

Lung radiofrequency ablation

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Lung RFA

- Animal feasibility studies since mid 90ies
 - 4 studies with animal lung tumor models
 - Goldberg et al, VX2 tumor nodules in rabbit lung, 1996
 - Miao et al, VX2 tumor nodules in rabbit lung, 2001
 - Lee et al, VX2 tumor nodules in rabbit lung, 2003
 - Ahrar et al, cTVT in dog lung, 2003
 - (Nomori et al, „gelatine tumors“ in swine, 2005)
- Patient lung ablations performed since 1999
 - No randomized, controlled studies so far
 - Several prospective studies

Lung RFA studies

Author	Lung Tumor	Lesion No	RFA device	Follow-up	Year of public.	Level of evid
Steinke et al.	Prim+mets	493	expandable	N/A	2004	II-2
Bojarski et al	Prim + mets	32	Intern cooled	10.1m (1-30m)	2005	II-2
Kang et al	Prim+mets	120	expandable	2w! CT+PET	2004	II-2
Fernando et al	NSCLC	21	expandable	14m	2005	II-2
Rossi et al	prim+mets	36	expandable	11,4+/- 7.7m	2006	II-2

Lung RFA studies

- Steinke et al., Pulmonary RFA – An International Study Survey. Anticancer Res. 2004
 - 7 centers, 500 procedures, mainly expandable probes, gen. anesth (40%) vs. analgosed. (60%), ablations in proximity to heart + hilar structures
 - 2 deaths, 30% pneumothorax, < 10% pleural effusion with tapping
 - Inclusion criteria, size, follow-up, recurrence not considered

Lung RFA studies

- Kang et al. Single group study to evaluate the feasibility and complications of radiofrequency ablation and usefulness of post treatment position emission tomography in lung tumours. World J Surg Oncol. 2004
 - 50 patients, 120 lesions (23 NSCLC, 97 mets), max 4 lesions (6 target areas) gen. anesth., expandable probe
 - 18% pneumothorax
 - CT **1 week** post RFA → 38% tumor destruction
 - PET **1-2 weeks** post RFA → 70% tumor destruction:
 - <3.5 cm CR
 - >3.5 cm PR

Lung RFA studies

- Bojarski et al. CT Imaging Findings of Pulmonary Neoplasms After Treatment with Radiofrequency Ablation: Results in 32 Tumors. AJR 2005

26 patients, 32 lesions (14 NSCLC, 18 mets)

mean size 3.1 cm (1-7cm), avg number 1.2, internally cooled needle (12 lesions with cluster), mean treatment time 5.7 min (1-12 min)

15 lesions f/u at 12m compared to baseline:

13% <, 27%=, 60%>

4 lesions with f/u at 24m: 100% larger than on prior CT

Lung RFA studies

- Rossi et al. : Percut. CT-guided RFTA of small unresectable lung tumors. Eur Respir J 2006

31 patients, 15 NSCLC, 16 CRC lung mets, 36 lesions
22+/-8mm, expandable electrode, gen. anest/consc.
sedation, CT follow-up

mean f/u 11.4+/- 7.7m:

overall recurrence rate 13.9% (20% NSCLC, 9.5% CRC mets)

19/31 alive, 15/31 disease free

Lung RFA studies

- Fernando et al. Radiofrequency ablation for the treatment of non-small cell lung cancer in marginal surgical candidates. J Thorac Cardiovasc Surg 2005
 - 18 patients, 21 tumors (NSCLC), 2,8cm (1.2-4.5cm)
 - 2 open procedures (1 periop. death), 16 CT-guided, expandable device
 - General anesth., CT + PET 4-6w p.i, then 3-monthly
 - F/u 14m (3-25m); progression in 8/21 nodules (38.1%)
6/18 patients (33%)
- RFA favored over radiation therapy, stereotactic radiosurgery as future option

Conclusion/gaps/recommendations

- No controlled, randomized studies to date (eg RFA vs. external beam radiation), patients under concomitant therapies
- No standardized inclusion criteria
ablation algorithms
follow-up (time, imaging modality, response evaluation)
- Several too optimistic results (Gadaleta et al, 2004, 92% complete response), hasty conclusions
(Palliation/pain control addressed only in case reports)