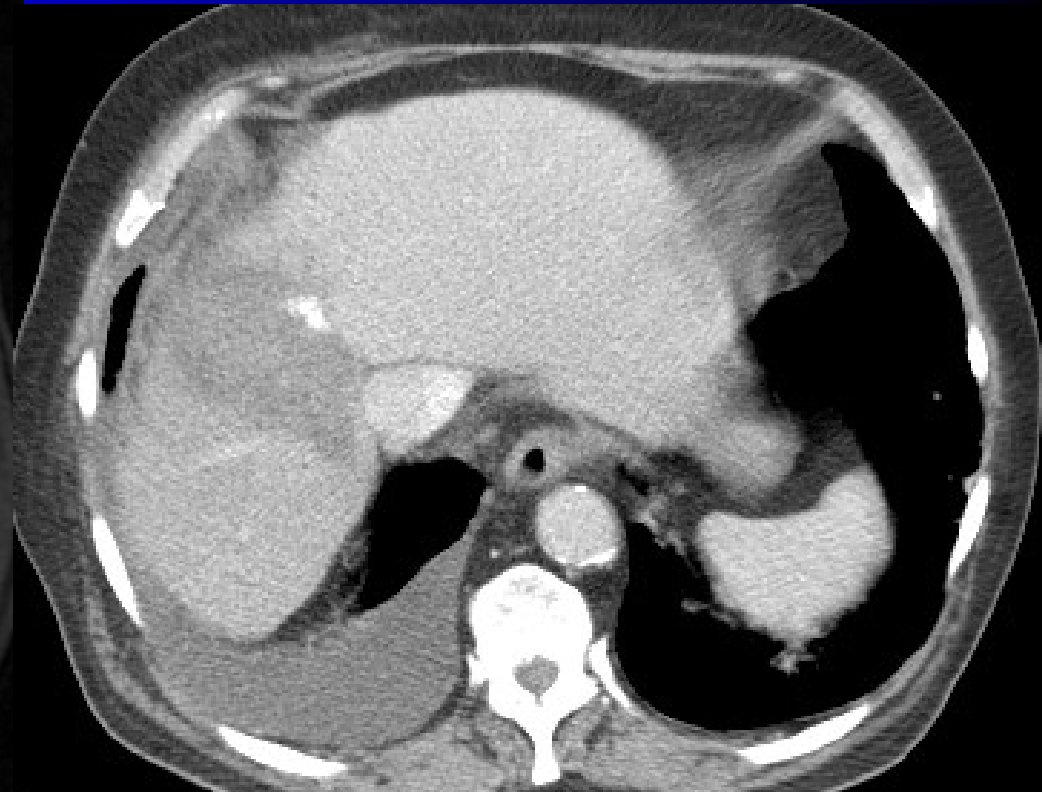


Mikrowellenablation

Study Dat
Study T

Tumore



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Krankenhaus Nordwest, Frankfurt am Main

Hitzeablation

Koagulationsnekrose

50-55° C, 4-6 Min → Zellschaden

60-100° C → sofortige Nekrose

> 100° C → Vaporisation &
Karbonisation

Ziel: Nekrose 2 cm größer als Tu

Radiofrequenzablation

am häufigsten eingesetzt

Wechselstrom → Ionenbewegung

→ Reibung → thermischer Schaden

Sonden bis 5 cm, 200-250 W

Steuerung über Impedanz, Hitze

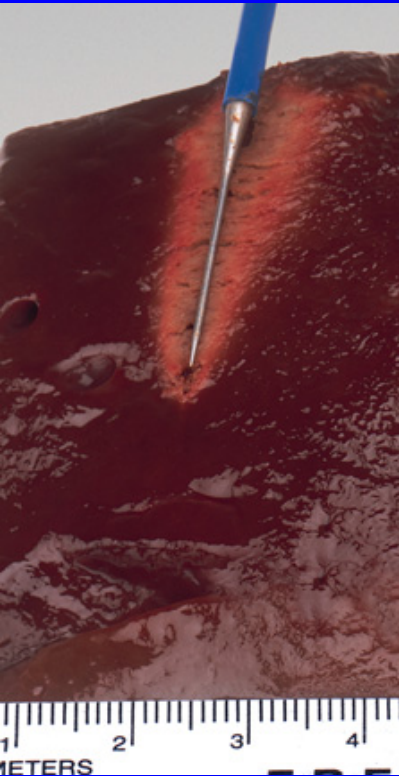
monopolar → Neutralelektroden

bipolar; NaCl Spülung, Switch

RFA Generatoren



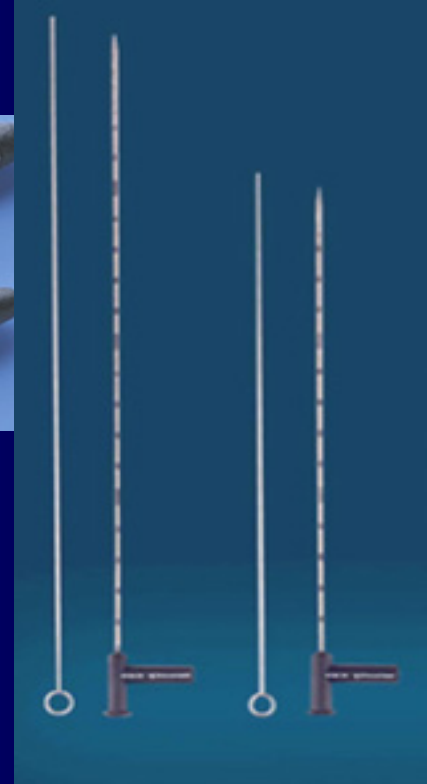
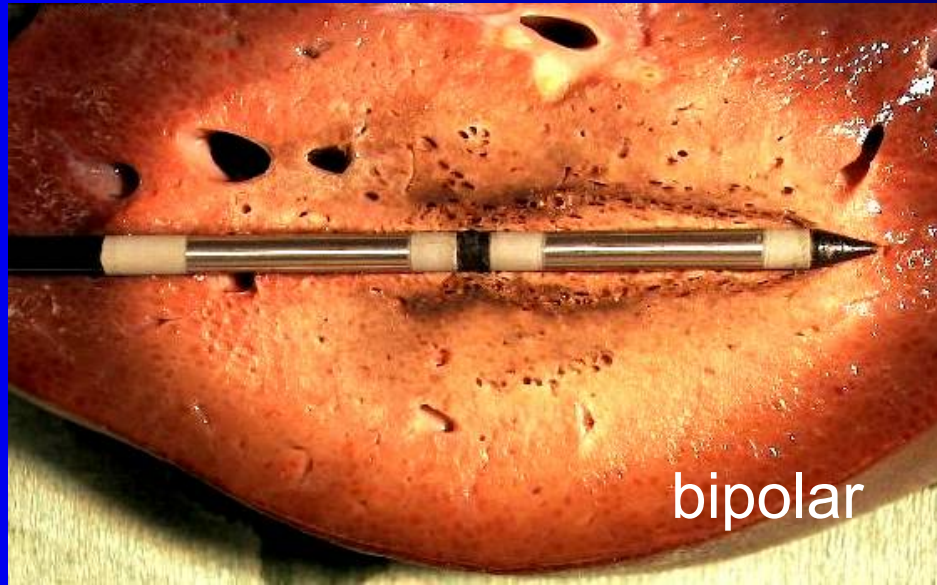
RFA Elektroden



Nadelelektroden



14 – 17 G

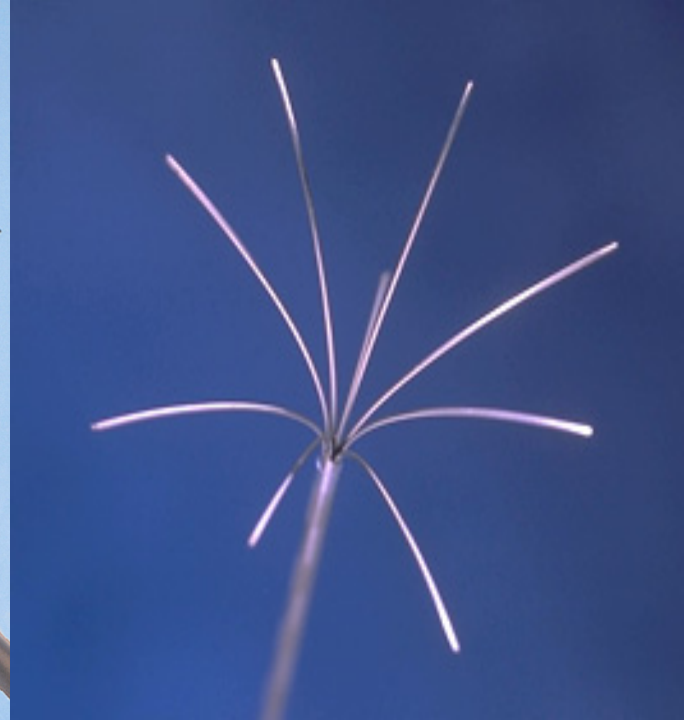
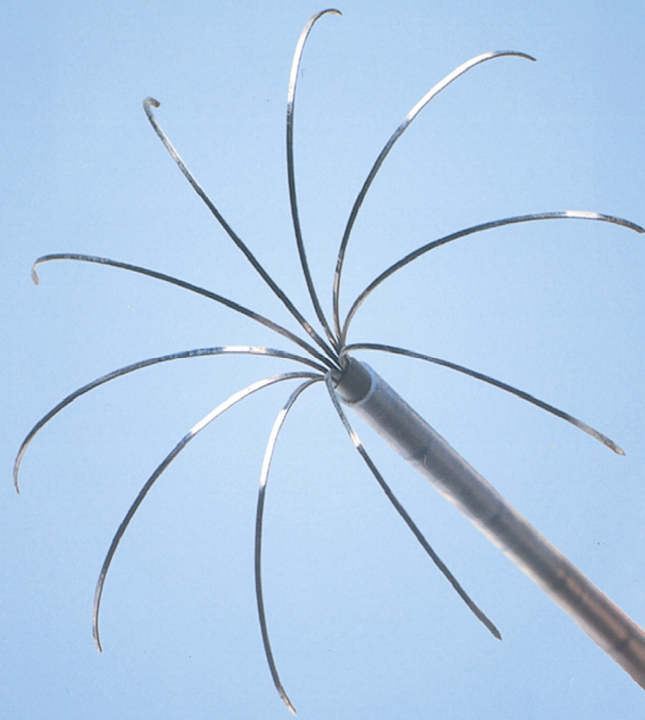
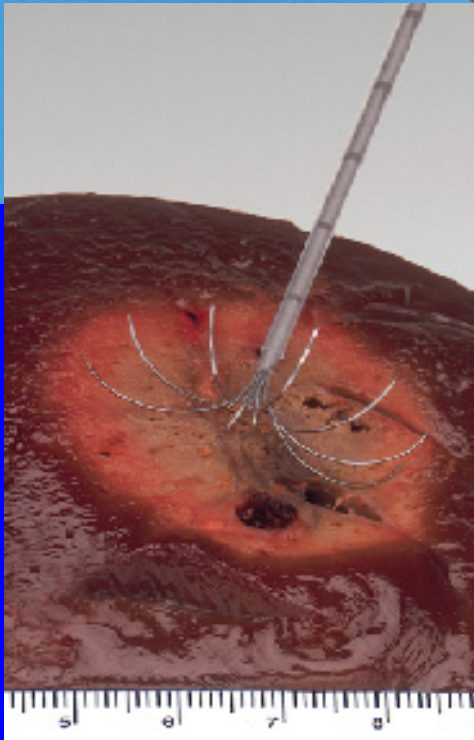


