



Percutaneous Cryoablation for Palliative Intervention Bibliography

Callstrom MR, Atwell TD, Charboneau JW, Farrell MA, Goetz MP, Rubin J, Sloan JA, Novotny PJ, Welch TJ, Maus TP, Wong GY, Brown KJ. Painful metastases involving bone: percutaneous image-guided cryoablation--prospective trial interim analysis. Radiology. 2006 Nov;241(2):572-80.

- Prospective study to determine efficacy and safety for the reduction of pain, improvement in the activities of daily life, and reduction in the use of analgesic medications for patients with painful metastatic lesions involving bone.
- Patients Characteristics
 - 14 patients age range, 21-72 years; mean age, 54 years
 - one or two painful metastatic lesions involving bone
 - a score of 4 or greater out of 10 for worst pain in a 24-hour period
 - did not respond to or refused conventional radiation treatment or chemotherapy
- Treated lesions were 1-11 cm in diameter
- Patients responses measured with the Brief Pain Inventory, and analgesic utilization at days 1 and 4, weekly for 4 weeks, and then every other week for a total of 6 months
- Change in pain score - prior to cryoablation, the mean score for worst pain in a 24-hour period was 6.7 of 10; post cryoablation the score decreased to 3.8 (P = .003) 4 weeks after treatment.
- Change in activities of daily living - mean pain interference with activities of daily living was 5.5 of 10 before treatment and decreased to 3.2 (P = .004) 4 weeks after treatment.
- Change in medication - All eight (100%) patients (exact 95% binomial confidence interval: 63%, 100%) for whom narcotics were prescribed prior to the procedure reported a reduction in these medications after cryoablation.
- No serious complications were observed.
- Conclusion: Percutaneous cryoablation is a safe and effective method for palliation of pain due to metastatic disease involving bone.

Ahlmann ER, Falkinstein Y, Fedenko AN, Menendez LR. , Cryoablation and resection influences patient survival for soft tissue sarcomas: impact on survivorship and local recurrence. Clin Orthop Relat Res. 2007 Jun;459:174-81.

- Retrospective review - cryoablation followed by tumor resection for the treatment of soft tissue sarcomas
- 38 patients with no prior treatment for their neoplasm
- Results –
 - Sixteen patients had evidence of more than 95% tumor necrosis, and 11 of these had 100% histologic necrosis.
 - Overall survival and disease-free survival based on the adequacy of freezing process -patients with more than 95% necrosis = survival rate of 94% at 2 years and 86% at 5 years less than 95% necrosis = survived 53% at 2 years and 34% at 5 years.
 - Three patients developed local recurrence.
- Conclusion - Cryosurgical ablation appears a safe and effective method of devitalizing tumor cells of soft tissue sarcomas.

Callstrom MR, Atwell TD, Charboneau JW, Farrell MA, Maus TP, Welch TJ, Nichols, Goetz J, Rubin J, Sloan, J, Novotny, P and Brown, K. Image-guided Cryoablation of Painful Metastatic Disease Involving Bone: Ongoing Clinical Trial RSNA 2007 presentation

- On-going multi-center trial
- 31 patients who fail conventional therapy or were not candidates
- Osteolytic metastatic lesions that abutted the bone were included
- Primary lesions colorectal, renal cell, bronchogenic, squamous cell
- 16 patients followed for 8 or greater weeks including 8 that have been followed for 24 weeks
- Change in pain – pre-treatment worst pain score 7.2 (scale 1-10) – post treatment four, 8, and 24 weeks after treatment, mean worst pain decreased to 4.2/10 at 4 wks, ($p = <0.0001$), 4.1/10 at 8 wks and ($p = 0.0002$), and 1.9/10 ($p = 0.001$) at 24 weeks.
- Conclusion - Cryoablation of patients with painful metastatic disease that have failed conventional therapy results in effective and durable relief of pain
- Clinical Relevance - Percutaneous cryoablation provides effective palliation for patients with painful metastatic disease

Callstrom MR, Charboneau JW, Goetz MP, Rubin J, Atwell TD, Farrell MA, Welch TJ, Maus TP. Image-guided ablation of painful metastatic bone tumors: a new and effective approach to a difficult problem. Skeletal Radiol. 2006 Jan;35(1):1-15. Epub 2005 Oct 5

- Review of current ablative therapies for painful metastatic bone tumors.
- External beam radiation therapy is the current standard of care for localized pain - 20-30% of patients treated do not experience pain relief
- Analgesics remain the only alternative treatment option
- Image-guided percutaneous methods of tumor destruction have proven effective for treatment of this difficult problem.

Tuncali K, Carrino J, et al: MRI-guided percutaneous cryotherapy of bone and soft tissue metastases adjacent to critical structures: initial experience in 22 patients. 2005 RSNA Abstract.

- Twenty-seven biopsy-proven soft tissue and bone metastases (mean diameter 5.2 cm, range 3-10 cm) in 22 patients (15 M, 7 F, 24-85 years old, mean 56 years)
- Primary malignancies were colorectal (n=14), lung (n=3), mesothelioma (n=3), ocular melanoma (n=2), kidney (n=1), testis (n=1), leiomyosarcoma (n=1); two were adenocarcinoma of unknown primary.
- All were located adjacent to, or were encasing one or more critical structures: bowel (n=14), sacral plexus or other nerves (n = 24), bladder (n=8), major blood vessels (n=6), ureters (n=7), tendons (n=5), spinal nerve roots (n=4), skin (n=4), and spinal cord, urethra, prostate, vaginal cuff, and spermatic cord, one each.
- Of 21 tumors with long-term f/u, 13 (62%) were stable or regressed. Eight showed progression (mean local progression-free interval 5.6 mos, range 3-18). Pain was palliated in 17 of 19 patients; six of whom experienced complete relief (mean f/u 8.9 wks, range 1-44); 11 had partial relief. Twenty-two (81%) of 27 tumors were treated without injury to adjacent critical structures.

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Additional References

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Callstrom MR, Charboneau JW, Goetz MP, et al. Image-guided ablation of painful metastatic bone tumors: a new and effective approach to a difficult problem. *Skeletal Radiology* 2006;35(1):1-15.

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