

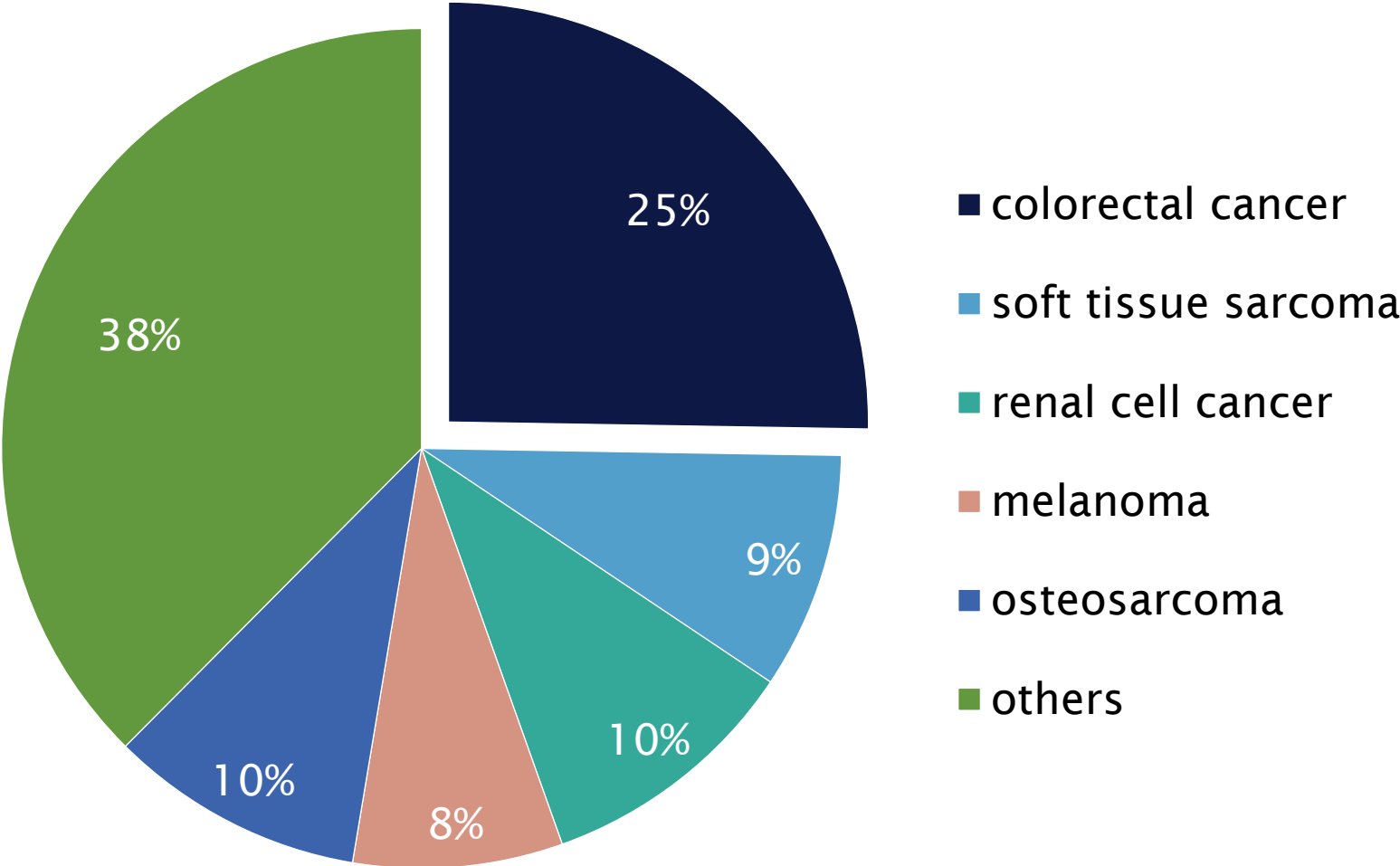
Thorakale Metastasenchirurgie

Thomas Schweiger, MD PhD

Department of Thoracic Surgery, Medical University Vienna

WPK Academy - 5 Jahre Vienna International Center for Thoracic Oncology (VICTO)

Primärtumore in der pulmonalen Metastasen Chirurgie

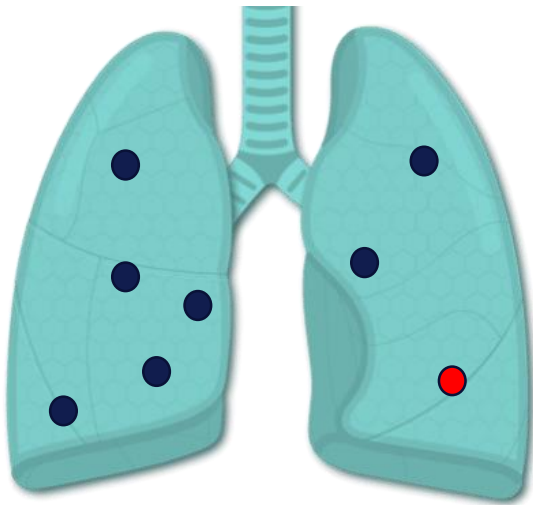


Schweiger et al., Unpublished data

Thorakale Metastasen Chirurgie

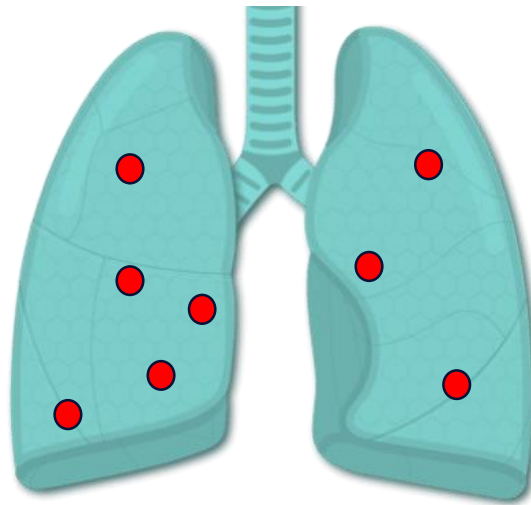
Diagnostisch

Gewinnung von
repräsentativem Gewebe



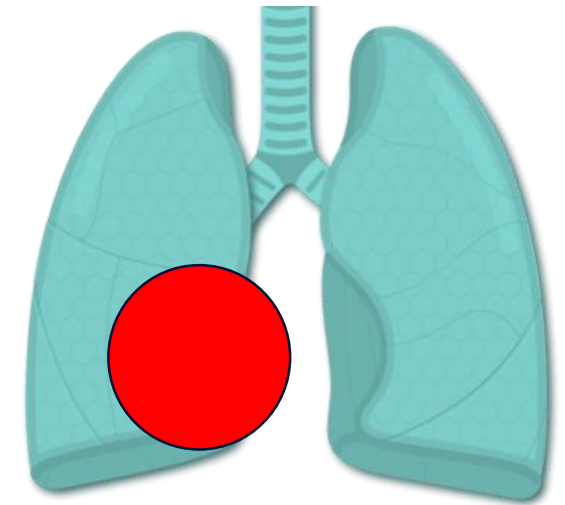
„Kurativ“

R0 Resektion aller
Metastasen



Palliativ

Resektion zur
Symptomlinderung
(z.B. Hämoptysen)



Indikationen und Techniken

Patientenselektion

Primärtumor komplett reseziert
oder resezierbar

Extra-thorakale Metastasen
resezierbar (falls vorhanden)

