Oligometastatic Sarcoma

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SITEMAN CANCER CENTER

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NCCN National Comprehensive Cancer Network®

NCI CCC A Comprehensive Cancer Center Designated by the National Cancer Institute

Washington University in St. Louis
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MIR Mallinckrodt Institute of Radiology

DISCLOSURES:

- Stryker, Merit, Boston Scientific, Teleflex/Arrow and Bard/BD-consultant

Background

- Sarcomas encompass ~ 70 different histological subtypes
- 1-2% of adult malignancies
  - 13,130 new cases of sarcoma with 5,350 deaths per year
- Median age at diagnosis is 60 years old, with 2 incidence peaks, at 50 and 80 years old
- 90% of patients with STS present with localized disease, although many will develop metastatic disease
- Median overall survival (OS) is 12-14 mos. w/ metastatic disease
- Cytotoxic chemotherapy is mainstay therapy with emerging immunotherapy as first line treatment
- Combination of chemotherapy with resection of pulmonary mets increased OS from 5% to 65%.
- Not all mets or patients are amenable to surgery.

STS Types

- Undifferentiated pleomorphic sarcoma
- Liposarcoma
- Leiomyosarcoma
- Synovial sarcoma
- Malignant peripheral nerve sheath tumor (MPNST)

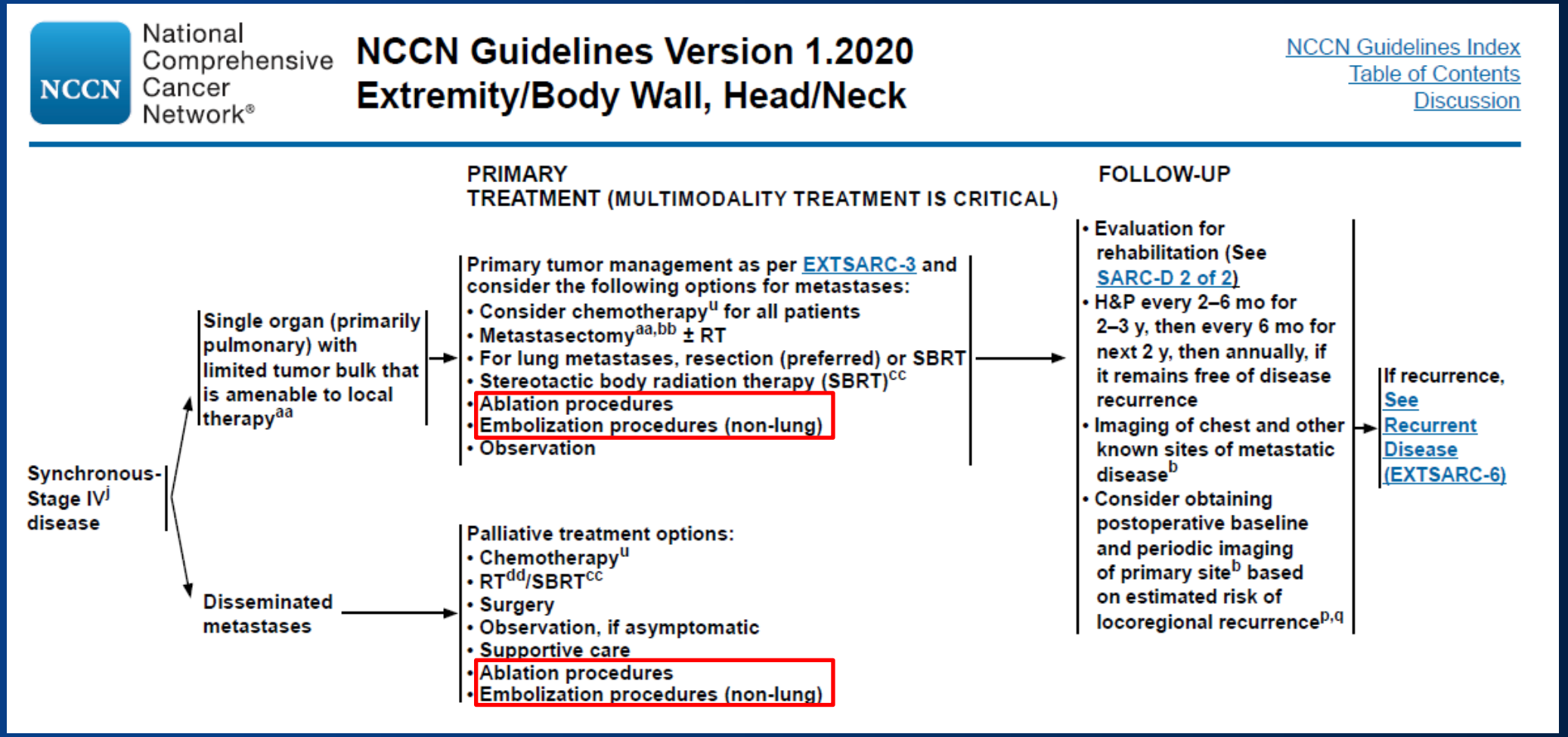
75%

- Mxofibrosarcoma
- Clear cell sarcoma
- Rhabdomyosarcoma
- Pleomorphic sarcoma
- Angiosarcoma
- Epithelioid sarcoma
- Alveolar soft part
- Extra osseous Ewings'
- Gastrointestinal stromal tumor (GIST)
- Solitary fibrous tumor
- Epithelioid hemangioendothelioma
- Desmoid

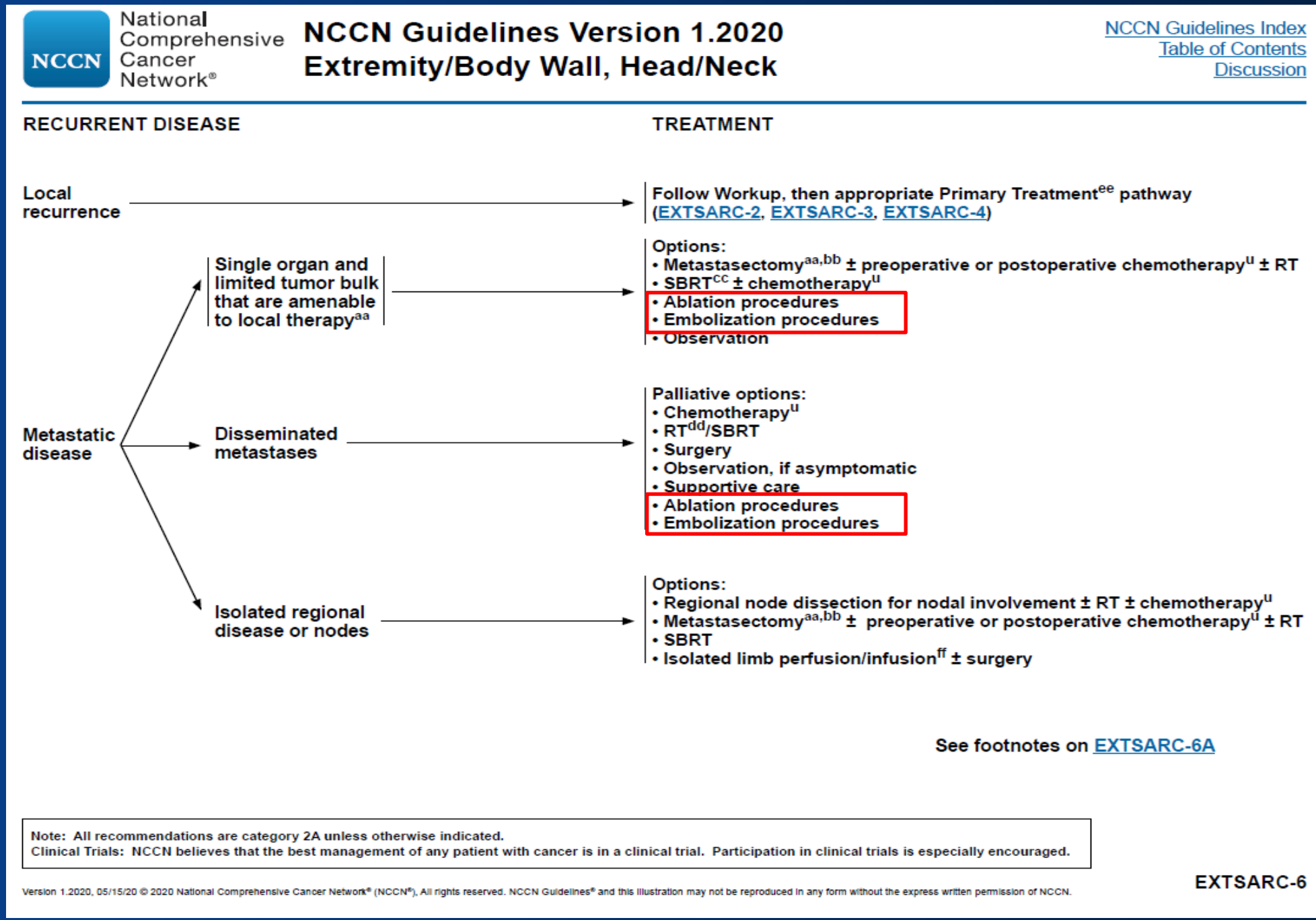
Oligometastases

- Most commonly metastasizes to the lung, liver and bone
- ASCO **Multidisciplinary Management of Oligometastatic Soft Tissue Sarcoma 2018**
  - "Oligometastatic STS is best approached as a multimodality disease, benefiting from evaluation and possible treatment with surgery, interventional radiology, radiation therapy, and chemotherapy.
  - Interventional radiology techniques including radiofrequency ablation (RFA) and arterial embolization provide nonoperative local modality alternatives that can provide good disease control."

