State-of-the-Art Musculoskeletal Interventions for Metastatic Osseous Disease: Current Updates and Future Directions

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Purpose

The expanding role of MSK interventions for osseous metastases have incorporated many different techniques, including radiofrequency ablations (RFA), cryoablations, percutaneous osteosynthesis with cementoplasty augmentation (POC), and electrochemical therapy (ECT). This exhibit will examine current updates and future directions of these interventions.

Materials and Methods

A review of randomized control and clinical trials published between 2015 and 2025 on RFA, MWA, POC, and ECT for treating metastatic bone cancer was conducted. From the search, 7 studies were evaluated on efficacy of these procedures via decreases in mean VAS score, tumor response rates, and local progression free survival rates in their study populations.

Conclusions

Ablation techniques have been trusted treatment options in the treatment of metastatic bone cancer for many years. Several studies have demonstrated superior patient outcomes with the employment of this family of procedures, citing improvements in pain, tumor responsiveness, and local progression free survival. Further development of alternative procedures, such as POC and ECT, can offer additional options for patients who may not be candidates for RFA or cryoablation.

Results

- Overall, studies found favorable results regarding the efficacy of ablation procedures
- A 2022 study investigating radiofrequency ablations noted statistically significant decreases in VAS score at the 1-month follow-up
- 2 studies investigating POC further noted significant decreases in VAS score throughout their follow-up periods
- 2 studies demonstrated high rates of local progression-free survival in cryoablation procedures
- 2 studies evaluated the efficacy of ECT for the treatment of metastatic osseous disease by examining tumor response rates

Study Name	Pusceddu, et. al	Kim, et. al	Mavrovi et. al	Autrusseau et. al	Asanuma, et. al	Cevolani, et. al	Campanacci, et. al
Publication Date	2022	2016	2017	2022	2024	2023	2022
Procedure Tested	RFA	POC	POC	Cryoablation	Cryoablation	ECT	ECT
Sample Size	17	43	12	16	25	29	37
Pre-procedure VAS Score	2.0	9.5	6.8 +/- 1.2	–	–	–	–
Follow-up VAS Score	0.0 at 1-month follow-up	3.3 at 6-week follow-up	2.3 +/- 1.1 at 1-month follow-up	–	–	–	–
Local Progression Free Survival	–	–	–	93.3% at Year 1 84.6% at Year 2 76.9% at Year 3	88.1% at Year 1 79.7% at Year 2 79.7% at Year 3	–	–
Response Rate per RECIST Criteria	–	–	–	–	–	45% Partial Response 3% Complete Response	16% Partial Response 9% Complete Response

Table 1: Reviewed studies testing RFA, POC, Cryoablation, and ECT procedures with associated outcomes

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