



Introduction

- Many liver tumors are conventionally treated with thermal ablation, chemoembolization and radiation therapy which may require invasive access, interrupt systemic therapies, or struggle with tumors in difficult anatomical locations³.
- Histotripsy has been developed as a minimally invasive technique to address these issues--using focused ultrasound-induced acoustic cavitation to destroy hepatic tumors³. It is an alternative for patients with complex tumors, anatomical challenges, and significant comorbidities².
- While the absence of puncture reduces hemorrhagic risk, histotripsy may activate coagulation and elevate thrombotic potential.
- This case highlights the anesthetic concerns for liver histotripsy performed in a remote setting with non-OR anesthesia (NORA) environment for in a medically complex patient.

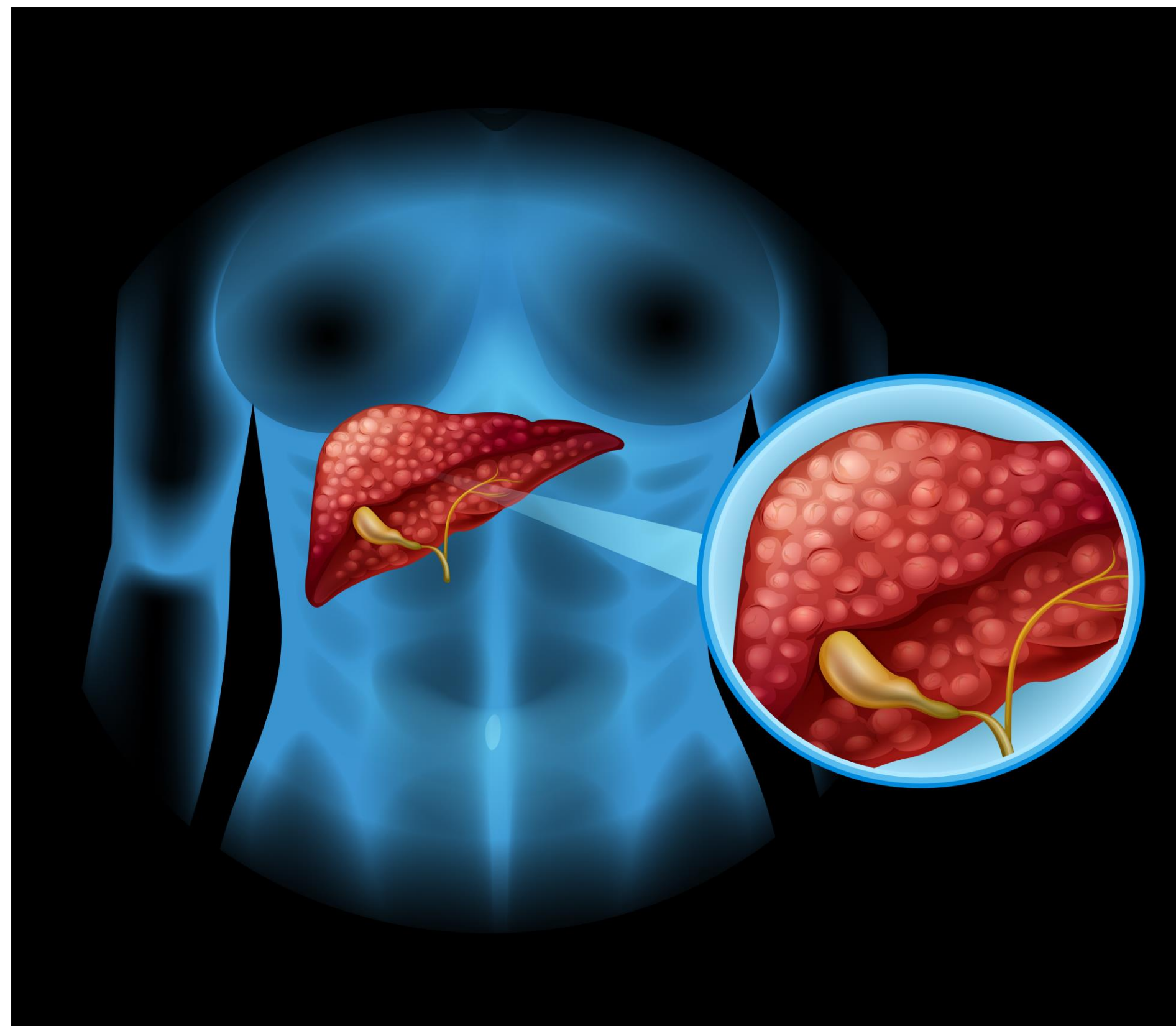


Figure 1: Graphic of liver cancer, Source: Freepik.com

Case Description

A 79-year-old man with **metastatic sigmoid colon adenocarcinoma to the liver** underwent a liver histotripsy in interventional radiology suite.

- Comorbidities: CAD with PCI and drug-eluting stents, severe COPD, hypertension, and type 2 diabetes.
- Home medications (daily): **Aspirin 81mg, clopidogrel 75mg, amlodipine 10mg, lisinopril 20mg, metoprolol succinate 100mg**, insulin and oral anti-glycemics, bronchodilators, inhaled corticosteroids, statin, PPI, and alprazolam PRN.
- Exercise tolerance adequate, and he was not oxygen-dependent.

General anesthesia was induced, and a double-lumen endotracheal tube was placed via direct laryngoscopy. The 4.5-hour procedure proceeded without intraoperative complications.

- Postoperatively, the patient developed a **hypertensive crisis with acute respiratory distress**.
- Pulmonary congestion on chest radiography.
- Management: IV antihypertensives, diuretics, and bronchodilators led to stabilization and oxygen weaning.

The patient was discharged the following day.

Discussion

The patient's complex cardiopulmonary history and anticoagulant use posed anesthetic challenges throughout the perioperative period.

- **Lung isolation with double lumen ETT for better liver lobe exposure:** This optimizes the **acoustic window**, prevented air from interfering with ultrasound.
- **Hemodynamic control:** Hemodynamic control was critical given the patient's cardiac, stroke risks, and anticoagulant use.
- **High risk in remote location:** The procedure occurred in a remote setting with non-OR anesthesia (NORA) with limited personnel and no on-site blood bank with major limitations on massive blood transfusion. If a major complication occurred during the procedure, a plan was in place for a transfer to a tertiary facility.

