Lung & Kidney: Best First Cases to Develop Your Practice

Alda Tam, MD

Professor, Interventional Radiology

MD Anderson Cancer Center

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Lung

- **Metastases >> NSCLC**
  - Identify oncologists & surgeons (surg onc and thoracic surg) who treat the most colon cancer and sarcoma cases
  - Parenchymal sparing advantage
    - Medically high risk for surgery; prior thoracotomy, prior XRT
  - Image-guided thermal ablation has been successfully accomplished in “high risk,” objectively defined with a single major and/or two or more minor criteria. Major criteria included an FEV1 or DCLO ≤ 50%, and minor criteria, a less depressed FEV1 or DLCO between 51-60%, advanced age ≥ 75 years, pulmonary hypertension, LVEF ≤ 40%, resting or exercise PaO_2 < 55 mmHg, and pCO_2 > 45 mmHg

Lung

TABLE 1. Comparing Ablative Technologies

Parameter(s)	Radiofrequency	Microwave	Cryoablation
Set up	++	+++ (quickest)	+
Duration of ablation	++	+++ (shortest)	+
≤3 cm	+++	+++	+++
>3 cm	+	+++	++
≤1.5 cm pleura	+ (pain)	+ (pain, air leak)	+++
Emphysema	++	+++	+
Chest wall	+	++	+++
Mediastinum	+	+	++
Thermal sinks	+	+++ (least)	++
Preservation of collagen	+	+	+++
Coagulopathies	+++	+++	+

Tumor Factors

- Size: < 3 cm
- Number: 4/lung
- Location: Peripheral
- No extrapulmonary mets
- Biology: RCC, CRC, sarcoma

Abtin et al. *J Thorac Imaging.* 2019;34:266-77

Defining New Metrics in Microwave Ablation of Pulmonary Tumors: Ablation Work and Ablation Resistance Score

Ramsey A. Al-Hakim, MD, Fereidoun G. Abtin, MD, Scott J. Genshaft, MD, Erin Kutay, MD, MPH, and Robert D. Suh, MD

