Rolle der Strahlentherapie als Teil der Palliative Care

16.03.2023

Patrick Clemens

LKH Feldkirch
Abteilung für Strahlentherapie und Radio-Onkologie
patrick.clemens@lkhf.at

Palliativ Netz Liechtenstein

In Kooperation mit:
UFL Private Universität im Fürstentum Liechtenstein
SPITALREGION RHEINTAL WERDENBERG SARGANSERLAND

Fortbildungsseminar

Palliativ-Netz Liechtenstein (PNFL)

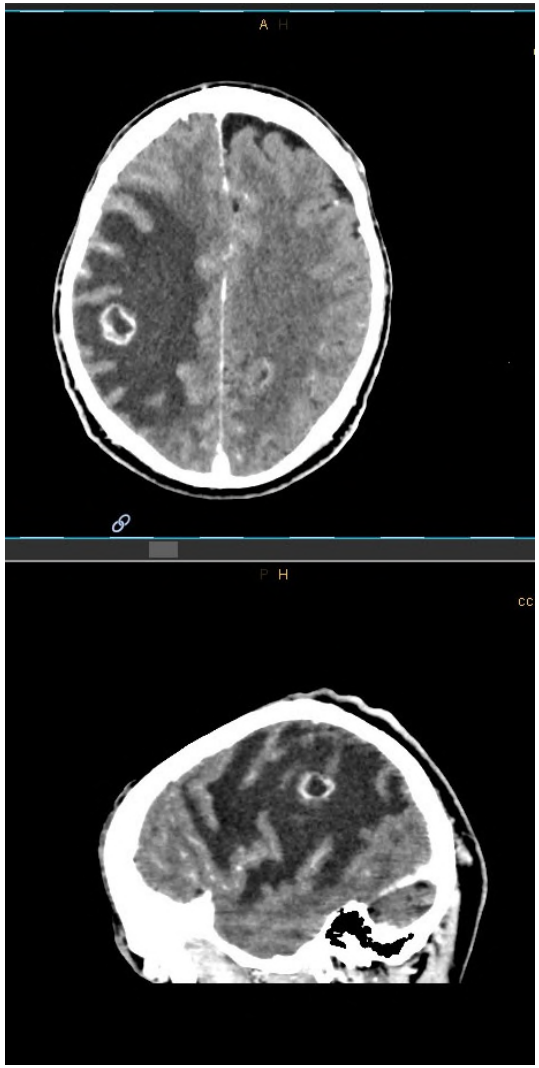
Brückenschlag zwischen allgemeiner und spezialisierter Palliative Care durch regionale und multidisziplinäre Zusammenarbeit

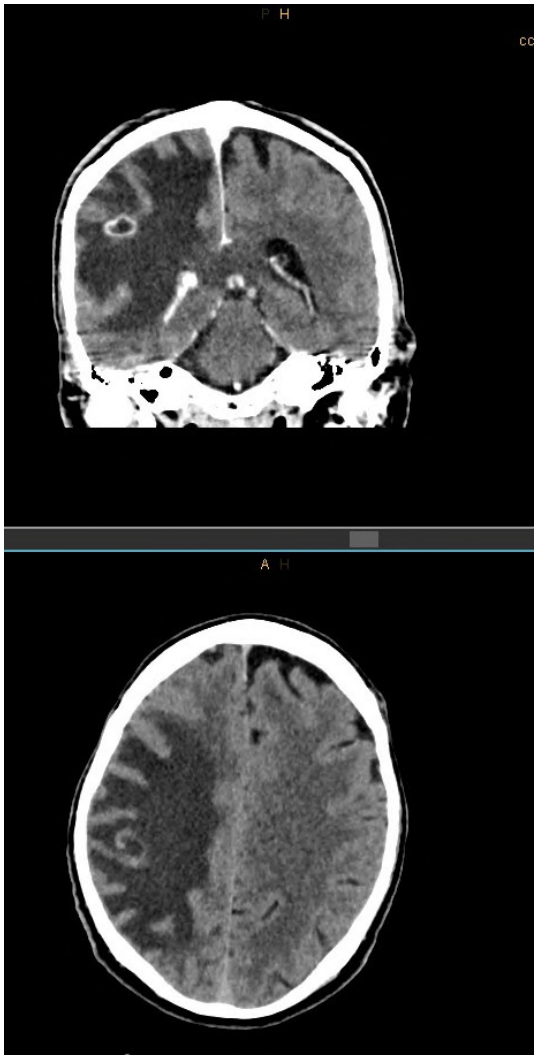
16. März 2023, Gemeindesaal und UFL/Spoerry Triesen (FL)

- 03/2023: Patient, 62a
- Patient mit Hemiplegie links zuhause aufgefunden
- Aufnahme zur Therapie & weiteren Abklärung

CCT mit KM

Knapp 2 cm große Metastase rechts frontoparietal mit massiven Hirndruckzeichen, subfalzine Herniation





Ursache für Symptome gefunden

Akutbehandlung:

GC - 40mg Fortecortin i.v./PPI

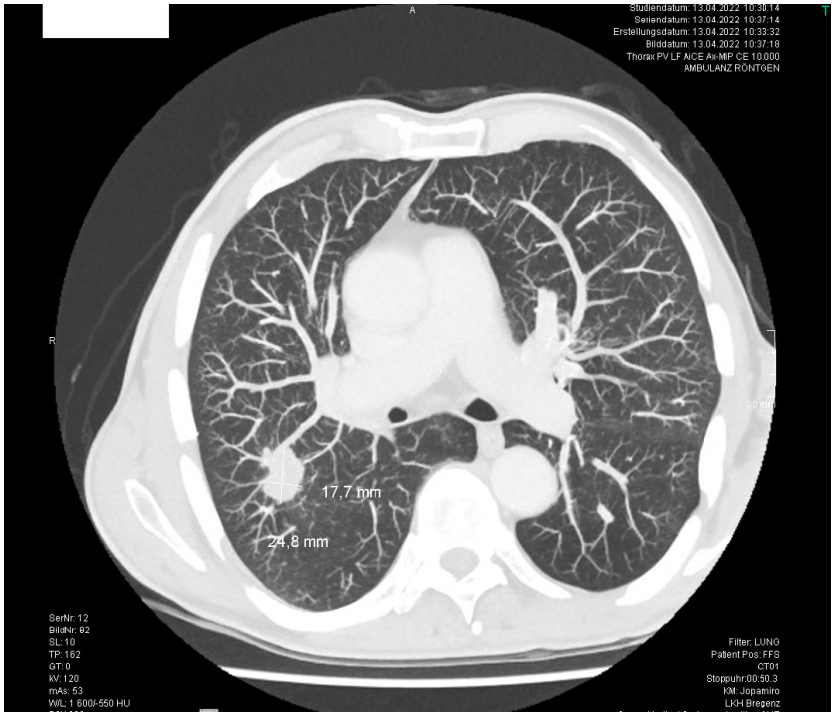
Primumsuche

lehnt Patient ab

Vorbefund

04/2022

V.a. Bronchus CA



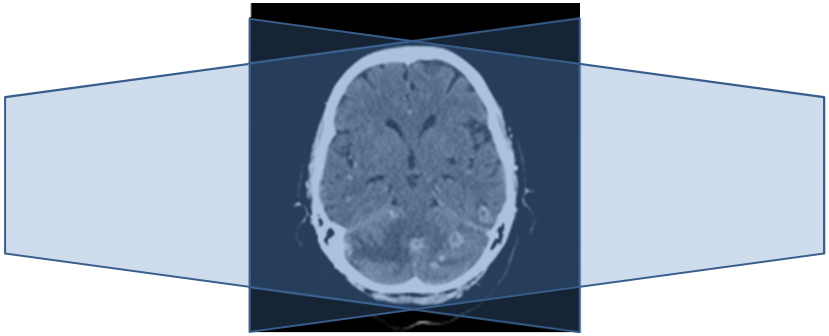
Gemeinsames klären des weiteren Vorgehens

- Was wünscht der Patient?
- Was sind die **Ziele des Patienten**?
- Was sind **unsere Ziele für den Patienten**?
- Sind die Ziele realistisch erreichbar?

Maximal symptomorientierte Therapie

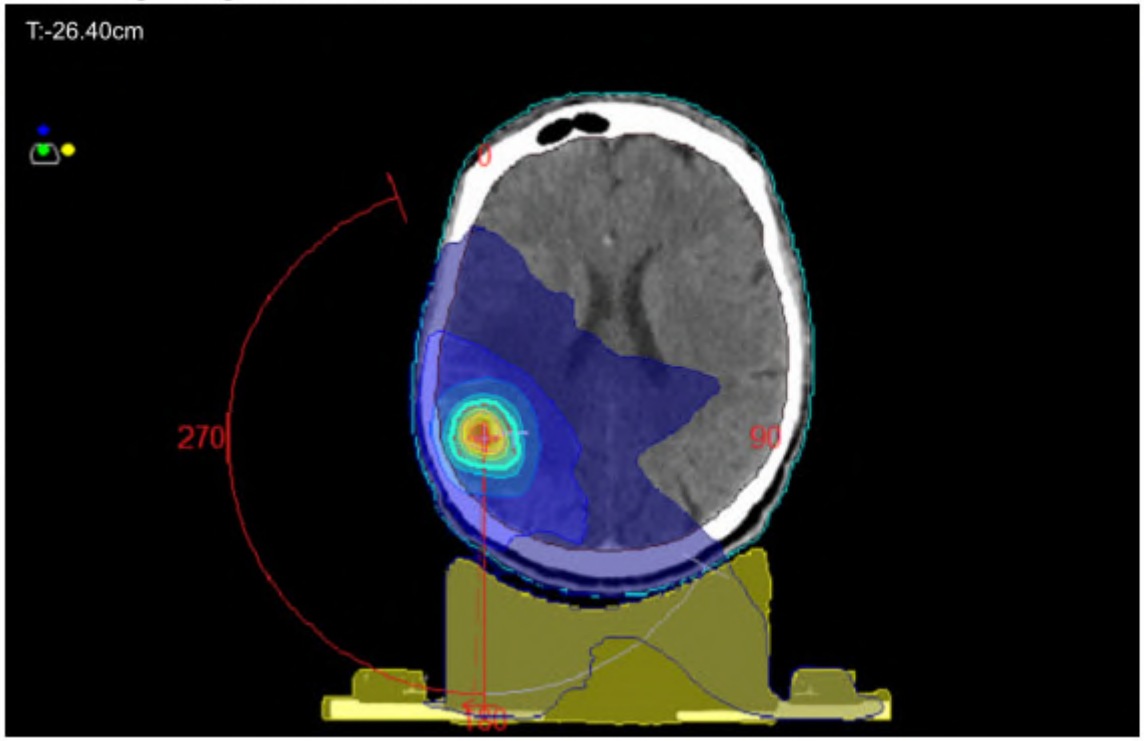
Hirnmetastasen

- Therapie:
  - Früher Ganzschädelradiatio



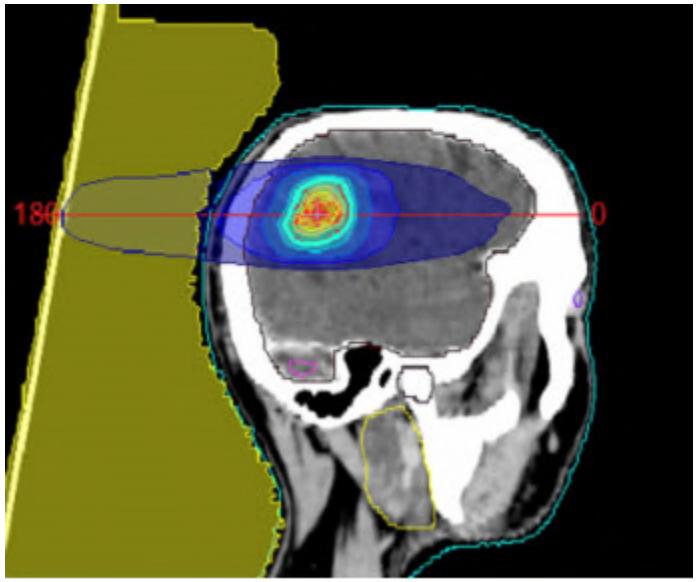
  - Möglichkeiten jetzt?

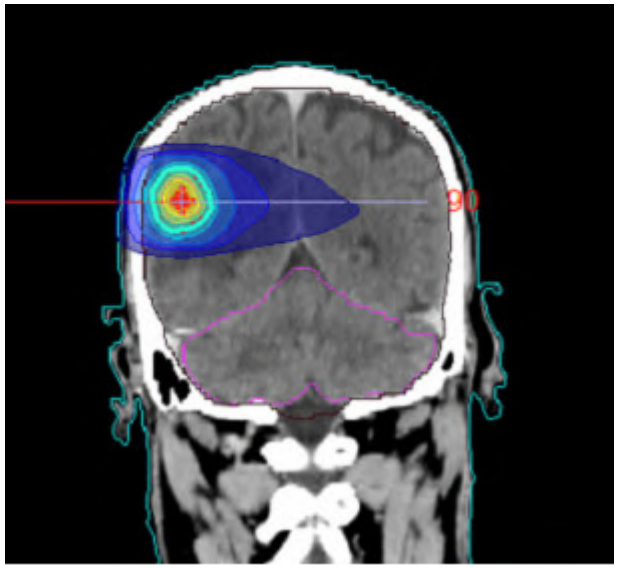
SPV Passing Through Plan Isocenter



Color	Dose (Gy)
	48.125
	46.813
	43.750
	41.563
	39.375
	35.000
	30.625
	21.875
	13.125
	4.375

Color	Structure Name
	Patient
	Eye Globe L
	Eye Lens R
	Gland Parotid R
	Gland Parotid L
	OpticNerve R
	OpticNerve L
	Gland Submand
	Eye Lens L
	Ear Cochlea R
	Eye Globe R
	TMJoint R
	TMJoint L
	Gland Submand
	Cerebellum
	Pituary
	Ear Cochlea L
	Chiasm
	OralCavity
	Brain
	SpinalCord
	Brain Stem
	Gland Lacrimal
	Gland Lacrimal
	Tisch Schaedel
	GTV
	PTV 3500





Was ist Strahlentherapie?

- Medizinische Anwendung von **ionisierender Strahlung zur Therapie von (Krebs-) Erkranungen**
- und ggfs. Kombination mit anderen Modalitäten (z.B.: Ctx, Immuntherapie, Hyperthermie)
- zumindest der technische/physikalische Teil …

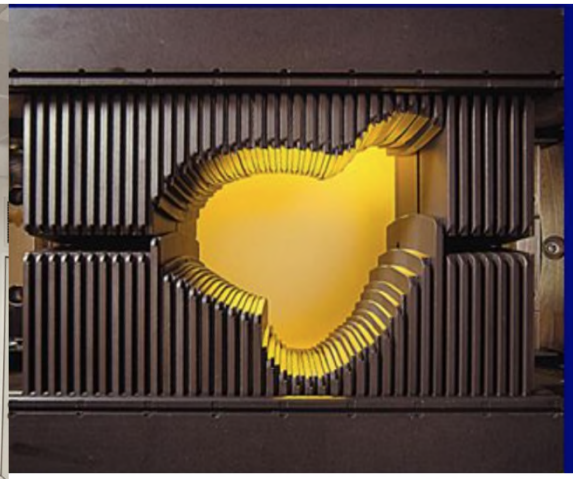
Ionisierende Strahlen

- Als **Energiedosis** bezeichnet man die von einem bestrahlten Objekt, z. B. Körpergewebe, über einen Belastungszeitraum pro Masseeinheit absorbierte Energiemenge

Einheit: Gray (**Gy**)

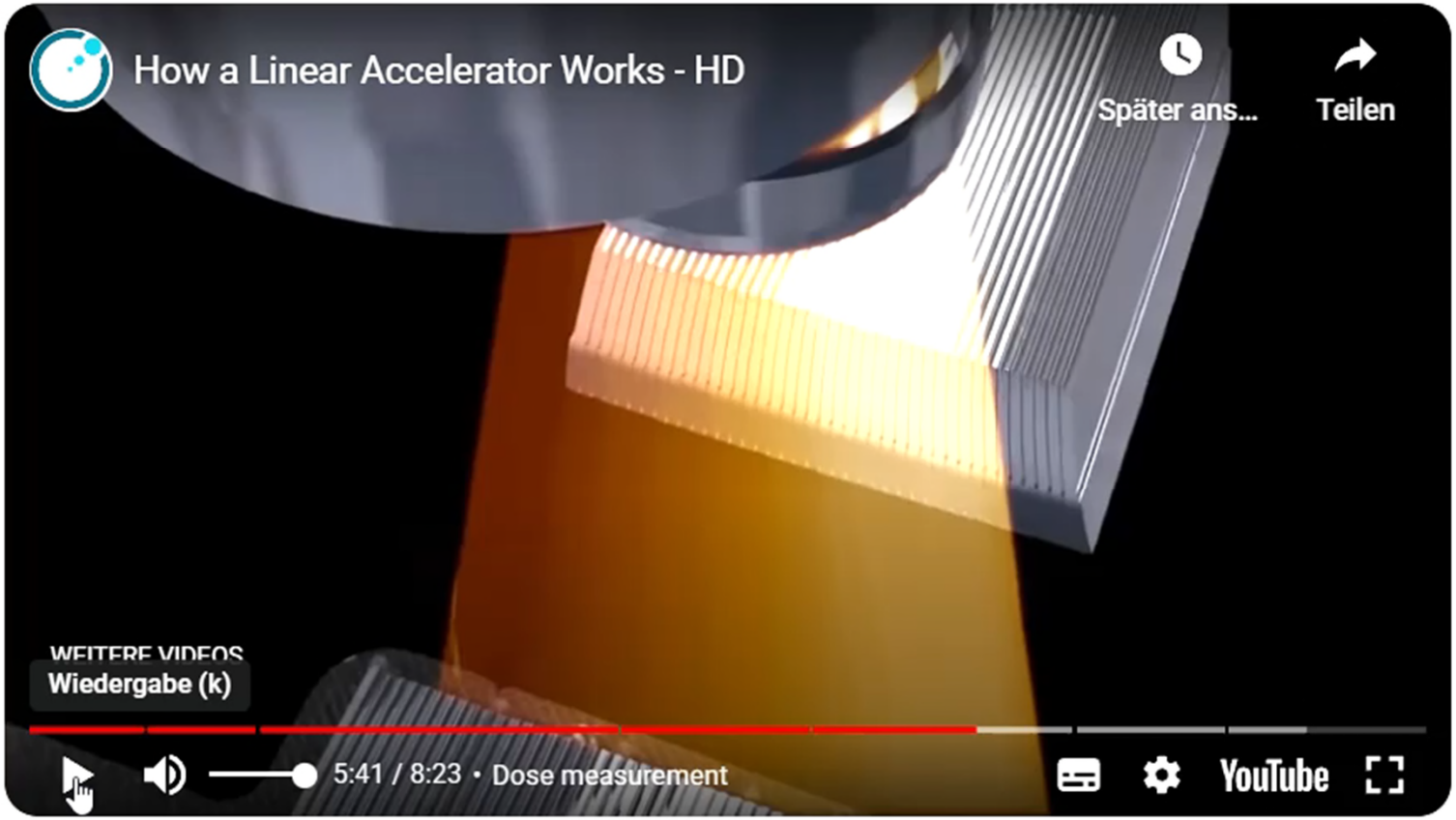
1 Gy = 1 J/kg

LINAC (Linearbeschleuniger)

