ONCOLOGICAL TREATMENT OF UROGENITAL CANCERS

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2013.
ORGANS

KIDNEY/cortex/ tumours

PROSTATE tumours

UROTHelial tumours

PENILE and TESTICULAR tumours
KIDNEY (CORTEX) TUMOURS
Occurrence of kidney tumours

• Third most common urological tumours
• More common among men
• Approx. 40% are diagnosed asymptotically (by routine abdominal ultrasound)
• 30% of the cases are metastatic at the time of diagnosis
Diagnosis

- Anamnesis and physical examination
- **Imaging** examinations (abdominal CT, MRI)
- Renography in order to see renal functions
- Biopsy, if operation is not performed
- Searching for **distant metastasis** in order to determine the stage (chest X-ray, chest CT, bone scintigraphy, skull CT)
Kidney tumour – TNM (natural course of the disease)

- **T1**: tumour diameter is less than 7 cm in the renal parenchyma
- **T2**: tumour diameter is more than 7 cm, but its maximally 10 cm in the renal parenchyma
- **T3a**: grow into the renal vein, can involve the fat tissue and the adrenal gland, but intact Gerota’s fascia
- **T3b**: grow into the IVC below the diaphragm
- **T3c**: grow into the IVC above the diaphragm
- **T4**: break through the Gerota’s fascia, involve the adrenal gland
- **N1**: single lymph node
- **N2**: multiple lymph nodes
Negative prognostic factors

• High grade
• Initial histological type: non-clear cell type (in case of clear cell type biological therapy is available)
• Vascular invasion
• Higher TNM stage: lymph node + worse prognosis
• Metastasis: lymphogenous and haematogenous lung, bone, liver, brain
Surgical therapy of kidney tumours

- In localised cases operation (nephrectomy) is the primary intervention.
- Function of the contralateral kidney must be controlled.
- Lympadenectomy is performed rarely.
- Thrombectomy can also be performed in the renal vein and in the IVC, if tumour thrombus can be found in it.
- Wedge resection or partial nephrectomy can only be performed in case of small tumour located in the upper pole.
- Surgical removal of solitary liver and lung metastases is recommended to obtain tumour free status.
- Nephrectomy is also recommended for metastatic patients with good general condition: spontaneous regression can occur in the metastases.
- If nephrectomy cannot be performed, embolisation is recommended.
Radiotherapy
rarely, after the operation, in case of positive resection margin

- Low radiosensitivity
- Irradiation of large target volume in the renal bed (approx. 16 cm) is necessary
- Postoperative dose to the tumour bed: 45-50-(60) Gy
- Probably palliative therapy can be used to reduce bleeding or pain
Drug therapy for kidney tumour

- After nephrectomy no other treatment is necessary in localised cases
- **Metastatic clear cell** tumours: targeted therapies are available; e.g.:
  - VEGFR inhibitor: sunitinib (Sutent), axitinib (Inlyta)
  - VEGF inhibitor: bevacizumab (Avastin)
  - mTOR inhibitors e.g.: everolimus (Afinitor)
- Probably progesterone
- Bone metastasis: bisphosphonate therapy
Targets of targeted therapies in case of kidney tumour (mTOR and VEGF-receptors) and the currently registered medicines
furi???
Győngyi; 2013.11.15.
PROSTATE CANCERS
Natural development and course of prostate cancer

Development of prostate cancer is very slow, it can often persist for decades. Development of the latent carcinoma can last for even 30 years.

"Civilisation" disease

<table>
<thead>
<tr>
<th>20 year</th>
<th>10 years</th>
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<tbody>
<tr>
<td>normal cell</td>
<td>high grade PIN</td>
</tr>
<tr>
<td>genetic</td>
<td>environmental factors</td>
</tr>
<tr>
<td>latent. ca.</td>
<td>clinical ca.</td>
</tr>
</tbody>
</table>

In case of 50-75% of latent carcinomas diagnosed during autopsy progression into clinical carcinoma do not occur!
**Aim of the screening**

**Screening of patients who are endangered by a progressing prostate cancer:**

- high Gleason grade
- larger tumour volume
“Overtreatment” is the problem of screening

- In case of patients whose disease was diagnosed by screening prostate cancer is not lethal in 84% of the cases
- Among patients with screen-detected prostate cancer 16% die of the disease.

