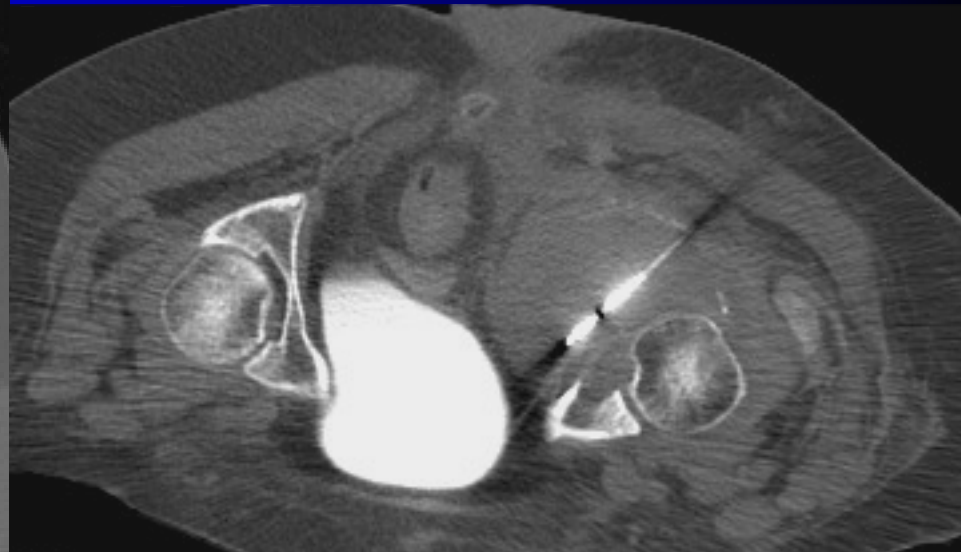


# Mikrowellenablation solider Tumore



[s@khnw.de](mailto:s@khnw.de)

Zentralinstitut für Radiologie und Neuroradiologie  
Krankenhaus Nordwest, Frankfurt am Main

# Hitzeablation

## Koagulationsnekrose

50-55° C → Zellschaden

60-100° C → sofortige Nekrose

> 100° C → Vaporisation &  
Karbonisation

*Größe, Homogenität, Zeit*

# Radiofrequenzablation

*am häufigsten eingesetzt*

Wechselstrom → Ionenbewegung

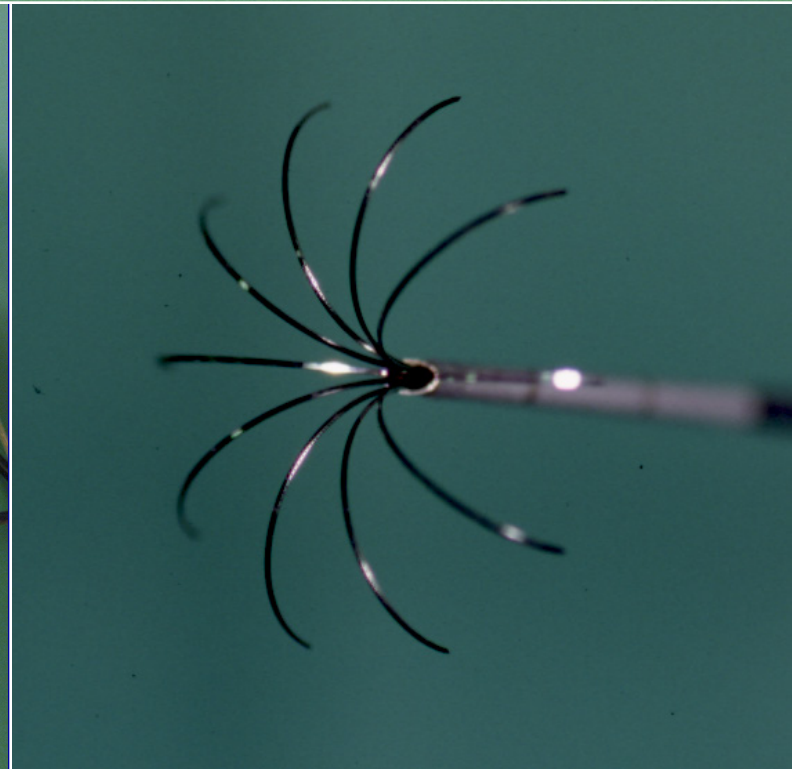
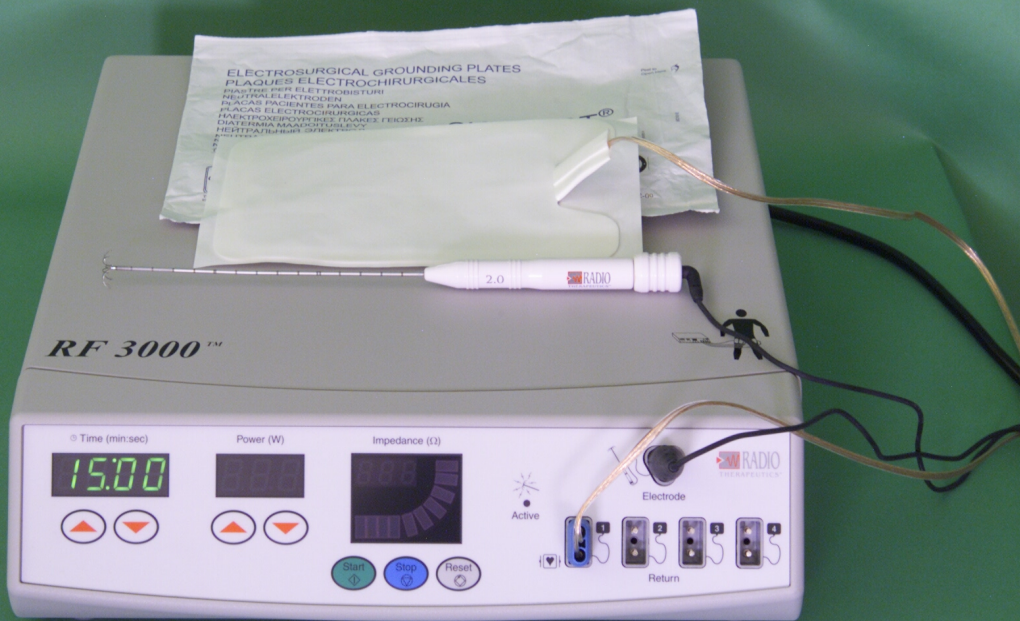
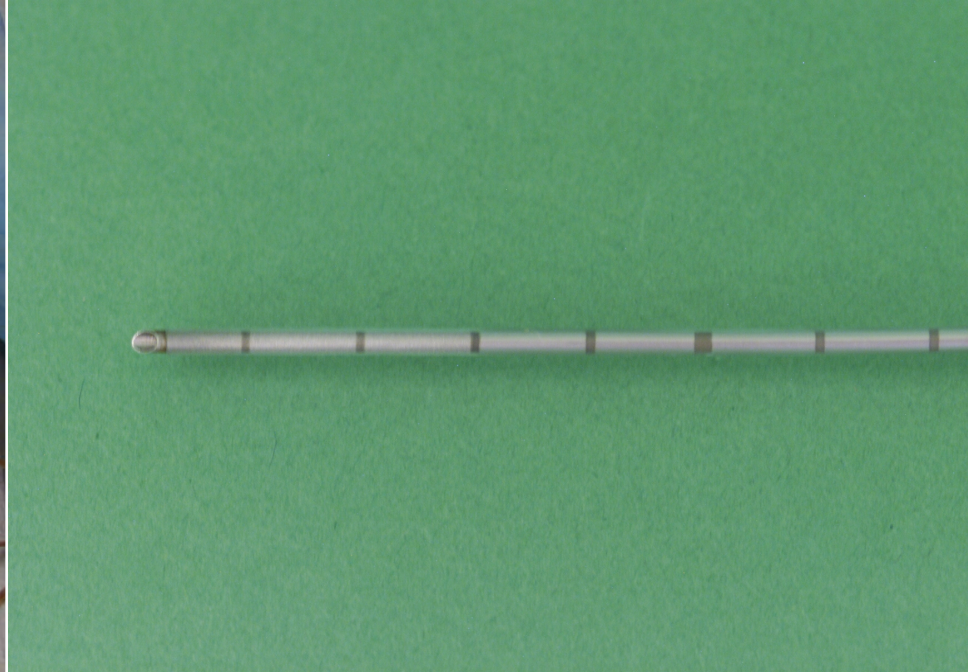
→ Reibung → thermischer Schaden

Sonden bis 5 cm, 200-250 W

Steuerung über Impedanz, Hitze

monopolar → Neutralelektroden

bipolar; NaCl Spülung, Switch



# Mikrowellenablation

elektromagnetische Energie

Frequenz 900 MHz - 10 GHz

Leistung 60-80 W, 1- ... Sonden

Wassermoleküle rotieren

Bewegungsenergie → Hitze

Hitzeprofil, bis 10 Min., Temp. ↑

MWA/RFA 13/40 Min. → Effekt?

