Large blocks in prostate and bladder pathology

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The history of the large block technique in radical prostatectomy and cystectomy

- The first large block evaluation of prostate and urinary bladder was performed more than half a century ago.¹
- During a period of 15 years, 45 cases were studied in this way.
- It was concluded that: „the perspective of bladder cancer obtained from these studies has been worth this investment of time and energy.”²

Large blocks in radical prostatectomy
A large block can provide important information

- In cases where
  - the tumour is not visible
  - its boundaries are not clear
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- A large slide can show the localization of the **microscopic extraprostatic spread** of the tumour in every cases
A large block can provide important information

- Determination of the localization and the extent of the **positive surgical margin** precisely, which is to be measured in millimetres.
A large block can provide important information

- Assessment of an **anteriorly localized tumour**
- better prognosis than that of a peripheral tumour
A large block can provide important information

- The quantitative assessment of nerve-sparing surgery
- Characterization of the resection surface quality
A large block can provide important information

- Possibility of measurement of the **tumour volume**
- Reporting of some quantitative measure of the tumour volume in a prostatectomy specimen is needed\(^4\)

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A more precise measurement of the tumour size

- **Computer-assisted measurements** are considered the most precise assessment of the tumour volume

- The previous computer programs have their limits

- We have developed a program which combines the tumour volume measurement with a mathematical approach to the Gleason score

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The most precise measurement of the tumour size

- The program on the classical drawing of Gleason
The most precise measurement of the tumour size

- The program on the classical drawing of Gleason
- Following exclusion of the luminal surface of the glands, division by the whole surface of the tumour will result in a ratio which we extrapolate to the density of tumour
- The tumour density can fit a mathematical approximation to the Gleason score
The most precise measurement of the tumour size

- Density values on a chart
A more precise measurement of the tumour size

- In our 65 prostate specimens, the median value of density correlated with density assessed in the Gleason drawing.
- Our preliminary examinations suggest that the volume combined with the density can be a more precise parameter than the volume alone.
- Differences can arise from the existence of a tertiary grade.
Large blocks in radical cystectomy
Current mortality rates of urinary bladder cancer in men

“The incidence and mortality rates in general have decreased in most western countries, but increased in some eastern European and developing countries.”

The samples of radical cystectomy

- Therapy of a muscle-invasive organ-confined tumour is radical cystectomy
- The most important information concerning radical cystectomy samples is the **stage**
  - prognosis
  - postoperative therapy
The samples of radical cystectomy

- Imaging technology does not give an accurate stage assessment


- The **pathological stage** is decisive

The current cut up protocol of radical cystectomy

- The most important step in the pathological work is the **selection of the areas** to be processed for microscopic examination.
- Current cut-up guidelines involve a significant degree of **subjectivity**.
- It is basically left to the **pathologist** to select the **areas** which may be important.
The limits of the current cut up protocol

- A microscopic extra-organ spread (pT3a) can be detected only incidentally
- Infiltration into the dense tissue of the prostate (from pT2 to pT4a) is most often invisible to the naked eye
- It is difficult to assess of dysplasia/in situ carcinoma
- Determination the involvement and distance of the circumferential resection margin is uncertain
- The verification of pT0 tumour is impossible
- The protocol is not useful in the assessment of tumour volume
- or to estimate the extent of a unicellular or tentacular infiltrating tumour edge
- or in the examination of tumour heterogeneity
Gross Dissection Protocol for Radical Cystectomy (GDPRC)

Gross Dissection Protocol for Radical Cystectomy (GDPRC)

- Removal of the urethral stump
- Orientational incision

Gross Dissection Protocol for Radical Cystectomy (GDPRC)

- The **basal block** (BB) serves for the evaluation of the bladder base and the prostate base in toto.
- Due to anteflexion of the axes of the prostate and the bladder, the transverse resection level of the urethra and the BB are not parallel.
- The wedge-shaped cross section made from the prostate yields a BB enclosed by parallel planes.

Gross Dissection Protocol for Radical Cystectomy (GDPRC)

- Processing of the BB:
- Completion of the orientational incision creates a right and a left portion
- This is followed by halving the right and left parts and trisecting the resulting quarters
- The 12 radial cut-offs can be placed into standard cassettes.

The GDPRC can be implemented in a flexible fashion

- The most frequent modification is visualization (reflection) in two cutting levels (blue double arrow)
- The lesion can be observed on adjacent cutting surfaces (red double arrow)
- The arrow indicates the BB
- The arrowheads shows the frontal processing of the dome

Gross Dissection Protocol for Radical Cystectomy (GDPRC)

Benefits of the GDPRC

The volume, pT3a, CRM and its distance can be determined
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Benefits of the GDPRC
Badder neck and prostate involvement can be determined
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Benefits of the GDPRC
The extent of dysplasia and *in situ* carcinoma can be determined
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The extent of dysplasia and *in situ* carcinoma can be determined.
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The extent of dysplasia and *in situ* carcinoma can be determined.
Benefits of the GDPRC
Stage pT0 can be identified with certainty

- hemosiderin and granulomatous area
- the entire preparation is tumour-free
The incidences of the pathological stages in the literature

The incidence determined on the basis of a large number of cases must reflect the actual incidence of 15,586 stages of 27,394 cystectomies presented in 15 publications from the period between 1971 and 2010.
Benefits of the GDPRC
Accurate determination of the pathological stage

<table>
<thead>
<tr>
<th></th>
<th>pT0</th>
<th>pTa</th>
<th>pTis</th>
<th>pT1</th>
<th>pT2</th>
<th>pT3</th>
<th>pT4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of cases (%)</td>
<td>12 (8.7)</td>
<td>1 (0.7)</td>
<td>4 (2.9)</td>
<td>21 (15.2)</td>
<td>29 (21)</td>
<td>48 (34.8)</td>
<td>23 (16.7)</td>
</tr>
<tr>
<td>Total no. of lymph nodes</td>
<td>240</td>
<td>13</td>
<td>64</td>
<td>398</td>
<td>517</td>
<td>840</td>
<td>327</td>
</tr>
<tr>
<td>Average no. of lymph nodes</td>
<td>20</td>
<td>13</td>
<td>16</td>
<td>21</td>
<td>39.4</td>
<td>39</td>
<td>29.5</td>
</tr>
<tr>
<td>No. of metastatic lymph nodes</td>
<td>13 (1.5%)</td>
<td>0</td>
<td>0</td>
<td>2 (0.5%)</td>
<td>18 (8.1%)</td>
<td>123 (28.7%)</td>
<td>58 (23.31)</td>
</tr>
</tbody>
</table>

The stage distribution in 138 consecutive radical cystectomy assessments with the GDPRC
The incidences of the pathological stages in the literature and with the GDPRC quite accurately reflected the statistical averages of the data based on a large number of cases.
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The incidences of the pathological stages in the literature and with the GDPRC

GDPRC quite accurately reflected the statistical averages of the data based on a large number of cases
In summary

- During the past 6 years, we have studied 206 cases in this way.
- „Preparation of the (large block) material for histologic examination is time-consuming and requires a high degree of skill, and the pathologist in turn must be willing to spend an appreciable amount of time in reviewing the material. From our standpoint, however, the perspective of bladder cancer (and prostate) obtained from these studies has been worth this investment of time and energy”

Thank you for your attention!