

Clinical Study

Diagnostic Role of ^{18}F -FECH-PET/CT Compared with Bone Scan in Evaluating the Prostate Cancer Patients Referring with Biochemical Recurrence

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^{18}F -FECH-PET/CT has been proved to be an imaging agent for prostate carcinoma. However, its role in detecting the bone metastases is still blurred owing to the lack of related studies. The purpose of our study was to assess the efficacy of PET with ^{18}F -ethylcholine in assessing the bone status and to compare the results with that of conventional bone scan findings. For this purpose, we selected 37 patients (mean age 69 ± 7), who had been referred for restaging purposes due to biochemical recurrences and underwent both ^{18}F -FECH-PET/CT and bone scan in a short interval. Generally 18 patients out of 37 patients referred with biochemical relapse were confirmed to have bone involvement. From 18 confirmed bone involvement cases, ^{18}F -FECH-PET/CT identified correctly the bone involvement in 15 cases with overall sensitivity of 83.3%. On the other hand, bone scan identified 17 out of 18 confirmed cases with overall sensitivity of 94.4%. The lesion-related results show that the sensitivity of each investigation differs with the anatomical regions, and by comparing both results, ^{18}F -FECH-PET/CT was mostly superior to bone scan; however, without a statistical significance ($P > 0.1$). In conclusion, no significant gain in sensitivity was achieved using bone scan compared with ^{18}F -FECH-PET/CT.

1. Introduction

Carcinoma of the prostate is the most common malignancy in men with increased incidence rates owing to the population ageing and the improvement of diagnostic procedures.

The early detection of the bone metastases is of value in making decision regarding the treatment plan, which may vary extremely according to the bone status.

The likelihood of the bone metastases at the first diagnosis varies with the histological score and serum level of prostate-specific antigen, and it is possible to some extent to estimate the degree of tumor spread in the light of the PSA value. Bone involvement is much less frequently involved with low PSA level, so that the bone staging is not recommended with PSA less than 10 ng/mL, except if there are known bone disorders which may later cause false positive findings [1–3]. However, in patients with PSA relapse after primary therapy

it is not easy to be guessed based on PSA values whether the bone involvement or another involvement is behind a PSA rising.

In established skeletal involvement, there is a need of effective imaging method to monitor the status progress. Bone scan is the widely used screening technique for assessing the bone status in the most malignancies, and it shows mostly high sensitivity in detecting the bone involvement. However, it faces a serious disadvantage represented by the low specificity. PET/CT with ^{18}F -fluorodeoxyglucose (FDG) is known to have general limitation in prostate cancer. PET with radiolabeled choline such as ^{18}F -FECH-PET was found to be an effective method in diagnosis of primary and recurrent PCA tumors as well [4, 5]. Two possible mechanisms have been proposed to explain the increased choline uptake in prostate cancer cells. The first is increased cell proliferation in tumors, because choline is a precursor for the biosynthesis