Guidelines and Treatment Algorithms



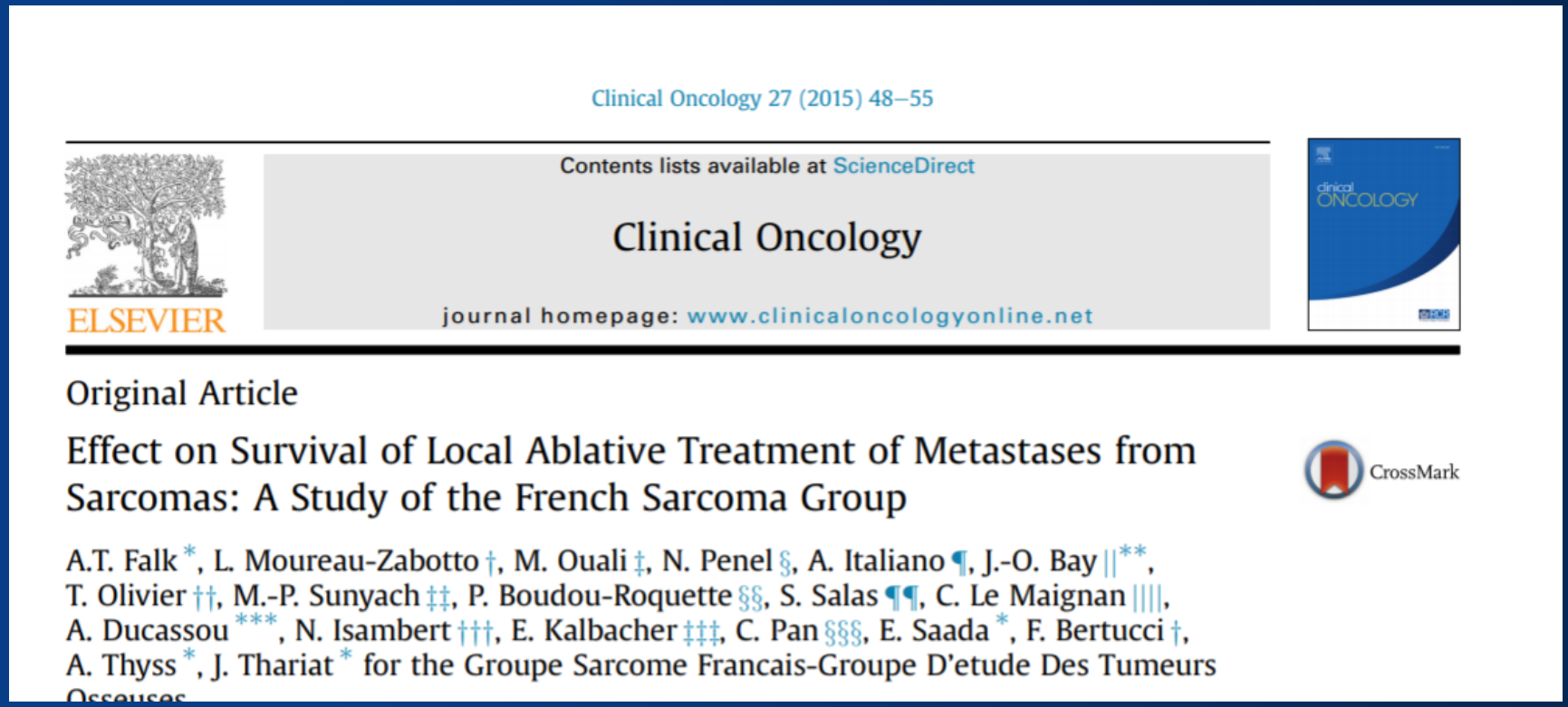
Guidelines and Treatment Algorithms



Local Therapies

- Surgical resection is the cornerstone of treatment and influences LTC and survival
- Radiation therapy for neoadjuvant/adjuvant treatment for LTC
- Most of published data to date has been on treatment of oligometastatic bone sarcomas.
- Ablation is increasingly being used LTC

Local Therapy



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Original Article

Effect on Survival of Local Ablative Treatment of Metastases from Sarcomas: A Study of the French Sarcoma Group

A.T. Falk *, L. Moureau-Zabotto †, M. Ouali ‡, N. Penel §, A. Italiano ¶, J.-O. Bay ||**, T. Olivier ††, M.-P. Sunyach ‡‡, P. Boudou-Roquette §§, S. Salas ¶¶, C. Le Maignan ||||, A. Ducassou ***, N. Isambert †††, E. Kalbacher ‡‡‡, C. Pan §§§, E. Saada *, F. Bertucci †, A. Thyss *, J. Thariat * for the Groupe Sarcome Francais-Groupe D'etude Des Tumeurs Osseuses

- 281 pts with oligo lung (72%), liver (11 %), bone (3.2%), ….
- 164 treated with local therapy including surgery (nearly 80%) and ablation
- 2-year overall survival (OS) rates were 36.3% for the non-local treatment group and 63.6% for the locally treated group

The Oncologist®

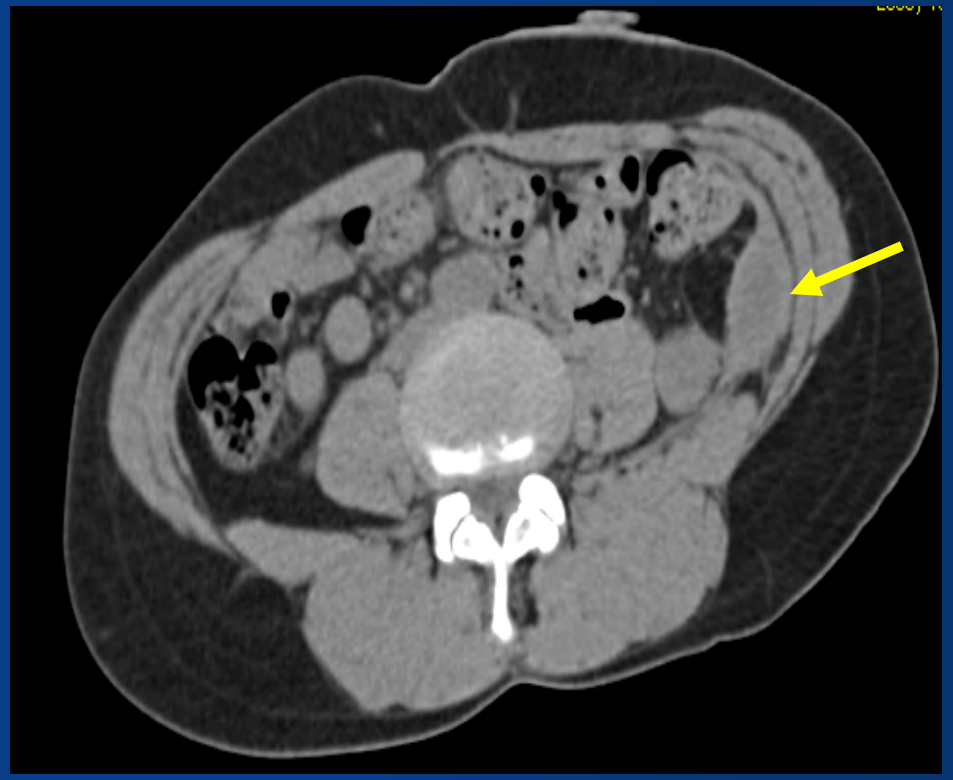
Clinical Trial Results

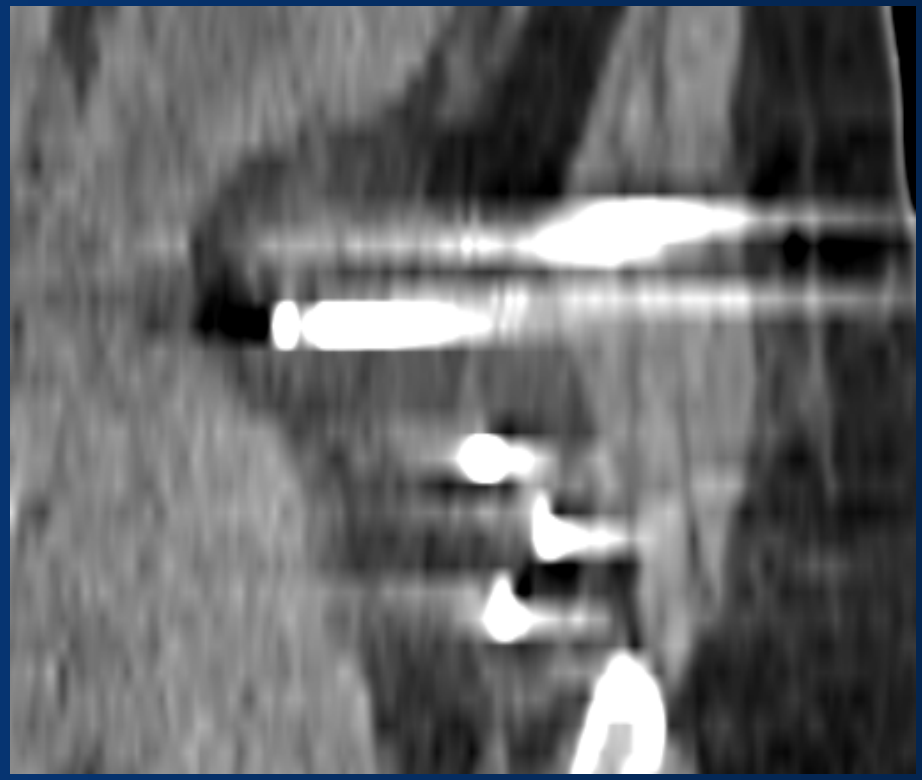
A Phase II Study of Tumor Ablation in Patients with Metastatic Sarcoma Stable on Chemotherapy

Angela C. Hirbe,[a] Jack Jennings, Nael Saad,[b] Joseph D. Giardina,[a] Yu Tao,[a] Jingqin Luo,[a] Shellie Berry,[a] Jacqui Toeniskoetter,[a] Brian A. Van Tine[a]

[a]School of Medicine, Washington University in St. Louis, St. Louis, Missouri, USA; [b]University of Rochester Medical Center, Rochester, New York, USA

- Phase II study in patients with oligometastatic soft tissue sarcoma stable on six cycles of chemotherapy and then received ablation therapy to their residual disease.
- Following ablation, patients were not treated with any further therapy
  - followed by surveillance imaging to determine the progression free rate

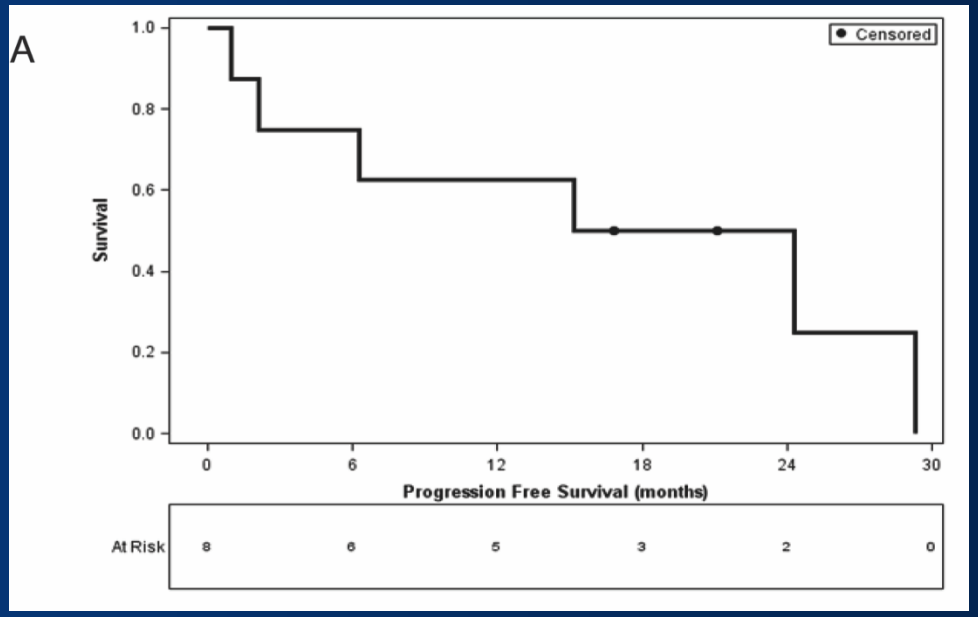


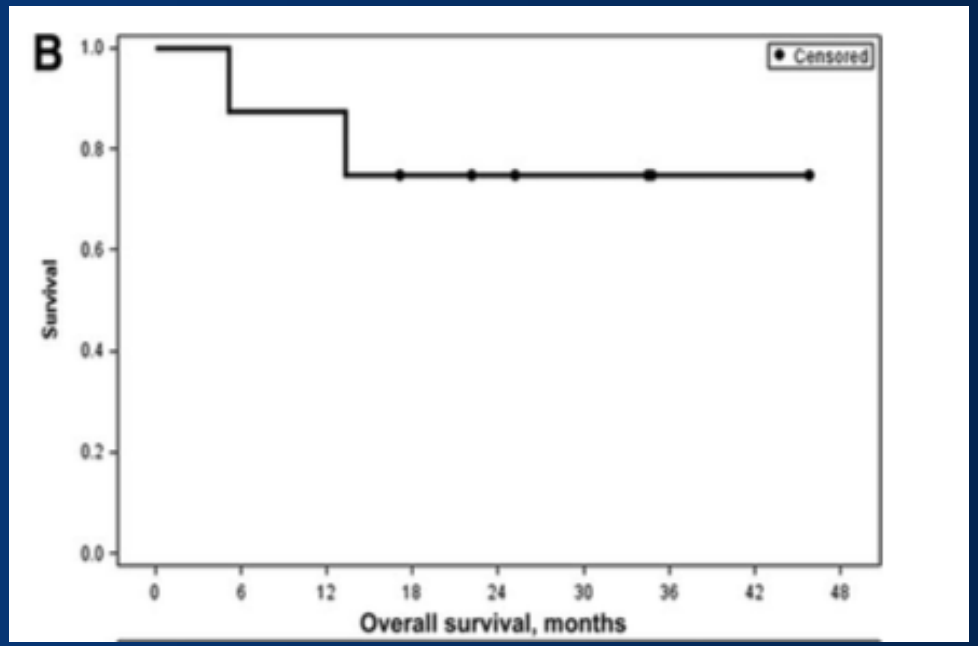


- 55-year-old woman with metastatic sarcoma status post rectosigmoid resection
  - increasing soft tissue deposits in the left pelvis
  - Cryoablation of the mass.