*Detectable cancer that would prove fatal before the age of 85 years if left untreated

McGregor et al 1998
Aim is the early detection
1. detects prostate cancer when it is limited to the organ of origin
2. decreases prostate cancer death

**Form:** annual PSA blood test
+ rectal digital examination

Beginning: among men over 50 years of age, who have complaints originating from the lower urinary tract
Prostate cancer TNM

T1: non palpable, non visible
  T1a<5%, T1b>5%,
  T1c biopsy
T2: inside the prostate
  T2a<half of one lobe
  T2b>half of one lobe
  T2c both lobes
T3: over the prostate capsule
  T3a extracapsular spread
  T3b seminal vesicle
T4: fixated, involves its surrounding

N1: regional lymph node met.
M1: distant metastasis (mainly bone)

Natural course
Bone metastasis is the most common in case of prostate cancer

**Productive ground**

- Hormonotherapy can lead to excessive bone turnover
- It provide the productive ground for sticking bone metastases

**“Seeding”**

- Anatomical features promote the development of spinal metastasis
  - Through Batson venous plexus

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3. Van der Pluijm et al., Cancer Res 2005;65: 7682-90

Nelson et al., Cancer 2008; 113:2478-87
Examination protocol

- PSA blood test and rectal digital examination (RDE)
- If PSA level is increased (above 4 ug/mL), mapping biopsy from both lobes and histological examination
- In case of urination complaints, TURP (transurethral resection of the prostate) can also be performed
- Determination of the tumour extent: transrectal ultrasound (TRUS), abdominal and pelvic CT/MRI
- First look for metastasis in the skeleton!
Prostate cancer treatment

- In very early stage - **T1a** – only follow-up, regular PSA blood test and RDE
- In early stage **T1b-T2**: radical prostatectomy or definitive radiotherapy /RT/ is recommended (maybe neoadjuvant hormone therapy /HT/)
- **From T3 N0:** combined HT + RT (maybe prostatectomy)
- In case of lymph node positivity or distant metastasis only HT, then combined HT is recommended
Type of radiotherapy in case of prostate cancer

Teletherapy/ percutaneous irradiation:
- 3DCRT / 3D dimension conformal radiotherapy /
- IMRT / intensity modulated radiotherapy /

Brachytherapy / internal radiotherapy:
- Performed with afterloading device
- Implanting radioactive isotope (seed therapy)
Teletherapy of prostate carcinoma

- Definitive 3 dimension irradiation is performed with progressive field narrowing, with CT-based planning and maybe with MRI-CT fusion.
- Mask fixation device is used before the CT examination.
- Conformal irradiation starts with 4-field box technique: until 46 Gy, then volume is reduced and therapy continues with 6-field technique in 24-28 Gy dose.
- Dose escalation is performed until 74 Gy.
Anatomical borders in case of prostate irradiation

The largest fields contains the lymph nodes of the true pelvis

Smaller fields involves the prostate and seminal vesicle

3DCRT
Steps of external beam radiotherapy for prostate

1. Mask fixation system is used before the planning CT is performed

2. Planning CT is performed in fixed position
3. In order to specify the target volume MRI / CT fusion can be performed
4. Physicians indicate the contours of the target volume and the organs at risk on the CT slices.

5. Physicists create an irradiation plan (Photo: 4-field box technique)
6. Irradiation plans are analysed by the physician and the physicist.

Photos of 6-field plan

3DCRT
7. Verification (if necessary correction) is performed during the irradiation by comparison the fields of the treated target volume and the reconstructed pictures created by the planning system.
Intensity modulated radiotherapy
(IMRT)

Modern method of conformal radiotherapy, during which small segments “subsegments” are used within the different radiation fields. Dose of these segments can be determined individually. Therefore the total dose of the different areas (including organs at risk) can be determined more accurately.

Duration of the therapy can be its disadvantage in case of too much segments.
Pictures of IMRT

Different segments and intensity profiles can be seen in the pictures.
Brachytherapy

Internal radiotherapy is performed by isotopes located in different cavities or tissues. Cavital therapy is performed by applicators. Isotope or applicators (later containing isotope) are placed into the tissues surgically or via needles.