Technische Resektabilität aller
pulmonalen Metastasen

Ausreichende funktionelle
Reserve

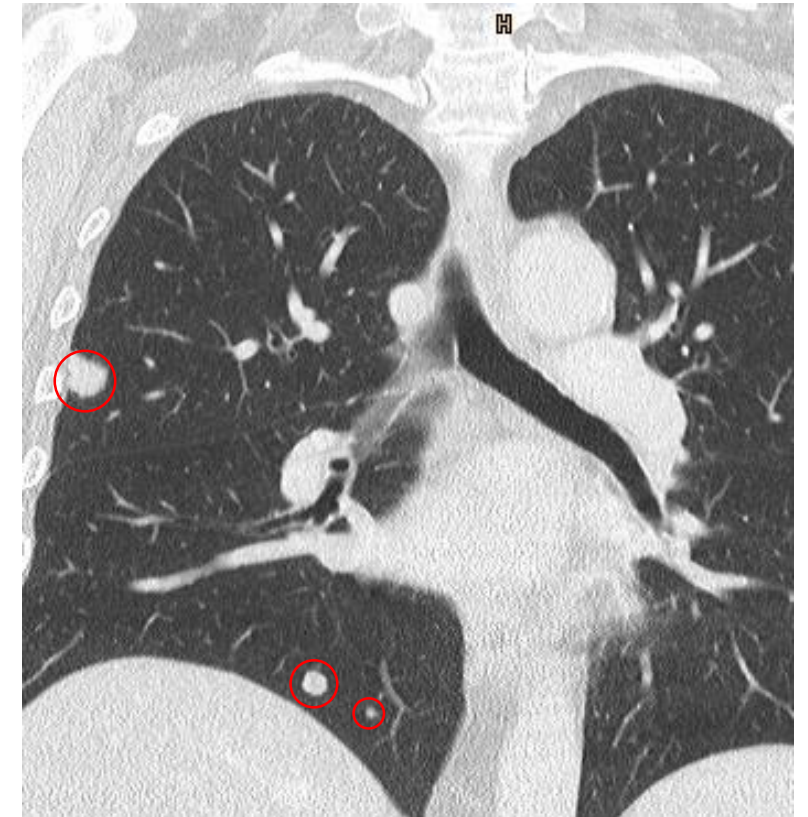
MDT & multidisziplinäres
Behandlungskonzept

Adapted from Ehrenhaft JL, Lawrence MS, Sensenig DM. Pulmonary resection for metastatic lesions. *Arch Surg.* 1958;77:606-612.

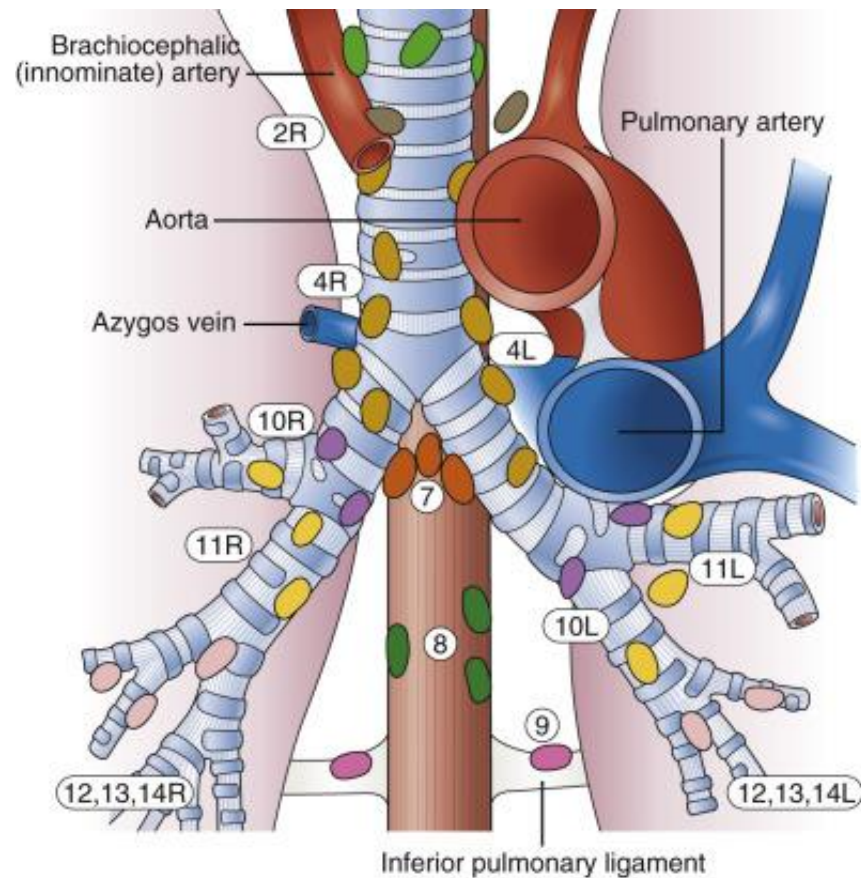
Klinische Prognosefaktoren

Clinical factor	Impaired Overall Survival
Radikalität	R1/R2
Metastasenanzahl	> 1 Metastase
Disease free interval (DFI)	< 36 Monate
Lymphknotenstatus	N1/N2

International Registry of Lung Metastases, Pastorino et al. 1997
Thorac Surg Clin. 2016 Aug;26(3):315-23.



Chirurgische Techniken Lymphknotensampling



- Sampling/Dissektion von hilären (N1) und mediastinalen (N2) Lymphknotenstationen
- Prognostische Relevanz
- evtl. therapeutische Konsequenz -> adjuvante CHT

Chirurgische Techniken Lymphknotensampling

Interactive Cardiovascular and Thoracic Surgery 18 (2014) 482–487
doi:10.1093/icvts/ivt554 Advance Access publication 16 January 2014

ORIGINAL ARTICLE – THORACIC

Does nodal status influence survival? Results of a 19-year systematic lymphadenectomy experience during lung metastasectomy of colorectal cancer[†]

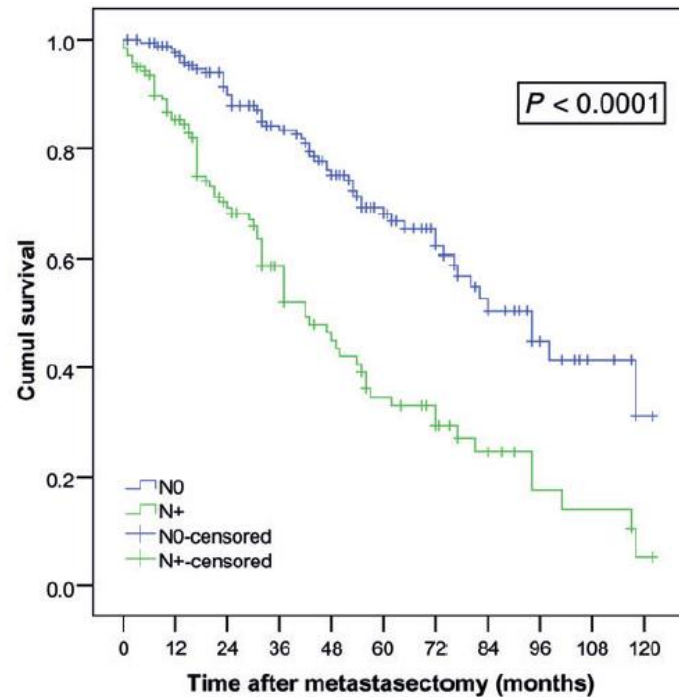
Stéphane Renaud^a, Marco Alifano^b, Pierre-Emmanuel Falcoz^{a*}, Pierre Magdeleinat^b, Nicola Santelmo^a, Olivier Pagès^b, Gilbert Massard^a and Jean-François Régnard^b