# Mikrowellenablation



# **MWA am KH Nordwest**

*RFA seit 2001 bis 10/2009*

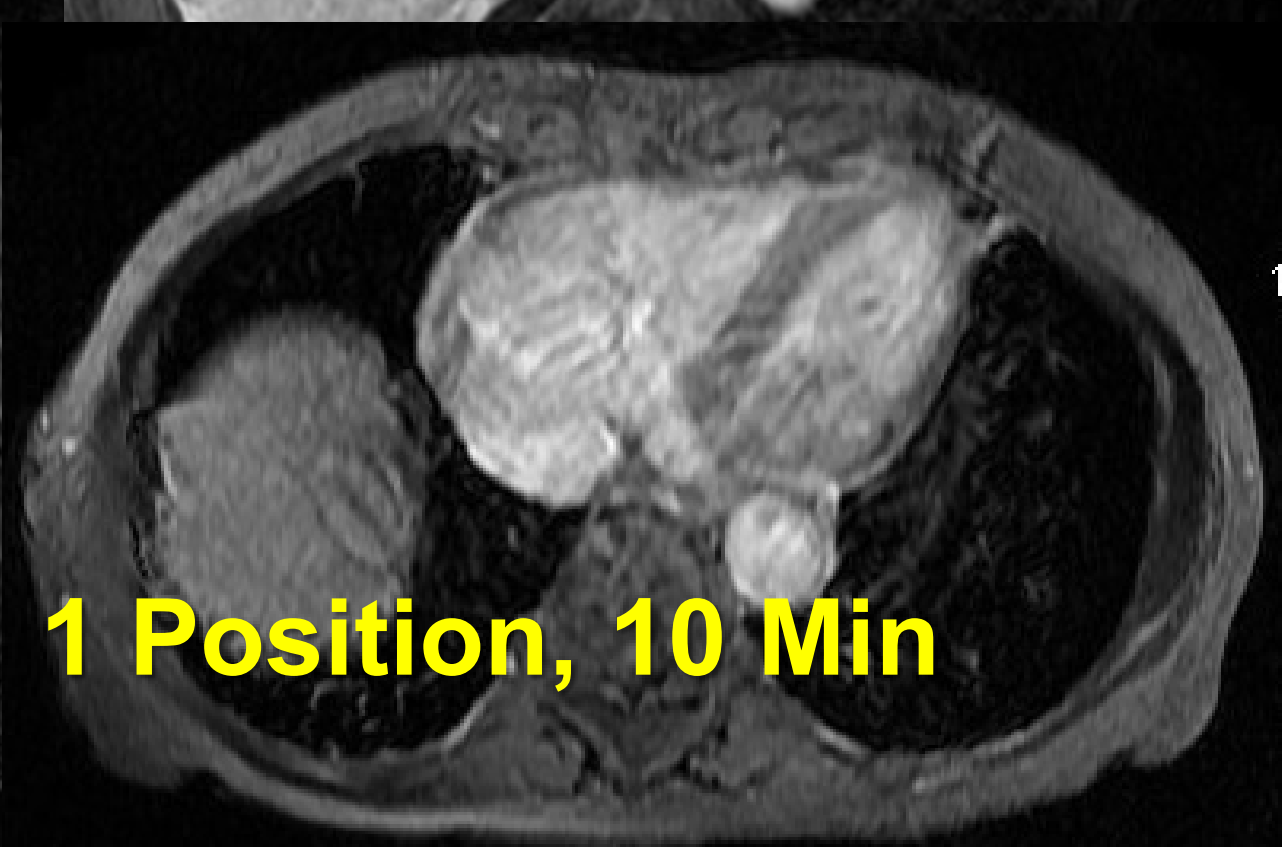
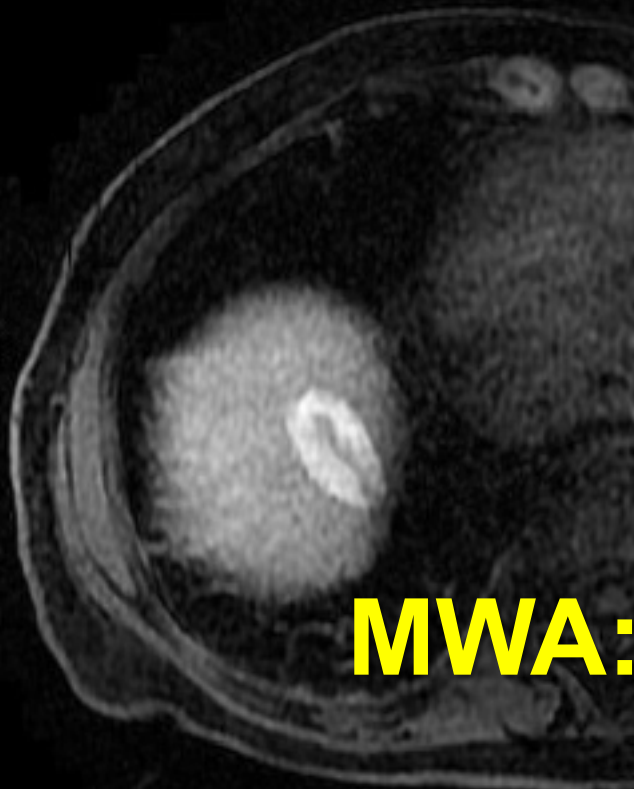
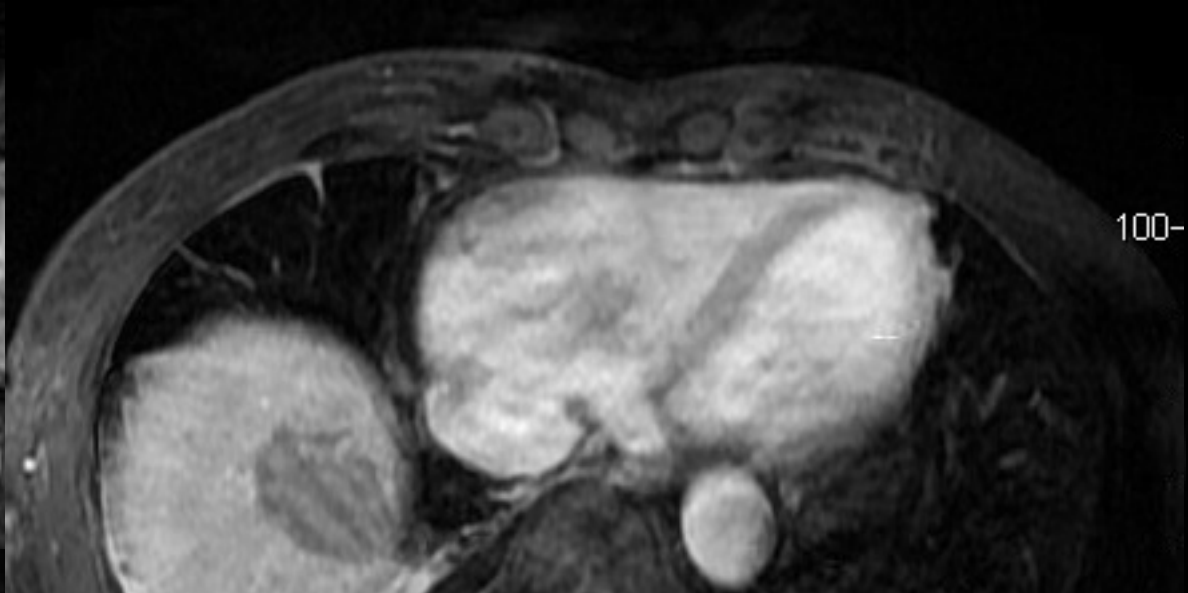
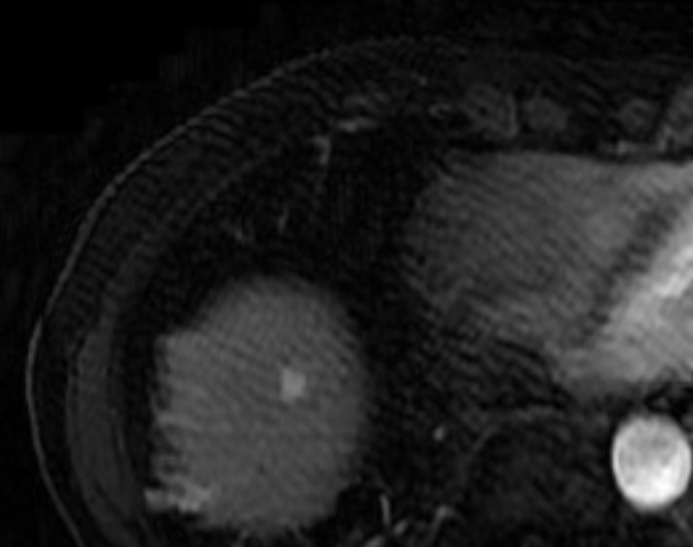
**1. MWA bei Rezidiv eines HCC**

**78 J, seit 2002 4 x RFA / Emb.**

**Läsion Seg. 8, Emb. frustran**

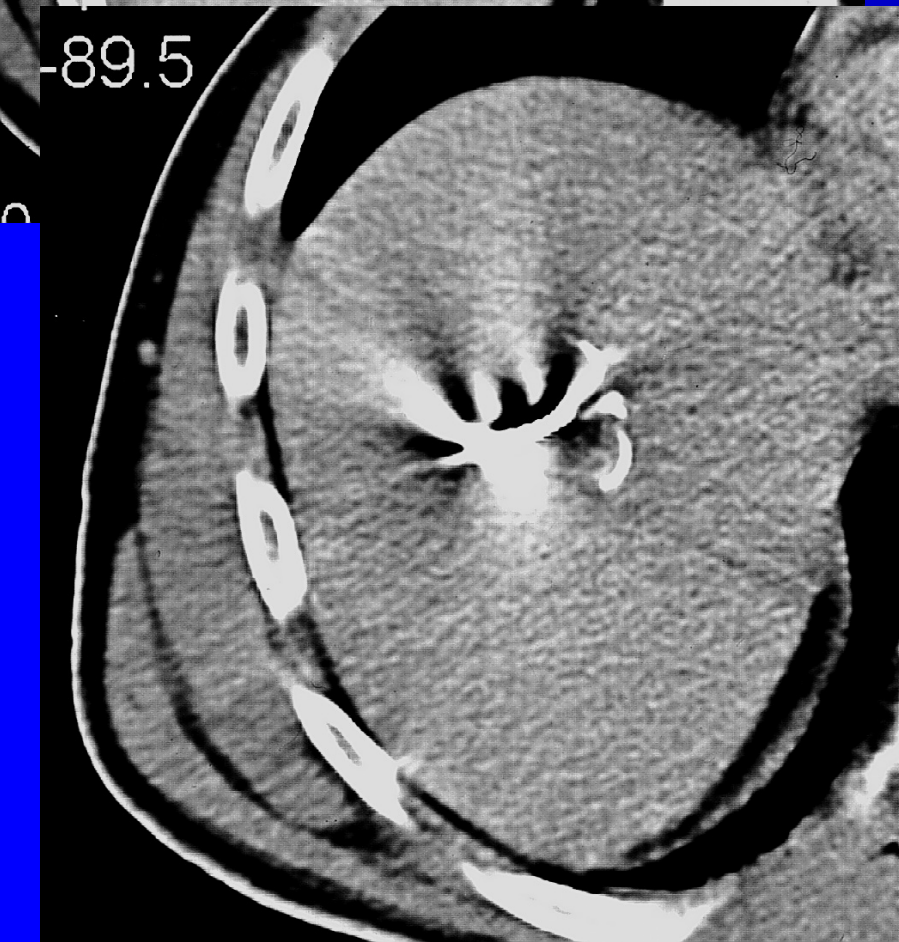
**transpulmonale MWA → Zeit**

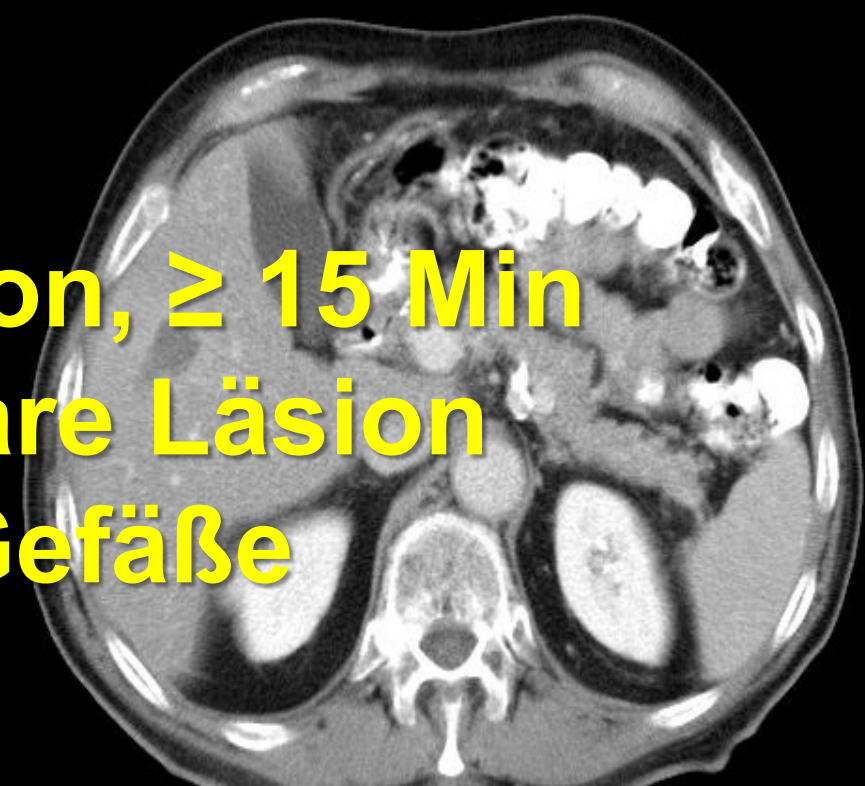
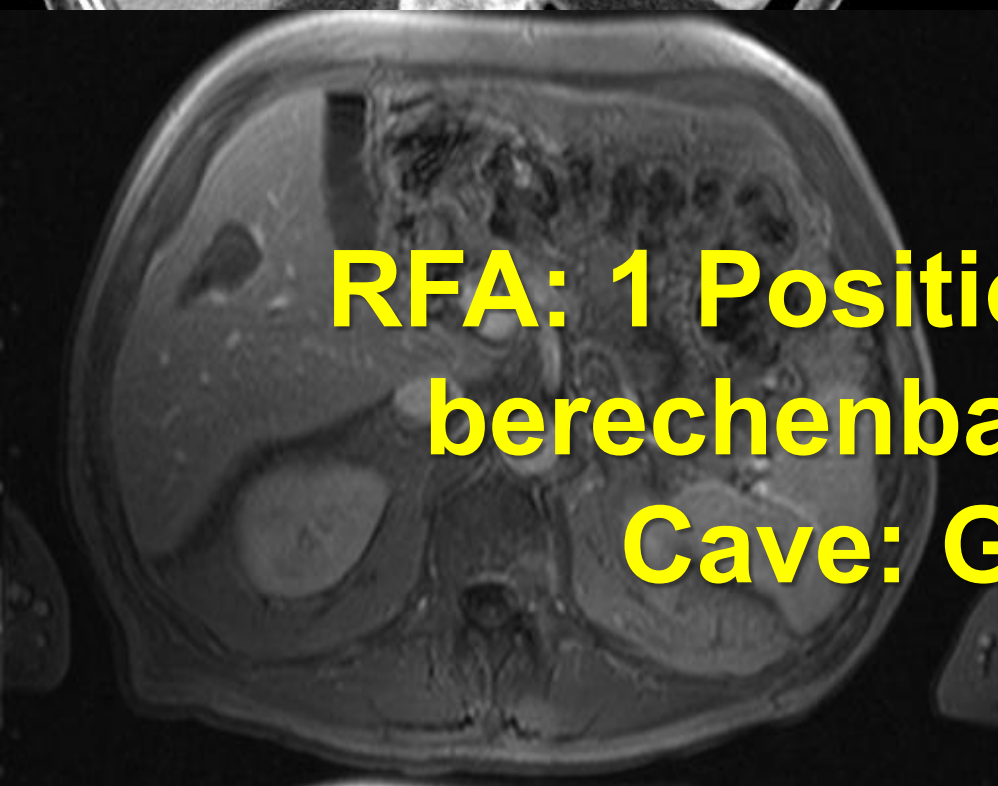
**79 J, tumorfrei & Wohlbefinden**