Guiding tube

Radioactive isotop

BR-TH

Afterloading device
Seed – isotope therapy

Seeds containing isotopes are implanted into the tissue of the prostate.
Insertion of seeds and applicators is guided by transrectal ultrasonography guidance. Intervention is performed through the perineal region.
Insertion of seeds and applicators

Performed under sterile, almost surgical circumstances
Inserting the applicators
„Larding” is completed
Connecting the radiation device
Location of prostate seeds and dose distribution
Drug therapy of prostate cancer

• In case of advanced or metastatic prostate tumours combined hormonotherapy is indicated, in form of TAB (total androgen block), which means that anti-androgen and LHRH analogues are given simultaneously.

• In case of progression hormonotherapy is changed. If other progression occur, the prostate cancer is castration-resistant (CRPC).

• Docetaxel chemotherapy with prednisolone is given in metastatic CRPC cases.

• New hormontherapeutic and chemotherapeutic agents means the next opportunity.
Következő lehetőség az új hormonterápiás és új kemoterápiás szerek alkalmazása.
Gyöngyi; 2013.11.16.
Side effect of hormone therapy

Concerns: osteoporosis, sarcopenia, cardiovascular problems, lipids, metabolic syndrome
BLADDER CANCERS
(urothelial tumours)
Origin of bladder cancer

- Poli-chronotropic tumours, multiplex disease in time and space
- Local recurrence is common
- Urothelial cells cover the whole urinary system. Tumour originates from these regions (renal pelvis, ureter, bladder, urethra)
- Multiple regions can often be involved („due to dropping tumour cells“) e.g. simultaneous appearance of renal pelvis and bladder cancer
G23  vizeletképző rendszer hámját
Győngyi; 2013.11.16.
Epidemiology of bladder cancer

• 11th malign tumour all over the world
• 200 000 cases/year all over the world
• more common among men (3x)
• most common in the 6-7th decades
• it is benign in 85% under 40 years of age
Bladder cancer TNM

- Tis - in situ carcinoma
- Ta  - non invasive papillary tumour
- T1  - subepithelial connective tissue
- T2  - muscularis propria – a: inner half, b: outer half
- T3a - over the muscularis propria, microscopic
- T3b - extravesical invasion
- T4a - prostate, uterus, vagina
- T4b - pelvic wall, abdominal wall

- N1 – single lymph node <2cm
- N2 – single 2-5 cm, multiple
- N3 - 5 cm<
Bladder cancer therapy

In case of early and superficial cancers (T1):
•- transurethral (through the urethra) resection
•- postoperative therapy: only KT or bladder irrigation with BCG, then follow-up

In case of muscular involvement (T2-T3):
•- surgical remove of the bladder (cystectomy) is recommended
•- alternatively chemoradiotherapy can be administered

In case of locally advanced tumour (T4, N+):
chemotherapy and chemo-radiotherapy

In case of distant metastasis: only chemotherapy can be administered
IRRADIATION OF BLADDER CANCER

- Performed with mask fixation system, with full bladder
- Conformal 4-field box technique for the pelvic lymphatic system, then 6-field technique for the bladder
- Dose: for the true pelvis 45-50Gy, then completed with the bladder until 60-66Gy
- If the patient is appropriate for it, possibly combined chemoradiotherapy has to be performed, weekly 1x radiotherapy combined with cisplatin!
- Details of external beam irradiation are very similar to the technique described in case of the prostate
TESTICULAR CANCERS
Introduction

• 1-2 % of all cancers
• Occurs in 3 age groups:
  - newborn-infant (mature teratoma, yolk-sac)
  - young adulthood 15-35 years of age (non-seminoma)
  - 40-60 years of age (mostly seminoma)
• Seminoma and non-seminoma are very sensitive to chemotherapy
• Only the seminoma is radiosensitive
Tumour spread

- Primer tumour often cannot be defined due to the fast growing.
- It often originates from retained testis. It occurs more commonly in case of testicular dysgenesis and atrophy.
- Testis descends from the abdomen during the ontogenesis, so regional metastasis develops in the para-aortic lymph nodes.
Histological types

