

Comparing surgical resection (SR), microwave ablation (MWA), and radiofrequency ablation (RFA). How do the overall survival rates differ in patients diagnosed with early-stage hepatocellular carcinoma (a single tumour 5cm or smaller or up to three nodules 3cm or smaller)

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# Hepatocellular Carcinoma in Australia Snapshot



## 6th most common cause of cancer globally and fourth most common cause of cancer death.

Incidence increased from 2.1 persons per 100 000 in 1982 to 8.8 per 100 000 in 2018.

### Background

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Hepatocellular carcinoma (HCC) poses a significant health issue in Australia, responsible for 5% of all cancer deaths in 2022. Various treatment modalities such as surgical resection, liver transplantation, and locoregional therapies are available, yet the five-year survival rate has stagnated at 22% since 2018.

#### **Methods** Identification of studies via databases and registers In our study, we aimed to compare the 1-, 3-, and 5-year overall survival rates of early-stage HCC patients undergoing surgical resection, microwave ablation, or radiofrequency ablation. Drawing from databases like the Cochrane Library, Queensland Clinical Knowledge Network, and PubMed, we prioritized randomized controlled trials from 2014 onwards. The rigorous selection and quality assessment were collaboratively performed by our team, focusing on adults diagnosed under the BCLC staging system. Our synthesis combined qualitative summaries with quantitative meta-analyses, ensuring comprehensive insights into the efficacy of these treatments Studies identified from: Studies removed before screening: Inclusion Criteria: Databases (n = 32) • Duplicate studies removed (n = 2) • Adults (≥18 years) with early-stage HCC (Barcelona Clinic Liver Cancer • Studies removed for other (BCLC) staging system). • MWA and RFA by specialist interventional radiologists reasons (n = 1)• SR by trained surgeons. • Randomised controlled trials (2014 onwards). • Outcomes: OS rate at 1-, 3-, and 5-years Studies after the removal of **Exclusion Criteria:** duplicates (n = 28) • Studies containing other types of liver cancers (e.g., cholangiocarcinoma). • Non-original research, reviews, editorials, or non-English articles. • Studies including inappropriate treatments such as chemotherapy or immunotherapy. Studies excluded Studies screened ( n = 3) (n = 28) Full-text articles assessed Reports excluded: for eligibility (n = 25)



# **EVALUATION, IMPLICATIONS AND RECOMMENDATIONS**

## **Evaluation**

The meta-analyses reveal that MWA, RFA, and SR have comparable survival outcomes over 1, 3, and 5-year intervals, underlining the effectiveness of each modality without establishing the dominance of one over the others.

Survival outcomes remains a cornerstone, but an evaluation of complication rates, which showed 3.1% for MWA, 4.2% for RFA, and a pronounced 33.3% for SR, is equally significant. This contrast insinuates the more invasive nature of SR in comparison to the less invasive procedures of MWA and RFA, thereby prompting a nuanced consideration of the risk-benefit spectrum in therapeutic decisions.

A crucial facet of understanding the robustness of these meta-analyses is appraising the heterogeneity of the encompassed studies. A pronounced I2 value in this context (around 97.6%) points towards substantial variability across the studies, potentially stemming from disparities in methodologies, tient demographics, or treatment guidelines among the investigated studies. Moreover, the distinction between RFA and SR, with a p-value of 0.0457, is worth highlighting. In medical inquiry, such a p-value gnifies a statistically relevant divergence between these two modalities in terms of survival rates. Yet, the tangible clinical implications of this observation warrant deeper exploration.

Potential biases, limitations of the analysed studies, and other influencing factors should be meticulously considered in subsequent investigations to cement these findings' applicability and significance.

## **Implications for Clinical Practice**

In the Australian healthcare landscape, Microwave Ablation (MWA) emerges as an effective and less invasive treatment option, especially pivotal for regional and remote centres to minimise patient travel to tertiary facilities. Its efficacy hinges on enhancing accessibility and continuous training with up-to-date technology.

Concurrently, Radiofrequency Ablation (RFA), anchored in its longstanding credibility, necessitates ongoing refinement aligned with global standards and a keen eye on its cost-effectiveness within Australia's health system.

Surgical Resection (SR), while potent, demands judicious patient selection and a multidisciplinary approach. The emphasis on fostering skills and leveraging telemedicine, especially for pre and post-operative stages, accentuates its comprehensive potential, particularly for patients in more remote locations.

MWA 📀	RFA	SR
<ul> <li>Presents an innovative and minimally invasive technique for managing specific medical conditions.</li> <li>Holds significant promise for outreach in regional and remote sectors of Australia.</li> <li>Diminishes the necessity for patient transfers to major healthcare facilities.</li> <li>Prioritises enhancing medical service distribution throughout the country.</li> </ul>	<ul> <li>Enhanced RFA recovery protocols may expedite patient turnover and hospital resource optimisation.</li> <li>The ascending prevalence of RFA might necessitate a reorientation of procedural training paradigms.</li> <li>RFA's cost-efficacy could instigate reconsideration of healthcare fiscal distributions in favour of non-invasive techniques.</li> </ul>	<ul> <li>Rigorous patient selection criteria for SR could enhance outcomes and operational efficiency.</li> <li>Multidisciplinary team-based approaches are pivotal in providing holistic care for SR recipients.</li> <li>Integration of telehealth consultations in SR care pathways could bridge accessibility gaps for geographically isolated patients</li> </ul>

## **Summary of Recommendations**

Adopt Microwave Ablation (MWA) as a prioritised treatment option for patients who may not be ideal candidates for surgery, leveraging its minimally invasive nature.

- Facilitate accessibility to MWA in regional and remote Australian centres, aiming to minimise patient travel to tertiary healthcare facilities.
- Prioritise investment in regular training and maintenance of up-to-date equipment, ensuring the consistent and effective application of both MWA and RFA techniques.
- Continuously refine Radiofrequency Ablation (RFA) procedures, ensuring alignment with international best practices, enhancing its efficacy and patient outcomes.
- Evaluate the cost-effectiveness of RFA in the Australian health system context, ensuring its sustainable delivery and value proposition.
- Emphasise the multidisciplinary approach for Surgical Resection (SR), ensuring optimal outcomes, especially for complex hepatocellular carcinoma cases.