



Surgery of vena cava thrombosis in Wilms´ tumor

Jörg Fuchs

*Department of Pediatric Surgery and Pediatric Urology,
Children´s Hospital, University of Tuebingen*



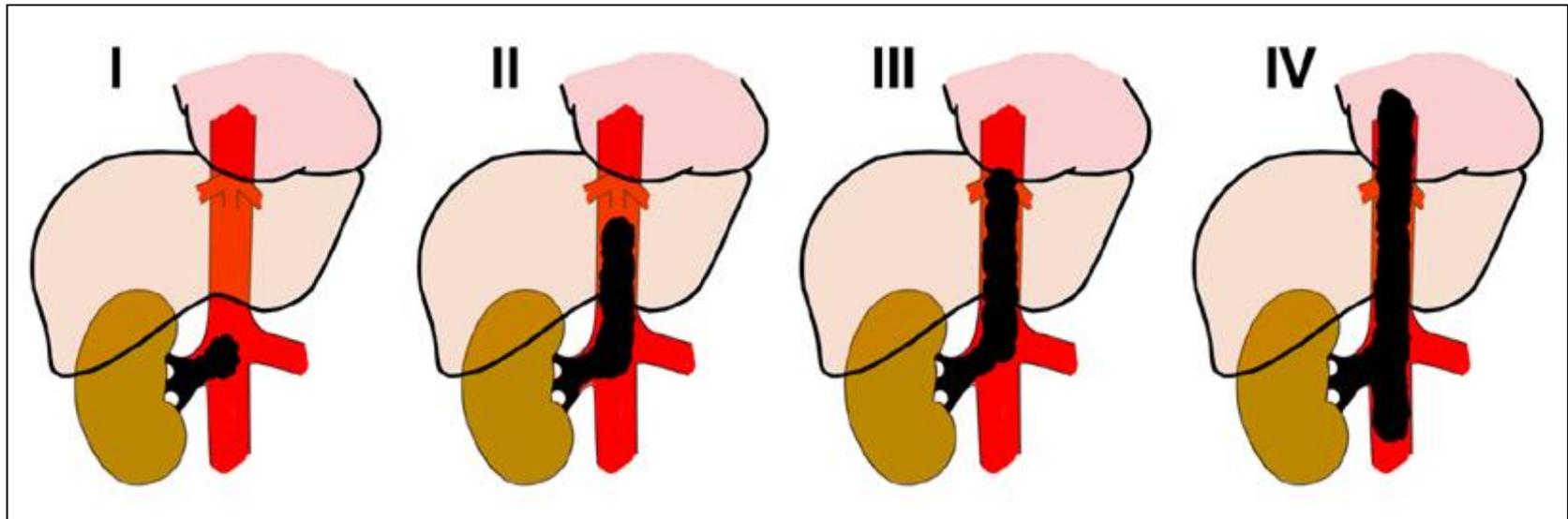
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Staging of cavoatrial tumor thrombus

Incidence : 4 - 8%



Daum et al, Eur J Pediatr Surg (1992); Chiappini et al, J Thorac Cardiovasc Surg (2002)



Imaging investigations



Ultrasound

Echocardiography

CT scan

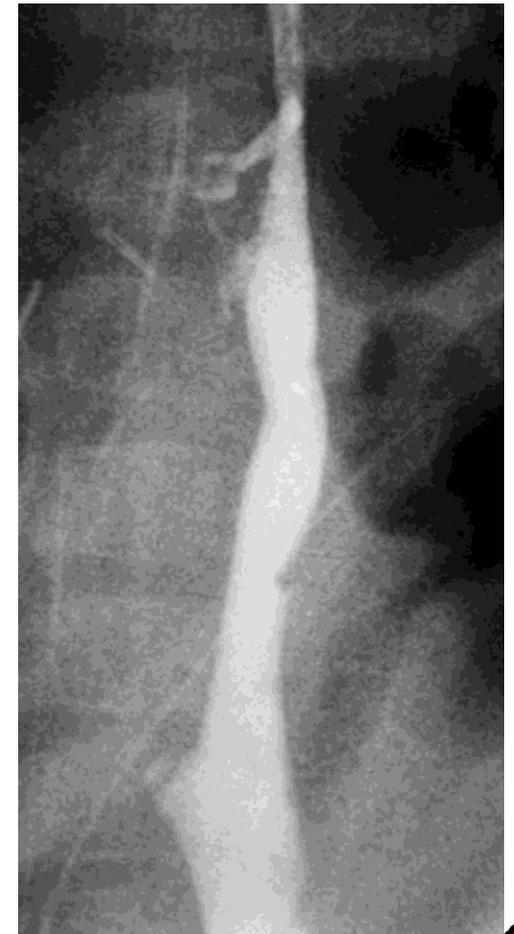
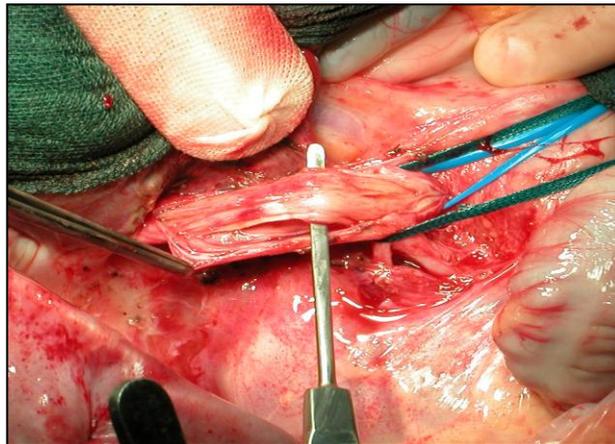
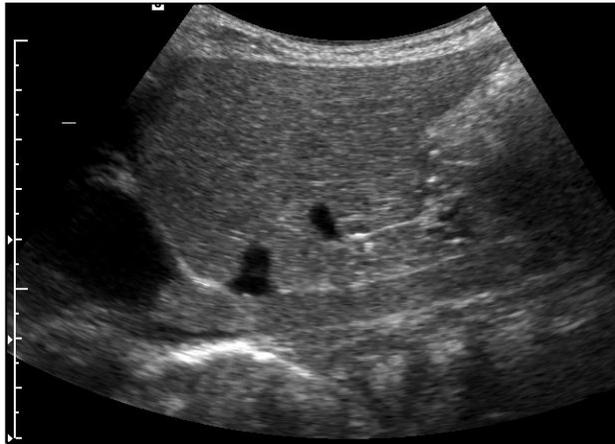
MRI