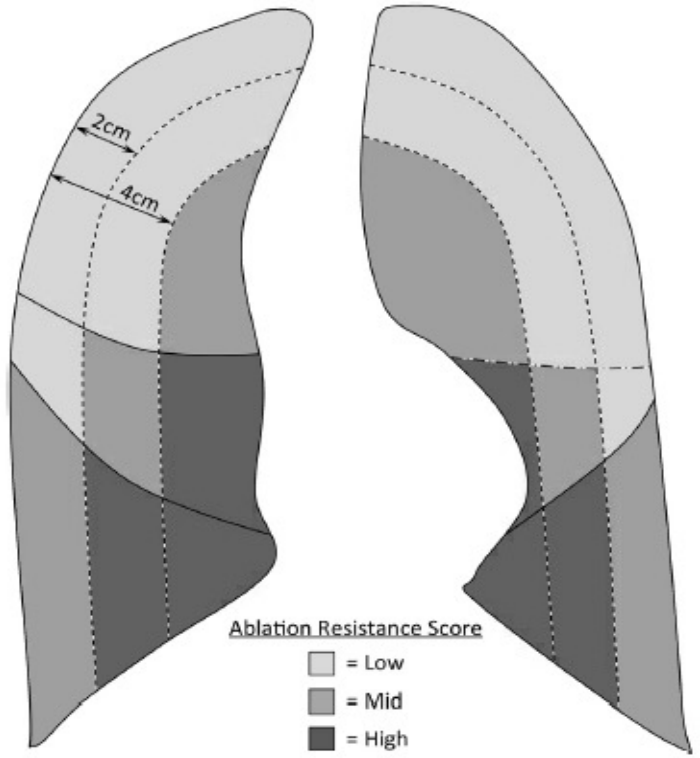
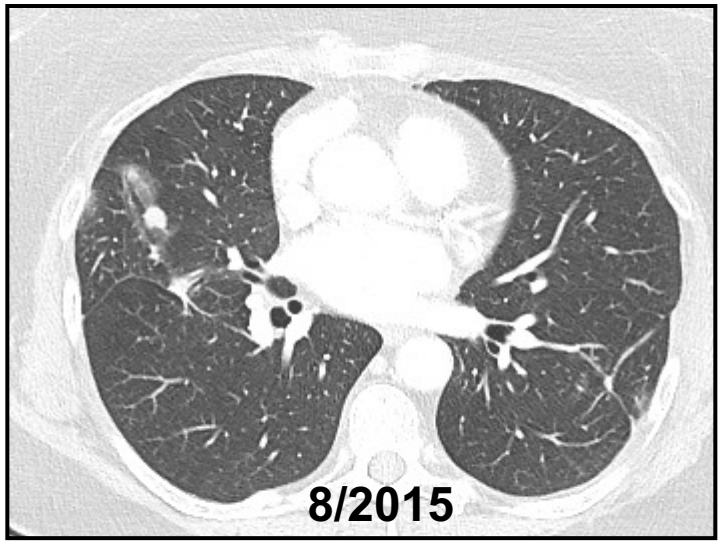
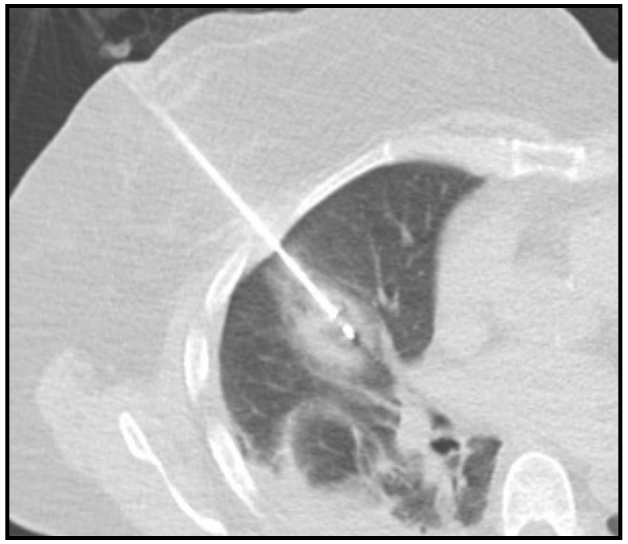
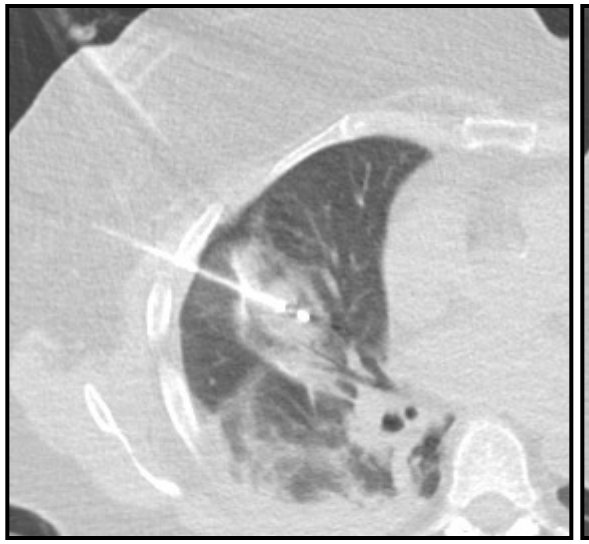
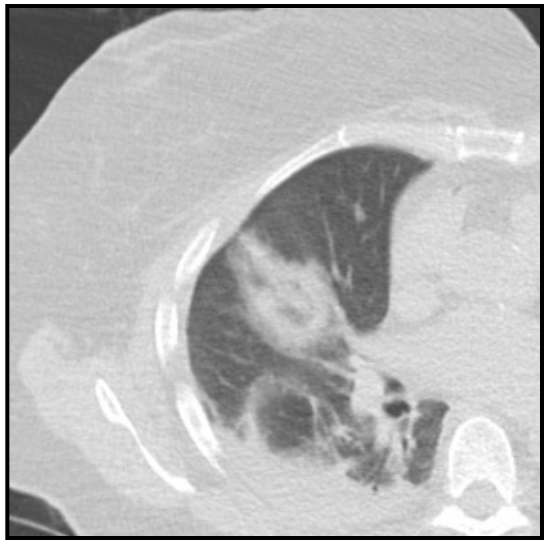


Figure 1. Schematic demonstrating different ablation resistance score groups: low score (ablation resistance score = 2–3), medium score (ablation resistance score = 4), and high score (ablation resistance score = 5–6). Dashed lines indicate divisions between pulmonary regions, and solid lines indicate divisions between pulmonary lobes. Dot-dashed line represents division between left upper lobe and lingula. *J Vasc Interv Radiol 2016; 27:1380–1386*

