UZ LEUVEN

Retroperitoneal Sarcoma "crash course" ☺

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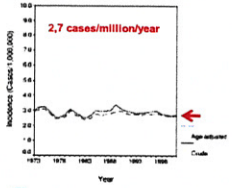
Incidence

- Cancer Statistics (2005): **15%** of all STS *(Jemal et al., CA Cancer J Clin 2005)*
- **SEER cancer registry** (NCI)

Retroperitoneal Sarcoma
A Population-Based Analysis of Epidemiology, Surgery, and Radiotherapy
Cancer 2006;106:1810–6.

[1973-2001]
N = 2348 new primary RPS
median age: 64 years
M = F



Histopathology & Size

(Strauss et al.; BJS 2010)

– Most frequent subtypes:
- Liposarcoma (LPS)
- Leiomyosarcoma (LMS)

– 50% high-grade

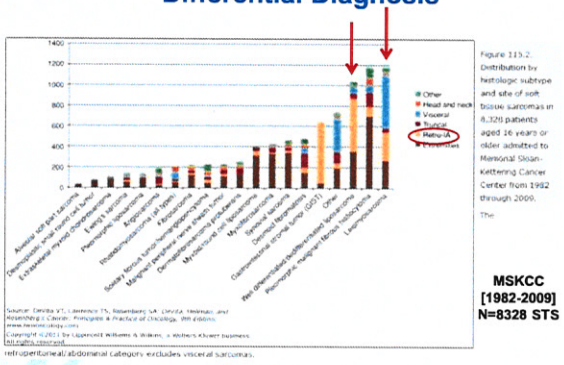
- Very large tumors

Table 1 Demographics, operative outcomes and pathology characteristics of 200 patients with primary retroperitoneal sarcoma

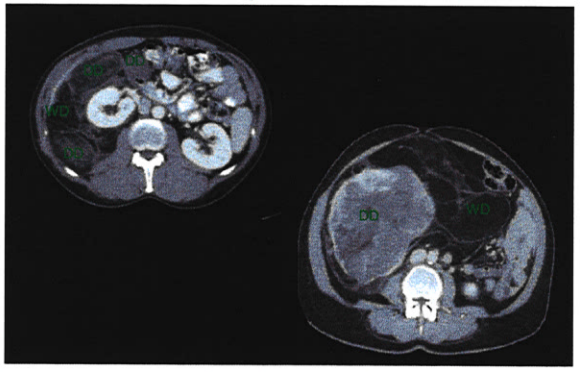
	N=200
Median (range) tumour diameter (cm)	27 (5–60)
Tumour size distribution (cm)	
5–9·9	4 (2·0)
10–19·9	51 (25·5)
20–39·9	108 (54·0)
≥ 40	37 (18·5)
Median (range) tumour weight (kg)	4·0 (0·03–25·0)
Tumour grade	
1	93 (46·5)
2	81 (40·5)
3	26 (13·0)
Tumour subtype	
Liposarcoma	152 (76·0)
Well differentiated	84 (42·0)
Dedifferentiated	57 (28·5)
Myxoid	9 (4·5)
Pleomorphic	3 (1·5)
Leiomyosarcoma	27 (13·5)
Solitary fibrous tumour	11 (5·5)
Synovial sarcoma	3 (1·5)
Fibrosarcoma	2 (1·0)
Pleomorphic rhabdomyosarcoma	1 (0·5)
Undifferentiated round cell sarcoma	1 (0·5)
Malignant PNST	1 (0·5)
Epithelioid smooth muscle tumour	1 (0·5)
Desmoplastic small round cell tumour	1 (0·5)

CAVE: 80% retroperitoneal tumors = MALIGNANT!