Cavography

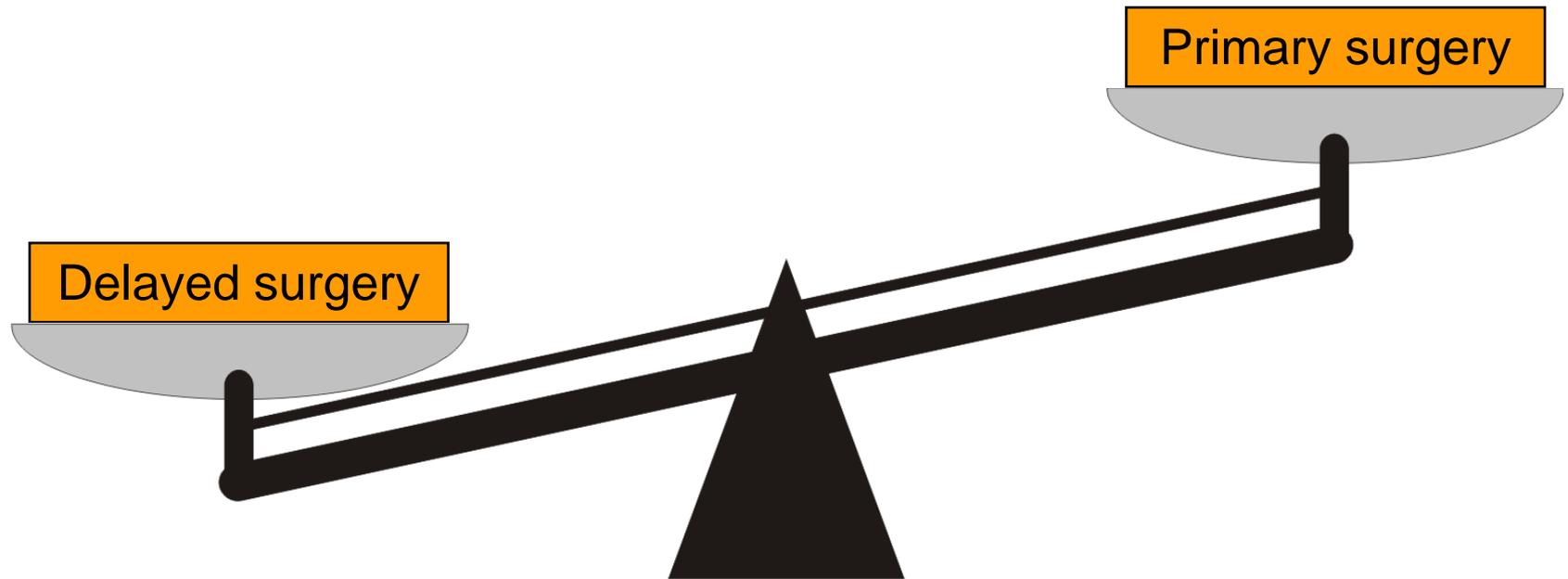
McGahan et al, J Ultrasound Med (1993);Frederici et al, MPO (1994);
Mitchell et al, J Comput Assist Tomogr (2000)



Imaging



Chemotherapy and surgery



Ritchev et al, Cancer (1993); Mushtaq et al, Br J Urol (1996);
Godzinski et al, Semin Urol Oncol (1999);
Szavay et al, PBC (2004); Lall et al, J Pediatr Surg (2006)



Preoperative chemotherapy

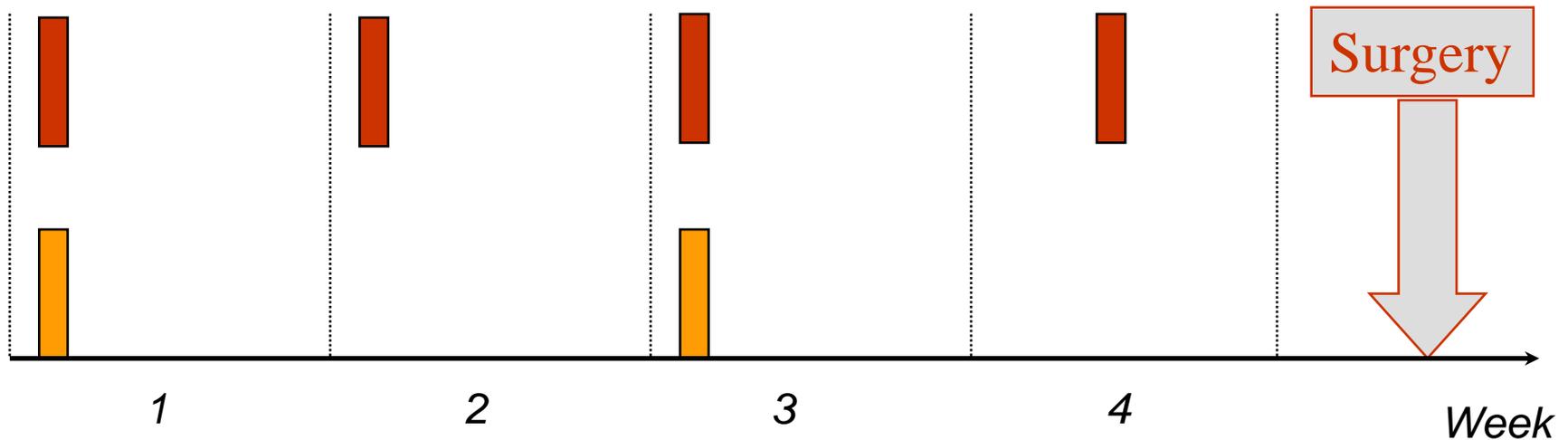
- Shrinkage of tumor
- Reduction of advanced surgical procedures
- Lower vitality of thrombus