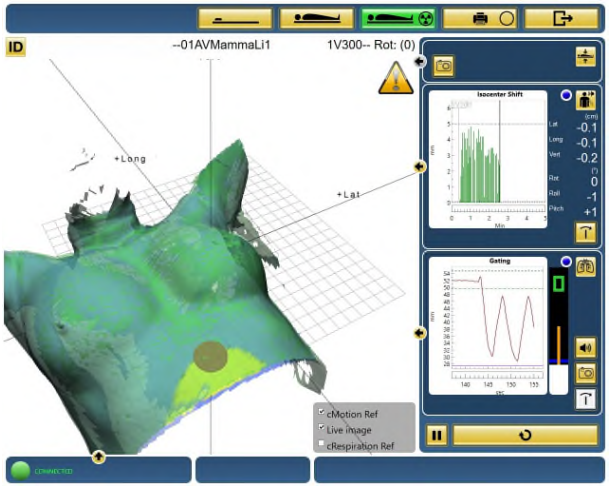


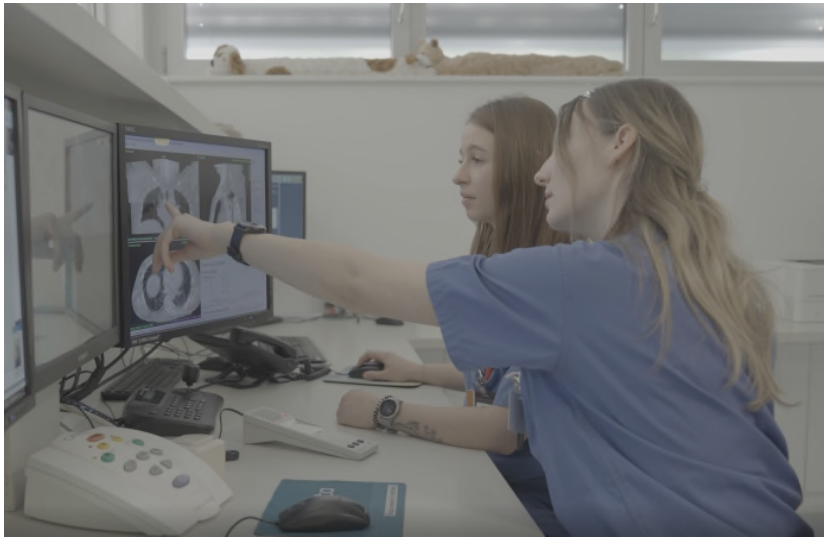
How a Linear Accelerator Works - HD

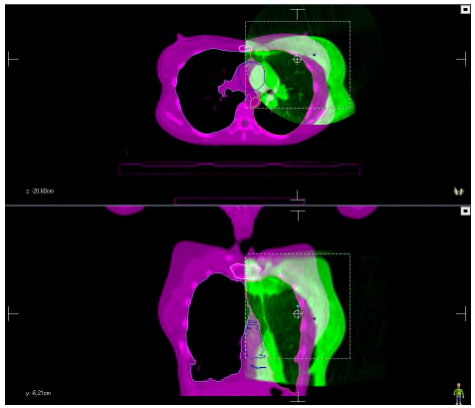
YouTube · Elekta · 26.12.2010



https://www.youtube.com/watch?v=jSgnWfbEx1A

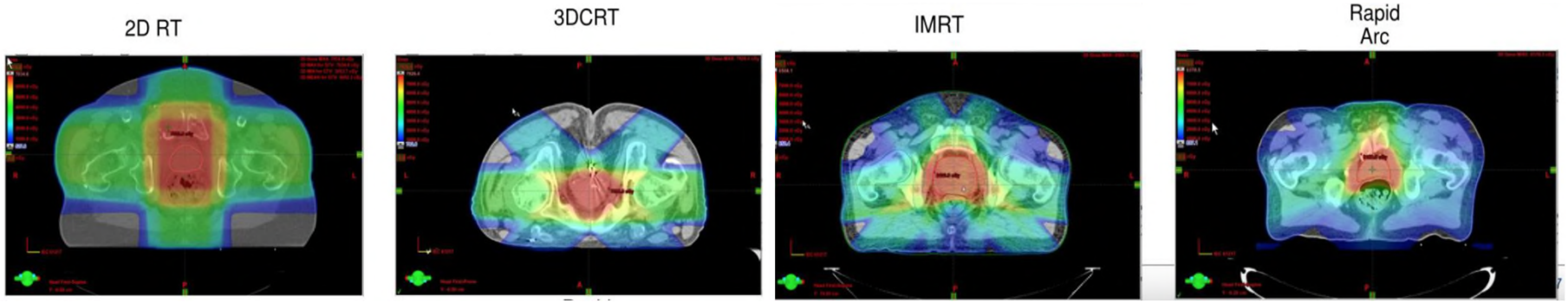

ID
--01AVMammaLi1
1V300-- Rot: (0)
+Long
+Lat
Isocenter Shift
Gating
cMotion Ref
Live image
cRespiration Ref





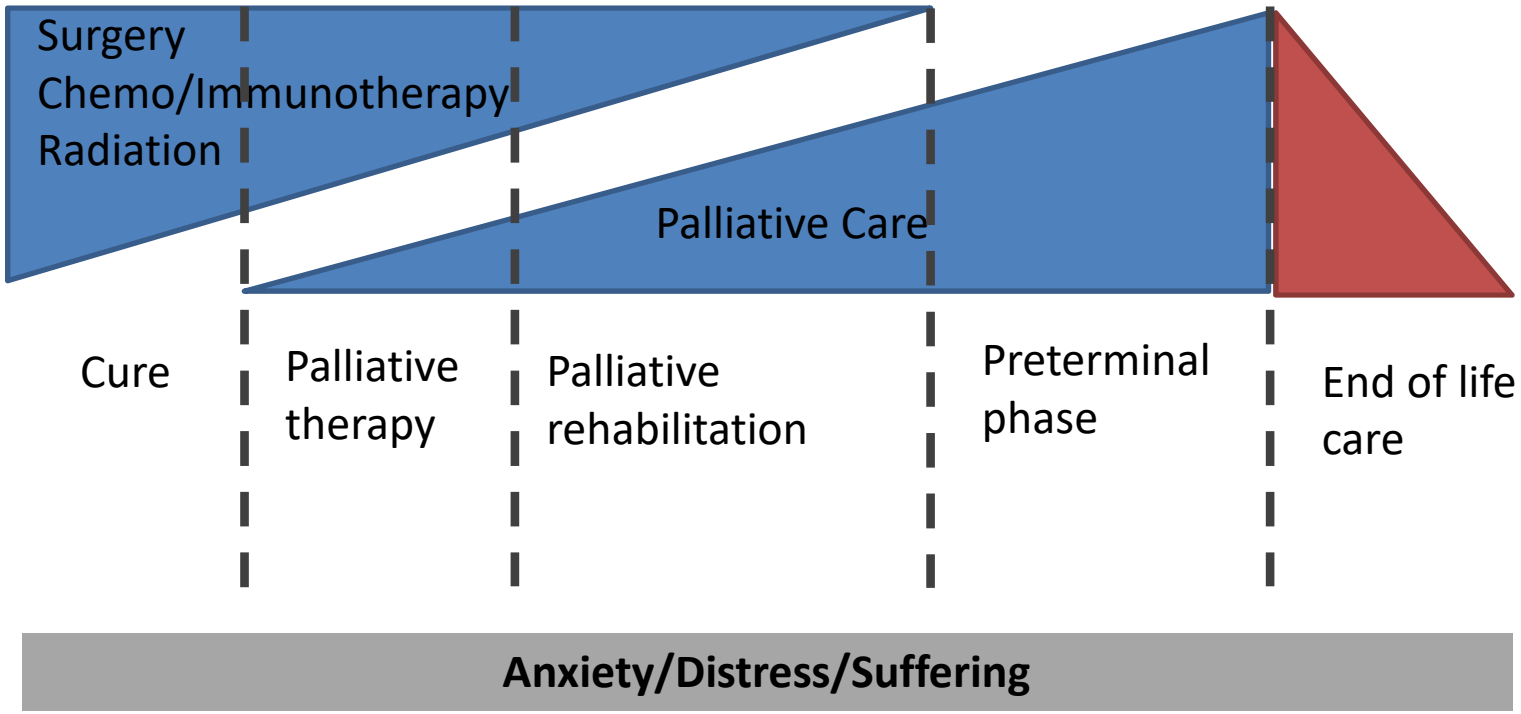
Ziel der Strahlentherapie

Bestmögliche Tumorkontrolle durch maximale Tumorzellzerstörung unter Schonung von umliegend gesundem Gewebe

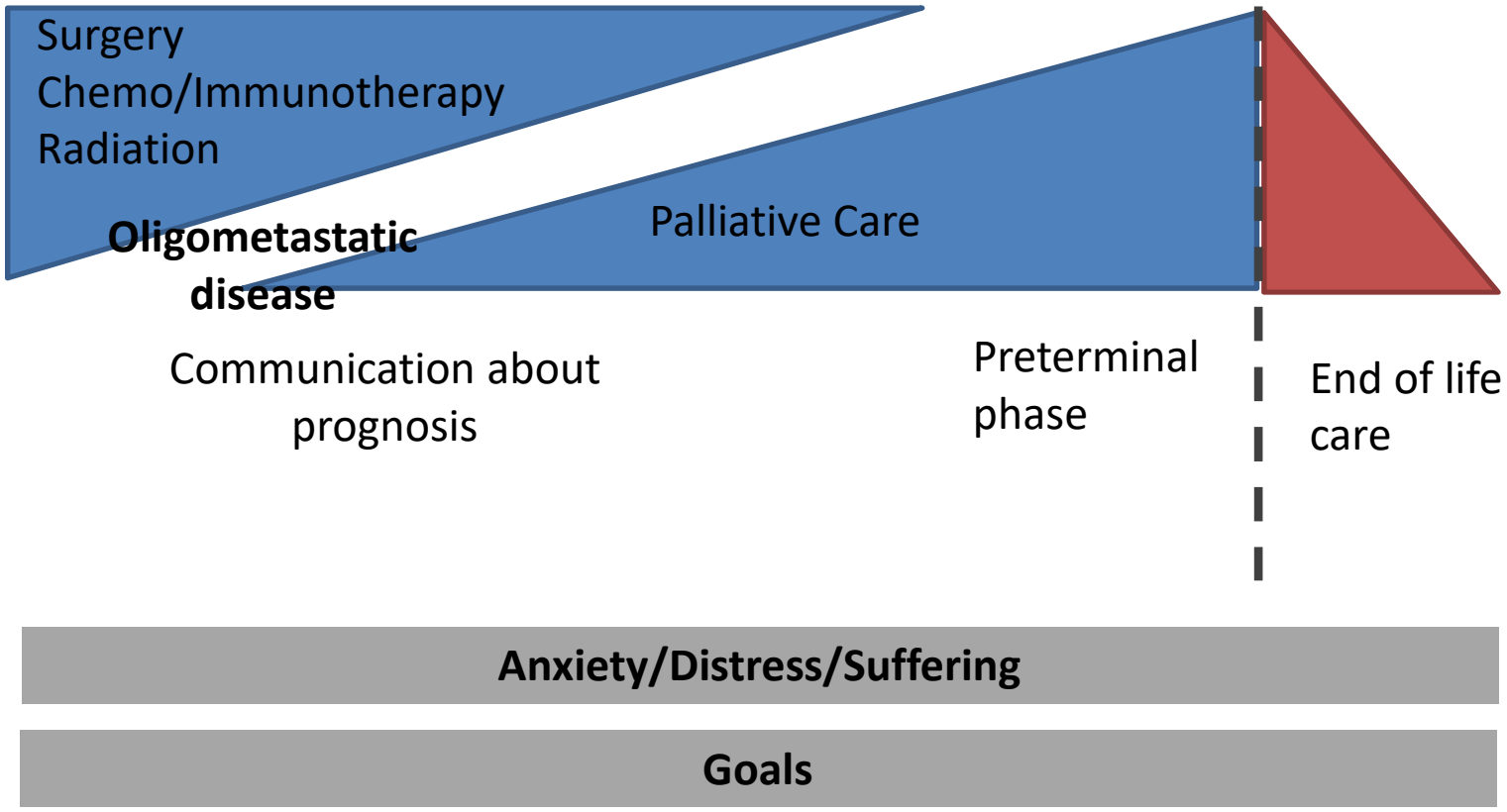


Ziel der Strahlentherapie
Palliative Care

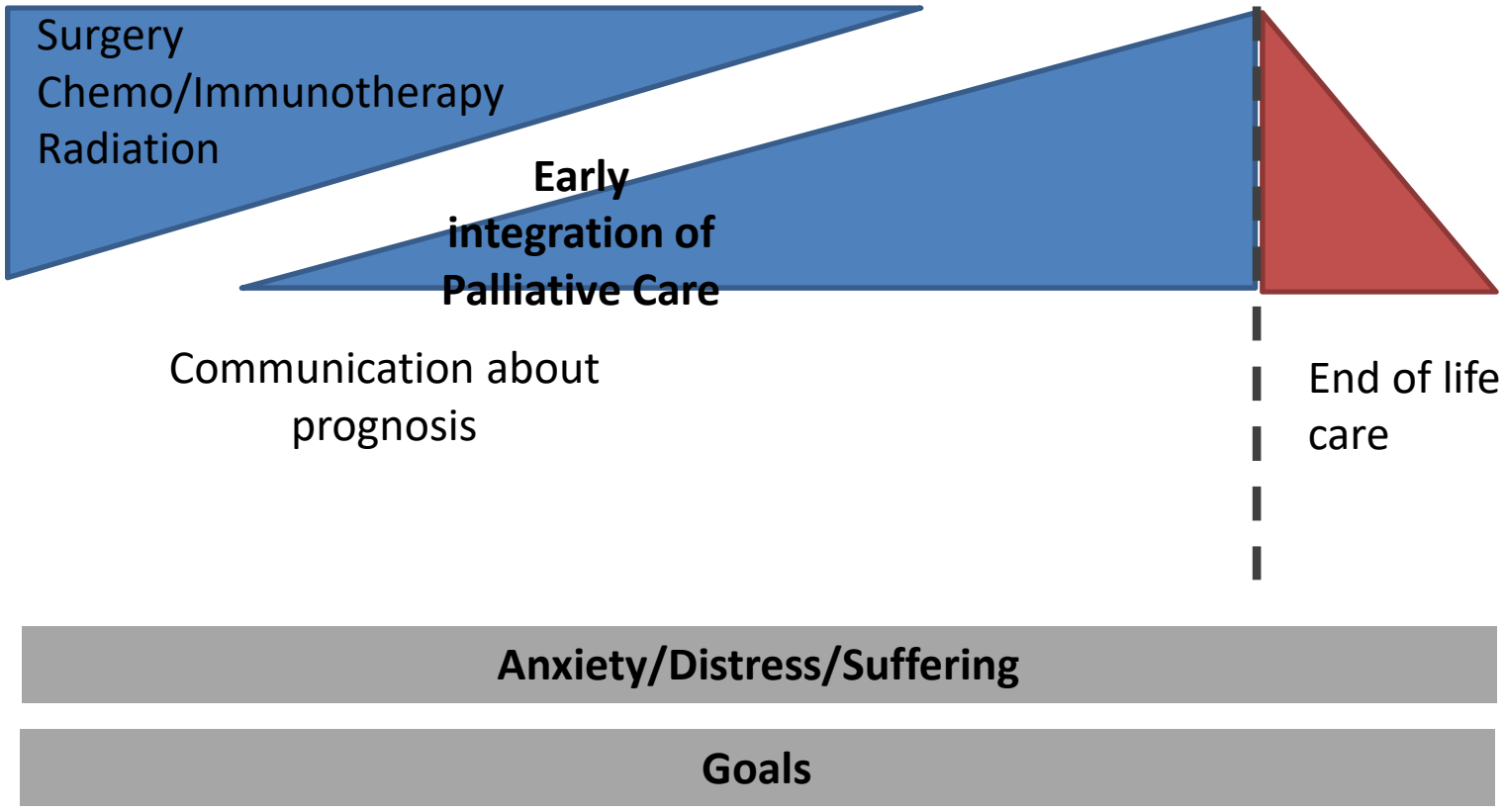
- Bestmögliche Symptomkontrolle durch Tumorzellzerstörung unter maximaler Schonung von umliegend gesundem Gewebe – Quality of Life
- Verhinderung von Symptomen in der Zukunft
- Lebensverlängerung – nicht um jeden Preis



Nach CLEMENS, K.E., KLASCHIK, K., Palliative medicine. State of the art 2007, Anaesthesiol. Intensivmed. Notfallmed. Schmerztherapie 42 (2007) 280–285)



Nach CLEMENS, K.E., KLASCHIK, K., Palliative medicine. State of the art 2007, Anaesthesiol. Intensivmed. Notfallmed. Schmerztherapie 42 (2007) 280–285)
Adaptiert Clemens 2023



Nach CLEMENS, K.E., KLASCHIK, K., Palliative medicine. State of the art 2007, Anaesthesiol. Intensivmed. Notfallmed. Schmerztherapie 42 (2007) 280–285)
Adaptiert Clemens 2023
Temel et al 2010, DOI: 10.1056/NEJMoa1000678

Ziele der Palliativen Therapie

Symptomatic brain metastases (SCLC)

	Europe	USA
Extende Life	23%	48%
Relieve Symptoms	87%	96%
Prevent Symtpoms	39%	80%
Give Hope	20%	44%

Maher et al 1992

Review Article

Defining the radiation oncologist's role in palliative care and radiotherapy

Tai Chung Lam[1], Yolanda Tseng[2]

- A palliative care team is a "comprehensive group of **specialized clinicians from a variety of disciplines** who share a common goal to improve the quality of life for patients and families facing serious illness.
- Among a survey of ASTRO members, 79% respondents reported having a palliative medicine service at their in institution.

http://dx.doi.org/10.21037/apm.2018

Review Article

Defining the radiation oncologist's role in palliative care and radiotherapy

Tai Chung Lam[1], Yolanda Tseng[2]

- As patients may have several radiation oncology visits over a short time, radiation oncologists also have the unique opportunity to provide **basic supportive care (e.g., nausea, pain, constipation)** and screen patients, who may **require more complex symptom management** and/or psychosocial support.
- Many patients considered for palliative radiotherapy have concomitant symptoms.
  - Symptoms:
    - Pain – 60-80%
    - Breath difficulty – 20-75%
    - Dysphagia
    - Blood loss
    - Fatigue - 50%
    - Concurrent depression/anxiety - 10-15%

http://dx.doi.org/10.21037/apm.2018

Review Article

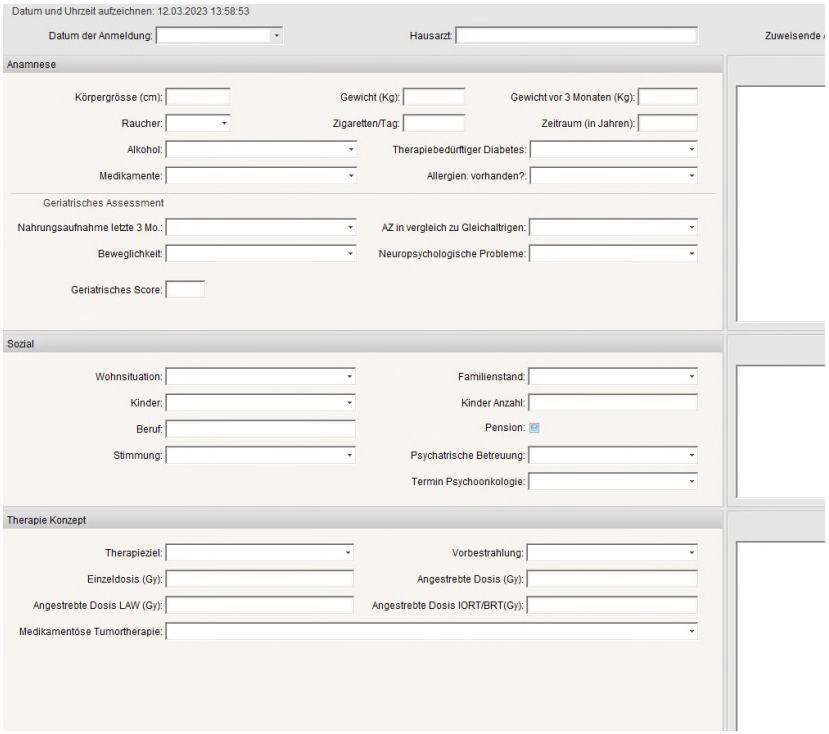
Defining the radiation oncologist's role in palliative care and radiotherapy

Tai Chung Lam[1], Yolanda Tseng[2]

Life expectancy

- For advanced cancer patients - referral for palliative radiotherapy may **herald progressive disease**
- Radiation oncologists must be comfortable with estimating life expectancy to effectively counsel patients and to **determine a patient's likelihood of benefiting** from palliative radiotherapy
- Radiation oncologists must choose a dose/fractionation scheme that **balances the patient's life expectancy with long-term efficacy** and side effects
- Despite this, **physicians** are generally **poor at prognosticating** (Chow et al 2011) and **tend to be optimistic** in survival estimates, especially for patients with limited life expectancy (Chow et al 2005, Gripp et al 2007)

http://dx.doi.org/10.21037/apm.2018



ASSESSMENT IN DER GERIATRISCHEN ONKOLOGIE FRAGENKATALOG

Komorbiditäten

art. Verschlusskrankheit	Niereninsuffizienz
Herzinfarkt	COPD
Herzinsuffizienz	Leberzirrhose
Insult	Diabetes mellitus
Demenz	Autoimmunerkrankung
Venenthrombose	Lungenembolie

Polypharmazie:

Nimmt Patient täglich >/= 5 verschiedene Medikamente? ja / nein

Ernährung:

Normalgewicht?