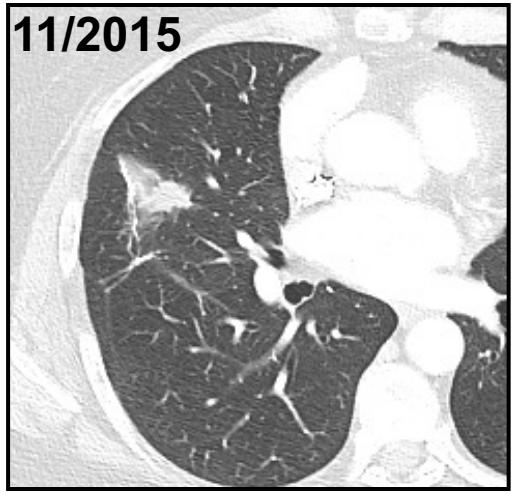


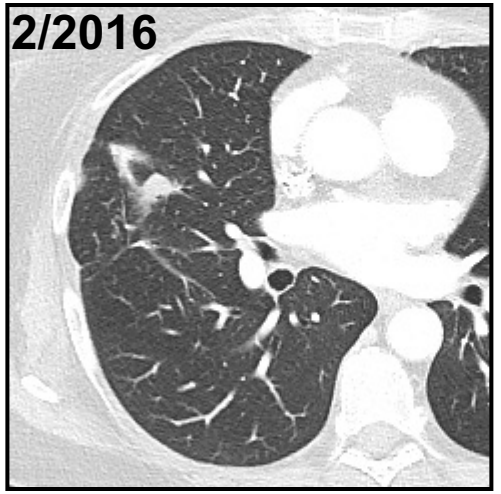


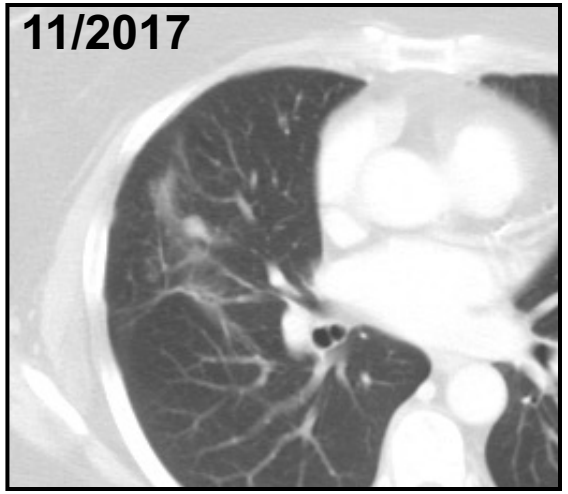


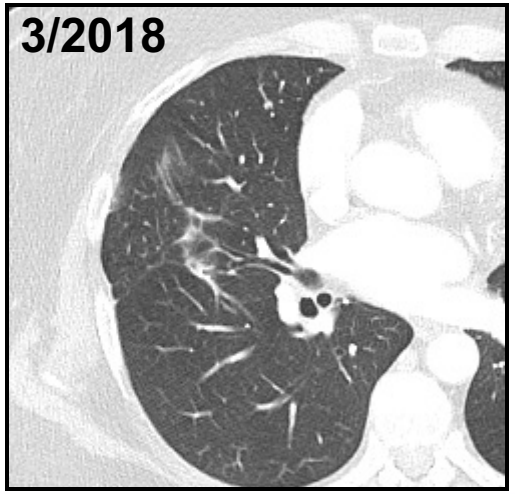


61-year-old woman w/rectal cancer & synchronous lung metastasis dx'ed 2013. Treated with transanal excision & neoadjuvant radiation along with concurrent capecitabine. In 2014: APR w/partial posterior vaginectomy and VRAM flap reconstruction followed by adjuvant FOLFOX + bevacizumab and bilateral thoracotomies w/multiple wedge resections.