- Loss of staging information
- Risk of tumor progress
- Side effects

The role of preoperative chemotherapy in relation to complications and outcome is not clear!



Preoperative chemotherapy (Stage I – III)



VCR 1,5 mg/m²

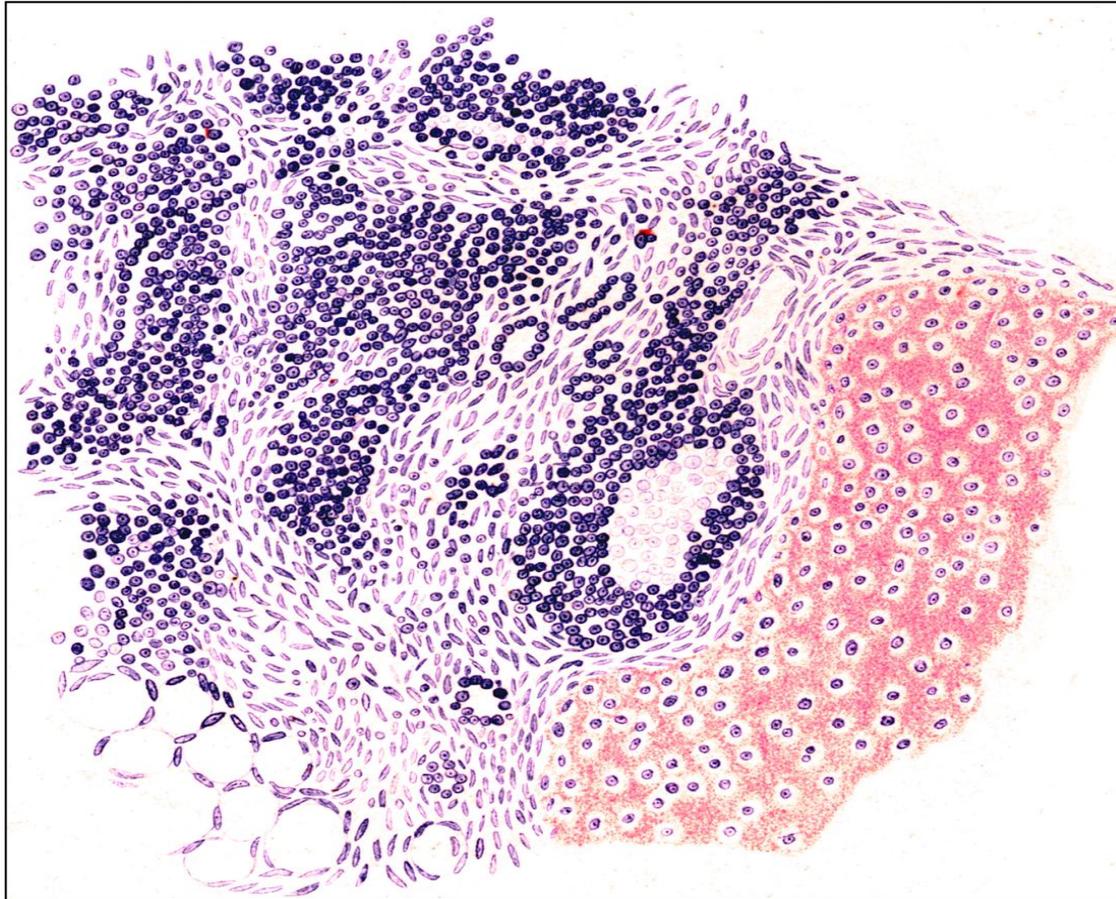


ACT-D 15 µg/kg

(SIOP 2001/ GPOH-protocol)