- Retrospective analysis

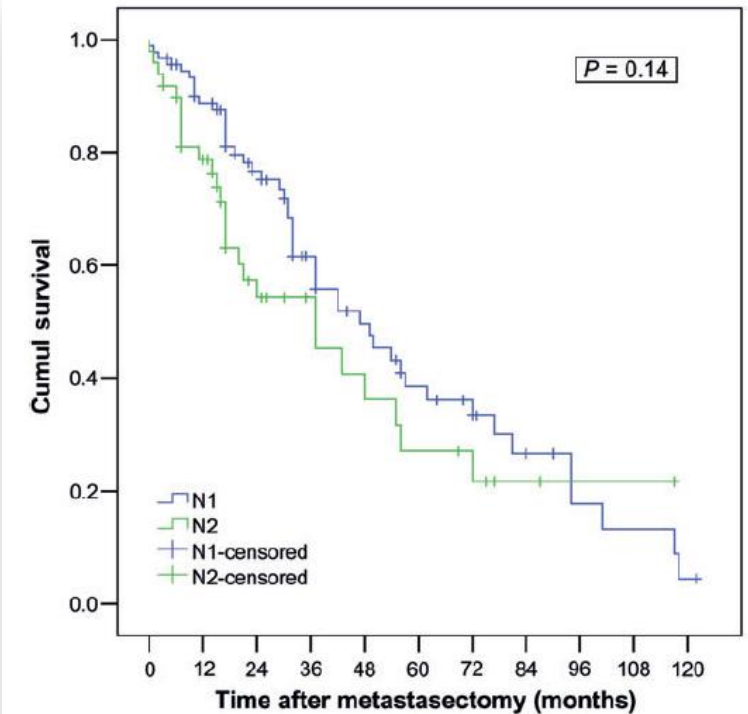
- 320 patients

- Median survival

94 months (N-) vs 42 months (N+)



Patients at risk N0	180	164	131	109	84	56	37	22	13	6	1
Patients at risk N+	140	111	68	44	31	22	15	9	5	4	1



Patients at risk N1	91	77	50	32	23	16	11	7	4	3	1
Patients at risk N2	49	34	18	12	8	6	4	2	1	1	0

INTERACTIVE
CARDIOVASCULAR
AND THORACIC
SURGERY

Chirurgische Techniken

Lymphknotensampling

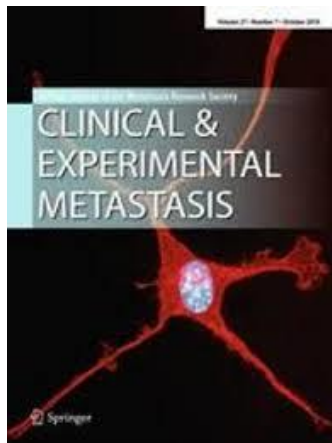
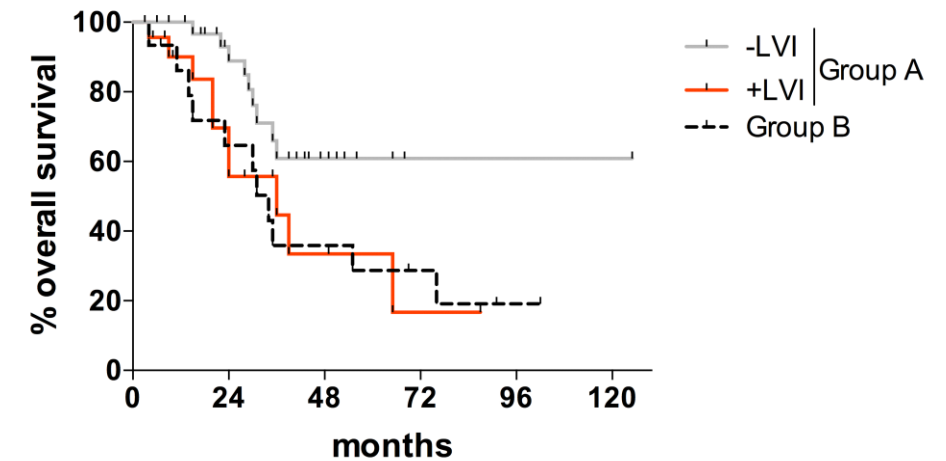
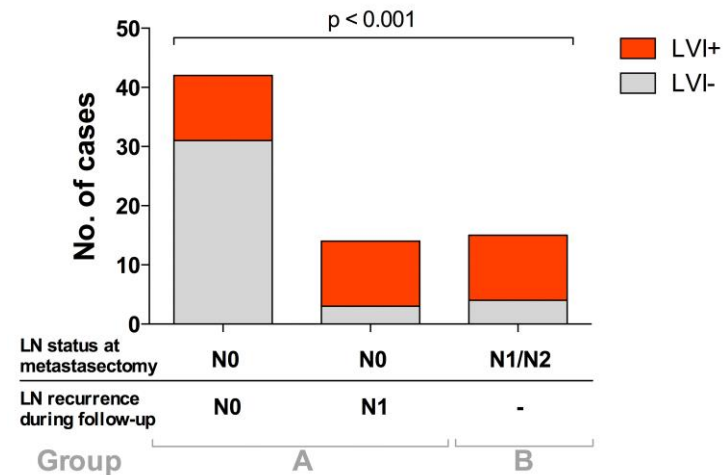
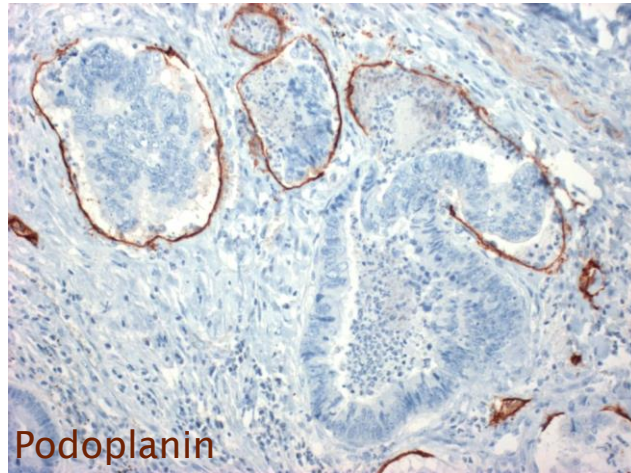
Table 1
Summary of incidence and prognosis of intrathoracic nodal metastases

Primary Tumor Histology	Incidence of Intrathoracic Lymph Node Involvement (%)	5-Year Survival After R0 Resection (%) ³¹	Median Survival N– vs N+ (mo)
Colorectal	30	45	94 vs 42 ³
Renal cell	35	40	107 vs 37 ¹³
Sarcoma	15	40	47 vs 18 ¹⁷
Germ cell tumor	25	80	Not reported
Melanoma	10	25	27 vs 16 ²²
Head and neck SCC	35	30	29 vs 11 ²⁶
Breast	30	40	85 vs 38 ²⁹

Lymphknotensampling bei jeder Metastasektomie

Chirurgische Techniken

Lymphgefäßinvasion in pulmonalen Metastasen

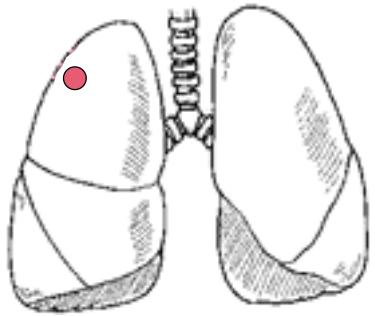


Increased lymphangiogenesis in lung metastases from colorectal cancer is associated with early lymph node recurrence and decreased overall survival

Thomas Schweiger^{1,2} · Christoph Nikolowsky^{1,2} · Thomas Graeter³ ·
 Gernot Seebacher³ · Jürgen Laufer⁴ · Olaf Glueck^{1,2} · Christoph Glogner^{1,2} ·
 Peter Birner⁵ · György Lang¹ · Walter Klepetko¹ · Hendrik Jan Ankersmit^{1,2} ·
 Konrad Hoetzenecker¹