RFA Elektroden

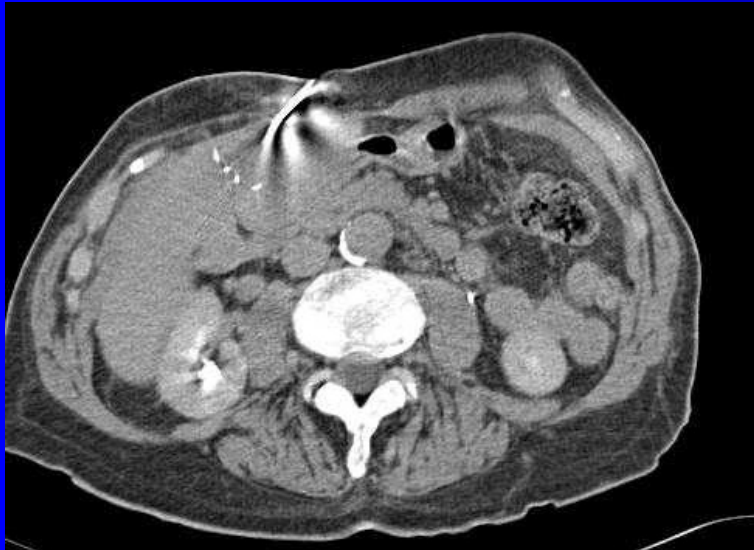
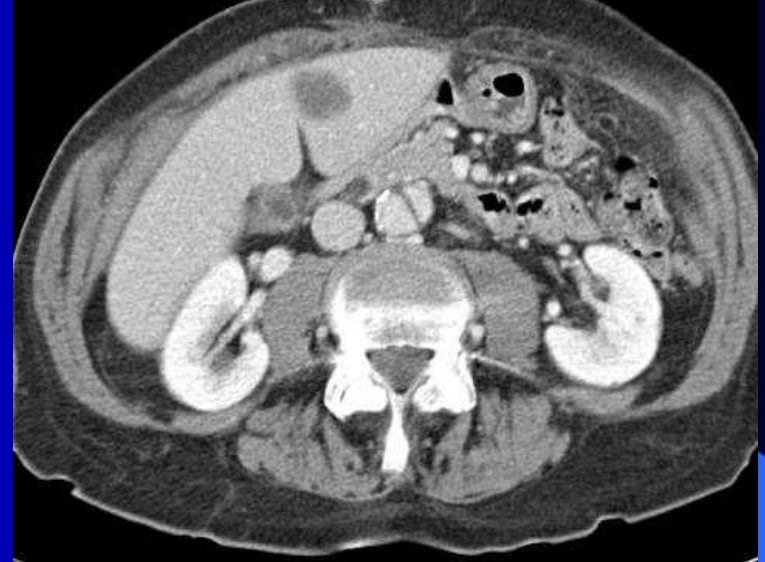
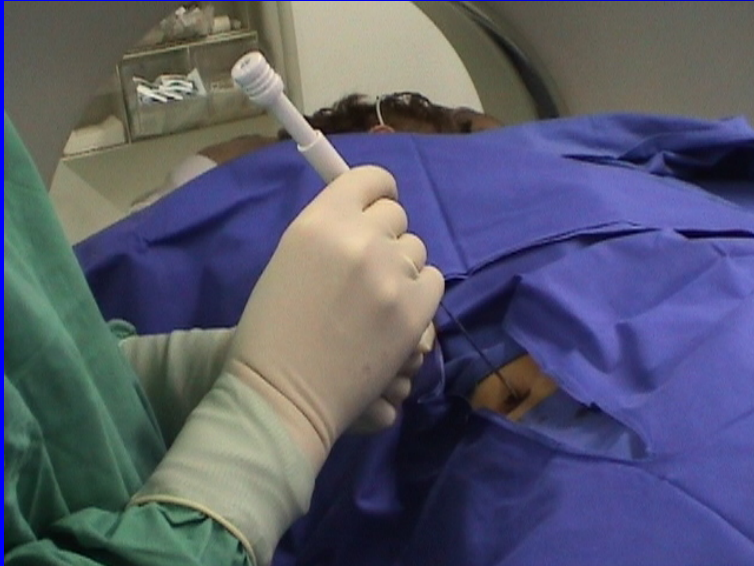
Cluster-/Schirm

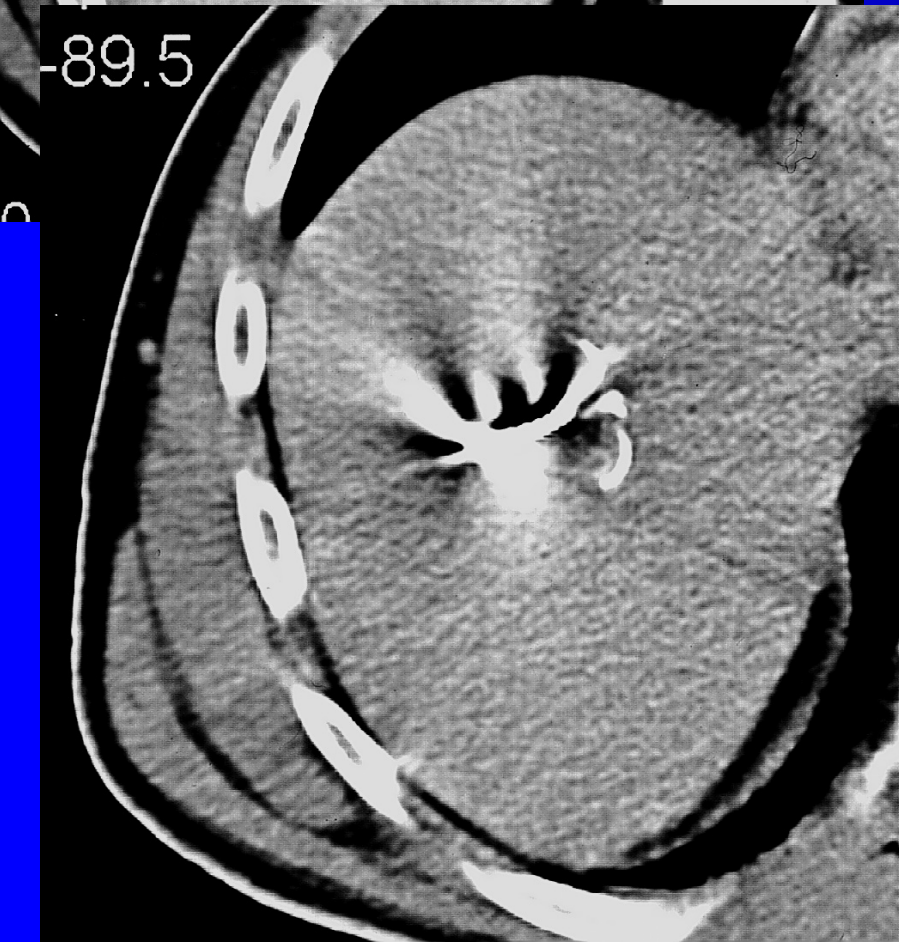
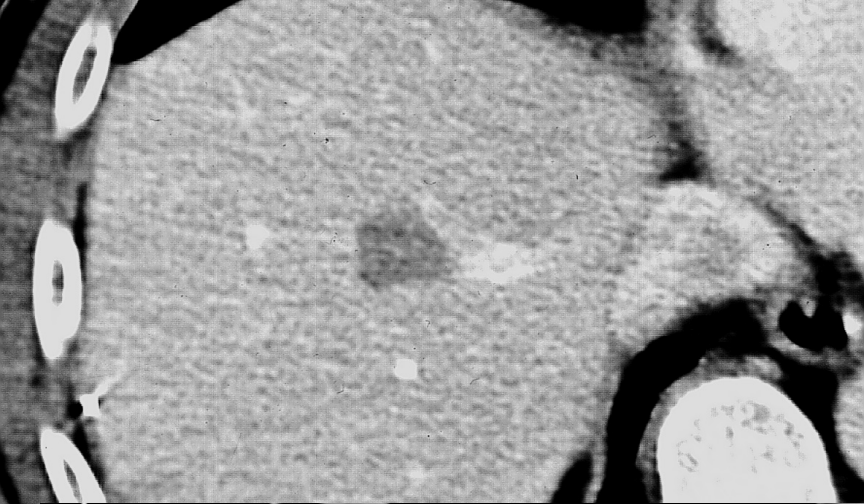
14 – 17 G

