

STEREOTACTIC BODY RADIOTHERAPY FOR EARLY STAGE LUNG CANCER: A MULTICENTRIC STUDY. GOECP/SEOR



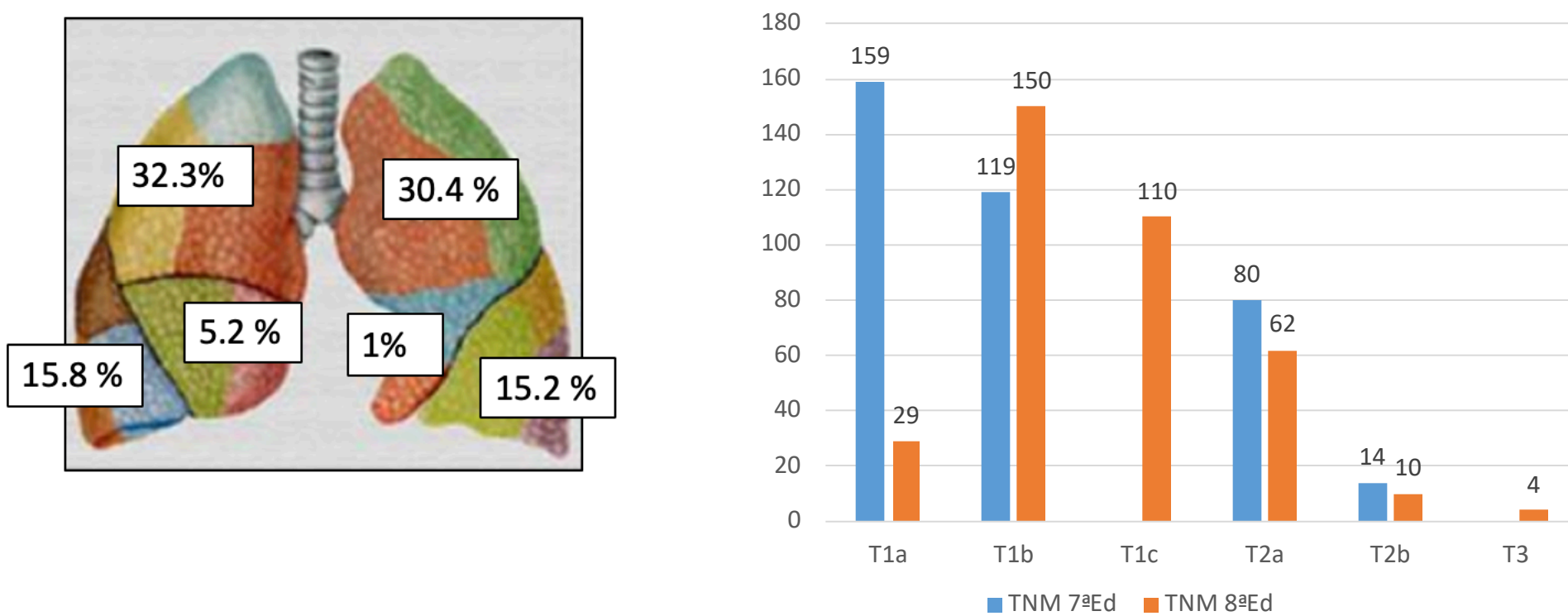
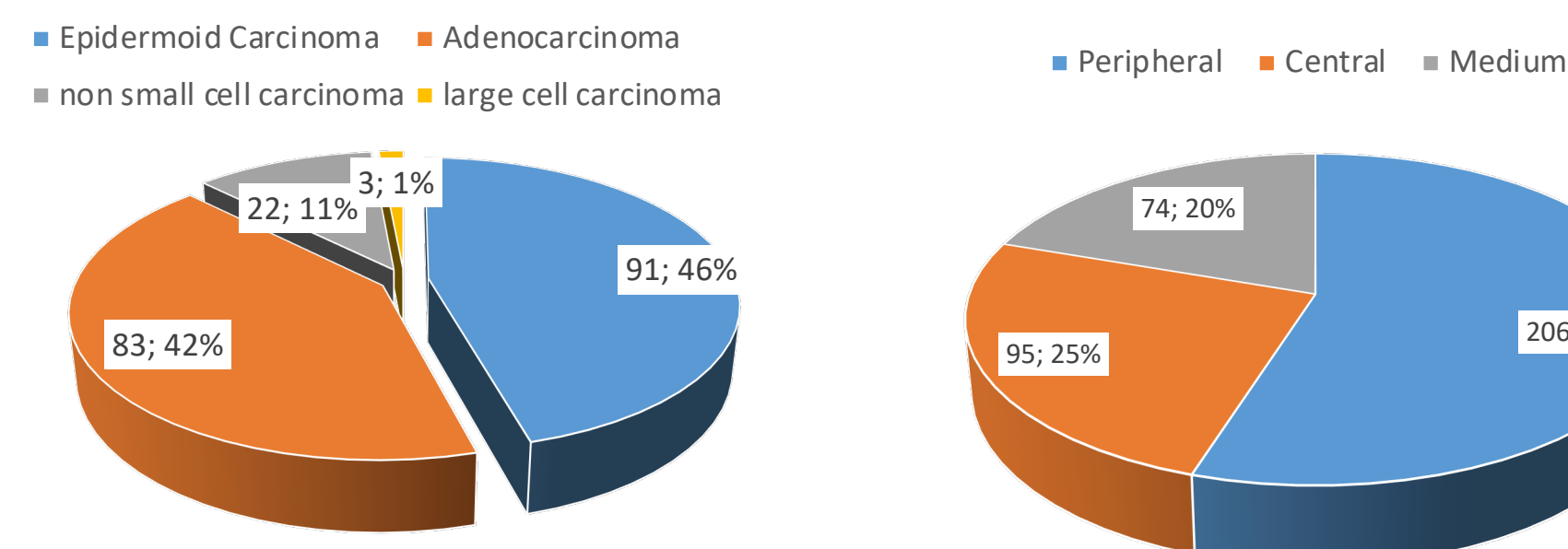
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PURPOSE / OBJECTIVE(s)

