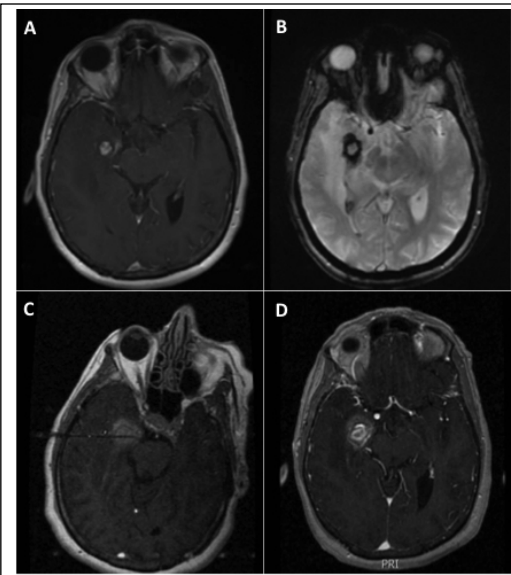


## Introduction

Laser interstitial thermal therapy (LITT) is an intriguing, minimally invasive treatment modality for many neurosurgical pathologies, including tumors, radiation necrosis, chronic pain, and epilepsy. Reported complications are typically recognized in the early postoperative period, and include neurologic deficit, hemorrhage, edema and infection.(2,4,6) Here, we present a series of two interesting cases of late-onset cyst formation after LITT, a complication that, to our knowledge, has not yet been reported in the literature.

## Case 1

- 59 year-old female with right temporal arteriovenous malformation (AVM), status-post embolization and stereotactic radiosurgery (SRS) 10 years prior; now presents with recurrent seizures refractory to antiepileptic medication, but otherwise neurologically intact. MRI demonstrated a 1 x 1 cm radiation induced cavernous angioma with surrounding hemorrhage (Figure 1A, 1B).
- 3 ablations were performed at 10 watts, for a total treatment time of 3 minutes, 28 seconds (Figure 1C). Post-ablation MRI demonstrated an evolving hematoma in the area of ablation. (Figure 1D).
- Following ablation, patient remained seizure free. MRI at 9 months demonstrated stable ablation cavity; MRI at 18 months demonstrated a small 1 cm cyst adjacent to ablation zone (Figure 2A, 2B), which slowly enlarged over the course of serial MRIs.
- At 30 months, the patient experienced a breakthrough grand mal seizure. MRI showed the cyst was approximately 2 x 2 cm (Figure 2C, 2D). Cyst was surgically removed via a temporal craniotomy and a transcortical approach.
- Surgical pathology revealed gliotic brain tissue and hemosiderin deposition. There was no indication of recurrent AVM or radiation induced tumor. The patient recovered well from the procedure and has remained seizure free to date.

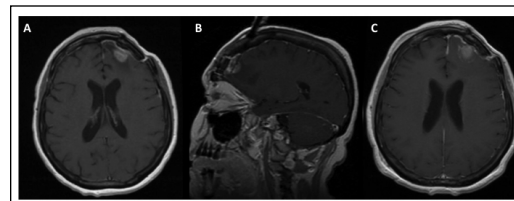


**Figure 1**

A. T1 weighted pre-ablation MRI. B. T2 weighted pre-ablation MRI. C. MRI guided laser catheter placement. D. Post-ablation MRI

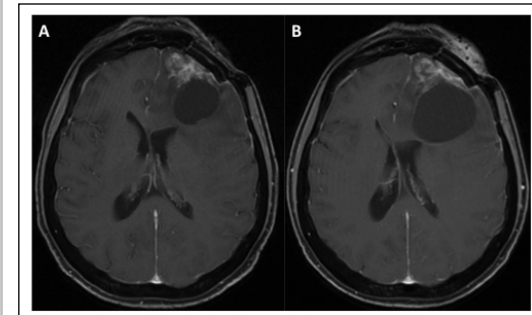
## Case 2

- 53 year-old female, with left frontal breast metastasis, status-post craniotomy and tumor resection followed by adjuvant gamma knife. One year later, presented with infield recurrence (Figure 3A).
- 3 ablations were performed at 10 watts, for a total treatment time of 3 minutes, 2 seconds (Figure 3B). Post-ablation MRI demonstrated complete ablation of the lesion (Figure 3C).
- Serial MRIs demonstrated a stable ablation cavity over the course of 2 years. At 30 months, MRI demonstrated a 3 cm cyst extending from the ablation zone (Figure 4A).
- Follow-up MRI in 3 months demonstrated continued expansion of the cyst, now with 1 cm mass effect (Figure 4B). The lesion was suspected to be an infield recurrence, and cyst was resected via a revision left frontal craniotomy.
- Surgical pathology was consistent with a reactive process and not with a glioma. No evidence of metastatic breast carcinoma was identified. Postoperatively patient has done well, with no recurrent disease to date.



**Figure 3**

A. T1 weighted pre-ablation MRI. B. MRI-guided laser catheter placement. C.



**Figure 4**

A. T1 weighted MRI at 30 weeks post-ablation. B. T1 weighted MRI at 33 weeks post-ablation.

## Conclusions

These cases emphasize the importance of continued follow up in LITT patients despite radiologic and symptomatic stability, as well as the need for further study of the long term outcomes of LITT.

## Discussion

- Here, we present 2 cases of late-onset cyst formation 18 and 30 months post-ablation, which became symptomatic and required surgical removal. In both cases, pathology demonstrated gliosis and vessel hyalinization.
- Complications secondary to catheter insertion (hemorrhage, infection) and ablation of normal brain tissue (cranial nerve palsy, focal motor deficit, seizure, aphasia) have been reported after LITT, but long term complications have rarely been reported.(1,3,5)
- Similar to the pathophysiological mechanism seen in post-SRS cyst