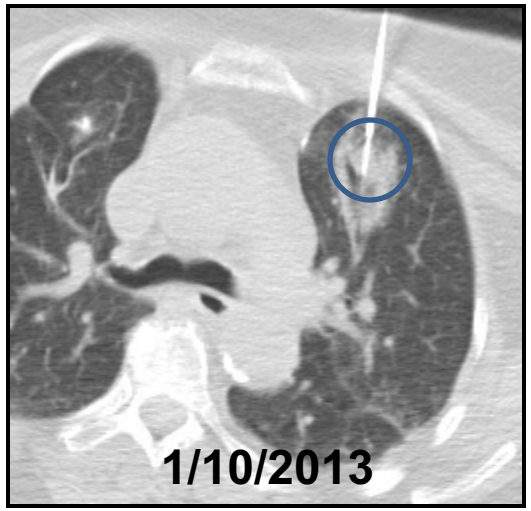


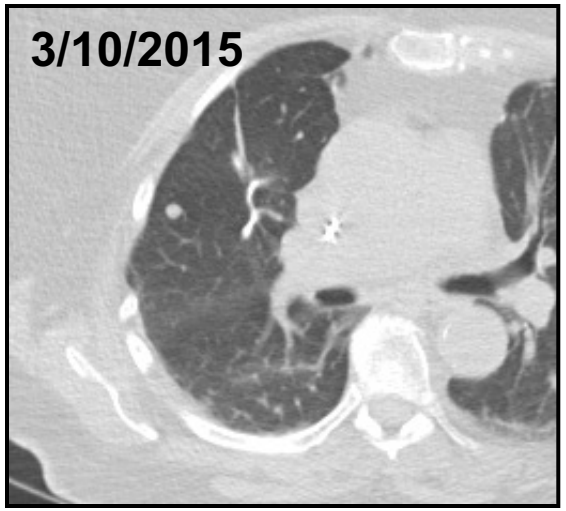


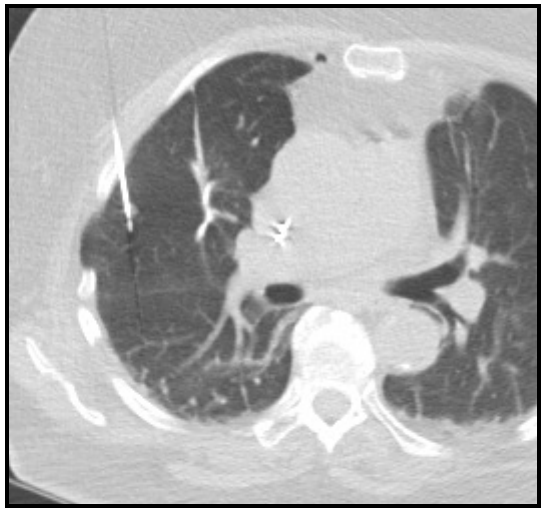


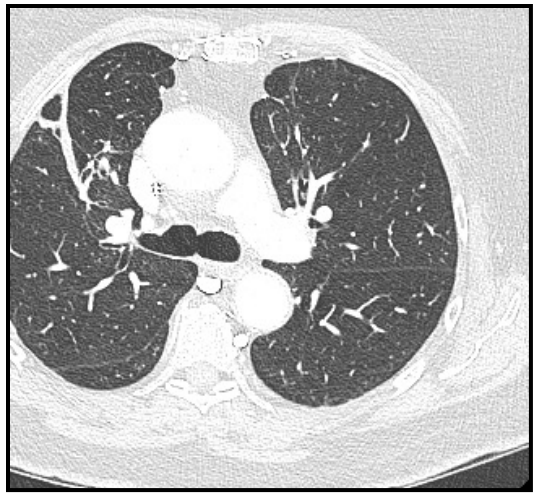
Patient has been on surveillance since the cryoablation in 2015.

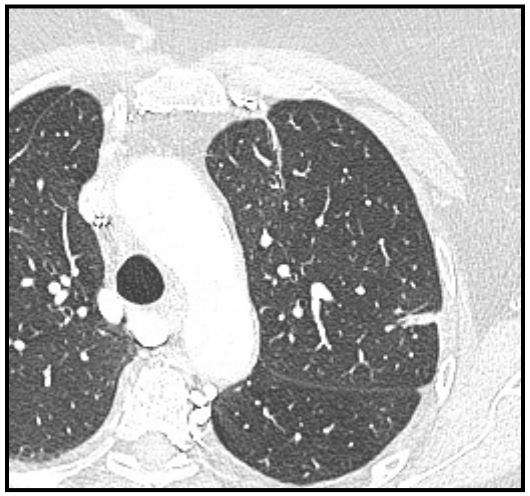
75-year-old woman with uterine leiomyosarcoma treated with TAH/BSO in 1999. Poor tolerance to doxorubicin/isofosamide, completed 2001. Surgical wedge resections for bilateral pulmonary mets in 2001, 2003, 2011. Patient on surveillance since 2015 without evidence of new disease or recurrence.