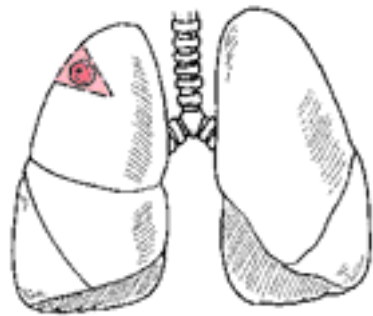
Chirurgische Techniken

Resektionsarten

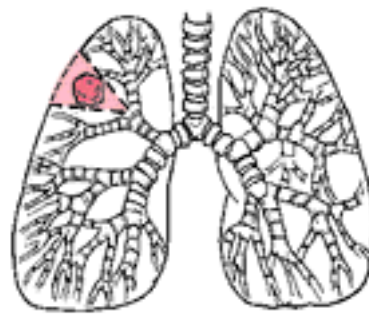


ENUCLEATION

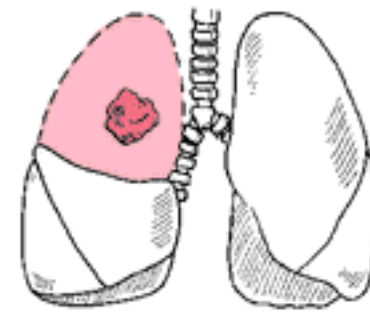
- Electrocautery
- Laser



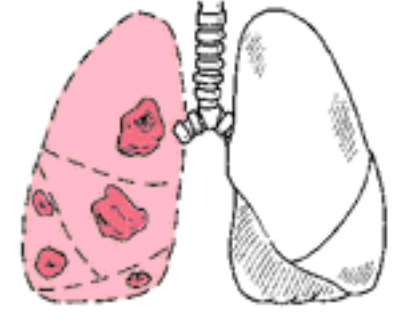
WEDGE RESECTION



**SEGMENTAL
RESECTION**



LOBECTOMY

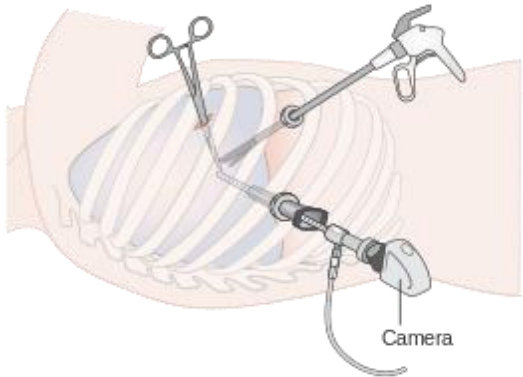
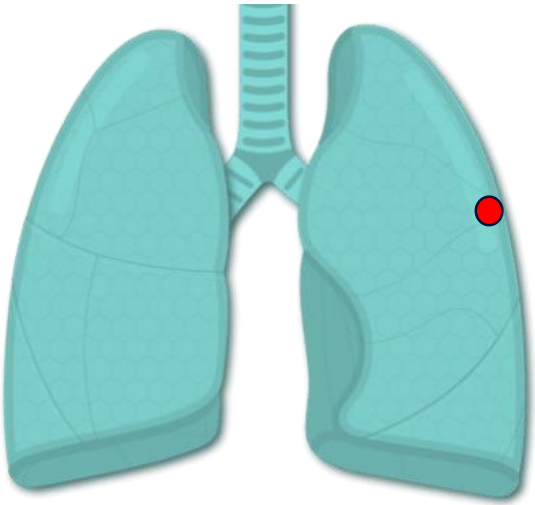


PNEUMONECTOMY

Zielsetzung: Parenchym-sparend, aber radikal (R0)

Metastasierungsmuster und Behandlungskonzepte

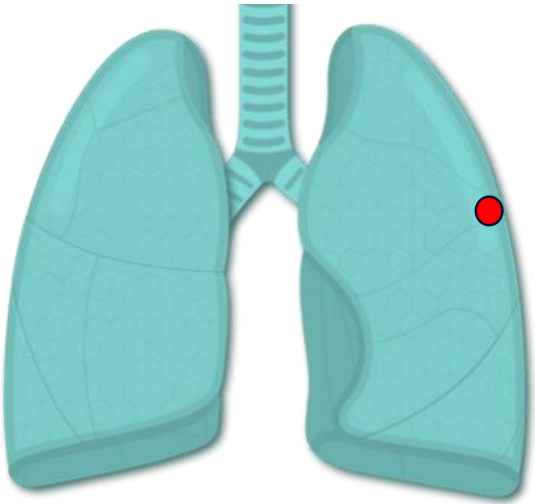
Singular, subpleural



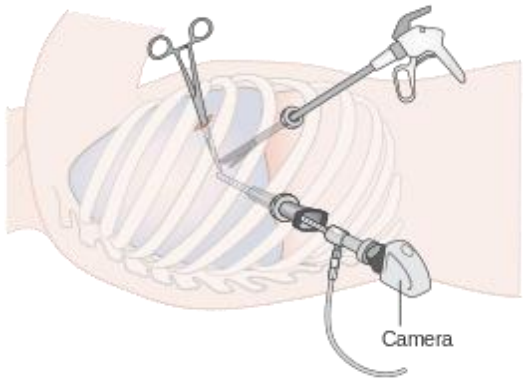
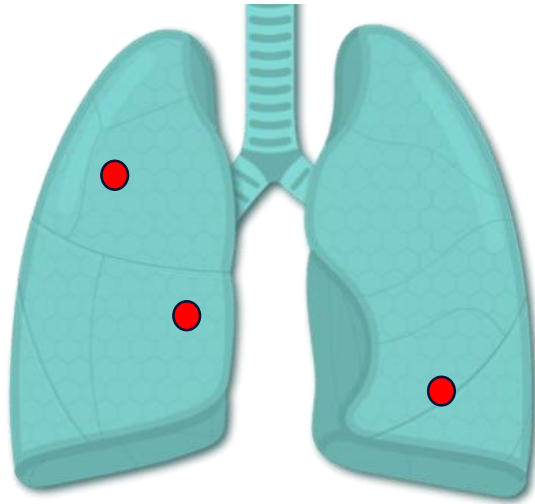
VATS