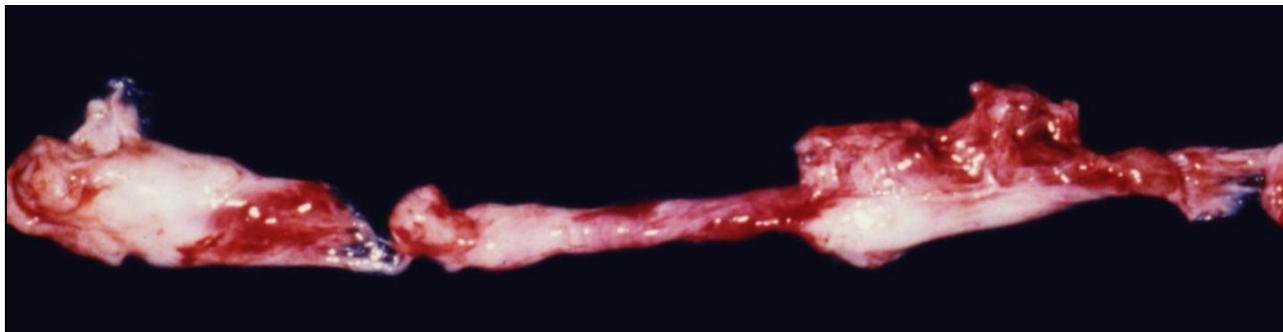
Histological aspects



Wilms, M: „Die Mischgeschwülste der Niere“, Leipzig 1899

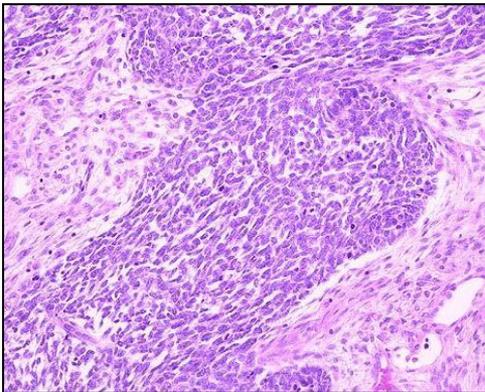


Vitality of cava thrombus

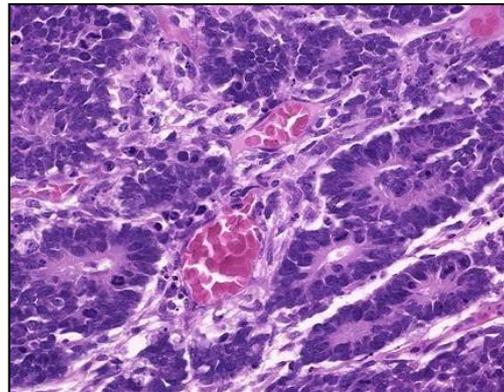


Classic Wilms' tumor

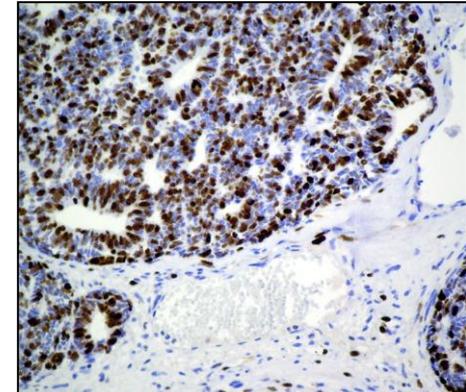
Blastema



Epithelium



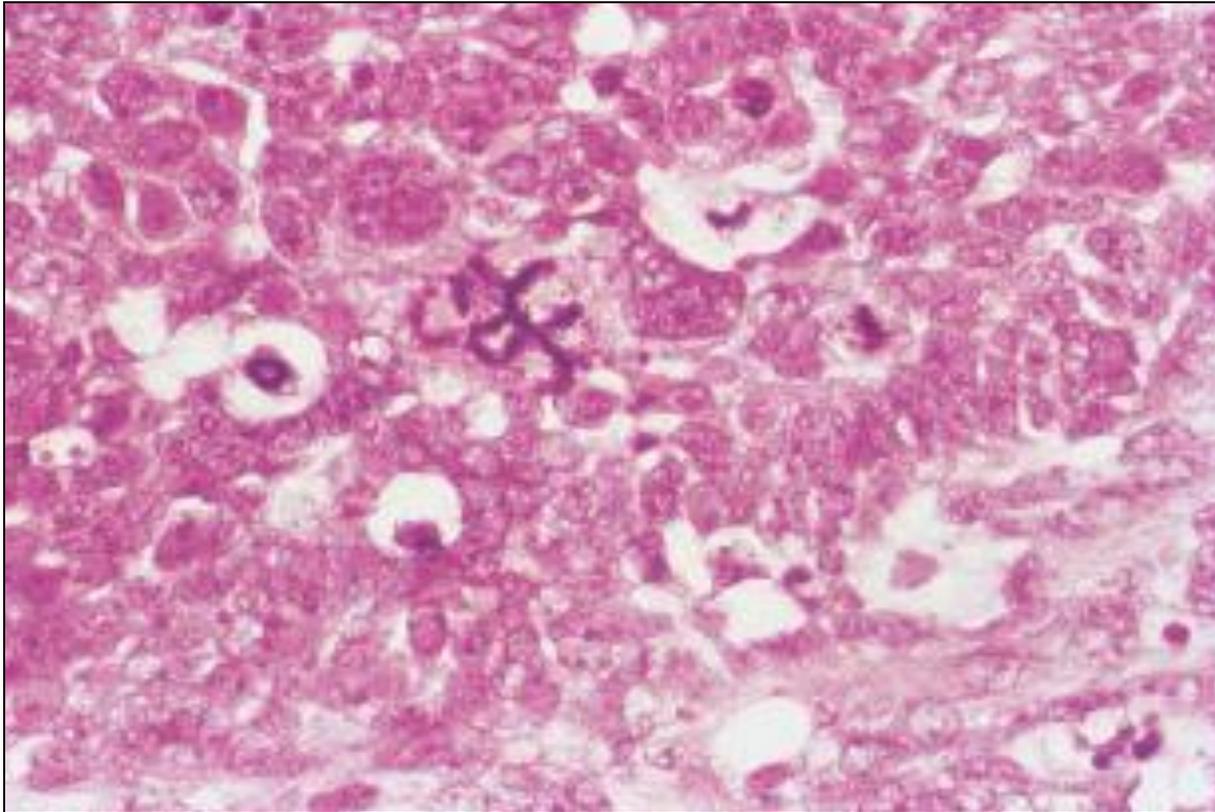
Stroma



Focal or diffuse anaplasia



Anaplasia in nephroblastoma

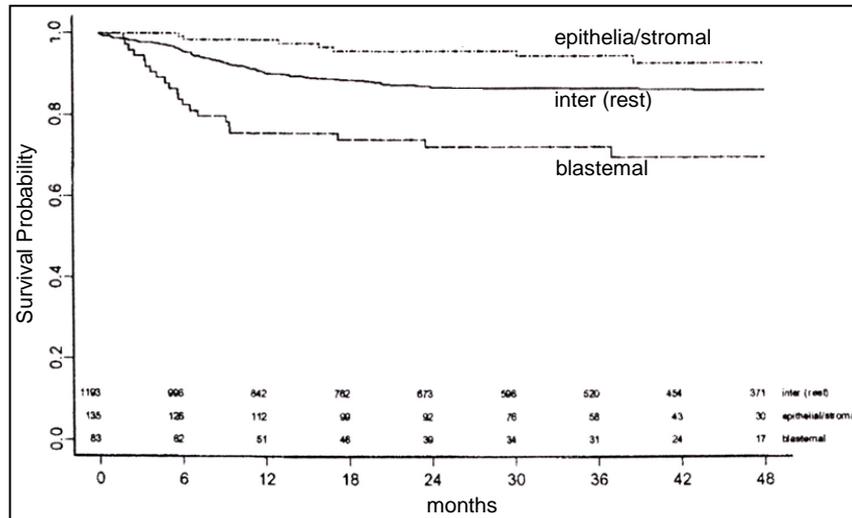


Anaplasia characterized by nuclear enlargement, hyperchromasia, and a multipolar mitotic figure (Hematoxylin and eosin, H&E; x 400)

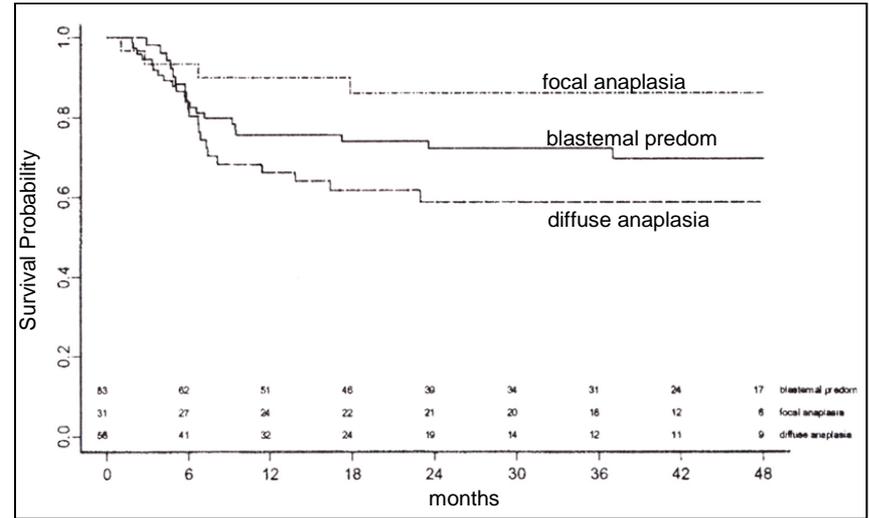


Relapse free survival (SIOP 9 and SIOP 93-01)