Results

- 3 month progression free rate (PFR) of 75%
- Median progression free survival (PFS)was 19.74 months.
  - compared to 13.4 months which has been reported for pulmonary metastectomy
- Ablation after stability on chemotherapy can serve as well tolerated maintenance therapy with significant PFS and systemic therapy-free interval





Lung

Ann Surg Oncol (2011) 18:3771–3777
DOI 10.1245/s10434-011-1806-0

Annals of
SURGICAL ONCOLOGY
OFFICIAL JOURNAL OF THE SOCIETY OF SURGICAL ONCOLOGY

ORIGINAL ARTICLE – BONE AND SOFT TISSUE SARCOMAS

Sarcoma Lung Metastases Treated with Percutaneous Radiofrequency Ablation: Results from 29 Patients

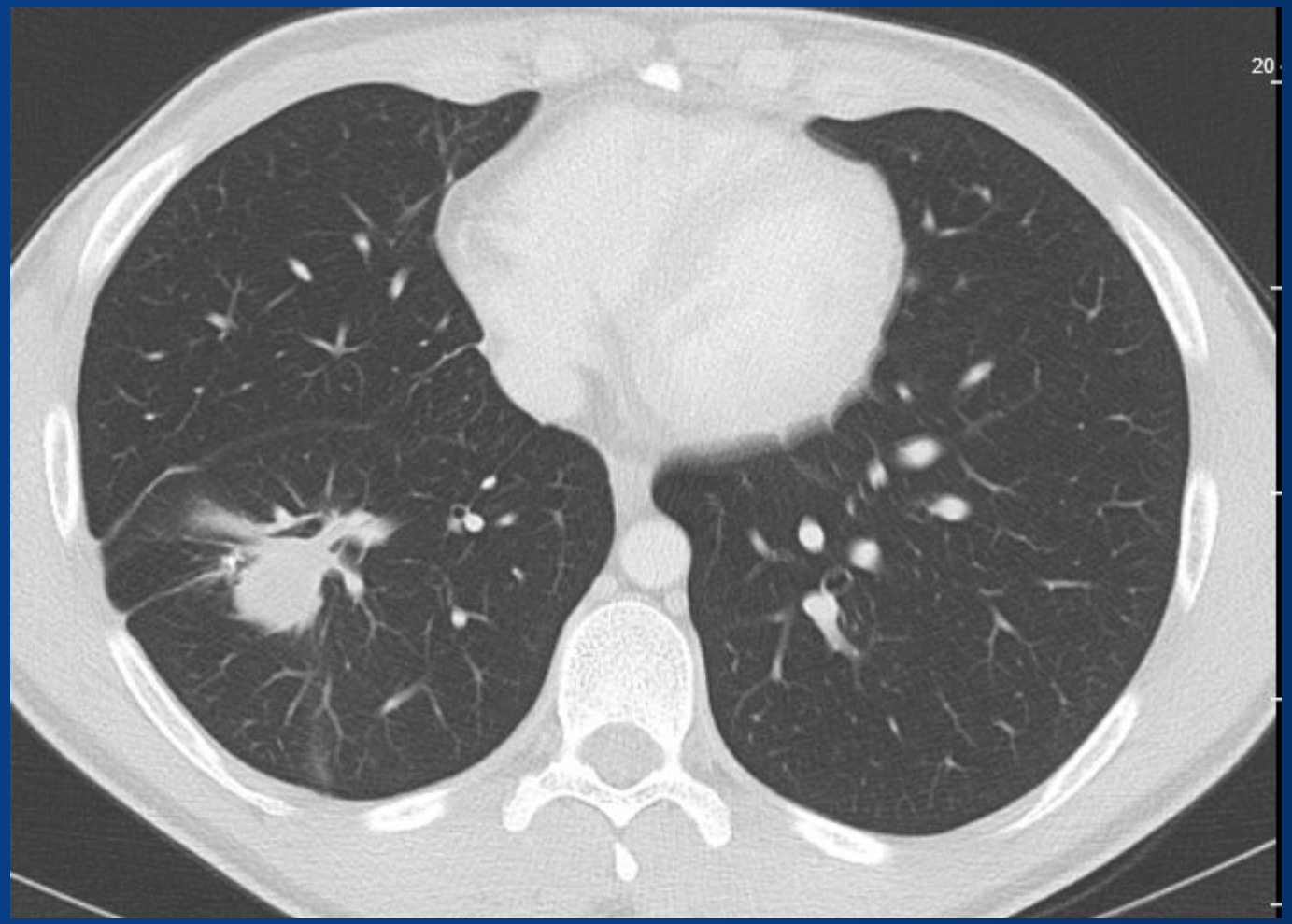
J. Palussière, MD[1], A. Italiano, MD[2], E. Descat, MD[1], S. Ferron, MD[1], F. Cornélis, MD[1], A. Avril, MD[3], V. Brouste, MD[4], and B. N. Bui, MD[2]

- Prospective: 29 pts with RFA of 47 lesions in sarcoma oligo lung mets
- LTC 90% median disease free interval of 7 mos with median f/u 50 mos.
- 1- and 3- year OS 92.2% and 65.2%

29 yom metastatic synovial sarcoma right knee



Cryoablation 4 probes



15 months post ablation

Liver

Cardiovasc Intervent Radiol (2014) 37:132–139
DOI 10.1007/s00270-013-0615-1

CIRSE

CLINICAL INVESTIGATION INTERVENTIONAL ONCOLOGY

A Role for Adjuvant RFA in Managing Hepatic Metastases from Gastrointestinal Stromal Tumors (GIST) After Treatment with Targeted Systemic Therapy Using Kinase Inhibitors

Antoine Hakimé · Axel Le Cesne · Frederic Deschamps · Geoffroy Farouil · Sana Boudabous · Anne Aupérin · Julien Domont · Thierry Debaere

- Most of literature is on GIST
- 17 patients/27 lesions RFA of metastatic GIST after TKI therapy
- 100% LTC w/ mean f/u 49 mos.
- 2-year progression-free survival was 75% in patients who continued TKI therapy post ablation but 30% in patients who discontinued TKI therapy post ablation

Liver

Abdominal Radiology

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Published online: 10 March 2016

Abdom Radiol (2016) 41:767–780
DOI: 10.1007/s00261-016-0687-x

Percutaneous cryoablation of hepatic tumors: long-term experience of a large U.S. series

Peter J. Littrup,[1] Hussein D. Aoun,[2] Barbara Adam,[2] Mark Krycia,[3] Matt Prus,[2] Anthony Shields[2]

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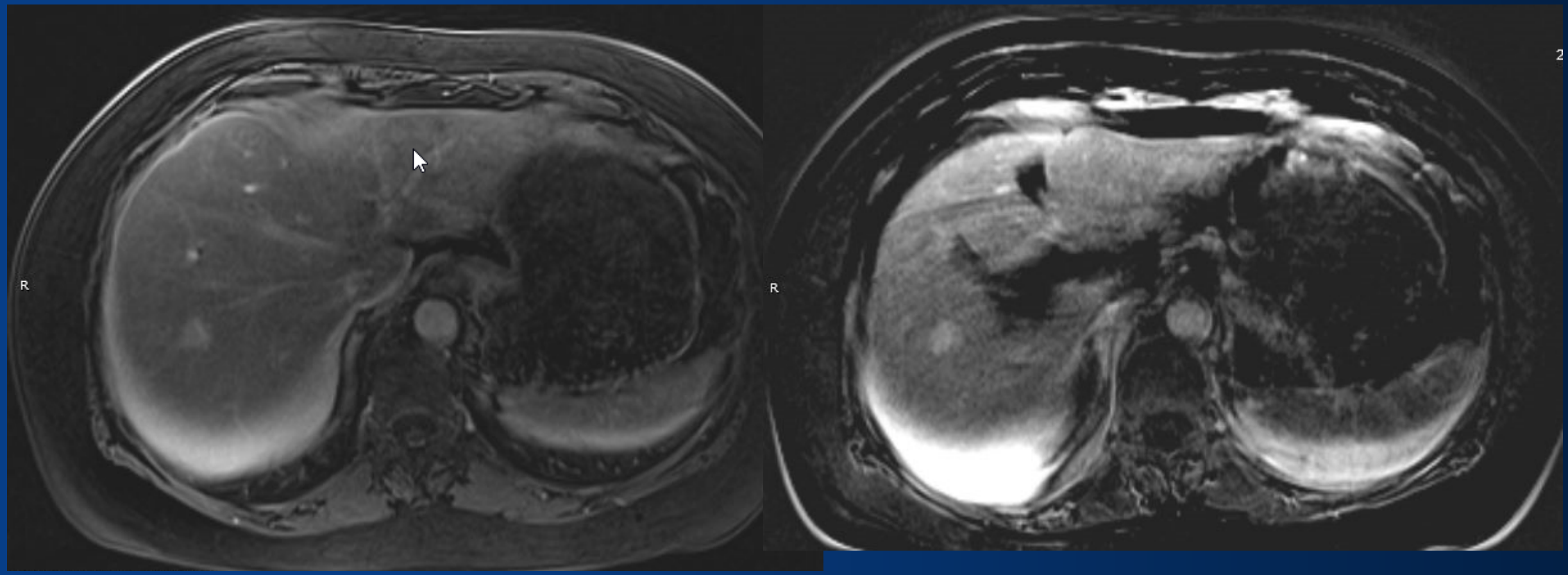
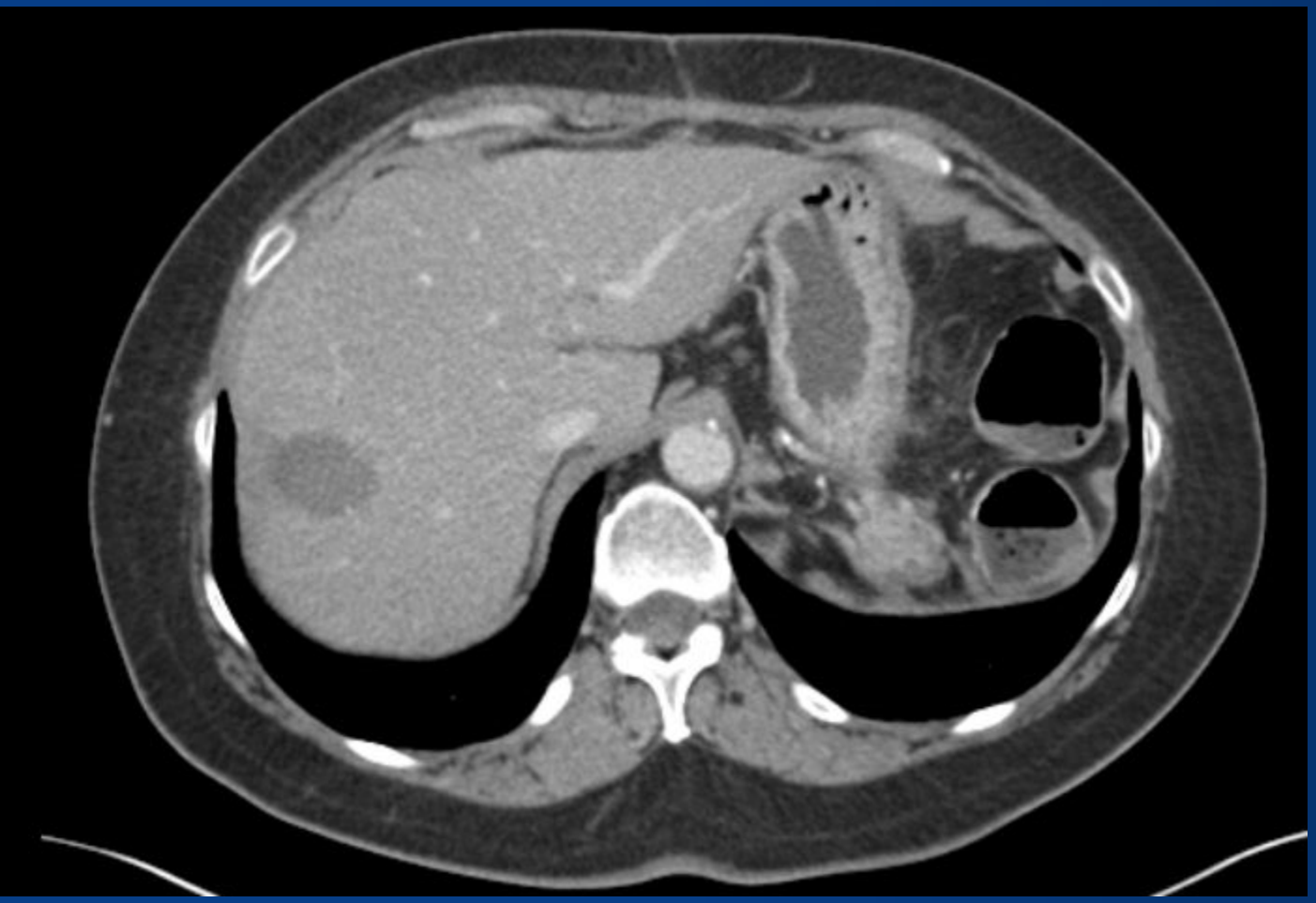
[2]Karmanos Cancer Institute, 110 East Warren, Hudson-Weber Building, Suite 504, Detroit, MI 48201, USA
[3]Wayne State University School of Medicine, Detroit, MI, USA

