

Microwave Ablation as an Effective Non-Surgical Strategy for teratoma, post-pubertal type, following chemotherapy

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Introduction

Patients with poor-prognosis germ cell tumours (GCT) represent 14% of all germ cell patients and have 54% five years-progression free survival (PFS) and 67% five years-overall survival (OS) [1]. There is a common consensus, following definitive chemotherapy with response, to resect any residual mass greater than 10-20 mm [2]. Limited data exists for non-surgical approaches i.e., ablation that could provide a focal treatment when surgery is not feasible. [2, 3].

Keywords

Microwave ablation, Nonseminomatous germ cell tumour, Testicular cancer, poor risk, Growing teratoma syndrome.

Case Reports

- Initial Presentation (Dec 2019):** 25-year-old male with right-sided pleurisy and lower back pain. CT showed multiple lung metastases, enlarged retroperitoneal lymph nodes invading IVC with thrombus, and a right testicular primary tumor. Tumor markers: AFP 2598 ng/ml, bHCG 6537 mIU/ml, LDH 2256U/l. CT/MRI revealed brain metastases.
- Started on chemotherapy (Carboplatin + Etoposide), later switched to BEP (Bleomycin, Etoposide, Cisplatin).
- Post-Chemotherapy (Apr 2020):** Mixed response—some tumors shrank, others grew. Brain imaging showed new metastasis consistent with growing teratoma syndrome
- Surgeries (2020-2022):** Multiple metastasectomies, craniotomies, thoracotomies, and ablations for lung and brain metastases.
- May 2020:** Left occipital craniotomy and excision of teratoma.
- Aug 2020:** Left lung VATS + 3 wedge resections. Path Teratoma
- Jan 2021:** Right posterior fossa craniotomy and excision of teratoma.
- Feb 2021:** Right thoracotomy + 21 wedge resections + microwave ablation (MWA) of lung nodules.Path TD
- May 2021:**POD Left thoracotomy + 18 wedge resections + lymph node sampling.
- Aug 2021:** Brain metastasis resection (left parietal + right occipital).
- Nov 2021:** MWA of residual lung nodules.
- Apr 2022:** POD Redo right thoracotomy + hilar nodule excision. Path TD
- Nov 2023:** Laparotomy + adhesiolysis for small bowel obstruction.
- Follow-up (2023-2025):** Stable lung nodule under surveillance, potential for future targeted treatment.

Microwave ablation (MWA)

- Patient positioned under **general anaesthesia** with single-lung ventilation.
- Placed in **lateral decubitus or supine position** depending on lesion location.
- Skin preparation and draping** performed under sterile conditions.
- Local anaesthesia** (e.g., **30ml of 5mg/ml chirocaine**) administered into subcutaneous tissues.
- Lesions were **identified using CT guidance**.
- A **15cm 12G or 15G microwave ablation probe** (Medtronic Emprint/Johnson & Johnson Neuwave) was used.
- The probe was inserted percutaneously **into the centre of the tumour**.

1.Feb 2021 – Right Lung MWA

1.22 nodules treated (21 wedge resections + 3 ablated).

2.MWA Details:

- 1.5mm right lower lobe lesion: 4 min at 75W.
- 2.8mm right upper lobe lesion: 5 min at 75W.
- 3.6mm right upper lobe lesion: 6 min at 75W.

3.No post-procedure complications, no chest drain inserted.