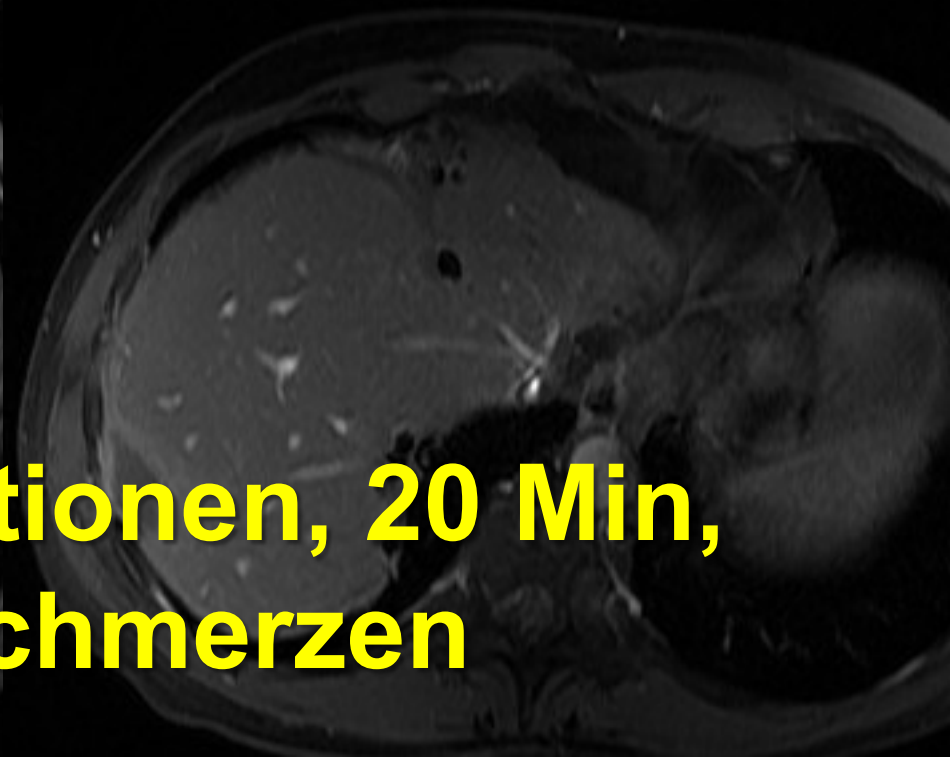
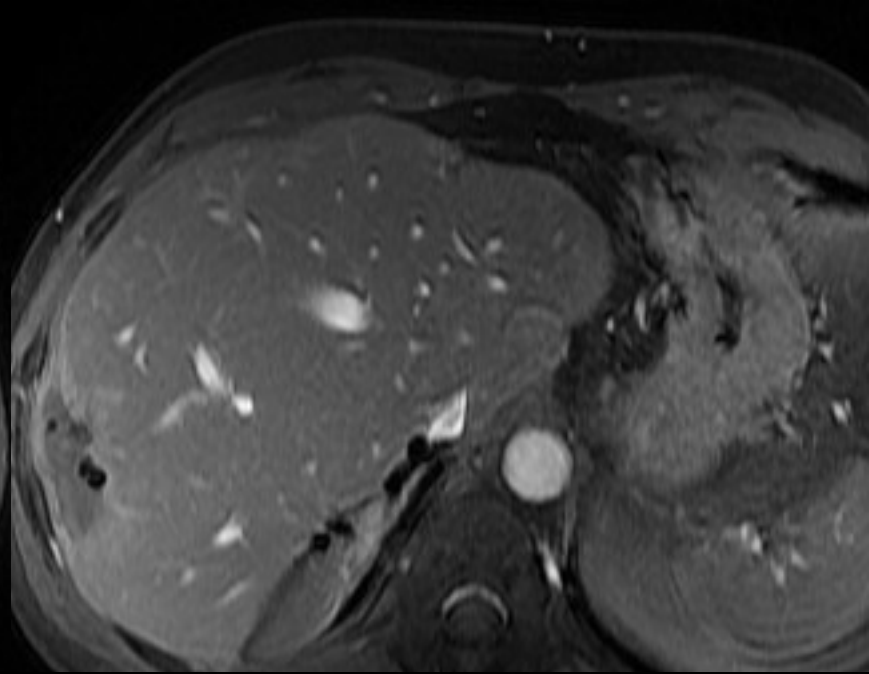
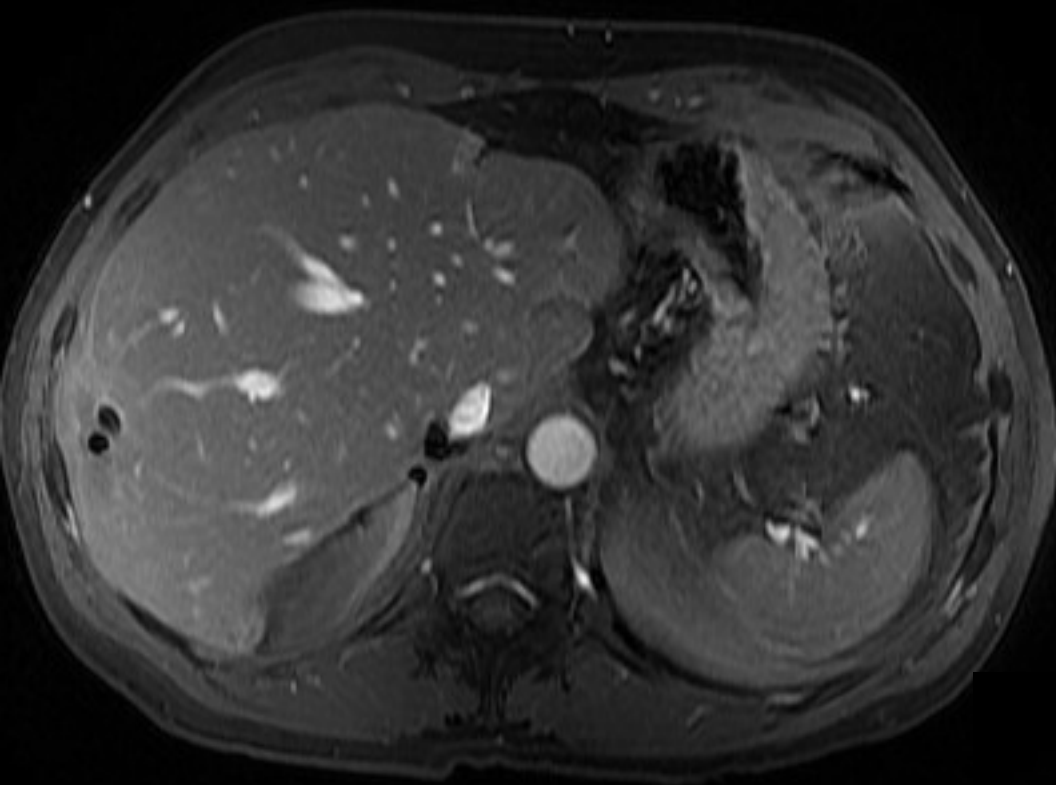
**MWA: 1 Position, 10 Min**







**RFA: 1 Position,  $\geq 15$  Min**  
**berechenbare Läsion**  
**Cave: Gefäße**

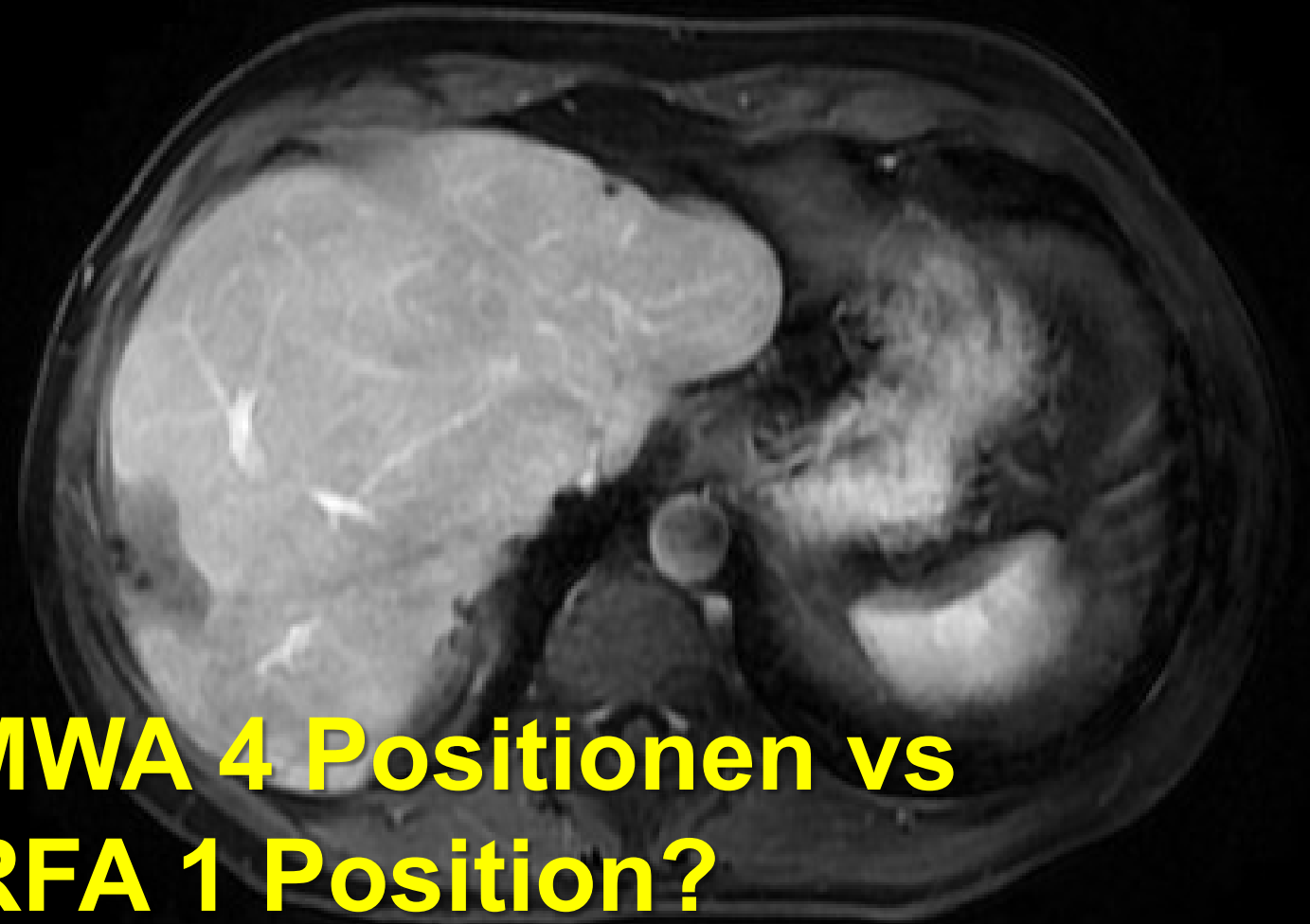
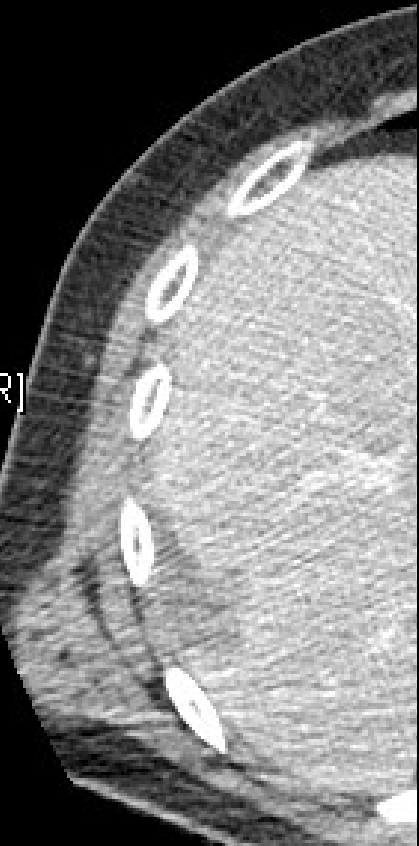


