Associazione Italiana Radioterapia e Oncologia clinica

Società Italiana di Radiobiologia

RE-IRRADIATION OF INTRACRANIAL MENINGIOMAS FAILING AFTER PREVIOUS RADIATION THERAPY: AN ITALIAN MULTICENTER RETROSPECTIVE STUDY

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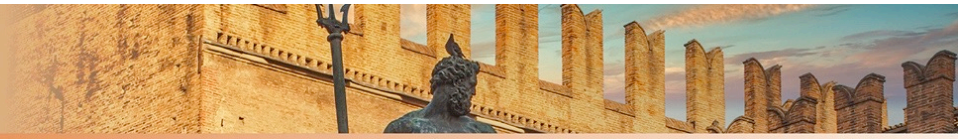
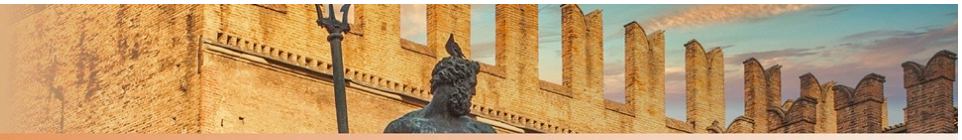


DICHIARAZIONE

Relatore: DANIELE SCARTONI

Come da nuova regolamentazione della Commissione Nazionale per la Formazione Continua del Ministero della Salute, è richiesta la trasparenza delle fonti di finanziamento e dei rapporti con soggetti portatori di interessi commerciali in campo sanitario.

- Posizione di dipendente in aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Consulenza ad aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Fondi per la ricerca da aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Partecipazione ad Advisory Board **(NIENTE DA DICHIARARE)**
- Titolarità di brevetti in compartecipazione ad aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Partecipazioni azionarie in aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Altro



BACKGROUND & PURPOSE

- ✓ With the advance of modern irradiation techniques, the role of radiotherapy (RT) for intracranial meningioma has increased significantly throughout the past years
- ✓ Despite the generally favorable outcome with local control rates up to 90% after ten years, progression after RT does occur. In those cases, re-irradiation is often difficult due to the limited radiation tolerance of the surrounding tissue
- ✓ To date, RT can be delivered with several techniques such as SRS, FSRT, IMRT and Particle therapy
- ✓ In absence of clinical controlled trials treatment decision for recurrent meningiomas are defined by local experience and clinical practice. Radiotherapy modality, treatment dose and patient accrual are not well established

We designed a multicenter retrospective study of meningioma patients relapsed after a previous radiotherapy course with the aim of investigating outcome, toxicity and prognostic factors conditioning survival

MATHERIAL / METHODS - A

Patient and treatment characteristics

Number of patients	185
Gender	
Male	81 (44%)
Female	104 (56%)
Age Re-irradiation (years)	
Median	62 years
Range	20-89 years
KPS Re-irradiation	
Median	90
Range	60-100
Tumor location	
- Convexity	90 (48%)
- Skull base	95 (52%)
Pathologic grade at time of Re-irradiation	
- Grade 1	110 (60%)
- Grade 2	65 (35%)
- Grade 3	10 (5%)

Radiotherapy modality	
- EBRT/IMRT	12 (9%)
- SRT	79 (41%)
- fSRT	63 (34%)
- PT	31 (16%)
Median GTV	
- EBRT/IMRT	20 cc (range 6,5 – 35 cc)
- SRT	7,5 cc (range 0,1 – 41,5 cc)
- fSRT	7 cc (0,8 – 30 cc)
- PT	44 cc (1,2 – 225,5 cc)
Median follow-up	4,6 years (range interq 1,7-6,8 yr)