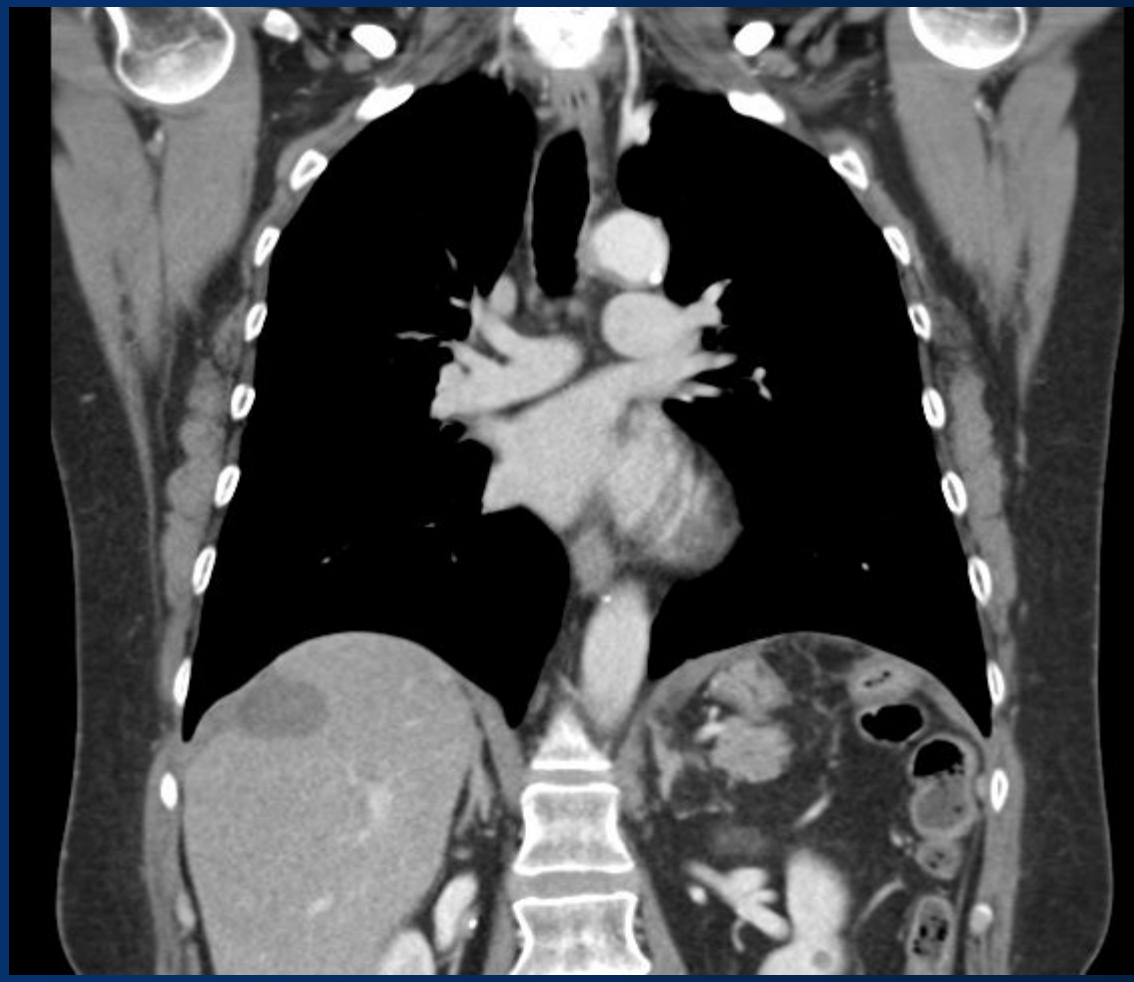
- 49 sarcoma pts. (non-CRC)
- Local tumor recurrence was 9.4% mean f/u 1.8 years



55 yow metastatic synovial sarcoma (LLE) and new lesion dome of liver (segment 7)

2 microwave probes





12 months post ablation

Bone and Soft Tissue

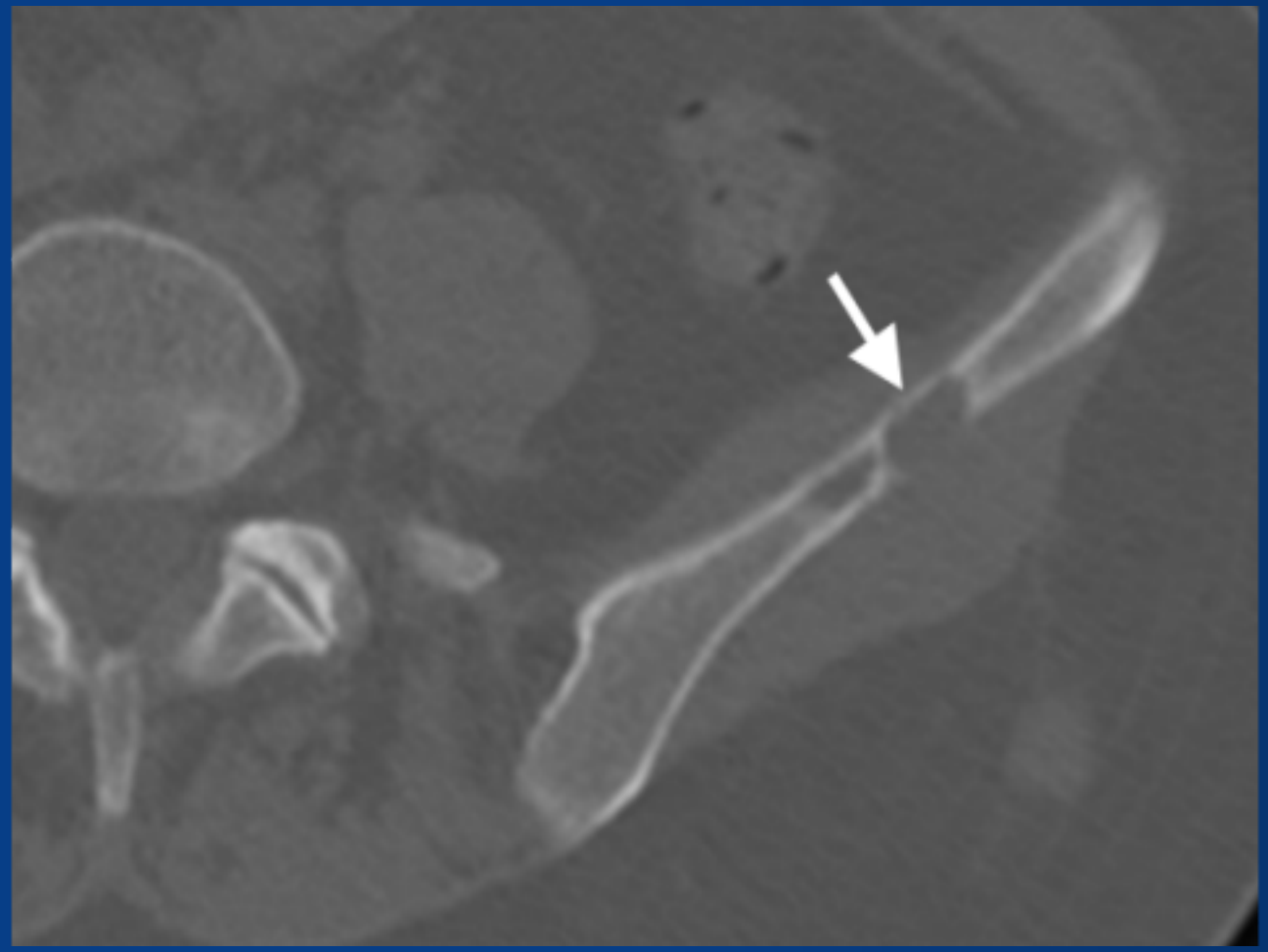
CardioVascular and Interventional Radiology
pp 1–10 | Cite as