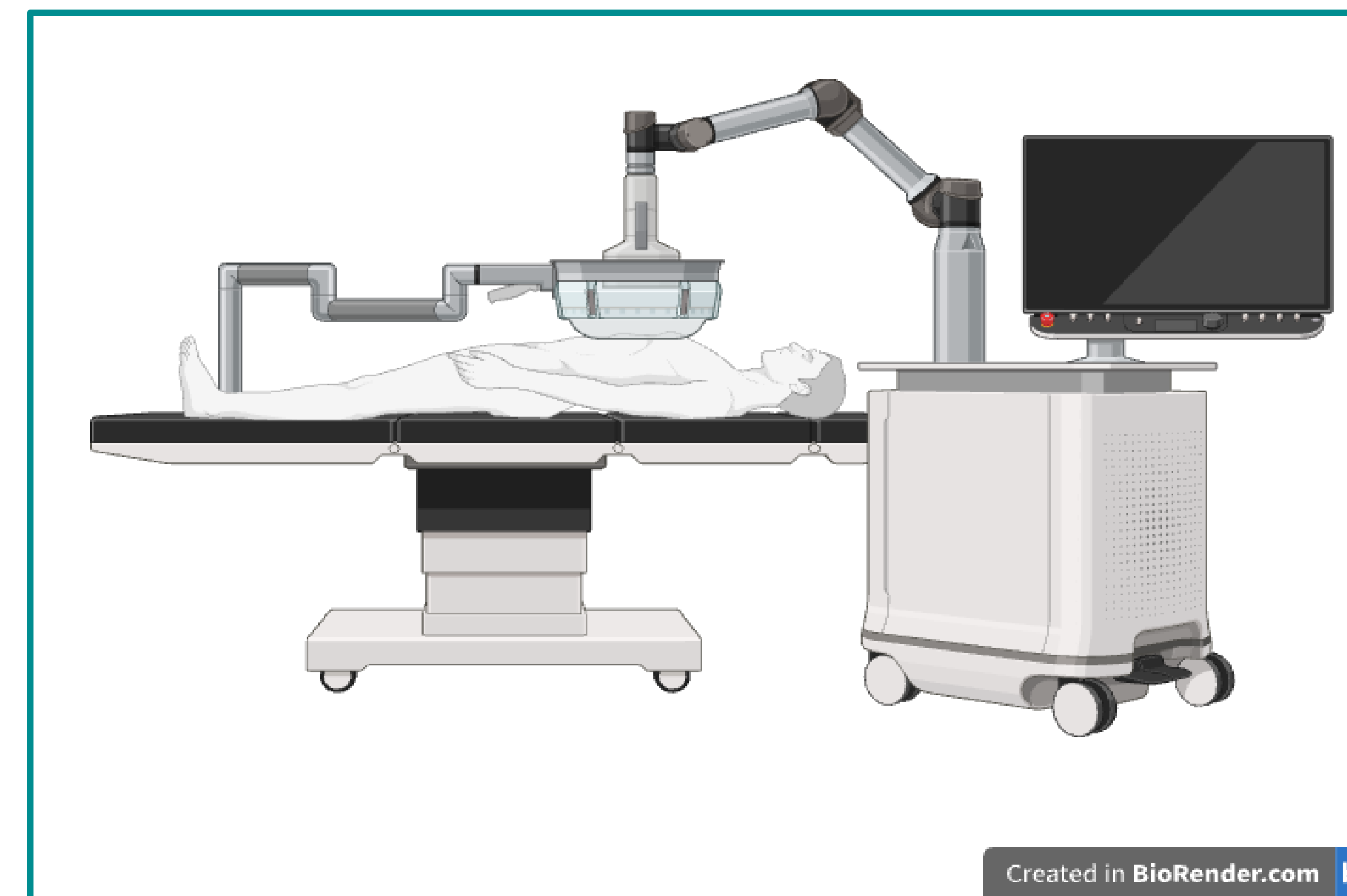


Figure 2: Model of histotripsy platform, Based on icons from BioRender.com

Conclusions

This case underscores the need for **proactive, tailored anesthetic planning** in high-risk patients undergoing novel procedures such as histotripsy, especially when performed in resource-limited, remote procedural locations.

- The combination of significant cardiopulmonary comorbidities, ongoing antiplatelet therapy, and the physiologic demands of one-lung ventilation required careful preoperative evaluation, vigilant intraoperative management, and rapid postoperative intervention.
- Because histotripsy is a novel modality with evolving procedural workflows, proactive planning and close communication among **anesthesia, interventional radiology, and perioperative support teams** were essential to maintaining patient safety and ensuring positive outcomes.

Literature Cited

1. Long, Y., Zeng, Q., He, X., Ye, H., Su, Y., Zheng, R., ... Li, K. (2020). One-lung ventilation for percutaneous thermal ablation of liver tumors in the hepatic dome. *International Journal of Hyperthermia*, 37(1), 49–54. <https://doi.org/10.1080/02656736.2019.1708483>
2. Uysal, M., Wehrle, C. J., Satish, S., Knott, E., Hong, H., Alkushi, E., Schlegel, A., Berber, E., Aucejo, F., Kim, J., & Kwon, D. C. H. (2025). Histotripsy of Liver Tumors: Patient Selection, Ethical Discussions, and How We Do It. *Cancers*, 17(7), 1100. <https://doi.org/10.3390/cancers17071100>
3. Xu, Z., Hall, T. L., Vlaisavljevich, E., & Lee, F. T., Jr (2021). Histotripsy: the first noninvasive, non-ionizing, non-thermal ablation technique based on ultrasound. *International journal of hyperthermia : the official journal of European Society for Hyperthermic Oncology, North American Hyperthermia Group*, 38(1), 561–575. <https://doi.org/10.1080/02656736.2021.1905189>