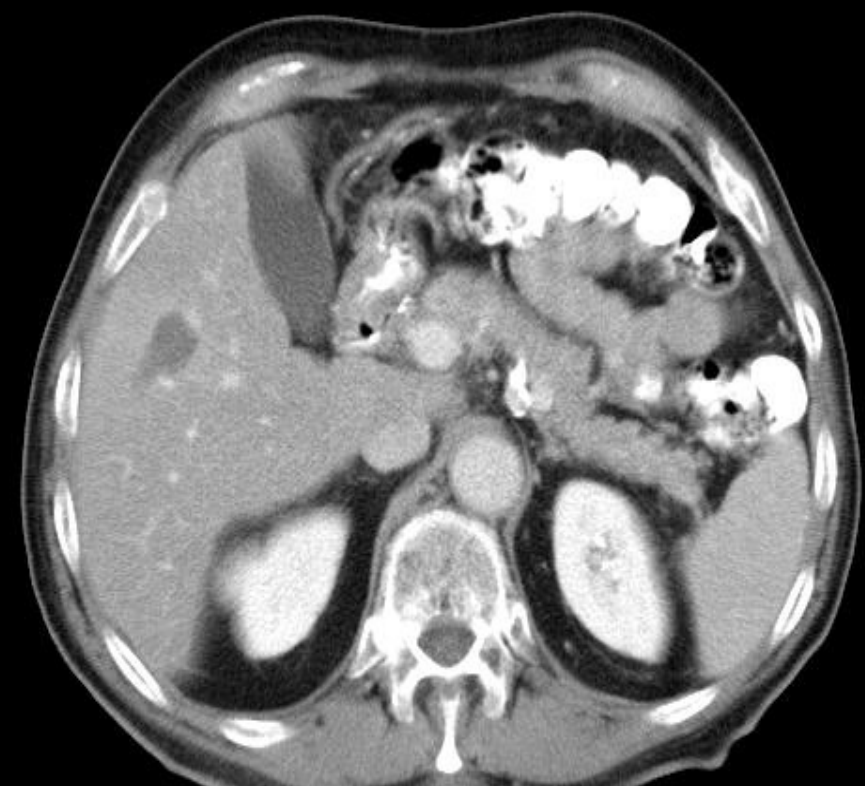
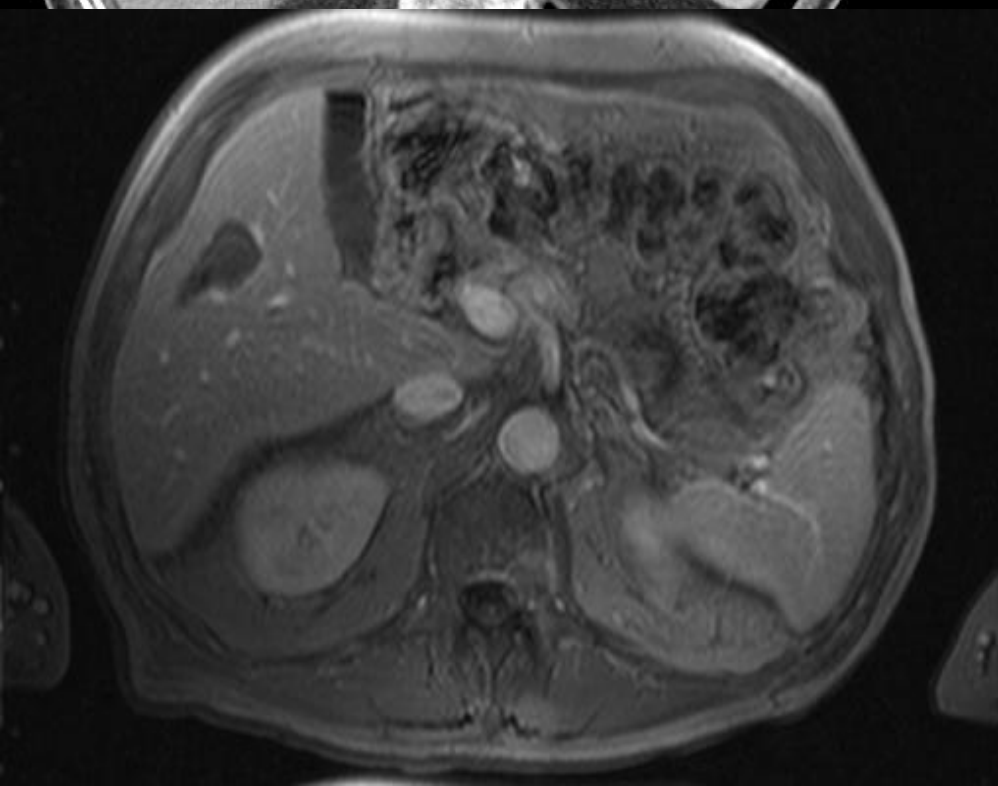
(cooled)



RFA: CT-gesteuert







Radiofrequenzablation

Pros: Etabliert, Erfahrung, Literatur
Erfolg abschätzbar, **Board**
> 1 System, Kosten

Cons: Zeit (!), Analgesie, kl. Läsion
Ablation x Zeit, Hitze passiv
heat sink Effekt, Verbrennung
inkomplette Ablation

Mikrowellenablation

Elektromagnetische Energie

Frequenzen 900 MHz - 10 GHz

Wassermoleküle rotieren

Bewegungsenergie → Hitze

aktiv, gleichförmig, konstant

Temp. intratumoral ↑, schnell

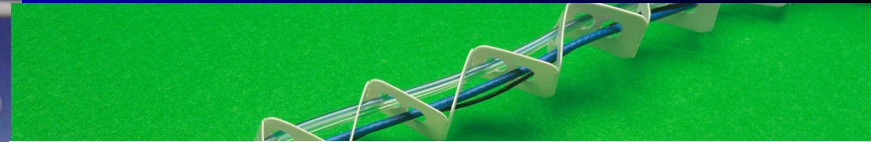
hohe Energiedichte, uniforme Ablation.

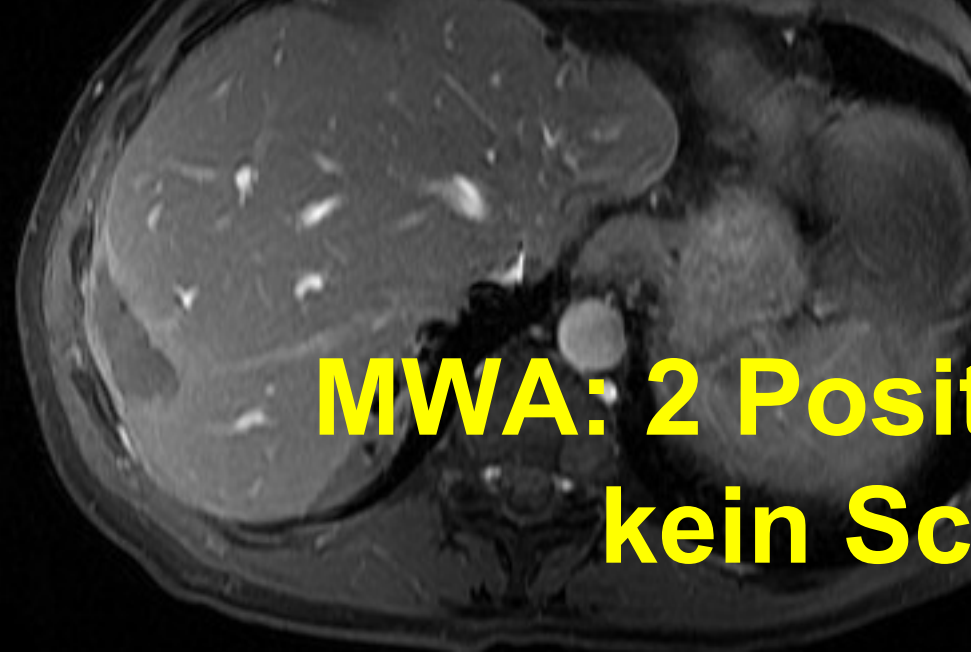
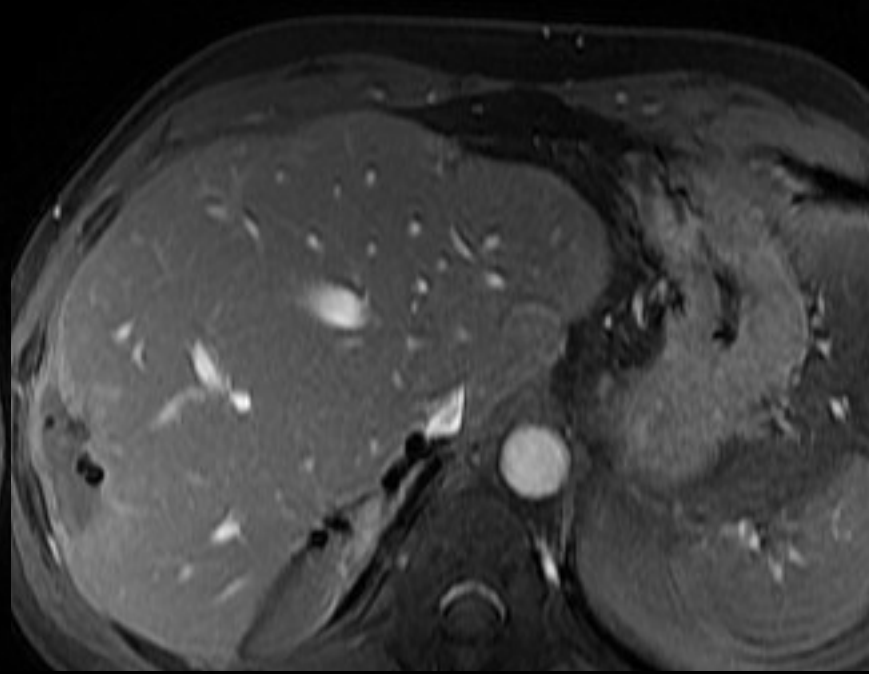
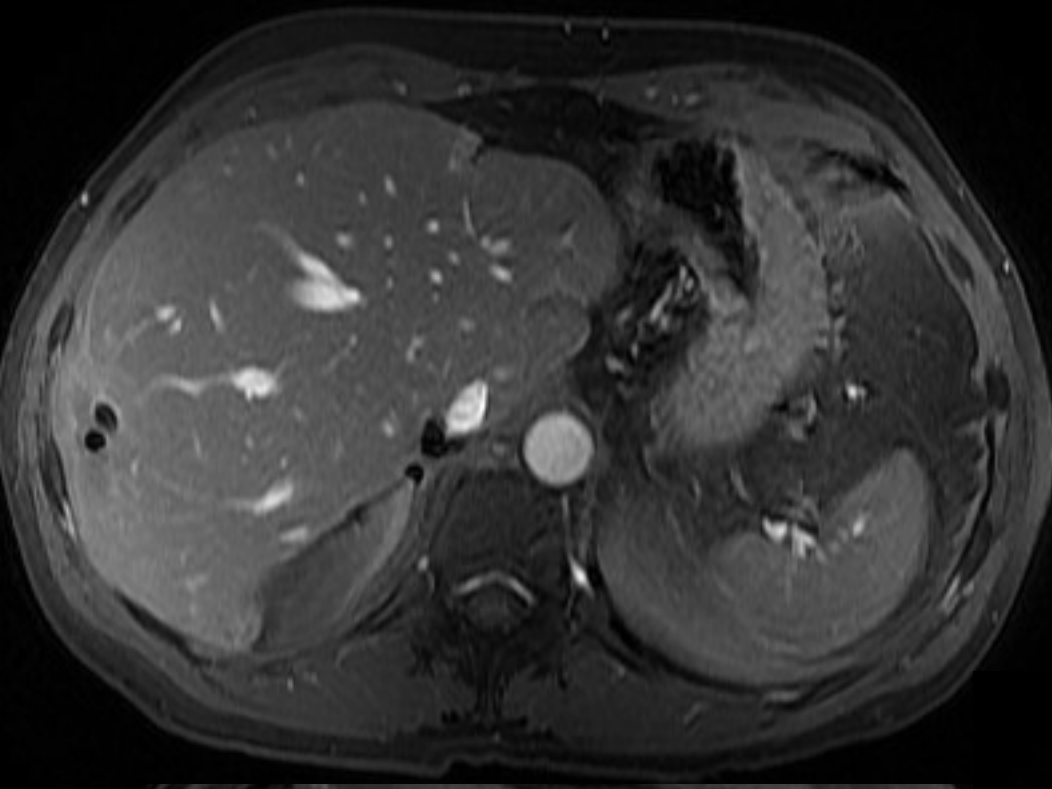
Mikrowellenablation