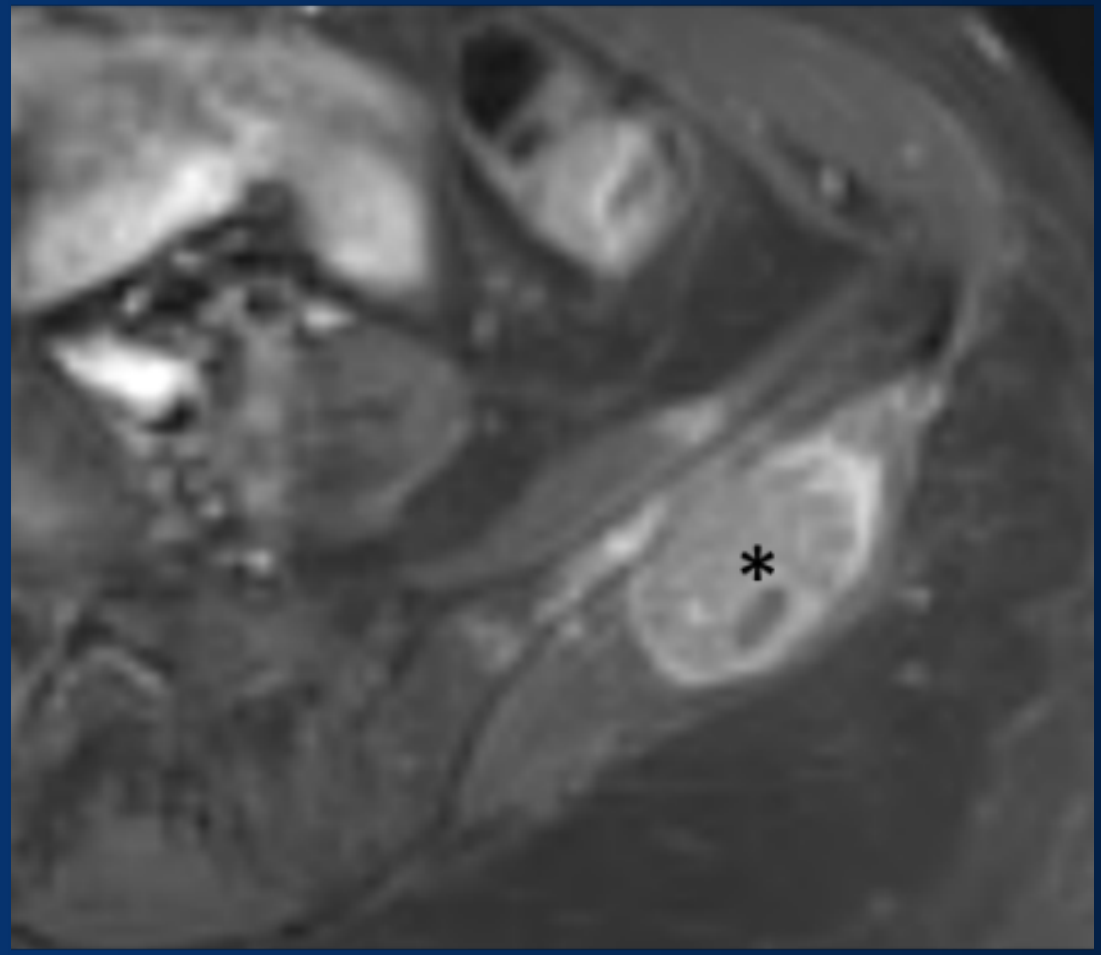
Radiographic Local Tumor Control and Pain Palliation of Sarcoma Metastases within the Musculoskeletal System with Percutaneous Thermal Ablation

Authors | Authors and affiliations

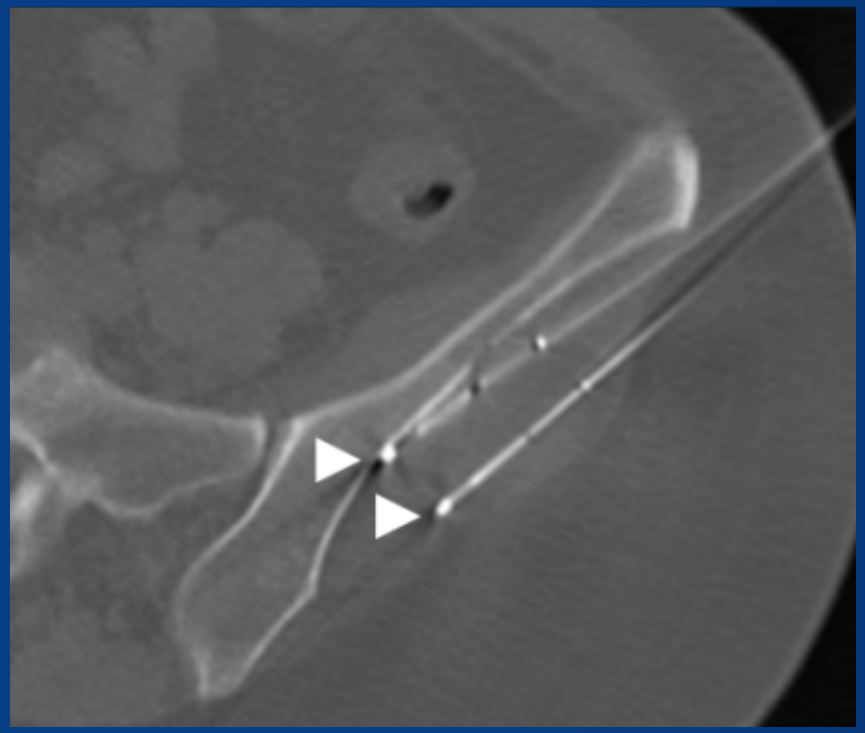
Devin Vaswani, Adam N. Wallace, Preston S. Eiswirth, Thomas P. Madaelil, Randy O. Chang, Anderanik Tomasian, Jack W. Jennings

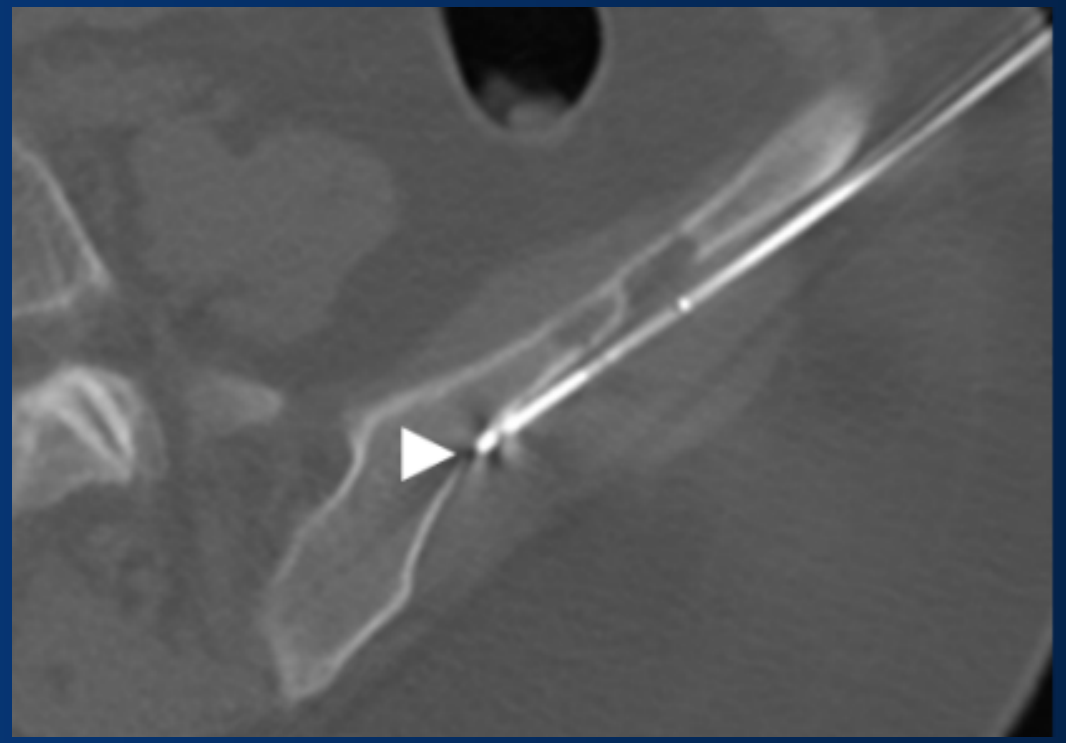
- Vaswani et al. CVIR 2018
  - 41 patients/64 lesions
  - 70% 1 year Local Tumor Control
    - 67% in setting of progressive systemic disease
    - 100% in oligometastatic disease