Gewichtsverlust in den letzten 3 Monaten? Mehr als 5%? ja / nein

(alternativ: Änderung der Kleidergröße? Wird Gürtel enger geschnallt?)

Mobilität:

Selbständig? mit fremder Hilfe? immobil?

Kognition:

Ist Pat. örtlich u/o zeitlich desorientiert? ja / nein

Bei Unklarheit: Uhrentest nach Shulman

Adaptiert 10.1002/14651858.CD006211.pub2

Review Article

Defining the radiation oncologist's role in palliative care and radiotherapy

Tai Chung Lam[1], Yolanda Tseng[2]

Gaps in physician-patient communication may contribute to patients' misunderstandings of the goals and limitations of their care.

Among 1,193 newly diagnosed patients with stage IV lung or colorectal cancer, 69% of lung cancer and 81% of colorectal cancer patients had **inaccurate understandings of whether palliative chemotherapy would cure their cancer** (Weeks et al 2012) clear, honest communication may provide the patient critical information to inform his treatment decisions, goals of care, and planning

http://dx.doi.org/10.21037/apm.2018

Kommunikation

Gespräch

- Anamnese – Symptome?
- Befunde (insb. Bildgebung)?
- Was wünscht der Patient?
- Was sind die **Ziele des Patienten**?
- Was sind **unsere Ziele für den Patienten**?
- Sind die Ziele realistisch erreichbar?

Maximal symptomorientierte Therapie

Review Article

Defining the radiation oncologist's role in palliative care and radiotherapy

Tai Chung Lam[1], Yolanda Tseng[2]

Clinical Indications for Radiotherapy

Uncontrolled, progressive tumor growth in advanced cancer patients may be associated with **pain**, **neurologic impairment**, **bleeding**, **ulcerative mass**, **obstruction of luminal organs**, or other **functional impairments**.

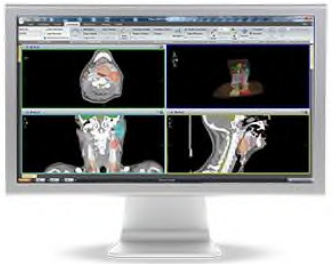
The efficacy and safety of radiation therapy for palliating these symptoms is well established in multiple settings, including those with loco-regionally advanced, inoperable, metastatic, or previously irradiated recurrent tumors (Lutz et al 2013)

http://dx.doi.org/10.21037/apm.2018

Strahlentherapie

Computertomographie

Planung

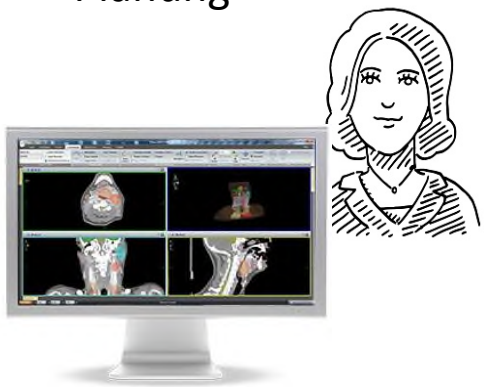


Bestrahlung

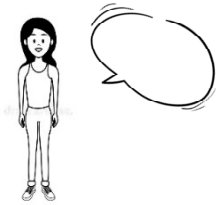
Strahlentherapie

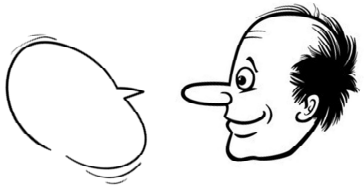
Planung

Computertomographie

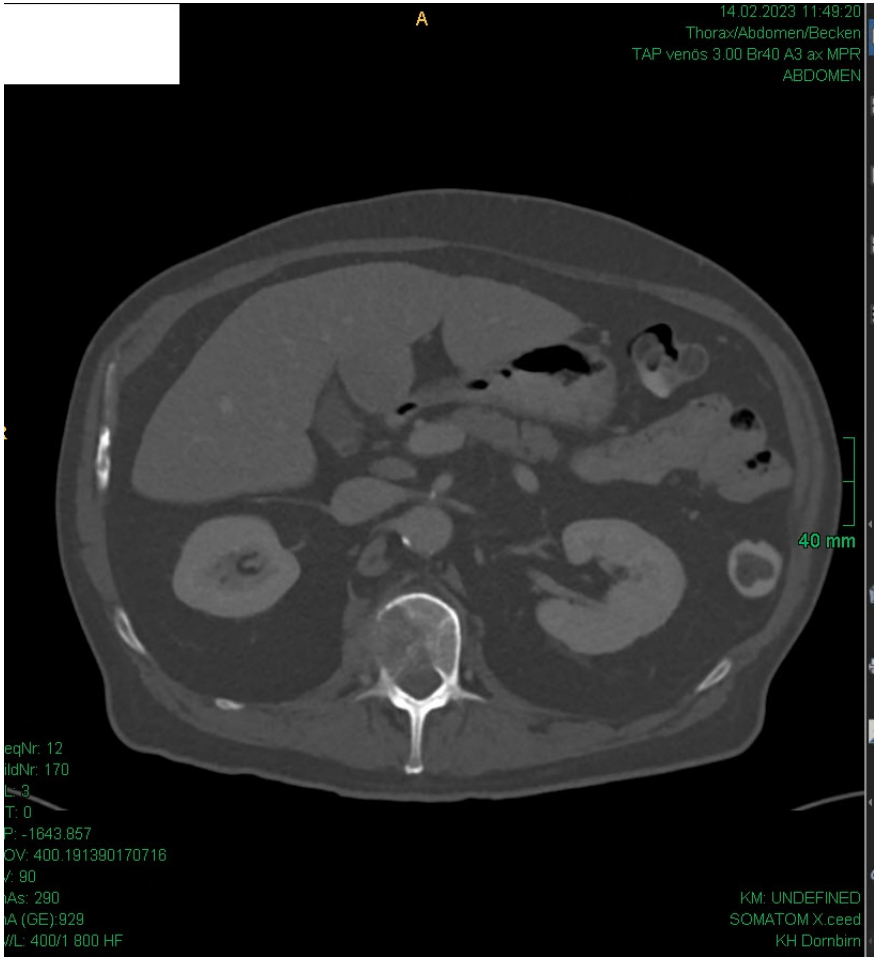


Bestrahlung



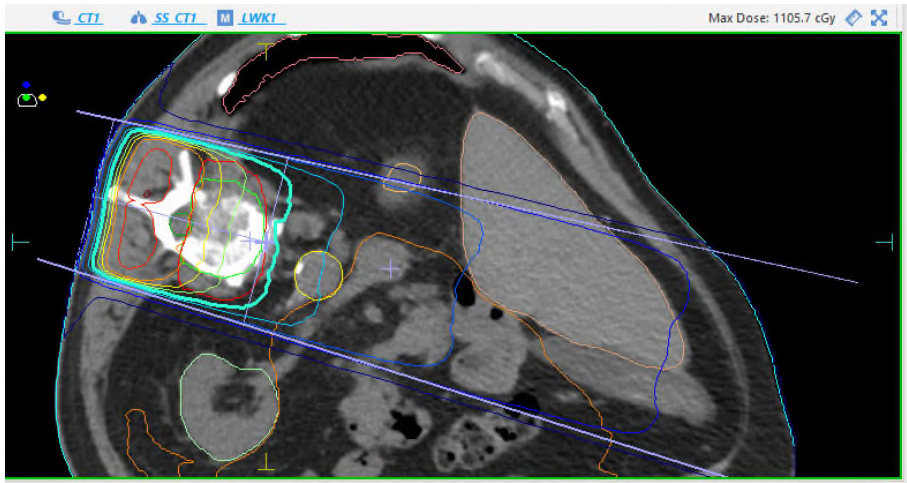


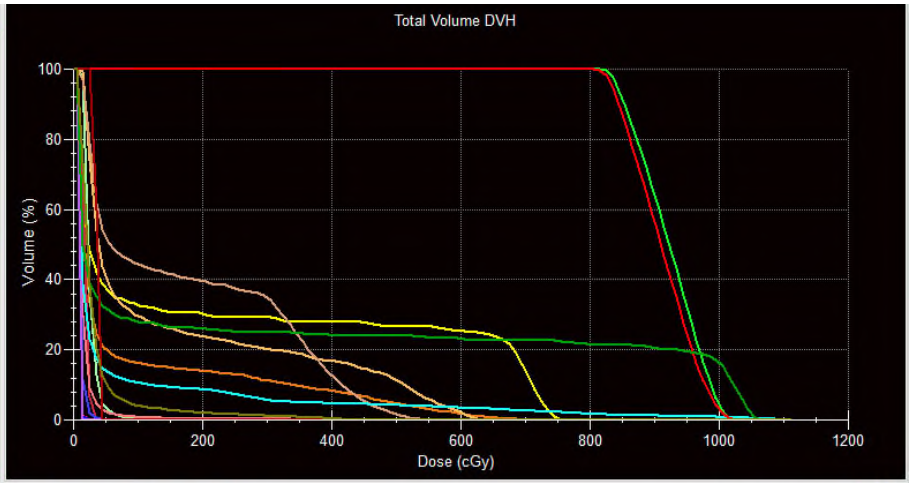
Herausforderungen

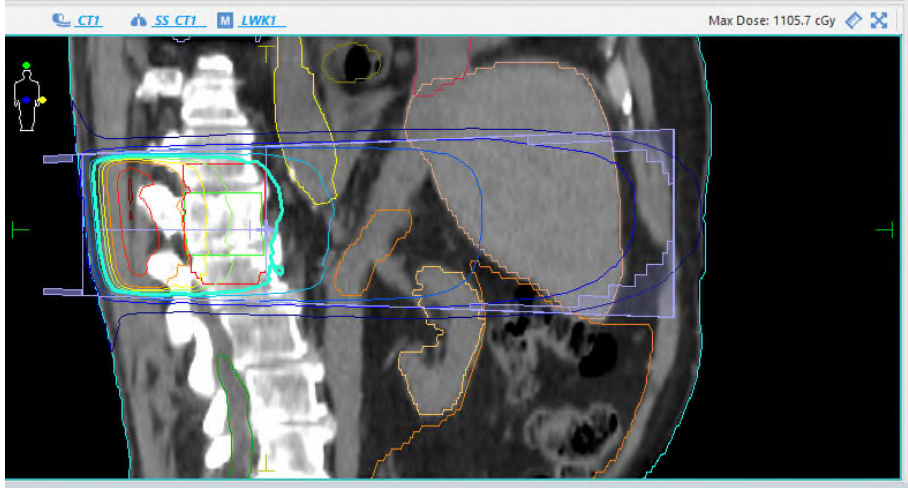


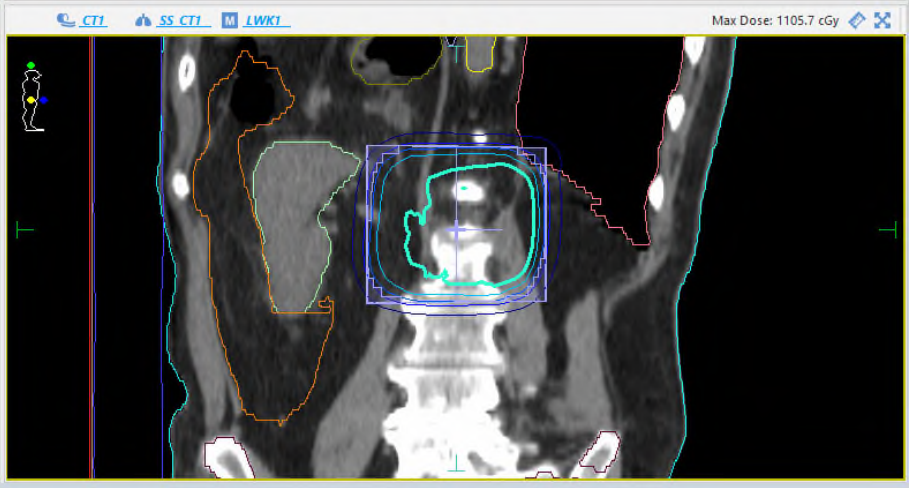
Herausforderungen

Herausforderungen

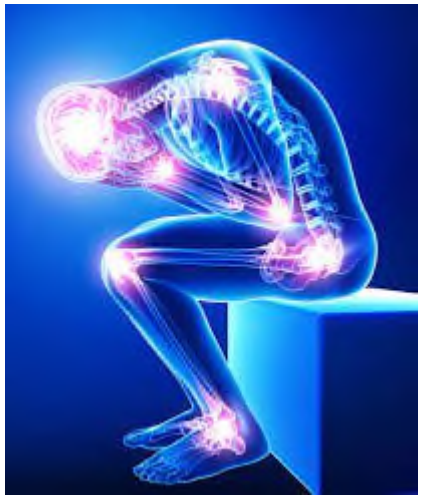








Symptom Schmerz



- 78% Schmerzen (VAS 7-10)
- 20% untragbare Schmerzen
- 45% guter Effekt der Analgetika
- 30-70% Nebenwirkungen der Analgetika
- 23% Analgetika ineffektiv

Knochenmetastasen

Entität	
Breast Cancer	50-85%
Prostate Cancer	50-70%
Lung Cancer	30-50%
Renal Cancer	30-50%

Lokalisation	
Spin	70%
Pelvis	41%
Femur	25%
Head	14%
Upper Extremity	10-15%

Radiotherapie bei Knochenmetastasen

- Ziele
  - Schmerzreduktion bis –freiheit
  - Reduktion der Analgetischen Therapie
    - Reduktion mögl. Nebenwirkungen
  - Erhalt oder Verbesserung der Mobilität
  - Vermeidung von Komplikationen

Palliative radiation therapy for bone metastases: Update of an ASTRO Evidence-Based Guideline

Stephen Lutz MD [a,*], Tracy Balboni MD MPH [b], Joshua Jones MD [c], Simon Lo MB ChB [d], Joshua Petit MD [e], Shayna E. Rich MD PhD [f], Rebecca Wong MB ChB [g], Carol Hahn MD [h]

Table 2 New prospective studies comparing SF vs MF RT regimens (KQs 1-3)

Investigator, y	Patients (n)	Fractionation	Complete or partial response (%)	Complete response (%)	Acute and late toxicity (%)	Repeat treatment rate (%)
Chow, 2012[8]	5617 in 25 RCTs	SF	60	23	NR	20
		MF	61	24		8 [a]
Gutierrez Bayard, 2014[4]	90	8 Gy in 1 fx	79	17	NR	13.3
		30 Gy in 10 fx	88	18		8.8 [a]
			at 4 wk	at 4 wk		
Howell, 2013[5]	235	8 Gy in 1 fx	70	19	10	15
		30 Gy in 10 fx	62	17%	20 [a]	5 [a]
			at 3 mo	at 3 mo	(acute grade 2-4)	
Majumder, 2012[6]	64	8 Gy in 1 fx	85	0	No statistically	NR
		30 Gy in 10 fx	77	0	significant difference	
			at 1 month	at 1 month		
Meeuse, 2010[7]	1157	8 Gy in 1 fx	53	NR	NR	7
		24 Gy in 6 fx	56			2
			(assessable patients)			

fx, fraction; MF, multiple fractions; NR, not reported; RCT, randomized controlled trial; SF, single fraction.
[a] Statistically significant comparison.

Lutz et al 2016, http://dx.doi.org/10.1016/j.prro.2016.08.001

Palliative radiation therapy for bone metastases: Update of an ASTRO Evidence-Based Guideline

Stephen Lutz MD [a,*], Tracy Balboni MD MPH [b], Joshua Jones MD [c], Simon Lo MB ChB [d], Joshua Petit MD [e], Shayna E. Rich MD PhD [f], Rebecca Wong MB ChB [g], Carol Hahn MD [h]

Table 2 New prospective studies comparing SF vs MF RT regimens (KQs 1-3)

Investigator, y	Patients (n)	Fractionation	Complete or partial response (%)	Complete response (%)	Acute and late toxicity (%)	Repeat treatment rate (%)
Chow, 2012[8]	5617 in 25 RCTs	SF	60	23	NR	
		MF	61	24		
Gutierrez Bayard, 2014[4]	90	8 Gy in 1 fx	79	17		
		30 Gy in 10 fx	88			
			at 4 wk			
Howell, 2013[5]	235	8 Gy in 1 fx				15
					20 [a]	5 [a]
				at 3 mo	(acute grade 2-4)	
Majumder, 2012[6]				0	No statistically	NR
			77	0	significant difference	
			at 1 month	at 1 month		
		8 Gy in 1 fx	53	NR	NR	7
		24 Gy in 6 fx	56			2
			(assessable patients)			

fx, fraction; MF, multiple fractions; NR, not reported; RCT, randomized controlled trial; SF, single fraction.
[a] Statistically significant comparison.

