68Ga-prostate-specific Membrane Antigen Positron Emission Tomography/Computed Tomography for Prostate Cancer Imaging: A Narrative Literature Review.

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Abstract
The 68Ga-prostate-specific membrane antigen (68Ga-PSMA) has been recently developed to be used, as a ligand, in positron emission tomography/computed tomography (PET/CT) prostate cancer imaging, to detect prostate disease. The main objective of this review was to collect data and findings from other studies and articles to assess, theoretically, if 68Ga-PSMA PET/CT is a more appropriate prostate cancer diagnostic technique in comparison with others available such as CT, 18F-fluoro-2-deoxyglucose PET/CT, or 18F-fluoromethylcholine (18F-choline) PET/CT. For that purpose, PubMed, the online scientific articles' database, was consulted where the keywords "PSMA" and "PET" were used to find relevant articles. The clinicaltrials.gov, clinical trials' database, was also consulted where the keywords “68Ga-PSMA" and "prostate" were used to search clinical trials. Based on the reviewed scientific literature, several studies were conducted to assess and compare the 68Ga-PSMA PET/CT detection rate in prostate cancer with other available techniques. One of those studies, conducted by Giesel et al., concluded, within study sample, that 75% of patients with lymph nodes detected by 68Ga-PSMA PET/CT would have not been identified using other conventional morphological criteria based techniques. In Eiber et al.'s study, 68Ga-PSMA PET detected prostatic disease findings in 67% of patients with prostate-specific antigen levels <1 ng/mL, when compared with choline-based PET that presented detection rates between 19% and 36%. In Bluemel et al.'s study, 68Ga-PSMA identified positive prostatic disease in 43.8% of the patients with negative findings in F-choline PET/CT. Findings from this review demonstrate that 68Ga-PSMA PET/CT is more effective in detecting metastases, lymph nodes, and recurrent prostate cancer when compared to 18F-choline-based PET/CT and CT. 68Ga-PSMA PET/CT presents also more imaging contrast and can be more cost-effective. 68Ga-PSMA has already been subjected to first-in-human trials, and it is now being tested in Phase II and III trials.

KEYWORDS: 68 Ga-prostate-specific membrane antigen; positron emission tomography/computed tomography; prostate cancer