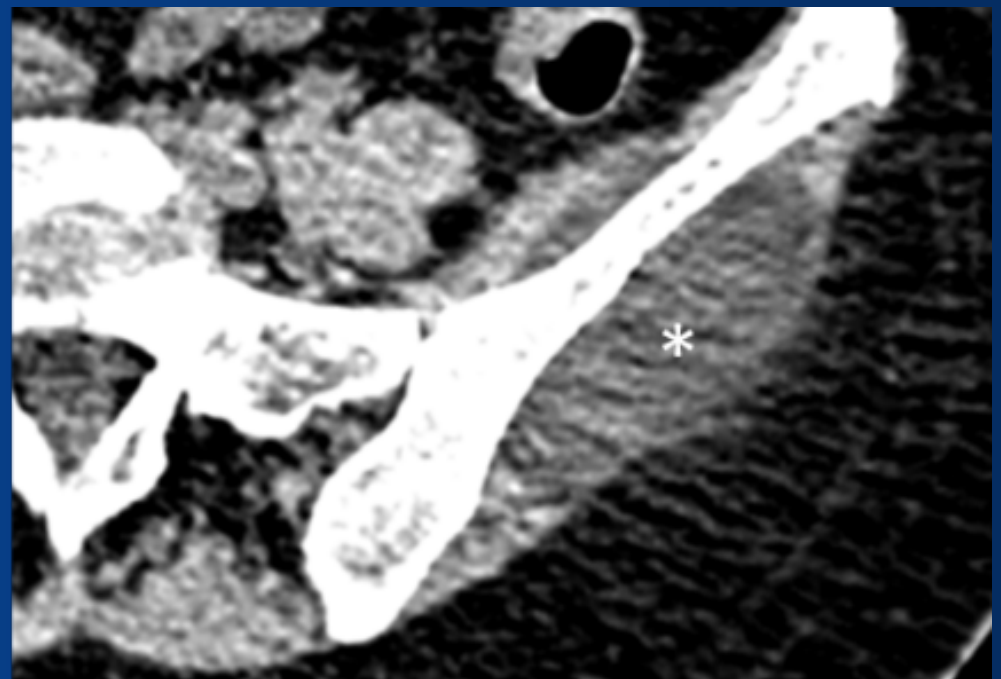




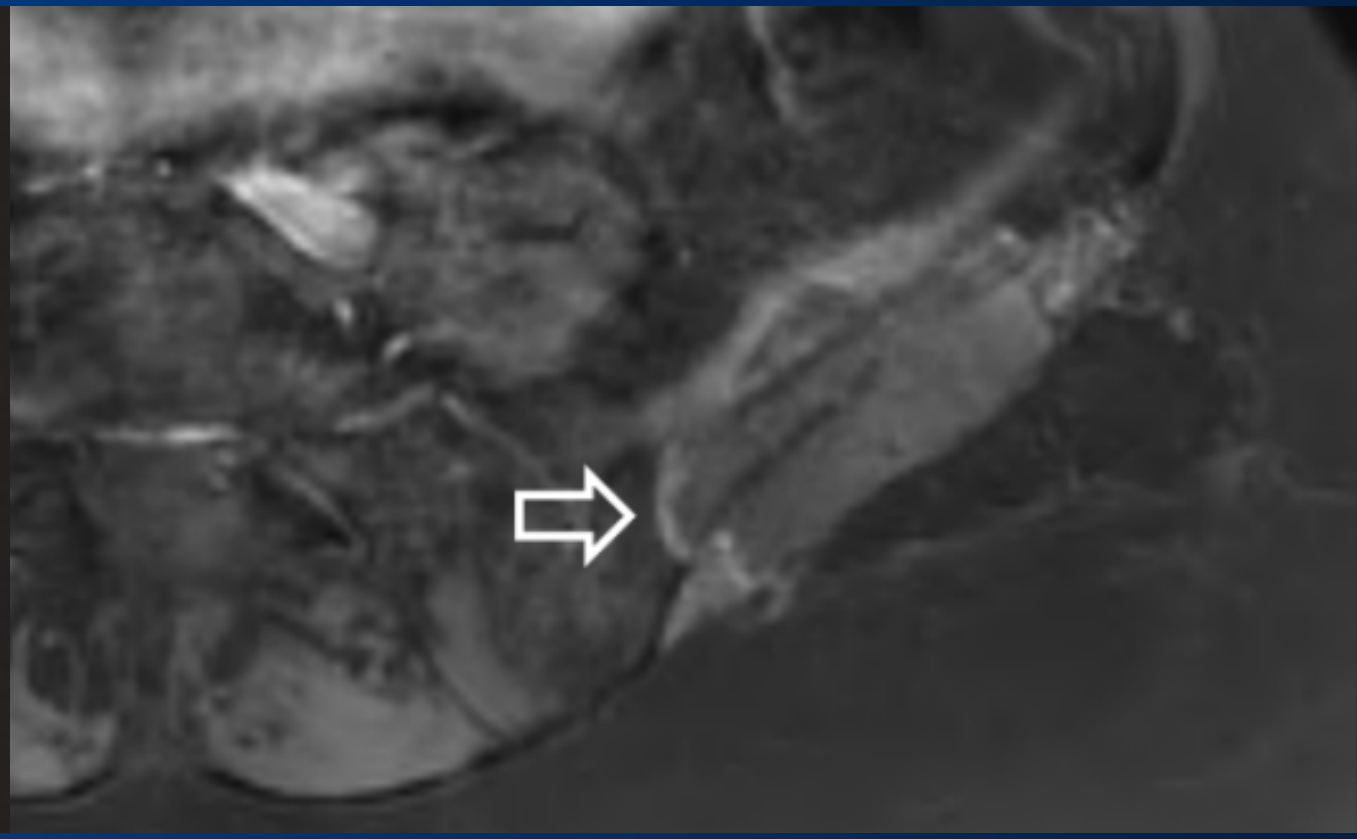
52-year-old woman with metastatic leiomyosarcoma



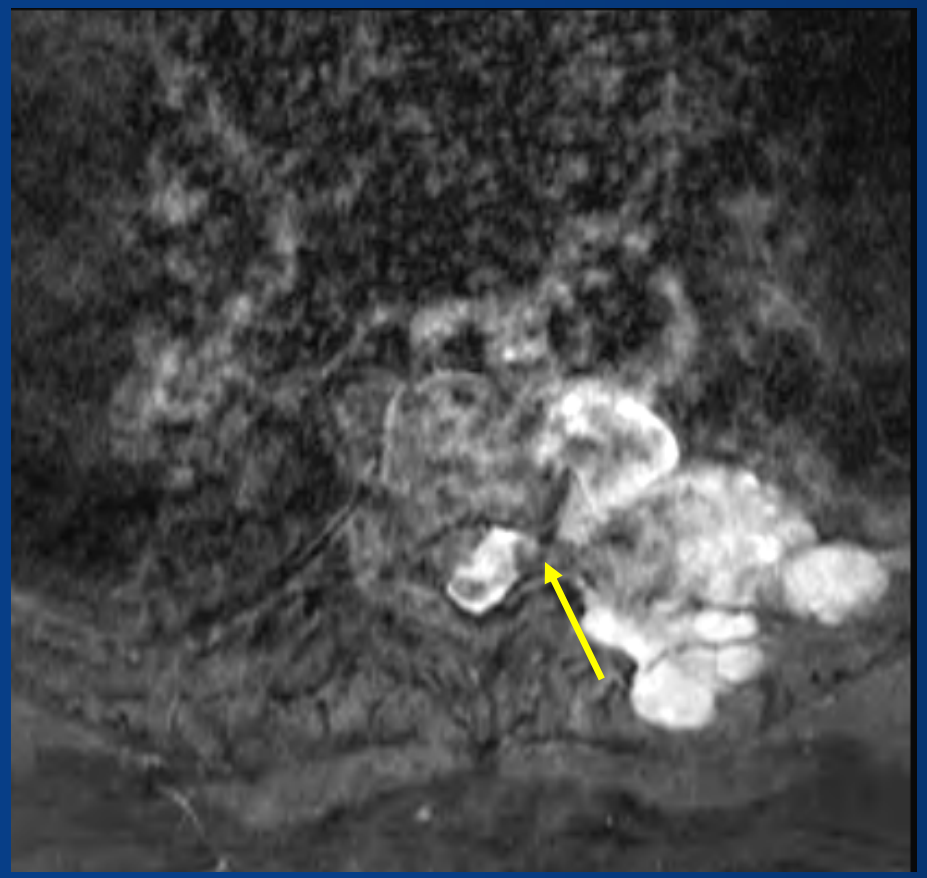




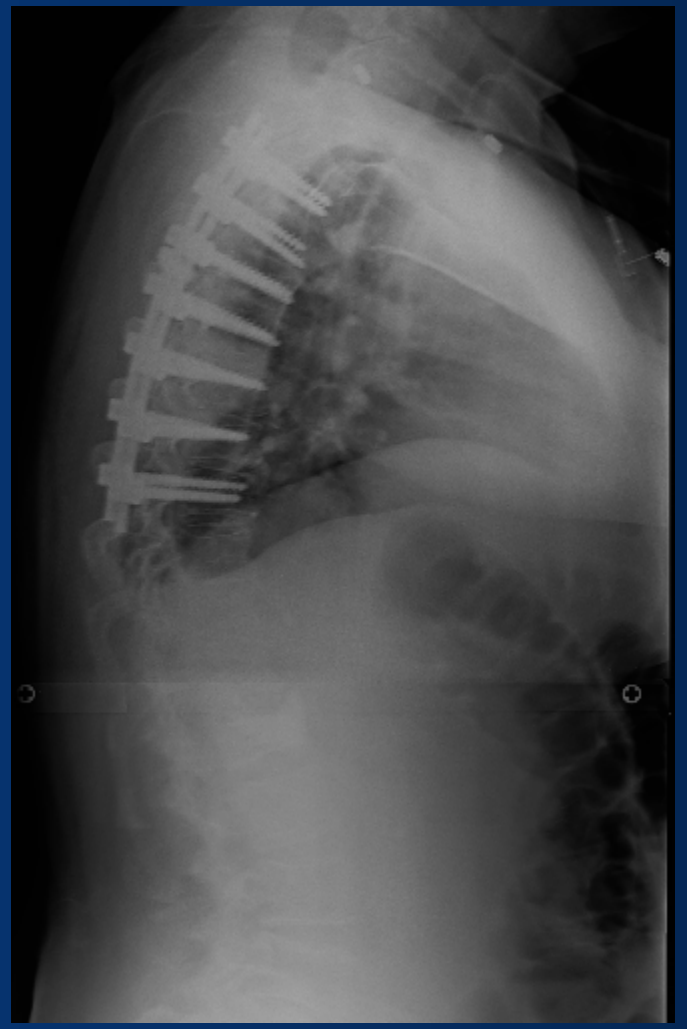
18-FDG PET/CT
16 weeks post ablation



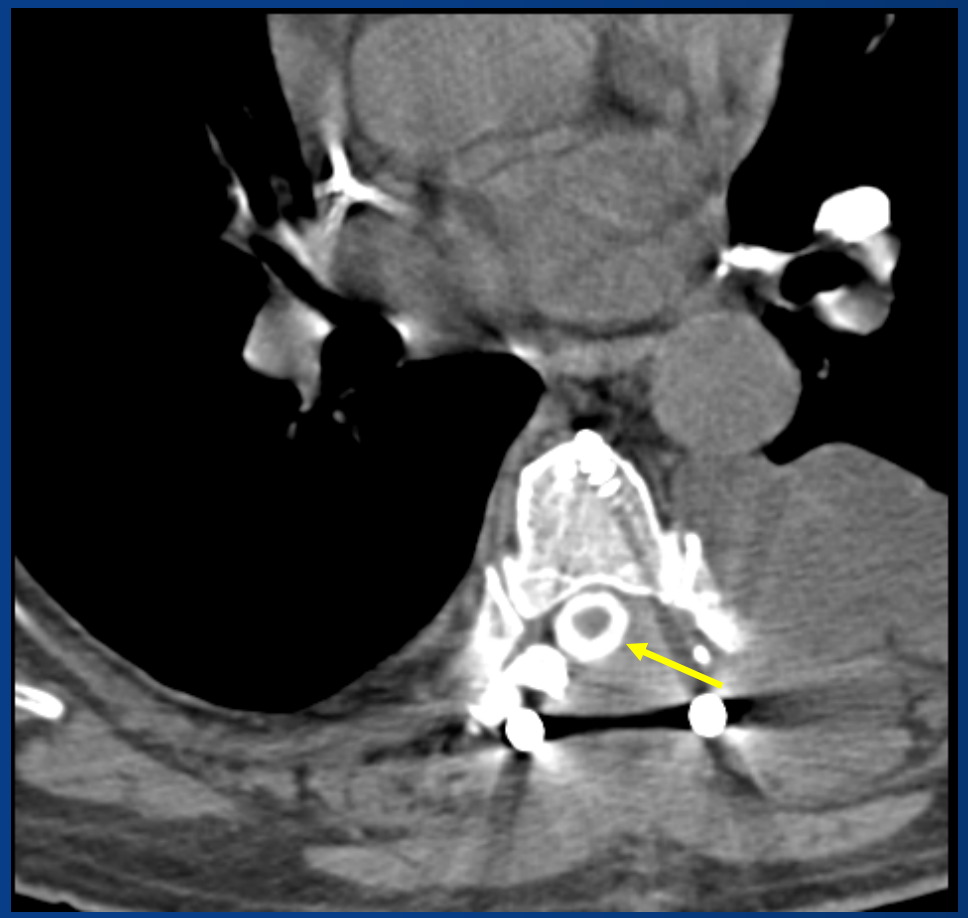
MRI post contrast
30 weeks post ablation