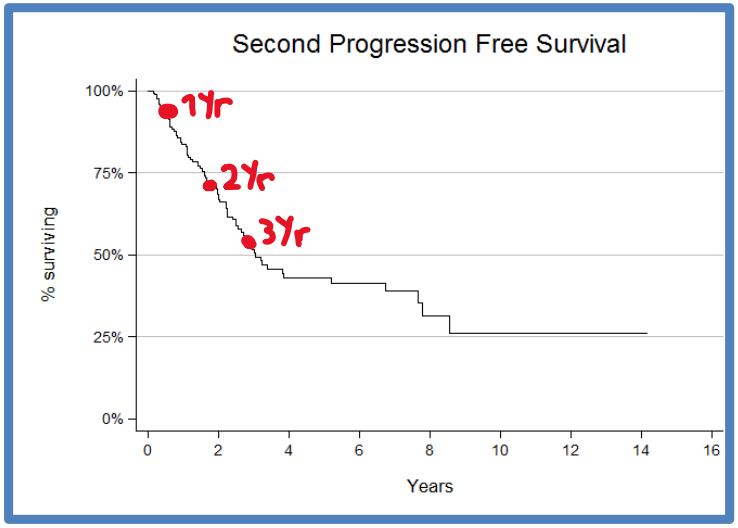
MATHERIAL / METHODS - B

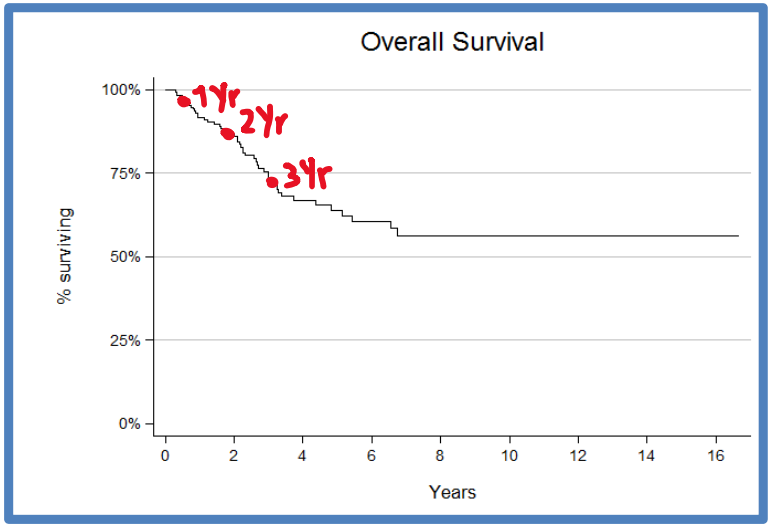
Median Dose and Delivery

- ✓ **EBRT/IMRT**: **50 Gy** (range 20 – 60 Gy); median BED_4 64 Gy (range 40 – 90 Gy)
- ✓ **SRT**: **14 Gy** (range 8 – 22,5 Gy); median EQD2 41 Gy (range 16 – 99,5 Gy); median BED_4 62 Gy (range 24 – 149 Gy)
- ✓ **fSRT**: **25 Gy** (range 19,5 – 55 Gy); median EQD2 40 Gy (range 25 – 67,5 Gy); median BED_4 62 Gy (range 30,7 – 94,5 Gy)
- ✓ **PT**: **55 Gy** (50,4 – 66 Gy); median BED_4 84 Gy (range 73 – 99 Gy)