Pros: 915 MHz, 45 W, 13 G Nadel,
mehrere Sonden zeitgleich,
kein heat sink Effekt, keine
Verbrennungen, Schmerzen,
10 Min/Ablation, Tumorgroße,
Vaporisation/Carbonisation

Cons: Einzelerfahrungen seit 2008

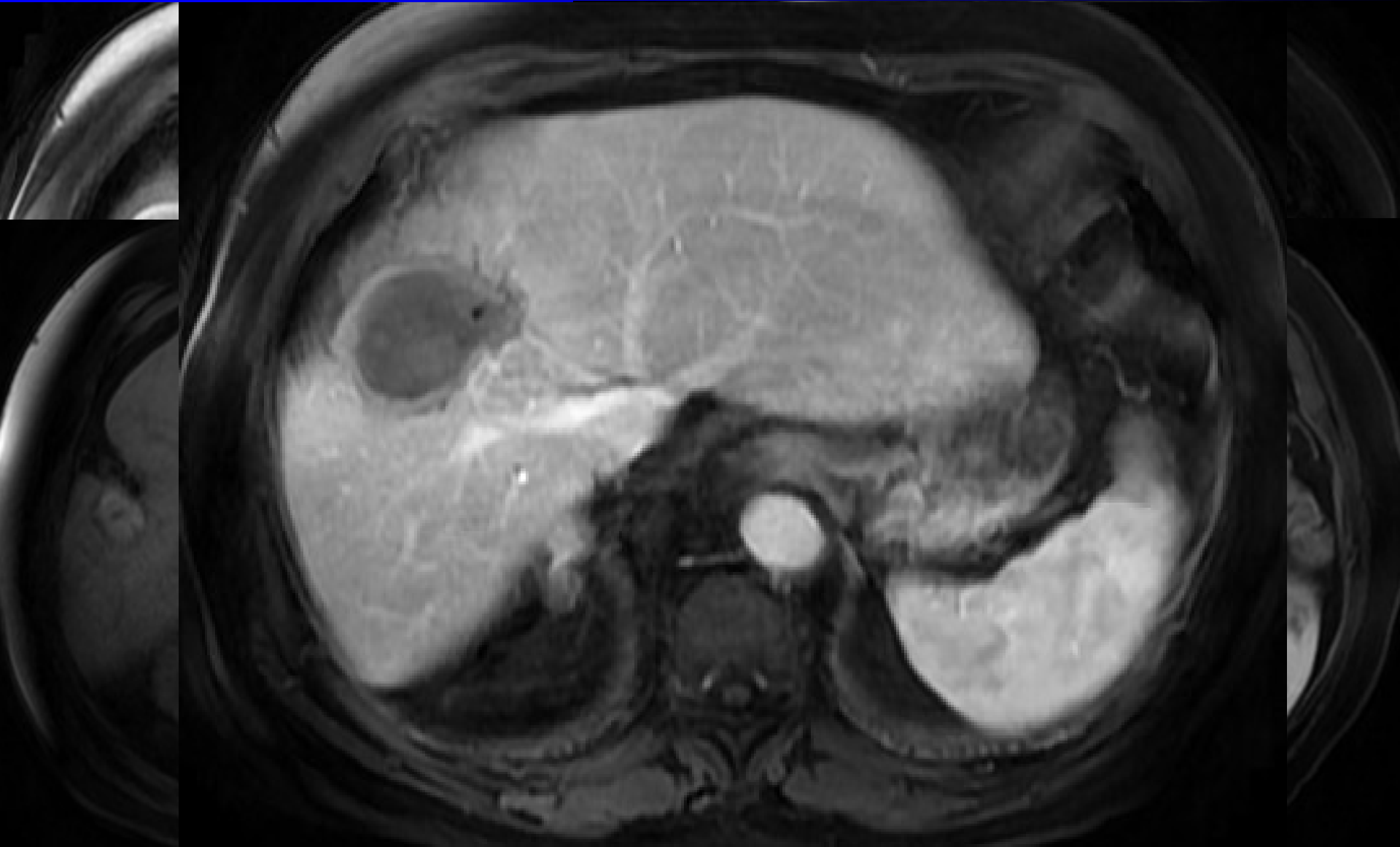
Mikrowellenablation

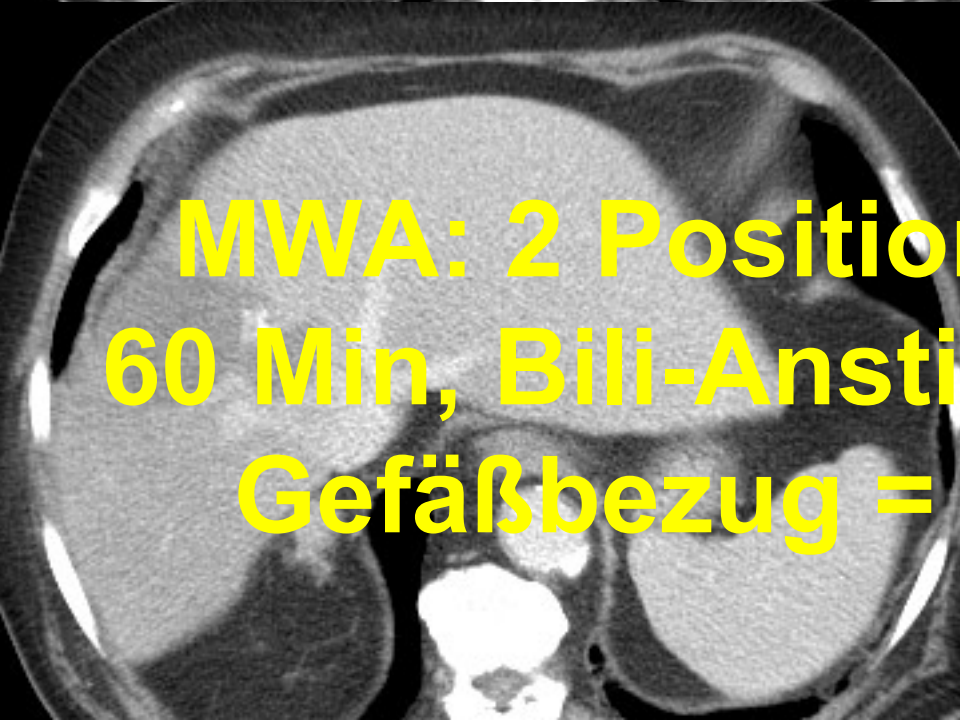