**MWA: 2 Positionen, 20 Min,  
keine Schmerzen**

Study Date:01.09.2011

Study Time:16:49:11

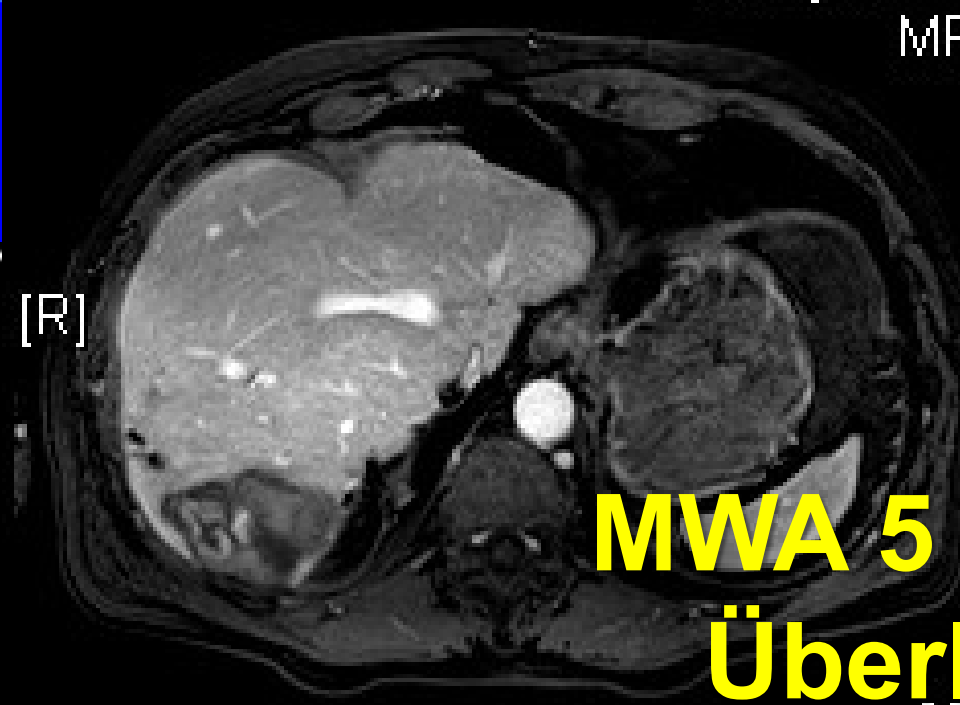
MRN:



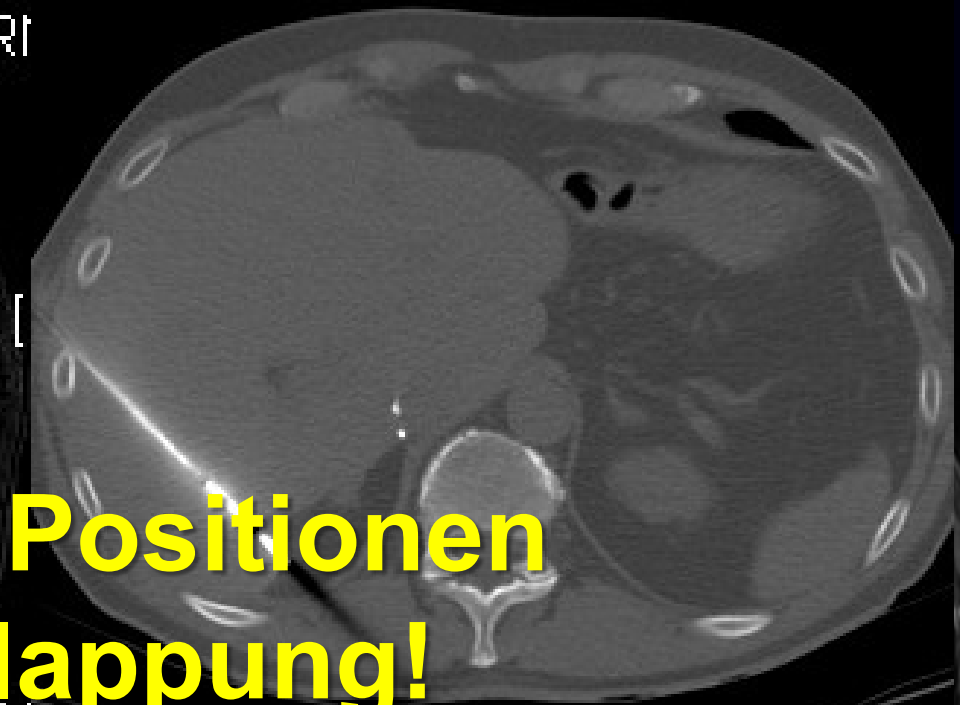
**6 Mo: MWA 4 Positionen vs  
RFA 1 Position?**

MRI

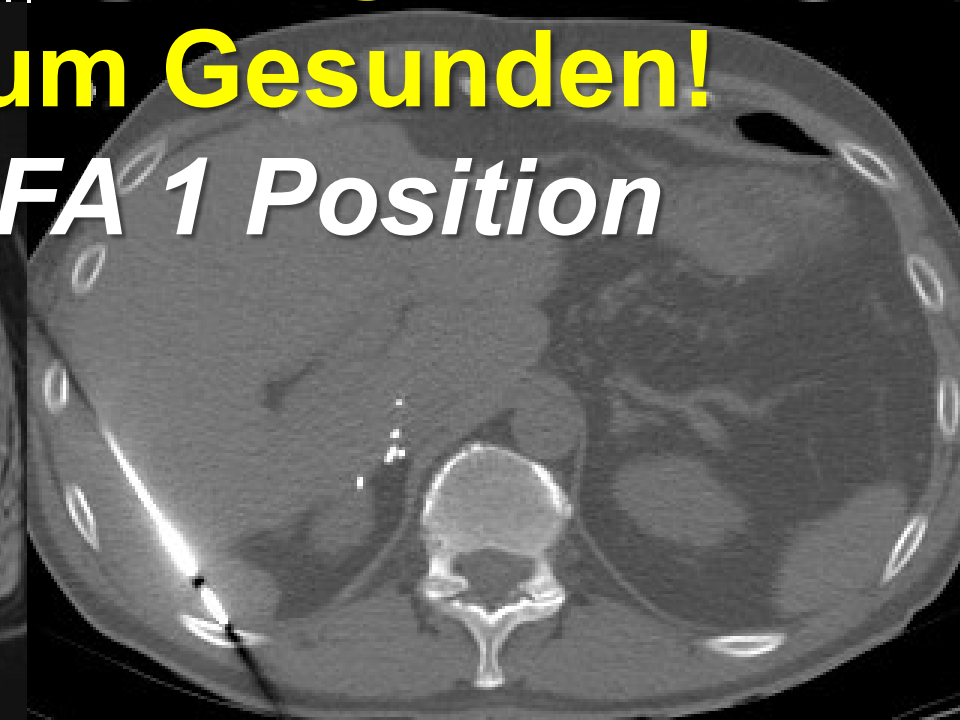
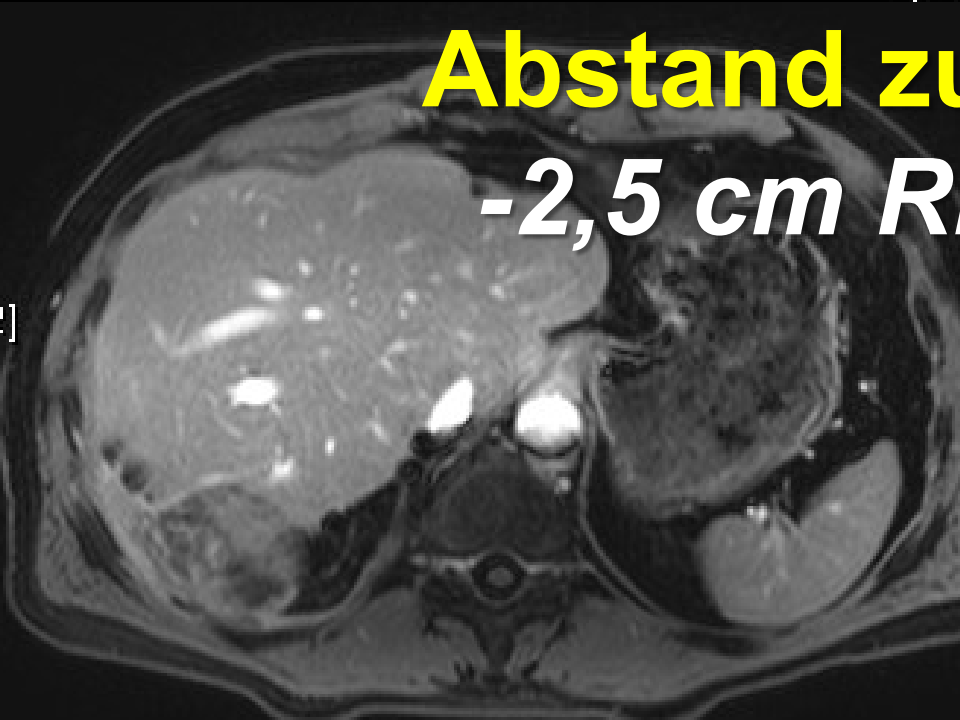
[R]

