Surgery of the Wilms’ tumor with thrombosis
In 1893 Blunt Sutton described the tumor thrombus of kidney’s embryonic adenomyosarcoma (nephroblastoma)

Frequency of occurrence – 3 - 6%

Right atrial infiltration – < 1%

(Godzinski J., 1999; Lambert A.W., 2001; Ritchey M.L., 1988; Szavay P., 2004)
Peculiarities of the Wilms’ tumor trombus

• High risk of pulmonary embolism
• High response to chemotherapy

(\textit{Lambert A.W., 2001; Shamberger R.C., 2001})

Our experience:

(\textit{chemotherapy SIOP 2001/04})

Complete response – 57.9%
Partial response – 21.1%
Effect of chemotherapy to thrombus
What factors determine the survival?

Histological type
Stage of disease
Preoperative chemotherapy

(Ritchey M.L. 1993, 2001; Lall A. 2006)

The level infiltration of IVC doesn’t influence on survival if radical operation was performed
Our experience from 1980 to 2011

48/1714 (2.8%)
Have been treated or observed

24 patients were operated on

Males – 15; females - 9

Age: 1.92y – 15y (median 5.17y)

19 – had chemotherapy before surgery

5 – had primary surgery
<table>
<thead>
<tr>
<th>pStage</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>2 (8.3%)</td>
</tr>
<tr>
<td>III</td>
<td>15 (66.7%)</td>
</tr>
<tr>
<td>IV</td>
<td>6 (25%)</td>
</tr>
<tr>
<td>V</td>
<td>1 (4.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
</tr>
</tbody>
</table>
Retrohepatic segment of IVC 5
Right renal vein 6
Infrahepatic segment of IVC 8
Left renal vein 5

Total 24
Blood loss
100 – 3500 ml

Complications of surgery stage 47.8%

Hypotension:
- bleeding
  (5.3 – 108.7 ml/kg; med 26.5 ml/kg)
- reduction of cardiac return

High blood loss is bad surgery planning!!!

<table>
<thead>
<tr>
<th>Grade</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Nakayama D.K., 1986)</td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 15 ml/kg)</td>
<td>9 (37.5%)</td>
</tr>
<tr>
<td>Moderate (15-29 ml/kg)</td>
<td>10 (41.7%)</td>
</tr>
<tr>
<td>High (&gt; 30 ml/kg)</td>
<td>5 (20.8%)</td>
</tr>
</tbody>
</table>
Results

Time of operations – 90 – 390 min

Morbidity – 6/24 (25%): ileus, infectious, blood clot

Mortality – 1/24

urgent primarily nephrectomy with thrombectomy and resection infrahepatic segment of IVC
cause of death – acute heart failure on 1st day after surgery
## Radicalism of operations (R₀-75%)

<table>
<thead>
<tr>
<th>Level of thrombus spreading</th>
<th>n</th>
<th>R₀</th>
<th>R₁/₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal veins</td>
<td>8</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Infrahepatic segment of IVC</td>
<td>7</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Retrohepatic segment of IVC</td>
<td>3</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>
Case # 1:

4 y.o. male.

**Diagnosis:** Wilms’ tumor at the left pT3N0M0, tumor’s thrombus IVC (retrohepatic segment), 4 courses of neoadjuvant chemotherapy.
Vascular extension

Adhesion and occlusion tumor’s thrombus IVC involved retrohepatic segment with spreading to contralateral renal vein, right hepatic vein and infrarenal segment of IVC.
Operation

Left nephradrenalectomy, thrombectomy with resection of infrarenal segment of IVC, reconstruction of right renal and right hepatic veins
The time of operation – 390 min
Blood loss – 2000,0 ml

Using Cell-Saver with high degree of clearing «on line» has been returned 600,0 ml of autoblood

In postoperative period: blood clot was in retrohepatic segment of IVC with partial recanalisation by the 12th day
Discharge - on the 13 day
Remission – 19 months
Case # 2:

The boy 2 years

Diagnosis: Bilateral nephroblastoma; thrombus in IVC (retrohepatic segment); 4 courses of neoadjuvant chemotherapy
Operation:
right nephradrenalectomy, thrombectomy of IVC, resection of the left kidney and para-aortal dissection
Operation time – 270 min

Blood loss – 100 ml

No complications

Discharge – on the 12th day

Remission – 24 months
# Survival

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Survival</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Survival (2y and 5y) with thrombus</td>
<td>62.8%</td>
<td>9 died during 2 y (8 – progression)</td>
</tr>
<tr>
<td>III and IV stages</td>
<td>74.2% and 33.3%</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Overall survival without thrombus for III and IV st</td>
<td>74.5%</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Histology: nonclassif. rhabdoid typical</td>
<td>80% 66.7% 58.8%</td>
<td>~t 1.95</td>
</tr>
<tr>
<td>Radicalism: Ro R1/2</td>
<td>64% 57.1%</td>
<td>P&gt;0.05</td>
</tr>
<tr>
<td>Adjuvant Chem.: with without</td>
<td>65.5% 33.3%</td>
<td>t 1.95</td>
</tr>
<tr>
<td>Adjuvant RT: with and without</td>
<td>66.7% and 0%</td>
<td></td>
</tr>
</tbody>
</table>
Survival (20 alive from 33)

Overall survival in cohorts with and without thrombus

Overall survival in patients with thrombus in III and IV stages

- III stage
  - p<0.05
- IV stage
Survival

Overall survival depends on histology

Overall survival depends on spreading in IVC
Survival

Overall survival depends on features of thrombus

Overall survival depends on radicalism of surgery

- close wall
- floating
- obstructive

P > 0.05

R0
R1/2
Overall survival depends on use chemotherapy

Overall survival depends on use radiation therapy

Survival

% 100

% 100

years

years

65.5 65.5

33.3 33.3

0 100

0 100

0 0

P<0.05

P<0.05

yes

no

yes

no
Conclusion:

1. Survival better in III stage than in IV

2. Tendency to increase survival: after neo-and adjuvant chem.; with floating thrombus, with nonclassif. histology thrombus

3. Not correlation between survival and thrombus spreading in IVC

4. Radiation therapy increase survival
Treatment strategy

The same as for III-IV stages of Wilms’ tumor without thrombus in IVC

*(SIOP 2001/04)*

- Chemotherapy
- Surgery
- Chemotherapy + RT
What’s Important ?!

• Preoperative chemotherapy!!!

• To know extension of thrombus before operation

• To know features of thrombus: floating or adhesive

• During each emergency nephrectomy should be careful to perform an examination of IVC and renal veins (prevent embolic complications)