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Outcomes and toxicity of stereotactic radiotherapy for metastatic breast cancer: A retrospective cohort study

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Aim: Technological advances in radiotherapy have allowed for the delivery of ablative doses to sites of disease in most parts of the body. In this trial, we describe the outcomes of a group of breast cancer patients treated to sites of metastatic disease with Stereotactic Radiotherapy (SBRT). Predictors of treatment outcomes are also investigated in this cohort.

Method: After institutional research ethics board approval, patients with metastatic breast cancer who received SBRT to metastatic disease from 2011 to 2016 were identified by electronic chart review. Patient demographics, histologic information and clinical data were collected from the electronic patient record and the radiation treatment planning system. Outcomes of interest included Local Control (LC), Overall Survival (OS) and Progression Free Survival (PFS). In addition to Kaplan-Meier estimates, univariate analysis using the log-rank test and multivariate analysis with cox regression was used to assess covariates, which were identified a priori.

Result: 120 patients between the ages of 25 to 82 (median 54.8 years) with 193 treated lesions were identified. Median follow-up was 9.8 months (range 0.03 to 72.31 months). Patients' Estrogen Receptor (ER), Progesterone Receptor (PR) and Her-2 status were 83.9%, 70.7% and 18.4% respectively (may be better to describe subtype here, e.g. luminal a). 70.3% had lymph node positive disease at diagnosis. The majority of treated lesions were in the spine (45%), followed by liver (20%), lung (18%) and non-spine bone (14%). There were no recorded grade 4 or 5 toxicities, with only 5.3% of patients reporting side effects (most commonly mild pain). 1-year LC, PFS and OS was 88%, 45% and 84% respectively. On univariate analysis, PFS varied depending on treatment indication (oligometastasis, oligoprogression or salvage) with a median PFS of 24.4 months, 5.6 months and 8.1 months respectively ($p<0.001$). Similarly, a difference in OS by treatment indication was also seen with 1-year survival of 91%, 82% and 57% respectively ($p<0.001$). Survival was influenced by molecular subtype, with the worst survival seen in patients with triple negative disease ($p=0.001$).

Conclusion: Local control rates remain excellent after SBRT to sites of metastatic disease in this population of breast cancer patients. The most significant risk for these patients remains distant failure, with significantly longer PFS in those being treated for oligometastatic disease in comparison to other indications. Favorable PFS observed in the oligometastasis subgroup would support further randomized evaluation of the potential benefit of SBRT in this population, as is currently being performed in other tumor histology's.

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