Stereotactic body radiotherapy (SBRT) has become the standard of care for patients with medically inoperable early stage non small cell lung cancer, and for those refusing surgical resection. The purpose of this study is to analyze the effectiveness and safety of treatment with SBRT in primary early lung cancer.

MATERIAL & METHODS

Collaborative retrospective multicenter study from 16 Spanish centers. **376 primary lung cancers in 361 patients** (313 men (86,7%) and 48 woman (13,3%), with median age 74,2 years (range: 48-91) were treated with SBRT. 349 tumors (92.8%) were inoperable. In 53.5% anatomopathological study was available.



Mean tumor size 22.5±9.5 mm

The PET-CT showed increased metabolism in 353 lesions (93.9%) with an average SUVmax of 8.5.

Treatments were planned with stereotactic immobilization equipment mainly (88,5%), Dampenig 78.5%, CT 4D 40% or CT normal+insp+esp in 57.4%. IGRT cone beam 93,4%

The most used schemes were: 60 Gy in 5 x 12 Gy (38.8%) and 8 x 7.5 Gy (28.4%), on alternate days in 289 cases (77%).

Tumor response was evaluated with RECIST 1.1 and PERCIST 1.0 criteria. Toxicity was evaluated with CTC-AE v4. Statistical analyses was performed with SPSS 22.0 software package (IBM SPSS, Inc., Chicago, IL, USA).

RESULTS

205 lesions (54.5%) had **complete response (CR)**. **Prognostic factors of CR: Univariate analysis**

Qualitative variables		n	No CR	CR	p
PETCT	Increased SUV/no	333/13	39.9/69.2%	60.1/30.8%	0.035
Location	Central/Medium /Perif	92/73/184	33.7/32.9/48.4 %	66.3/67.1/51.6%	0.017
CT	4D/N+I+E/Other	143/197/10	46.2/36/80%	53.8/64/20%	0.018
IGRT	Cone beam/4D	263/69	45.2/23.2%	54.8/76.8%	0.001

Quantitative variables	n	No CR	n	CR	p
Size tumor (mm)	134	24.03±10.34	196	21.11±8.8	0.006
GTV (cc)	110	19.75±19.48	138	13.6±14.23	0.005
PTV (cc)	115	49.61±39.42	151	35.72±24.76	0.001
Median dose PTV (Gy)	110	60.82±4.95	137	59.12±4.69	0.006
Max dose PTV (Gy)	111	66.5±5.88	139	63.96±6.21	0.001

Multivariate analysis

variables	p	OR	IC 95%
Size tumor (mm)	0.288	1.037	0.969 – 1.110
GTV (cc)	0.591	1.012	0.969 – 1.057
PTV (cc)	0.043	0.974	0.949 – 0.999
Median dose PTV (Gy)	0.468	1.048	0.923 – 1.189
Max dose PTV (Gy)	0.147	0.922	0.826 – 1.029
PETCT (Increased SUV)	0.355	2.090	0.438 – 9.976
Location	0.966	0.983	0.44 – 2.196
CTSIM	0.683	2.158	0.053 – 87.101
IGRT	0.000	5.143	2.29– 11.52

Toxicity

The only acute toxicity was pulmonary G2 in 2.7%. Chronic toxicity ≥G2 was: Pulmonary G2 3.4%, G3 1.5% and G5 0.4% and Cardiac G2 0.7%. We did not find any dosimetric factors predictive of toxicity ≥ G2.