Ansprechen 60 bis 88%

Lutz et al 2017, http://dx.doi.org/10.1016/j.prro.2016.08.001

JAMA Oncology | Original Investigation

Single-Fraction Stereotactic vs Conventional Multifraction Radiotherapy for Pain Relief in Patients With Predominantly Nonspine Bone Metastases

A Randomized Phase 2 Trial

Quynh-Nhu Nguyen, MD; Stephen G. Chun, MD; Edward Chow, MBBS, PhD; Ritsuko Komaki, MD; Zhongxing Liao, MD; Rensi Zacharia, MD; Bill K. Szeto, BA; James W. Welsh, MD; Stephen M. Hahn, MD; C. David Fuller, MD; Bryan S. Moon, MD; Justin E. Bird, MD; Robert Satcher, MD; Patrick P. Lin, MD; Melenda Jeter, MD; Michael S. O'Reilly, MD; Valerae O. Lewis, MD

Table. Pain Response Over Time by Treatment Group

	Patients, No. (%)													
	2 Weeks			1 Month			3 Months			6 Months			9 Months		
Group	Single Fx	Multifx	*P* Value	Single Fx	Multifx	*P* Value	Single Fx	Multifx	*P* Value	Single Fx	Multifx	*P* Value	Single Fx	Multifx	*P* Value
Intent-to-Treat Population															
Responders (CR + PR)	34 of 81 (42)	19 of 79 (24)	.03	36 of 81 (44)	24 of 79 (30)	.18	31 of 81 (38)	17 of 79 (21)	.05	19 of 81 (23)	17 of 79 (21)	.89	17 of 81 (21)	12 of 79 (15)	.06
Nonresponders (PP + IR)	21 of 81 (26)	33 of 79 (42)		17 of 81 (21)	20 of 79 (25)		12 of 81 (15)	18 of 79 (23)		9 of 81 (11)	11 of 79 (14)		5 of 81 (6)	14 of 79 (18)	
Per-Protocol Treated Population															
Responders (CR + PR)	34 of 55 (62)	19 of 52 (36)	.01	36 of 44 (68)	24 of 44 (45)	.21	31 of 43 (72)	17 of 35 (49)	.03	19 of 28 (68)	17 of 28 (61)	.78	17 of 22 (77)	12 of 26 (46)	.04
Nonresponders (PP + IR)	21 of 55 (38)	33 of 52 (64)		36 of 44 (68)	20 of 44 (45)		12 of 43 (28)	18 of 35 (51)		9 of 28 (32)	11 of 28 (39)		5 of 22 (23)	14 of 26 (54)	

Abbreviations: CR, complete response; Fx, (radiation) fraction; IR, indeterminate response; PP, pain progression; PR, partial response.

Pain response was scored as both change in pain score (assessed on a 0-to-10 scale) and use of analgesics per the International Consensus Criteria.[10,11]

Nguyen et al 2019, JAMA Oncol. doi:10.1001/jamaoncol.2019.0192

JAMA Oncology | Original Investigation

Single-Fraction Stereotactic vs Conventional Multifraction Radiotherapy for Pain Relief in Patients With Predominantly Nonspine Bone Metastases

A Randomized Phase 2 Trial

Quynh-Nhu Nguyen, MD; Stephen G. Chun, MD; Edward Chow, MBBS, PhD; Ritsuko Komaki, MD; Zhongxing Liao, MD; Rensi Zacharia, MD; Bill K. Szeto, BA; James W. Welsh, MD; Stephen M. Hahn, MD; C. David Fuller, MD; Bryan S. Moon, MD; Justin E. Bird, MD; Robert Satcher, MD; Patrick P. Lin, MD; Melenda Jeter, MD; Michael S. O'Reilly, MD; Valerae O. Lewis, MD

Table. Pain Response Over Time by Treatment Group

	Patients, No. (%)											
	2 Weeks			1 Month			3 Months					
Group	Single Fx	Multifx	*P* Value	Single Fx	Multifx	*P* Value						*P* Value
Intent-to-Treat Population												
Responders (CR + PR)	34 of 81											.06
Nonresponders (PP + IR)												
Per-Protocol Treated Pop												
Responders (CR + PR)									(68)	17 of 28 (61)	.78	17 of 22 (77)	12 of 26 (46)	.04
Nonresponders (PP + IR)	2 (3						12 of 43 (28)	18 of 35 (51)	9 of 28 (32)	11 of 28 (39)		5 of 22 (23)	14 of 26 (54)	

Abbreviations: CR, complete ... IR, indeterminate response; PP, pain progression; PR, partial response.

Pain response was scored as both change in pain score (assessed on a 0-to-10 scale) and use of analgesics per the International Consensus Criteria.[10,11]

CONCLUSIONS AND RELEVANCE Delivering high-dose, single-fraction SBRT seems to be an effective treatment option for patients with painful bone metastases. Among evaluable patients, SBRT had higher rates of pain response (complete response + partial response) than did MFRT and thus should be considered for patients expected to have relatively long survival.

Nguyen et al 2019, JAMA Oncol. doi:10.1001/jamaoncol.2019.0192

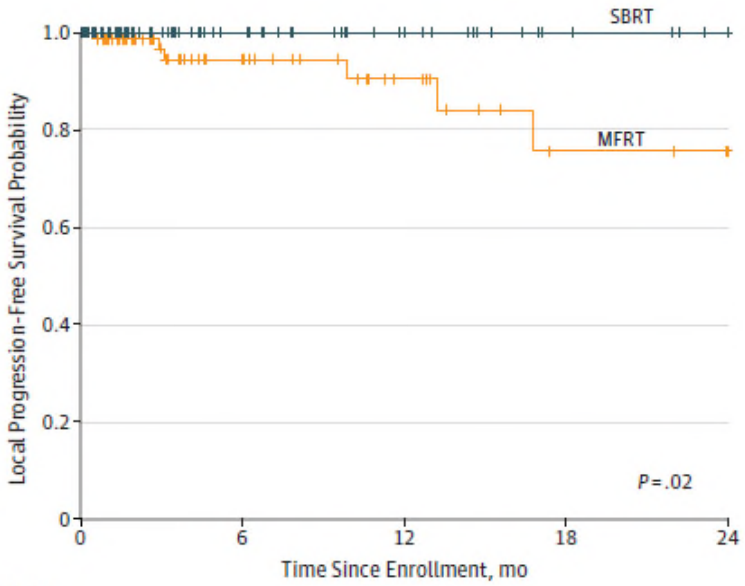
JAMA Oncology | Original Investigation

Single-Fraction Stereotactic vs Conventional Multifraction Radiotherapy for Pain Relief in Patients With Predominantly Nonspine Bone Metastases

A Randomized Phase 2 Trial

Quynh-Nhu Nguyen, MD; Stephen G. Chun, MD; Edward Chow, MBBS, PhD; Ritsuko Komaki, MD; Zhongxing Liao, MD; Rensi Zacharia, MD; Bill K. Szeto, BA; James W. Welsh, MD; Stephen M. Hahn, MD; C. David Fuller, MD; Bryan S. Moon, MD; Justin E. Bird, MD; Robert Satcher, MD; Patrick P. Lin, MD; Melenda Jeter, MD; Michael S. O'Reilly, MD; Valerae O. Lewis, MD

Figure 2. Local Progression-Free Survival According to Treatment

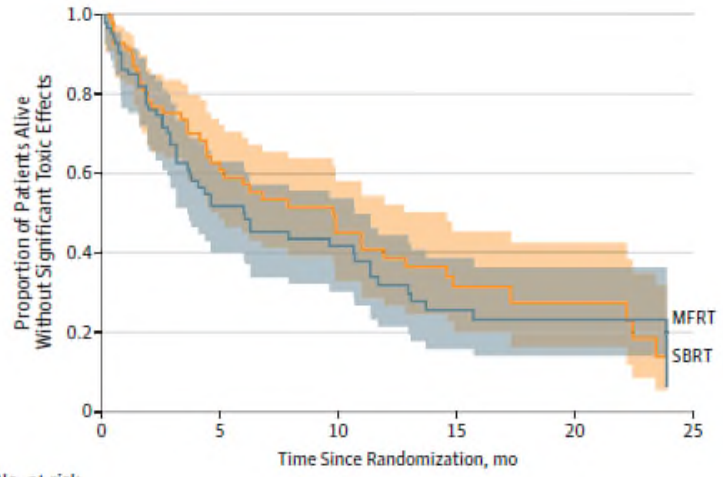


No. at risk

SBRT	81	32	17	8	4
MFRT	79	31	17	8	6

MFRT indicates standard-dose multifraction radiation therapy (10 fractions of 3 Gy each, for a total of 30 Gy); SBRT, high-dose, single-fraction stereotactic radiation therapy with a dose of 12 Gy or 16 Gy (solid line).

Figure 3. Overall Quality-Adjusted Product-Limit Survival According to Treatment



No. at risk

SBRT	81	32	17	7	3
MFRT	79	31	16	9	7

The Q-TWiST method was used to analyze quality-adjusted overall survival time, that is, the proportion of patients alive without significant toxic effects (all MD Anderson Symptom Inventory [MDASI] scores <5) over the interval since randomization, in months. The shaded areas represent interval confidence limits. MFRT indicates standard-dose multifraction radiation therapy (10 fractions of 3 Gy each, for a total of 30 Gy); SBRT, high-dose, single-fraction stereotactic radiation therapy with a dose of 12 Gy or 16 Gy (solid line).

Nguyen et al 2019, JAMA Oncol. doi:10.1001/jamaoncol.2019.0192

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Original Article

Single vs multiple fraction palliative radiation therapy for bone metastases: Cumulative meta-analysis

Wiederbestrahlungsrate höher bei Applikation von einer Fraktionen

Fig. 3. Re-treatment rates for single versus multiple fractions for patients in the intention-to-treat analysis.

https://doi.org/10.1016/j.radonc.2019.06.037

Contents lists available at ScienceDirect
Radiotherapy and Oncology
journal homepage: www.thegreenjournal.com

Original Article

Single vs multiple fraction palliative radiation therapy for bone metastases: Cumulative meta-analysis

Radiotherapie ist effektiv im Verhindern von pathologischen Frakturen

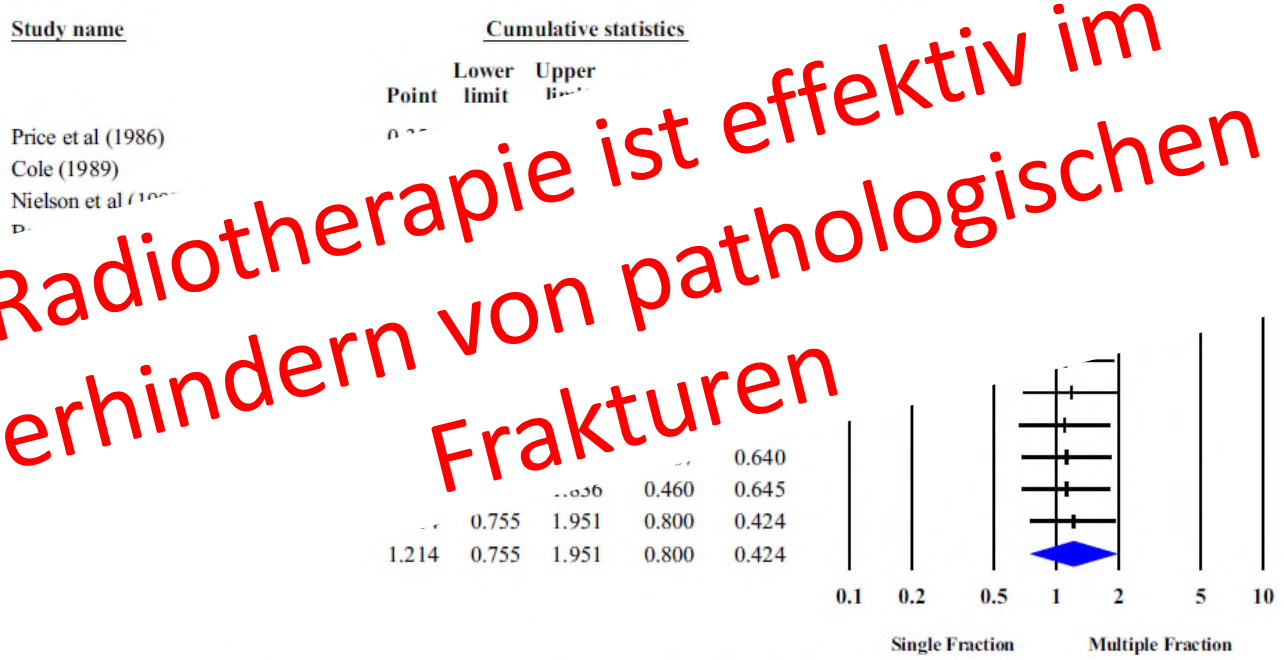


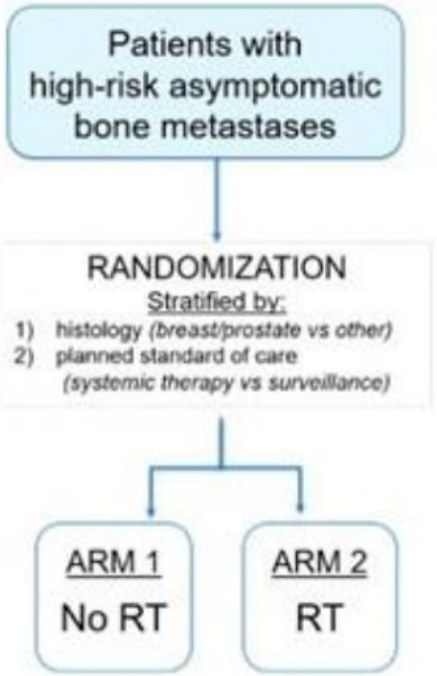
Fig. 4. Pathological fracture rates for single versus multiple fractions for patients in the intention-to-treat analysis.

https://doi.org/10.1016/j.radonc.2019.06.037

Clinical Trials

Prophylactic Radiation Therapy vs. Standard-of-Care for Patients with High-Risk, Asymptomatic Bone Metastases: A Multicenter, Randomized Phase II Trial

Erin Gillespie, MD



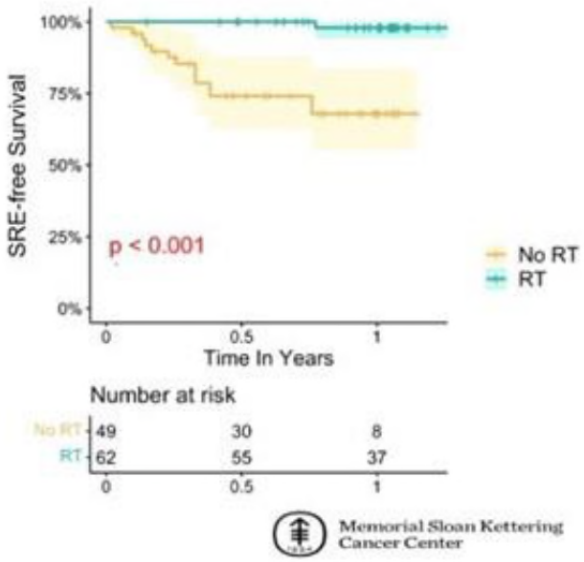
Primary endpoint: **Skeletal-Related Events (SRE)**

SRE = skeletal-related event, defined as:
- Pathologic fracture,
- Cord compression,
- Surgery for instability, or
- ~~RT for pain~~

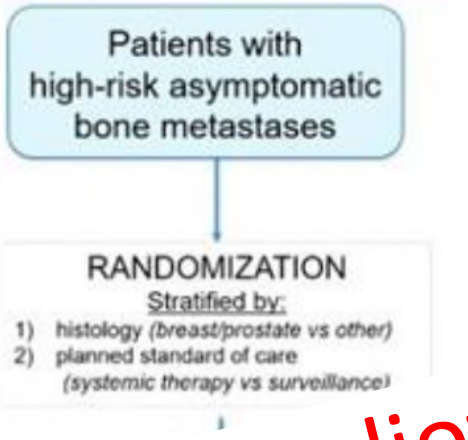
No RT arm: 14/48 (29%)
- 6 non-RT events (12.5%)

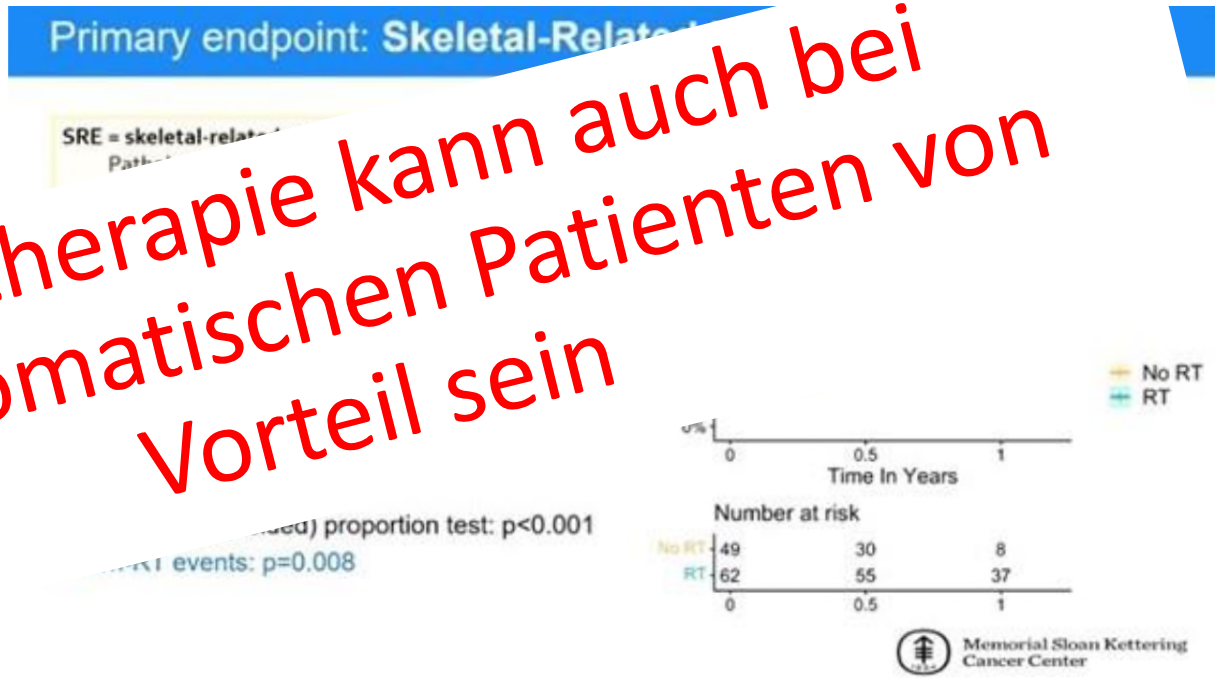
RT arm: 1/62 (1.6%)
- 0 non-RT events (0%)

Two-sample (one-sided) proportion test: p<0.001
- Non-RT events: p=0.008



ASTRO 2022, Clinical trials Session





Radiotherapie kann auch bei asymptomatischen Patienten von Vorteil sein

ASTRO 2022, Clinical trials Session

Myelonkompression

- Symptome: Neurologischer Ausfall kaudal der Läsion
- Prüfen der Option Notfall OP
- Ziele der Radiotherapie:
  - Erhaltung der neurolog. Funktion, ggfs. Verbesserung
  - Verbesserung der Schmerzen
- Prognoseabschätzung
  - Tokuhashi-Score

Tokuhashi-Score

Parameters	Score (points)	Number of patients
General condition (%)		
Poor (KPS 10-40)	0	39
Moderate (KPS 50-70)	1	26
Good (KPS 80-100)	2	15
Number of extraspinal bony metastases foci		
>3	0	16
1-2	1	38
0	2	16
Number of metastases in vertebral bodies		
>3	0	34
2	1	21
1	2	15
Metastases to the visceral organs		
Unremovable	0	30
Removable	1	1
No metastases	2	39
Primary site of the cancer		
Pancreas, esophagus, stomach, bladder, lung, osteosarcoma	0	30
Liver, gall bladder, unidentified	1	4
Others	2	
Uterus, kidney	3	6
Rectum	4	0
Thyroid, prostate, breast, carcinoid	5	30
Spinal cord palsy (Frankel Grading)[27]		
Complete (Frankel A and B)	0	23
Incomplete (Frankel C and D)	1	24
None (Frankel E)	2	23
Tokuhashi prognostic group		
Poor	0-8	46
Intermediate	9-11	20
Good	12-15	4