Testicular tumours belong to 3 main groups:

I. **Germ cells tumours**
   A. One histological type
      1. Seminoma
      2. Embryonal carcinoma
      3. Yolk sac tumour
      4. Polyembryoma
      5. Choriocarcinoma
      6. Teratomas
         a. Mature teratoma
         b. Immature teratoma
         c. Teratoma with malignant transformation
   B. Multiple histological type

II. **Gonadal stromal tumours**

III. **Mixed tumours (germ cell+stromal elements)**

Seminoma with mixed elements has to be treated as non-seminoma!
Interesting fact about the stage, that due to the effective treatability stage IV. does not exist, distant metastasis belongs to stage III.

Tumour markers are also calculated into the stage.

No other tumour with similar features exist!
- 85% of seminomas are at st. I. at the time of diagnosis
- Less aggressive than NS
- Recurrence in 15-20%, PAO lymph node
- Dose of radiotherapy and the volume of irradiation field decreased
- Alternative method: carboplatin (CBP) chemotherapy 1x, although number of relapses is higher
- Most preferred method: „watch and wait“

### Table 4. Comparison of Treatment Options for CSI Seminoma

<table>
<thead>
<tr>
<th></th>
<th>Active Surveillance</th>
<th>Radiation</th>
<th>Carboplatin × 1 Cycle</th>
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</thead>
<tbody>
<tr>
<td>Overall cure rate</td>
<td>&gt; 99%</td>
<td>&gt; 99%</td>
<td>&gt; 99%</td>
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<tr>
<td>Short-term side effects</td>
<td>Anxiety</td>
<td>Modest</td>
<td>Minimal to modest</td>
</tr>
<tr>
<td>Long-term side effects</td>
<td>Long-term effects of abdominal imaging, treatment effects if required</td>
<td>Modest, but secondary malignancies</td>
<td>Likely minimal, but uncertain</td>
</tr>
<tr>
<td>Relapse rate</td>
<td>1.5%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Center effect</td>
<td>Unlikely</td>
<td>No</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Uniformly eliminates retroperitoneal relapse</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Abdominal imaging required in follow-up</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Physician and patient compliance required</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>No. of cycles of CTx/100 pts as adjuvant/curative treatment</td>
<td>45</td>
<td>12</td>
<td>112</td>
</tr>
<tr>
<td>% pts receiving unnecessarily exposed to CTx-related toxicity</td>
<td>0%</td>
<td>85%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Abbreviations: CSI, clinical stage I; CTx chemotherapy; pts, patients.
Table 2. Comparison of Treatment Options in CSI Nonseminoma

<table>
<thead>
<tr>
<th></th>
<th>CSI Nonseminoma</th>
<th>Active Surveillance</th>
<th>RPLND</th>
<th>BEP × 2 cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall cure rate</td>
<td>&gt; 99%</td>
<td>&gt; 99%</td>
<td>&gt; 99%</td>
<td></td>
</tr>
<tr>
<td>Short-term side effect</td>
<td>Anxiety</td>
<td>Modest</td>
<td>Modest</td>
<td></td>
</tr>
<tr>
<td>Long-term side effects</td>
<td>Long-term effects of abdominal imaging, treatment effects if required</td>
<td>Minimal</td>
<td>Likely minimal</td>
<td></td>
</tr>
<tr>
<td>Relapse rate</td>
<td>15% (low risk)</td>
<td>10%-15%</td>
<td>2%-3%</td>
<td></td>
</tr>
<tr>
<td>50% (high risk)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30% in unselected group</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Center effect</td>
<td>Unlikely</td>
<td>Yes*</td>
<td>Unlikely</td>
<td></td>
</tr>
<tr>
<td>Uniformly eliminates retroperitoneal relapse</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Abdominal imaging required in follow-up</td>
<td>Yes</td>
<td>No (in expert centers)</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Physician and pt compliance required</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No. of cycles of CTx/100 pts as adjuvant/curative treatment</td>
<td>90 unselected group (45 in 100 LRG pts) (150 in 100 HRG pts)</td>
<td>45</td>
<td>209</td>
<td></td>
</tr>
<tr>
<td>% pts receiving unnecessarily exposed to treatment-related toxicity</td>
<td>0%</td>
<td>70%*</td>
<td>70%*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>85% LRG</td>
<td>85% LRG</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% HRG</td>
<td>50% HRG</td>
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</table>

Abbreviations: CSI, clinical stage I; RPLND, retroperitoneal lymph node dissection; BEP, bleomycin, etoposide, and cisplatin; CTx, chemotherapy; pts, patients; LRG, low-risk group; HRG, high-risk group.

