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Introduction to image-guided thermal ablations special issue

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Since the early '90s when radiofrequency ablation (RFA) was first reported for the treatment of liver tumors [1], the number of available technologies and clinical indications of percutaneous image-guided thermal treatments has largely expanded [2,3]. Nevertheless, many controversial topics still exist in several different clinical scenarios. Accordingly, the present special issue has been dedicated to the current most debated applications of percutaneous thermal treatments.

In particular, the issue opens with the manuscript by Tomasian and Jennings [4] who report on image-guided thermal treatments of bone tumors, which is considered a safe [5] minimally-invasive option to provide pain relief and effective local tumor control in selected patients [6–8].

Mauri et al. [9] discussed the application of laser and RFA for the treatment of benign and malignant thyroid diseases; this clinical scenario is one of the latest explored frontiers in image-guided thermal treatments [10,11]. Despite the relatively recent introduction of these treatments for thyroid tumors, thermal ablation is proposed as first-line treatment in selected patients presenting benign thyroid nodules or as an alternative to surgery in selected patients presenting with thyroid cancer.

Two papers focus on kidney cancer. Given the large incidence of small-sized kidney tumors (i.e. <4 cm, T1a) incidentally detected on cross-sectional imaging and the favorable reported data comparing surgery to thermal ablation for small-sized tumors [12], it is becoming widely accepted to propose thermal treatments for T1a tumors, especially in non-surgical candidates. In this perspective, Filippiadis et al. [13] highlight the crucial role of proper patients' selection and summarize the excellent results available for T1a tumors. On the other hand, much more controversy exists about tumors between 4 and 7 cm (i.e. T1b) [14,15]. Accordingly, Welch et al. focus their attention to this particular set-up in which the role of image-guided thermal treatments is not well defined and is largely debated [16].

Another large section of this special issue is dedicated to lung tumors. In particular, Deschamps et al. [17] discussed thermal treatments of lung metastases. Very high rates of local tumor control have been reported, especially when oligo-metastatic patients presenting with small metastases are treated [18]. Then, Palussière et al. describe image-guided thermal treatments in patients with primary lung tumors [19]. In fact, although still not applied on a large scale, it has been demonstrated that thermal ablation of T1a N0 non-small-cell lung cancer in patients ineligible for surgery provides high rates of long-term local tumor control [20]. Furthermore, these authors show that ablation may be offered to patients with oligoprogressive lung cancer disease as well as in cases recurring after radiotherapy. In the end, a combination of ablation and immunotherapy in patients with lung cancer is presented as a promising future application that needs further investigation.

Maiettini et al., in their paper, provide an overview of the possible application of image-guided thermal ablations in another controversial area of percutaneous treatments such as pancreatic cancer [21]. These authors underline how ablation is currently applied in patients with advanced pancreatic cancer who have exhausted other therapeutic options. They emphasize the potential role of these techniques in determining an immunomodulated response [22].

Putzer et al. discussed locoregional treatments in patients affected by melanoma oligometastatic disease [23]. Ablative therapies are also discussed in the neurologic field by Prada et al., who have focused their review on movement and psychiatric disorders, chronic pain, drug-resistant epilepsy, and brain tumors [24].

As clinical applications of image-guided ablations are expanding, it is of crucial importance to continue to innovate the available ablation technologies. In this perspective, Ben-David et al. [25], present a novel internally-cooled RFA electrode that uses RF pulsing technology to create large, reproducible, and spherical ablation zones.

In conclusion, in the present special issue, we have presented the most innovative and controversial scenarios regarding percutaneous image-guided thermal treatments. We hope that this issue may further stimulate researchers' interest in this fascinating field of modern medicine, and in this perspective, we strongly encourage submissions related to all the presented topics. In the end, we hope that the reading of the aforementioned papers written by the most eminent opinion-leaders in the field may be immediately useful for readers' daily practice.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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References

