Evaluation of Hybrid $^{68}$Ga-PSMA Ligand PET/CT in 248 Patients with Biochemical Recurrence After Radical Prostatectomy.

The expression of prostate-specific membrane antigen (PSMA) is increased in prostate cancer. Recently, $^{68}$Ga-PSMA (Glu-NH-CO-NH-Lys-(Ahx)-(68)Ga(HBED-CC)) was developed as a PSMA ligand. The aim of this study was to investigate the detection rate of $^{68}$Ga-PSMA PET/CT in patients with biochemical recurrence after radical prostatectomy. Two hundred forty-eight of 393 patients were evaluable for a retrospective analysis. Median prostate-specific antigen (PSA) level was 1.99 ng/mL (range, 0.2-59.4 ng/mL). All patients underwent contrast-enhanced PET/CT after injection of 155 ± 27 MBq of $^{68}$Ga-PSMA ligand. The detection rates were correlated with PSA level and PSA kinetics. The influence of antihormonal treatment, primary Gleason score, and contribution of PET and morphologic imaging to the final diagnosis were assessed. Two hundred twenty-two (89.5%) patients showed pathologic findings in $^{68}$Ga-PSMA ligand PET/CT. The detection rates were 96.8%, 93.0%, 72.7%, and 57.9% for PSA levels of $\geq$2, 1 to $\leq$5 ng/mL/y, respectively, no significant association could be found for PSA doubling time (82.7%, 96.2%, and 90.7% in $\geq$6, 4-6, and $\leq$8),
detection efficacy was significantly increased (P = 0.0190). No significant difference in detection efficacy was present regarding antiandrogen therapy (P = 0.0783). Hybrid (68)Ga-PSMA ligand PET/CT shows substantially higher detection rates than reported for other imaging modalities. Most importantly, it reveals a high number of positive findings in the clinically important range of low PSA values (<0.5 ng/mL), which in many cases can substantially influence the further clinical management.