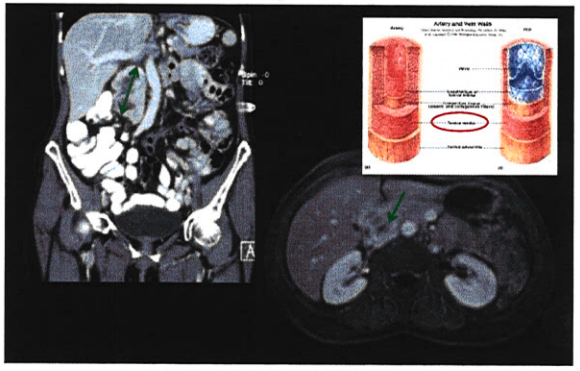
Differential Diagnosis



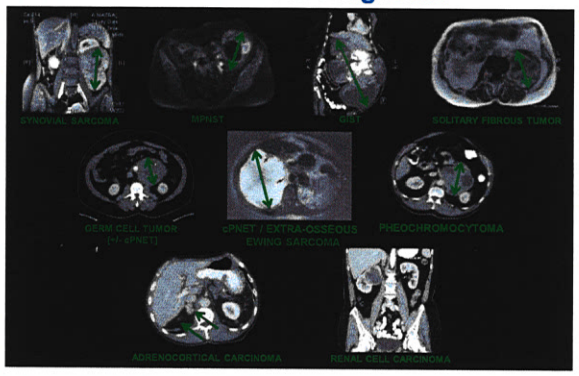
Liposarcoma



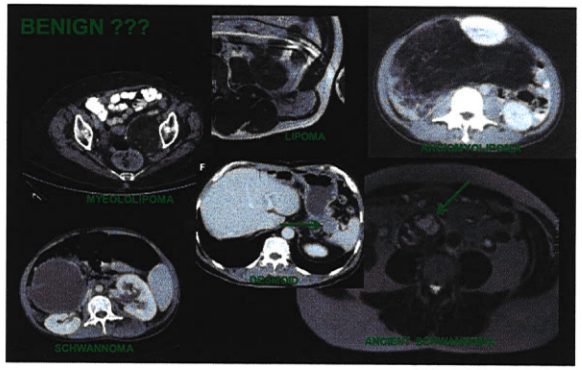
Leiomyosarcoma



Differential Diagnosis

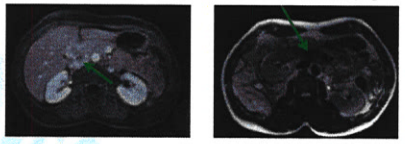


Differential Diagnosis



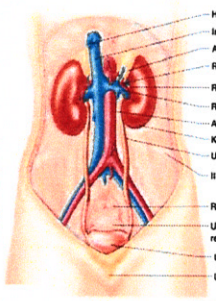
Imaging

- **CT:** diagnostic / staging *note: mineralization!*
- **MRI:** diagnostic & preop.planning
  - **Encasement SMA !** (PV)
  - Invasion central vessels or other vital structures (e.g. duodenum)



- **DMSA:** bilateral renal function !!!
- **(PET/CT)**

Retroperitoneum



+ n.femoralis

+ diagfragmakoepels
+ m. psoas
m. iliacus
m. quadratus lumborum
schuine buikspieren

+ n. ilioinguinalis
n. ilihypogastricus
n. genitofemoralis
n. cutaneus lateralis femoris

+ aa./vv. lumbales

⇨ **75% of sarcoma-related deaths involve uncontrolled local recurrence**

Compartimental Resection?

JOURNAL OF CLINICAL ONCOLOGY — ORIGINAL REPORT

Aggressive Surgical Policies in a Retrospectively Reviewed Single-Institution Case Series of Retroperitoneal Soft Tissue Sarcoma Patients

(Gronchi et al., JCO 2009)

- **ITM** **N=288** [1985-2001 vs. 2002-2007]

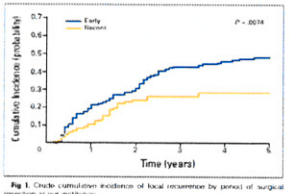
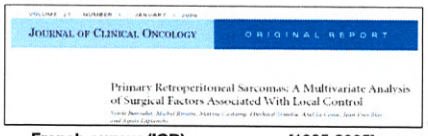


Fig 1. Crude cumulative incidence of local recurrence by period of surgical resection at our institution.

More liberal
en-bloc resections
⇩
greater local control

low-grade tumors !

Compartimental Resection?


JOURNAL OF CLINICAL ONCOLOGY — ORIGINAL REPORT

Primary Retroperitoneal Sarcomas: A Multivariate Analysis of Surgical Factors Associated With Local Control

(Bonvalot et al., JCO 2009)

- **French survey (IGR)** [1985-2005] **N=382**

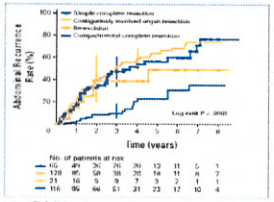


Fig 3. Abdominal recurrence rate according to type of surgery.

Complete compartimental resection without tumor rupture

high-volume center !!!

Surgical guidelines

- **Guidelines**

Ann Surg Oncol (2012) 19:2981–2991
DOI 10.1245/s10434-012-2342-2

Annals of SURGICAL ONCOLOGY

ORIGINAL ARTICLE – BONE AND SOFT TISSUE SARCOMAS

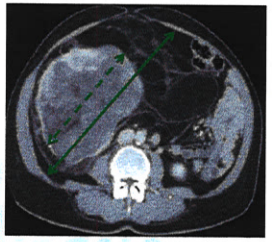
Technical Considerations in Surgery for Retroperitoneal Sarcomas: Position Paper from E-Surge, a Master Class in Sarcoma Surgery, and EORTC–STBSG