KPS: Karnofsky performance status

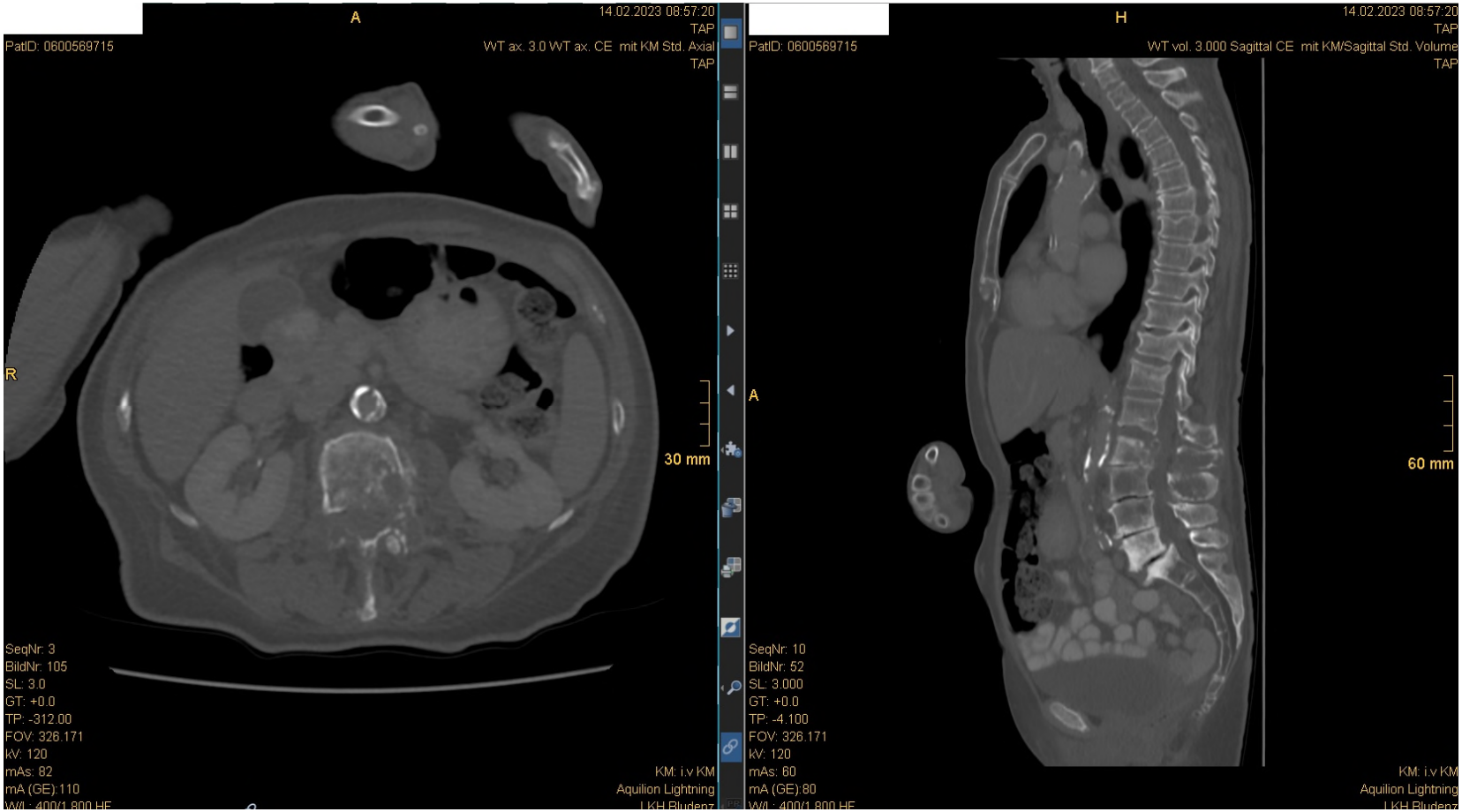
Myelonkompression

Ort der Metastase	
Thorakal	70%
Lumbal	20%
Cervical	10%
Multiple Level	20-30%

Entität	
Hämatologische Malignome	20%
Lunge	16%
Mamma CA	12%
CUP	11%
Sarkome	8%
Prostata CA	7%
Andere	26%

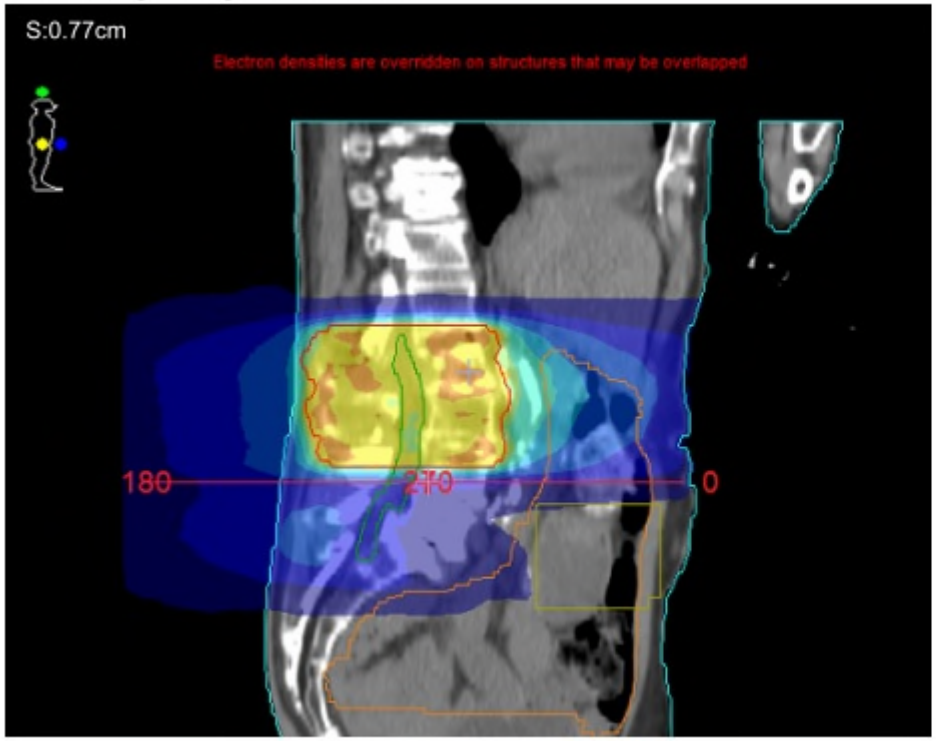
Myelonkompression

Symptome	First symptom	Symptom at diagnosis
Pain	96%	96%
Weakness	2%	76%
Bladder dysfunction	0%	57%
Sensory dysfunction	0%	51%


A
14.02.2023 08:57:20
TAP
PatID: 0600569715
WT ax. 3.0 WT ax. CE mit KM Std. Axial
TAP
R
30 mm
SeqNr: 3
BildNr: 105
SL: 3.0
GT: +0.0
TP: -312.00
FOV: 326.171
kV: 120
mAs: 82
mA (GE):110
KM: i.v KM
Aquilion Lightning
H
14.02.2023 08:57:20
TAP
PatID: 0600569715
WT vol. 3.000 Sagittal CE mit KM/Sagittal Std. Volume
TAP
A
60 mm
SeqNr: 10
BildNr: 52
SL: 3.000
GT: +0.0
TP: -4.100
FOV: 326.171
kV: 120
mAs: 60
mA (GE):80
KM: i.v KM
Aquilion Lightning

Electron densities are overridden on structures that may be overlapped

SPV Passing Through Plan Isocenter

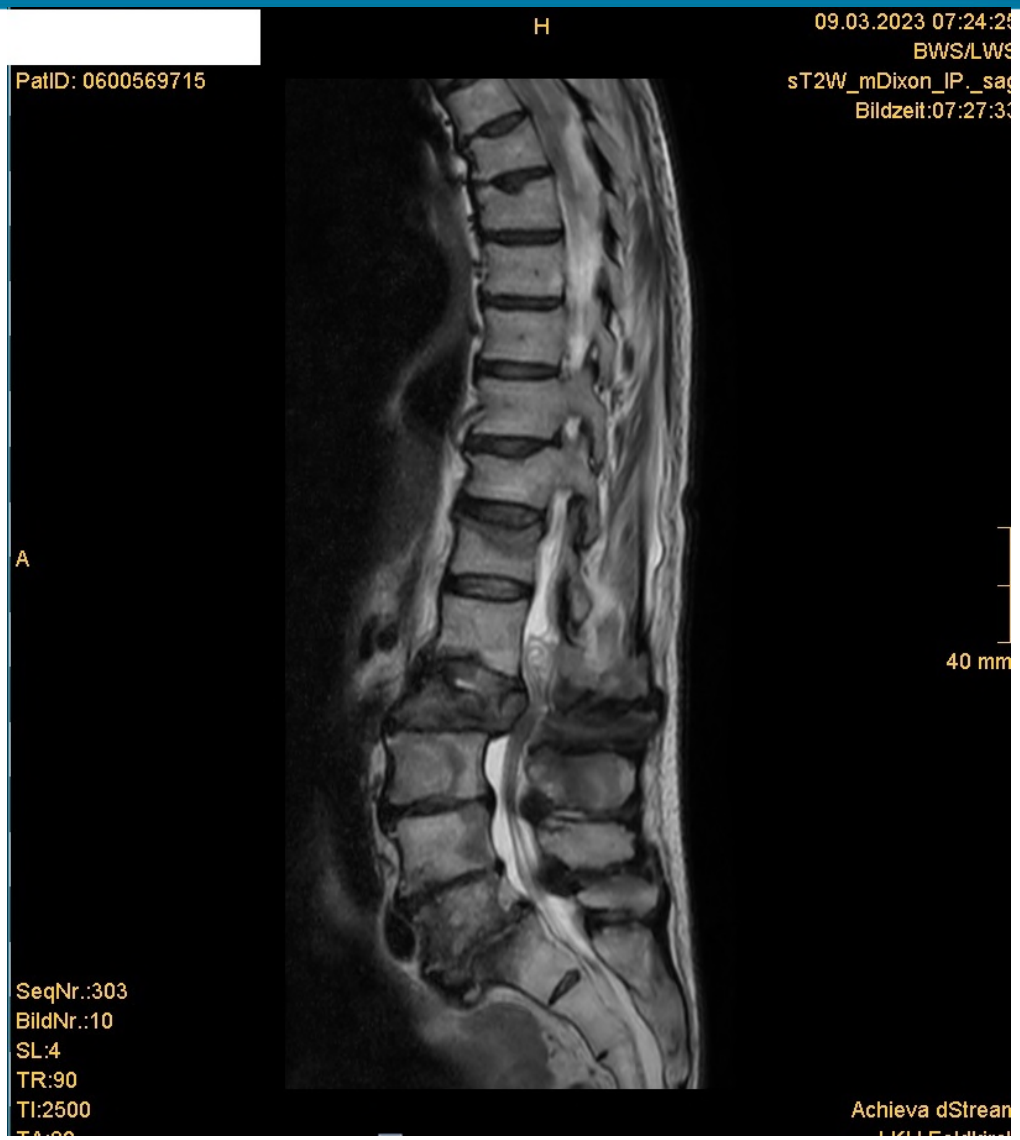


Color	Dose (Gy)
	39.600
	37.800
	36.000
	34.200
	32.400
	28.800
	25.200
	18.000
	10.800
	3.600

Color	Structure Name
	Patient
	Kidney L
	Kidney R
	Bowel Bag
	Esophagus
	Stomach
	SpinalCord
	PTV 05 3600
	PTV2 05 3600
	Sparing Arm
	Sparing Bowel


A
08.03.2023 15:46:55
LWS
PatID: 0600569715
WS NAT WT Axial
LWS NAT/Axial
LWS
R
30 mm
SeqNr: 4
BildNr: 30
SL: 3.000
GT: +0.0
TP: 87.0000
FOV: 250.00
kV: 120
mAs: 100
mA (GE):100
Aquilion ONE


H
08.03.2023 15:46:55
LWS
PatID: 0600569715
WS NAT WT Sagittal
LWS NAT/Sagittal
LWS
A
30 mm
SeqNr: 6
BildNr: 38
SL: 3.000
GT: +0.0
FOV: 250.00
kV: 120
mAs: 100
mA (GE):100
Aquilion ONE


H
09.03.2023 07:24:25
BWS/LWS
PatID: 0600569715
sT2W_mDixon_IP._sag
Bildzeit:07:27:33
A
40 mm
SeqNr.:303
BildNr.:10
SL:4
TR:90
TI:2500
Achieva dStream

Myelonkompression

- OP vs. Radiotherapie vs. Symptomorientierte Therapie
  - OP Mortalität 3-13%
  - Schlechteres Outcome bei bestehender Paraplegie oder Dysfunktion der Harnblase
- Pro Radiotherapie
  - Strahlensensibler Tumor
  - Intraduraler Tumor
  - Stabilität der Wirbelsäule
  - Paravertrebraler Tumor
  - Langsame Verschlechterrung der Neurologie

	No. Pts	Med. duration of mobility	% Regaining mobility	Survival (days)
S +XRT	50	126 days	9/16 = 56%	129
XRT	51	35 days	3/16 =19%	100

Regine WF et al 2006

Contents lists available at ScienceDirect
Radiotherapy and Oncology
journal homepage: www.thegreenjournal.com
ELSEVIER

Original Article

Single vs multiple fraction palliative radiation therapy for bone metastases: Cumulative meta-analysis

Radiotherapie ist effektiv im Verhindern von Rückenmarkskompression

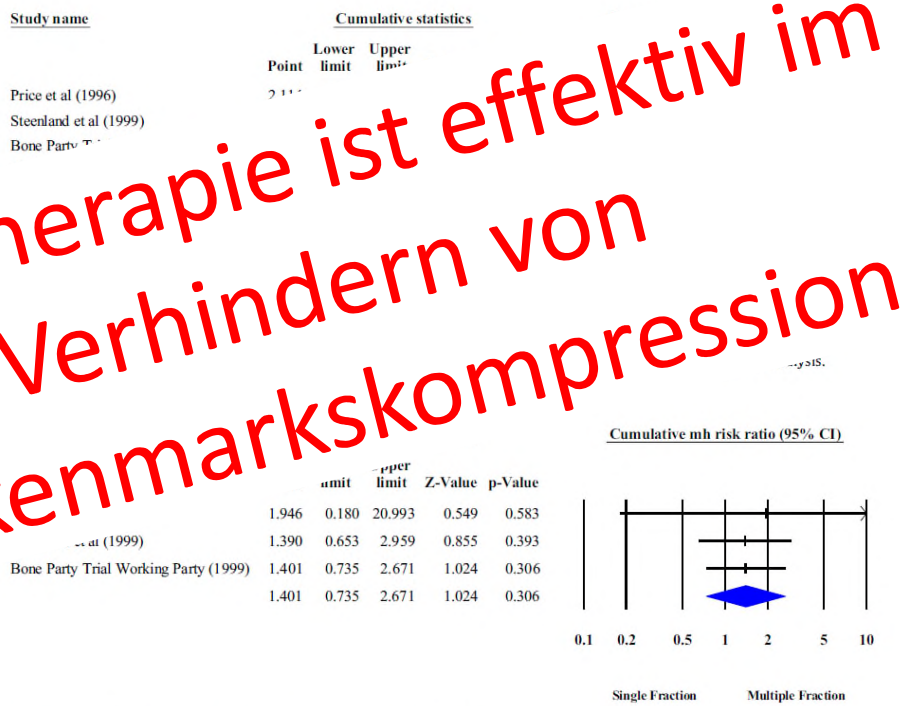


Fig. 6. Spinal cord compression rates for single versus multiple fractions for patients with spinal metastases in the intention-to-treat analysis.

https://doi.org/10.1016/j.radonc.2019.06.037

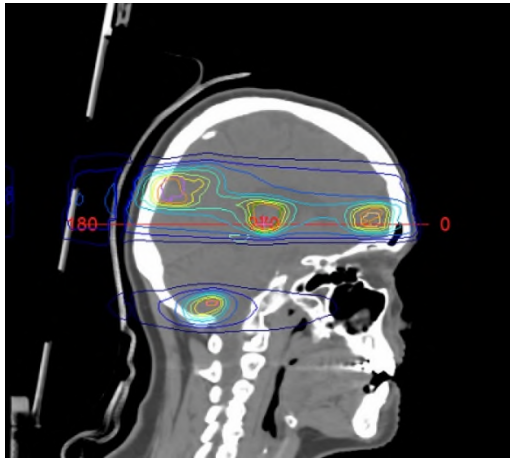
Motor and sphincter function before and after treatment according to radiotherapy regimen.

	8 Gy × 2 short-course No. of patients (%)	8 Gy single-dose No. of patients (%)	Total No. of patients (%)
Motor function			
1. Walking pretreatment	101 (67)	98 (64)	199 (65)
Walking	91 (90)	86 (88)	177 (89)
Not walking	10 (10)	12 (12)	22 (11)
2. Not walking pretreatment	49 (33)	55 (36)	104 (35)
Ambulation regained	13 (26)	9 (16)	22 (21)
Not walking	36 (74)	46 (84)	82 (79)
Total of responders	104 (69)	95 (62) p = N.S.	199 (66)

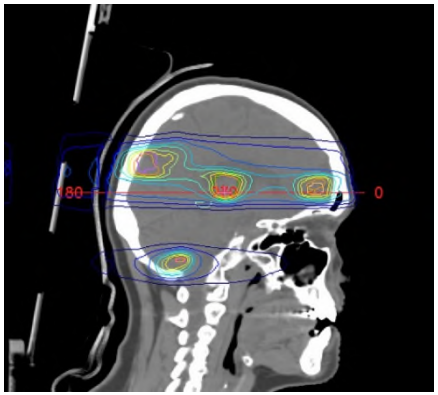
Maranzano et al 2009

Hirnmetastasen

- bei 25-50% der onkologischen Patient:innen
- multipel bei >50% der Patien:innen
- Entitäten
  - Lunge 50%
  - Mamma 15%
  - CRC 6%
- Prognose:
  - besser bei singulärer Metastase
  - Median OS 4-6 Monate
  - Ohne Therapie 1 Monat
  - Steroid 2 Monate
  - RT >4 Monate



Hirnmetastasen



- Symptome
  - Cephalea
  - Epileptische Anfälle (fokal bis GM)
  - Neurologische Ausfälle
- Diagnostik
  - Akut cCT, für Therapieentscheidung cMRT