* Patients receiving unnecessary treatment in the entire group.
<table>
<thead>
<tr>
<th>Author, Year</th>
<th>No. of Pts</th>
<th>Median FU (months)</th>
<th>No. Relapse (%)</th>
<th>Cause-specific Survival (%)</th>
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<tbody>
<tr>
<td>Clinical Stage I Nonseminoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colls, 1999&lt;sup&gt;9&lt;/sup&gt;</td>
<td>248</td>
<td>53</td>
<td>70 (28)</td>
<td>98</td>
</tr>
<tr>
<td>Roeleveld, 2001&lt;sup&gt;10&lt;/sup&gt;</td>
<td>90</td>
<td>97</td>
<td>23 (26)</td>
<td>99</td>
</tr>
<tr>
<td>Daugaard, 2003&lt;sup&gt;11&lt;/sup&gt;</td>
<td>301</td>
<td>60</td>
<td>86 (29)</td>
<td>99</td>
</tr>
<tr>
<td>Atsu, 2003&lt;sup&gt;12&lt;/sup&gt;</td>
<td>132</td>
<td>38</td>
<td>32 (24)</td>
<td>99</td>
</tr>
<tr>
<td>Duran, 2007&lt;sup&gt;4&lt;/sup&gt;</td>
<td>305</td>
<td>76</td>
<td>77 (25)</td>
<td>99</td>
</tr>
<tr>
<td>Kollmannsberger, 2009&lt;sup&gt;5&lt;/sup&gt;</td>
<td>223</td>
<td>52</td>
<td>59 (26)</td>
<td>100</td>
</tr>
<tr>
<td>Clinical Stage I Seminoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van der Maase, 1993&lt;sup&gt;13&lt;/sup&gt;</td>
<td>261</td>
<td>48</td>
<td>49 (19)</td>
<td>99</td>
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<tr>
<td>Oliver, 2001&lt;sup&gt;14&lt;/sup&gt;</td>
<td>110</td>
<td>98</td>
<td>21 (19)</td>
<td>100</td>
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<tr>
<td>Germa-Llunch, 2002&lt;sup&gt;15&lt;/sup&gt;</td>
<td>233</td>
<td>23</td>
<td>38 (16)</td>
<td>100</td>
</tr>
<tr>
<td>Daugaard, 2003</td>
<td>394</td>
<td>60</td>
<td>69 (18)</td>
<td>100</td>
</tr>
<tr>
<td>Warde, 2005&lt;sup&gt;16&lt;/sup&gt;</td>
<td>421</td>
<td>98</td>
<td>64 (15)</td>
<td>100</td>
</tr>
<tr>
<td>Nichols, 2010 (submitted for publication)</td>
<td>313</td>
<td>34</td>
<td>47 (15)</td>
<td>100</td>
</tr>
</tbody>
</table>

Abbreviations: Pts, patients; FU, follow-up.
Table modified from Groll et al.<sup>8</sup>
THERAPY

The most important is the surgical removal of the testis, semicastration and its histological examination

St. I. - in the absence of vascular invasion: watch and wait
  - carboplatin monotherapy is also possible/seminoma/
  - maybe 25 Gy PAO radiotherapy/seminoma/
  - retroperit. lymph node operation (RPLND) /non-sem/
  - 2xBEP postop. chemotherapy /non-sem/

From St. II. - BEP chemotherapy is recommended
  - In St. III. even 6 cicles
PENILE CANCERS
Symptoms, origin

- Exophytic/infiltrative-ulcerated growth
- Pain, infection, bleeding, urination complaints may occur
- Enlarged inguinal lymph node, metastasis occur in 50%
- Most common on the glans
- Glans

