

Stereotactic Body Radiotherapy for Extracranial Oligometastatic Disease From Head and Neck Primary Cancers: A Meta-Analysis

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Introduction

Stereotactic radiation (SBRT) is increasingly used to treat oligometastatic (OM) and oligoprogressive (OP) cancers; emerging data suggests possibility of altering disease course

A minority of primary head and neck (HN) cancer patients present with or develop OM

Current prospective evidence includes few OM HN patients, with dedicated trials unlikely to accrue

Objective

Perform a systematic review and meta-analyses of OM HN patients treated with SBRT to quantify:

- Overall Survival (OS)
- Progression free survival (PFS)
- Local control (LC)
- Toxicity

Understand technical parameters of treatment globally

Materials & Methods

Search

Systematic review using PRISMA guidelines

PubMed and Embase queried from inception to Jan 2022

Keywords:

- "Radiation" +
- "Metastases" +
- "Head and neck cancer"

Screening

Independent authors conducted screening

OM/OP from any histology arising in HN/salivary glands

Exclusion:

- Surgical/other ablative therapies
- Mixed primaries (or interventions) without separate HN outcomes
- >5 lesions

Synthesis

Abstracted data included:

- Study demographics
- 1,2,3 year OS, LC, PFS
- Toxicity

Variables selected for clinical relevance and common reporting

Statistics

Meta-analysis as per MOOSE guidelines

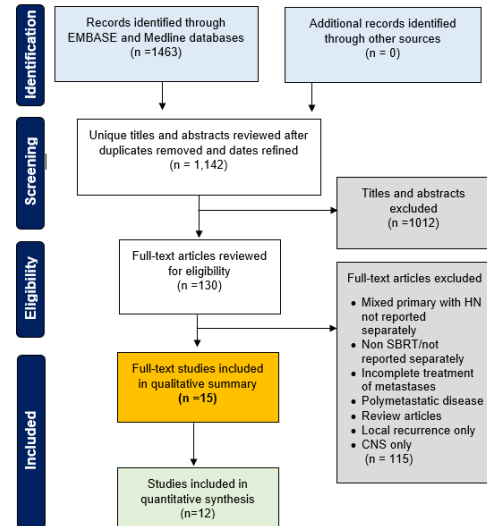
Weighted random-effects models
DerSimonian and Laird method; forest plots generated

Heterogeneity evaluated

- I^2 statistic (significance >50%) Cochran Qtest (significant if p-value<0.10)
- Tau-squared for between-study variance

