EARLY RADIOLOGICAL RESPONSE FOLLOWING SBRT FOR PULMONARY METASTASES: CLINICAL AND DOSIMETRIC PREDICTORS OF RESPONSE AND LOCAL CONTROL

Syed Mohsin Raza, Ahmed Ammar, Muhammad Kashif, Tabinda Sadaf

Shaukat Khanum Memorial Cancer Hospital & Research Centre, Lahore, Pakistan

BACKGROUND & OBJECTIVE

Background: Stereotactic body radiotherapy (SBRT) is an effective local ablative treatment for selected patients with pulmonary metastases. Early post-SBRT changes on imaging may mimic residual or recurrent disease, and the link between dosimetry, early response and local control is unclear.

Objective: To evaluate patterns and predictors of early radiological response after SBRT for pulmonary metastases and their association with local control, progression-free survival (PFS) and overall survival (OS).

METHODS

Design: Retrospective study of lung SBRT for pulmonary metastases from extrapulmonary primary malignancies at a tertiary cancer center.

Exclusions: Primary lung malignancy, duplicate records, inadequate follow-up. Clinical, tumor, treatment, imaging and planning data were collected.

Early response: CT approximately 3–6 months after SBRT.

Dosimetry: Target volumes (ITV, internal target volume; PTV, planning target volume), BED10, PTV dose coverage, organ-at-risk (OAR) dose-volume parameters.

Outcomes: Local control assessed radiologically; PFS and OS by Kaplan–Meier analysis.

DOSIMETRY & TOXICITY

Dosimetry: no evaluated dosimetric parameter showed a statistically significant association with early response.

Toxicity: Grade 1 radiation pneumonitis in 8 patients; no documented rib fractures or significant chest-wall toxicity.

RESULTS

FAVORABLE EARLY RESPONSE

30 / 35 PATIENTS (85.7%)

FIG 1. LOCAL CONTROL AND SURVIVAL

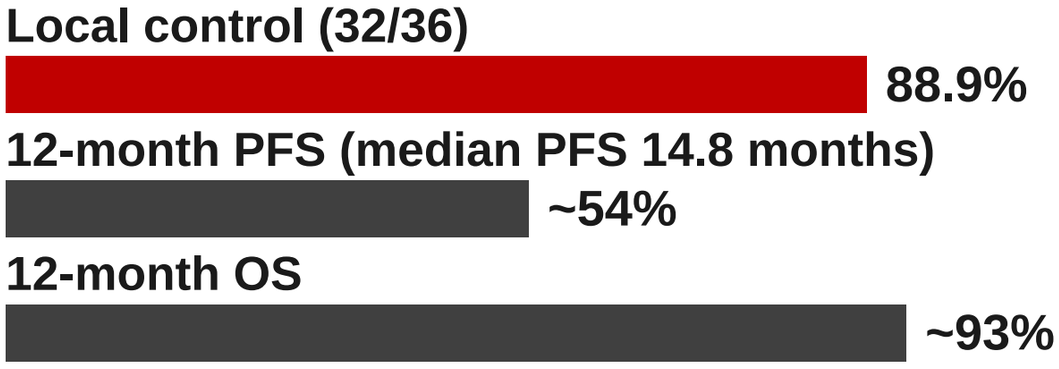


FIG 2. SUBGROUP COMPARISONS

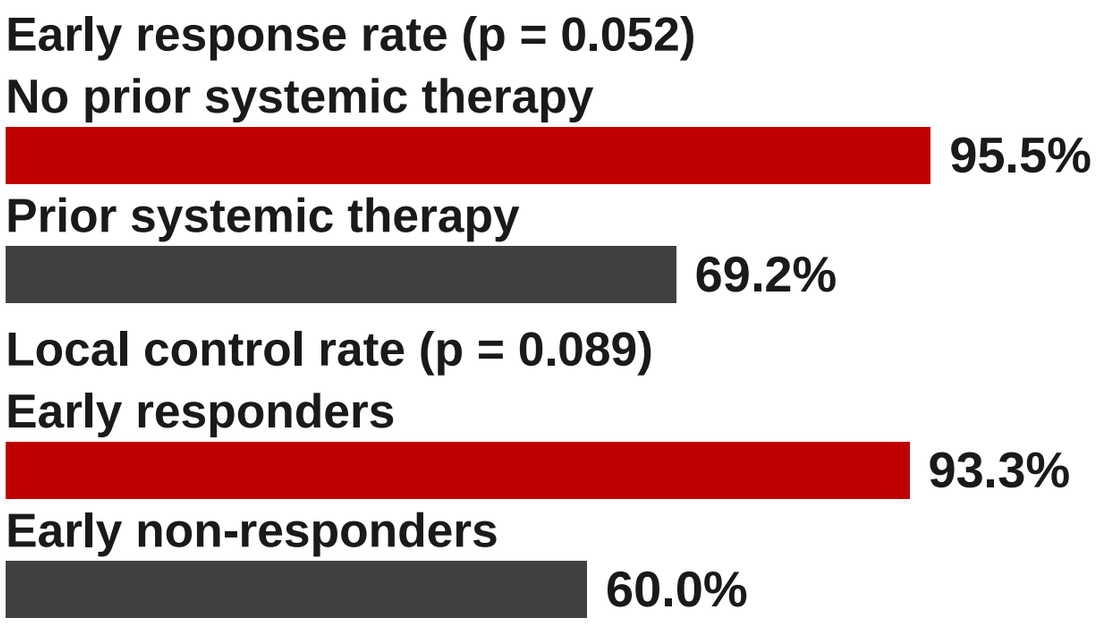


TABLE 1. COHORT CHARACTERISTICS

Characteristic	Value
Unique patients	37
Median age	50 years (IQR 43–59)
Main primaries	Colorectal 9, sarcoma 6, breast 5
Median lesion size	12 mm
Peripheral lesions	32/36 (88.9%)
Solitary metastases	34/36 (94.4%)
Median BED10	120 Gy
Median ITV	3.47 cc
Median PTV	14.47 cc
Median PTV D99%	52.9 Gy

CONCLUSION

Response: SBRT for pulmonary metastases achieved a high early radiological response rate, excellent local control, favorable survival and limited toxicity.

Local control: Early response showed a clinically meaningful trend toward improved local control (p = 0.089).

Dosimetry: No individual dosimetric parameter significantly predicted response; integrating target-volume, BED, dose-coverage and OAR parameters provides a foundation for further investigation in larger cohorts.

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