Background and Objective

- **Bone scintigraphy (Bone Scan):** Bone scans are image studies commonly used to assess metastatic spread to the skeleton.
- **Bone Scan Index (BSI):** A quantitative measurement that reflects the extension of tumor in bone as a percent of the total skeletal mass calculated from Bone Scans.
- **What can we use it for?** BSI is a prognostic biomarker that can be used to prognose survival in prostate cancer (PCa) patients.
- **Why is it more interesting now?** Recently, an automated method to calculate BSI was developed, which makes it feasible to use in clinical routine.
- **Which is the purpose of this study?** To evaluate the prognostic value of BSI as an outcome measure in high-risk PCa patients during androgen deprivation therapy (ADT).

Patients and Methods

- **100 Prostate Cancer Patients**
  - Consecutive group
  - Retrospective analysis
  - High risk at the time of diagnosis: Clinical tumor stage (cT) T2c/T3/T4, Gleason score (GS) 8-10 or Prostate-specific antigen level (PSA) >20 ng/mL.
- **Whole-body bone scans**
  - At the time of diagnosis—before treatment
  - At follow up—during hormonal therapy
  - BSI calculated using the automated software EXINI Bone™
- **Clinical and Survival Data**
  - cT stage, GS, PSA, treatment and survival data were collected from computerized medical records.

Results

A) Both BSI at baseline and follow-up during treatment are significantly associated with survival (p<0.001).

Kaplan Meier curves showing patient-survival probability stratified by Bone Scan Index (BSI) groups at baseline (1) and at follow up (2):

B) When adding follow-up BSI to a prognostic base model (age, cT, GS and PSA) the concordance index (C-index) increased both at baseline and at follow-up (p=0.003 and p=0.012 respectively):

<table>
<thead>
<tr>
<th>Prognostic model for prediction of overall survival AT BASELINE</th>
<th>C-index</th>
<th>Prognostic model for prediction of overall survival AT FOLLOW UP</th>
<th>C-index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classical model (Age, PSA, clinical tumor stage, Gleasson score)</td>
<td>0.77</td>
<td>Classical model (Age, PSA, clinical tumor stage, Gleasson score)</td>
<td>0.76</td>
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<tr>
<td>Classical model + BSI</td>
<td>0.81</td>
<td>Classical model + BSI</td>
<td>0.79</td>
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<td>p&lt;0.003</td>
<td></td>
<td>p=0.012</td>
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</tbody>
</table>

Conclusions

- **BSI** is a useful imaging biomarker that adds prognostic value in outcome evaluation of PCa patients with bone metastases during ADT.
- Calculation of BSI values could thus help not only with risk stratification of PCa patients at the time of diagnosis but also with evaluation of the post-treatment prognosis during follow-up of high-risk patients.
- **BSI** could be a valuable complement to PSA and other traditional methods for risk stratification in the management of newly diagnosed PCa patients and during follow up process.
- To summarise, automated BSI is a promising new imaging biomarker that offers objective quantitative information that may be a useful tool in the decision-making process for personalised treatment of high-risk PCa patients during ADT.