Clinical Practice Guideline

Radiation Therapy for Brain Metastases: An ASTRO Clinical Practice Guideline

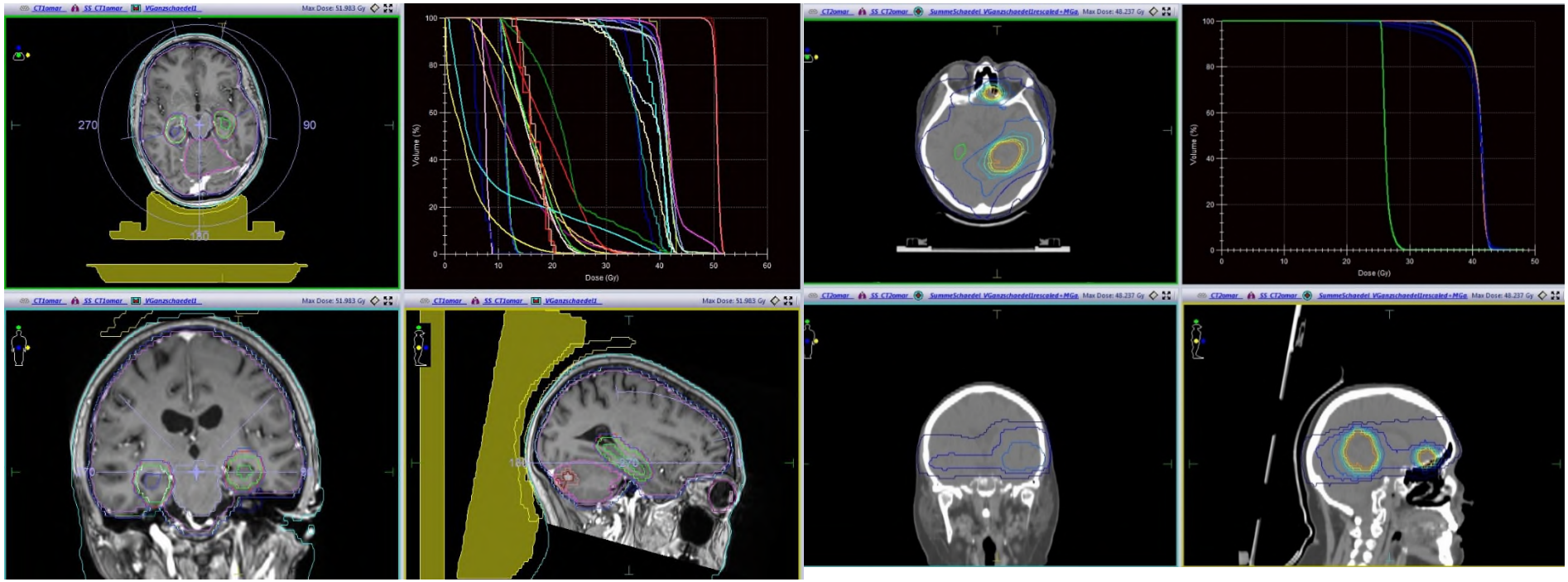
1. For patients with an ECOG performance status of 0-2 and up to 4 intact brain metastases, SRS is recommended.	Strong	High 13-18
2. For patients with an ECOG performance status of 0-2 and 5-10 intact brain metastases, SRS is conditionally recommended.	Conditional	Low 19-21

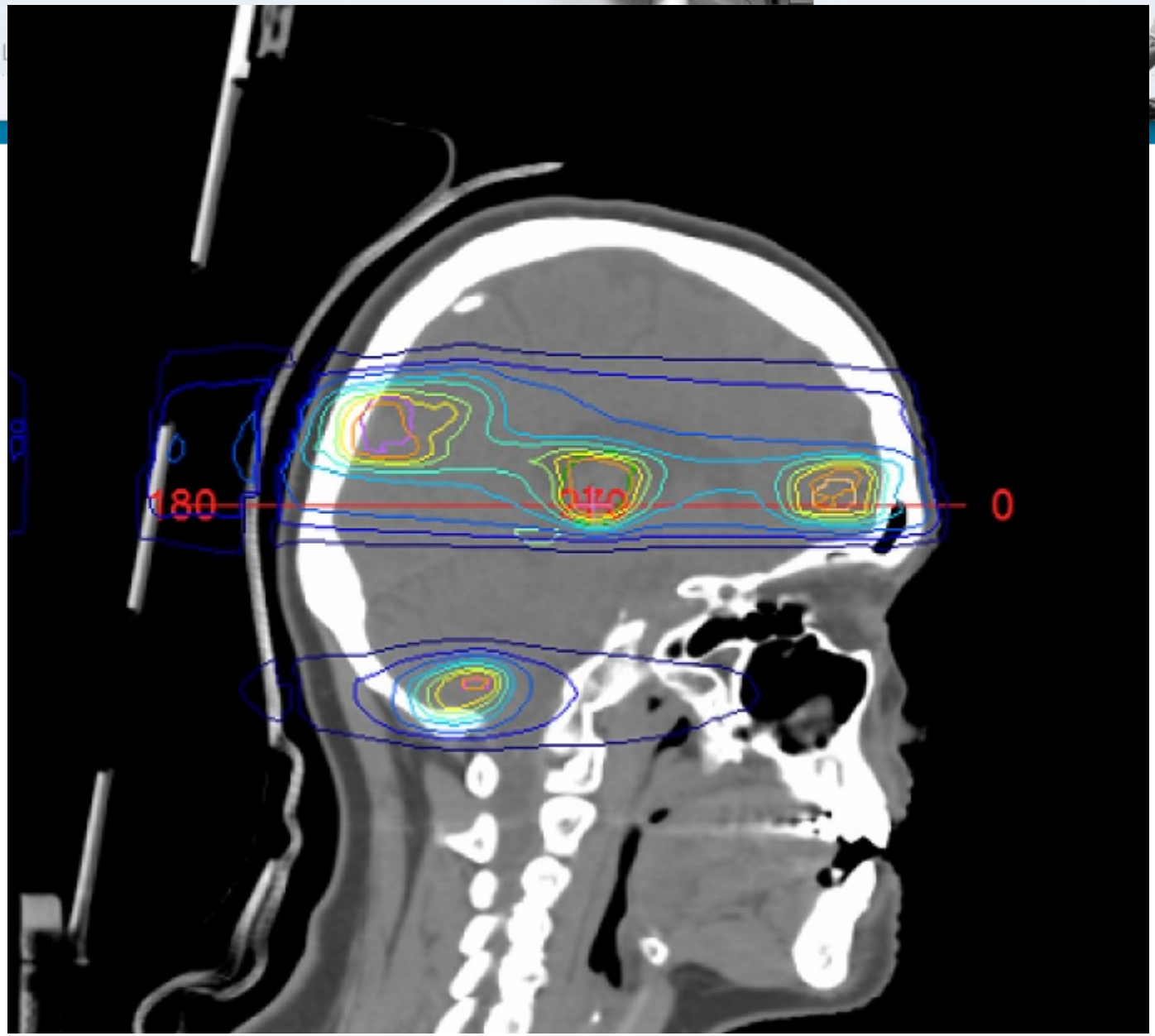
1. For patients with resected brain metastases, radiation therapy (SRS or WBRT) is recommended to improve intracranial disease control.	Strong	High 13,50,51
2. For patients with resected brain metastases and limited additional brain metastases, SRS is recommended over WBRT to preserve neurocognitive function and patient-reported QoL.	Strong	Moderate 52
3. For patients whose brain metastasis is planned for resection, preoperative SRS is conditionally recommended as a potential alternative to postoperative SRS.	Conditional	Low 53,54

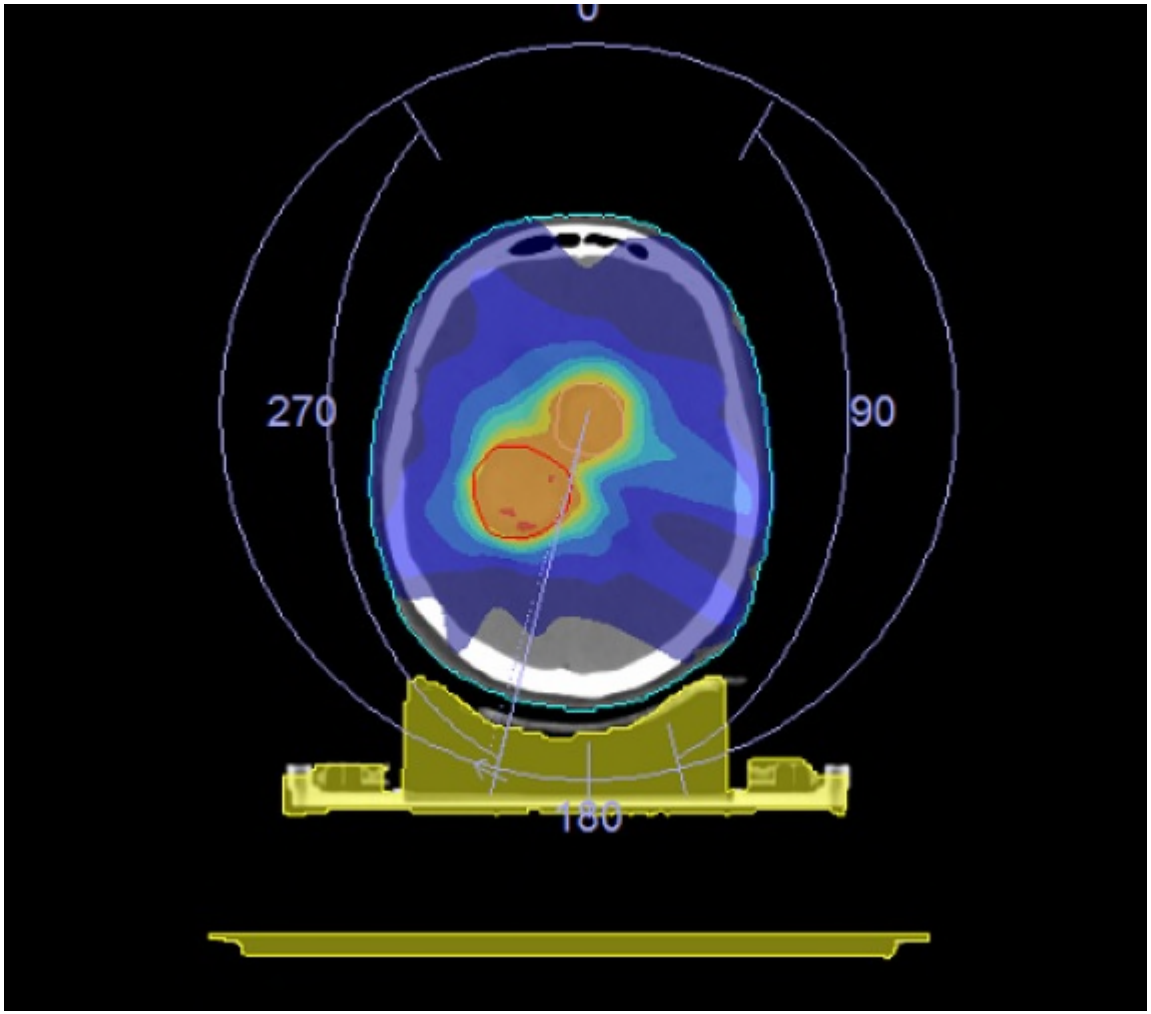
1. For patients with favorable prognosis (estimated using a validated brain metastasis prognostic index) and brain metastases ineligible for surgery and/or SRS, WBRT (eg, 3000 cGy in 10 fractions) is recommended as primary treatment. (See KQ1, recommendations 7 and 8 for consideration of systemic therapy.)	Strong	High 64-67
2. For patients with favorable prognosis and brain metastases receiving WBRT, hippocampal avoidance is recommended. Implementation remark: Hippocampal avoidance is not appropriate in cases of brain metastases in close proximity to the hippocampi or in cases of leptomeningeal disease.	Strong	High 4,68-70

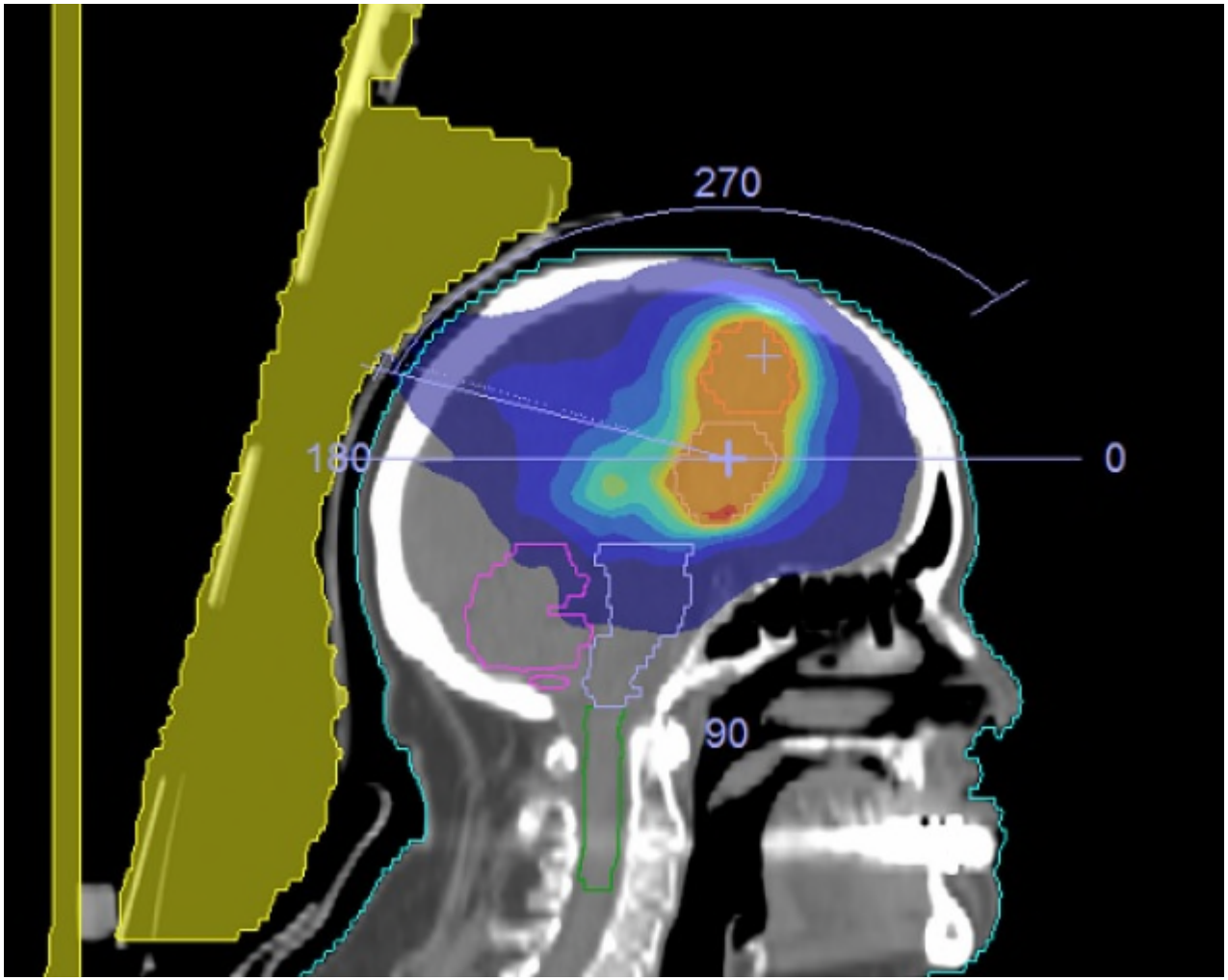
https://doi.org/10.1016/j.prro.2022.02.003

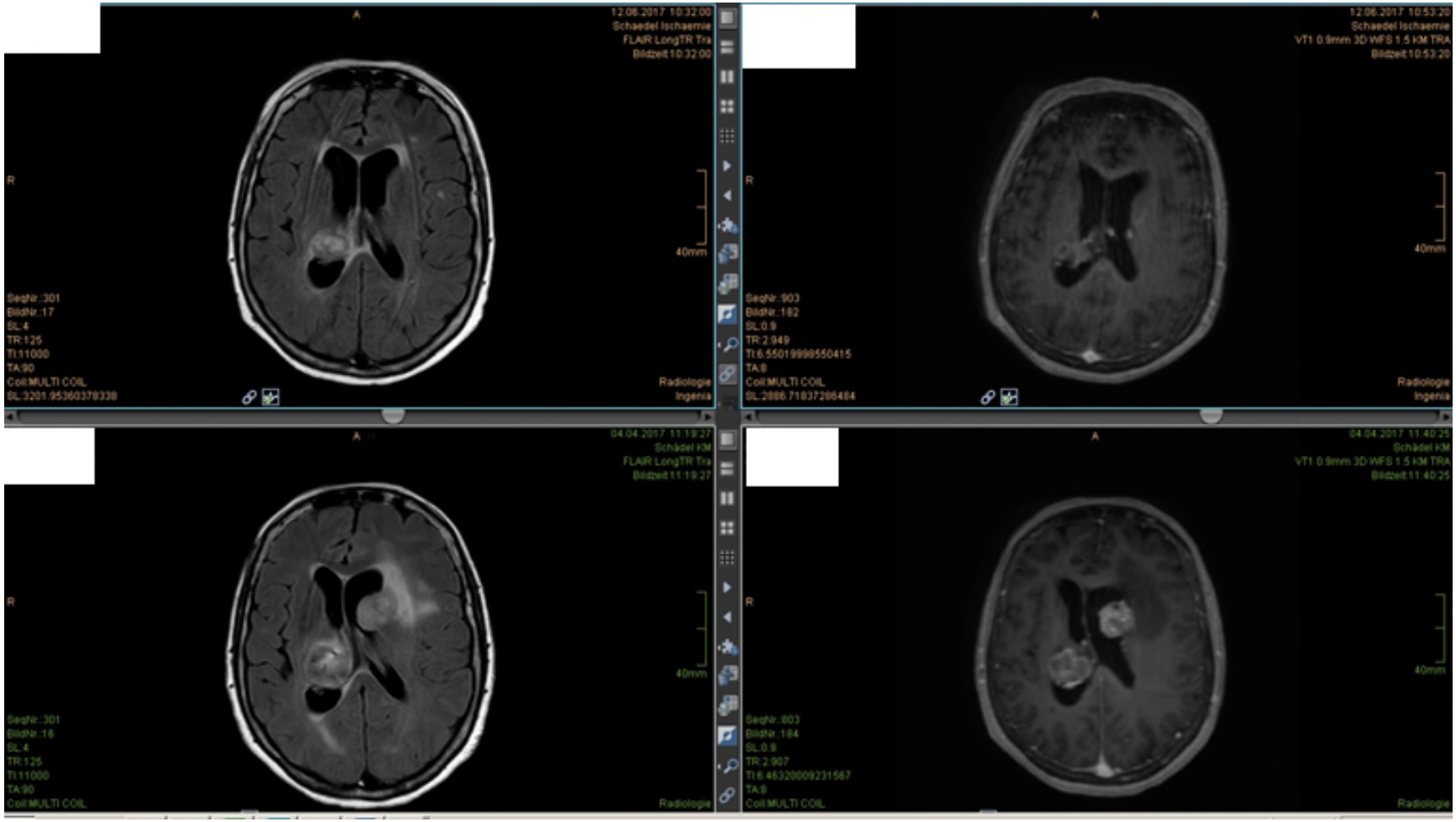
Hippocampusschonung




180
0


0
270
90
180


270
180
0
90


12.06.2017 10:32:00
Schaedel Ischaemie
FLAIR LongTR Tra
Bildzeit:10:32:00
40mm
SeqNr.:301
BildNr.:17
SL:4
TR:125
TI:11000
TA:90
Coil:MULTI COIL
SL:3201.95360378338
Radiologie
Ingenia
12.06.2017 10:53:20
Schaedel Ischaemie
VT1 0.9mm 3D WFS 1.5 KM TRA
Bildzeit:10:53:20
40mm
SeqNr.:903
BildNr.:182
SL:0.9
TR:2.949
TI:6.550199998550415
TA:8
Coil:MULTI COIL
SL:2886.71837286484
Radiologie
Ingenia
04.04.2017 11:19:27
Schädel KM
FLAIR LongTR Tra
Bildzeit:11:19:27
40mm
SeqNr.:301
BildNr.:16
SL:4
TR:125
TI:11000
TA:90
Coil:MULTI COIL
Radiologie
04.04.2017 11:40:25
Schädel KM
VT1 0.9mm 3D WFS 1.5 KM TRA
Bildzeit:11:40:25
40mm
SeqNr.:803
BildNr.:184
SL:0.9
TR:2.907
TI:6.463200092315 87
TA:8
Coil:MULTI COIL
Radiologie

