Challenging Role of Implementing Molecular Information at the Cancer Registry

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Background

• Staging classification system (TNM) characterizes the anatomic extent of the tumor

• Also biomarkers and other prognostic factors are used for decision making on individualised and personalized medicine
  • Structured information not (yet) available at the Cancer Registry
How to Retrieve Information?

• Linkage with other administrative databases → clinically relevant?
• Manual revision of the pathology reports
Pathology reports

Annually:
- ~ 2,300,000 records (structured)
- ~ 870,000 reports (unstructured plain text)

Developing innovative techniques

- Structure input text
- Derive patterns within structured data
- Compare the output to a reference dataset
- Automatic extraction
- Machine learning
Before automatic extraction: ~ 20% Gleason score availability

Conclusion: PPB: Poorly differentiated invasive adenocarcinoma, Gleason score VIII (IV + IV) 8 (4+4).

After automatic extraction: ~ 97% Gleason score availability (41,075 new diagnoses of prostate cancer)
Clinical information: ...

Macroscopy: ...

Microscopy: ...

Conclusion: PPB: Poorly differentiated invasive adenocarcinoma, **Gleason score VIII (IV + IV) 8 (4+4)**.
3. HER2-OVEREXPRESSIE:
Uitleg: score 0 à 1 is negatief, score 2+ is twijfelachtig + en score 3+ is positief
Controles:
- score 3+: technisch in orde.
- score 1+: technisch in orde.
- interne controle (niet-neoplastisch epitheel): negatief.
Resultaat:
- percentage cellen met volledige circumferentiële membraankleuring: >10 %.
BESLUIT:
4. HER2-overexpressie: Dako graad 1+. 
Negatief.
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Receptorstatus – Breast Cancer (1)

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BESLUIT:
4. **HER2**-overexpressie : Dako graad 1+.
Negatief.
Receptor status – Breast Cancer

Dataset incidence year 2014

<table>
<thead>
<tr>
<th>Marker</th>
<th>Values</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER</td>
<td>Pos, Neg, Unknown</td>
<td>94%</td>
</tr>
<tr>
<td>PR</td>
<td>Pos, Neg, Unknown</td>
<td>93%</td>
</tr>
<tr>
<td>HER2 (IHC)</td>
<td>0, 1+, 2+, 3+, Unknown</td>
<td>92%</td>
</tr>
<tr>
<td>HER2 (ISH)</td>
<td>Pos, Equivocal, Negative, Carried out no result, Unknown</td>
<td>93%</td>
</tr>
</tbody>
</table>
Oropharyngeal cancer – HPV

- Prognostic impact of HPV status
- New TNM classification 8th edn.: p16+/p16-
- International cancer registries: no structured HPV data

<table>
<thead>
<tr>
<th>Manual revision</th>
<th>Algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV/p16 performed and results known</td>
<td>16.5%</td>
</tr>
<tr>
<td>HPV/p16 + prevalence</td>
<td>50%</td>
</tr>
</tbody>
</table>

1. International Cancer Registries: no structured HPV data.
Oropharyngeal cancer – HPV (2)

15 – 69 years

HPV+

HPV-

15 – 69 years

HPV+

HPV-

4 CAPIA SELECTA
4.1 Patient frailty and HPV status in oropharyngeal cancer: relation to age and impact on survival
Future ...

- Molecular markers – other cancer types
- Other prognostic factors – tumor size, lymph nodes, ...
- Structured information via Healthdata.be platform

- Enriched database: Quality of Care projects

- Stakeholders
  - Authorities
  - Physicians
  - Researchers
  - Patients
  - ...