comorbidity.
- Re-irradiation (re-RT) is no longer avoidable to improve survival of relapsed patients.
- Several studies reported acceptable toxicities of stereotactic body radiotherapy (SBRT) for the local recurrence.
- Salvage dose re-RT is increasingly being used.

# Purpose

- To know clinical outcomes and adverse events of thoracic re-RT using hypofractionated radiotherapy (HFRT) or SBRT for locally-recurrent non-small cell lung cancer (NSCLC) after the 1<sup>st</sup> HFRT or SBRT

# Materials and Methods

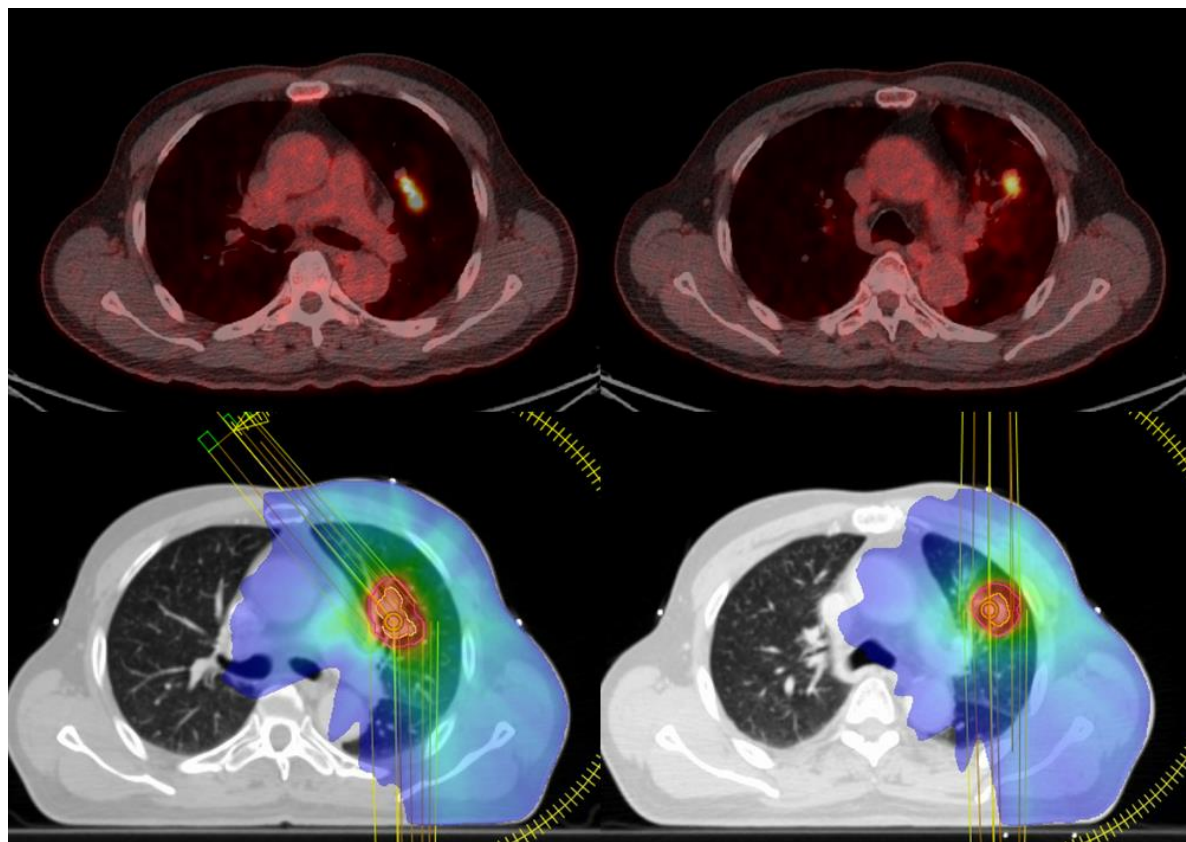


Patient characteristics	N=37
<b>Sex</b>	
M	34
F	3
<b>Pathology</b>	
Adenocarcinoma	11
Squamous cell carcinoma	26
<b>Recurrence biopsy</b>	
No	22
Yes	15
<b>Re-RT dose, BED<sub>10</sub></b>	
≤100 Gy <sub>10</sub>	11
>100 Gy <sub>10</sub>	26
<b>Cumulative dose, BED<sub>10</sub></b>	
≤213 Gy <sub>10</sub>	9
>213 Gy <sub>10</sub>	28
<b>Initial RT method</b>	
HFRT	13
SBRT	24
<b>Re-RT method</b>	
HFRT	13
SBRT	24

