



UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

DEPARTMENT OF RADIATION ONCOLOGY

Clinical Outcomes of Patients with Recurrent Lung Cancer Re-irradiated with Proton Therapy on the Proton Collaborative Group Prospective Registry Trial

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Disclosures

- Varian Medical Systems: speakers honoraria

Background: Recurrent Lung Cancer

Following radiation therapy for lung cancer up to 50% of patients may develop a locoregional recurrence.

Treatment options are limited for locoregionally recurrent lung cancer and outcomes poor with median survival of 3 - 15 months.

Re-irradiation with proton beam therapy may be safer and better tolerated than photon therapy but data on patient outcomes is limited to small prospective studies and retrospective reports.

Current Proton Collaborative Group Member Institutions



Arizona and Minnesota



Oklahoma City and New Jersey



Purpose

To assess clinical outcomes of patients enrolled on the Proton Collaborative Group prospective registry trial with recurrent lung cancer re-irradiated with proton beam therapy

Methods

67 patients treated with proton beam therapy from 2010 to 2016 at six PCG institutions

Toxicity and outcomes prospectively recorded and reported to PCG

- CTCAE version 4.0

Statistical Analysis

- Kaplan Meier survival estimates and log rank statistics

Patient and Tumor Characteristics

Characteristic	N=67 (%)
Median age at 1 st RT (range)	66 (39-87)
Median age at PBT Re-RT (range)	68 (41-89)
Female	29 (43%)
White	55 (82%)
Black	7 (10%)
Other	2 (3%)
Not Reported	3 (4%)
Current smoker	11 (16%)
Former smoker	54 (81%)
Non-smoker	1 (1%)
Not Reported	1 (1%)

Characteristic	N=67 (%)
ECOG PS at PBT	
0	31 (46%)
1	25 (37%)
2	6 (9%)
3	2 (3%)
Not Reported	3 (4%)
NSCLC	60 (90%)
SCLC	7 (10%)

Initial Radiation Therapy Characteristics

Characteristic	N=67 (%)
Courses of RT before PBT	
1	60 (90%)
2	6 (9%)
3	1 (1%)
Conventional fractionation Median Dose (range)	53 (79%) 59.4 Gy (30-74 Gy, 10-37 fx)
SBRT Median Dose (range)	14 (21%) 50 Gy (35-64 Gy, 3-5 fx)
Chemotherapy prior to PBT	56 (84%)
Lung resection prior to PBT	23 (35%)