2.Nov 2021 – Left Lung MWA

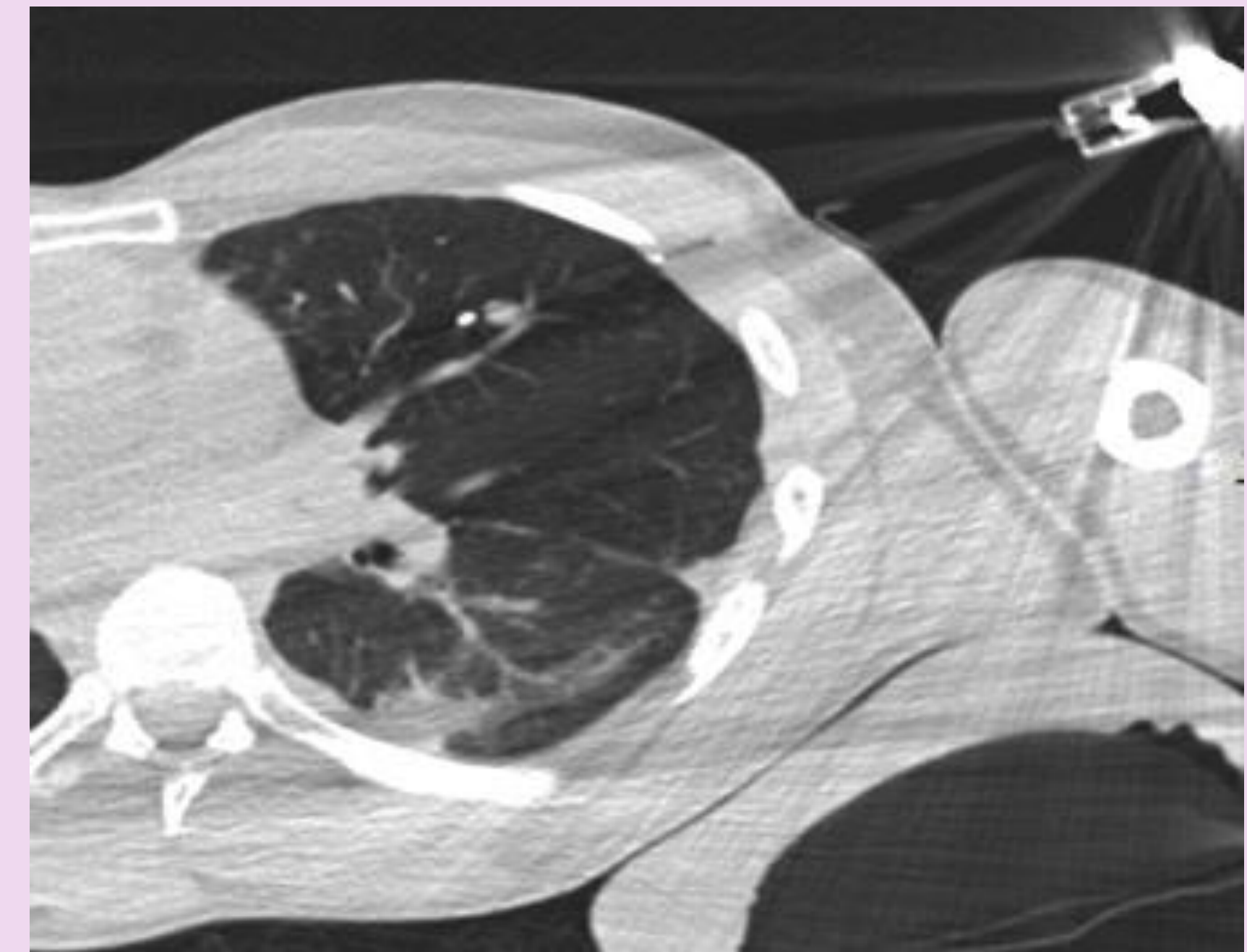
1.MWA Details:

- 1.9mm left upper lobe nodule: 5 min at 65W.
- 2.12mm left upper lobe nodule: 7 min at 65W.
- 3.Multiple smaller nodules treated cumulatively.