Metastasierungsmuster und Behandlungskonzepte

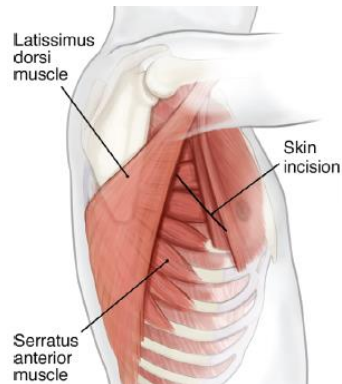
Singular, subpleural



Multiple, parenchymal



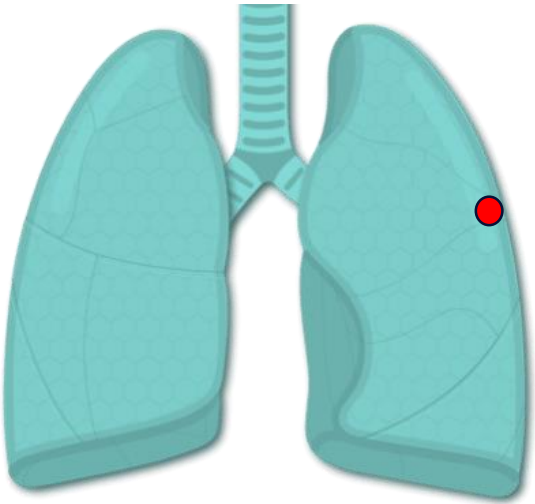
VATS



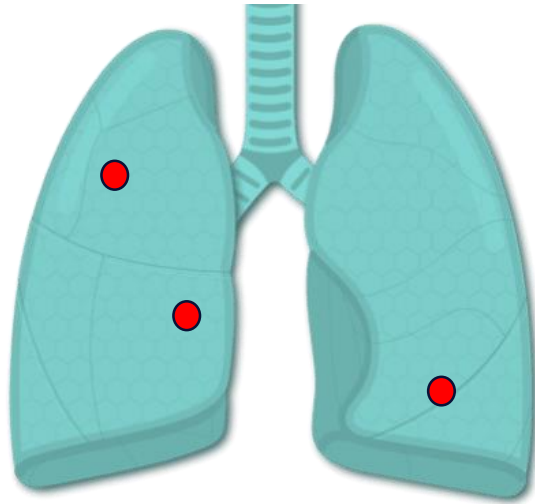
VATS/Thorakotomie

Metastasierungsmuster und Behandlungskonzepte

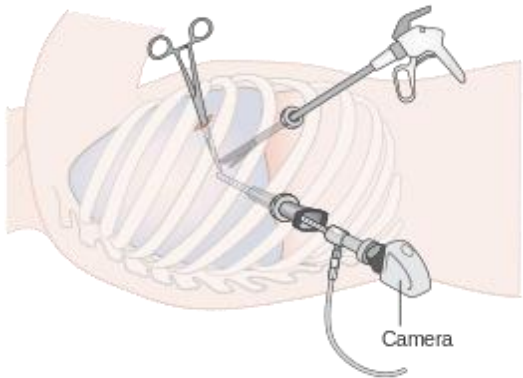
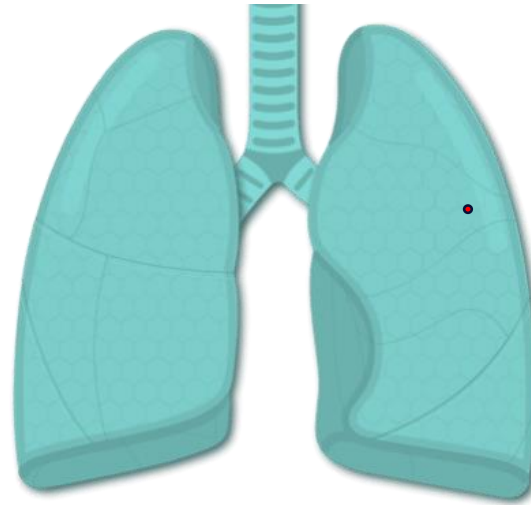
Singular, subpleural