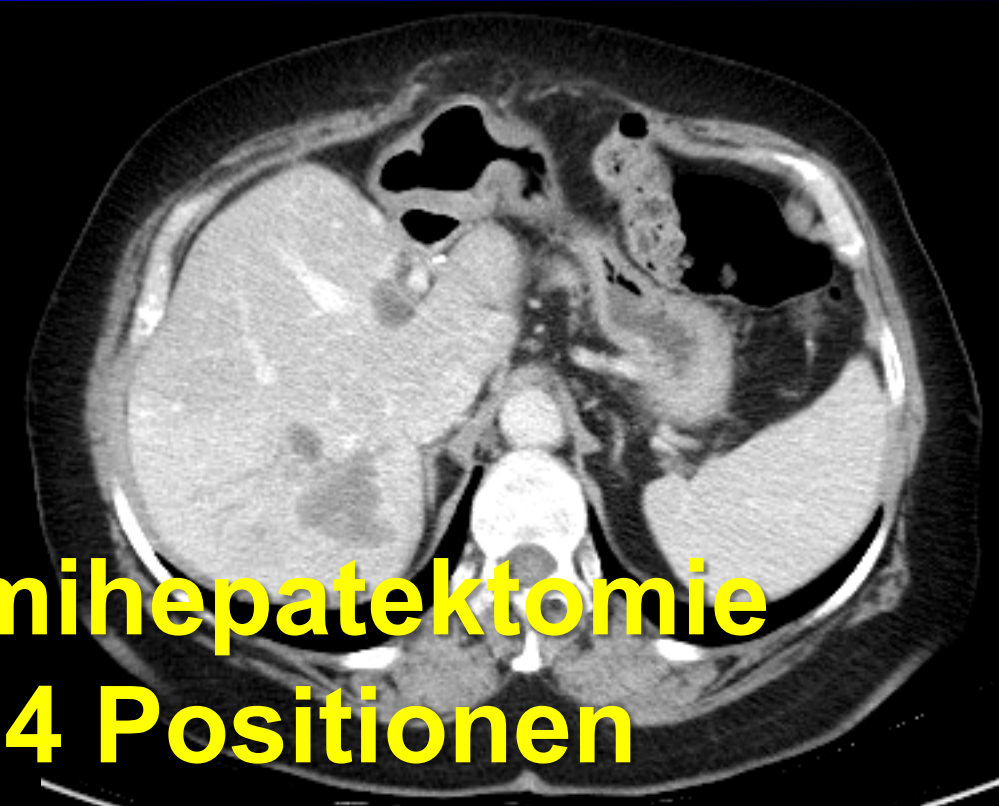
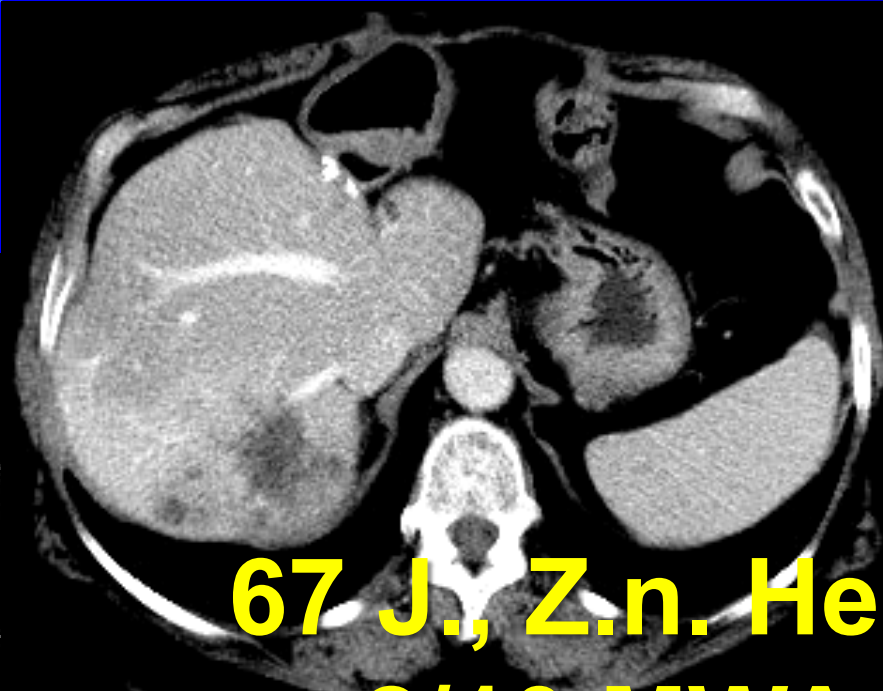


**MWA 5 Positionen  
Überlappung!**

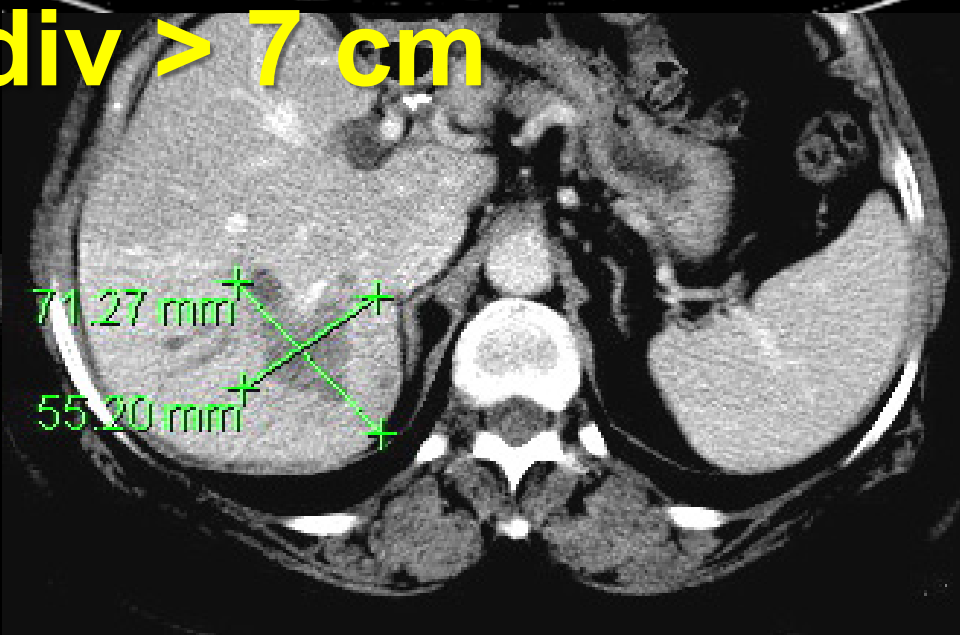
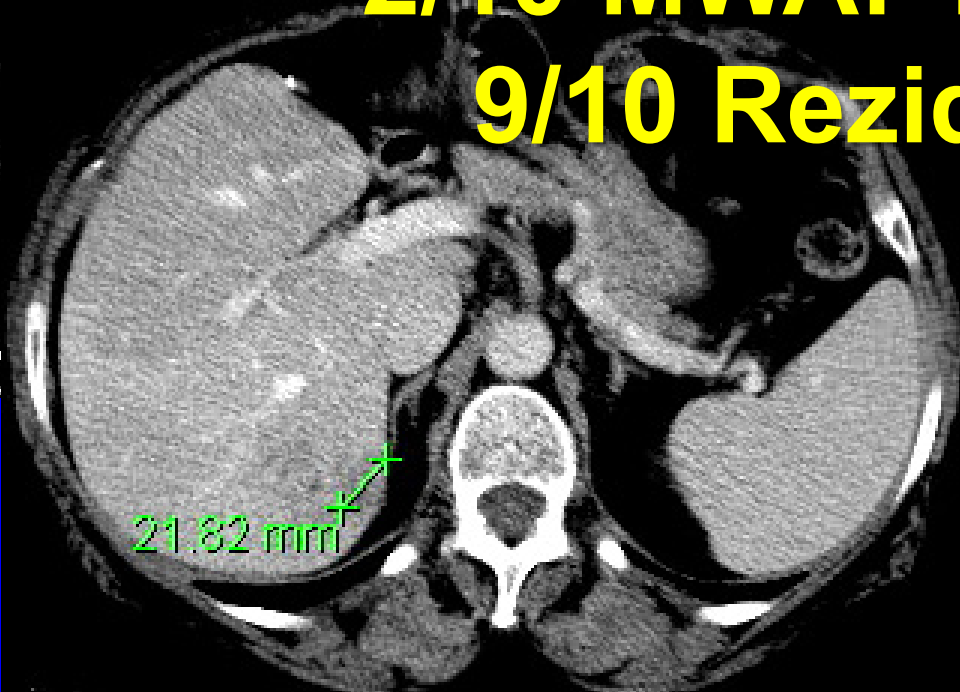


**Abstand zum Gesunden!  
-2,5 cm RFA 1 Position**





**67 J., Z.n. Hemihepatektomie  
2/10 MWA: 4 Positionen  
9/10 Rezidiv > 7 cm**



**unden**

**MWA: 19 Positionen überlappend  
45 W zu 10 Min.**

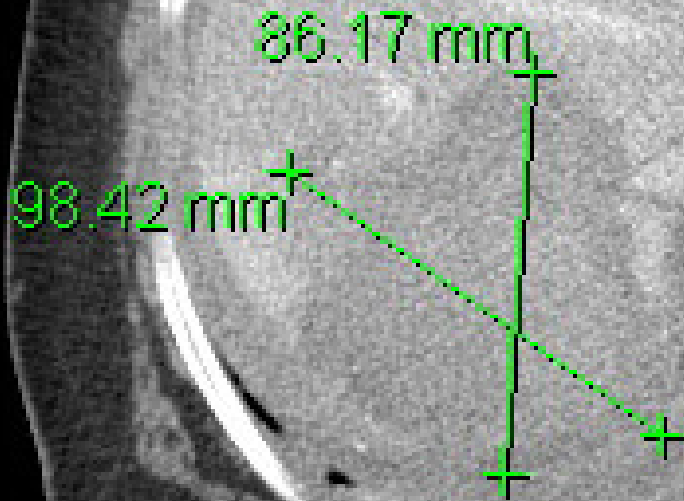
**Koordinatenablation, MPR  
präoperative Planung**

46.59 mm

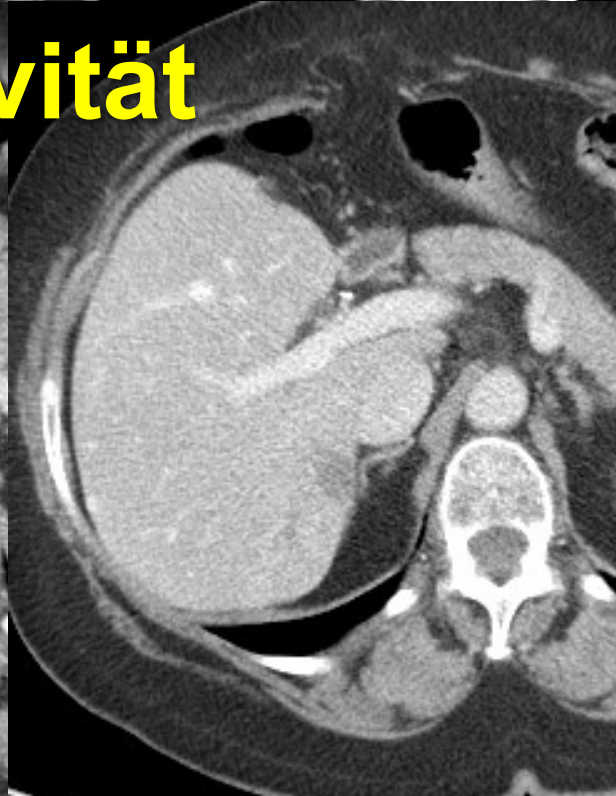
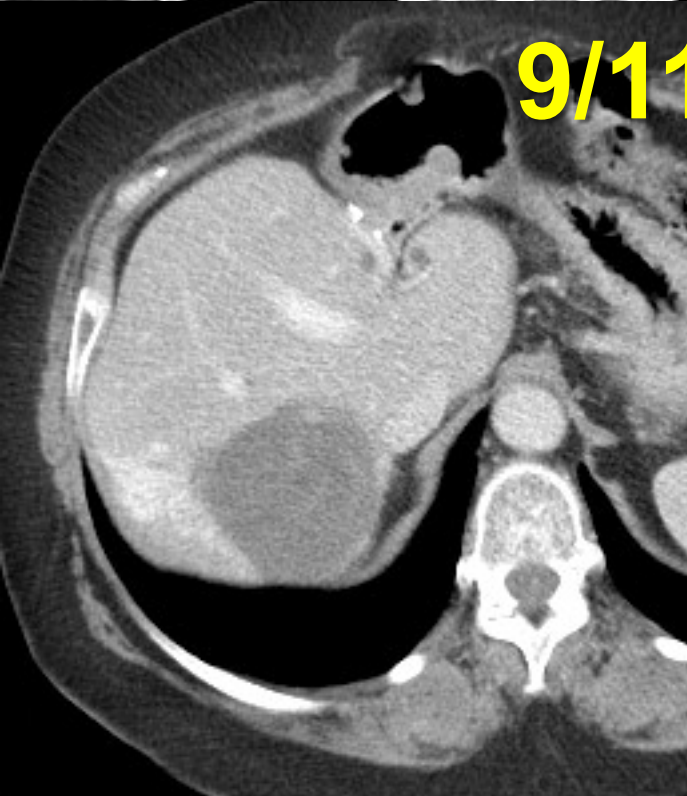
15.94 mm