**MWA: 2 Positionen, 20 Min,
kein Schmerzen**

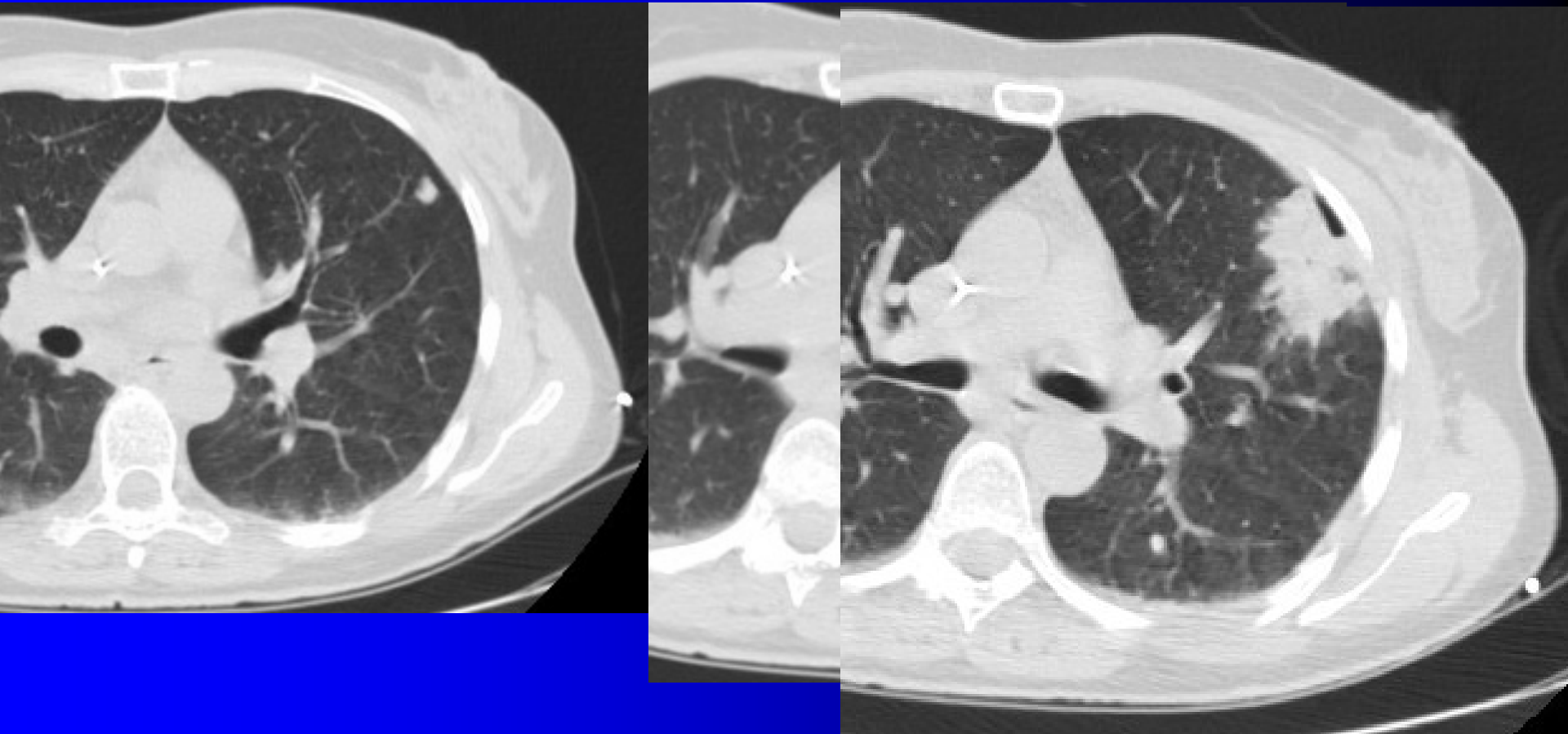
Leber: HCC





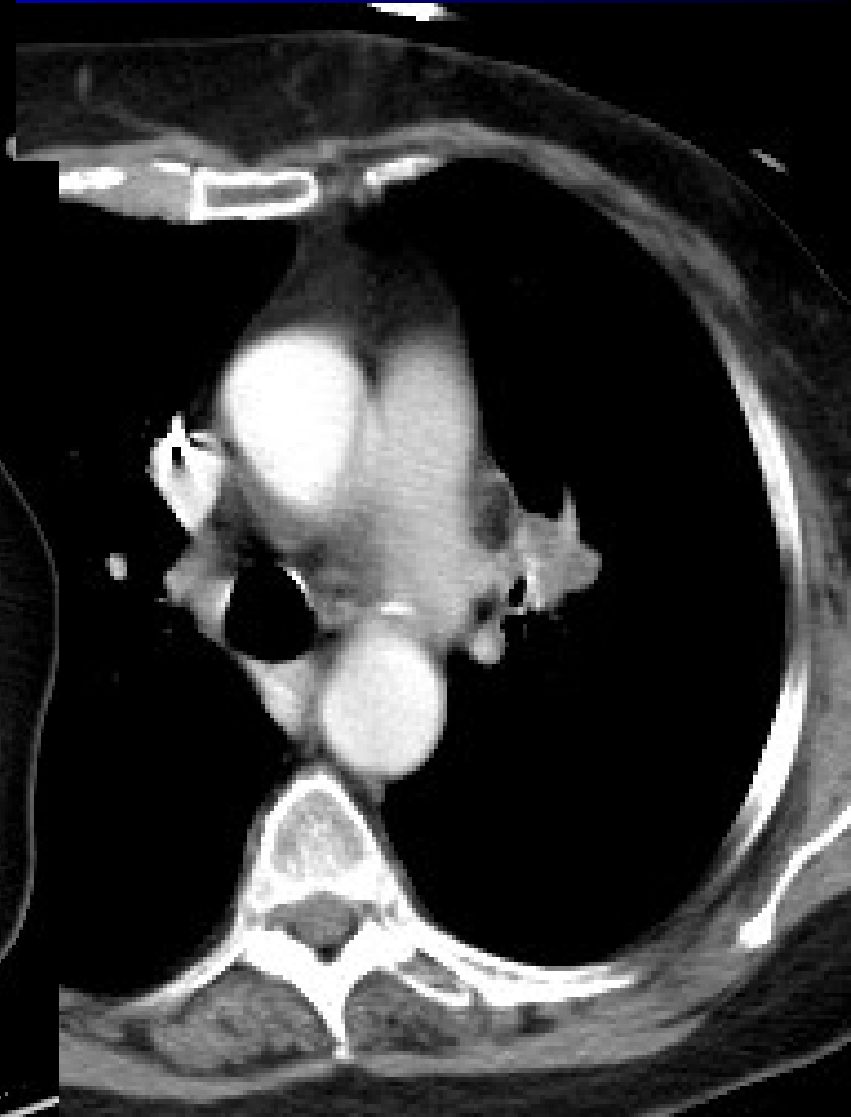
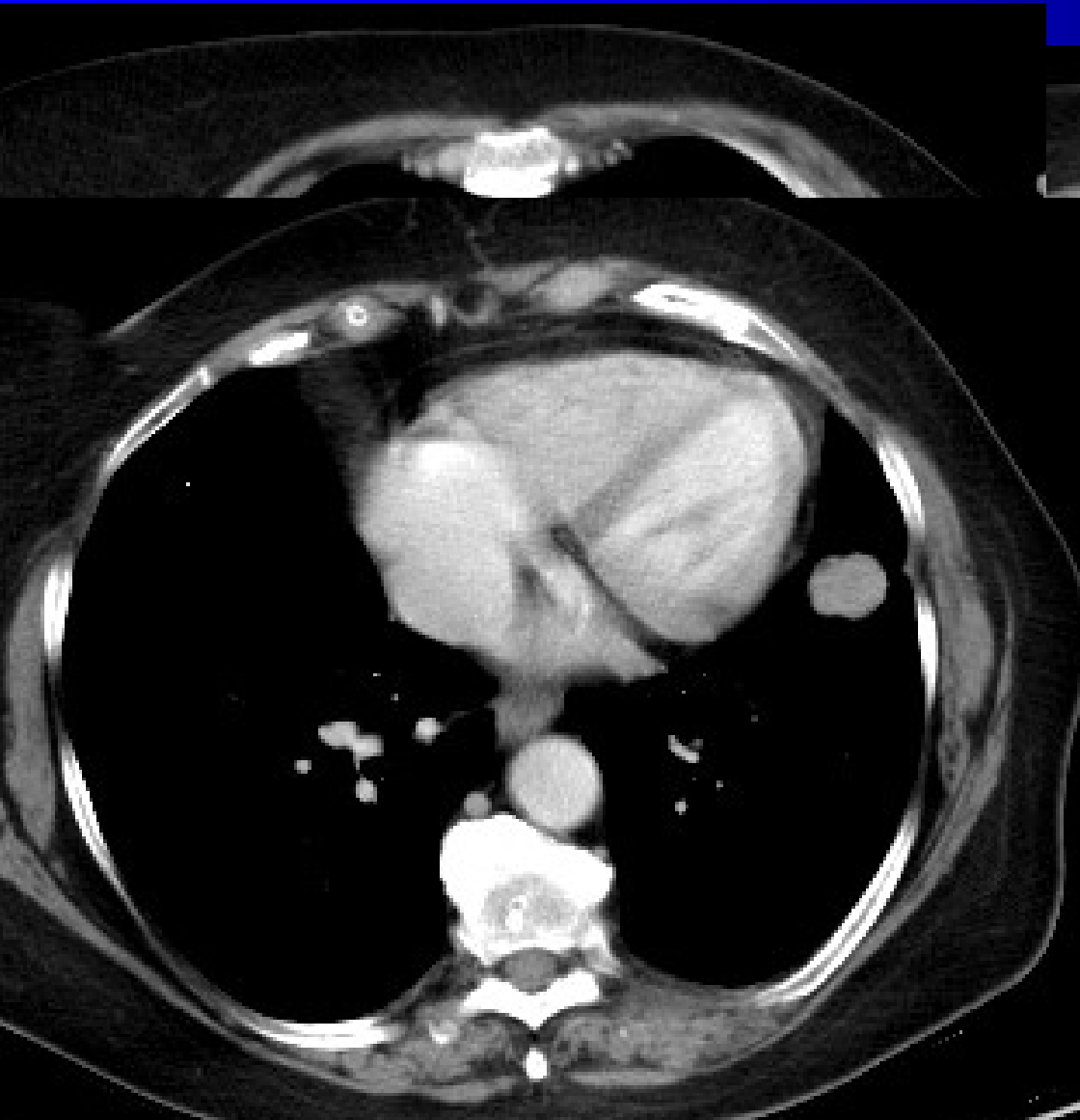
**MWA: 2 Positionen, 6 Ablationen
60 Min, Bili-Anstieg, Hospitalisation
Gefäßbezug = MWA vorteilhaft**