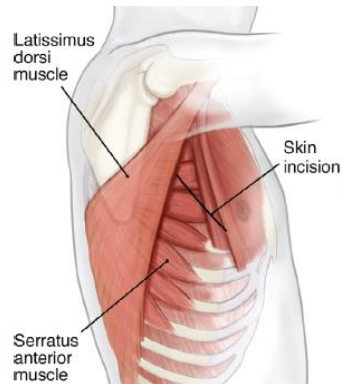
Multiple, parenchymal



<5mm, parenchymal



VATS

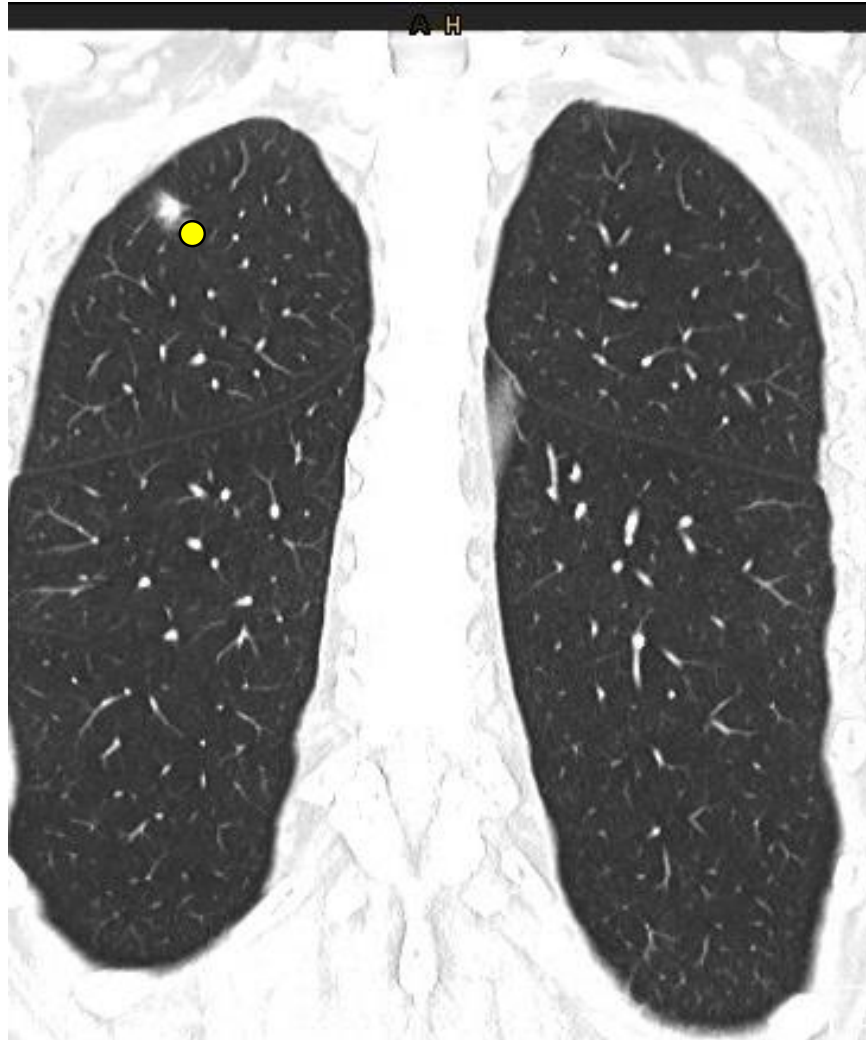


VATS/Thorakotomie



Pre-OP Markierung

Fluoroscopy-guided VATS after marking with metal plug



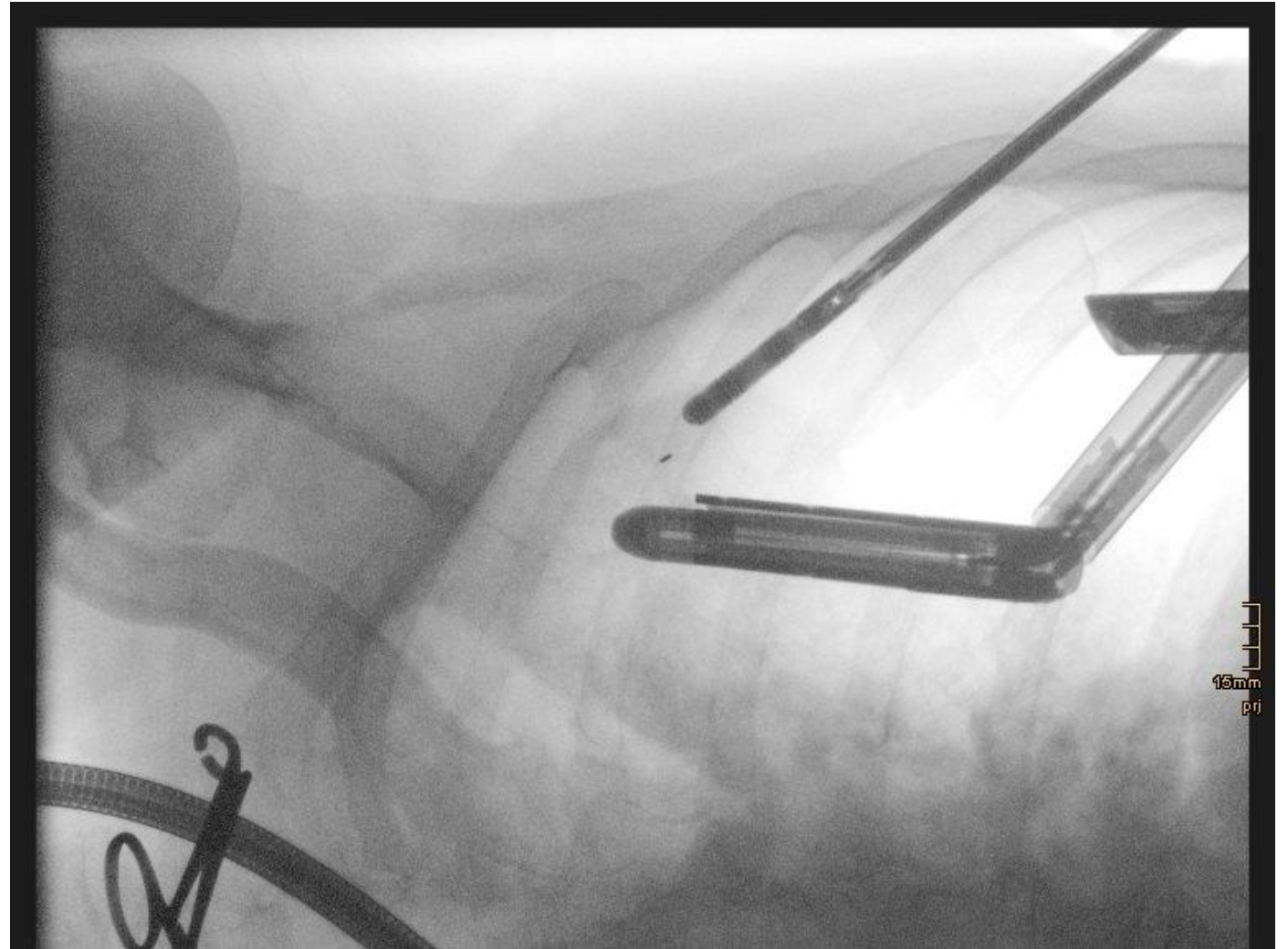
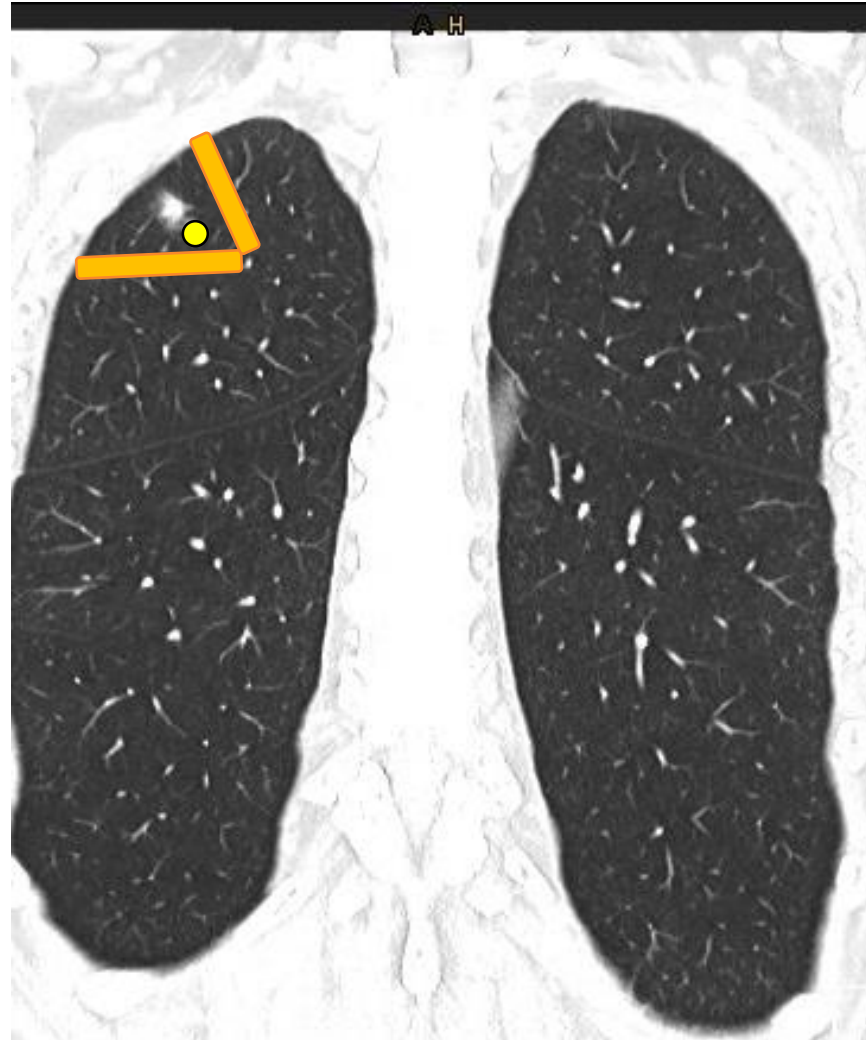
Schritt 1: CT-gezielte Markierung mit Metallplug

- Unmittelbar vor OP in Lokalanästhesie

Schritt 2: VATS Resektion

- Identifikation mittels Durchleuchtung
- Resektion im Gesunden

Fluoroscopy-guided VATS after marking with metal plug

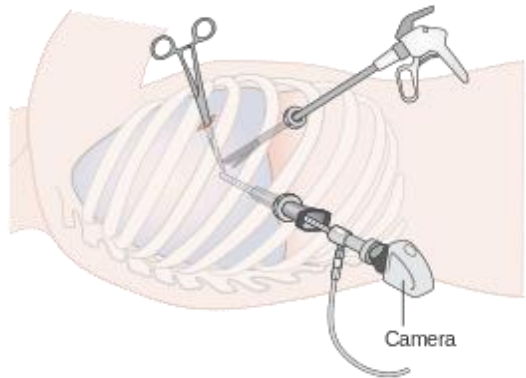
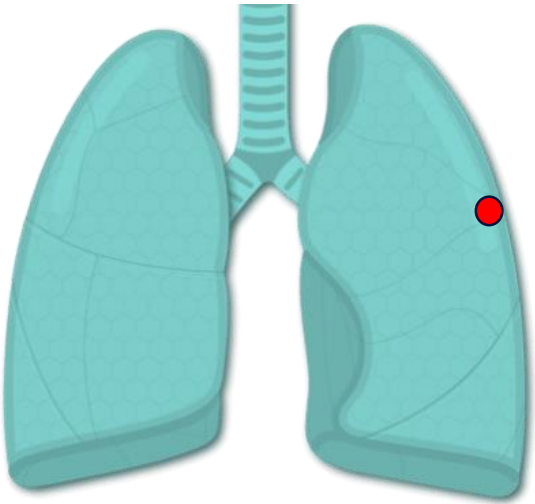


Fluoroscopy-guided VATS after marking with metal plug



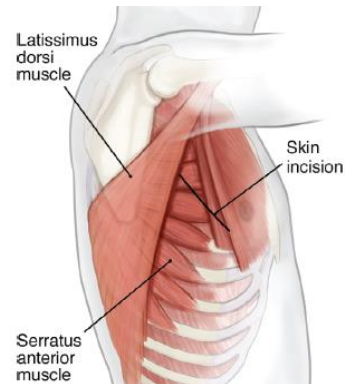
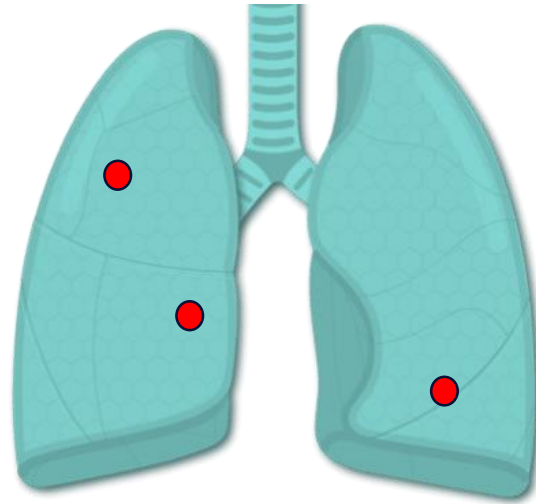
Metastasierungsmuster und Behandlungskonzepte