RESULTS – A

Outcomes



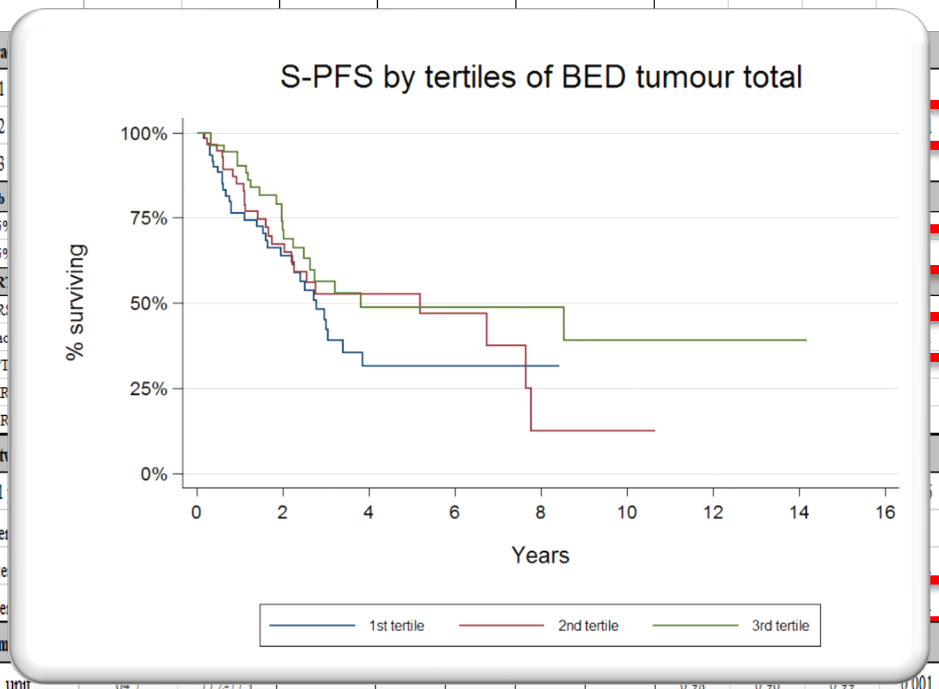


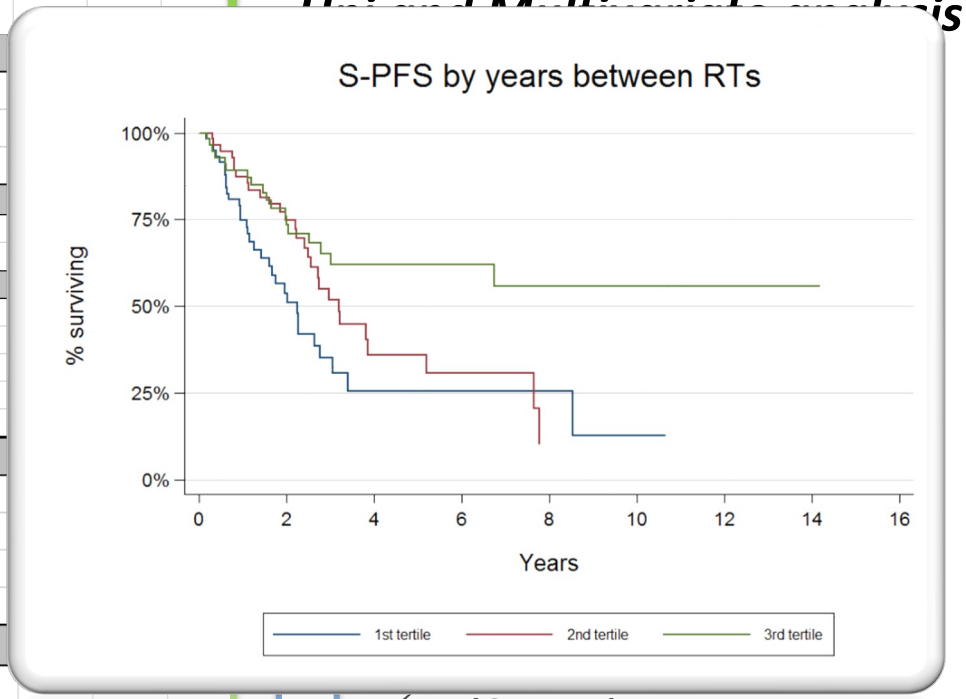
PFS 1yr: **83.8%**
PFS 2yr: **67.7%**
PFS 3yr: **51.6%**