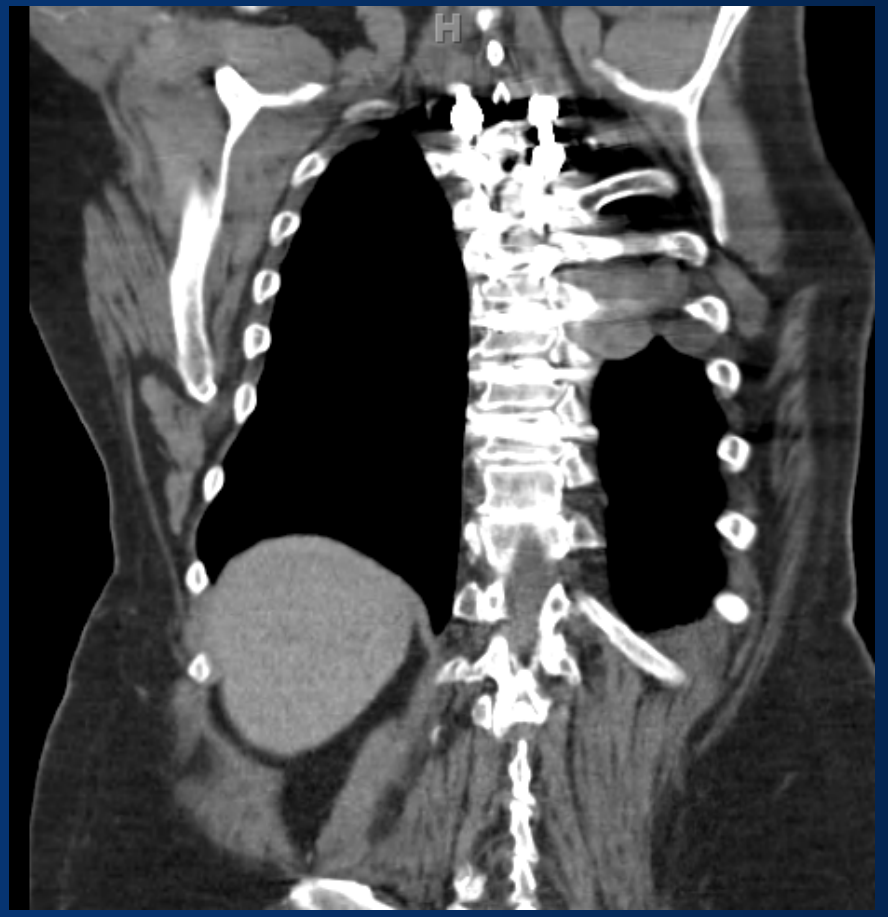


- 62 yom with metastatic right knee liposarcoma on a clinical trial with this being an index lesion
- T4-T7 metastatic lesion with spinal cord compression presenting with progressively worsening pain; NOT myelopathic

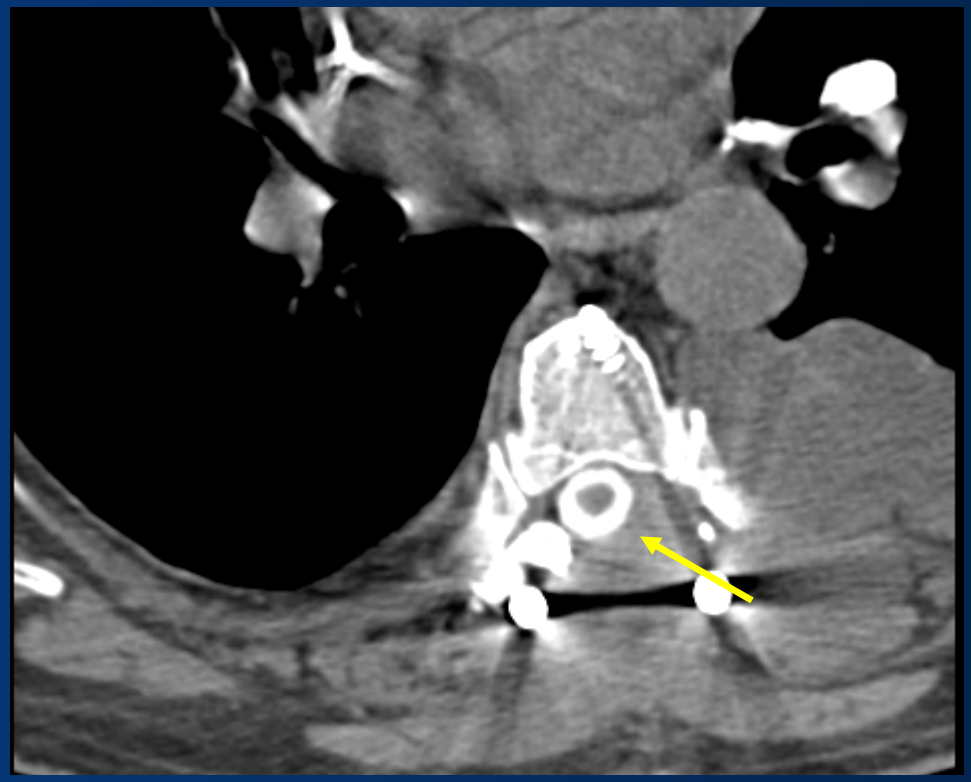


- Posterior decompression and fusion T3-T9
- Gross tumor removed in canal; pleural tumor was left





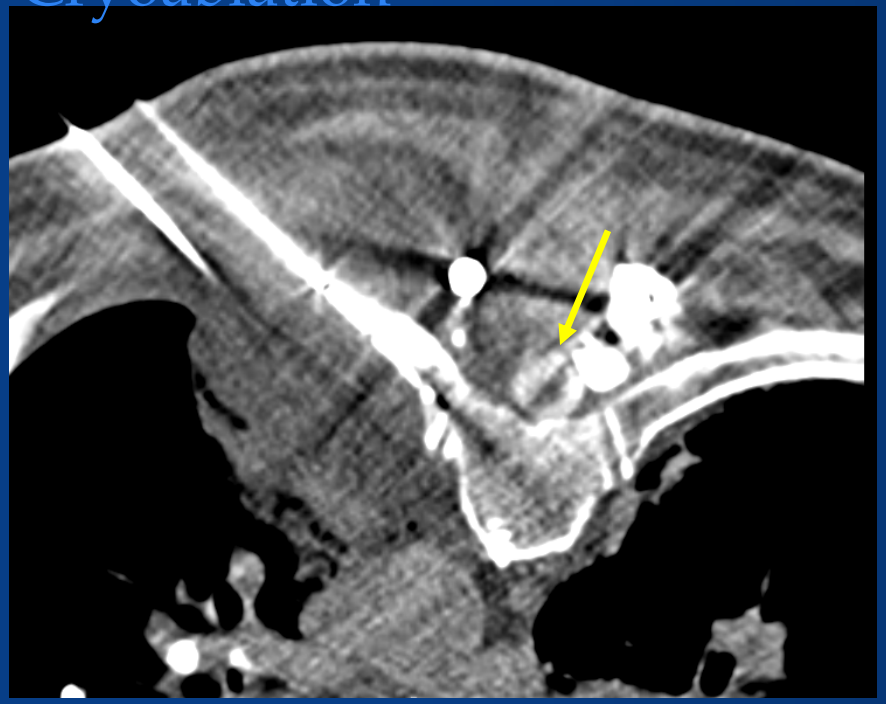
- Presents with new worsening pain
- CT myelogram 1 mos post surgery demonstrates tumor extending into foramen and canal
- Receives Stereotactic body radiation therapy (SBRT) 21 Gy in 3 fractions

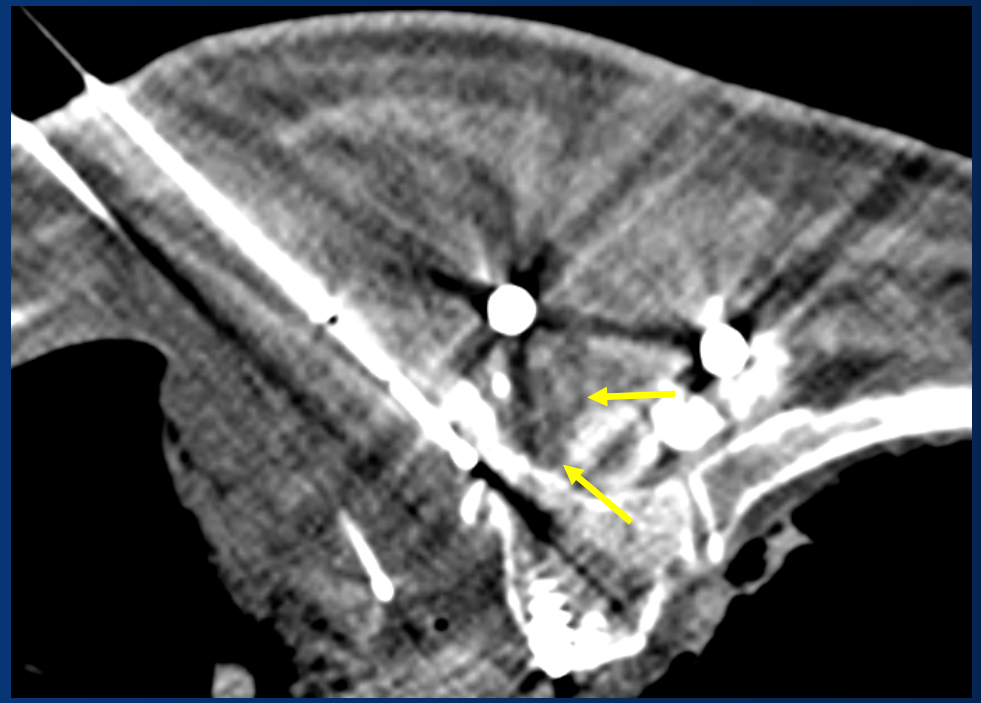


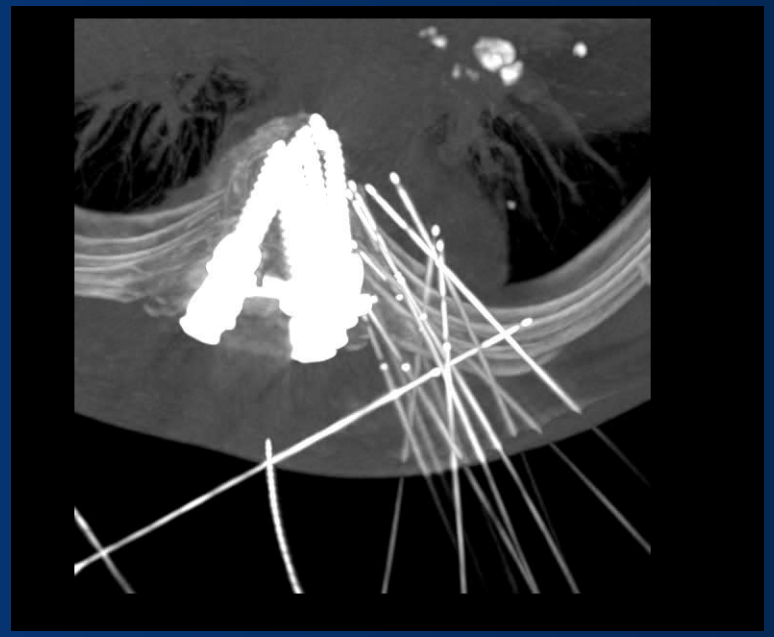
6 weeks prior CT myelogram

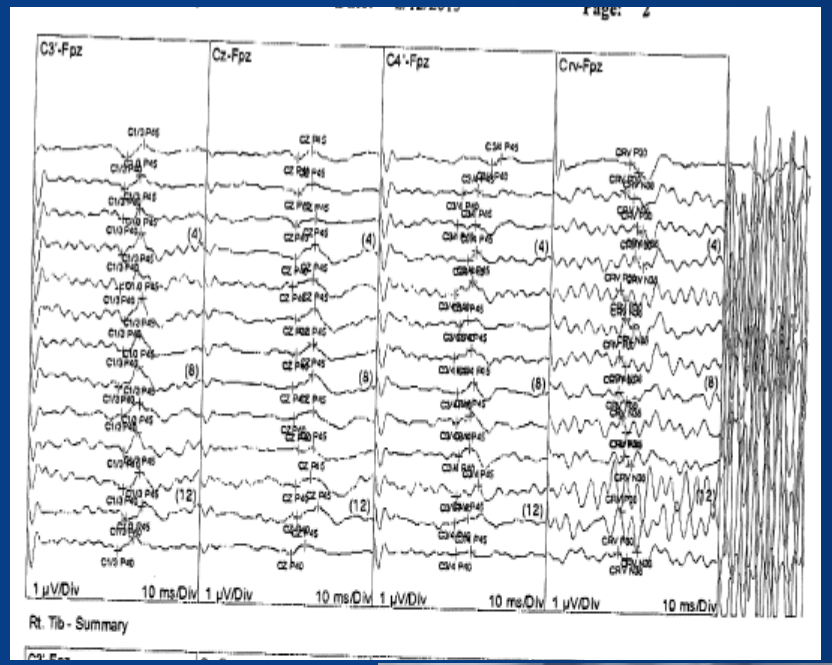
- 6 weeks later he continues to have pain
- CT w/o myelogram concerning for progression of canal component.