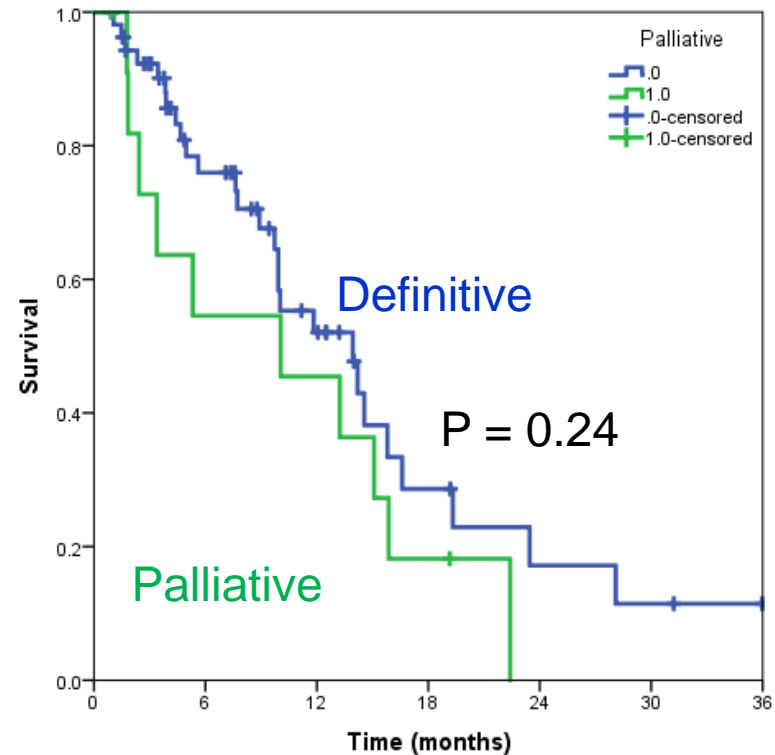
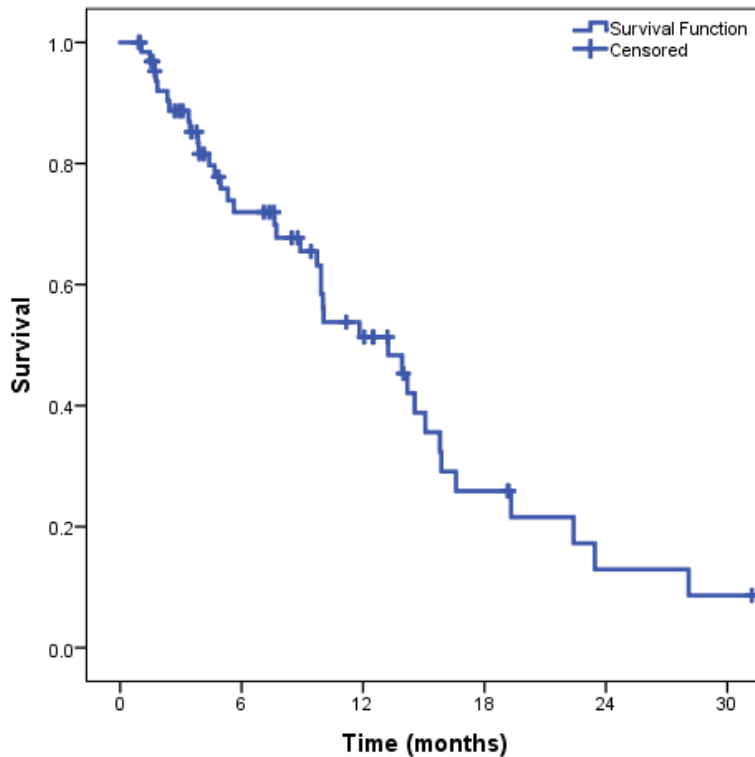
Proton Beam Therapy Characteristics

Characteristic	N=67 (%)
Median time from prior RT to PBT	20 mo. (2.2 – 265 mo)
Median PBT dose (Gy(RBE)) (range)	60 Gy (30-74 Gy, 1.2-6 Gy/fx)
Palliative dose (EQD2 < 50 Gy(RBE))	12 (18%)
Definitive dose (EQD2 > 50 Gy(RBE))	55 (82%)
Conventionally fractionated	37 (67%) (50-74 Gy, 1.8-2 Gy/fx)
Hyperfractionated	2 (4%) (64.8-70 Gy, 1.2-1.23 Gy/fx BID)
Hypofractionated	16 (29%) (40-60 Gy, 2.25-6 Gy/fx)
Concurrent chemotherapy	20 (30%)
Completed course of PBT	67 (100%)
Median follow-up (months) (range)	7.6 mo (1-36 mo)

Overall Survival

	1-year	2-year	Median OS (mo)
All (n=67)	51%	13%	13.2
Definitive Dose (n=55)	52%	17%	13.9
Palliative Dose (n=12)	46%	0%	10.1