Lungenablation

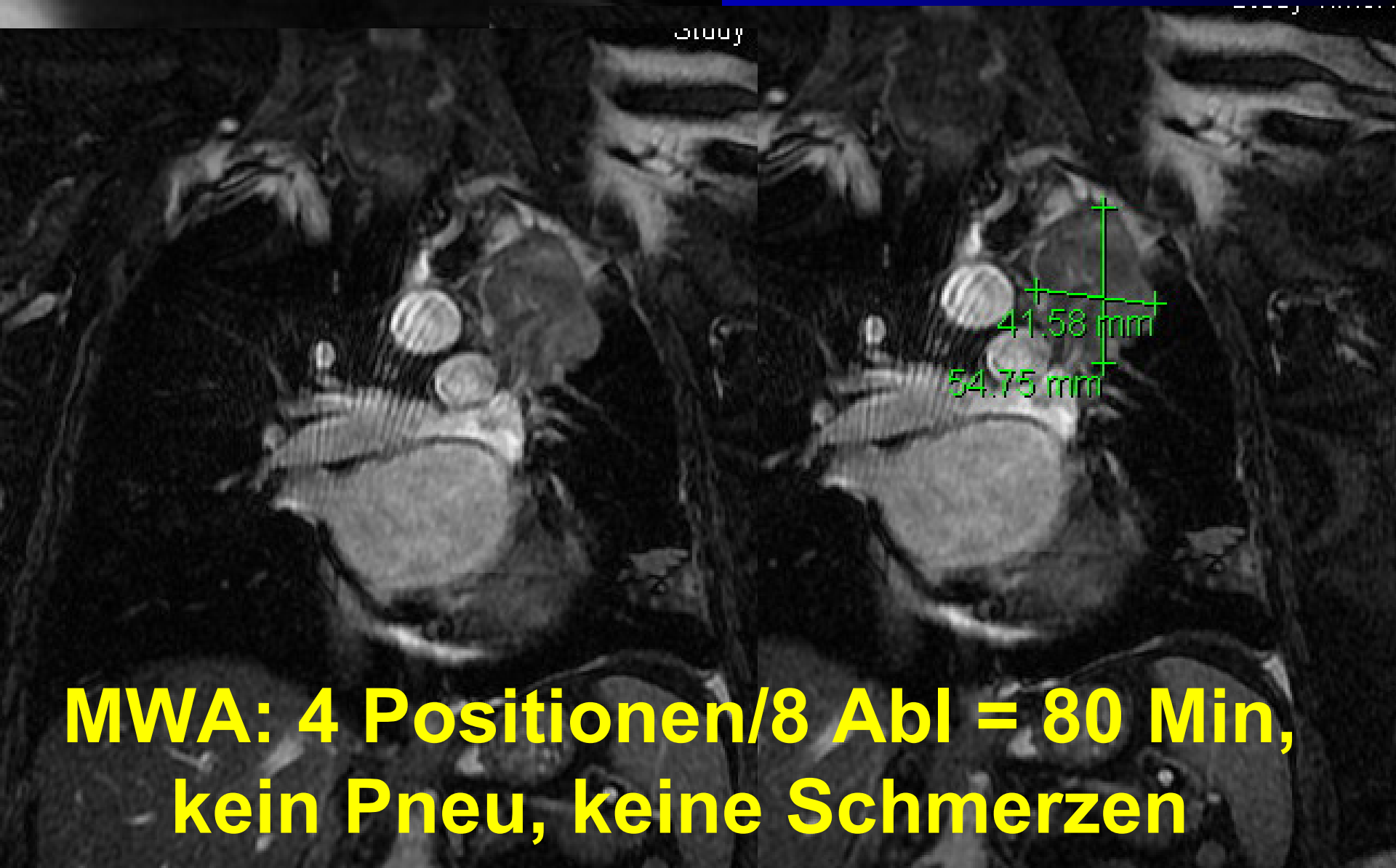


RFA: 30 Min, Pneu, Schmerzen

Lungenablation



Lungenablation



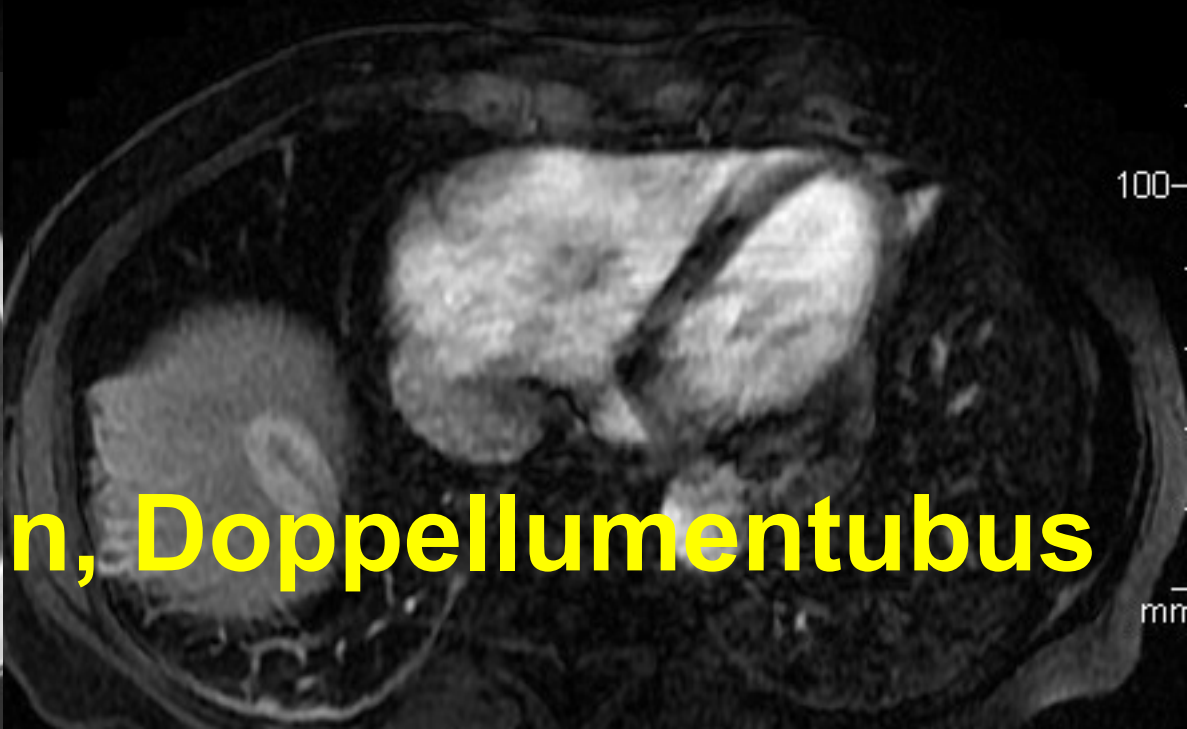
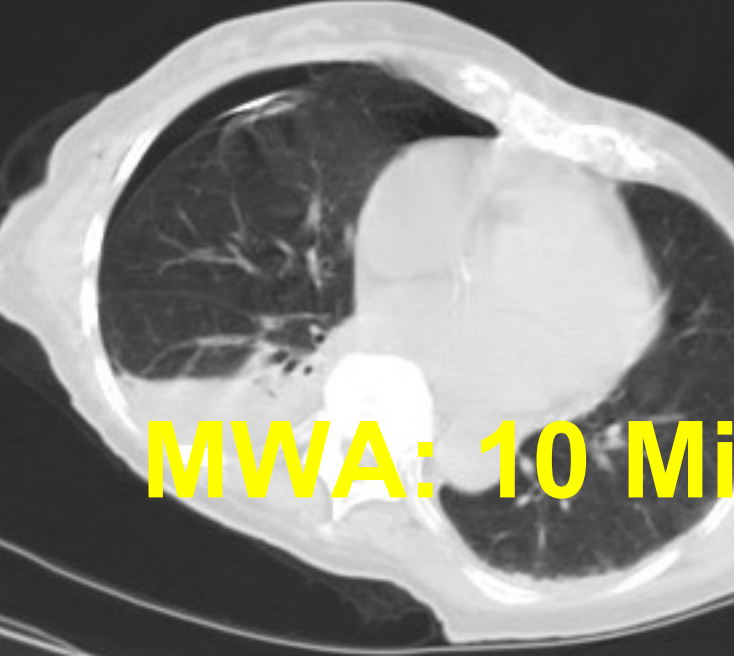
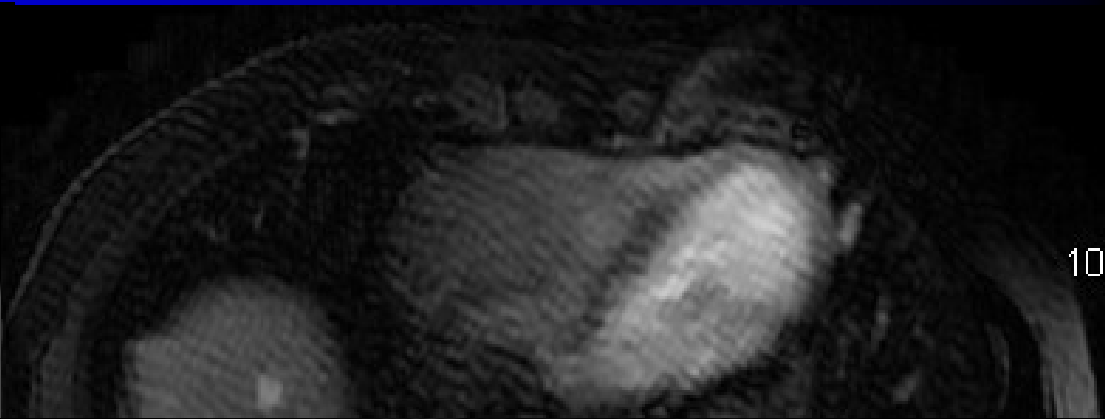
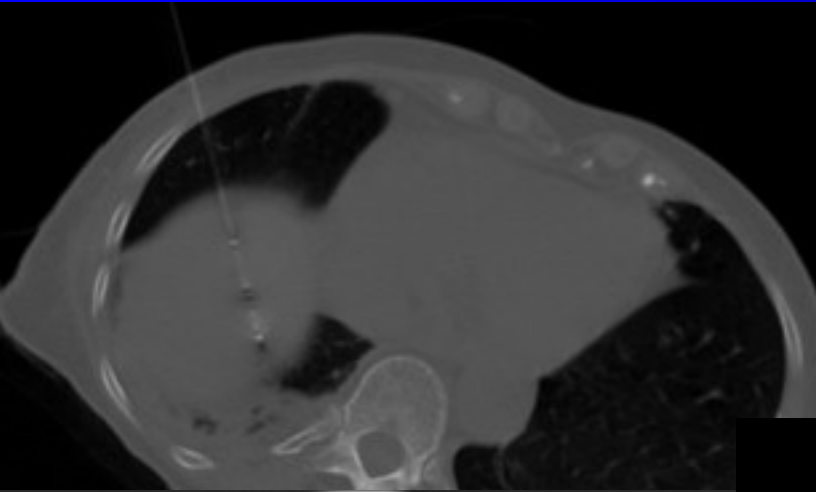
**MWA: 4 Positionen/8 Abl = 80 Min,
kein Pneu, keine Schmerzen**