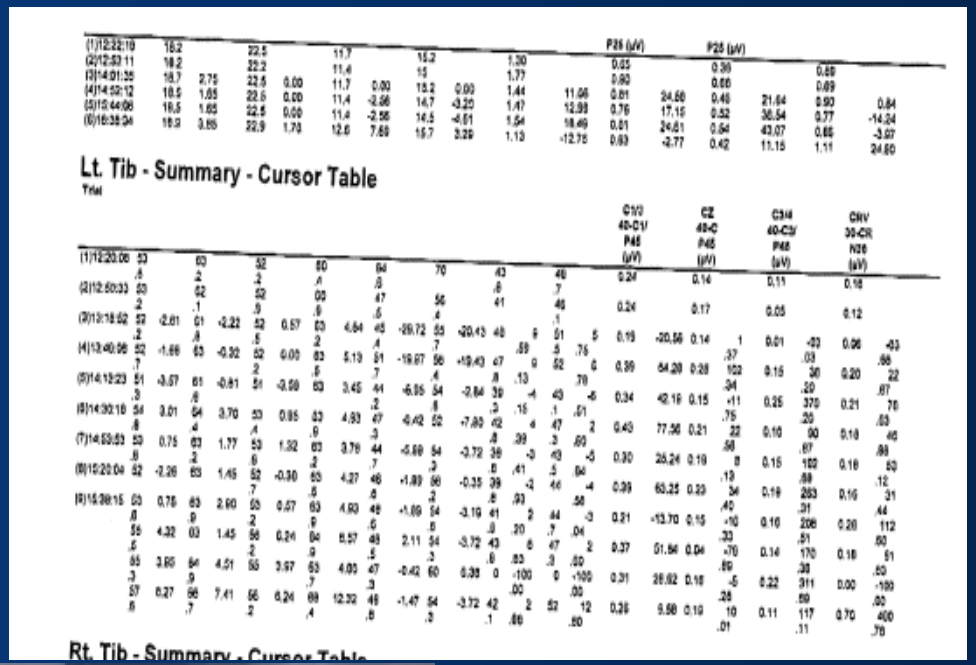
Cryoablation

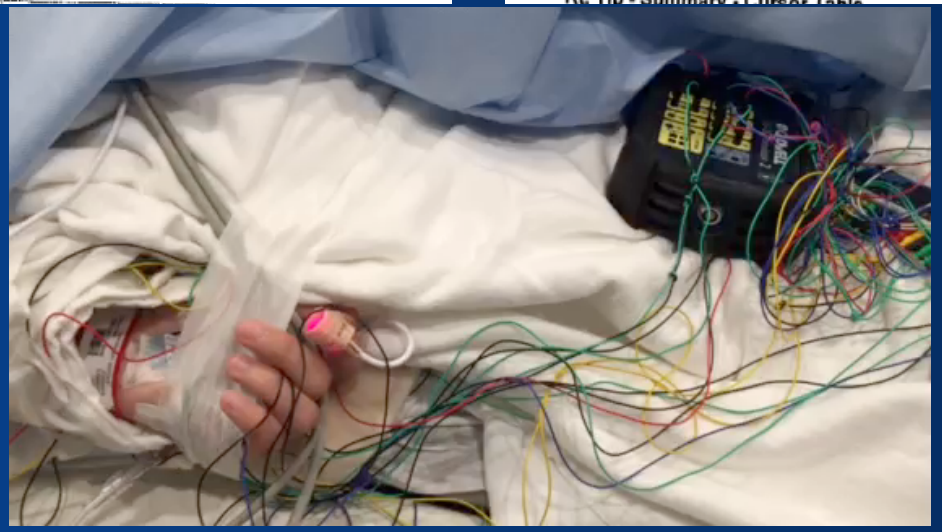




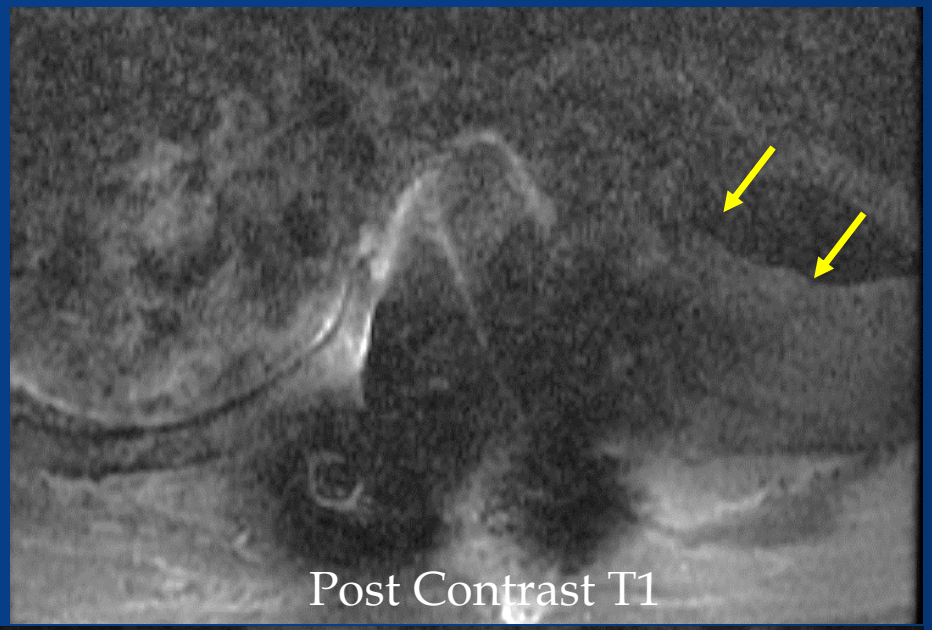


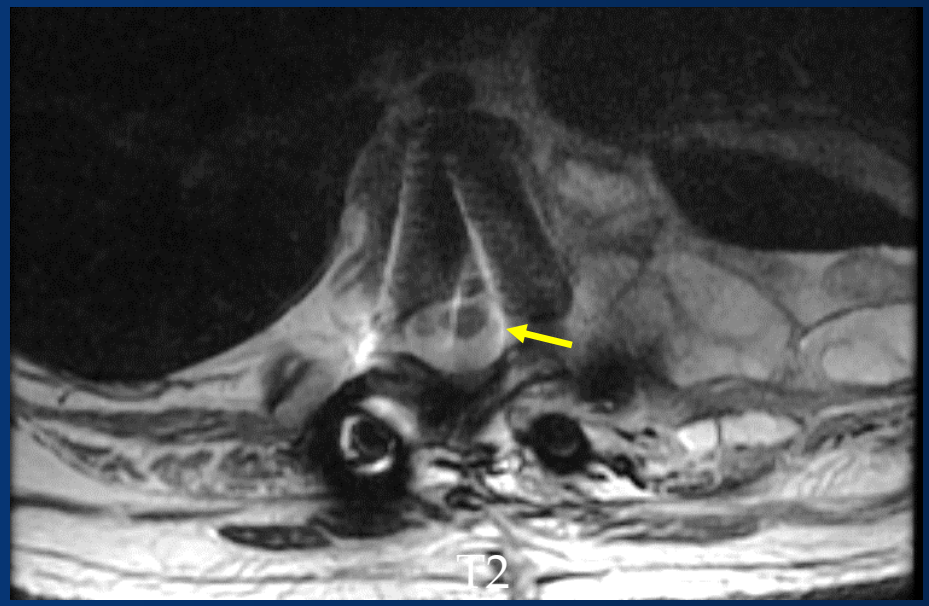


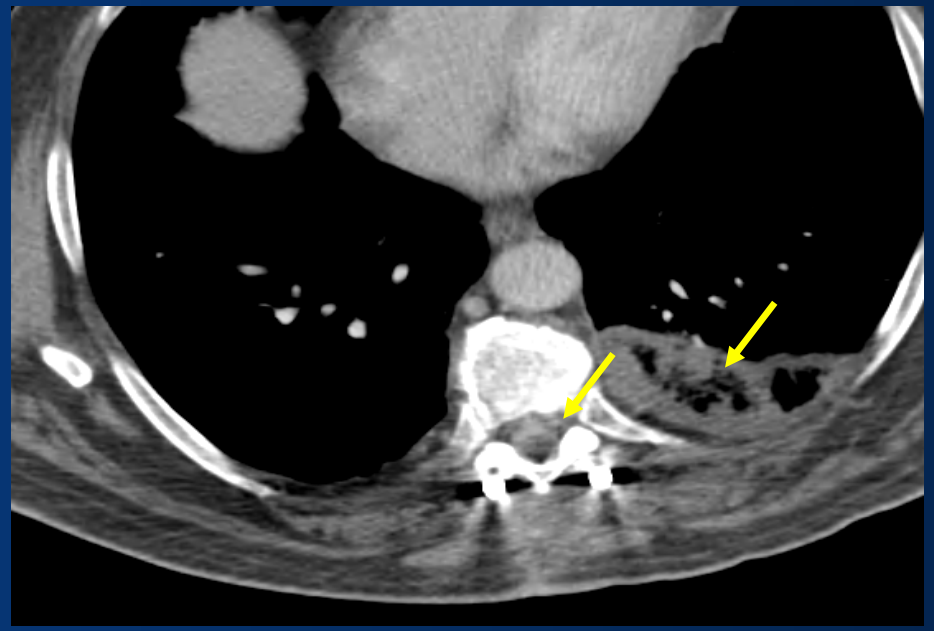




- Somatosensory and motor evoked potentials were well formed, symmetrical, and repeatable throughout the ablation







4 mos. f/u MRI examination and CT

Conclusion:

- Given the diversities of sarcomas, single line therapy is not likely to be successful across the subtypes
- Local Therapies are integral in the treatment algorithm in patients with sarcoma oligometastatic disease
- ASCO and NCCN guidelines support ablative therapies for LTC
  - Use these guidelines with local medical, radiation, and surgical oncologists and private payers for preauth/precertification
- Ablation after stability on chemotherapy can serve as well tolerated maintenance therapy with significant PFS and systemic therapy-free interval
- The goal is local tumor control and to increase PFR and PFS and ultimately OS

Thank you