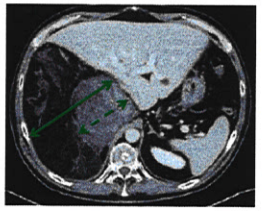
Sylvie Bonvalot, MD, PhD[1], Chandrajit P. Raut, MD, MSc[2], Raphael E. Pollock, MD, PhD[3], Piotr Rutkowski, MD[4], Dirk C. Strauss, MD[5], Andrew J. Hayes, MD[5], Frits Van Coevorden, MD[6], Marco Fiore, MD[7], Eberhard Stoeckle, MD[8], Peter Hohenberger, MD, PhD[9], and Alessandro Gronchi, MD[7]

Surgical guidelines

- **Biospsy**
  - In general:
    preop. biopsy = necessary to achieve correct oncological diagnosis *before* planning any therapy
    CAVE: masses showing higher density without a fatty or lipomatous component !
    → differentiate STS from other neoplasms: extremely different R/ !
  - **Core Needle Biopsy** (14-16G)
  - avoid open surgical biopsy (could complicate surgery)
  - **preferable: retroperitoneal image-guided approach**
    → avoid peritoneal seeding along needle track

Surgical guidelines

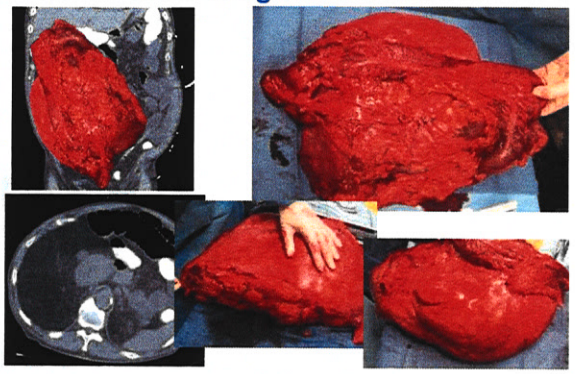




THIS IS **NOT** NORMAL FAT **!!!**
THIS IS **WDLPS**

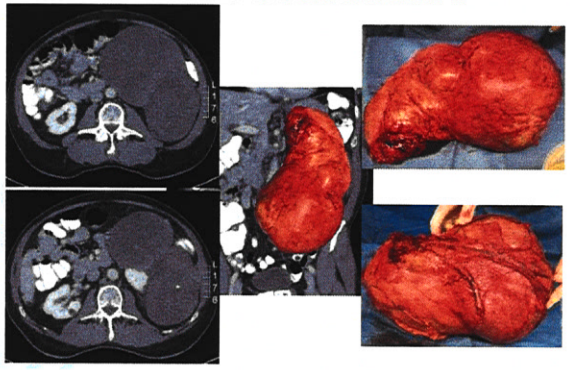
M, 71y.

Case 1: right-sided WDLPS



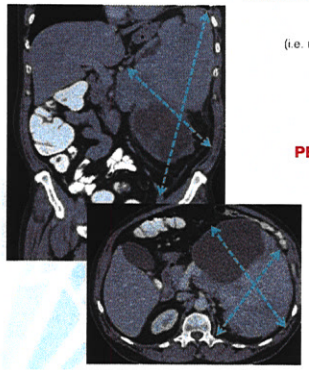
M, 70y.

Case 2: left-sided DDLPS



M, 58y.

CAVE !!!

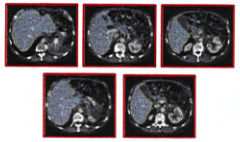


if only "local excision"

(i.e. no compartimental resection, no nephrectomy)

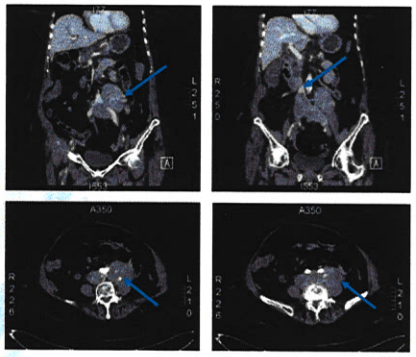
within few weeks

PERITONITIS SARCOMATOSA !!!



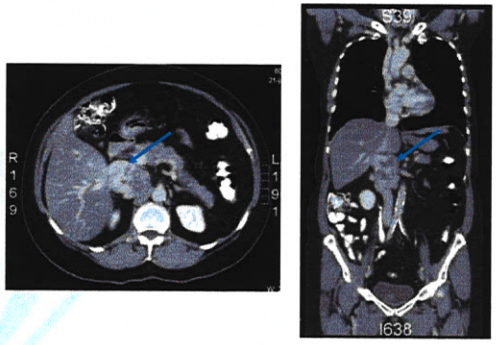
F, 79y.

Case 3: LMS VCI



F, 72y.