# Radiotherapy

- The median re-RT dose
  - HFRT : 60 Gy (range, 50-70)
  - SBRT : 52 Gy (range, 48-60)
- The median interval between 1<sup>st</sup> RT and re-RT
  - 13 months (range, 3-74)
- The median cumulative biologically equivalent dose for  $\alpha/\beta=10$  ( $BED_{10}$ )
  - 239 Gy<sub>10</sub> (range, 168-300)

# Radiotherapy Plan

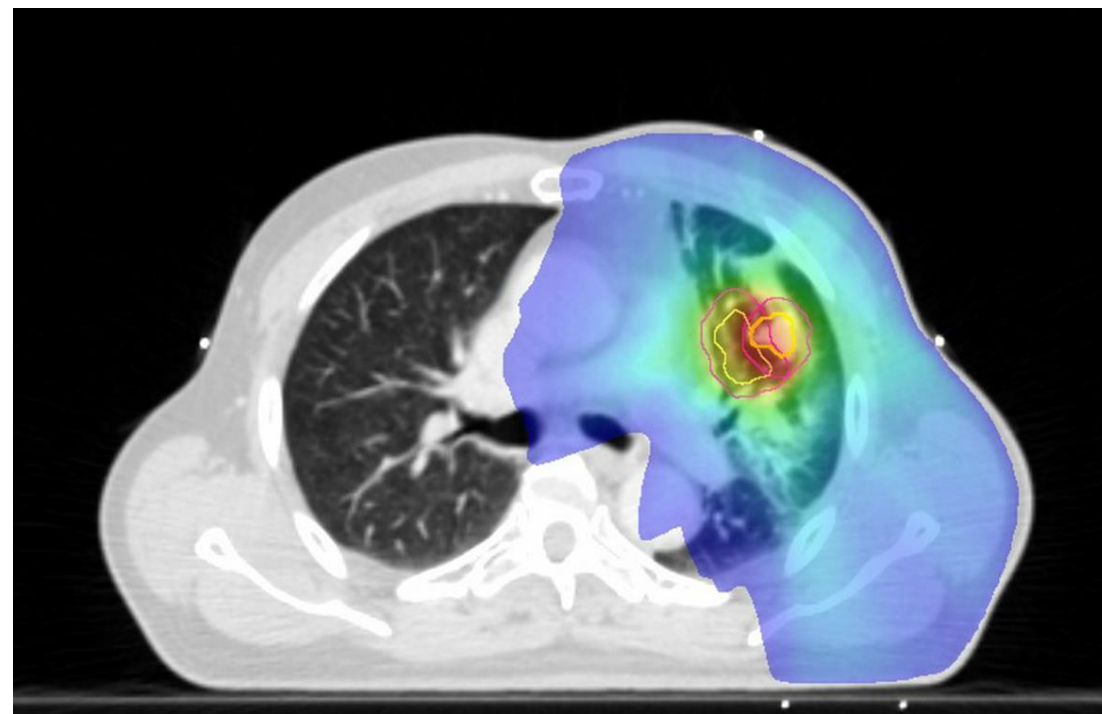


**1st SBRT**

60 Gy/6 fractions

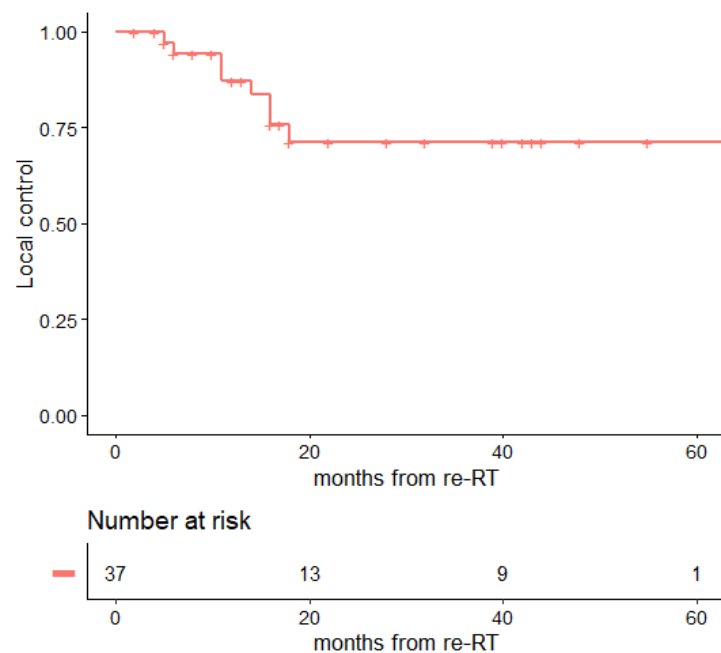
**Re-SBRT**

48 Gy/4 fractions



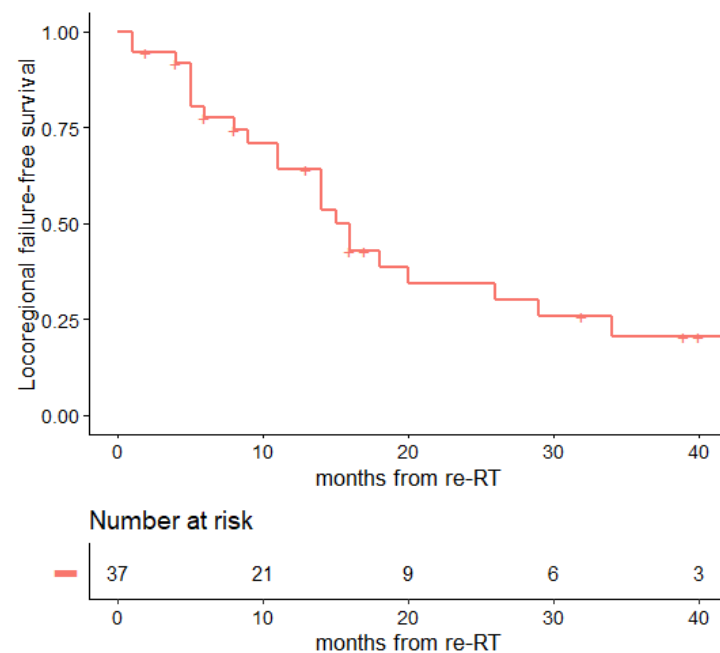
- Plan summation
  - Cumulative dose,  $BED_{10}$  : 225.6  $Gy_{10}$   
(yellow line : ITV, magenta line : PTV)