Histological subtype



Presence of anaplasia



Histological subtype of intravascular extension

Histological subtype	No intravascular extension (%)	Intravascular extension (%)
Favorable	87,5	92,1
Focal anaplasia	2,1	1,3
Diffuse anaplasia	7,5	4,6
Clear cell sarcoma	2,9	2,0



Vitality of cava thrombus



NWTS 4

- 165 children with cava thrombosis
- 65 received preop. chemotherapy
- 97 had viable tumor thrombus
 - 75 without chemotherapy
 - 22 with chemotherapy



Vitality of cava thrombus



NWTS 4

165 children with cava thrombosis

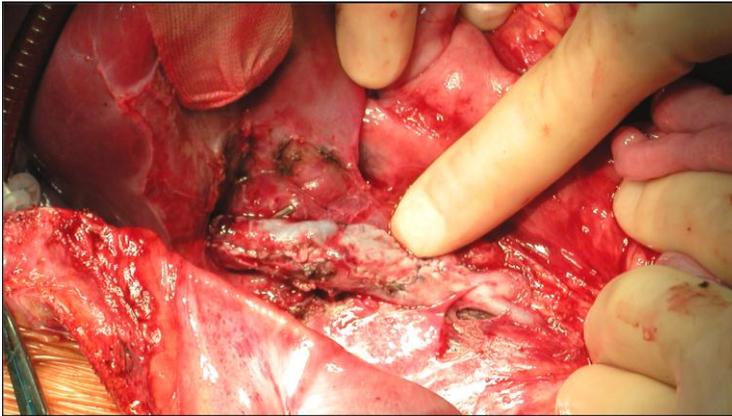
- 100 w/o chemotherapy: 75 % viable thrombus
- 65 with chemotherapy: 34% viable thrombus