50.38 mm

**24h Kontrolle 10 cm Nekrose  
nach 2 Tagen Entlassung  
*Postablationssyndrom***

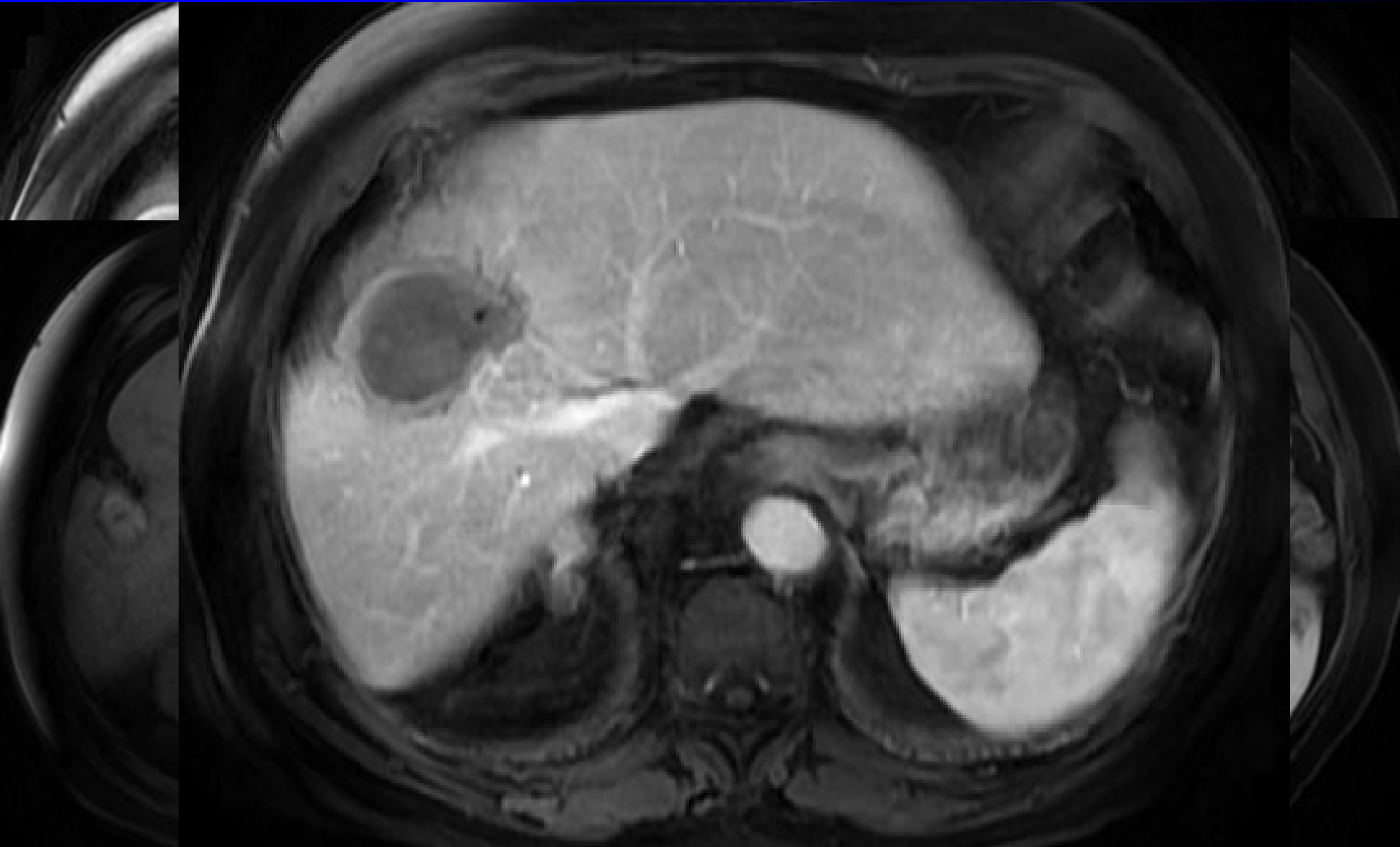






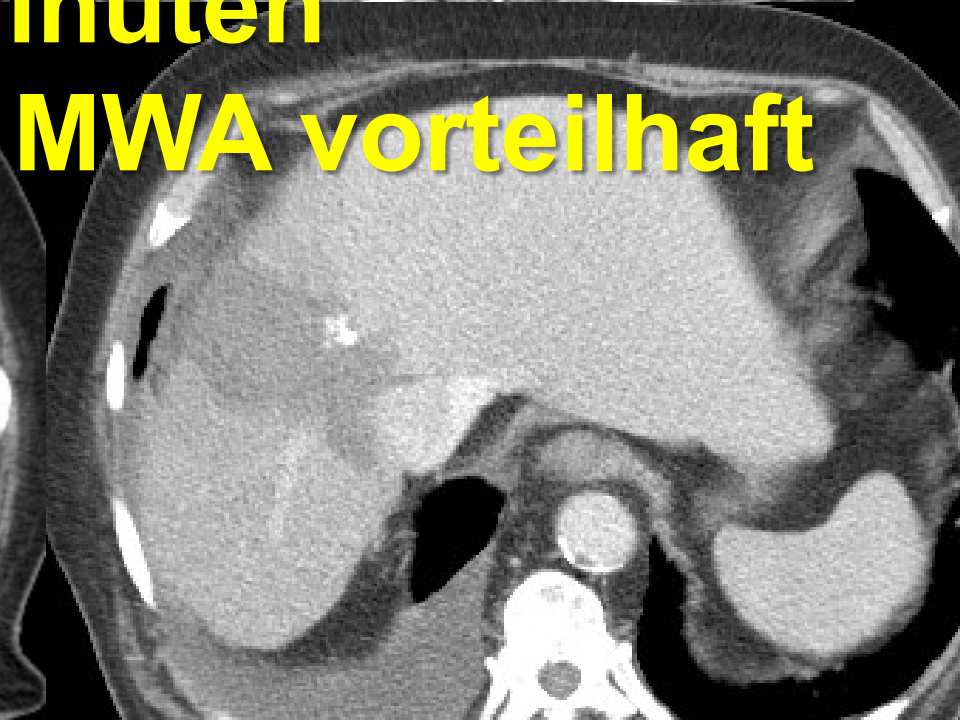
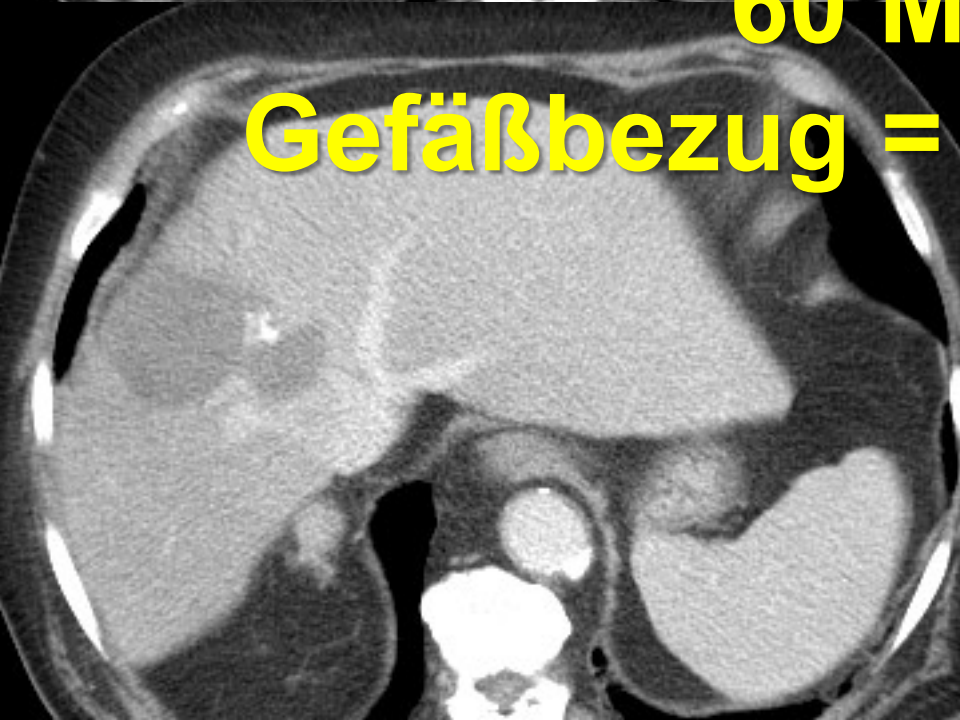
**9/11: keine Aktivität**

# HCC mit Tumorrest





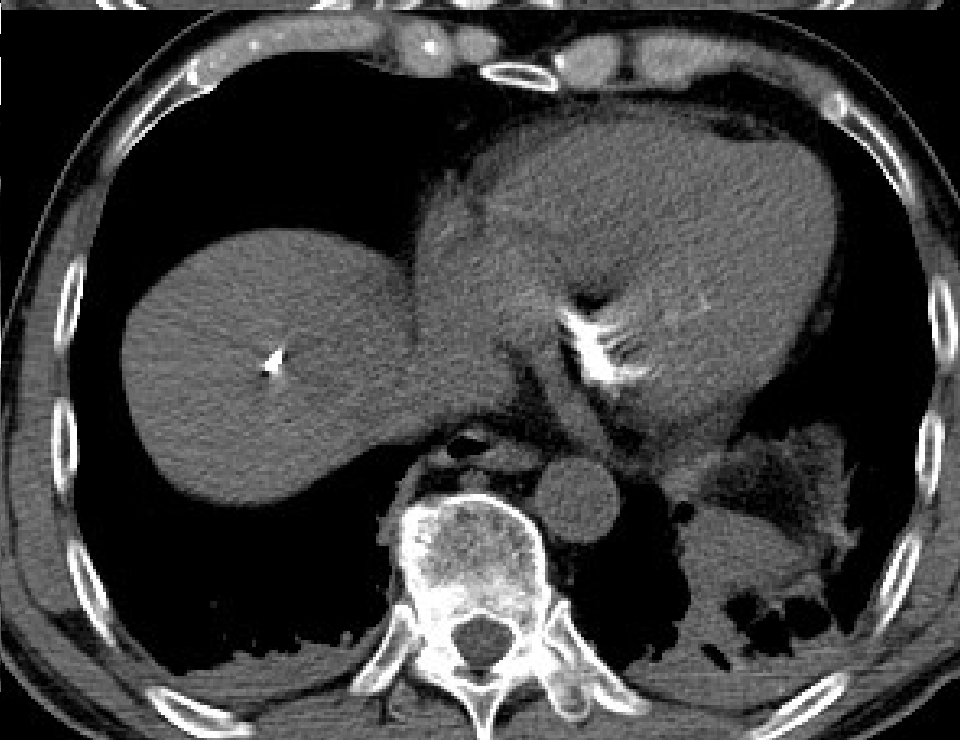
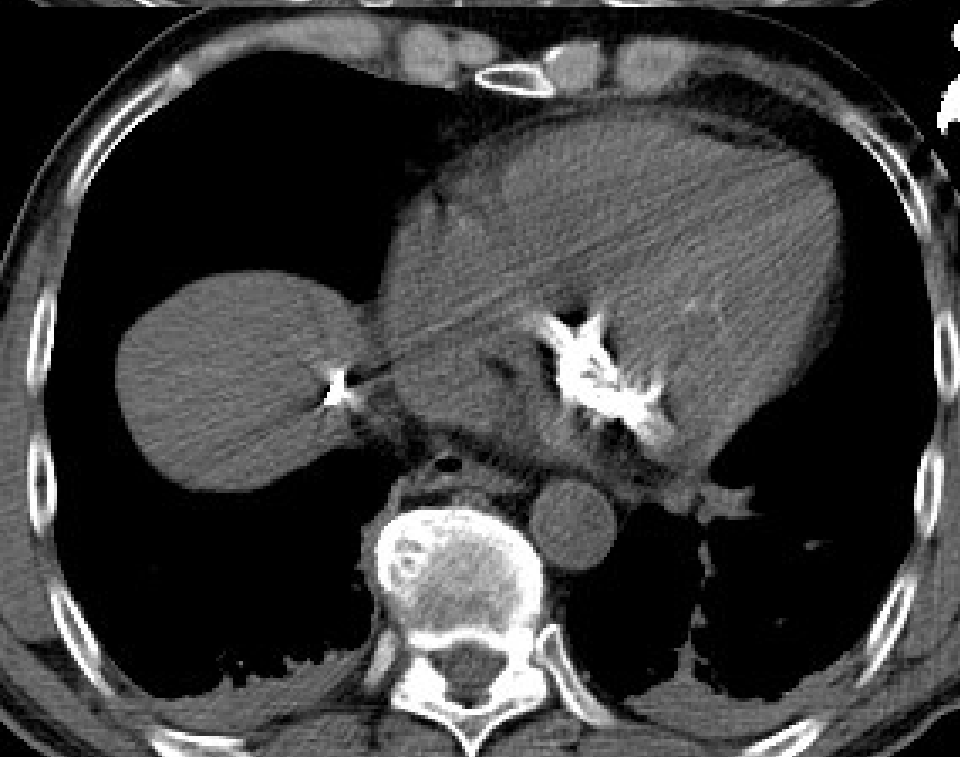
**MWA: 2 Positionen, 6 Ablationen  
60 Minuten**



