Freezing the Pain: Clinical Applications of Cryoablation in Metastatic Bone Disease

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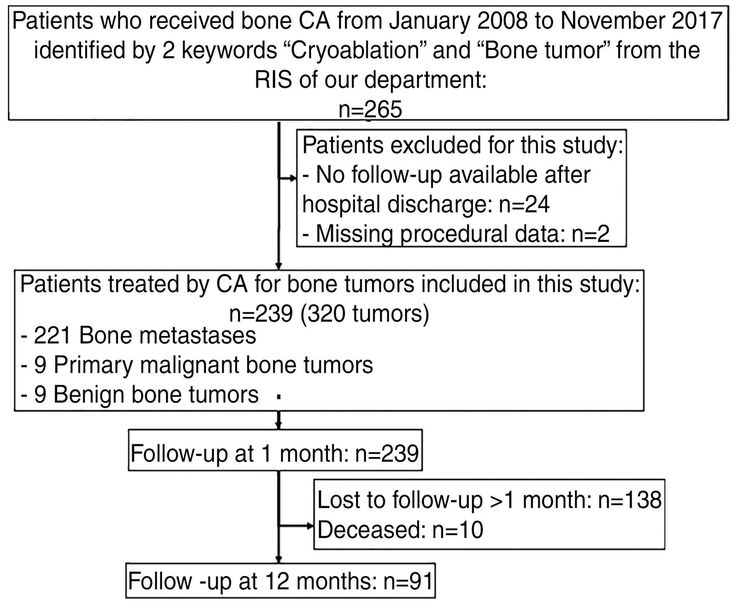
Introduction

- Traditional treatment approaches for osseous metastatic disease include systemic chemotherapy, external beam radiation therapy (EBRT), orthopedic procedures, and pharmaceutical agents such as bisphosphonates.
- Recent advances have demonstrated the utility of locoregional image-guided interventions like cryoablation
- We sought to understand the safety profile and capabilities of cryoablation in treatment of osseous metastatic disease.

Methods

- A literature review was conducted to evaluate PubMed-indexed studies on historical treatment options for osseous metastatic disease as well as recent advances in cytoablative therapies
- The analysis involved multicenter retrospective studies, prospective clinical trials, and systematic reviews of the utility of cryoablation in local control, pain relief, and quality of life improvements in patients with osseous metastatic disease.

Figure 1: Study population, excluded patients, and follow-up for bone tumor cryoablation (CA) therapy[4]



Results

Figure 2: Average pain scores and pain relief for cryoablation patients[3]

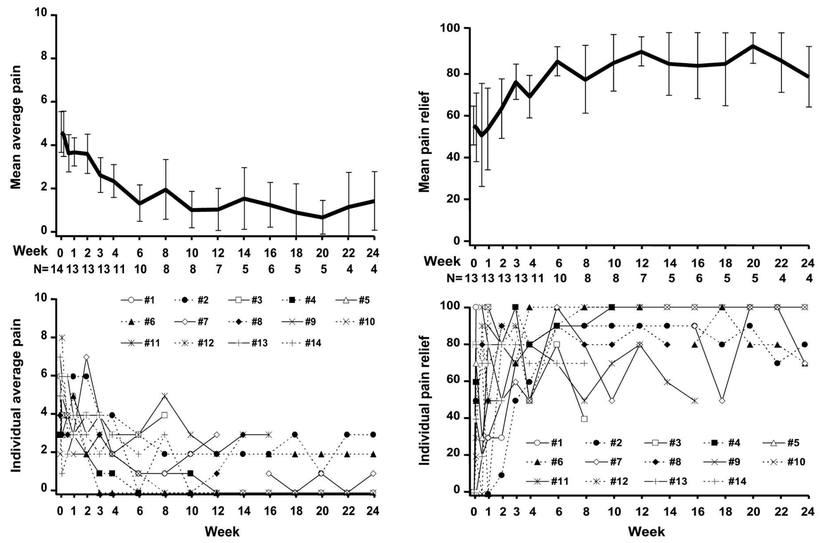
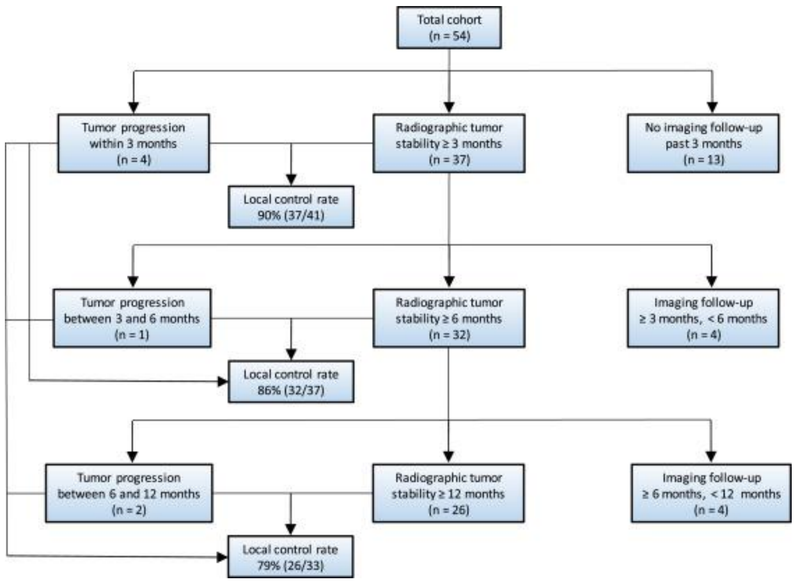


Figure 3: Metastatic Disease Control Rates at 3, 6, 9, and 12 month follow up[1]



Results

- Local control rates of osseous metastatic disease utilizing cryoablation are generally reported in the range of 79–90% at 1 year, depending on tumor location, size, and patient population.[1]
- This significant pain control is associated with increased tolerance of ADLs and improvement in QOL in patient with osseous metastatic disease.[2-3]
- Cryoablation provides rapid pain relief observed within 24 hours of therapy initiation with mean pain score reductions of 4–6 points on a 0–10 scale sustained for up to 6 months post-therapy.[3]
- The safety benefits of cryoablation coincide with a favorable risk profile, with a major complication rate of 2–4% and an overall complication rate of 9–13% overshadowed by the therapeutic benefits.[4]

Conclusions

- The current treatment regiment for osseous metastatic disease includes systemic and local therapies, bone-modifying agents, and locoregional interventions like cryoablation.
- By simultaneously improving local control, pain relief, and quality of life with minimal risk profiles in various patient populations, cryoablation demonstrates promising capabilities.

Limitations

- Definitive understanding of benefit of cytoablative therapy versus standard-of-care therapy is limited

Future Directions

- Continued randomized clinical trials are needed to streamline patient selection criteria and understand the utility of this intervention in comparison to standard-of-care modalities.

References

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