OBJECTIVE: To i) map the recurrence pattern of PCa early biochemical recurrence (BCR) after radical prostatectomy with $^{68}$Ga-PSMA-11 PET/CT in patients with serum PSA levels <1 ng/ml, ii) determine how often consensus clinical target volumes (CTV) based on the Radiation Therapy Oncology Group (RTOG) guidelines cover $^{68}$Ga-PSMA-11 PET/CT-defined disease, and iii) assess the potential impact of $^{68}$Ga-PSMA-11 PET/CT on SRT. Patients and Methods: This is a post-hoc analysis of an intention-to-treat population of 270 patients who underwent $^{68}$Ga-PSMA-11 PET/CT at 4 institutions for BCR after prostatectomy without prior radiotherapy at PSA<1 ng/mL. RTOG consensus CTV that included both the prostate bed and pelvic lymph nodes were contoured on the CT dataset of the PET/CT by a radiation oncologist blinded to the PET component. $^{68}$Ga-PSMA-11 PET/CT images were analyzed by a nuclear medicine physician. PSMA-positive lesions not covered by planning volumes based on the consensus CTV were considered to have a major potential impact on treatment planning. Results: The median PSA at the time of $^{68}$Ga-PSMA-11 PET/CT was 0.48 ng/ml (range 0.03-1). One-hundred-thirty-two/270 patients (49%) had a positive $^{68}$Ga-PSMA-11 PET/CT. Fifty-two/270 (19%) had at least one PSMA-positive lesion not covered by the consensus CTV. Thirty-three/270 (12%) had extra-pelvic PSMA-positive lesions and 19/270 (7%) had PSMA-positive lesions within the pelvis but not covered by consensus CTV. The two most common $^{68}$Ga-PSMA-11 PET-positive lesion locations outside the consensus CTV were bone (23/52, 44%) and perirectal lymph nodes (16/52, 31%). Conclusion: Post-hoc analysis of $^{68}$Ga-PSMA-11 PET/CT implies a major impact on SRT planning in 52/270 patients (19%) with PCa early BCR (PSA<1.0 ng/ml). This justifies a randomized imaging trial of SRT with or without $^{68}$Ga-PSMA-11 PET/CT investigating its potential benefit on clinical outcome.