[1] Rossi S, Fornati F, Pathies C, et al. Thermal lesions induced by 480 KHz localized current field in guinea pig and pig liver. Tumori. 1990;76:54–57.
[2] Cazzato RL, Garnon J, Ramamurthy N, et al. Percutaneous image-guided cryoablation: current applications and results in the oncologic field. Med Oncol. 2016;33:140.
[3] Hinshaw JL, Lubner MG, Ziemlewicz TJ, et al. Percutaneous tumor ablation tools: microwave, radiofrequency, or cryoablation-what should you use and why? Radiographics. 2014;34:1344–1362.
[4] Tomasian A, Jennings JW. Percutaneous minimally invasive thermal ablation for management of osseous metastases: recent advances. Int J Hyperthermia. 2019;36:3–12.
[5] Auloge P, Cazzato RL, Rousseau C, et al. Complications of percutaneous bone tumor cryoablation: a 10-year experience. Radiology. 2019;291:521–528.
[6] Cazzato RL, Arrigoni F, Boatta E, et al. Percutaneous management of bone metastases: state of the art, interventional strategies and joint position statement of the Italian College of MSK Radiology (ICoMSKR) and the Italian College of Interventional Radiology (ICIR). Radiol Med. 2018;124:34–49.
[7] Cazzato RL, Auloge P, De Marini P, et al. Percutaneous image-guided ablation of bone metastases: local tumor control in oligometastatic patients. Int J Hyperthermia. 2019;35:493–499.
[8] Deschamps F, Farouil G, Ternes N, et al. Thermal ablation techniques: a curative treatment of bone metastases in selected patients? Eur Radiol. 2014;24:1971–1980.
[9] Mauri G, Gennaro N, Lee MK, et al. Laser and radiofrequency ablations for benign and malignant thyroid tumors. Int J Hyperthermia. 2019;36:13–20.
[10] Papini E, Pacella CM, Solbiati LA, et al. Minimally-invasive treatments for benign thyroid nodules: a Delphi-based consensus statement from the Italian minimally-invasive treatments of the thyroid (MITT) group. Int J Hyperthermia. 2019;36:376–382.
[11] Mauri G, Pacella CM, Papini E, et al. Image-guided thyroid ablation: proposal for standardization of terminology and reporting criteria. Thyroid. 2019;29:611–618.
[12] Thompson RH, Atwell T, Schmit G, et al. Comparison of partial nephrectomy and percutaneous ablation for cT1 renal masses. Eur Urol. 2015;67:252–259.
[13] Filippiadis D, Mauri G, Marra P, et al. Percutaneous ablation techniques for renal cell carcinoma: current status and future trends. Int J Hyperthermia. 2019;36:21–30.
[14] Atwell TD, Vlaminck JJ, Boorjian SA, et al. Percutaneous cryoablation of stage T1b renal cell carcinoma: technique considerations, safety, and local tumor control. JVIR. 2015;26:792–799.
[15] Hebbadj S, Cazzato RL, Garnon J, et al. Safety considerations and local tumor control following percutaneous image-guided cryoablation of T1b renal tumors. Cardiovasc Intervent Radiol. 2018;41: 449–458.
[16] Welch BT, Shah PH, Thompson RH, et al. The current status of thermal ablation in the management of T1b renal masses. Int J Hyperthermia. 2019;36:31–36.
[17] Prud'homme C, Deschamps F, Moulin B, et al. Image-guided lung metastasis ablation: a literature review. Int J Hyperthermia. 2019; 36:37–45.
[18] de Baère T, Aupérin A, Deschamps F, et al. Radiofrequency ablation is a valid treatment option for lung metastases: experience in 566 patients with 1037 metastases. Ann Oncol. 2015;26: 987–991.
[19] Palussière J, Catena V, Lagarde P, et al. Primary tumors of the lung: should we consider thermal ablation as a valid therapeutic option? Int J Hyperthermia. 2019;36:46–52.
[20] Palussiere J, Lagarde P, Aupérin A, et al. Percutaneous lung thermal ablation of non-surgical clinical N0 non-small cell lung cancer: results of eight years' experience in 87 patients from two centers. Cardiovasc Intervent Radiol. 2015;38:160–166.
[21] Maiettini D, Mauri G, Varano G, et al. Pancreatic ablation: minimally-invasive treatment options. Int J Hyperthermia. 2019;36: 53–58.
[22] Mauri G, Nicosia L, Xu Z, et al. Focused ultrasound: tumour ablation and its potential to enhance immunological therapy to cancer. Br J Radiol. 2018;91:20170641.
[23] Putzer D, Schullian P, Bale R. Locoregional ablative treatment of melanoma metastases. Int J Hyperthermia. 2019;36:59–63.
[24] Franzini A, Moosa S, Servello D, et al. Ablative brain surgery: an overview. Int J Hyperthermia. 2019;36:64–80.
[25] Ben-David E, Nissenbaum I, Gourevitch S, et al. Optimization and characterization of a novel internally-cooled radiofrequency ablation system with optimized pulsing algorithm in an ex-vivo bovine liver. Int J Hyperthermia. 2019;36:81–88.