Clinical Utility of BSI in Sweden

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Agenda

• Incidence and mortality of prostate cancer in Sweden
• National Prostate Cancer Registry in Sweden (NPCR)
• Guidelines for staging and monitoring of bone metastases
• On-going and future activities related to BSI
In Sweden 1/6 will be diagnosed with prostate cancer

Incidence 10 000
Mortality 2 400

Figure 2a: The ten most frequent cancer sites, males

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>33.4</td>
</tr>
<tr>
<td>Skin, excl melanoma</td>
<td>10.0</td>
</tr>
<tr>
<td>Colon</td>
<td>7.0</td>
</tr>
<tr>
<td>Trachea, bronchus, lung &amp; pleura</td>
<td>6.7</td>
</tr>
<tr>
<td>Urinary organs, excl. kidney</td>
<td>6.4</td>
</tr>
<tr>
<td>Malignant melanoma of skin</td>
<td>5.0</td>
</tr>
<tr>
<td>Rectum and anus</td>
<td>4.1</td>
</tr>
<tr>
<td>Non-Hodgkin lymphoma</td>
<td>3.0</td>
</tr>
<tr>
<td>Kidney</td>
<td>2.3</td>
</tr>
<tr>
<td>Nervous system</td>
<td>2.2</td>
</tr>
</tbody>
</table>

OFFICIAL STATISTICS OF SWEDEN
Statistics – Health and Medical Care
Cancer Incidence in Sweden 2009

Socialstyrelsen
National prostate cancer registry in Sweden

On-line reporting

>120 000 PCa cases in 2012

Capture rate 98%
National prostate cancer registry in Sweden
PSA level at diagnosis

PSA 4-10

PSA >100
Guidelines for prostate cancer in Sweden 2014

Risk stratification according to D´Amico (modified)

**Intermediate risk**
- \( cT2b \)
- and/or
- Gleason 7
- and/or
- \( PSA = 10-19,9 \)

**High risk**
- \( cT2c-T3 \)
- and/or
- Gleason 8-10
- and/or
- \( PSA \geq 20 \)
Bone scan is the golden standard for M-staging

High-risk patients: always

Intermediate risk: before treatment

>73% undergoes bone scan
Castration-resistant prostate cancer

- Clarify dissemination (symptoms?)
- Clinical trials available?
- Discuss at MDT
- On-line registration in NPCR (new)
- Individualized follow-up - QoL
Prostate cancer disease continuum: mCRPC treatment options 2014

We need to predict and evaluate response
Interpreting PSA declines in the context of novel targeted therapies must be done with caution, based on proposed mechanism of action:

- After anti-androgen treatment (e.g., enzalutamide, abiraterone), PSA transcripts are quickly downregulated because PSA expression is directly regulated by androgen receptors.
- Sipuleucel-T has shown significant overall survival benefit with no PSA change, raising questions about the value of PSA response for non-hormonal non-cytotoxic drugs.

Guidelines state that PSA response data should be viewed together with other clinical data:

- Recent studies had radiographic progression and not PSA as primary endpoint.
For patients with advanced, metastatic prostate cancer that has been treated maximally with hormone therapy to control the effects of the male hormone, androgen. The nomogram predicts the survival probability one to two years later. To learn more, visit our frequently asked questions.

Enter Your Information

To gather the information required below, download our PDF worksheet.

<table>
<thead>
<tr>
<th>Current Age</th>
<th>75 (40 to 85 yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPS (Karnofsky Performance Status)</td>
<td>80</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>13 (6 to 17 g/dl)</td>
</tr>
<tr>
<td>PSA</td>
<td>350 (0.01 and 8450 ng/ml)</td>
</tr>
<tr>
<td>LDH (Lactate Dehydrogenase)</td>
<td>1400 (116 to 1955 IU/L)</td>
</tr>
<tr>
<td>ALK (Alkaline Phosphatase)</td>
<td>60 (19 to 3079 IU/L)</td>
</tr>
<tr>
<td>Albumin</td>
<td>3 (2.6 to 5.2 g/dl)</td>
</tr>
</tbody>
</table>

Your Results

Learn more about your results below.

<table>
<thead>
<tr>
<th>Survival Probability</th>
<th>1 Year</th>
<th>17%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 Year</td>
<td>2%</td>
</tr>
<tr>
<td>Median Survival Months</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

More biological tools included!

www.nomograms.org
Halabi nomogram – predicting OS probability

Updated Prognostic Model for Predicting Overall Survival in First-Line Chemotherapy for Patients With Metastatic Castration-Resistant Prostate Cancer

Susan Halabi, Chen-Yen Lin, W. Kevin Kelly, Karim Fizazi, Judd W. Moul, Ellen B. Kaplan, Michael J. Morris, and Eric J. Small

Opioid use, ECOG

Hemoglobin, PSA, ALP, LDH

Disease site: Lymph-node, bone, visceral

An online calculator is available at:
Exini Bone ™
Manual and automated BSI measurements were strongly correlated \((r = 0.80)\), correlated more closely \((r = 0.93)\) when excluding cases with BSI scores 10 (1.8%), and were independently associated with PCa death \((p < 0.0001\) for each) when added to the prediction model.

Predictive accuracy of the base model (C-index: 0.768; 95% confidence interval [CI], 0.702–0.837) increased to 0.794 (95% CI, 0.727–0.860) by adding manual BSI scoring, and increased to 0.825 (95% CI, 0.754–0.881) by adding automated BSI scoring to the base model.
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**This predictive imaging biomarker may prove complementary to PSA and ALP for an objective treatment response evaluation and prediction of survival in the management of patients with prostate cancer.**
Clinical utility of BSI in Sweden

• Exini bone™ implemented at prostate cancer centers

• Support decision-making to initiate and continue CRPC treatment.

• Retrospective studies on value of BSI to predict outcome and response to treatment published (ADT)

• Retrospective multicenter studies on-going (abiraterone, enzalutamide, Ra-223, tasquinimode, cabazitaxel)

• Prospective trials initiated

• BSI report in National Prostate Cancer Registry
• A paradigm shift: New treatment options in CRPC are pushing us towards a need for quantification of tumor burden

• BSI provides an opportunity to start utilizing quantitative measurement of bone metastases

• We can then better select "suitable patients"

• We can more objectively evaluate response to treatment
Conclusions II

• Bone scan is the golden standard in monitoring patients with bone metastases

• BSI provides additive value in using bone scan
  – Useful at MDT conferences

• BSI can be integrated in prediction models with multiplexing of clinical characteristics and other biomarkers