Surgery



Surgical options in cava thrombosis



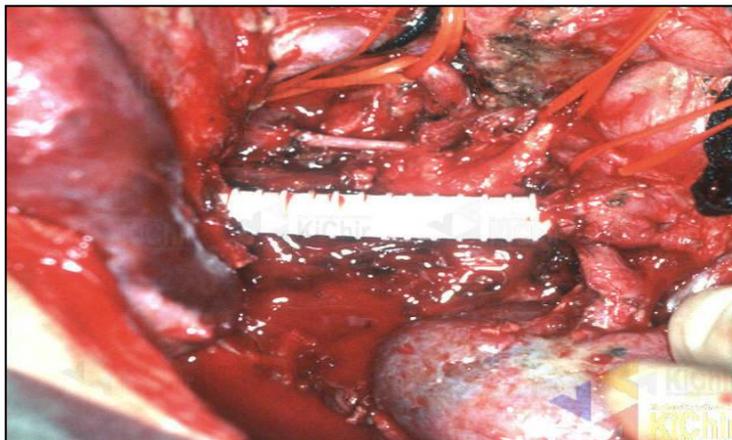
Thrombectomy

Cava patch

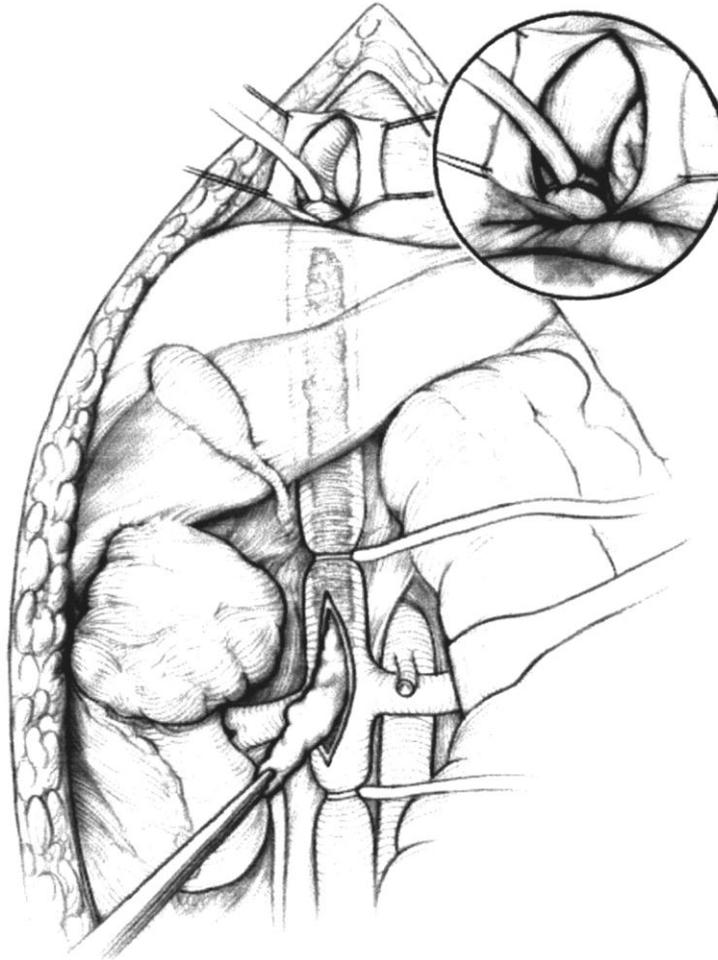
Cava replacement

Cava resection

Surgery with CPB



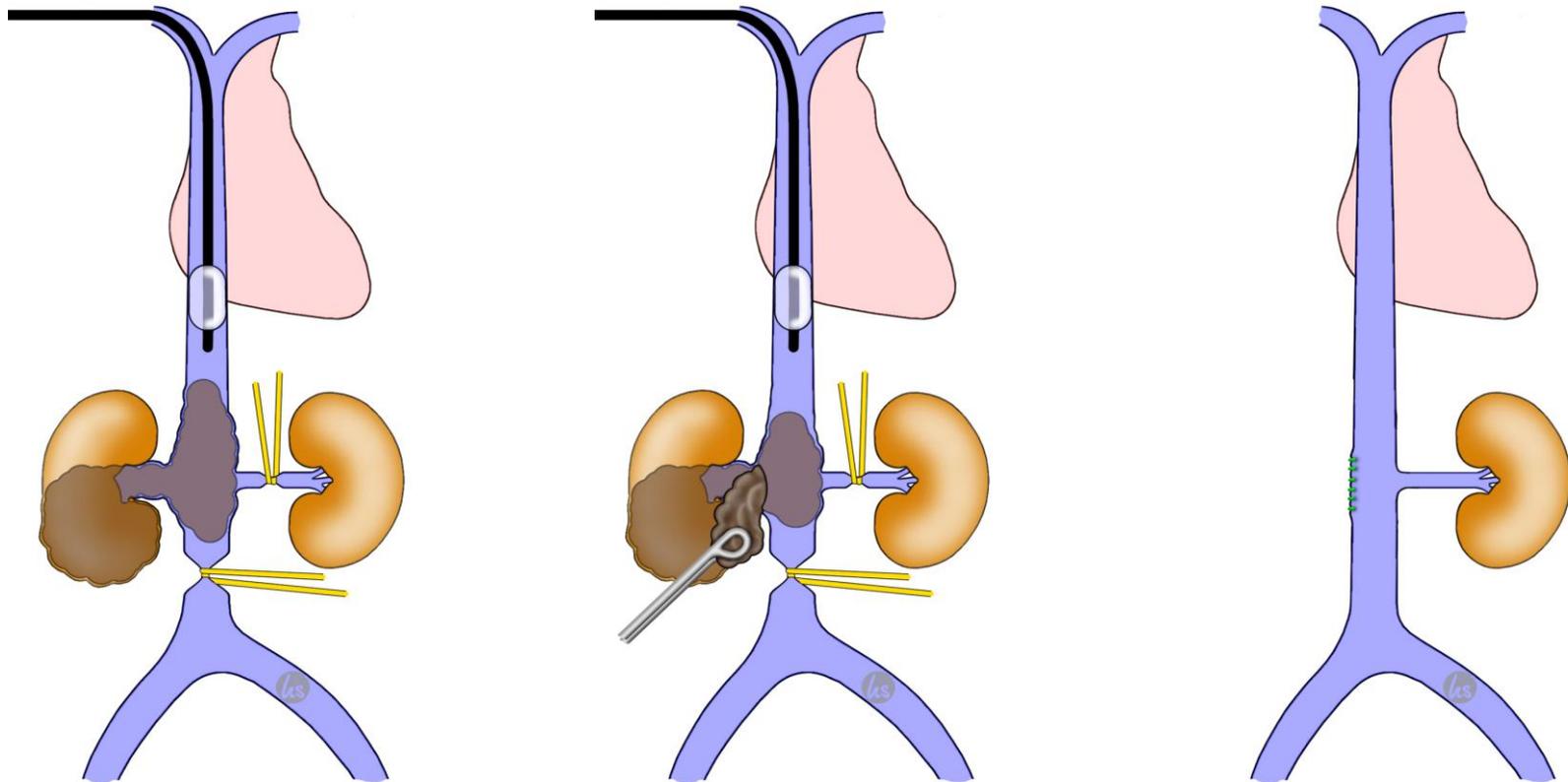
Principles of surgery without CPB



Lodge et al, J Pediatr Surg (2000)



Principles of surgery without CPB



Frederici et al, MPO (1994);



Surgical Complications

Morbidity: 0 - 44% !