With a median **follow-up** after SBRT of 30 months (range 3–127 months) **local control** was 90 %.

	n	%
Local relapse	37	9.8
Lymph node relapse	47	12.5
Distant metastasis	61	16.2
Other lung tumor*	41	10.2
Second neoplasms	25	6.6

*16 cases were treated with another SBRT

The **local relapse free survival (LRFS)** was **90 %**, median survival of **66.6 months** (IC95% 63,14–70,1). Figure 1.

Prognostic factors of local relapse free Survival

Variable		n	LR	%LRFS	Median Survival (IC 95%)	
CR	no	136	21	84.6	59.11 (53.7 – 64.4)	0.000
	yes	191	10	94.8	70.46 (66.2 – 74.6)	
BED (Gy)	>110	173	12	93.1	67.17 (64.27 – 70.08)	0.046
	<110	164	21	87.2	63.68 (58.13 – 69.23)	
Size (mm)	<30	266	22	91.7	64.08 (60.315 - 67.85)	0.003
	>30	72	13	81.9	60.50 (52.92- 68.08)	

The **overall survival** was 61.6%, median survival 58.8 months (IC95%= 49,2 – 68,45).

The **specific overall survival** was 79.2%, median survival 87.3 months (IC95% 77,5-97).

The **disease-free survival** was 79.6% median disease-free survival 55,78 months (IC95% 51,2-60,4).

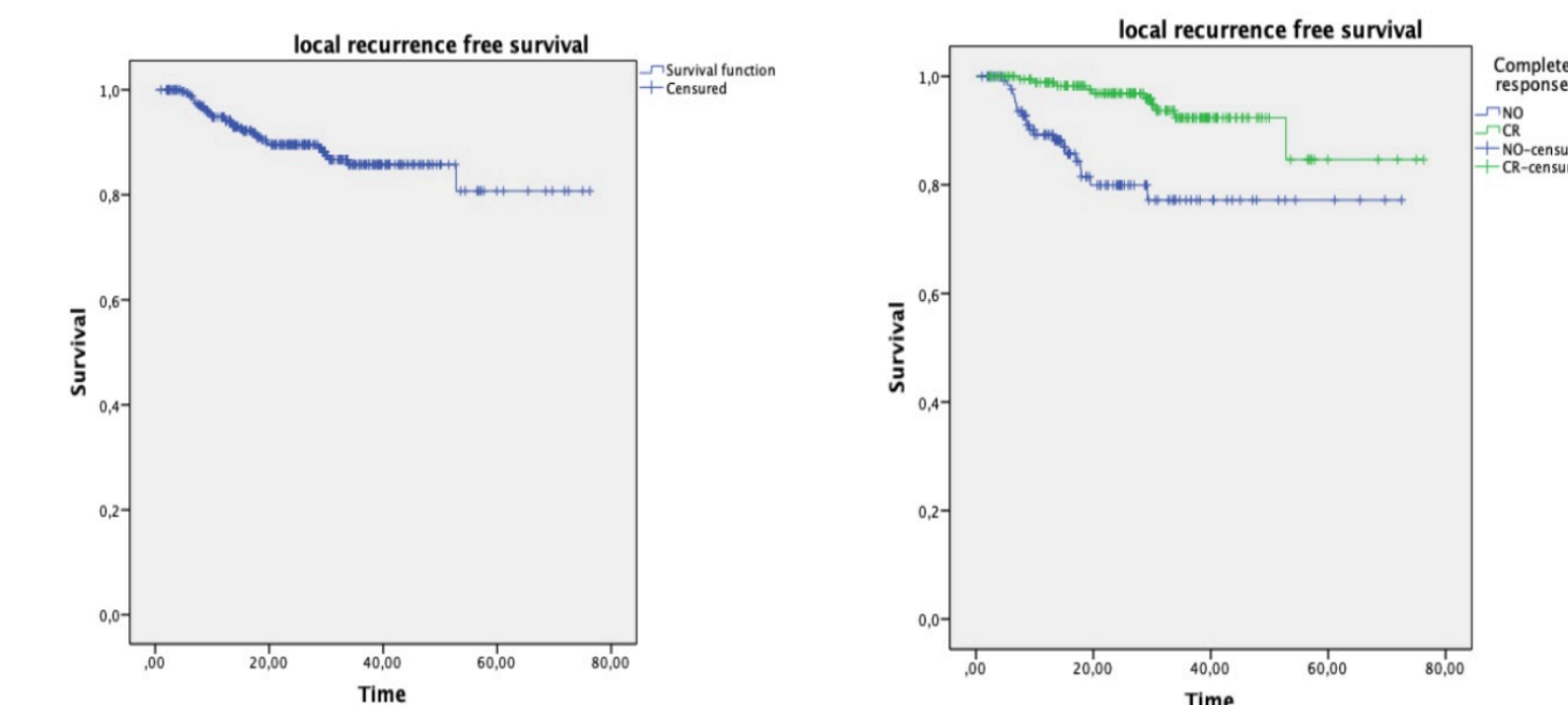


Figure 1.- Local recurrence free survival: in patients with CR was 94.8% with an average survival 70.5 months (IC95% 66,2–74,6), in patients non-CR was 84.6% with an average survival of 59 months (IC95% 53,8-64,4), p <0.001.