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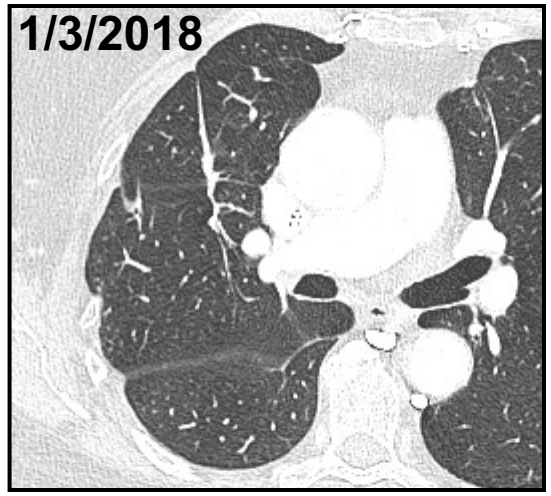


Kidney

- Identify urologists, oncologists, and orthopedic surgeons treating the most RCC in your institution
- Good support for IR interventions in the NCCN guidelines for stage T1a and recurrent/metastatic disease
- RCC represents a disease state with multiple opportunities for IR to provide added value to patient care

Kidney

- Ablation for primary stage T1a RCC
- Ablation for recurrent RCC in kidney
- Embolization for large, hypervascular primary RCC w/wo venous invasion prior to resection
- Embolization for symptomatic primary RCC
- Ablation of soft tissue/bone/liver/lung metastases from RCC

Kidney

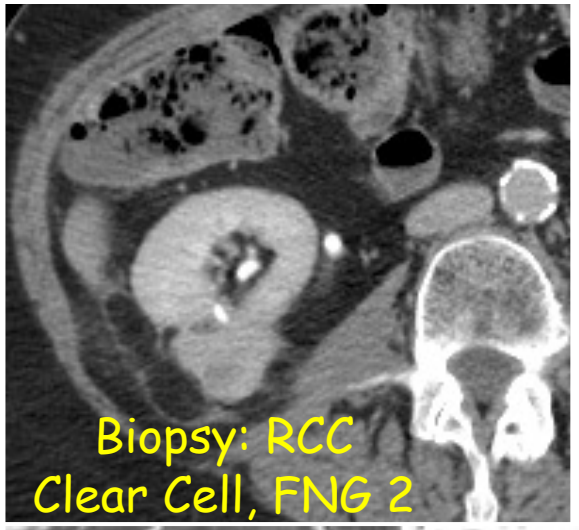
- Ablation for primary stage T1a RCC
- Ablation for recurrent RCC in kidney

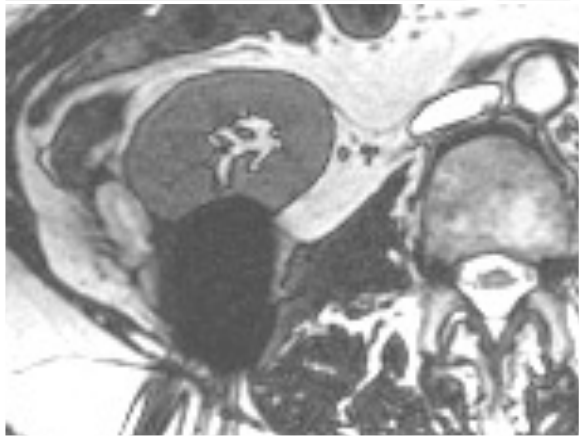
Tumor size:

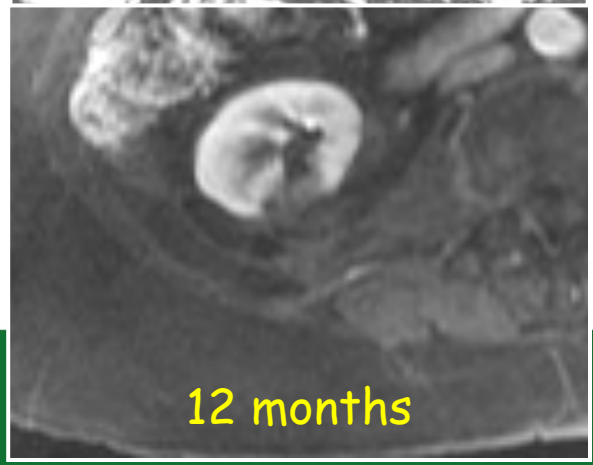
- < 4 cm ideal
- > 4 cm may require additional interventions