- Bleeding
- Pulmonary embolism
- Cardiac and/or renal failure
- IVC occlusion
- Chylothorax
- Sepsis



Comparison of data from study trials

Parameter	NWTS	GPOH	UKW3
Patients	165	33	59
Chemotherapy (%)	42	88	88
High risk tumors (%)	6	15	?
Relapse (%)	3	12	15
Intraop. death	0	0	5
Complications (%)	21	18	14

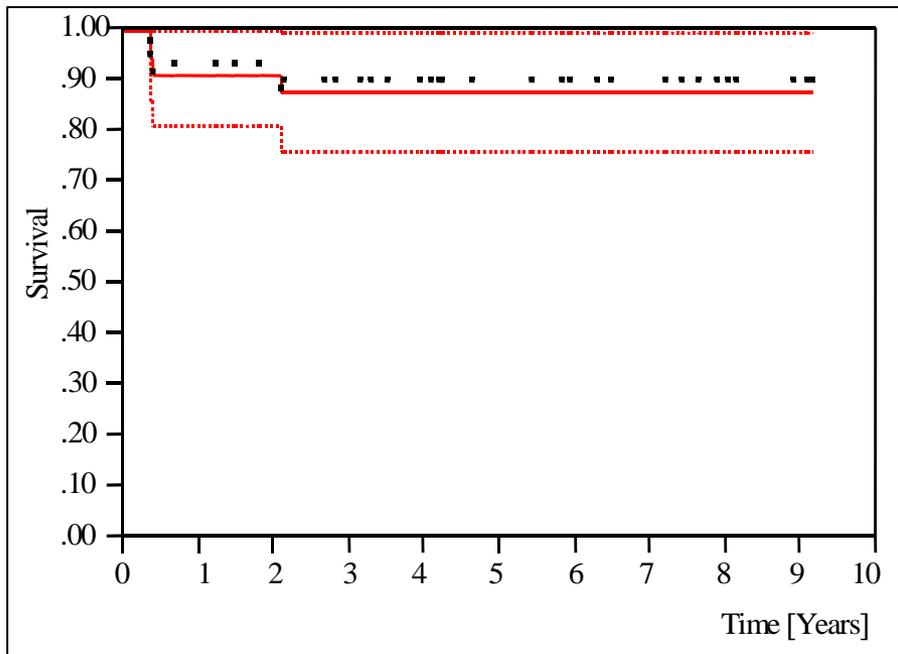
Shamberger et al, Ann Surg (2001), Szavay et al, PBC (2004),
Lall et al, J Pediatr Surg (2006)