OS 1yr: **91.7%**
OS 2yr: **86.8%**
OS 3yr: **72.5%**

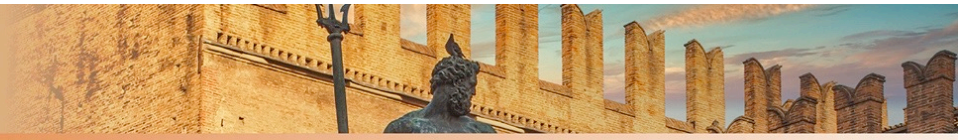
RESULTS – B

	N or median	% or IQR	N missing	Second progression		Univariate Cox regression				Multiple Cox regression			
				No (N, %)	Yes (N, %)	HR	lower 95% CI	upper 95% CI	p-value	HR	lower 95% CI	upper 95% CI	p-value
Gra													
1													
2													
3													
Ki67 mib													
≤5%													
>5%													
Tecnh R													
SR													1,00
multifrac													0,36
PT													0,90
IMR													0,62
EBR													-
Years betv													
by +1													
1st te													1,00
2nd te													0,56
3rd te													0,38
BED tum													
by +1 unit	64,7	55,2-77,1				0,98	0,96	0,99	0,001				
1st tertile	65	36,5%	0	26	40,0%	39	60,0%	1,00				1,00	
2nd tertile	59	33,1%		37	62,7%	22	37,3%	0,45	0,27	0,76	0,003	0,47	0,26	0,83	0,010
3rd tertile	54	30,3%		37	68,5%	17	31,5%	0,55	0,31	0,97	0,039	0,31	0,13	0,76	0,010





