Impact of Intraoperative Frozen Section (NeuroSAFE) during robotic radical prostatectomy on rates of nerve-sparing and positive margins in patients with preoperative mpMRI and PSMA PET/CT: Initial experience

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Introduction & Objectives: To present the initial experience of NeuroSAFE frozen section technique in robotic radical prostatectomy (RARP).

Materials & Methods: Between April 2019-December 2020, 38 patients with prostate cancer underwent initial bilateral nerve sparing RARP with intraoperative frozen section by NeuroSAFE technique. 36 patients had preoperative multiparametric MRI and 23 had a prostate-specific membrane antigen positron emission tomography/computed tomography (PSMA PET/CT). Neurovascular bundles (NVBs) were resected in case of intraoperative positive surgical margin (PSM) at frozen section analysis.

Results: Mean patient age was 63 years and the mean PSA value was 6.2 ng/ml. At final pathology, organ-confined and non-organ-confined disease were present in 22 and 16 patients, respectively. In 76 NeuroSAFE procedures, PSM was detected in 10 patients (26.3%; pT2=3, pT3a=3, pT3b=4) unilaterally. Subsequent secondary NVB resection revealed residual cancer in only two of the resected NVBs at final pathology (one GG3 and the other GG5). In the 8 patients where no tumor was present in the resected NVB, PSM was <4mm in five patients and GG was 1-2 in seven patients. There were no PSMs at NeuroSAFE specimen in final pathology (100% accuracy). Four patients with negative NeuroSAFE on both sides and one of the 10 patients with positive NeuroSAFE (one of the 2 with tumor in resected NVB) had PSM in the main specimen (outside NeuroSAFE) at final pathology. PSM at NeuroSAFE and subsequent secondary resection of the NVB was recorded in seven of 16 pT3 patients (43.7%). In total, mpMRI (n=36) correctly predicted ECE in 9 of 14 pT3 patients (sensitivity 64.2%) and was false positive in 4 of 22 pT2 patients (specificity 81.8%); mpMRI accuracy for detection of ECE was 75%. PSMA PET/CT (n=23) missed ECE in 10 of 12 patients (sensitivity 16.7%) and was false positive in 4 of 11 pT2 patients (specificity 63.6%); PSMA PET/CT accuracy for detection of ECE was 39%.

Conclusions: NeuroSAFE technique increases the rate of nerve-sparing during RARP both in cT2 and cT3 patients with pre-operative mpMRI. PSMA PET-CT alone had a low accuracy for the prediction of ECE in our series. The oncological impact of presence versus absence of tumor in resected NVBs needs to be analyzed further in larger series with longer follow-up.