Einzelne, subpleural



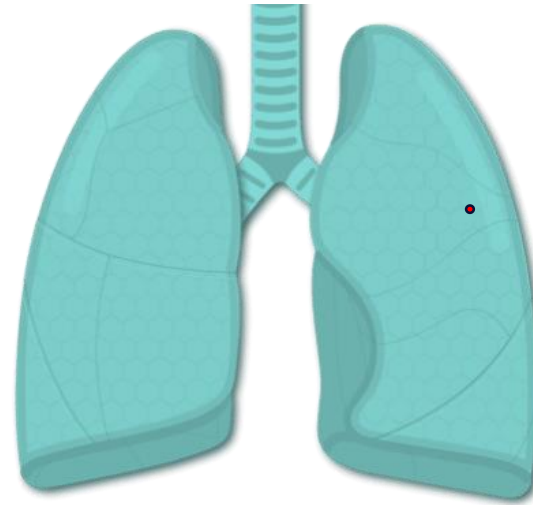
VATS

Multiple, parenchymal



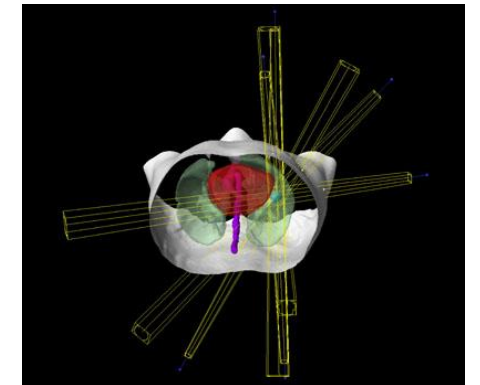
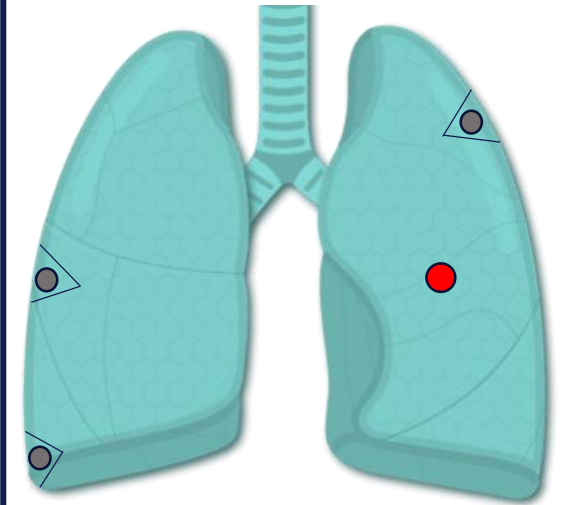
VATS/Thorakotomie

<5mm, parenchymal



Pre-OP Markierung

Zentral, inkomplett
Hybrid-Verfahren



Post-OP SBRT

Metastasektomie vs. Stereotaxie

Local failure after stereotactic body radiation therapy or wedge resection for colorectal pulmonary metastases

Check for updates

David B. Nelson, MD, MSc,^a Nabihah Tayob, PhD,^b Quynh-Nhu Nguyen, MD,^c Jeremy Erasmus, MD,^d Kyle G. Mitchell, MD,^a Wayne L. Hofstetter, MD,^a Boris Sepesi, MD,^a Mara B. Antonoff, MD,^a and Reza J. Mehran, MD^a

- 826 metastases in 351 patients
- Propensity score matched
- 2yrs-risk for local recurrence
 - 14.1% wedge resection
 - 29.4% SBRT
- Hazard ratio +1.38 per cm

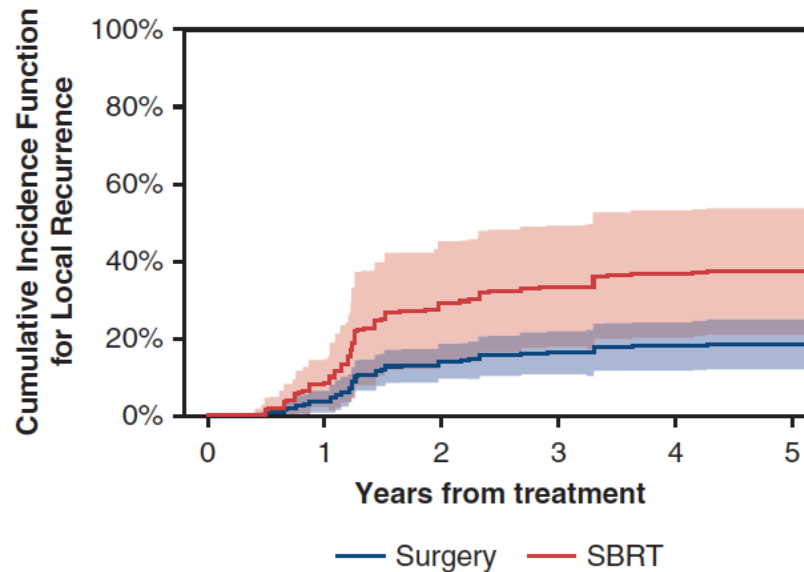


FIGURE 2. Cumulative incidence function indicating risk of local recurrence is higher with SBRT compared with wedge resection. Results modeled with death as a competing risk using matching weights. *SBRT*, Stereotactic body radiation therapy.

TABLE 3. Multivariable factors associated with the risk of local recurrence, unweighted cohort

Factor	HR (95% CI)	P value
SBRT	3.28 (1.53-7.04)	.002
Tumor size (per cm)	1.38 (1.01-1.87)	.042
Disease-free interval (per year)	0.89 (0.77-1.03)	.110
<i>KRAS</i>		
Wild-type (reference)	–	–
Mutant	0.92 (0.54-1.57)	.756
Missing	0.16 (0.04-0.64)	.010
Differentiation		
Well-moderate (reference)	–	–
Poor	1.76 (0.90-3.46)	.099
Lymphovascular invasion		
Absent (reference)	–	–
Present	0.83 (0.45-1.51)	.534
Missing	0.92 (0.40-2.13)	.852
Response to chemotherapy		
Not given (reference)	–	–
Response	0.80 (0.31-2.03)	.632
No change	1.06 (0.49-2.32)	.879
Progression	0.50 (0.24-1.06)	.069

HR, Hazard ratio; CI, confidence interval; SBRT, stereotactic body radiation therapy.

Kombination aus Metastasektomie und Stereotaxie

Metastasektomie

- komplette Entfernung
- pathologische Aufarbeitung
- Lymphknotensampling

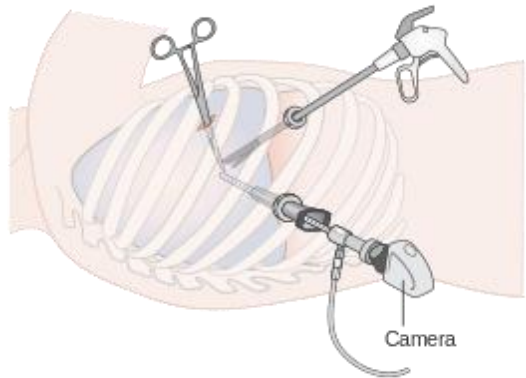
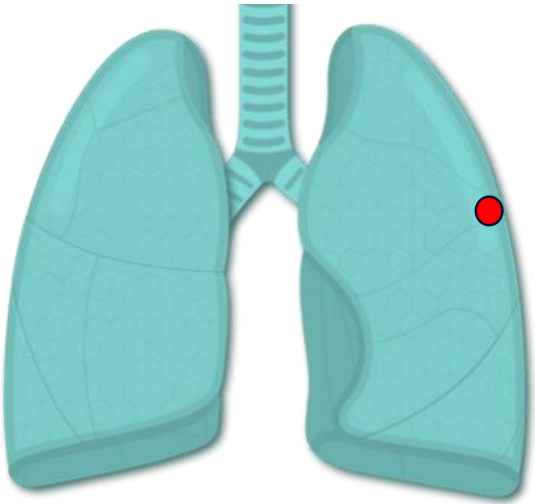
SBRT

- geringe Invasivität
- Abskopaler Effekt

Parenchym-schonende, aber radikale Behandlungsoption bei komplexem Metastasierungsmuster

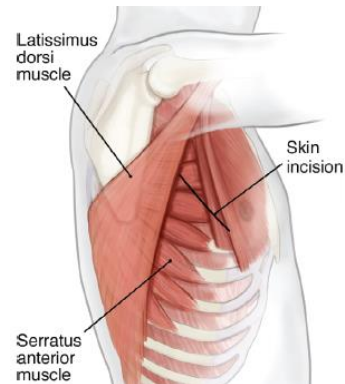
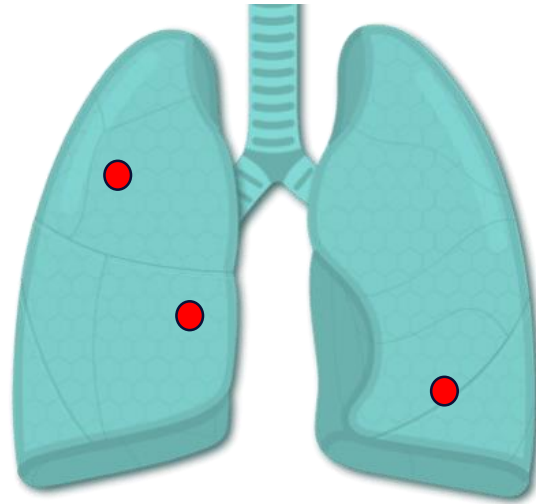
Metastasierungsmuster und Behandlungskonzepte