Lungenablation



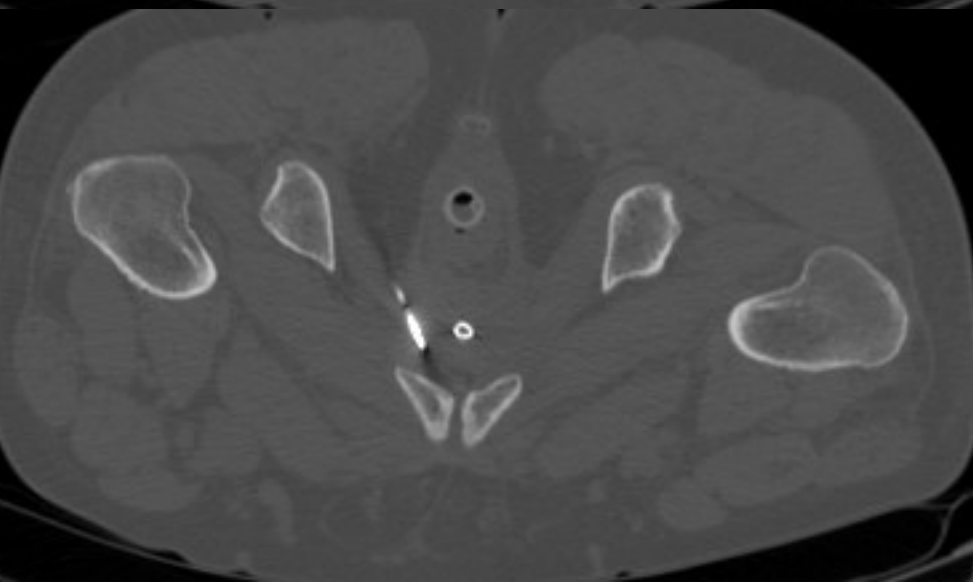
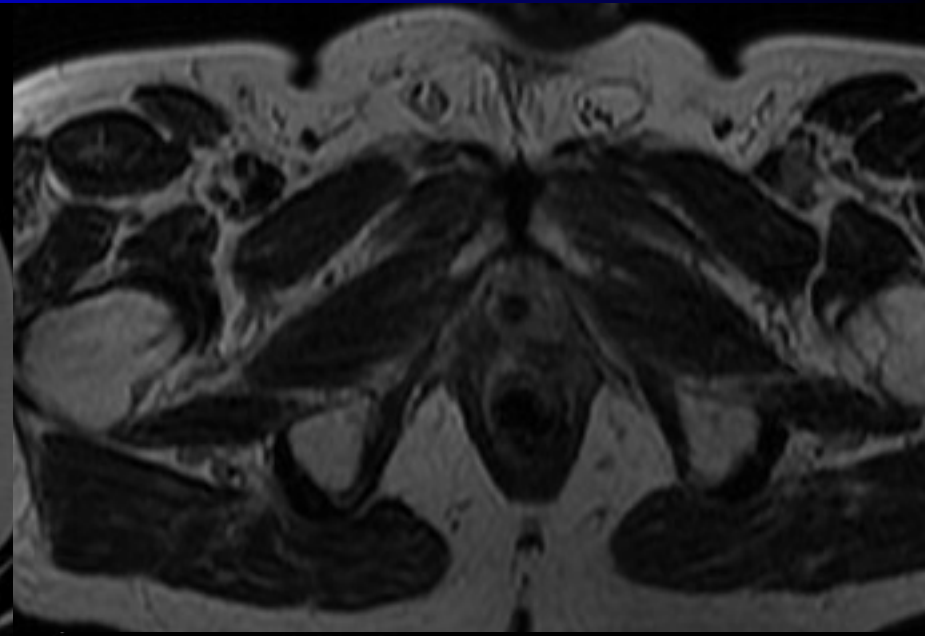
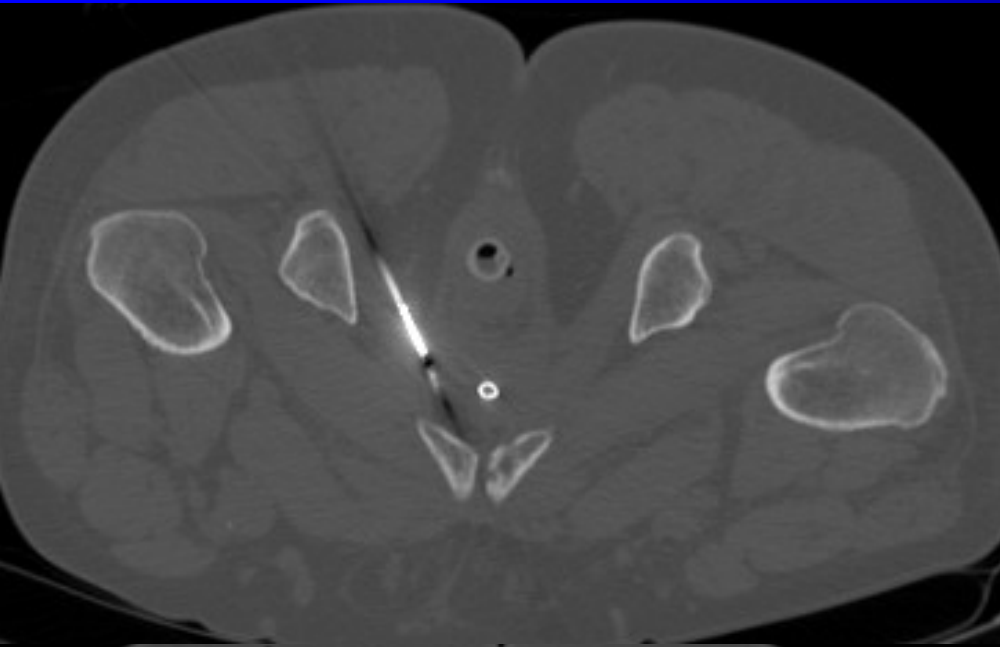
**MWA: 10 Min, kein Pneu,
kein Schmerzen**

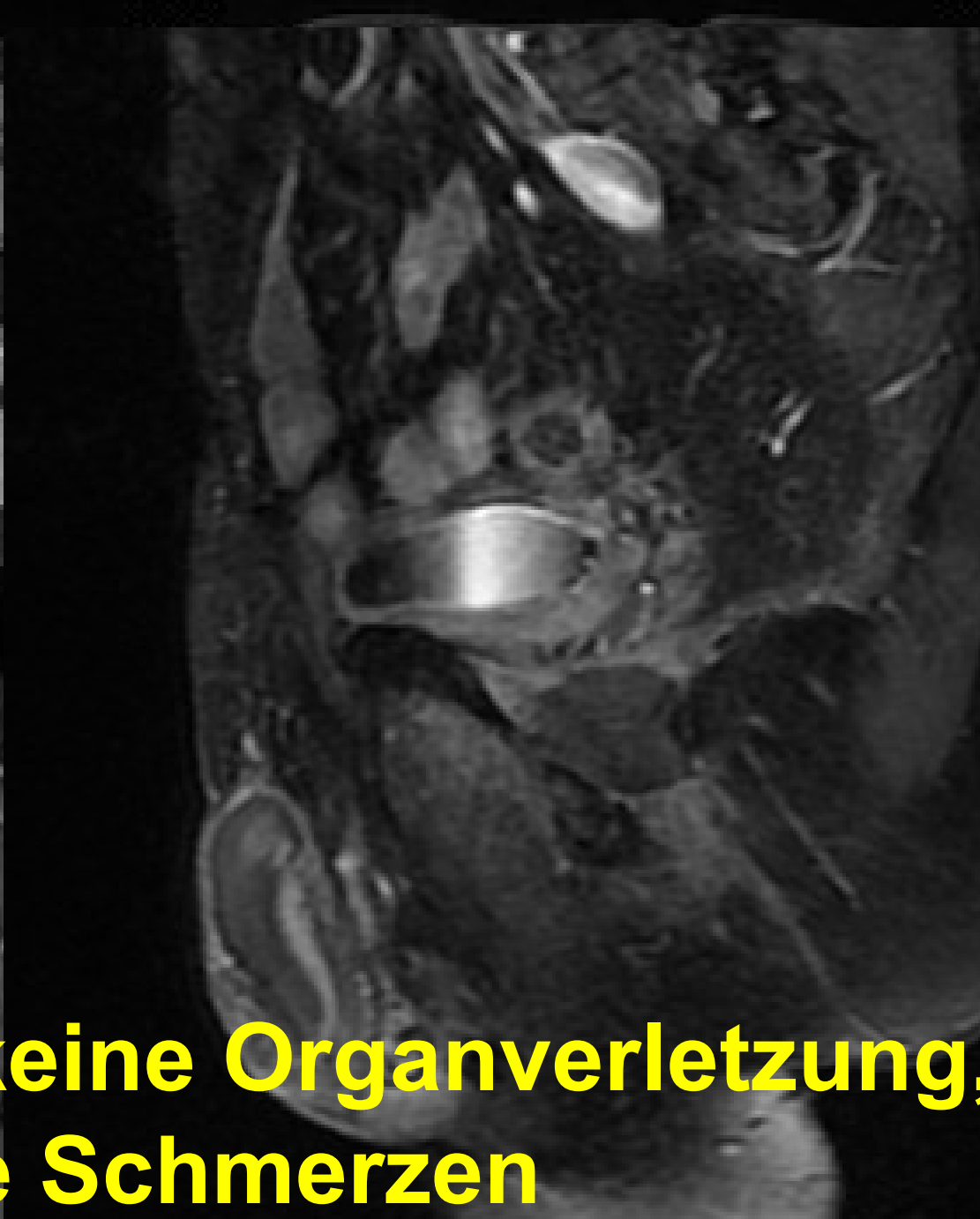
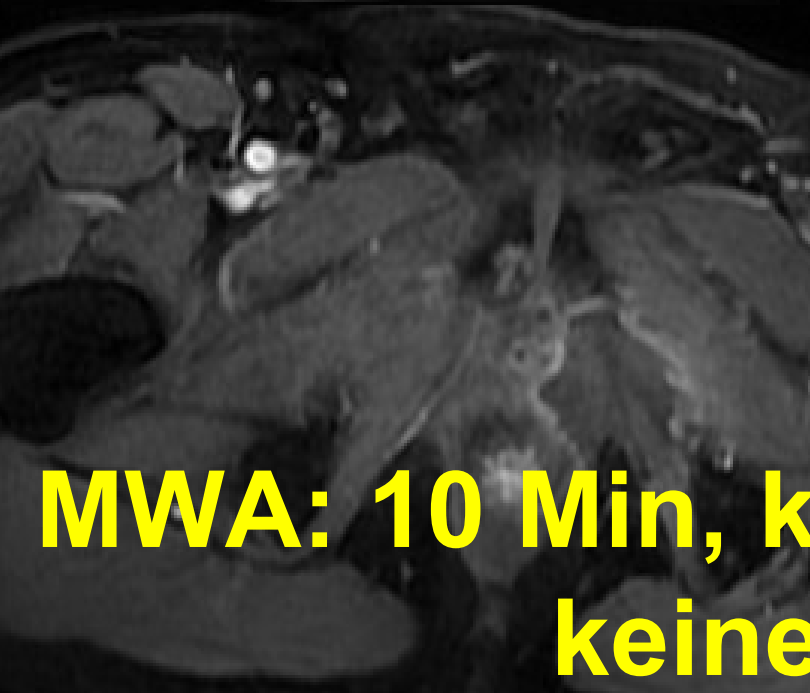
Transpulmonale Ablation