# Treatment outcomes after re-RT



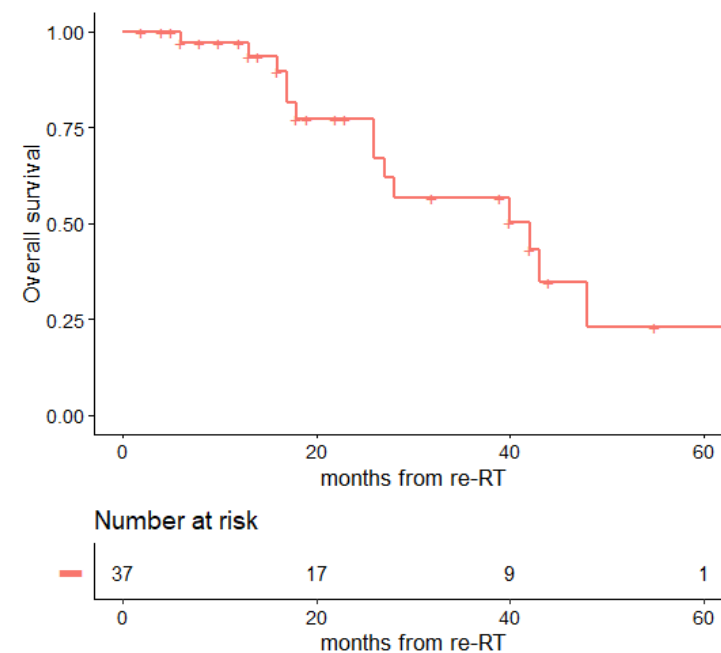
## Local control rate

1-year 87.2 %  
2-year 71.1 %



## Locoregional failure-free survival

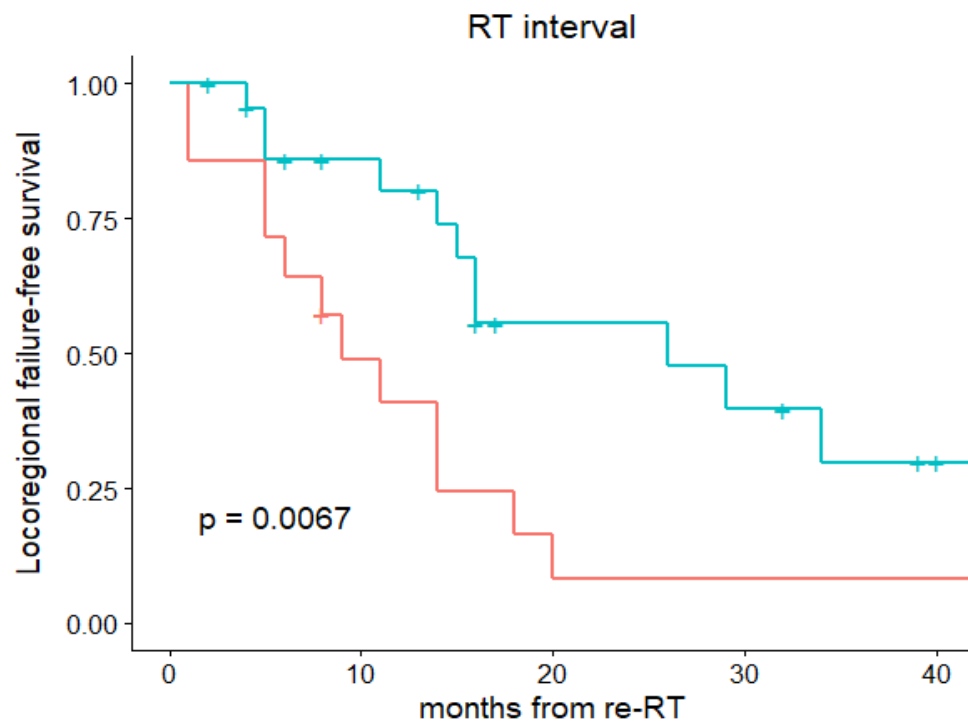
64.2 %  
34.3 %



## Overall survival

97.1 %  
77.4 %

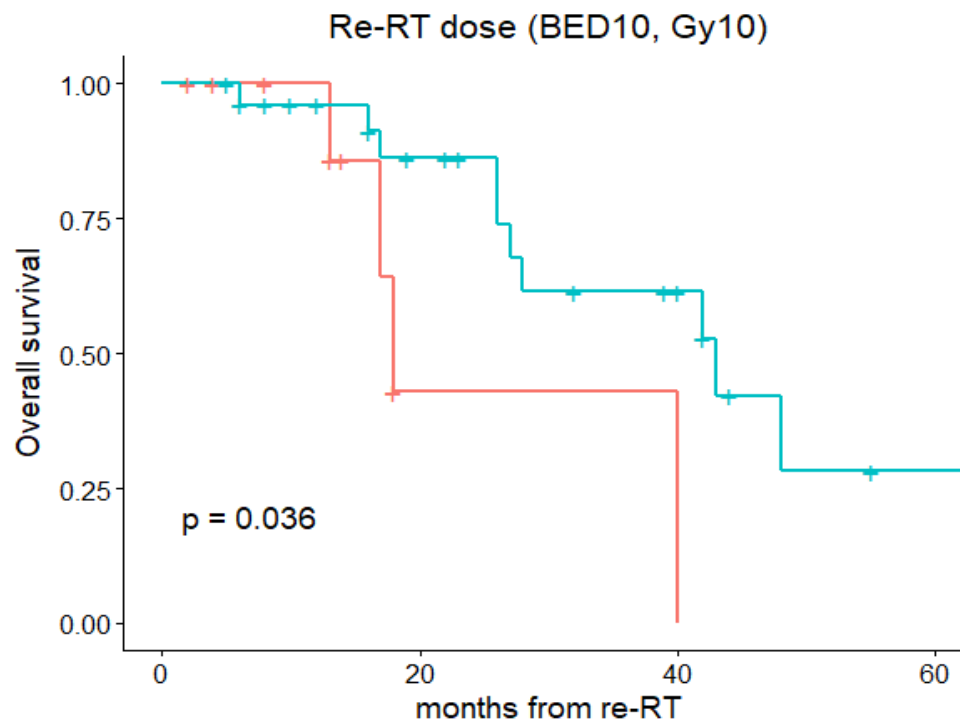
# Prognostic factors after re-RT; univariate



Number at risk

	0	10	20	30	40
<12m	14	6	2	1	1
≥12m	23	15	7	5	2

months from re-RT



Number at risk

	0	20	40	60
<100	11	1	1	0
≥100	26	16	8	1

months from re-RT



# Adverse events

	Acute toxicities (N=37)		Chronic toxicities (N=37)	
	Grade 1	Grade 2	Grade 1	Grade 2
<b>Cough</b>	1 (2.7%)	2 (5.4%)	1 (2.7%)	1 (2.7%)
<b>Chest wall pain</b>	5 (13.5%)	1 (2.7%)	1 (2.7%)	6 (16.2%)
<b>Dyspnea</b>	1 (2.7%)	1 (2.7%)	1 (2.7%)	0 (0.0%)
<b>Pneumonitis</b>	2 (5.4%)	2 (5.4%)	1 (2.7%)	1 (2.7%)
<b>Hemoptysis</b>	2 (5.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

- The crude grade 2 toxicity
  - 14 cases
- No grade  $\geq 3$  toxicities

# Conclusions

- Re-RT with HFRT or SBRT shows favorable outcomes and acceptable adverse events for locally-recurrent NSCLC after 1<sup>st</sup> HFRT or SBRT.
- Selection of appropriate patients for salvage dose re-RT is important for safe treatment.