Results

PRISMA Figure



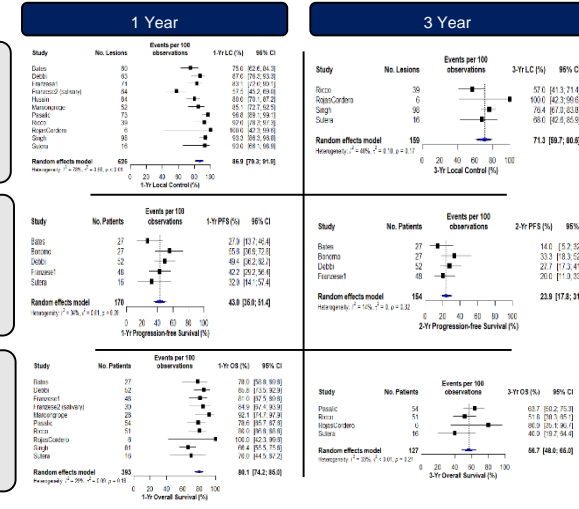
Study Demographics

Study	Pt lesion	Design	OM HNC Definition	Sites treated	RT dose	BED10 (min-max)	Median Flap	NOS* Scale
Bates	27/80	Retro	1-5 mets, mixed histology; (22 metachronous, 5 synchronous, OP 5)	Mixed sites, 50% lung-only	35/5# to 50/5#	59.5-100Gy	19.2 mos	●
Bonomo	27/28	Retro	1-5 mets, HNSCC, <5cm max dim, (de novo 22, OP 6)	Lung only	26Gy/1# to 54Gy/3#	93.6-151.2Gy	22.0 mos	●
Debbi	52/63	Multi-institutional Retro	1-2 mets, HNSCC, all metachronous, <5cm max dim, (de novo 22, OP 6)	Lung only	60Gy/3#	180Gy	45.3 mos	●
Dohopolski	17/NR	Retro	1-5 mets, mixed histology, majority metachronous	Lung only	Mixed: 60/5# to 40/4#	105.6-180Gy	29.5 mos	●
Franzese	48/71	Retro	1-5 mets, mixed histology; metachronous, 42, OP: 6	Mixed sites, 50% lung	21Gy/5# to 75Gy/3#	35.7-145.3Gy	20.2 mos	●
Franzese	30/64	Retro	1-3 mets, Salivary gland primary	Mixed sites, 53% lung	20/1# to 54/5#	60-115.5Gy	29.2 mos	●
Hong	34/NR	Multi-institutional Retro	1-5 mets, NS	NR	24Gy/3# to 50Gy/10#	43.2-75.0Gy	26.2 mos	●
Husain	42/64	Multi-institutional Retro	<5 extracranial mets; HNC mixed histology; Metachronous: 31 Synchronous 11	Mixed site, 50% lung	20-30/1# to 50Gy/10# (median BED = 100)	60-100Gy (median BED = 100)	18.2 mos	●
Maroongroge	20/52	Retro	Limited spine mets, Mixed histology	Spine only	NR	NR	51.7 mos	●
Pasalic	54/73	Retro	1-3 mets, mixed histology; majority metachronous (non-cligo patients also reported)	Lung only	Range from 50/4# or 70/3#	Range from 112.50 to 119.0Gy	20 mos	●
Ricco	51/39**	Multi-institutional database Retro	1-3 mets, mixed histology	Lung only	Median: 50Gy/3#	Median: 133.5Gy	13.0 mos	●
Rojas Cordero	6/6	Retro	1-4, mixed histology; <5cm max dim	Lung only	50Gy/5# to 55/5#	100.0-115.5Gy	42.0 mos	●
Singh	81/98	Registry Retro	HNC OMD-HS	Mixed site, 53% lung	20Gy/1# to 60Gy/5	100Gy BED: 37.5-180Gy med 92.2Gy	NR	●
Sutera	16/16	Phase II - single arm	1-5 mets, mixed histology	Mixed site	41-54Gy in 3-5 #	97.0-104.0Gy	41.3 mos	●
Yamamoto	NR/128	Multi-institutional database	1-5 mets, NR	Lung only	NR	BED=75Gy	NR	●

Omitted Studies

- 2 studies with mixed modality surgery/ablation/SBRT in 144 patients: OS5: 31%; LC3=85%; no difference between modalities
- Meta-analysis of 11 studies, 387 patients with <=2 lung mets undergoing metastectomy: OS5= 29%

Pooled Analysis



Toxicity

- Toxicity infrequently reported across studies (n=7, 47%)
- Grade 3 toxicity rare, <5% in all (most common = pneumonitis)
- **No Grade 4 or 5 events reported**

Discussion

Primarily evaluated HNSCC lung metastases; while most common, limited sample of other histologies and sites may limit generalizability

Given limited PFS reported in many studies, appropriate combination therapy and sequencing of novel systemic therapies likely represents next frontier

Study comprised of small retrospective studies without comparators

Conclusion

Meta-analysis demonstrates SBRT offers excellent LC and promising OS with acceptable toxicities in OM HNC, building on evidence that aggressive MDT is selectively warranted

Further investigation on concurrent and adjuvant therapies, dose escalation in radioresistant histologies, combinations of other MDT's, and prospective series to confirm efficacy and safety are warranted.