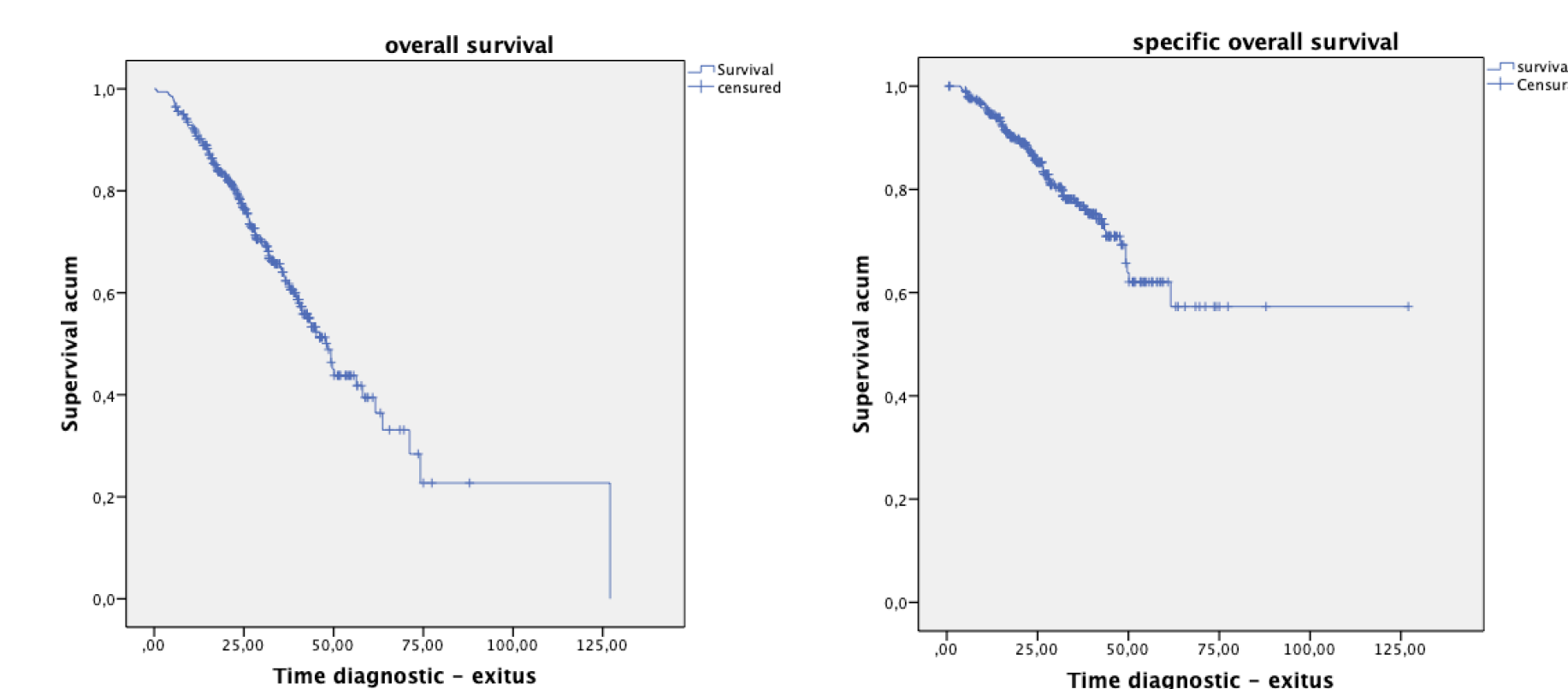


Figure 2.- The overall survival was 61.6%, median overall survival 58.8 months (IC95%= 49,2 – 68,45). The specific overall survival was 79.2%, median specific overall survival 87.3 months (IC95% 77,5-97)

SUMMARY / CONCLUSION

- SBRT is an effective and well-tolerated treatment option for patients with early stage lung cancer who are not suitable for surgery.
- 54,5% of the lesions had response complete. The prognostic factors of complete response were: small size of PTV and IGRT 4D.
- Local relapse free survival was 90 %, the prognostic factors were: tumor size < 30 mm, complete response and BED >110 Gy.
- The overall survival was 61.6%, median 58.8 months.
- The specific overall survival was 79.2%, median 87.3 months.
- The disease-free survival was 79.6% median 55,78 months

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