Ablation of lung tumours

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Abstract

Radiofrequency, laser, microwave and cryotherapy have all been used for the ablation of lung tumours. However, radiofrequency ablation (RFA) and microwave ablation are the most widely used technologies. RFA has been successfully applied to tumour measuring from 3 to 3.5 cm, either primary or secondary. Lung function usually recovers to pre-ablation values following an initial reduction and the complication profile is well understood.

Keywords: Radiofrequency ablation; colorectal metastasis; sarcoma; primary lung cancer.

Colorectal metastases

Results from metastasectomy suggest a survival advantage but there are many patients with small volume but inoperable disease, bilateral disease or patients with both liver and lung metastases. As a result, colorectal metastases form the largest single cohort of patients undergoing ablation. We have treated 488 metastases in 151 patients with inoperable disease and achieved a median survival of 41 months and 3-year survival rate of 57% in those treated with curative intent. Results from other centres are not dissimilar. Median survival of 33 months and 1-year, 2-year and 3-year survival rates of 85%, 64% and 46%, respectively, have been reported in one cohort of 55 patients with inoperable colorectal metastases and Yamakado et al. reported a 3-year survival rate of 47% in a multicentre trial of 71 patients.

Sarcoma

There is good evidence that repeated resection is beneficial. The reported 3-year survival rate is between 30% and 54%, and the 5-year survival rate is 15–40%, with median survival of 12–18 months. Ablation can be used in inoperable patients with small volume lung only disease but also in operable patients for whom surgery would be inappropriate, too invasive or would interrupt other therapy.

Nakamura et al. reported on 20 patients who underwent ablation with a mean of 7 metastases, mean size 1.4 cm. The 1- and 3-year survival rates were 58% and 29% overall and median survival was 12.9 months, but for the subgroup who had complete ablation of all visible disease the 1- and 3-year survival rates were 89% and 59%. Our results of ablation of 121 sarcoma metastases in 48 patients using either radiofrequency or microwaves also reflect therapeutic intent. Of 30 patients treated with curative intent, 25 are alive at a median of 20 months.

Primary lung cancer

Primary lung cancer patients are much more challenging. They often carry significant medical co-morbidity, which makes ablation harder. Limited respiratory reserve and repeated infective exacerbations of underlying chronic obstructive pulmonary disease turn ablation from a very benign intervention into a more significant intervention.

Ablation has delivered reasonable survival data in early stage lung cancer. Hiraki et al. reported on 20 non-surgical patients with stage 1 non-small cell lung cancer and showed that the cancer-specific survival at 2 years was 93% and 83% at 3 years. Pennathur et al. reported on 100 patients with significant medical co-morbidities treated with ablation; a 2-year survival rate of 49% was achieved.

Ablation can be used in isolation or in conjunction with radiotherapy. It is expected that the combination will be more effective than either treatment alone. The rates of 1-, 2- and 3-year survival in 41 patients with inoperable stage I/II lung cancer treated with RFA
and radiotherapy were 87%, 70% and 57%, with a mean survival for tumours <3 cm of 44 months\cite{6}.

The role of ablation relative to conventional treatment modalities is being established but much more work is required. A retrospective comparison of sublobar resection, RFA and cryotherapy showed similar 3-year cancer specific survival rates in all 3 groups\cite{7}. Kim et al.\cite{8} compared matched patients with stage I lung cancer who underwent RFA \((n = 8)\) and surgery \((n = 14)\) and found no difference in overall survival.

## Conclusion

Ablation is a very effective tool for the local control of small volume lung tumours. There are many patients for whom conventional therapy is not applicable, but who are suitable for ablation treatment.

## References

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