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Bone Scan Index: A Strong Predictor of Outcome in Metastatic Hormone Naive Prostate Cancer Patients

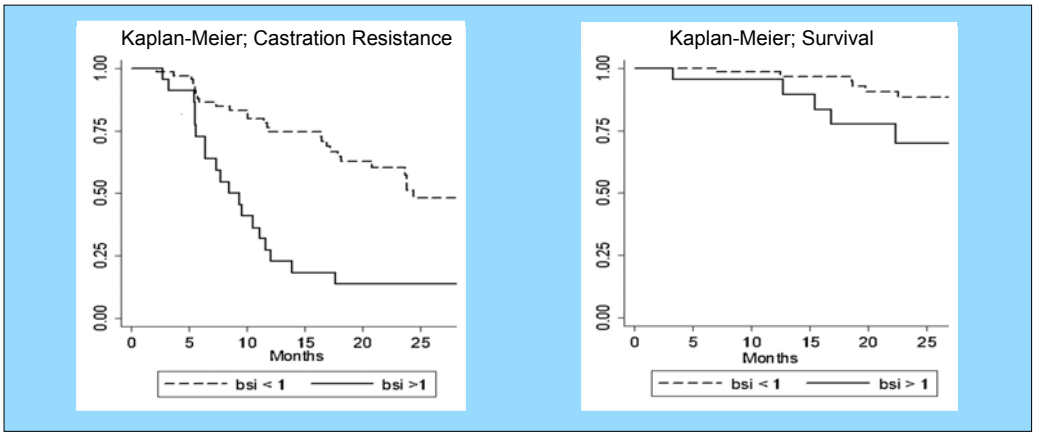
Janne Rasmussen[1], Mads Hvid Poulsen[2], Allan Johansen[1], Lars Lund[2], Poul F. Høilund-Carlsen[1], Oke Gerke[1,3], Lars Edenbrandt[4]
Depts. of Nuclear Medicine[1], and Urology,[2] Odense University Hospital, Odense, DENMARK
Dept. of Business and Economics[3], University of Southern Denmark, Odense, DENMARK.
Nuclear Medicine Unit[4], Skåne University Hospital, Lund University, Malmö, SWEDEN.
Lars Edenbrandt is employed by and shareholder in EXINI Diagnostics AB, Lund, Sweden.

Purpose

Prostate cancer patients are M-staged by whole-body bone scintigraphy (WBS) and categorized as M0 or M1. Within the M1 group, there is a wide range of clinical outcome. The Bone Scan Index (BSI) was introduced a decade ago providing quantification of bone metastases by estimating the percentage of bone involvement. Being too time consuming, it never gained widespread clinical use. In a retrospective material, we used a novel computer-assisted software for automated detection/quantification of bone metastases to evaluate the BSI for prediction of castration resistance and prostate cancer specific survival. The term castration resistance is used when the disease becomes resistant to androgen suppression.

Subjects & methods

A total of 88 patients with prostate cancer awaiting initiation of androgen deprivation due to metastases (bone, lymph nodes, or both) were included. WBS was performed prior to androgen deprivation using a two-headed gamma camera ^{99m}Tc-MDP/DPD. BSI was obtained using the automated platform EXINI bone (EXINI Diagnostics AB, Lund, Sweden). In Cox proportional hazard models, time to castration resistance and prostate cancer specific survival were modelled as the dependent variables, whereas PSA, Gleason score and BSI were used as explanatory factors. For Kaplan-Meier estimates, BSI groups were dichotomously split into: BSI <1 and BSI ≥ 1.



Results

The mean age of the patients was 72 years (range 52-92), the median PSA level was 73 µg/L (range 4-5740), the average Gleason score was 7.7 (range 5-10), and the mean BSI was 1.0 (range 0-9.2). During a mean follow-up of 26 months (range 8-49), 48 patients became castration resistant and 15 died, the majority (13) of prostate cancer.

Regarding time to castration resistance, only BSI proved statistically significant (HR=1,45; 95%CI: 1.22-1.74).
Regarding prostate cancer specific survival, again only BSI was statistically significant (HR=1,34; 95%CI: 1.07-1.67).

Multivariate analysis: **Castration Resistance**		
	Hazard ratio	p-value
PSA	1.001	0.47
Gleason	1.271	0.07
BSI	1.452	<0.0005

Multivariate analysis: **Survival**		
	Hazard ratio	p-value
PSA	1.000	0.11
Gleason	1.015	0.95
BSI	1.339	0.01

Conclusion

BSI obtained by a novel automated computer-assisted algorithm appears to be a useful predictor of outcome with regard to castration resistance and prostate cancer specific survival in patients with metastatic prostate cancer.

Nuclear Medicine
Odense University Hospital Denmark