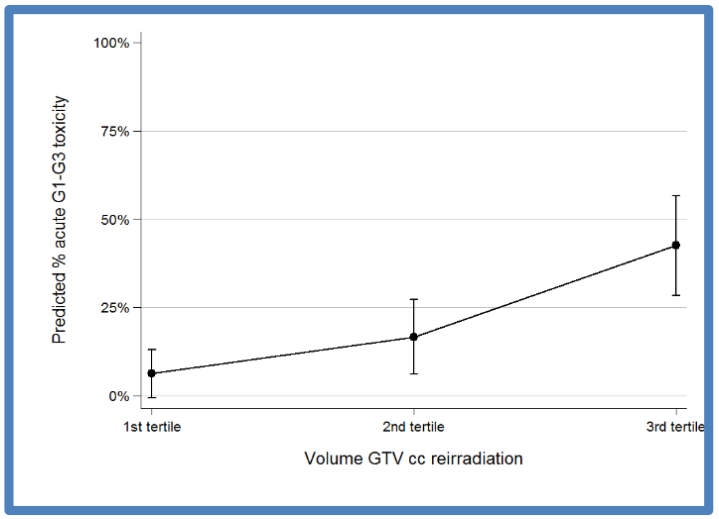
✓ **Ki67 > 5%**

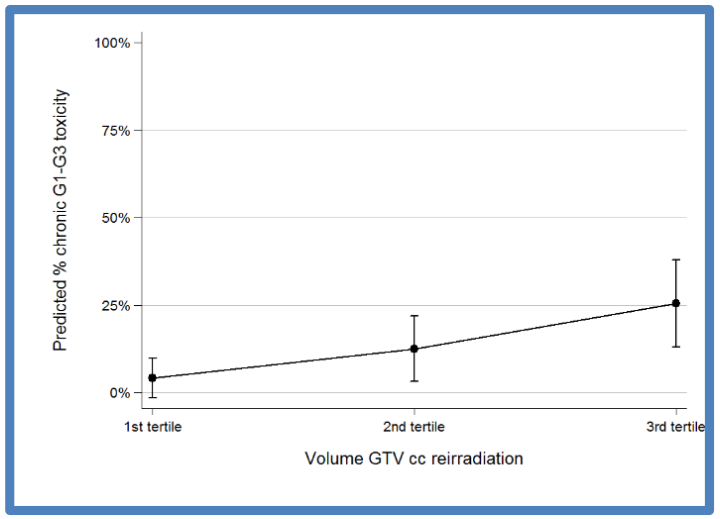


RESULTS – C
Toxicity

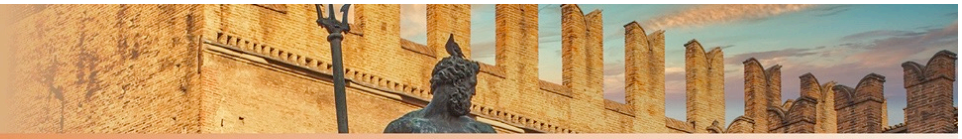
- ✓ All pts completed the treatment without breaks
- ✓ **No G3 acute and late toxicity (3% acute G3 seizure)**
- ✓ **Radionecrosis: 10%** (no G3 radionecrosis)
- ✓ **Larger GTV** higher risk of acute and late toxicity

RESULTS – C
Toxicity





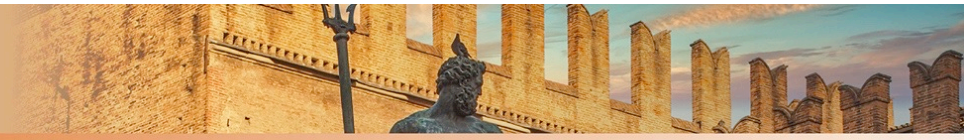
	acute toxicity: any (G1-G3) vs. none						acute toxicity: G2-G3 vs. G1-none						chronic toxicity: any (G1-G3) vs. none						chronic toxicity: G2-G3 vs. G1-none					
	no	yes	OR	lower 95% CI	upper 95% CI	p-value	no	yes	OR	lower 95% CI	upper 95% CI	p-value	no	yes	OR	lower 95% CI	upper 95% CI	p-value	no	yes	OR	lower 95% CI	upper 95% CI	p-value
GTV reirr																								
1st tertile	45	3	1,00				46	2	1,00				46	2	1,00				46	2	1,00			
2nd tertile	40	8	3,00	0,74	12,09	0,122	48	0	-	-	-	-	42	6	3,29	0,63	17,18	0,159	48	0	-	-	-	-
3rd tertile	27	20	11,11	3,02	40,93	<0.001	33	14	9,76	2,08	45,86	0,004	35	12	7,89	1,66	37,53	0,009	39	8	4,72	0,95	23,54	0,058



RESULTS – D
Elderly patients
(> 65 years)

Number of patients	**87/185**
Gender	
Male	41 (47%)
Female	46 (53%)
KPS Re-irradiation	
Median	90
Range	60-100
Tumor location	
- Convexity	44 (50,5%)
- Skull base	43 (49,5%)
Pathologic grade at time of Re-irradiation	
- Grade 1	41 (47%)
- Grade 2	40 (46%)
- Grade 3	6 (7%)

Radiotherapy modality	
- EBRT/IMRT	9 (10%)
- SRT	37 (43%)
- fSRT	28 (32%)
- PT	13 (15%)
Median GTV	
- EBRT/IMRT	20 cc (range 6,5 – 35 cc)
- SRT	9,5 cc (range 0,3 – 39,8 cc)
- fSRT	6,5 cc (0,9 – 29,5 cc)
- PT	51,6 cc (8,7 – 157 cc)



RESULTS – E
Elderly patients
(> 65 years)