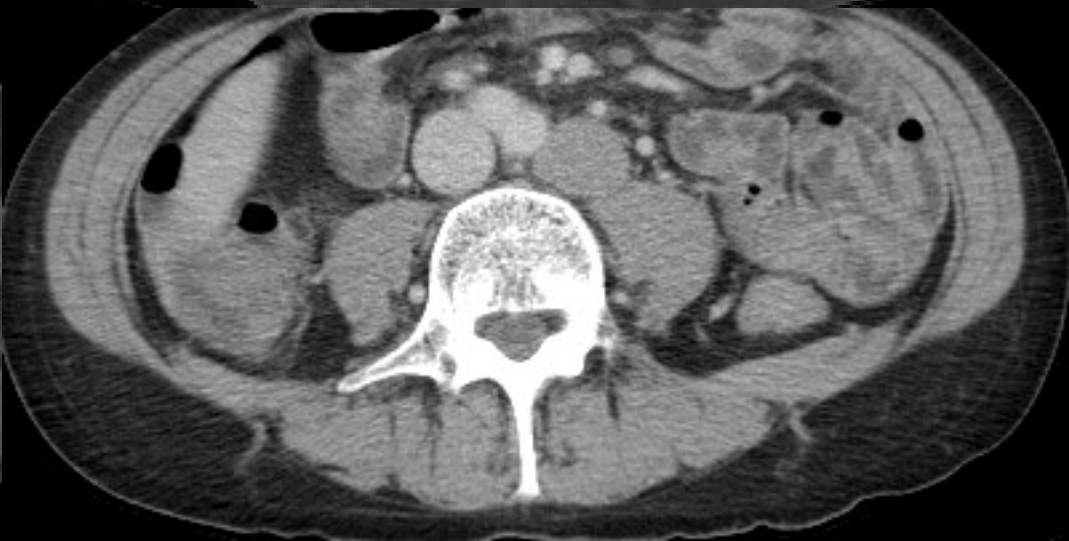
**Gefäßbezug = MWA vorteilhaft**

# Punktion & Steuerung

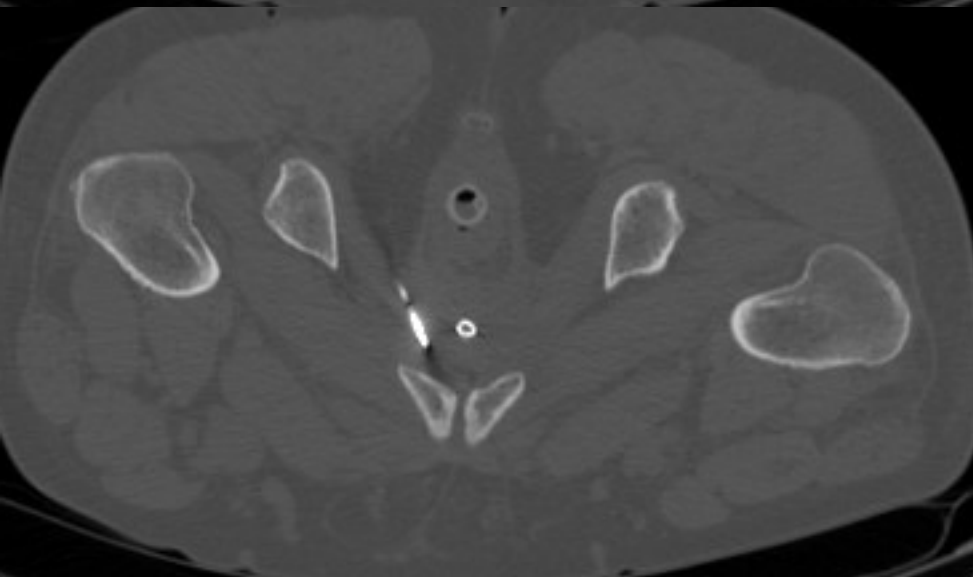
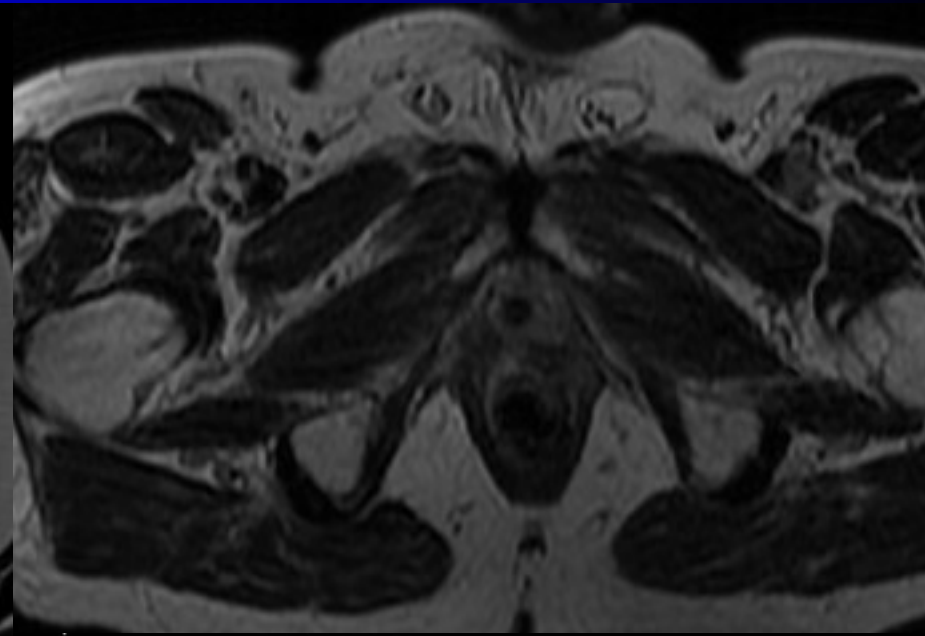
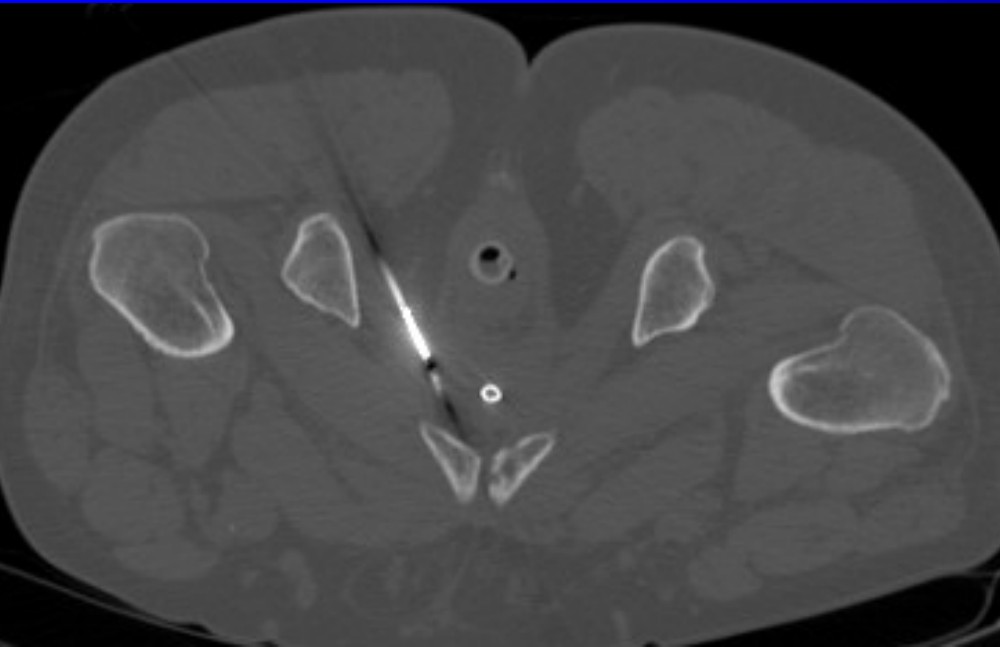


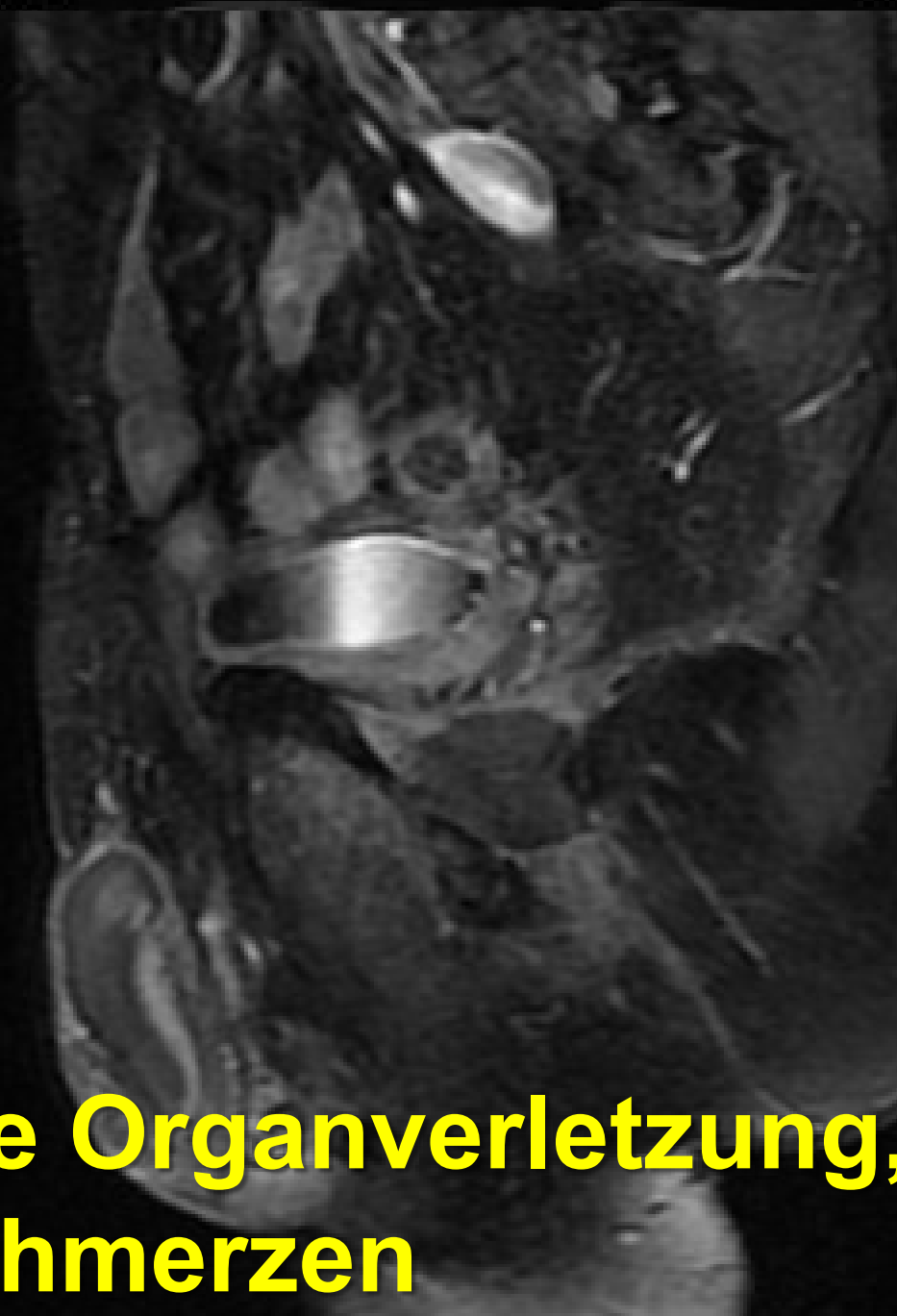
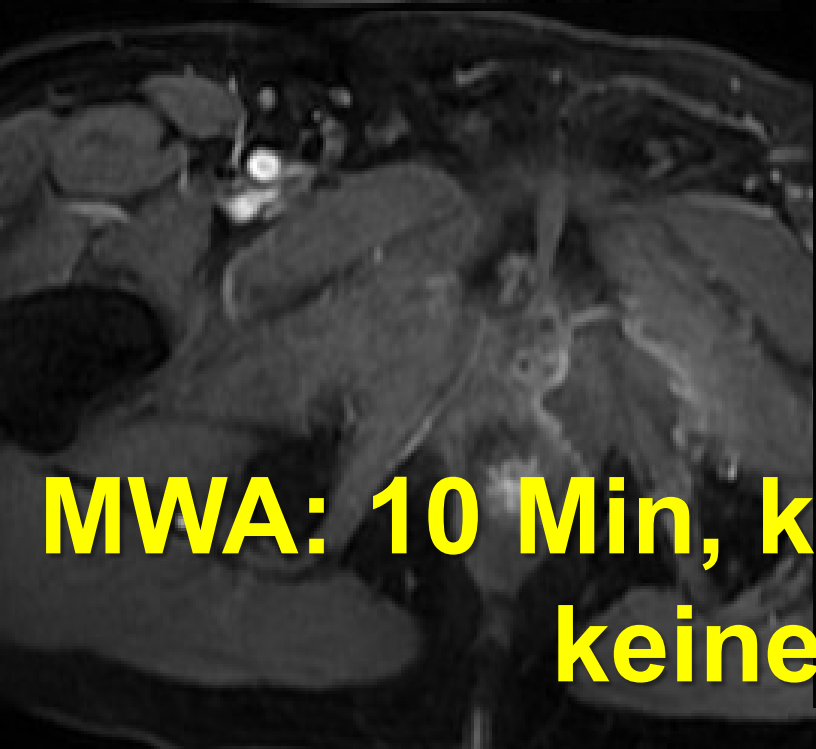