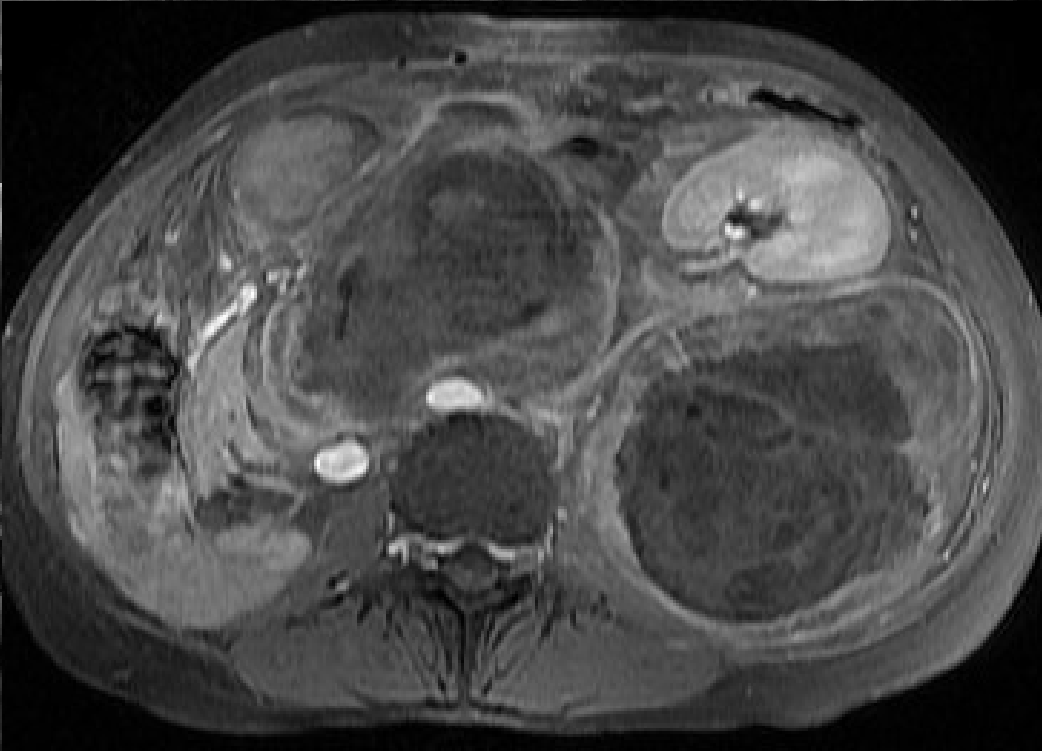
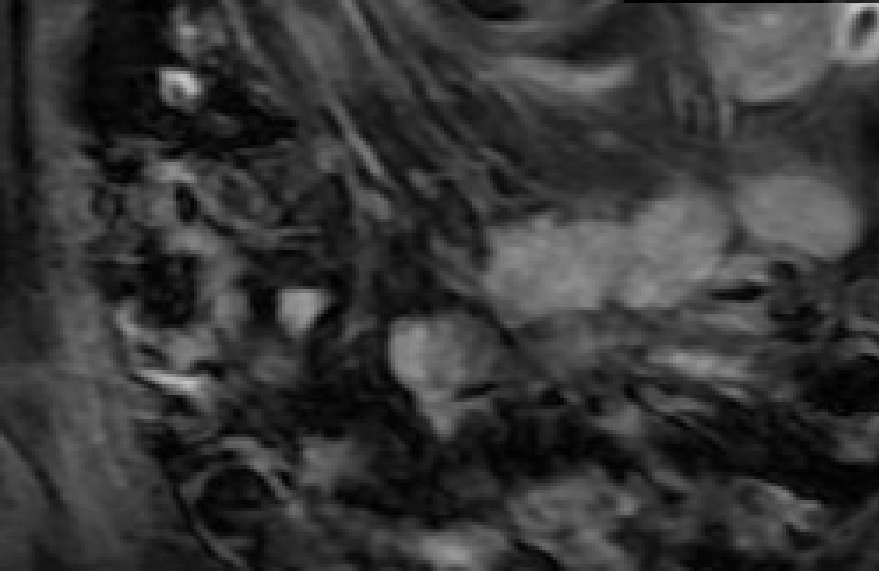
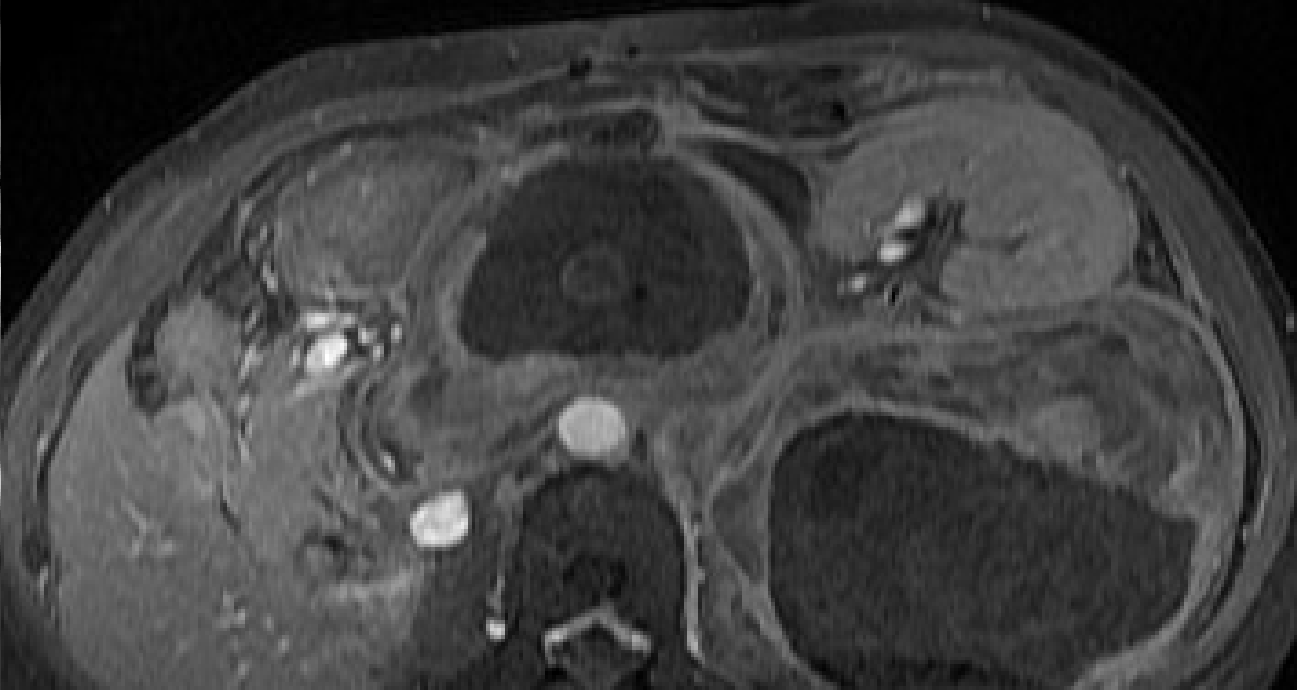
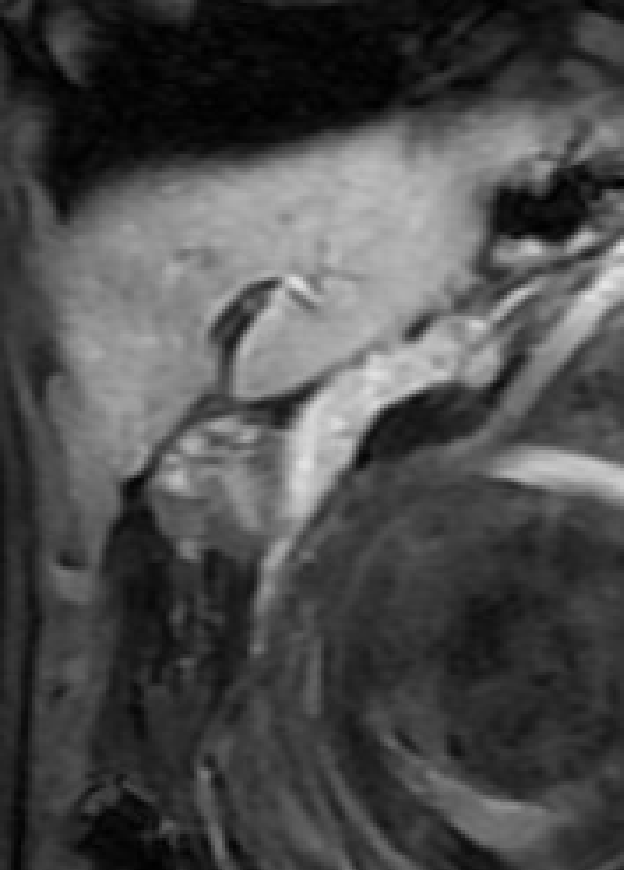
MWA: 10 Min, Doppellumentubus

Prostata-CA Rezidiv





**MWA: 10 Min, keine Organverletzung,
keine Schmerzen**



Study
Stuc



[L]



Erfolgskontrolle

CT/MRT nach 24h, 3/6/9/12 Monaten

**MRT: Dynamik, keine Strahlung
bessere Aussage Nekrose
Zirrhoseleber**

**CT: normales Leberparenchym
Lungenablation**

Läsion größer (24h), Schrumpfung

Cave: hyperdenser/-intensiver Rand

Mikrowellenablation

hohe Energiedichte → Gefäßbezug

zeitlich definierte Ablationen (10 Min)

Nekrosen exakt zu kalkulieren

mehrere Sonden → große Tumore

→ Überlappung/Geometrie

→ Postablationssyndrom

weniger Schmerzen, Morbidität

weniger Pneus bei Lungenablation