

MICROWAVE VERSUS RADIOFREQUENCY ABLATION TREATMENT FOR HEPATOCELLULAR CARCINOMA

[Spanish full text](#)

Introduction: Liver cancer is one of leading causes of death world-wide. Indeed, ranked by frequency, it is the fifth leading cause diagnosed in men and the ninth in women. Although treatment is initially by surgical resection, this can not be performed on all patients. In recent years, therefore, new techniques have been developed for those patients among whom resection is contraindicated, and these include radiofrequency ablation (RFA) and microwave ablation (MWA) among others.

Objectives. To assess the efficacy/effectiveness and safety of MWA versus RFA in the treatment of primary and secondary liver tumours.

Methods. We conducted a review by conducting an exhaustive search of the scientific literature until November 2016, stipulating no time limit and covering the following computerised biomedical databases:

- specialised systematic-review databases, such as Health Technology Assessment (HTA), Database of Abstracts of Reviews of Effectiveness (DARE), National Health Service Economic Evaluation Database (NHS EED) and the Cochrane Plus Library; and,
- general databases such as Medline, Embase and ISI.

Results and discussion. The literature search retrieved a total of 1107 references. After perusal of the abstracts, 48 papers were selected for assessment of the full text. Finally, 8 studies were included that fulfilled the pre-established inclusion criteria (3 systematic reviews and 5 observational studies).

- Efficacy/effectiveness. Both the systematic reviews and the studies that updated them agreed that MWA had a slight advantage over RFA in complete tumour ablation, though this did not reach statistical significance, with odds ratios (ORs) of 1.12 (95% CI: 0.67–1.88; $p=0.67$) and 0.98 ($p=0.82$). In areas adjacent to vascular and peribiliary structures, one study reported similar ablation rates for MWA and RFA in metastasis of colorectal cancer. In terms of local recurrence, the same trend was observed, with similar results for both techniques in tumours <2 cm (OR: 1.01; 95% CI: 0.53-1.87; $p=0.98$). However, better results were observed for MWA in the case of: tumours >2 cm (OR: 0.46 (95% CI: 0.24-0.89; $p=0.002$; OR: 0.36 95% CI: 0.22-0.58; $p<0.001$) in both hepatocellular carcinoma and hepatic metastases; and tumours of over 5 cm or various tumours of under 3 cm (OR: 0.36 95% CI:0.22-0.58; $p<0.001$).
- Results for overall survival were similar for the two techniques, with studies that favoured both MWA and RFA. Two reviews reported that survival at 3 and 5 years of follow-up was higher with RFA than with MWA. When analyses by subgroup were performed, however, survival was only significant for hepatocarcinoma at 5 years (OR: 0.60; 95% CI: 0.39-0.94; $p=0.03$). According to some studies, MWA appeared to be better in tumours >3 ($p=0.02$). In another study, overall survival at 5 years was around 50% for RFA and ranged from 37% to 73.1% for MWA.

- Safety. One systematic review specifically assessed the complications associated with MWA as compared to those associated with RFA. Despite the heterogeneity of the studies included, devices used and tumour sizes, similar results were reported in terms of mortality rates, and high and low complication rates for both techniques (mortality of 0.15% for RFA and 0.23% for MWA, with similar complication rates, i.e., 4.1% versus 4.6% respectively). The updated studies generally agreed on that fact both ablation techniques displayed similar safety profiles. One of the studies specifically analysed MWA and RFA treatment in the case of metastases in proximity to large vessels and/or major bile ducts, and indicated that, in peribiliary-site lesions, the treatment of choice would be RFA, inasmuch as it gave rise to fewer complications than did MWA.

Conclusions and recommendations

Available evidence on the effectiveness and safety of MWA versus RFA in the treatment of hepatocarcinoma and hepatic metastases is limited, and is essentially based on observational studies of low methodological quality and a high degree of heterogeneity, which means that their results should be approached with caution.

On the basis of these studies, the effectiveness of MWA is observed to be similar to that of RFA in terms of complete ablation, as well as survival and disease-free time, with results that favour both techniques. Local tumour recurrence seems to be slightly less following the intervention with MWA versus RFA, and better in hepatic metastases.

In general, in larger-sized tumours of more than 3 cm and less than 6 cm, MWA would seem to be more effective than RFA.

Both MWA and RFA are interventions with comparable safety-result profiles and similar high and low complication rates and side-effect rates. Likewise, mortality rates do not differ between the two techniques. In peribiliary-site lesions, however, the results favour RFA, with more complications being observed among patients treated with MWA.

Cost-effectiveness studies that assessed MWA versus RFA were not identify.

Patients eligible for ablation treatment must be rigorously selected on the basis of their clinical status. Ablation in high-risk patients is inadvisable.

Local ablation could be considered a treatment option for patients who are in the early stages, have small-sized lesions, and are not candidates for surgery that might require a complex surgical intervention.

In patients fitted with pacemakers and/or other electronic implants, special care must be exercised, since their use is contraindicated due to the overheating of such devices by the thermal energy released in the case of MWA and the need for an earth wire in the case of RFA. In this regard, pacemakers should, where possible, be previously deactivated under the supervision and control of a Department of Cardiology or ICU.

There is a need for methodologically well-designed controlled randomised clinical trials with homogeneous comparative groups, to ensure that variables are comparable, internal validity is enhanced, and effectiveness and safety results can be extrapolated to clinical practice with an optimal degree of reliability.