Einzelne, subpleural



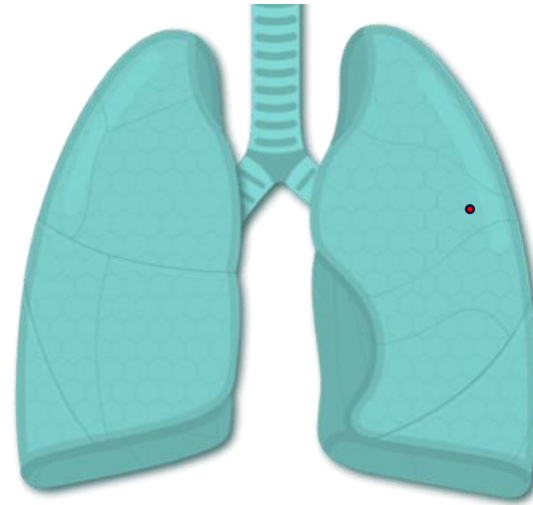
VATS

Multiple, parenchymal



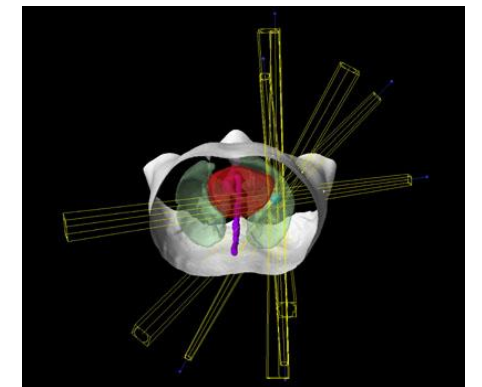
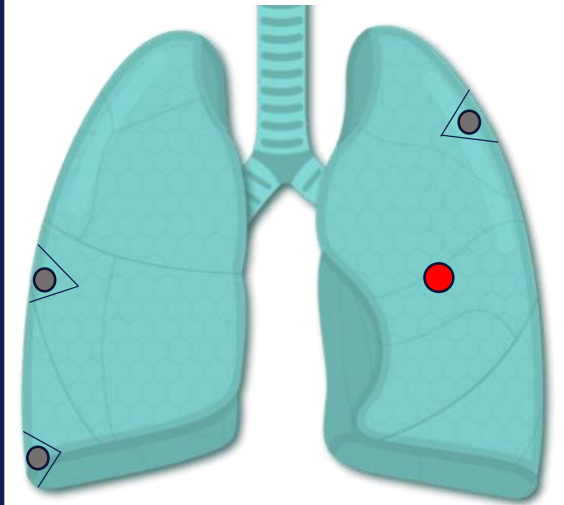
VATS/Thorakotomie

<5mm, parenchymal



Pre-OP Markierung

Zentral, inkomplett
Hybrid-Verfahren



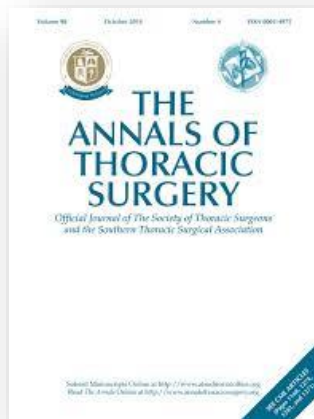
Post-OP SBRT

Re-Metastasektomie

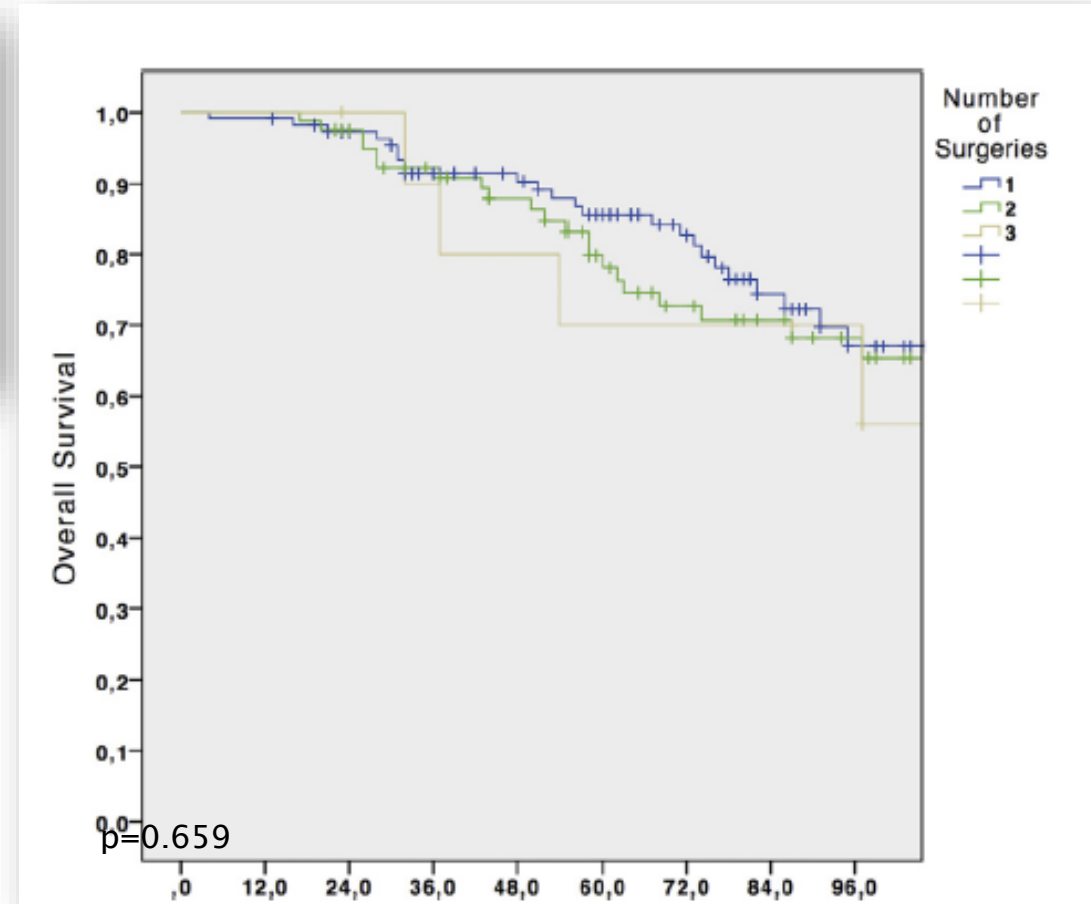
Do Repeated Operations for Recurrent Colorectal Lung Metastases Result in Improved Survival?

Check for updates

Cecilia Menna, MD, Giammauro Berardi, MD, Simone Maria Tierno, MD, Claudio Andreotti, MD, PhD, Giulio Maurizi, MD, Anna Maria Ciccone, MD, Antonio D'Andrilli, MD, Francesco Cassiano, MD, Camilla Poggi, MD, Daniele Diso, MD, PhD, Federico Venuta, MD, Erino Angelo Rendina, MD, and Mohsen Ibrahim, MD, PhD



- Retrospective analysis of 203 patients
- Overall survival ↓: Lymphnode involvement
- Overall survival ↑: adj. CHT
- No OS difference for 1st/2nd/3d metastasectomy



Zusammenfassung

- Stetig geringere Invasivität durch **parenchym-sparende, minimal-invasive Operationsmethoden**
- **Gute Langzeitergebnisse** auch bei wiederholten Eingriffen
- **Multimodale Therapiekonzepte** (Markierung plus OP, OP plus SBRT,...)

Thorakale Metastasenchirurgie

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