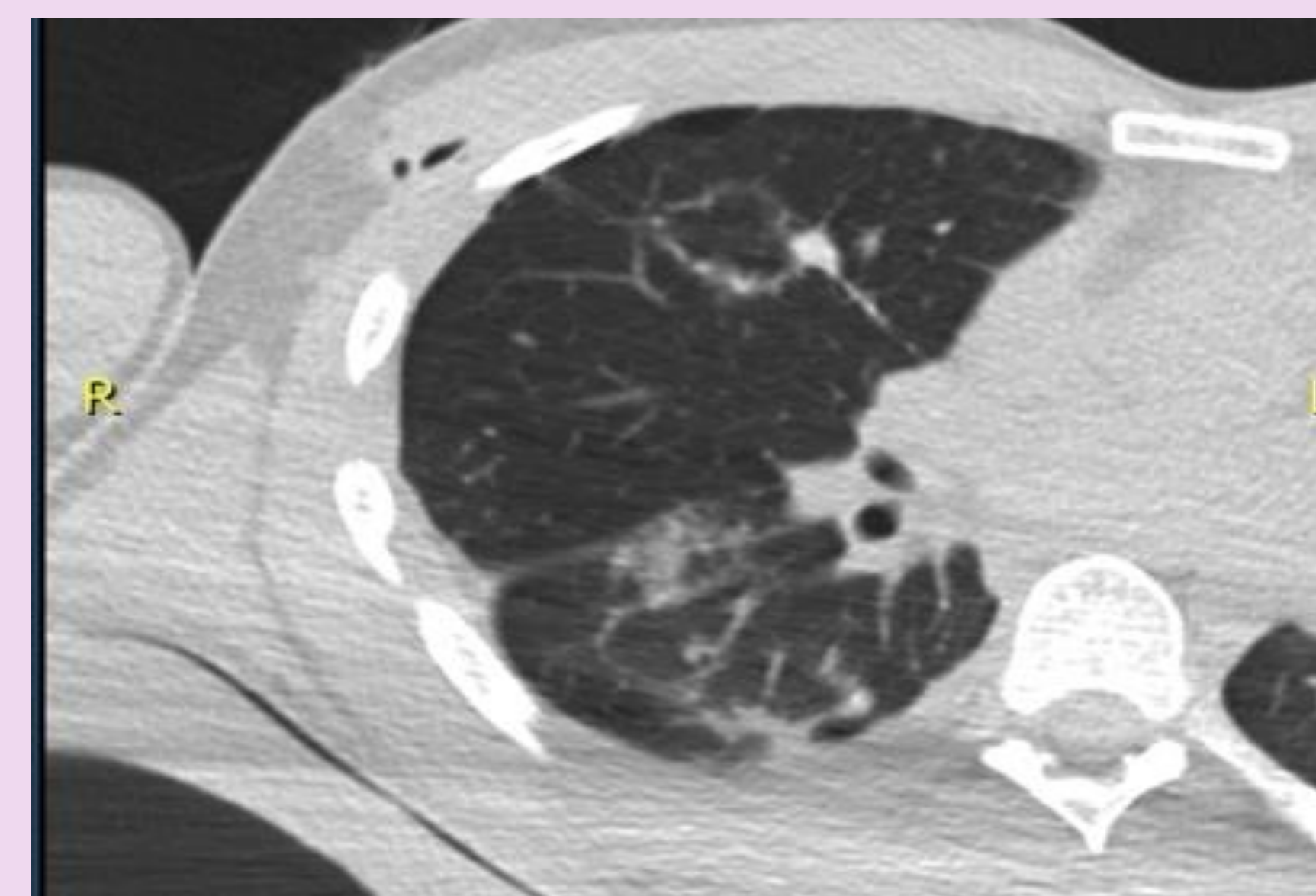
2.Complications: Subcutaneous emphysema, small pneumothorax (no drain needed).

Post-Ablation Management

Probe repositioned if additional ablation was required. Complications monitored (pneumothorax, haemorrhage, subcutaneous emphysema).6F drain inserted for subcutaneous emphysema in Nov 2021 procedure. Small pneumothorax observed, but no chest drain required. No haemoptysis or intrapulmonary haemorrhage noted. Post-procedure antibiotics (co-amoxiclav for 5–7 days) given as prophylaxis.5. Follow-up & Surveillance



(a)



(b)

Fig1 (a) and (b): MWA of a right middle lobe lesion, showing appropriate needle position and post-ablation appearance (post-ablation perilesional halo indicating the margin of the ablation).

Discussion

Teratomas are not chemo or radio-sensitive, and surgical resection is the cornerstone of treatment.

Patients who are ineligible for surgery may benefit from alternative treatments, such as percutaneous ablation.

Many studies have demonstrated that microwave ablation (MWA), laser-induced thermotherapy (LITT), and radiofrequency ablation (RFA) are efficient means for eradicating pulmonary metastases.

Moreover, it was also shown in studies that MWA had the potential to be beneficial in the treatment of local tumours compared to other ablation techniques.

The MWA technique is expected to be more effective for lung tumour ablation than radiofrequency ablation because it produces a larger spherical ablation area in less time and has less impact from the heat sink effect .

Conclusion

Teratoma, post pubertal type is characteristically chemotherapy and RT resistant and is treated surgically. In this case, MWA was a safe, minimally invasive therapeutic alternative for residual lung lesions, in the context of having had teratoma (post pubertal type) resected from multiple other sites. It appears effective as the patient has had no recurrence of teratoma in the treated areas at 30 months from treatment. It may be possible to use MWA for lesions in the liver too.

References

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Disclosure

No conflict on interest of any of the authors.

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