Case 4: LMS VCI



Patterns of recurrence

- 6 European institutions
- 2 North American institutions
- 2002 – 2011

Variability in Patterns of Recurrence After Resection of Primary Retroperitoneal Sarcoma (RPS)
A Report on 1007 Patients from the Multi-institutional Collaborative RPS Working Group

(Gronchi et al., Ann Surg 2016)

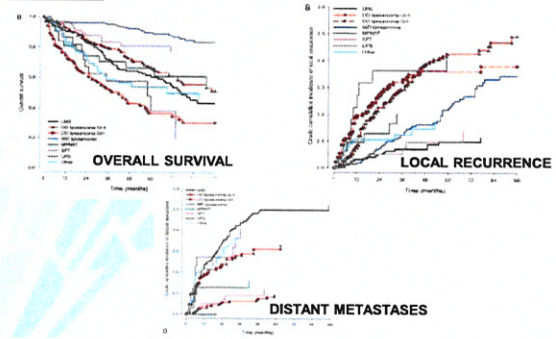
- N= 1007 consecutive patients
- Median follow-up: 58 months [first and third quartile range 36–90]

TOTAL POPULATION

	5-year	8-year	10-year
Overall survival (%) [95%CI]	67 [63-70]	56 [52-61]	46 [40-53]
Local Recurrence (%) [95%CI]	25,9 [23,1-29,1]	31,3 [27,8-35,1]	35 [30,5-40,1]
Distant Metastases (%) [95%CI]	21 [18,4-23,8]	21,6 [19,0-24,6]	21,6 [19,0-24,6]

Patterns of recurrence

PER SUBTYPE



Patterns of recurrence

- significant predictors of outcome:
  - tumor size
  - histologic subtype → **Patterns of recurrence**
  - malignancy grade
  - multifocality
  - **completeness of resection**
- Different treatment policies → influence on LR of WDLPS, without impacting OS
- ≠ adjuvant systemic therapies → no impact on LR, DM, or OS of LMS
- Conclusions: **Reference centers!** management strategy requires specific expertise
  Histologic subtype → patterns of recurrence → R/
- Prospective international registry is needed! → TARPS-WG

Radiotherapy?

THE LANCET Oncology

Preoperative or postoperative radiotherapy versus surgery alone for retroperitoneal sarcoma: a case-control, propensity score-matched analysis of a nationwide clinical oncology database

(Nussbaum et al., Lancet Oncol 2016)

- National Cancer Data Base
- N= 9068 adult patients
  localised, primary RPS,
  diagnosed from 2003 to 2011
- classified into three groups:
  - 563 in the preoperative radiotherapy group
  - 2215 in the postoperative radiotherapy group
  - 6290 in the no radiotherapy group.
- negligible differences in demographic, clinicopathological, and treatment-level variables.
- Matching → 2 comparison groups:

	PREOPERATIVE RT		~~POSTOPERATIVE RT~~	
	Yes	No	~~Yes~~	~~No~~
Median FU	42 months (IQR 27-70)	43 months (25-64)	~~54 months (IQR 32-79)~~	~~47 months (26-72)~~
Median OS	110 months (95% CI 75-not estimable)	66 months (61-76)	~~89 months (95% CI 79-100)~~	~~64 months (50-69)~~
HR	HR 0·70, 95% CI 0·59-0·82; p<0·0001)		~~HR 0·78, 0·71-0·85; p<0·0001)~~	

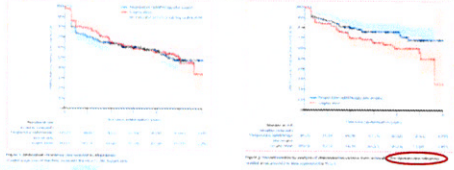
Radiotherapy?

Role of RT in treatment of RPS?

- Retrospective analysis (Bonvalot et al., JCO 2009)
  3-year recurrence rate: 49% without RT vs 34% with RT
- **Postoperative?** high SAE rate!
- **Preoperatieve RT?**
  - Tumor in situ → delineation and treatment planning more straightforward
  - Less toxicity
  - Tumor may displace radiosensitive structures outside the treatment field
- **Trials**
  - **ACOSOG Z9031** recruitment problems
  - EORTC STRASS

Radiotherapy?

- **STRASS-trial** **preop. RT + surgery versus surgery only**



(Bonvalot et al., Lancet Oncol 2020)

- 5-year OS: after surgery: 79·4% (95%CI 69·1–86·5)
  after surgery + RT: 76·7% (95%CI 66·9–84·0)
- Similar abdominal recurrence-free survival in both groups
- Subgroups analysis: (CAVE small N !!!)
  - No benefit for LMS and high-grade sarcoma
  - BUT: potential benefit for LPS en low-grade sarcoma → prospective trial!
- BUT: trend to benefit for LPS and low-grade sarcoma