Weitere Fallbeispiele


23.03.2018
3016 29-08-27
W


für infektgefährdete und infizierte Wunden
18/277
04.07.18

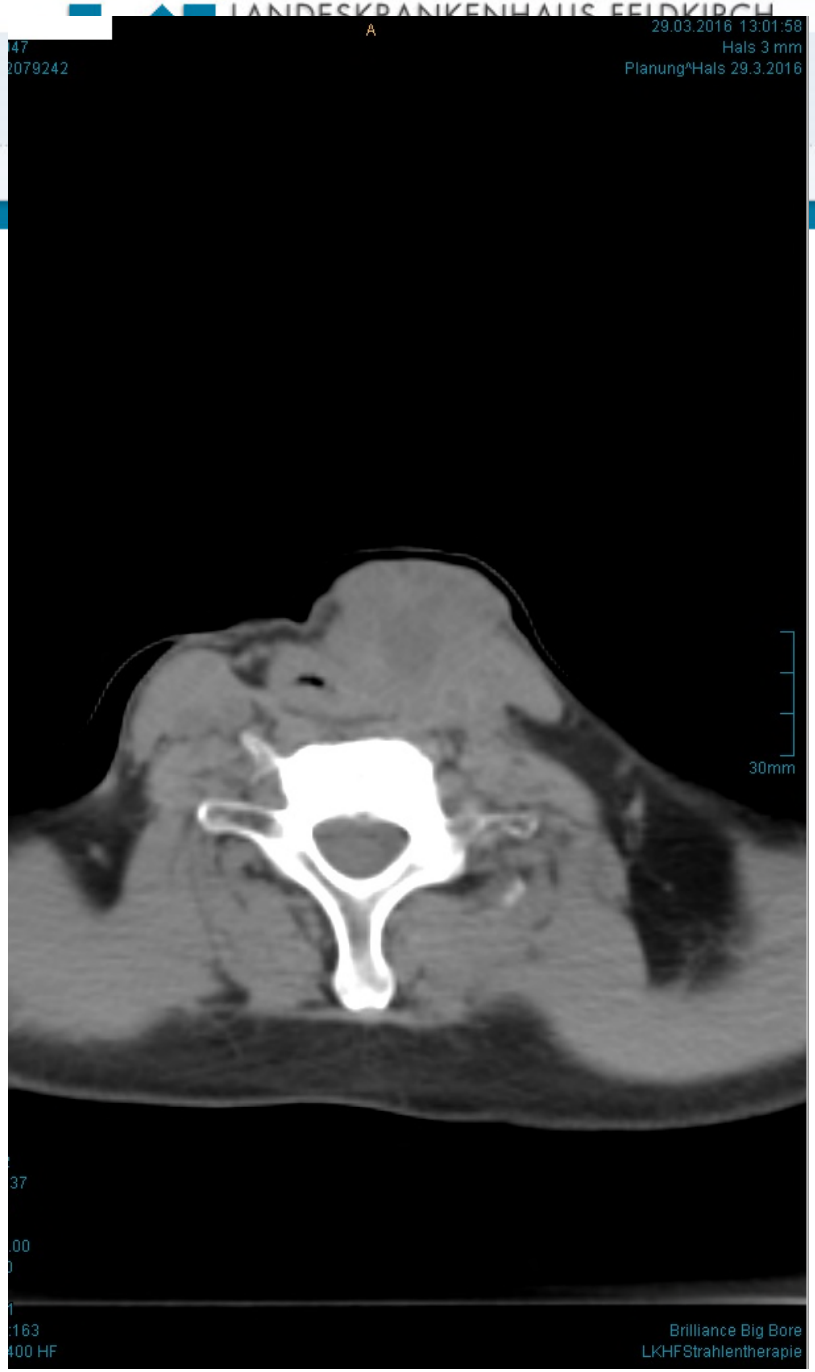

21/410
KG - Nummer
Datum
19.4.21
0
1 cm
2
3
4
5
6
7
8
9
10


21|410


Suprasorb®
21|410
Jetzt den Wert ablesen und eintragen. Read off the value and write it down.


A
29.03.2016 13:01:58
Hals 3 mm
Planung^Hals 29.3.2016
30mm
Brilliance Big Bore
LKHF Strahlentherapie


prasorb® X + PHMB – Der intelligente antimikrobielle Wundverband
VAS
Datum
Station
Visum
14/12/1


A
29.03.2016 13:01:58
Hals 3 mm
Planung^Hals 29.3.2016
30mm
Brilliance Big Bore
LKHF Strahlentherapie


A
29.11.1947
PatID: 02079242
R
20mm
SeqNr: 3
BildNr: 57
SL: 2.500000
GT: 0.000000
TP: -133.250
FOV: 250.000000
kV: 120
mAs: 12
mA (GE):284
WL: 60/350 HF
Optima CT660
LKH Feldkirch

Brachytherapie

Brachytherapie

Brachytherapie


LAG

Review Article

Defining the radiation oncologist's role in palliative care and radiotherapy

Annals of Palliative Medicine, Vol 8, No 3 July 2019

Table 4 Summary

Role of the radiation oncologist in palliative cancer care
Prognostication and communication
Control symptoms from cancer progression
Bone metastases: pain control
Spinal metastases/spinal cord compression: pain control and function preservation
Brain metastases: symptom control, function preservation
Thoracic tumors: pain, cough, bleeding control, relieve obstruction
Gastro-intestinal symptom control: pain, bleeding control, relieve obstruction
Gynaecological and urological symptom control: pain and bleeding control
Malignant ulcers: pain and bleeding control
As a primary palliative care provider
Opioid use assessment, review and safety monitoring
Physical, psychological and spiritual symptoms monitoring
Referral to palliative care specialists or palliative care team if symptom burden is persistent
Participate in palliative care multidisciplinary team

http://dx.doi.org/10.21037/apm.2018

Zusammenfassung

- Strahlentherapie ist
  - effektiv
  - rasch Applizierbar
  - wenig bis fehlende Toxizität
- Aktive und Bewusste Entscheidungen treffen
  - Fachwissen, Ethik, Prognose, Patient:innenperspektive
- Ziel - Verbesserung der Lebensqualität im Rahmen des gesamten Palliative Care Konzepts (interdisziplinär - interprofessionell)

Kurzes Gespräch vom 16.12.
18[55].

Hab ihr noch einmal gesagt,
dass für den Weg der
Symptomkontrolle verlorene Kauen
beim jedzeit für eine Tracheostomie
entscheiden kann. Ihre Antwort:
"Herr Doktor, ja keine
Luftröhrenschnitt"!! Mit
erhobenem Finger + todernst!

LG,
Paul

Daten Strahlentherapie Feldkirch

STATISTIKEN (2019)
- Neu bestrahlte Patienten 1025
- Wiederzugänge 247

Tumorentitäten (die 5 häufigsten)
- Mammakarzinome 215
- Gastrointestinale Tumore 55
- Tumore des Urogenitaltrakts 119
- Kopf-Hals-Tumore 59
- Gehirntumore 41

Teletherapieleistungen
- 3-D-Strahlentherapie Planungen (incl. CT) 3.291
- Intensitätsmodulierte Linac Behandlung 18.486
- Stereotaktische Bestrahlung 1.391
- bestrahlte Felder 136.925
- bestrahlte Regionen gutartige Erkrankungen 5.571

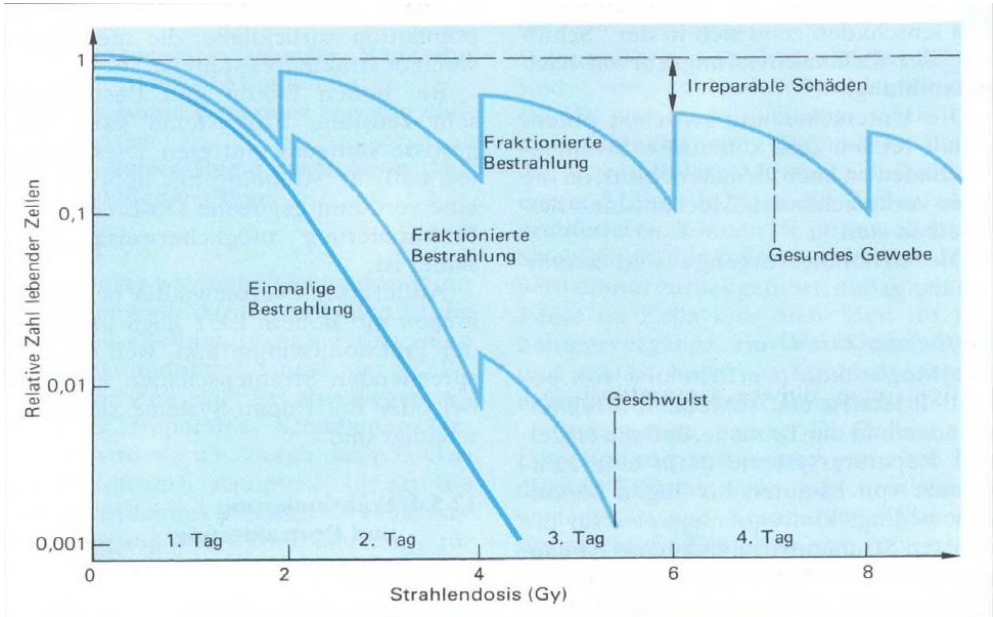
Ambulanz
- Kontrolluntersuchungen (Arzt) 10.036
- Kontrolluntersuchungen (Pflege) 13.413

Dosis in der Strahlentherapie

Figure 22.1. Conventional multifraction radiotherapy was based on experiments performed in Paris in the 1920s and 1930s. Rams could not be sterilized with a single dose of x-rays without extensive skin damage, whereas if the radiation were delivered in daily fractions over a period of time, sterilization was possible without skin damage. The testes were regarded as a model of a growing tumor and skin as dose-limiting normal tissue.

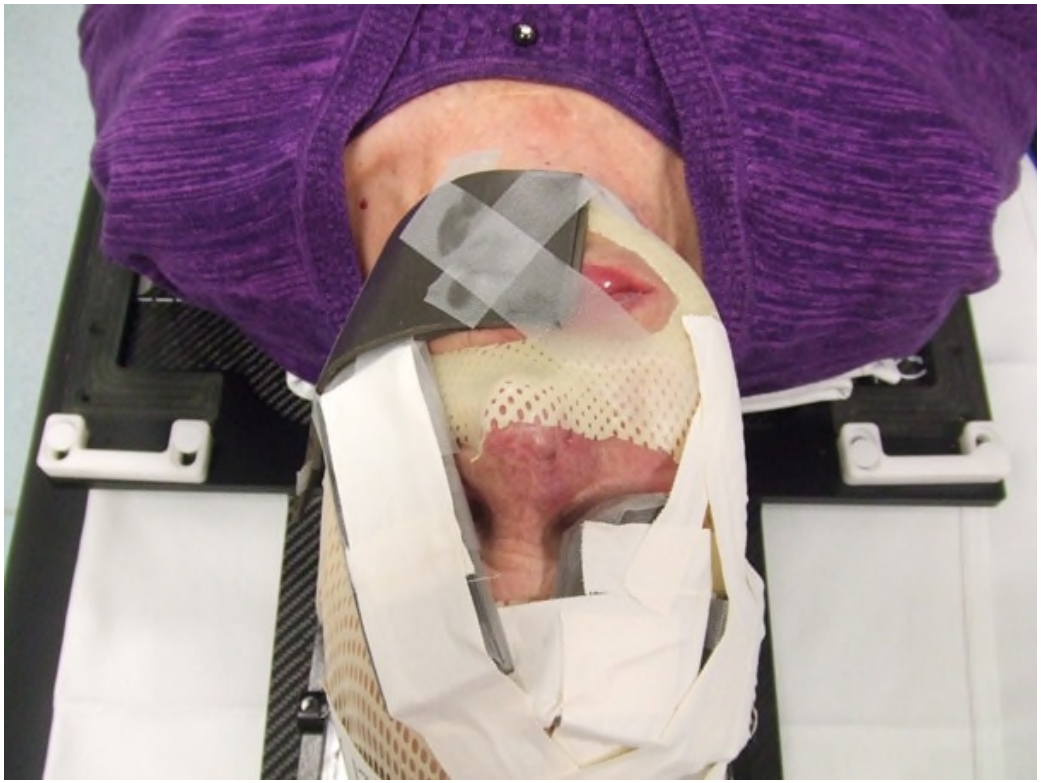
Dosis in der Strahlentherapie

- Fraktionierung
  - Konventionell
    1,8 bis 3 Gy
  - Stereotaxie/Radiochirurgie
    4 bis 25 Gy
- Gesamtdosis
  - Abhängig je nach Indikation: 20-80 Gy



Cutanes Merkelzell-Ca. Nasenspitze
cT2, cN1(18/61), cM1a(LK s c) R1
01.10.2012: Tumorexzision, Lappenplastik und Vollhauttransplantat.
Histologie: Merkelzell-Ca. (kleinzelliges neuroendokrines Ca der Haut)
29.10.2012: Nachresektion Alarknorpel, Rekonstr. mit Septumknorpel
Histologie: Tumorfreies Knorpel-Nachresektat
21.11.2012: Neck Dissection subomohyoidal re und Neck Dissection li
Histologie: LK-Metastasen 8/30 rechts sowie 10/31 links

12/2012: Lokalrezidiv der Nase
07.12.2012: Systemische Therapie mit Abraxane weekly
02/2013: größenregrediente LK Kieferwinkel bds., neue Raumforderung Processus alveolaris rechts
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly



12/2012: Lokalrezidiv der Nase
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly

Bei 37 Gy

12/2012: Lokalrezidiv der Nase
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly

Bei 43 Gy

12/2012: Lokalrezidiv der Nase
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly

Bei 51 Gy

12/2012: Lokalrezidiv der Nase
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly

7d Post RT

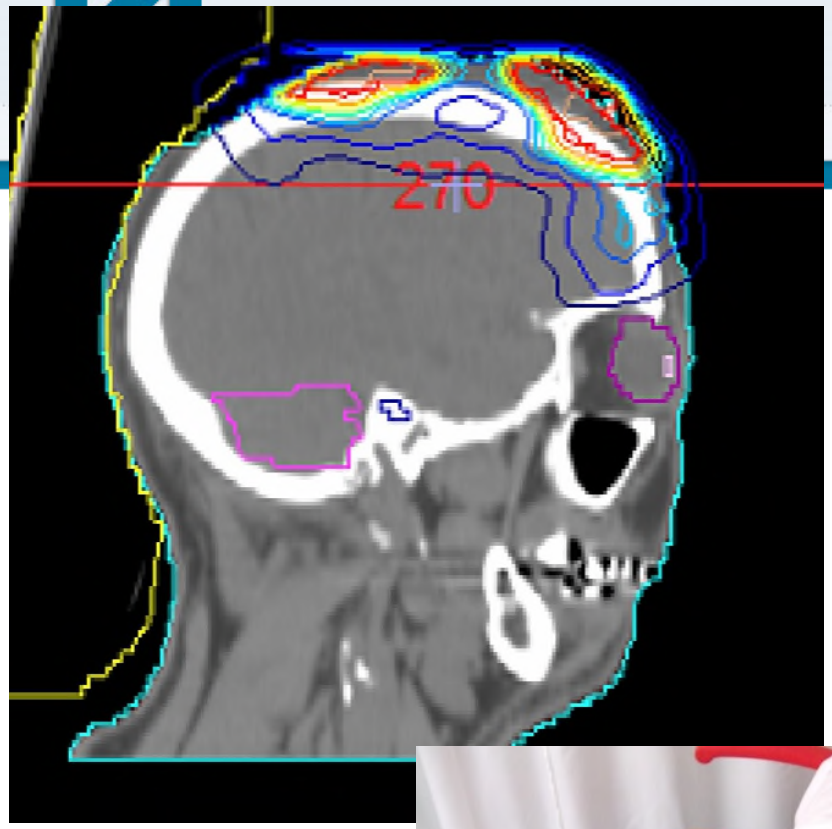
12/2012: Lokalrezidiv der Nase
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly

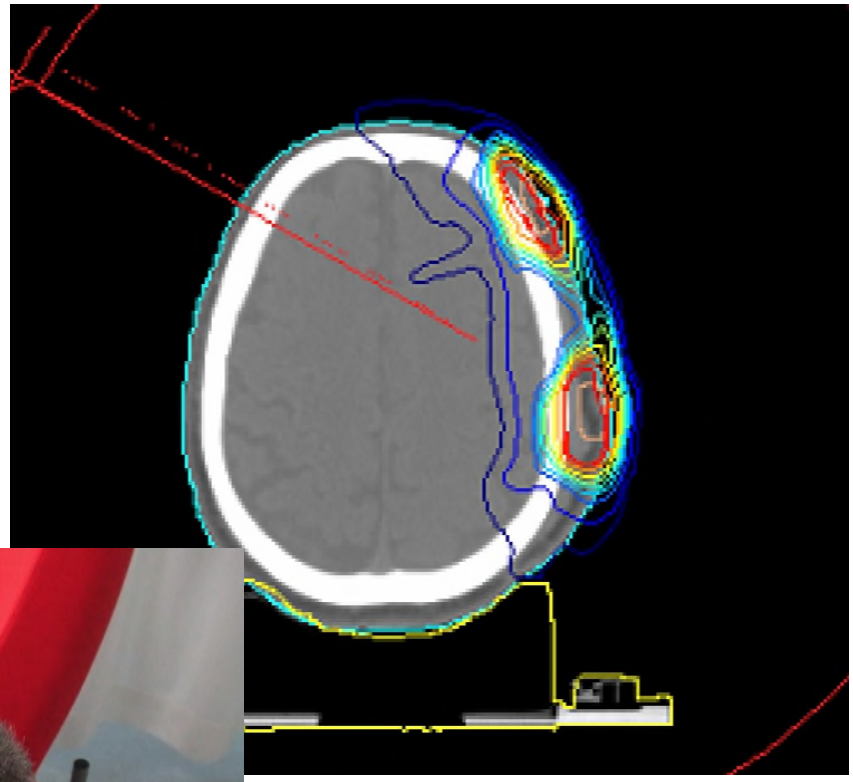
19d Post RT

12/2012: Lokalrezidiv der Nase
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly

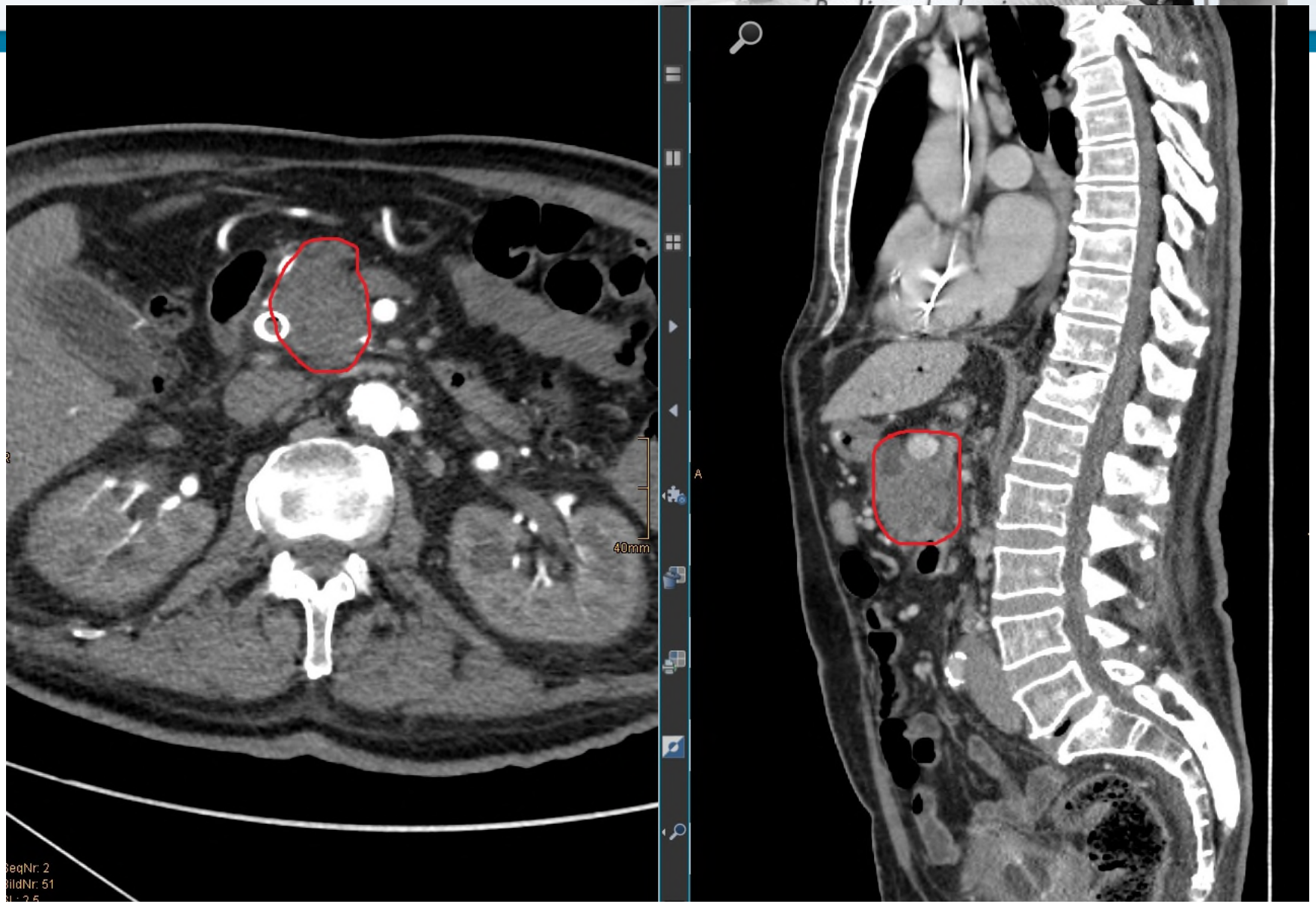
27d Post RT

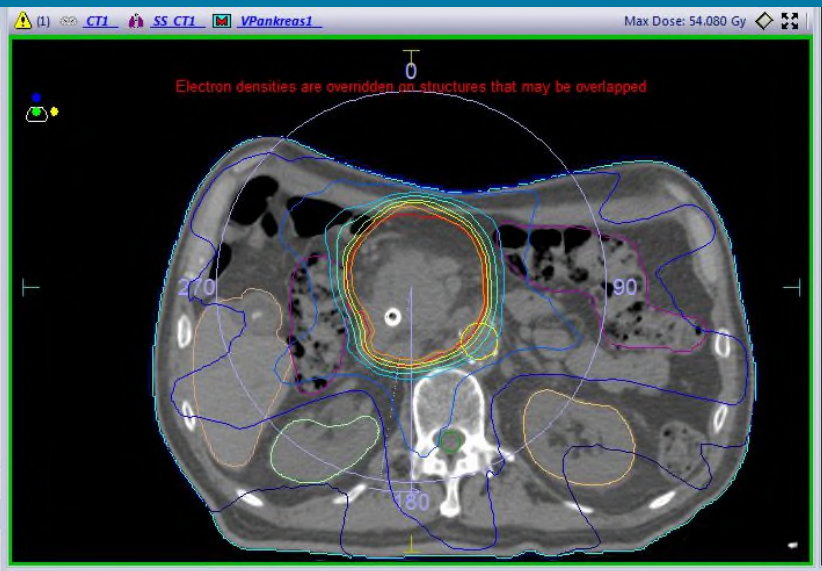
25.02. - 05.04.2013: pall. Radiatio 51Gy, parallel Carboplatin AUC 2 weekly
06/2013: Lymphknotenmetastasen kaudal des RT Feld

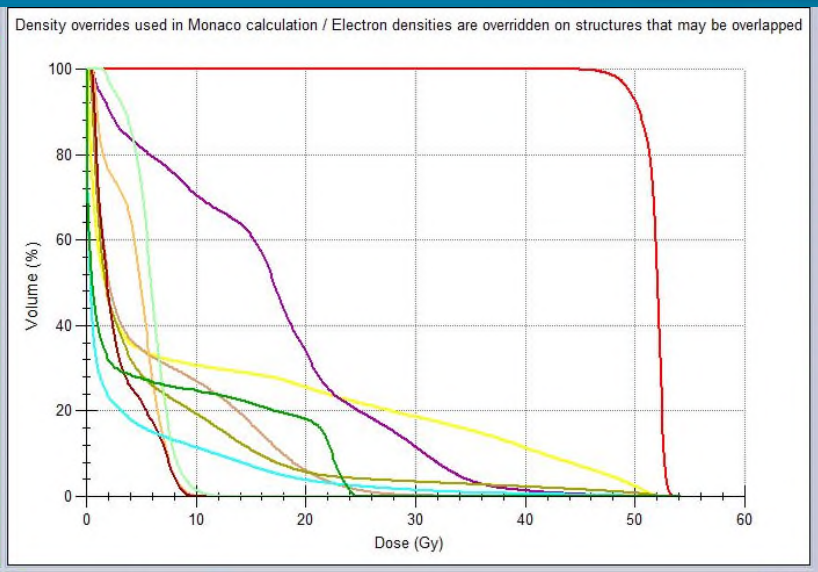

270

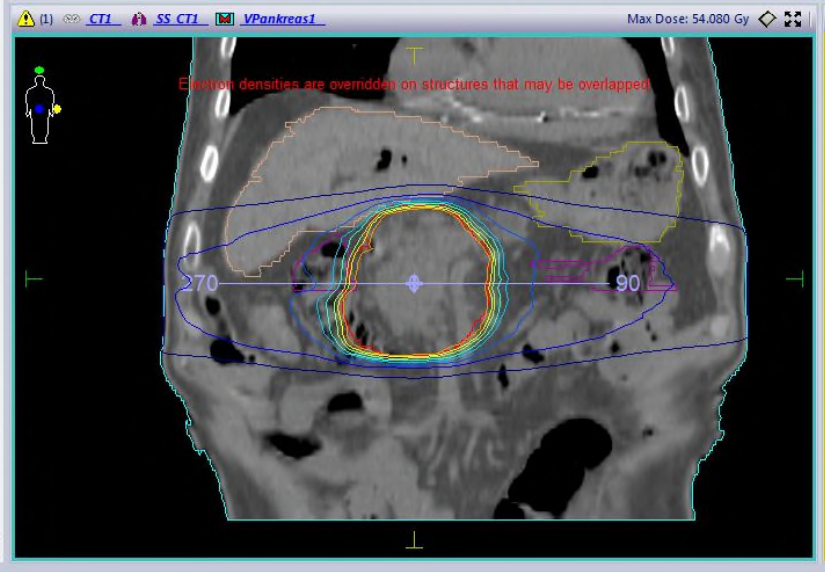


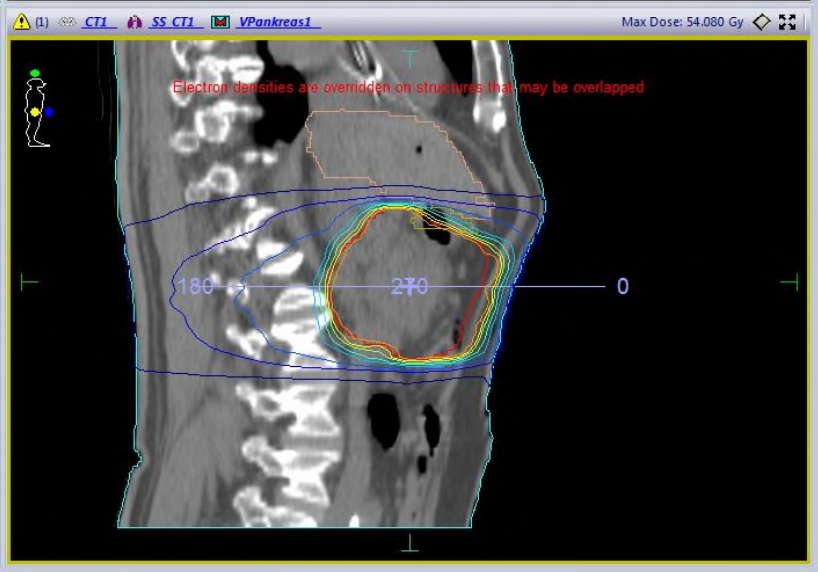

Suprascrb® X + PHMB – Der intelligente antimikrobielle Wundverband

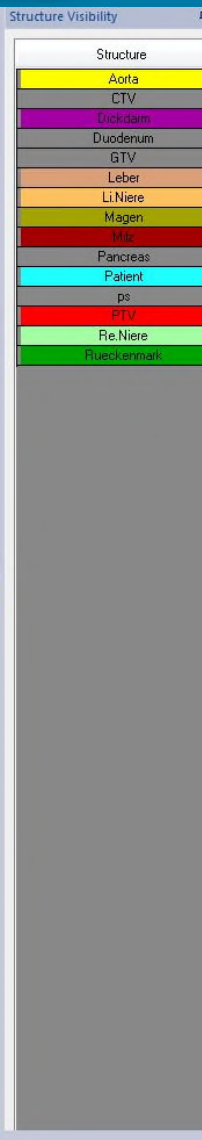

40mm
SeqNr: 2
BildNr: 51

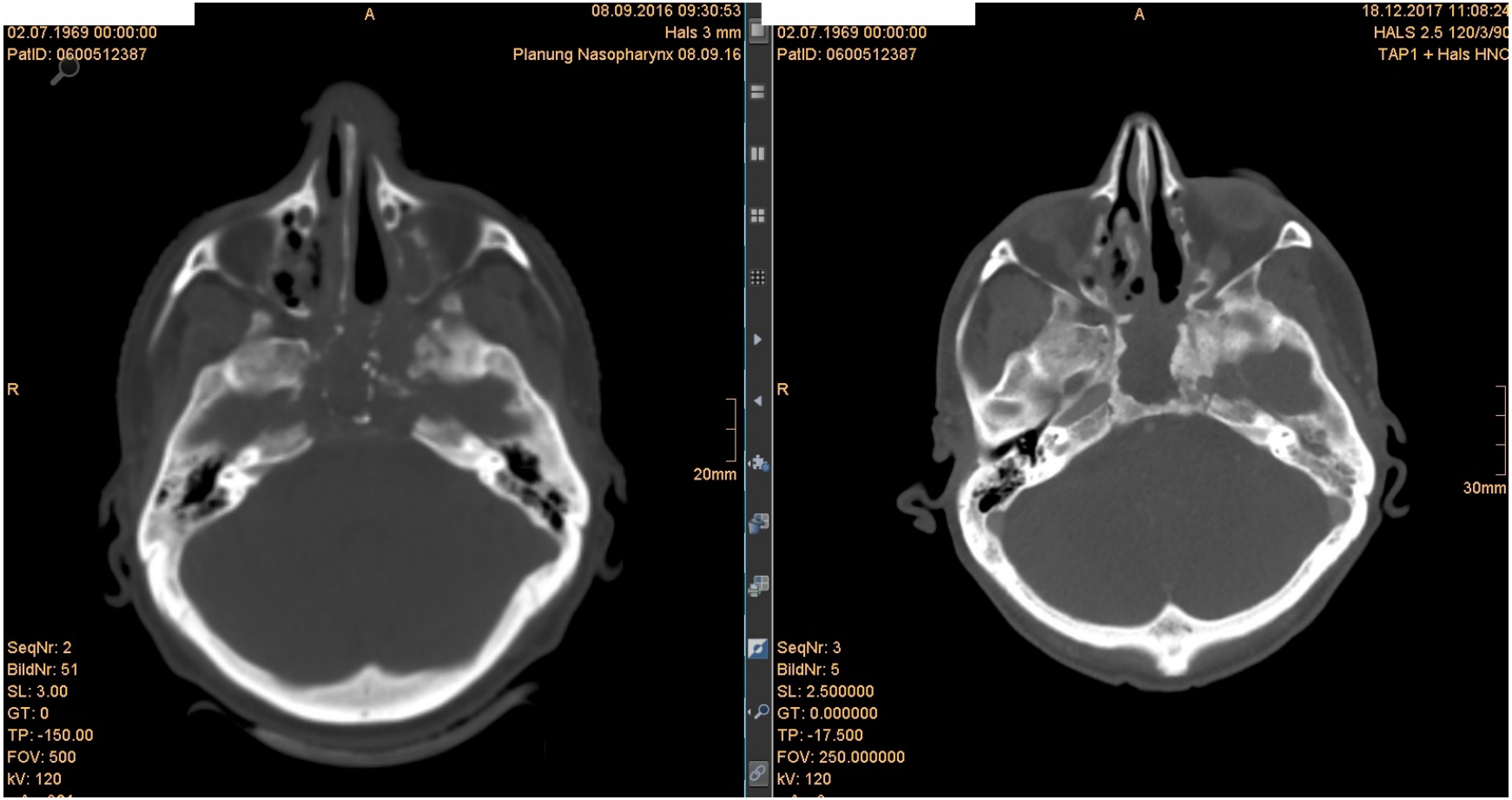

(1) CT1 SS CT1 VPankreas1
Max Dose: 54.080 Gy
Electron densities are overridden on structures that may be overlapped
0
270
90
180


Density overrides used in Monaco calculation / Electron densities are overridden on structures that may be overlapped
Volume (%)
Dose (Gy)
0
20
40
60
80
100
0
10
20
30
40
50
60


(1) CT1 SS CT1 VPankreas1
Max Dose: 54.080 Gy
Electron densities are overridden on structures that may be overlapped
270
90

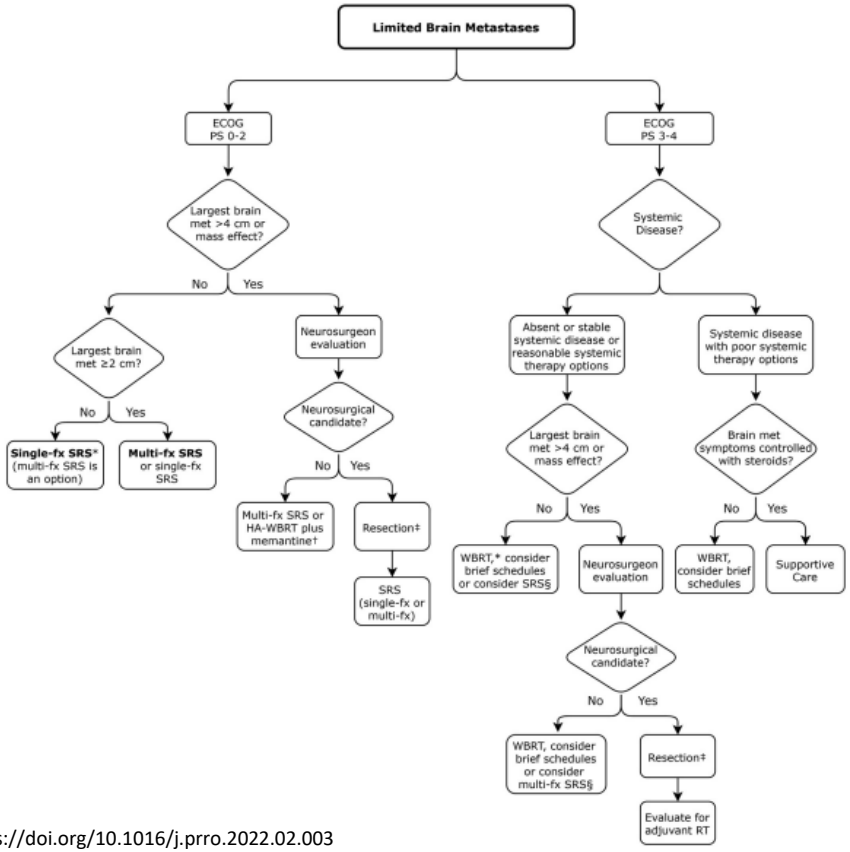

(1) CT1 SS CT1 VPankreas1
Max Dose: 54.080 Gy
Electron densities are overridden on structures that may be overlapped
180
270
0

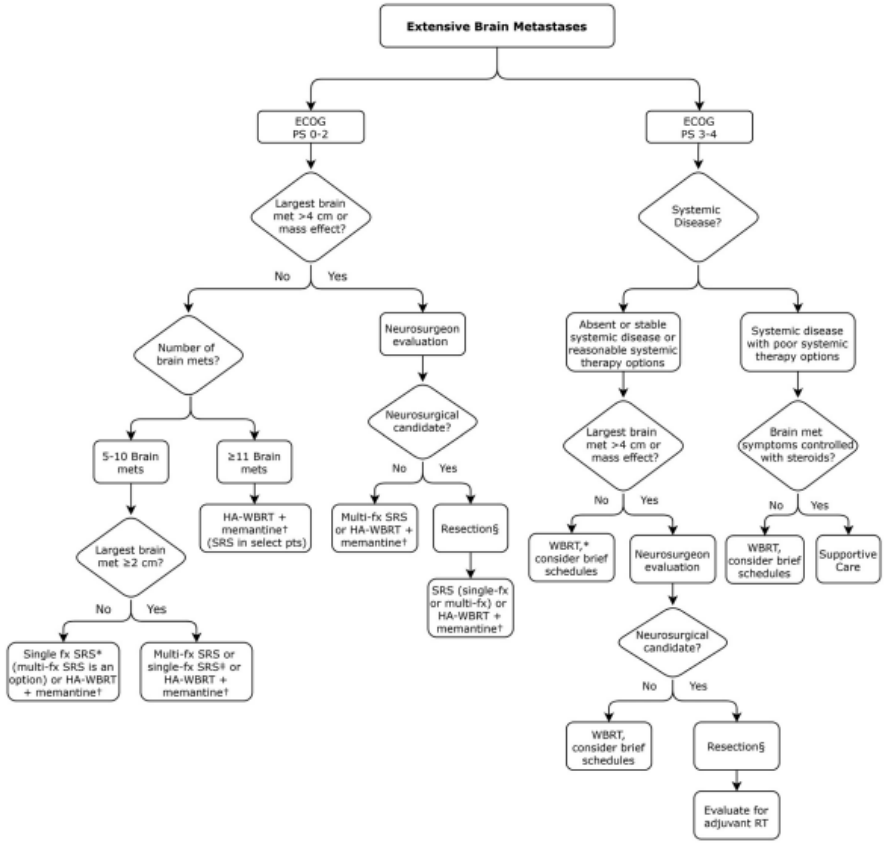

Structure Visibility
Structure
Aorta
CTV
Dickdarm
Duodenum
GTV
Leber
Li.Niere
Magen
Milz
Pancreas
Patient
ps
PTV
Re.Niere
Rueckenmark


A
08.09.2016 09:30:53
Hals 3 mm
Planung Nasopharynx 08.09.16
02.07.1969 00:00:00
PatID: 0600512387
R
20mm
SeqNr: 2
BildNr: 51
SL: 3.00
GT: 0
TP: -150.00
FOV: 500
kV: 120
A
18.12.2017 11:08:24
HALS 2.5 120/3/90
TAP1 + Hals HNC
02.07.1969 00:00:00
PatID: 0600512387
R
30mm
SeqNr: 3
BildNr: 5
SL: 2.500000
GT: 0.000000
TP: -17.500
FOV: 250.000000
kV: 120

Clinical Practice Guideline

Radiation Therapy for Brain Metastases: An ASTRO Clinical Practice Guideline





https://doi.org/10.1016/j.prro.2022.02.003