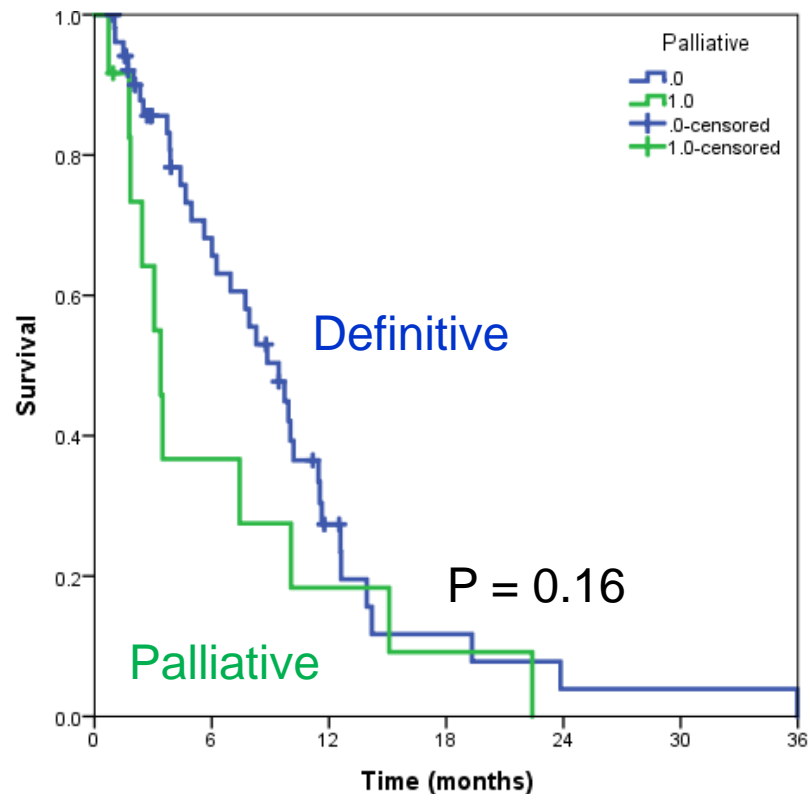
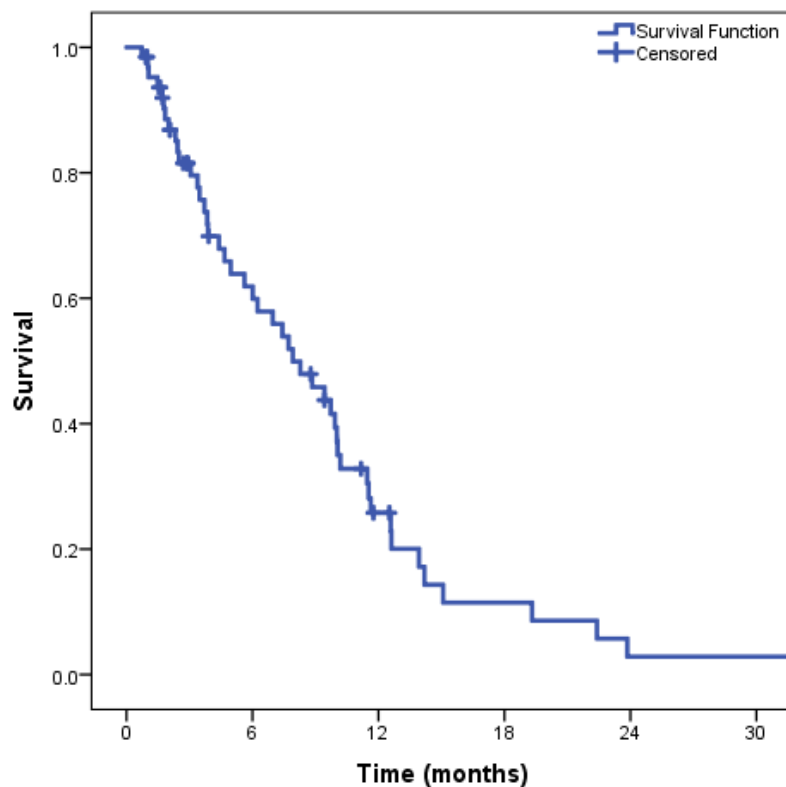
All Patients



Progression-Free Survival

	1-year	2-year	Median PFS (mo)
All Patients (n=67)	26%	3%	7.9
Definitive Dose (n=55)	27%	4%	9.4
Palliative Dose (n=12)	18%	0%	3.4

All Patients



Acute Toxicity

	Select Grade 2 n (%)	Grade 3 n (%)	Grade 4 n (%)	Grade 5 n (%)
Dyspnea	5 (7%)	-	-	-
Pneumonitis	-	-	-	-
Esophagitis	9 (13%)	-	-	-
Pneumonia	-	1 (2%)	-	-
Neck Pain	-	1 (2%)	-	-

Late Toxicity

	Select Grade 2 n (%)	Grade 3 n (%)	Grade 4 n (%)	Grade 5 n (%)
Dyspnea	4 (6%)	-	-	-
Pneumonitis	1 (2%)	-	-	-
Esophagitis	-	-	-	-
Fatigue	-	1 (2%)	-	-
Cardiac Arrest	-	-	-	1 (2%)

Conclusions

- Despite delivery to a high-risk, heavily pre-treated, previously irradiated population, proton therapy for recurrent lung cancer resulted in limited toxicity.
- All patients were able to complete the entire prescribed course of proton therapy.
- Future analyses:
 - Determine ideal re-irradiation dose and fractionation scheme
 - Determine factors associated with toxicity and local tumor control

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