# Lymphogen metastasiertes Magenkarzinom 2007



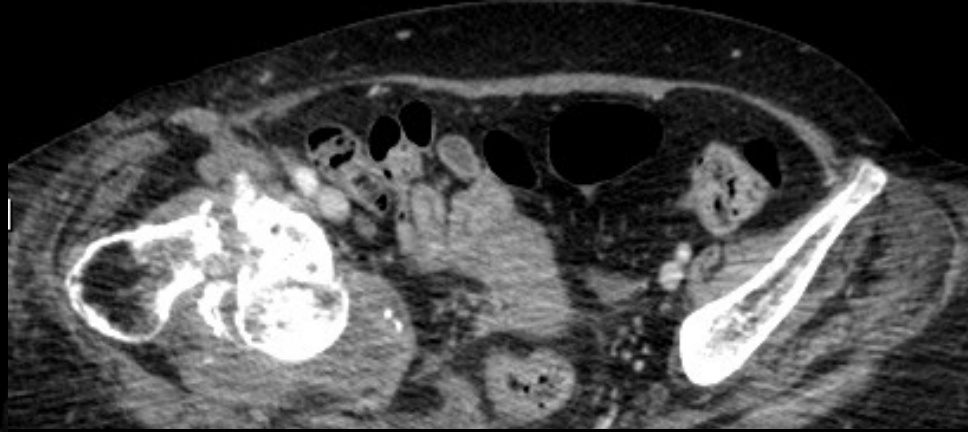
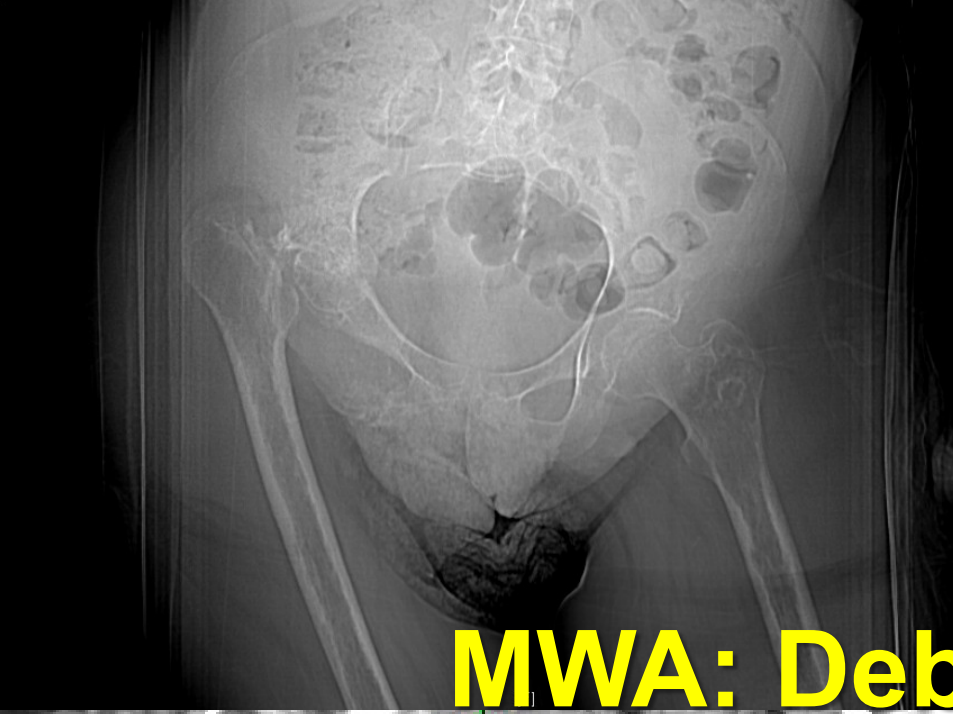
# Prostata-Ca Rezidiv



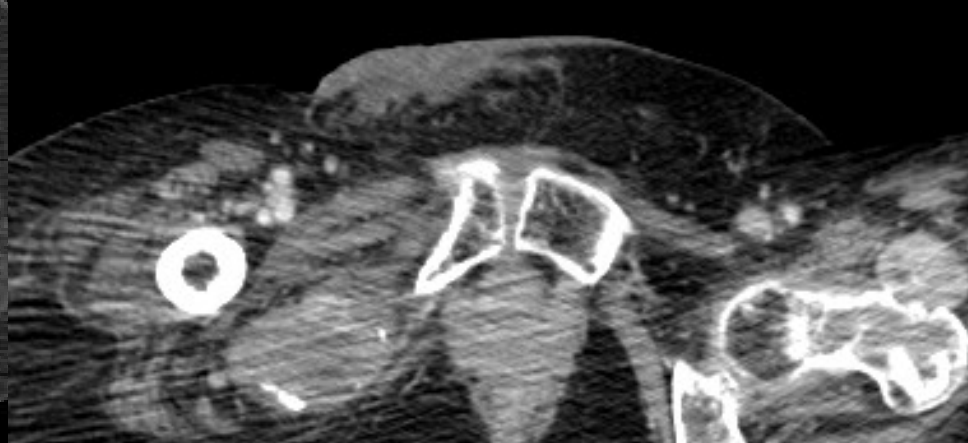
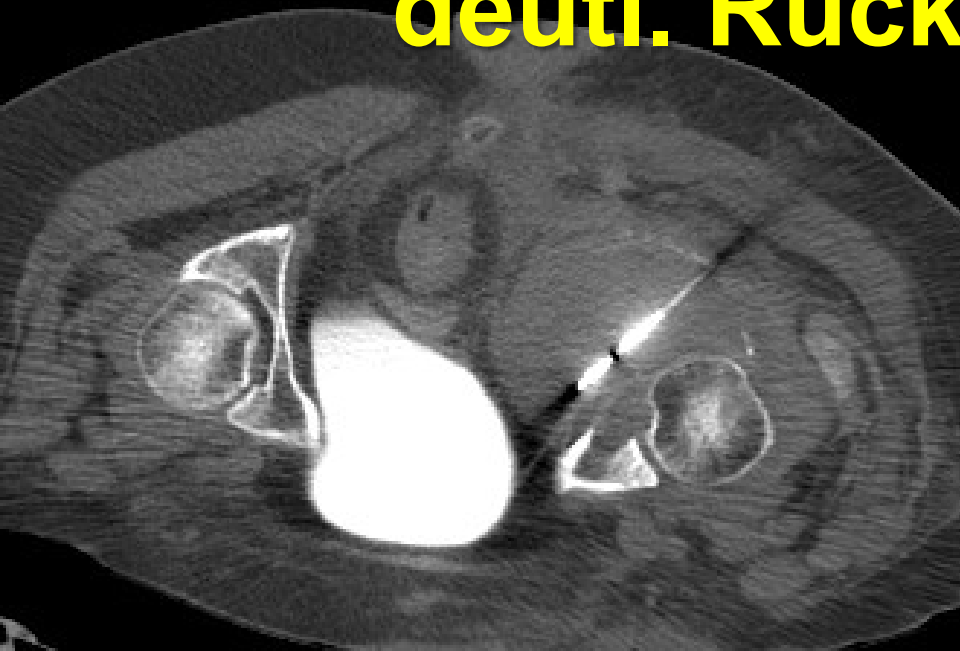
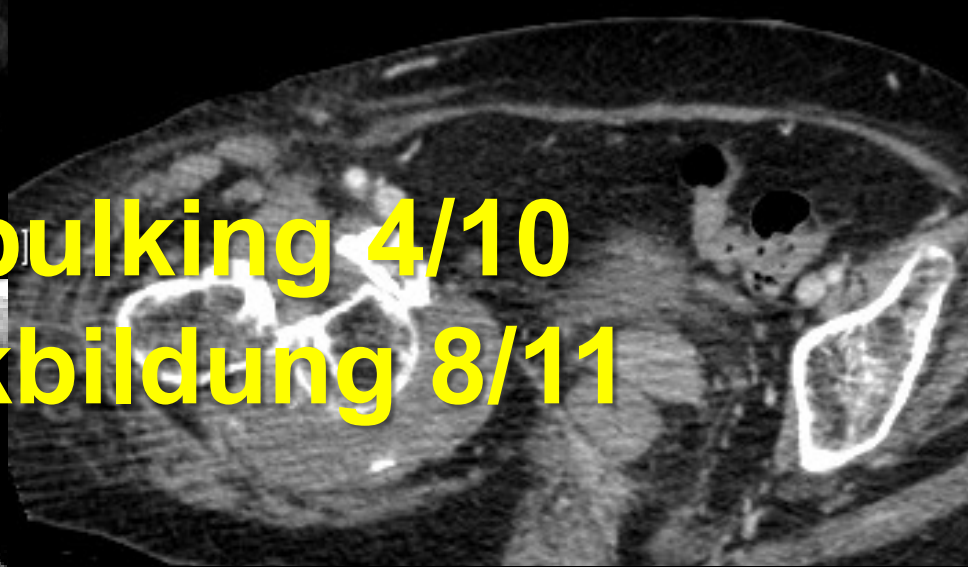


**MWA: 10 Min, keine Organverletzung,  
keine Schmerzen**





**MWA: Debulking 4/10**  
**deutl. Rückbildung 8/11**



# Mikrowellenablation

hohe Energiedichte → Gefäßbezug

zeitlich definierte Ablationen (10 Min)

Nekrosen exakt zu kalkulieren

mehrere Sonden → große Tumore

→ Überlappung/Geometrie

→ Postablationssyndrom

weniger Schmerzen, Läsionsgröße?

MWA → Nekrose unregelmäßig?

# Mikrowellenablation

120 MWA in knapp 2 Jahren

größeres Indikationsspektrum

Läsionen  $\leq 2,5$  cm RFA effizient

MWA aus einer Position unterlegen

Sondengeometrie! → Überlappung

Koordinatenablation: 1,2 cm

Erfolg eine Frage der Technik, 2 & 2

exakte Steuerung, Nachfrage steigt