Tumor location:

- Non-central tumors have better response rates
- Posterior/posterolateral tumors are more accessible







Kidney

- Embolization for large, hypervascular primary RCC w/wo venous invasion prior to resection
- Embolization for symptomatic primary RCC
- **MDACC 1999 – 2003:**
  - 30 patients underwent preoperative embolization
  - 25 patients (83%) with IVC tumor thrombus
  - Mean tumor size 11.5 cm

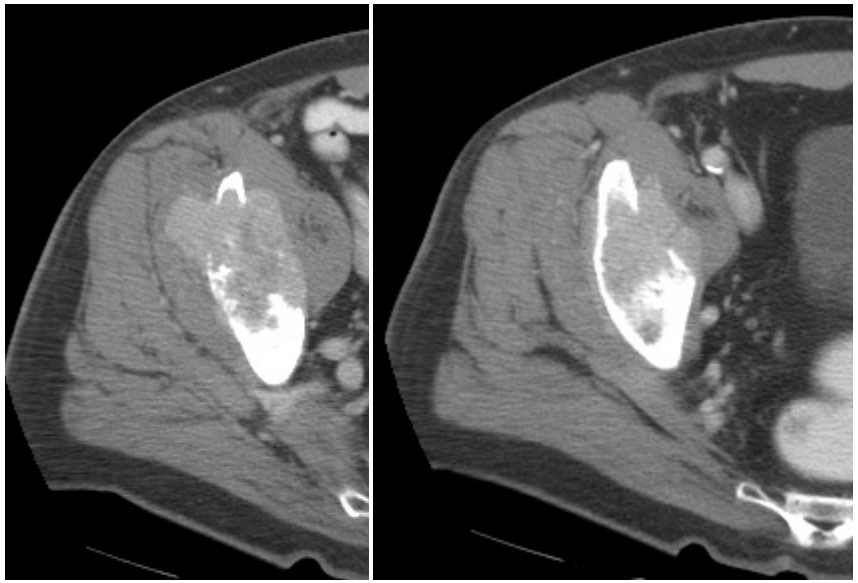
Findings During Surgery	No. of Cases	Avg. Tumor Size	Avg. EBL(L)	Median Surgery Delay
Significant Edema/Inflammation	12	9.5	3.2	2.5
No significant Edema/Inflammation	17	13.3	1.6	1.0
			P = .02	*P* = .03

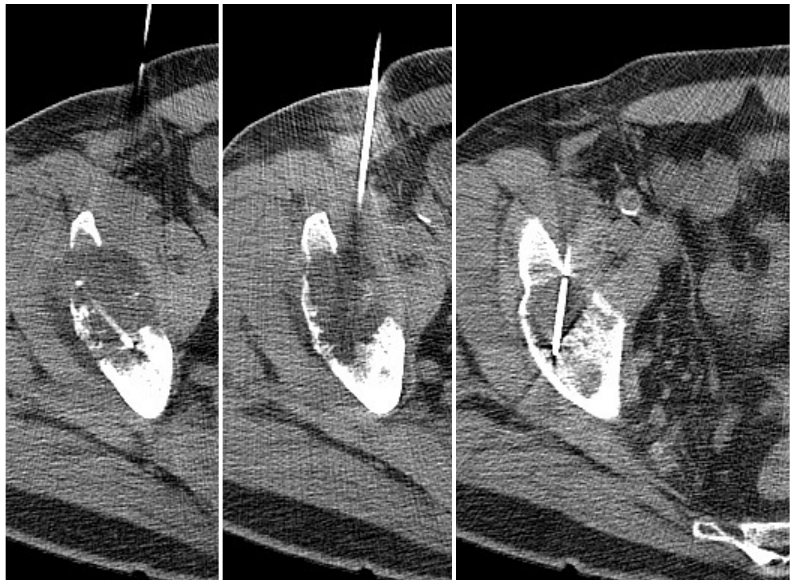
Verma et al. JVIR 2005;16:S17

Kidney

- Ablation of soft tissue/bone/liver/lung metastases from RCC

75-year-old man with metastatic RCC involving the right superior acetabulum





Conclusions

- Multidisciplinary practice – get to know the other players
- Use well-selected cases to develop familiarity with devices
  - Knowing how a device performs will allow you to take on more challenging cases while preserving safety margin
- Lung ablation – build the practice on metastatic disease
- Kidney – variety of clinical scenarios and multiple points within disease course to integrate IR interventions into the institutional practice