![Image showing different symptoms and locations](image)

---

**Table:**

<table>
<thead>
<tr>
<th>Test</th>
<th>Preputium</th>
<th>Glans</th>
<th>Total</th>
</tr>
</thead>
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<tr>
<td>Rozan R, 1995 n=259</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>41</td>
<td>74</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Penile cancer TNM disease course

T<sub>X</sub> size of the primary tumour is unknown
T<sub>0</sub> no evidence of primary tumour
T<sub>is</sub> carcinoma in situ
T<sub>a</sub> non invasive verrucous carcinoma
T<sub>1</sub> the tumour invades the subepithelial connective tissue
T<sub>2</sub> the tumour invades corpus spongiosum or cavernosum
T<sub>3</sub> the tumour invades urethra or prostate
T<sub>4</sub> tumour invades other adjacent structures
Primary lymphatic region is the ipsilateral inguinal lymphatic region
Therapeutic options

- Complete surgical removal of the penis
- Block dissection of the inguinal lymph node
- 3D conformal teletherapy with concomitant chemotherapy until 60-65 Gy
- Brachytherapy
- In metastatic case Cisplatin-based chemotherapy
Radiotherapy

- Teletherapy
- Brachytherapy

Penile conservation is possible, because in case of stage I. tumour radiotherapy can be curative (90%)
In case of (possible) lymph node involvement elective or curative bilateral inguinal RT is necessary
Dose: 60-65 Gy / 6-7 week
Target volumes (penis±lymphatic region)

- In case of superficial lesion, contact superficial x-ray therapy is possible
- Bigger, but localised tumours: brachytherapy /e.g. “with larding”/
- Treatment of lymphatic region is also possible with high-energy teletherapy, but bolus is necessary!
  - Different technical methods
  - Dose: 60-65 Gy

Interesting technique: using a box full of water for dose homogenisation
Thank you for your attention!
Summary – kidney cancer

- Kidney cancer is often diagnosed in advanced stage, about 40% is asymptomatic.
- Metastasis can be observed at the time of diagnosis in 30% of the cases (mainly lung, lymph node, bone).
- Surgical removal of the kidney (nephrectomy) means the primary care even in metastatic cases!!!
- If the patient’s condition do not make the operation possible, histological examination is necessary, then maybe embolisation can be performed.
- Metastatic patients with clear cell carcinoma can receive new, biological therapy.
Memorise about the prostate cancer!

• Screening is performed with PSA and RDE, if PSA is elevated biopsy is needed
• In case of urination problem transurethral resection is performed
• In most of the cases it originates from peripheral region
• No treatment, only follow-up is needed in early stage (T1a)
• Examination contains of true pelvis MRI/CT and transrectal UH
• Extension of the prostate cancer correlates with PSA level
• Most common metastasis: bone
Memorise about the prostate cancer treatment!

- TAB (total androgen block) hormonotherapy can be used in case of prostate cancers
- TAB treatment is a combined hormonotherapy (anti-androgen and LHRH-analogue together)
- Teletherapy and brachytherapy can also be used
- Radioactive seed implantation is one kind of brachytherapy
- Cystitis, urethritis and diarrhoea are the acute side-effects of radiotherapy
- Later complications: scarring, ceased organ function, ulceration, stricture
Summary – bladder cancer

- Originates from urothelial cells that cover the whole urinary system
- Multiple regions are often involved simultaneously („due to dropping tumour cells”)
- Early and superficial tumours (T1):
  - transurethral resection (TUR)
  - after-treatment: bladder instillation and follow-up
- Muscular involvement (T2-T3):
  - surgical removal of the bladder (cystectomy)
  - alternatively: chemoradiotherapy
Memorise about testicular and penile cancers!

- Testicular cancers are the most common among young adults
- Very chemosensitive (Cisplatin)
- Also metastatic cases can often be cured!!!
- Radiotherapy can also be used in case of seminoma

- Penile conservation is possible in case of early tumours
- Radiotherapy can be curative in case of stage I. tumours (90%)
- The inguinal ones are the primary lymphatic regions