Prostate cancer-specific PET radiotracers: A review on the clinical utility in recurrent disease.

Evans JD, Jethwa KR, Ost P, Williams S, Kwon ED, Lowe VJ, Davis BJ.

Prostate cancer-specific positron emission tomography (pcPET) has been shown to detect sites of disease recurrence at serum prostate-specific antigen (PSA) levels that are lower than those levels detected by conventional imaging. Commonly used pcPET radiotracers in the setting of biochemical recurrence are reviewed including carbon 11/fludeoxyglucose 18 (F-18) choline, gallium 68/F-18 prostate-specific membrane antigen (PSMA), and F-18 fluciclovine. Review of the literature generally favors PSMA-based agents for the detection of recurrence as a function of low PSA levels. Positive gallium 68/F-18 PSMA positron emission tomography/computed tomography scans detected potential sites of recurrence in a median 51.5% of patients when PSA level is <1.0 ng/mL, 74% of patients when PSA level is 1.0 to 2.0 ng/mL, and 90.5% of patients when PSA level is >2.0 ng/mL. Review of carbon 11/fludeoxyglucose 18 (F-18) choline and F-18 fluciclovine data commonly demonstrated lower detection rates for each respective PSA cohort, although with some important caveats, despite having similar operational characteristics to PSMA-based imaging. Sensitive pcPET imaging has provided new insight into the early patterns of disease spread, which has prompted judicious reconsideration of additional local therapy after either prostatectomy, definitive radiation therapy, or postprostatectomy radiation therapy. This review discusses the literature, clinical utility, availability, and fundamental understanding of pcPET imaging needed to improve clinical practice.

Copyright © 2017 The Authors. Published by Elsevier Inc. All rights reserved.