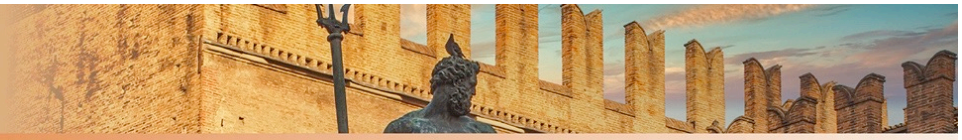
	N or median	% or IQR	N missing	Deceased				Univariate Cox regression				Multiple Cox regression			
				No (N, %)		Yes (N, %)		HR	lower 95% CI	upper 95% CI	p-value	HR	lower 95% CI	upper 95% CI	p-value
Age at reirrad															
<65	91	51,1%		70	76,9%	21	23,1%	1,00				1,00			
65.0-69.9	27	13,5%		20	74,1%	7	25,9%	0,87	0,45	1,70	0,685	0,84	0,40	1,75	0,639
70.0-74.9	23	14,2%	0	12	52,2%	11	47,8%	1,97	1,06	3,65	0,031	2,08	1,07	4,04	0,030
75.0-79.9	21	11,8%		18	85,7%	3	14,3%	0,94	0,44	2,01	0,875	1,19	0,54	2,62	0,668
>=80.0	16	9,0%		11	68,8%	5	31,3%	1,27	0,50	3,25	0,618	1,08	0,41	2,83	0,878
Age at reirrad															
<65	91	51,1%	0	70	76,9%	21	23,1%	1,00				1,00			
>=65	87	48,9%		61	70,1%	26	29,9%	1,17	0,75	1,84	0,481	1,22	0,77	1,92	0,394
Age at reirrad															
<65	93	51,4%		71	76,3%	22	23,7%	1,00				1,00			
65.0-69.9	27	13,3%		20	74,1%	7	25,9%	1,05	0,45	2,45	0,914	1,50	0,62	3,65	0,367
70.0-74.9	23	13,9%	0	12	52,2%	11	47,8%	3,08	1,48	6,40	0,003	3,17	1,44	7,01	0,004
75.0-79.9	22	12,2%		19	86,4%	3	13,6%	0,72	0,22	2,42	0,599	0,60	0,17	2,10	0,429
>=80.0	16	8,8%		11	68,8%	5	31,3%	2,80	1,04	7,51	0,041	3,18	1,12	9,00	0,029
Age at reirrad															
<65	93	51,4%	0	71	76,3%	22	23,7%	1,00				1,00			
>=65	88	48,6%		62	70,5%	26	29,5%	1,59	0,90	2,82	0,110	1,73	0,96	3,12	0,070

PFS

1-yr PFS: 81.4 %
3-yr PFS: 44.4 %

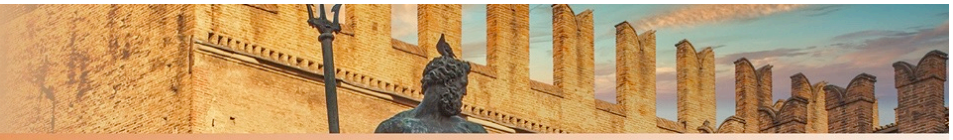
OS

1-yr OS: 91,5 %
3-yr OS: 62,7 %



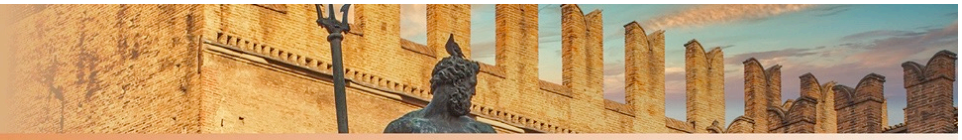
RESULTS – F
Elderly patients
(> 65 years)

- ✓ All pts completed the treatment without breaks
- ✓ **No G3 acute and late toxicity (2% acute G3 seizure)**
- ✓ **Radionecrosis: 10%** (no G3 radionecrosis)



CONCLUSIONS

- ✓ Reirradiation of meningiomas progressing after previous radiation treatments appears to be feasible with promising clinical outcomes, in elderly patients also
- ✓ Good toxicity prolife (radionecrosis rate of 10%)
- ✓ Different effective techniques (selection according to the GTV volume?)
- ✓ Grade > 1 and Ki67 > 5% negatively correlate with PFS



THANK YOU

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