Concomitant Electromagnetic Navigation Transbronchial Microwave Ablation of Multiple Lung Nodules is Safe

Background
Transbronchial microwave ablation of lung nodules using electromagnetic navigation bronchoscopy (ENB) is an emerging local therapy for lung oligometastases and early lung cancers in unfit patients. In particular, it is useful for the management of multifocal lung cancers as part of lung preserving strategy, as this population has become increasingly prevalent. Concomitant ablation of multiple lung nodules in a single operating session is postulated to provide a one-stop solution for this subgroup of patients.

Methods
Out of 72 patients who underwent ENB microwave ablation in hybrid operating room from April 2020 to October 2022, 18 patients had two or more lung nodules ablated in the same operating session. Nodules were proven or highly suspicious of malignancies or metastases. Feasibility and safety of concomitant ablation were retrospectively reviewed.

Results
A total of 42 nodules in 18 patients (5 males and 13 females) underwent concomitant multi-nodular ablation, with a mean age of 63. Reasons for lung preserving strategy were multifocal lung cancer (83.3%) and lung oligometastases (16.7%). Among those with multifocal disease, 86.7% had previous major lung resection for lung cancer. Majority of patients had ablation to two lung nodules, while 2 had ablation to three nodules and another 2 had ablation to 4 lung nodules. 9 patients had ablation to lesions resided in the same lobe, 7 in different lobes on the same side, and 2 on both sides of lung. Mean nodule size is 9.9mm (range 5-20mm). Mean minimal margin was 5.9mm, while 24 nodules (57.1%) required double ablation to ensure good coverage. Patients undergoing concomitant ablation as opposed to separate sessions benefit from fewer general anesthesia risks, and the approximated time saved for intubation, ENB registration and verification is 30 minutes per patient. The average operating time was 196 minutes for double nodule ablation, while that for single nodule ablation was 126 minutes in our historical cohort. There were no major complications despite overlapping ablation zones and mean hospital stay was 1.19 days. Only 1 patient who had triple nodule ablation developed post-ablation reaction.

Conclusions
Concomitant transbronchial microwave ablation of multiple lung nodules is feasible and safe without increased complication rate. It is an important armamentarium in the contemporary lung preserving strategy for battling multifocal lung cancer or lung oligometastases.

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