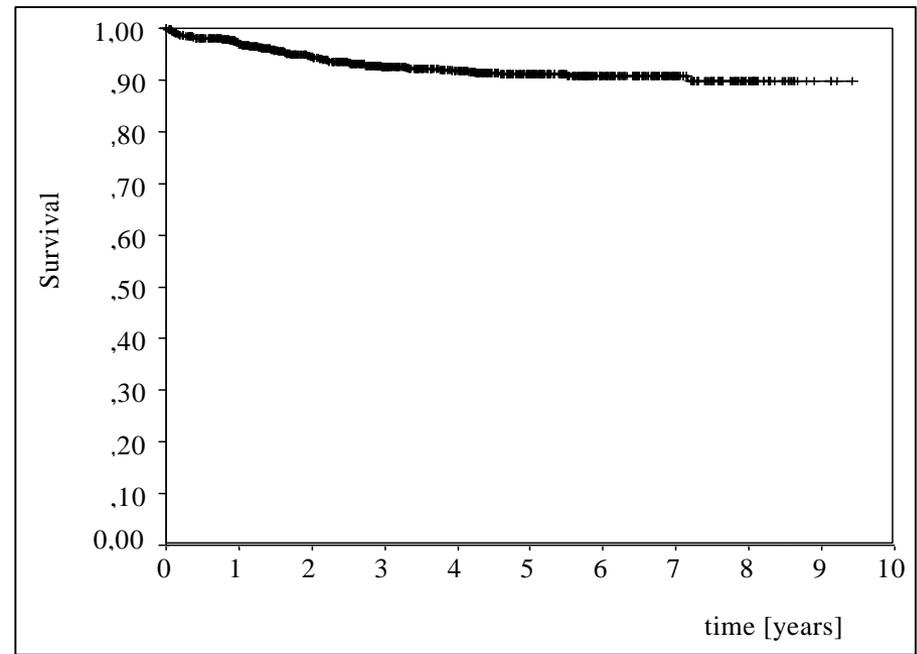
Outcome



SIOP 93-01/GPOH and SIOP 2001/GPOH



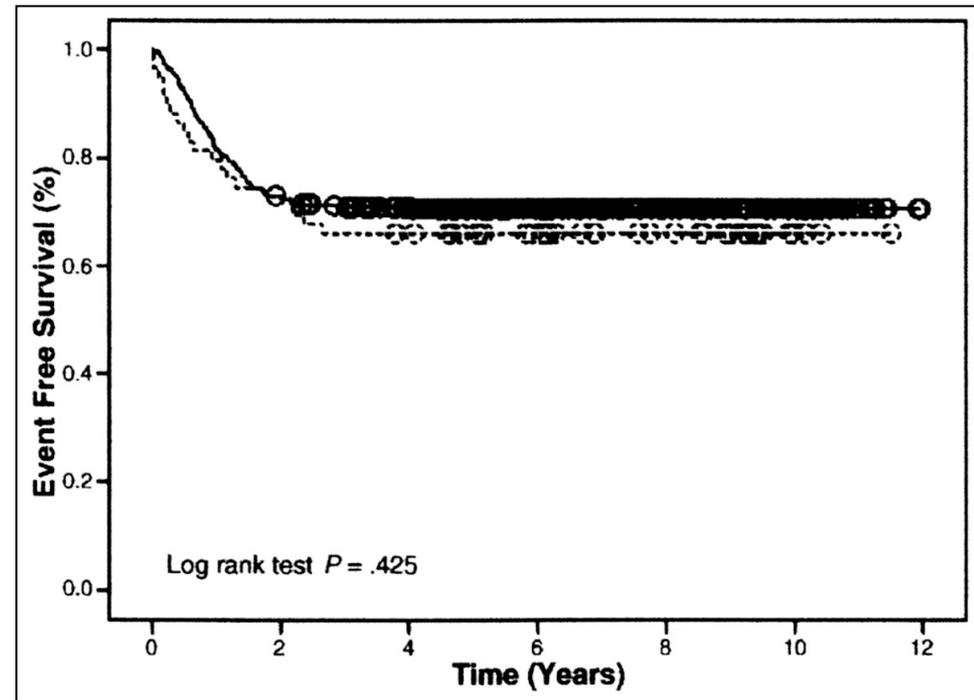
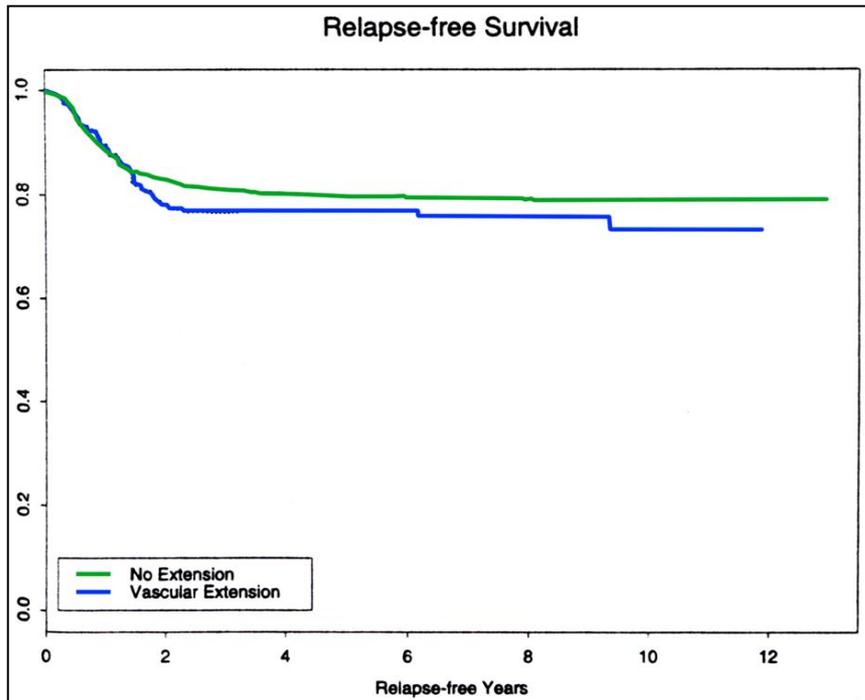
Cavo-atrial tumor thrombus, n=33,
died n=4, p=0,87*



SIOP 93-01/GPOH and SIOP 2001/GPOH
n=1151, died n=80, p=0,90*



Survival in NWTs 4 and UKW3 trials



Shamberger et al, Ann Surg (2001), Lall et al, J Pediatr Surg (2006)



Conclusions (I)

- Resection of intravascular extension of Wilms´ tumor - technical challenge
- Determination of surgical approach by the level of tumor thrombus
- Chemotherapy - option for shrinkage of tumor thrombus



Conclusions (II)

- Predominance of favorable histology
- Reduction of perioperative complications
- Good prognosis after complete thrombus removal



