Utility of Bone Scan Quantitative Parameters for the Evaluation of Prostate Cancer Patients

By

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ABSTRACT

Prostate Cancer is one of the common cancers in the world. It could primarily disseminate to the bone and can lead to death. In order to address its life threatening distant metastasis it is important to diagnose it earlier for timely treatment. Bone metastasis is usually diagnosed deploying bone scan imaging. However interpretation of the bone scans is a tedious procedure for the physicians and often leads to misinterpretation either as overestimation or underestimation of the metastasis. To minimize the risk of misinterpretation, one of the accurate methods is quantitative analysis of the bone scans in order to ascertain, whether a metastatic lesion is present or not. There are several methods to-date which can be used to analyse the extent of such lesions. For example, quantitation of the bone scan using quantitation methods i-e % BSI (Bone scan index), % PAB (Positive area on bone scans), EOD (extent of disease) and BLS (Bone lesion scoring). These methods are used for prognostication of survival and response to treatment on serial scans. The extent of fidelity of these all available quantitatation methods is not clear when used altogether in a single baseline bone scan. Therefore, the aim of this study is to use all available bone scan quantitative parameters on a baseline bone scans and to compare them all. Moreover, an improved methodology is introduced by comparing the results with the individual methods reported in literature and with PSA levels.

141 patients with histopathologically proved prostate cancer were chosen to implement all the four quantitative parameters on individual baseline bone scans. After which, for the calculation of risk of progression or regression of disease and survival rate, 40 patients were chosen from the same dataset. A serial follow up scan was performed to calculate 2-years survival rate. The dataset was again analysed using the same four bone scan quantitative

parameters and the cut off were calculated as **% BSI**: 1, **% PAB**: 0.5, **EOD**: grade 0 & 1, grade2, 3 & 4 and **BLS**: 5.

It was found out that the %PAB and % BSI methods are good prognostic indicator in baseline scans. Moreover the prostate cancer patients with the cut off % BSI >1, %PAB > 0.5, BLS >5 and EOD with grade 2, 3 & 4 showed increase risk of disease progression and less survival.